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Does Publicness Matter? A Mixed Method Analysis Identifying and Measuring Institutional Contributions to State Goals for Public Higher Education

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Abstract

States founded, control, and fund public postsecondary institutions because higher education helps meet state goals. Public institutions of higher education provide considerable public benefits to states, but these benefits have not been systematically measured. As a result, public conversations about the broad value proposition of higher education do not center the public benefits produced by institutions. Using a framework of empirical and realized publicness, this exploratory sequential mixed-methods study used content analysis of state agency mission and vision statements to identify state goals for public higher education. Quantitative measurements of institutional contributions to common state goals for higher education were developed using exploratory factor analysis. This study examined the extent to which public institutions such as research institutions, regional comprehensive institutions, Historically Black Colleges and Universities, and enrollment-based Minority Serving institutions provide realized publicness outcomes related to states' goals for higher education. Random-effects and fixed-effects regression models were used to test the impacts of financial publicness, state governance structures, and state accountability on institutional realized publicness outcomes. State goals for public higher education's contributions to society centered around providing broad access to affordability education regardless of a student's demographic background, ensuring equal success for all students and boosting state attainment, educating the state's workforce and providing economic development, and engaging with their communities and providing community development. The various contributions of public institutions to each of these state goals varied by the type of institution and, to a certain extent, varied based on the empirical publicness of the institution. Notably, financial publicness positively impacts institutional access and affordability incomes, and increased state authority has mixed and sometimes negative impacts on access, affordability, and workforce outcomes. This evidence indicates that the long-term trend toward privatization in higher education revenues negatively affects some of states' primary purposes for higher education. As one of the first analyses of publicness in higher education, this study provides empirical evidence about the connection between publicness and institutional outcomes, which may aid state policymakers as they consider changes in their funding allocations, governance structure, and measures of accountability for higher education.

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Keywords: *realized publicness, public benefits, higher education policy, state postsecondary goals, value of higher education, exploratory sequential mixed methods*

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Chapter One. Introduction

Public institutions of higher education exist today because previous generations believed that higher education served a public purpose to improve society. For a long time, it was commonly understood that states publicly fund higher education institutions because they promote social and economic wellbeing, therefore serving the state's interests (Enders & Jongbloed, 2007; Singh, 2012; J. Williams, 2016). Higher education's public purposes include developing local communities, providing an education for all citizens regardless of their life circumstances, and developing a state's workforce and economy (Lingenfelter, 2018). In the 21st century, however, higher education is caught in a challenging cycle of declining state funding, rising costs, and an increasingly negative public perception (Brown, 2018; Jones, 2018; Tierney, 2006). Despite widespread societal or public good benefits of higher education, recent trends show that policymakers and the public are primarily focused on higher education as a private good and its potential to facilitate individual economic benefits (Carnevale et al., 2019; Enders & Jongbloed, 2007; Third Way, 2022; Trammel, 2005; G. Williams, 2016). In part, this trend is due to the changing structure of funding for public institutions of higher education (Carey & Schneider, 2010; Tierney, 2006). Once primarily funded by states, public institutions are now increasingly reliant on student tuition and other revenue sources (Laderman & Weeden, 2020). The shift to tuition revenues rather than state

funding has led to widespread concerns about affordability and the economic value of higher education (Brown, 2018; Friedman, 2019; Jackson, 2017; Kirp, 2019; Long, 2010). At the same time, there is concern that institutions are focusing more and more on increasing tuition revenue and less on meeting state goals for higher education (Carey & Schneider, 2010; Jaquette, 2019; Jaquette & Curs, 2015). States have broadly responded by increasing accountability measures such as the use of performance funding (Long, 2010), but little evidence exists to tell us how institutions are responding to changing state context as states offer less funding but require more accountability (Carey & Schneider, 2010; Fryar, 2012; Tierney, 2006).

As funding for public higher education has shifted from the state to individual students which has privatized the system, scholars and higher education professionals are increasingly concerned about what this privatization of higher education will mean for institutional behavior and accountability for state goals (Ehrenberg, 2006; Travis, 2012). Privatization scholars argue that as institutions become more privately funded, they focus less on state goals to provide an education for all citizens, further develop the state's economy, and increase civic engagement (Carey & Schneider, 2010; Lyall & Sell, 2006; McClure et al., 2020). Scholars have situated the privatization of higher education as a manifestation of neoliberalism, an ideology that reshapes our understanding of the public sphere to be a space to promote economic and individualistic goals (Harvey, 2005; Saunders, 2007). Neoliberalism drives free-market institutional behaviors that focus primarily on economic goals like revenue generation, to the exclusion of a focus on public goals (Saunders, 2013; Slaughter & Rhoades, 2009).

Despite concern over the impacts of neoliberalism and privatization on higher education, the impacts on public institutions are not well understood (Fryar, 2012). Researchers have found links between the level of state appropriations for public higher education and some student outcomes, but such studies generally do not consider whether the institutions were able to offset state funding reductions by increasing other revenue sources, or if they faced declines in total operating revenue which may be more impactful on student outcomes than changes in state funding alone (Deming & Dynarski, 2009; Deming & Walters, 2017; Jaquette & Curs, 2015; Laderman et al., in press; Zhao, 2018). In addition, there is little evidence to show if there is any relationship between the proportion of state funding and an institution's ability to meet state goals (Enders & Jongbloed, 2007). We do not know, for example, what this privatization of higher education means for institutions or states as Fryar (2012) wrote,

> Despite the widespread concern over the move toward privatization in higher education, one must ask whether it will actually matter…what evidence do we have—either theoretical or empirical—that privatization will substantially affect institutions, either in management, operation, or performance. (p. 524)

Due to the lack of empirical evidence about the impacts of changing funding sources on institutional behavior and outcomes, advocates for the vast public benefits of higher education have struggled to articulate the importance of public funding to protect the non-economic benefits of a public system of higher education (Singh, 2012; Trammel, 2005). In part, this may be because we lack information about why states fund higher education in the first place, which raises the question of what a state's goals are for higher education. Limited research has attempted to answer this question, but such answers

would help explain the importance of publicly funded state systems for higher education. Therefore, in this study I examine the mission and vision statements of state systems of public higher education to shed light on state's purposes and goals for public higher education.

Background of the Study

Public Higher Education Revenues

At most public institutions, state funding and tuition revenue are the two primary funding sources, but institutions vary greatly in the amount of per-student state funding they receive and the amount of tuition revenue they are able to collect (Laderman & Weeden, 2020). This means that both total revenues per full-time equivalent (FTE) enrolled student and the proportion of total revenue that comes from public and private sources vary by institution. This distribution of revenue sources varies by state, institutional type, and time period (Laderman & Weeden, 2020). As Table 1 shows, the institutions that rely the most on state funding are also those with the fewest total revenues and serve more underrepresented students than the institutions with lower reliance on state funding and higher total revenues (Ahlman, 2019; Hillman, 2020; Mugglestone et al., 2019; Taylor & Cantwell, 2019).

Table 1

Revenues and Underrepresented Students by Institution Type

Institution type	State and local revenues (%)	Students of color (%)	Pell-eligible students (%)	Total revenue per FTE student ($)
Associates	52	40	52	13,983
Bachelors	39	36	53	15,448
Masters	33	31	44	20,886
Doctoral	18	24	31	47,507

Note. Data from the U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS).
Public degree-granting U.S. institutions only. Associates Dominant institutions are classified under the Associates category. State and local revenues are state and local appropriations, grants, and contracts as a proportion of total operating and non-operating revenues. Students of color include American Indian or Alaska Native; Black or African American; Hispanic; Native Hawaiian or Other Pacific Islander.

Historically, public higher education was a primarily state-funded enterprise with upwards of 80% of total institutional revenue coming from state appropriations as recently as the early 1990s (Palmer, n.d.). However, since the 1980s states have cut per-student funding to balance their budgets during economic recessions (Delaney & Doyle, 2011). Following two back-to-back economic recessions in 2001 and 2008 during which funding for higher education was cut more than any other state budget category, state funding for higher education today remains lower than in most years prior to the Great Recession (Laderman & Kunkle, 2022; National Association of State Budget Officers, 2019). Higher education enrollments run counter-cyclical to the economy meaning that during recessions when states have less tax revenue to spend, enrollment in higher education increases rapidly (the 2020 COVID-19 pandemic recession excluded). The combined forces of state funding cuts and enrollment increases led to sharp drops in per-student appropriations during the last two recessions (Laderman & Kunkle, 2022).

Despite more than a decade of economic recovery and years of declines in student enrollment, public institutions in 2021 still received 22% less in operating appropriations per-student than they did before the business-cycle peak in 2001 (Laderman & Kunkle, 2022).

Without adequate state funding to rely on, public institutions became increasingly reliant on tuition revenues over the last decade (Webber, 2017; Zhao, 2018). Overall, declines in state revenues and increases in tuition revenue mean that higher education has become increasingly privately funded by students and their families. Since 1980, per-student tuition revenue (which includes both in- and out-of-state tuition and fees) increased 180% after adjusting for inflation (Laderman & Kunkle, 2022). At four-year public institutions, more than half of institutional revenues in 2021 came from student tuition dollars, including student loans (Laderman & Kunkle, 2022). The results have been concerning for student affordability as public four-year tuition and fees have more than doubled since 2000 and as of 2019, students owed over $1.5 trillion in student loans (Friedman, 2019; Ma, Baum, et al., 2019).

While the trends of declining state support and increasing tuition are largely true across the board, states do differ considerably in their funding for higher education. For example, Wyoming provides over $25,000 in funding per student to four-year institutions, compared to less than $4,000 in Arizona and New Hampshire. Tuition revenue per student at four-year public institutions ranges from less than $3,000 in Florida to over $20,000 in Delaware (Laderman & Kunkle, 2022). These differences mean that public institutions still receive the vast majority of their funding from public

sources in some states, while in others, public institutions receive hardly any state funding. Additionally, there are major differences in the distribution of funding across institution types. Generally, community colleges and open-access regional comprehensive universities (RCUS) are the most reliant on state funding, since they are less able to raise tuition rates or attract more out-of-state and international students (McClure, 2018). On the other hand, many research-intensive doctoral universities rely the least on state funding, since they are able to receive more grants, contracts, donations, and collect much higher tuition revenue (Ehrenberg, 2006; Hearn et al., 2016). Taken together, disparities in an institution's reliance on state funding and ability to raise tuition revenues result in large differences in financial publicness. The long-term transition from public four-year higher education as a primarily state-funded initiative to one primarily dependent on tuition revenue is a particularly concerning phenomenon because higher education provides vast public benefits, and we do not know whether reductions in public funding for higher education will negatively impact these benefits.

Public Benefits of Higher Education

The public benefits of higher education are a large part of why public systems of colleges and universities exist. The U.S. created public colleges and universities while also publicly funding these institutions because higher education has clear and known benefits to serve and promote the public good (Enders & Jongbloed, 2007; Singh, 2012). When state and federal governments first involved themselves in funding higher education institutions, they did so in part to strengthen the public good. The broad

mission of higher education was originally intended to enhance knowledge and benefit all of society in a multitude of ways (Ravitch, 1989).

Historically, the public mission for higher education has been to support local communities, increase democratic engagement, preserve and extend knowledge through research, reduce inequities across the population, and enhance people's ability to hold the government accountable for its actions (Kezar, 2005; Saltmarsh & Hartley, 2011). In the United States, education has always been considered part of the public good, beginning with the Northwest Ordinance of 1787, which committed the nation to education by proclaiming that "knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged" (Ravitch, 1989, p. 35). Following World War II and the influential Truman Commission on Higher Education report, the public purposes of higher education were expanded to include reducing inequality and providing equal access to education for all Americans (Enders & Jongbloed, 2007; Gilbert & Heller, 2013).

When public institutions are focused on their founding purposes, they provide measurable benefits to individuals and society (J. Williams, 2016). Institutions of higher education hold a crucial role in promoting the public good by advancing democracy and increasing civic engagement (Dee, 2004; Singh, 2012; Tierney, 2006; J. Williams, 2016). One of the primary social benefits of higher education is its role in reducing inequality. When students of all backgrounds have access to higher education and are served well by it, higher education promotes social justice by "equalizing the life chances of talented individuals" (Singh, 2023, p. 6) regardless of their demographics (Chetty et al., 2017).

Additional documented public benefits of higher education include reducing income inequality and increasing state tax revenues (Singh, 2012; Trostel, 2010), increasing civic engagement and voting rates (Dee, 2004), and reducing crime rates, healthcare costs, reliance on government funding, and poverty (Lochner, 2004; London, 2006; Ma, Pender, & Welch, 2019). Institutions do this well: student exposure to higher education increases their general health outcomes, life expectancy, and life satisfaction; lowers the likelihood of drug use, crime, and obesity among graduates while making them more likely to vote and volunteer; and increases trust and tolerance between and across communities (G. Williams, 2016).

States established public institutions with a variety of missions because each type of institution contributes to the public good in unique ways (Birnbaum, 1983). For example, community colleges provide developmental instruction and immediate vocational and workforce needs, RCUs educate most undergraduate students attending four-year public institutions and provide important services to their communities (Alliance for Research on Regional Colleges, 2022), and large public universities and land-grant institutions generate research to advance society and provide advanced education in fields like medicine and law (Berdahl, 1985; Ogren, 2005). These institutions also serve different groups of students. Community colleges and RCUs serve higher populations of nontraditional students such as adults, rural, and low-income students (Ogren, 2005). Minority-serving institutions (MSIs) are federally designated institutions that, either via their founding missions or by their enrollment demographics, serve higher proportions of students of color (Hegji, 2017).

The societal benefits provided by each type of institution are not always easy to measure. While research contributions and employment rates are readily available, many of the broader societal benefits of higher education, such as improving democratic values and broadly advancing the creation of knowledge, are difficult to measure and quantify (Rizzo, 2005). The lack of concrete data about these aspects of the public benefits of higher education has largely kept the conversation about the value of college focused on economic impacts for which there are clear quantitative measures that can be cited (Enders & Jongbloed, 2007; Trammel, 2005). At the same time, public approval of higher education has declined as tuition prices increase and individual economic gains from a college education become less apparent (Jones, 2018).

Public Perception of the Purpose of Higher Education

The rising cost of college for students and families, and the resulting student loan crisis, has captured the public's attention. In the last few years, individuals and the media have increasingly questioned whether college is still "worth it" and whether we should continue encouraging most students to attend some form of higher education (Pearlstein, 2018; Salhotra, 2022; Shell, 2018; Tharp, 2018; Tretina, 2022). Fewer than half of people report confidence in higher education, a change that has occurred somewhat rapidly as the proportion of U.S. adults with confidence in higher education declined from 57% in 2015 to 48% in 2018 (Jones, 2018). In addition, 61% of Americans feel that higher education is going in the wrong direction (Brown, 2018).

Questions about the cost of higher education have lead people increasingly toward evaluating return-on-investment and future career prospects from earning a college

degree, and all the other benefits of higher education have become less important (Carnevale et al., 2019; Newton, 2018; Third Way, 2022). When policymakers and the public think about higher education, they now focus almost exclusively on the economic contributions of higher education to individual students' lives and state economies (Tierney, 2006). Declining state funding and increasing college tuition rates only add to the focus on economics as the public increasingly questions whether higher education is worth the cost (Pearlstein, 2018). As a result, there is a disconnect between the public's awareness of the benefits of higher education and how higher education serves the public good (McMahon, 2009). The way the public benefits of higher education in the 21st century are discussed largely describes education's ability to drive economic progress rather than the positive impacts higher education has for society writ large (Enders & Jongbloed, 2007; J. Williams, 2016). As public perception about the importance, value, and credibility of higher education decays, it has become easier for state policymakers to deprioritize higher education funding which affects student affordability and public perception (Carey & Schneider, 2010).

Part of the reason that funding for higher education has declined over time is due to higher education leaders and advocates not making a strong case to state leaders for continued public investment. According to Trammel (2005),

> advocates of public funding have argued that the economic returns to education provide a sufficient rationale for public investment…but higher education continues to have difficulty making a case for public funding. (p. 164)

Data on higher education's broader societal contributions may strengthen the argument that higher education is worth continued public investment.

Individual Economic Benefits of Higher Education

Opinion polling demonstrates that most Americans believe that the purpose of higher education is to get a job (Newton, 2018; Pearlstein, 2018). However, this was not always the case. From 1971 to 1991, the proportion of incoming freshmen who said they were attending college to make money increased from 49% to 75% (Harkavy & Hartley, 2008). As the cost of higher education has shifted from states onto students, the public has increasingly focused on the individual financial benefits of college (Newton, 2018; Singh, 2012; J. Williams, 2016). Influential groups like the Georgetown Center on Education and the Workforce often compare the total cost of a degree to increases in lifetime earnings to determine which colleges, majors, and degrees provide the largest individual financial benefit to students (Carnevale et al., 2019). The public has increasingly scrutinized and questioned the rising cost of higher education, resulting in valid criticism about low graduation rates at many institutions (Kirp, 2019; Nadworny, 2019). When students are paying for higher education, attending college becomes a transaction in which money and time are exchanged for a degree and a well-paying job (Saunders, 2007). In this environment, if institutions fail to serve their students and provide them with a degree, college becomes not worth the cost (Pearlstein, 2018).

Current conversations about higher education in the United States often center around the idea that higher education is not for everyone (Cass, 2018; Mian, 2017; Ozimek, 2014; Pearlstein, 2018). Statements about who should attend a higher education institution usually begin in the context of student loan debt, with people arguing that higher education is not worth taking on debt if students will not have a high-earning job

after graduating. For example, in a recent op-ed in the *Washington Post* a public affairs professor claims that our current system of higher education is wasting money by teaching too many students by drawing evidence from variation in wage premiums and economic output:

> Our higher-education system is an effective but needlessly costly system for signaling employers about which workers to hire. The same goal…could be accomplished with a smaller system that educates a much smaller number of talented and engaged students in practical subjects like science and engineering. (Pearlstein, 2018, p. 6)

Institutions respond to changes in public perceptions of higher education and how the state views their success by increasingly focusing on the economic components of education. By focusing primarily on the transactional exchange of higher education in which students exchange tuition for a degree and a degree is exchanged for a job, higher education has been reconceptualized as a private consumer good, and institutions are simply providers of individual benefits rather than contributors to the public good (Harvey, 2005; Saunders, 2013). When higher education is viewed as a private consumer good, it becomes increasingly important for states to hold institutions accountable and to show that state investments lead to consumer benefits.

Oversight, Authority, and Accountability

Increased public scrutiny over higher education has driven states to exercise greater oversight of higher education (Carey & Schneider, 2010; Hillman & Crespin-Trujillo, 2018). Oversight and accountability are also hallmarks of neoliberalism, which seeks to quantify, measure, and standardize educational outcomes (Harvey, 2005; Saunders, 2007). Oversight for public higher education exists to ensure that public

institutions align their activities with state goals for higher education. However, although most public agencies are solidly subject to public control and authority, higher education is, by design, publicly owned yet largely autonomous and self-regulatory in its daily operations and management (Kaplin & Lee, 2014; McLendon, 2003). Without full control over public postsecondary institutions, state leaders lack the necessary mechanisms to develop policies that influence institutional behavior to meet the needs of the public (Fowles, 2014). Although every state has set structures to govern and coordinate higher education, "oversight of higher education more closely resembles a spider web than a clear and explicit set of formal structures" (Lane, 2007, p. 633). In this study, the formal structures of higher education oversight take two main forms: state authority and state accountability.

State authority refers to state and system-level governance structures that have legal authority over higher education (Lane, 2007; McLendon, 2003). No two states have the same governance structure and responsibilities for public higher education (Fulton, 2019b). State authority also refers to ongoing state-level powers to manage the behavior of public institutions. These powers may include state-level planning, budgeting and resource allocation, regulating academic programs, and administration of services and programs (McGuiness, 2016). One example of varying state authority is that in some states, the governor or legislature is responsible for setting tuition rates at public institutions (Armstrong et al., 2017).

State accountability refers to the structure and policies that attempt to control institutional behavior and measure their outcomes (Aldeman & Carey, 2009; McLendon

et al., 2006). In higher education, "all accountability policies come down to creating incentives for institutions to act differently" (Carey & Schneider, 2010, p. 5). The purpose of public systems of accountability for higher education is to monitor and regulate institutional outputs and drive institutions toward certain desired behaviors that improve their outcomes (Aldeman & Carey, 2009). In many cases, accountability is intended to hold institutions accountable for what policymakers currently think of as an institution's contribution to the public good by "harnessing institutional self-interest by making what's good for colleges and what's good for society one and the same" (Carey & Schneider, 2010, p. 2). Research suggests that state accountability measures for higher education have increased in part because of the rising (student) cost of higher education and the resulting public attention on the finances of higher education (Carey & Schneider, 2010; Tierney, 2006).

States have responded to declining funding and heightened public scrutiny over institutional outcomes by implementing accountability measures intended to increase public oversight of higher education (Carey & Schneider, 2010). These measures intend to hold institutions accountable to state goals despite providing less financial support than in the past (Hillman & Crespin-Trujillo, 2018; Lane & Kivisto, 2008; Tierney, 2006). However, it is not clear that what states measure in their accountability systems reflects state goals for higher education. Additionally, when states are a minority investor in higher education, it is not clear that increased accountability will have the intended effect—it is possible that state funding is the primary driver of institutional accountability to state goals, and that public institutions become less responsive to state goals as they

move toward other revenue sources (Orphan & Laderman, 2023). On the other hand, changes in an institution's primary revenue sources may not impact institutional behavior either—the relationships between state funding, oversight, and institutional behavior are unclear and require additional research (Fryar, 2012).

Higher education faces increasingly negative public perceptions, and it seems likely that downward trends in state funding will continue given the funding cuts that have taken place over the last 20 years. Currently, there exists no framework to understand what states goals are for the public benefits of higher education and no tool to measure institutional outcomes in relation to those benefits. Developing a way to quantitatively measure institutional contributions to state's goals for the public good will provide empirical evidence for policymakers and higher education advocates interested in furthering state goals for higher education. Additionally, quantifying differences in institutional contributions to the public benefits of higher education will provide empirical evidence for policymakers and higher education advocates interested in furthering state goals for higher education.

Purpose and Research Questions

Increasing public mistrust of higher education, concerns about student affordability, and questions about whether college is worth it have made it increasingly difficult for public higher education institutions, systems, and state-level agencies to advocate for continued state funding and support for public institutions. Shifts in public funding and perception may have created an environment in which institutions are less willing to prioritize and pursue public benefits and state goals for higher education. The

heightened focus on private economic returns on student investments in higher education has added further strain and caused us to drift from the founding purposes of public higher education. The long-term decline in state funding and the resulting focus on the individual economic benefits of higher education is a particularly concerning phenomenon because higher education provides vast societal benefits beyond the individual financial gains the public focuses on today. Higher education provides substantial public benefits, but such benefits are not well understood and are not easily measured.

Therefore, the purpose of this mixed-method study was to identify and measure the public benefits provided by public higher education institutions, and assess the extent to which state funding and oversight impact the public benefit outcomes institutions produce. This study began with a qualitative strand to determine the common goals states have for the public benefits of higher education. I then developed measurements of realized publicness and institutional contributions to the public good. In the qualitative strand, I created a model to ensure that the developed measurements accurately represent themes in state goals for public higher education. I then examined the impacts of financial publicness and state oversight on each measured public benefit across four types of four-year public institutions. The primary research questions that I investigated are:

1. What common goals do states have for how public higher education can serve their states?
2. In what ways do state goals for public higher education differ from those of system-level agencies?

3. To what extent can observed variables measuring institutional contributions accurately capture the components of state goals identified through content analysis as latent constructs?
4. How do empirical publicness and realized publicness outcomes vary across types of four-year public institutions (Historically Black Colleges and Universities, minority-serving institutions, regional-comprehensive institutions, and research universities)?
5. What is the relationship between state oversight and an institution's contribution to different public benefits?
6. What is the relationship between state financial publicness and an institution's contribution to different public benefits?

The first two research questions guide the qualitative research strand. The first question is concerned with the development of common state-level goals for higher education. The second question focuses on whether system-level agency goals are representative of state goals. The third question braids the qualitative and quantitative strands of this study together and seeks to understand the extent to which a quantitative model can validate the qualitative findings in this study. The fourth, fifth, and sixth questions guide the quantitative research strand in this study. The fourth and fifth questions focus on the relationship between each component of empirical publicness and the realized publicness outcomes at public four-year institutions. The final question explores how the relationships between empirical and realized publicness vary across different types of institutions.

Key Terms

This study uses a set of key terms relating to public values, privatization and publicness, state behavior, and state goals for the public good. I rely on economic and public administration theories to define and operationalize these terms in the current study.

Accountability. Accountability refers to policies enacted by states that attempt to drive institutional behavior to meet state goals, such as performance-based funding (PBF; Carey & Schneider, 2010; McLendon et al., 2006).

Minority-serving institution (MSI). MSIs are institutions that are part of one of seven federal grant programs for institutions that serve a particular population of students of color. MSI designations can be based on an institution's founding mission or student enrollment demographics (Hegji, 2017). Mission-based HBCUs are examined separately from enrollment-based MSIs in this study. Enrollment-based MSIs include, for example, Asian American and Native American Pacific Islander-Serving Institutions (AANAPISIs) and Hispanic-Serving Institutions (HSIs).

Privatization. Privatization refers to the process of public institutions becoming increasingly privately funded. While privatization and publicness are similar, there is an important distinction between the two concepts (Fryar, 2012). Privatization is a unidirectional process of changes in funding, while publicness measures multiple facets of an entity at one time.

Public benefits. Public benefits describe particular components of the public good. In this study, public benefits refer specifically to state goals for public higher education that benefit the entire state.

Public good. In this study, the public good refers not to the availability and use of higher education but to the crucial role higher education plays in promoting the public good by advancing democracy and society (Singh, 2012; G. Williams, 2016). When I refer to the public good in this study, I do not mean one singular benefit for all of society. Instead, the public good is the combination of multiple social and fiscal public benefits, each of which serves the population.

Public purposes. The public purposes of higher education are the specific public benefits espoused by states when founding or continuing to fund public higher education institutions. Public purposes as defined in this study are largely synonymous with state goals for public higher education.

Publicness. Publicness describes the degree to which an entity is publicly controlled, funded, and authorized (Moulton, 2009). Publicness is a useful measurement of the different influences a state can have on an institution. Because all public institutions are publicly owned (controlled), this study focuses on funding and authority or oversight.

Realized Publicness. Realized publicness refers to the desired public good outcomes that are predicted by the extent to which an organization embodies or provides public values (Moulton, 2009).

Regional-comprehensive university (RCU). An RCU is a four-year public institution with a mission-driven focus to provide broad-access education and serve their region and state's workforce needs. These institutions are often branch campuses or part of a state university system (Fryar, 2015; Ogren, 2005; Orphan & McClure, 2019). Some RCUs are also doctoral research institutions and/or MSIs.

Research university. A research university refers to the public four-year institutions included in the Carnegie classification for doctoral institutions with either high or the highest research activity (The Carnegie Classification, n.d.-a)

State agencies. In this study, state higher education agencies refer to the state-level entity with the highest degree of oversight and/or control over public four-year higher education in each state. Such agencies are commonly referred to as State Higher Education Executive Offices (SHEEO) agencies, although in most contexts SHEEO agencies can also include system-level agencies (which are distinct from state-level agencies in this study).

State authority. State authority refers to the powers a state has to govern and regulate higher education (such as whether there is a state-level governing or coordinating entity).

State oversight. State oversight refers to the degree of control and influence a state has over its public institutions of higher education. This dimension is often called control in the public administration literature, but in this study, I refer to it as oversight because in higher education, the term control is usually used to refer to ownership categories such as public, not-for-profit, or for-profit (National Center for Education Statistics, 2019b).

This conception of state oversight is drawn from the literature on publicness (Bozeman & Moulton, 2011; Moulton, 2009). In this study, state oversight has two components: authority and accountability.

Summary of Methodology

The methodological approach I used to answer my research questions was an exploratory sequential mixed-method study. In my qualitative strand, I used content analysis to identify common state goals for the public benefits of higher education. States are involved in higher education to promote and advance immense public benefits. Therefore, public benefits in this study are framed as the benefits espoused in state higher education agency mission and vision statements for higher education. To bridge my qualitative and quantitative strands, I developed measurements to analyze public four-year institution's contributions to different components of each state goal for higher education. I focused specifically on four-year institutions because they have substantially greater variation in revenue sources and autonomy from the state (Thelin, 2011). I used exploratory factor analysis (EFA) to develop latent constructs for each state goal and assigned predicted factor scores of each institution's contribution to four identified state goals. I compared institutional contributions to these goals across four specific types of public four-year institutions: research institutions, RCUs, HBCUs, and enrollment-based MSIs. Finally, I examined the ability of states to drive higher education institutions toward the public purposes of higher education by determining the extent to which state publicness can impact institutional contributions to state goals for higher education within and across states. In this final analysis, state publicness was comprised of two

main parts: financial publicness, or the proportion of an institution's revenue that comes from the state; and state authority, which includes state governance structure, regulatory authority over higher education, and accountability efforts to control public institutions.

Summary of Findings and Results

In my qualitative strand, I found that state-level agencies had four primary goals for the public benefits of higher education. The first and most common goal was educational access and affordability, which centers around the ability of higher education to ensure equal access to an affordable education regardless of a student's background and demographics. The second goal was student success and state attainment, which expanded the state focus on access by seeking to ensure that institutions provided equal graduation and completion rates for all students, regardless of their background. In addition, state attainment was focused on the ability of higher education to increase bachelor's degree completion for state residents. The third shared state goal for the public benefits of higher education was workforce and economic development. This goal did not concern individual opportunities, but instead focused on the ability of higher education to provide an educated workforce and improve the state economy. The fourth goal was community improvement, which consisted of higher education institution's public service contributions and community engagement.

Through my literature review, I identified 12 quantitative variables to measure the four goals described above. While ample variables existed to measure student access, affordability, success, and attainment, there was limited data on institutional contributions to statewide (non-individual) workforce and economic outcomes. Additionally, I found a

lack of quantitative measures of community improvement. While I was able to use EFA to create latent constructs for the first three state goals, there was not sufficient data to create predicted factor scores for community improvement. Instead, I created an index of community improvement.

In my quantitative strand, I used the three factors (access and affordability, student success, workforce and economic development) and community improvement index to assess and compare the contributions of different types of public institutions to these public good outcomes. I found that HBCUs and MSIs had outsized contributions to equitable education access and success, but worse workforce outcomes. On the other hand, research institutions had worse contributions to access and success but better workforce outcomes. In my final analysis, I examined how empirical publicness (financial publicness and state authority) impacted these institutional contributions to state goals for the public good. I found a direct positive effect of financial publicness on institutional inputs like access and affordability, with scattered positive effects on the later outcomes. I found that state authority had mixed impacts, with negative effects of state-level governing boards on access, affordability, and workforce. Additionally, state accountability negatively affected access but positively affected workforce and economic development.

Significance and Implications

This study is one of the first to consider the concept of publicness in higher education (Feeney & Welch, 2012; Fryar, 2012; Laderman et al., 2020). Empirical evidence about the connection between publicness and institutional outcomes may aid

state policymakers as they consider changes in their funding allocations, governance structure, and measures of accountability for higher education. Several studies have examined changing levels of various revenue sources at public institutions (Webber, 2017; Zhao, 2018), and occasionally researchers consider revenue distribution as a control variable (Hagood, 2019; Zhang, 2009). With few exceptions (see Lee, 2017; Welch, 2014), research has not yet considered how changes in the distribution of an institution's funding might affect its behavior or applied the concept of publicness to these phenomena.

This study was the first to examine publicness at all four-year public institutions. Prior publicness research has focused exclusively on research institutions (Enders & Jongbloed, 2007; Feeney & Welch, 2012; Rutherford & Rabovsky, 2018; C. Thomas, 2019; Welch, 2014). In addition, no study on publicness in higher education has considered how well institutions meet the goals of the public entities that fund them; instead, prior research has examined how well institutions meet their own goals for things such as teaching, service, and research (Feeney & Welch, 2012), or whether publicness impacts their internal budget structure decisions (Rutherford & Rabovsky, 2018).

The inclusion of enrollment-based MSIs, HBCUs, and RCUs in this study is particularly important because their relationship with publicness is not well understood. Prior studies on publicness in higher education have almost entirely focused on research-intensive universities and have largely ignored the rest of the four-year sector (Enders & Jongbloed, 2007; Feeney & Welch, 2012; Rutherford & Rabovsky, 2018; Welch, 2014). Lee (2017) is a notable exception. MSIs and RCUs provide unique contributions to the

public good (Espinosa et al., 2018; Johnson et al., 2006; Orphan, 2018b; Orphan & McClure, 2019), but they may face larger negative impacts of privatization because they are often more reliant on state funding than other four-year institutions (McClure, 2018).

In addition, this research has important implications for state policymaking decisions as well as arguments about the privatization of higher education, which is widely assumed to negatively impact the public good (Carey & Schneider, 2010). Arguments against privatization often assume that public institutions are resource-dependent, which means that they will act in ways that benefit their primary sources of revenue (Fowles, 2014). Under this assumption, when states are minority investors in higher education, institutions would be less likely to work toward state goals for the public good. Some initial evidence does suggest that this is the case (Orphan & Laderman, 2023), but little is known about how privatization impacts institutions and states (Enders & Jongbloed, 2007; Fryar, 2012). This study directly tests this assumption by assessing each institution's contributions to the public good in relation to their financial dependence on the state.

Empirical evidence for the public benefits of higher education is particularly important as the United States recovers and adjusts following the COVID-19 pandemic and its effects on higher education. Federal stimulus funding has bolstered state revenues and protected state higher education funding, but it will run out over the next few years (Laderman & Kunkle, 2022; McNamara & Laderman, 2022), leaving states to make important decisions about their funding priorities. At the same time, higher education faces an ongoing enrollment decline (Sedmak, 2022), which is particularly concerning for

institutional revenues given the long-term trend toward an increased reliance on tuition (Laderman & Kunkle, 2022).

Higher education has long been seen as a low-priority budget category that is less beneficial to society than primary and secondary education, and when policymakers do not consider higher education a priority, it is easier for them to justify cutting higher education budgets (Singh, 2012; J. Williams, 2016). Inserting empirical evidence into the policymaking process may help reverse this trend (Singh, 2012). Findings from this study on the public benefits of different institutional types and any potential negative impacts of cutting state funding will also provide useful information for policymakers as they determine how and where to cut higher education.

Finally, this study is one of the first to attempt to quantify how institutions contribute to the public good by serving their communities. The public benefits of higher education on communities are rarely measured or discussed in the policy realm (Rizzo, 2005). While providing measurements of these contributions will not directly bring the importance of community contributions back into the public's minds, it enables discussion and assessment of community involvement, which may lead to a better understanding of the non-economic benefits of higher education, "what we assess…tends to influence what matters in higher education. It is therefore important to assess the things that count" (O'Meara & Meekins, 2012, p. 12).

Dissertation Overview

This section outlines the organization of this study. Chapter One has provided background information and a statement of the problem this dissertation will address—

the need to demonstrate the relationship between publicness and an institution's contributions to state goals for the public good. Chapter One also defined key terms used throughout the study, outlined the primary research questions and analytical framework used in this research, and explained the significance and implications of quantifying institutional contributions to the public good.

Chapter Two outlines the conceptual framework and literature review used to guide this study by describing what we know about privatization and publicness in higher education. I review the literature on the components of publicness and describe how the present study addresses limitations and modeling issues in prior studies on publicness in higher education. I review prior literature on the specific dimensions of publicness in higher education and outline known impacts of each dimension on institutional behavior. I examine prior studies that have measured state and institutional missions for higher education and develop the framework I will use to examine state goals. Following this, I review existing literature about the state goals I identified through the qualitative strand of my study. I then describe mission differentiation and explain the history and contributions of different types of four-year public institutions to the public good. Finally, I outline my specific mixed-method and quantitative hypotheses about the relationship between dimensions of empirical publicness and state goals for higher education.

Chapter Three describes the methodology used in this study. I begin by sharing my positionality and how it informs my research decisions. I then provide background information about mixed methods research and share my research design in detail. Next, I focus on my qualitative and quantitative data collection procedures and quantitative

dataset construction. In this section, I provide definitions and sources for all individual variables and measure used in the study. I then turn to data analysis, describing the qualitative content analysis, quantitative factor analysis, and quantitative regression models I use to answer my research questions. Chapter Four ends with a discussion of the primary limitations of this study.

In Chapter Four, I present the results of my study as they relate to each research question. I begin with my qualitative findings on state and system-level goals for public higher education, describing common goals and variation between state- and system-level agencies. Following the qualitative findings, I discuss how I braided the qualitative and quantitative strands of my study together by operationalizing state-level agency goals into measurable variables and testing their relatedness through factor analysis. Here, I present descriptive statistics and analysis of variance (ANOVA) results on the contributions of different types of public four-year institutions to each state goal. I then turn to the quantitative results and present the results of my random- and fixed-effects analysis on the effects of publicness on public good outcomes across institution types.

In Chapter Five, I integrate the qualitative and quantitative strands of my mixed-method analysis and discuss my findings as they relate to my conceptual framework and prior literature. I conclude by discussing implications and recommendations for practice at state higher education agencies, for state-level higher education policy, for publicness theory, and for future research on state goals for the public benefits of higher education and the relationship between empirical publicness and institutional contributions to the public good.

Chapter Two. Conceptual Framework and Literature Review

This chapter weaves together the conceptual framework and a literature review I used to guide the qualitative, quantitative, and mixed methods components of my study. In the first section, I outline the conceptual framework I created for my dissertation using privatization and publicness and the relationship between the two concepts. I describe publicness and its relevance to and prior use in higher education research. In the second section, I provide further insight into empirical publicness and review prior literature on the three empirical publicness components of ownership, funding, and oversight (Bozeman & Moulton, 2011). In the third section, I discuss realized publicness and explain how the theory of publicness can help explain and operationalize state goals for public higher education, which informs both the qualitative and quantitative strands of my dissertation (Moulton, 2009). I review literature on the public benefits of higher education, focusing at first on prior studies that analyzed higher education mission statements. I then review literature for each of the four common state goals I identified during the qualitative strand of my dissertation. The state goals I developed through my qualitative analysis serve as the conceptual framework behind my selection of variables in the quantitative strand of my study. For each of the state goals, I examine common measures and known predictors relevant to this study. Finally, drawing on the differentiated purposes for which states established their systems of higher education I

review literature on types of public institutions and their known public purposes and contributions to the public good.

Privatization

Publicness can empirically measure changes in the relationship between states and public institutions. Despite its applicability to public policy research (Bozeman, 2013), publicness has rarely been considered in higher education policy research. Therefore, I situate publicness as a component of privatization to provide a broader higher education context on the impacts of changing revenue sources on institutions and students before outlining the components of publicness and how they apply to the present study. Privatization is broadly defined as the decline in public financial commitments to higher education and the corresponding increases in private revenues and marketlike behavior at public institutions such as colleges and universities (Fryar, 2012; Morphew & Eckel, 2009). Lyall and Sell (2006) situate privatization trends in a broader change in societal views of politics and the government—privatization is a philosophy that "shrinks the sphere of public responsibility and shifts risk to individuals, often those least able to cope with additional financial insecurity" (p. 9). Privatization research is primarily concerned with changing trends in public postsecondary revenues and how those changes affect institutional behavior (McClure et al., 2020; Morphew & Eckel, 2009). A subset of the privatization literature also discusses how state oversight of higher education accelerates or otherwise interacts with privatization (Hearn et al., 2016; Travis, 2012). The similarities between privatization and publicness make a review of this literature particularly pertinent to the current study because research on publicness in higher

education is very limited. However, privatization is distinct from publicness and there is an important difference between an institution becoming more private versus becoming less public (Fryar, 2012).

Privatization often refers to a broad variety of frameworks and issues, from commercialization and marketization to changes in public values and government regulation (Fryar, 2012; McClure et al., 2020). Such a broad and undefined set of conceptual issues tied to one term makes it difficult to develop precise measures of privatization. Fryar (2012) argues that privatization has been used to describe two distinct concepts: the relationship between a public institution and the government, and the relationship between a public institution and the private market. The first concept concerns publicness, not privatization. An institution can decrease in publicness while not necessarily increasing in privatization. Instead, it could become more autonomous when publicness declines. Publicness and privateness are not simply inverse ends of a spectrum; while they are related, decreases in one would not necessarily lead to an equal increase in the other, as

> the idea of institutional autonomy alone suggests that universities could see fluctuations in governmental control (publicness) without experiencing any real shift in the extent to which the institution must respond to the market. (Fryar, 2012, p. 532)

The concerns about privatization from researchers and advocates for public higher education are not a new phenomenon and are not entirely due to declines in state funding. Even near the height of per-student state and local support for public institutions, researchers were alarmed that structural changes in state tax revenue and rising costs for

faculty and other academic expenditures would lead to the privatization of public higher education institutions. In the early 2000s, privatization was treated as an urgent and looming concern for higher education (McClure et al., 2020). However, much of the discussion occurred in the popular media, through opinion pieces and magazine articles (Ehrenberg, 2006; Longanecker, 2006; Lyall & Sell, 2006).

In 2012 as state funding hit a historic low, many scholars were deeply concerned about the privatization of American higher education (Travis, 2012). Some of this concern was driven by legislative action toward intentional privatization in several states (Kelderman, 2012). For example, in 2008 Michigan's legislature considered converting the University of Michigan, which was almost entirely privately funded, from a public to a private university (Travis, 2012). Since 2012, funding has slowly and steadily increased in many states and the share of public institution funding that comes from the state has not changed substantially (Laderman & Kunkle, 2022). As a result, the urgency with which the higher education community discussed privatization had lessened as many scholars considered privatization the new normal. As funding slowly increased over the last seven years, research on privatization has moved from a broad call for alarm to focus more on specific impacts of privatization on institutions, students, and states (McClure et al., 2020).

However, the U.S. economy was greatly affected by the COVID-19 pandemic from 2020 through 2022, resulting in high unemployment and a short recession in 2020, followed by rapidly rising inflation and concerns about a second recession in 2022 (Egan, 2022; National Bureau of Economic Research, 2021; U.S. Bureau of Labor Statistics,

2022). States and public higher education each received substantial federal stimulus funding to assist them in maintaining revenues during the pandemic, but it is not clear what will happen to state funding in coming years as federal stimulus funding runs out (Laderman & Kunkle, 2022). Understanding the impacts of these changes and how changes in publicness impact different state goals for the public good is especially important now as state leaders navigate an unprecedented budget situation and prepare to once again make difficult budgetary decisions that will have significant consequences for public higher education. While the impetus for my study comes in part due to scholars' concerns over privatization, my conceptual framework focuses on the aspect of privatization that is most closely related to state goals for higher education: publicness.

Publicness

Publicness is a framework with which one dimension of privatization can be measured (Fryar, 2012). Broadly speaking, publicness is "the degree to which organizations are affected by political authority" (Bozeman & Moulton, 2011, p. 363). Political authority in this context refers to public or government control over an organization. Although publicness is not frequently used in a higher education context, it is a well-developed public administration theory with many iterations. An organization's publicness is determined by three dimensions: ownership, funding, and control (Bozeman, 1987; Moulton, 2009). In higher education, publicness captures fluctuations in each state's relationship to public institutions over time.

The study of publicness stems from the need to understand whether government support leads to different outcomes than support from private sources such as customer

payments (Bozeman & Bretschneider, 1994). For most researchers, higher education institutions are generally viewed as either public or private. Publicness provides a lens with which to interrogate and reconsider the view that the public or private ownership of an institution is all that matters (Bozeman & Bretschneider, 1994). Publicness also moves beyond a simple binary view of public versus private entities. Public institutions still receive private funding through tuition dollars and donations, and private institutions receive public funding through student financial aid and federal grants and contracts, and are subject to state and federal regulation. Publicness theory indicates that if a public institution receives only a small portion of its funding from the state or is largely autonomous from state oversight, the institution might behave differently than a public institution that is almost entirely funded by the state and is under strict oversight (Bozeman & Moulton, 2011).

There is clear applicability of publicness theory to public policy (Bozeman, 2013). However, with few exceptions (Feeney & Welch, 2012; Laderman et al., 2020; Lee, 2017; C. Thomas, 2019; Welch, 2014), there is limited research on publicness in higher education (Fryar, 2012). In public administration, however, publicness has been studied for decades (Andrews et al., 2011). Traditionally, empirical analyses of publicness have focused primarily on whether an organization such as a non-profit, government subcontractor, or community center was public or private with a handful of studies also examining the extent to which an organization is publicly funded (Andrews et al., 2011). Many of these studies found modest effects of public ownership and funding on organizational outcomes such as efficiency, effectiveness, and equity (Andrews et al.,

2011; Rainey, 2014). However, Moulton (2009) suggests that studies finding only modest effects on publicness are not conceptualizing publicness correctly. Well-specified studies of publicness should consider all dimensions of publicness on a scale with multiple sources of evidence, not just binary indicators of funding or ownership.

Publicness has most often been used to answer questions about what makes organizations public. In the last decade, however, scholars have begun exploring what makes organizations provide public outcomes. Scholars generally agree that an institution's publicness changes over time and that those changes occur at different paces based on the environment (Bozeman & Moulton, 2011). In addition, a government's "desired outcomes pertaining to public values" (Bozeman & Moulton, 2011, p. 375) also shift over time and at different rates. Moulton (2009) refers to the study of how public good outcomes change as a result of changes in public and private ownership, funding, and control as realized publicness because realized publicness combines the empirical measurement of three dimensions of publicness with a theoretical discussion about public values and how best to achieve them. The outcomes of the current study, which focus on state goals for the public good, can be conceptualized as indicators of realized publicness at an institution, while the predictors, which focus on state political and economic authority, are measures of empirical publicness (Bozeman & Moulton, 2011; Moulton, 2009).

Empirical Publicness

The three components of empirical publicness are ownership, funding, and control (Bozeman, 1987; Moulton, 2009). Public institutions of higher education do not

technically vary in ownership (they are all owned by the state) but do have a mixture of public and private funding and different levels of public control. Therefore, this study focuses on funding and control, examining how these two components of publicness influence institutional behavior toward the public good.

There exists great variation across public institutions in the distribution of their funding revenues and their autonomy from the state. With so much variation in an institution's reliance on public funding, total per-student revenue, and autonomy from the state, it is challenging to tease apart the relationship between an institution's relationship to the state and its ability to promote the public good. The following section provides background information about the components of empirical publicness in higher education and what we know about the primary ways that states seek to drive institutional behavior to meet their goals.

Ownership

In the publicness framework, ownership refers to the organization's legal status (Bozeman & Moulton, 2011). Past studies have considered ownership in the strict sense, where an organization is either public, non-profit, or privately owned. Classifying organizations as strictly public or private has been termed "essentially fruitless" because it sheds little light on organizational behavior (Bozeman, 2013, p. 176). Although all public institutions in this study are, by definition, publicly (state) owned, they do differ in whether they primarily serve their region, state, or the entire nation as public institutions (Fryar, 2012). While not a perfect comparison, research universities generally consider themselves national or international universities, while RCUs consider themselves

regional- or state-serving institutions (Orphan, 2018b). Although this study does not directly measure variations in who an institution serves as part of publicness, the inclusion of different institution types furthers publicness literature by including, to some extent, a more nuanced measure of ownership (Fryar, 2012). Examining the differences in publicness across institutions with a different service region can illuminate the differential impacts of changes in the other two dimensions of empirical publicness: funding and oversight.

Funding

In the publicness framework, funding refers to the relative levels of revenue an organization receives from public (governmental) and private (market-based) sources (Moulton, 2009). In higher education, public funding includes federal, state, and local dollars appropriated to institutions or given through research grants or other contracts (Laderman & Weeden, 2020). From an institution's perspective, financial aid from federal or state sources is received as student tuition. The private funding sources for most higher education institutions include student tuition dollars (which includes loans and government aid), endowment investment returns, revenues from auxiliary enterprises, and donations. A complete measure of the funding component of an institution's publicness would consider all revenue sources, grouped by whether the source comes from the government or the market (Bozeman & Moulton, 2011; Welch, 2014; Whitney, 2004).

Despite limited research on financial publicness in higher education, funding is widely assumed to drive institutional behavior (Aldeman & Carey, 2009; Enders &

Jongbloed, 2007). Scholars have found evidence of resource dependence, whereby institutions change their priorities to align with their primary funder(s), in higher education (Fowles, 2014; Pfeffer & Salancik, 1978). However, publicness researchers disagree on whether funding actually impacts organizational behavior (Fryar, 2012). Some publicness scholars believe that when organizations receive block grants such as general operating appropriations to higher education institutions, they are likely to be less efficient and have lower consumer satisfaction—but it is not clear whether their effectiveness and contributions to equity are impacted by funding (Andrews et al., 2011). On the other hand, in a higher education publicness context, Feeney and Welch (2012) expected that public outcomes would be affected by funding as they stated, "we expect that the balance of funding sources…will affect the types of public outcomes that universities generate" (p. 275).

In one of the few journal articles focusing on publicness in higher education, Feeney and Welch (2012) examined the relationship between varying sources of funding and institutional goals (research, teaching, and service outcomes) at public and private research universities. The study found that increased federal research funding per FTE led to increased research output and increased federal student grant aid led to increased teaching output. Increases in private funding (tuition and fee revenue per FTE) led to reduced teaching output, and state and local appropriations per FTE had a small negative effect on research output and no relationship to teaching or service (Feeney & Welch, 2012). However, these findings may be largely due to the construction of variables: research output was measured with the number of journal articles published, teaching

output was based on the number of courses taught (and not the quality or anything to do with student outcomes), and service was measured via the number of committees each faculty member sat on, which is entirely internal to the institution and does not measure community service or public engagement (Feeney & Welch, 2012).

In another study on publicness in higher education, Rutherford and Rabovsky (2018) measured financial publicness (percent of revenues from the state government) in a quantitative study looking at the factors that predict whether a higher education institution will adopt a decentralized internal budget structure (responsibility-centered management) and how the adoption of that structure impacts student graduation rates. The authors found evidence that when institutions were heavily reliant on state funding, they had an increased likelihood of adopting this budget model as an attempt to increase efficiency. In addition, they found that higher financial publicness is associated with higher graduation rates for Black students (Rutherford & Rabovsky, 2018).

The funding dimension of empirical publicness provides a theoretical basis for the idea that state funding for higher education affects institutional behavior and outcomes. Prior research suggests a potential relationship between institutional revenues and outcomes (Feeney & Welch, 2012; Fowles, 2014; Rutherford & Rabovsky, 2018). Yet, no studies to date have examined financial publicness in higher education from a state perspective, and additional research is needed to understand how the percent of funding from state governments impacts institutional outcomes. In the following section, I explore literature on state funding for higher education more broadly.

Public Higher Education Funding Structures. State funding is the most widely recognized dimension of empirical publicness in higher education. Although states are just one of a variety of funding sources for public institutions of higher education, they have historically been the largest funder for most public institutions (Pew Charitable Trusts, 2019). State funding for public higher education grew immensely over the 20th century as public colleges expanded and higher education became accessible to the general public rather than the elite few (Thelin, 2011). Since the late 20th century, however, funding for public institutions has been on the decline—first as a percent of overall state budgets, and more recently on a per-student level as well (Laderman & Kunkle, 2022; Longanecker, 2006). As discussed previously in the section on privatization in higher education, declines in state support have both led to and illuminated the changing revenue structure at public higher education institutions. This section reviews the primary revenue sources for public institutions of higher education.

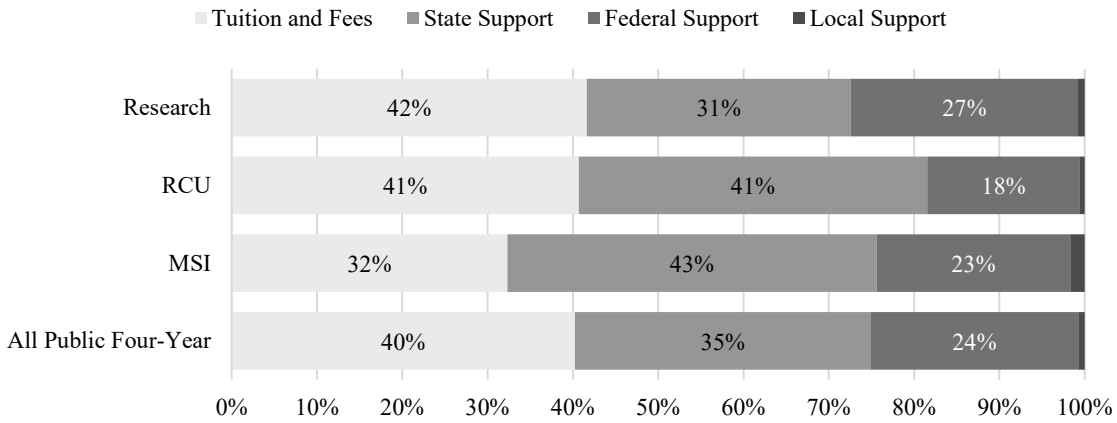
The two largest general operating revenue sources for most public four-year institutions are state tax appropriations, and student tuition and fees (Laderman & Kunkle, 2022). The federal government provides substantial investments in higher education, but these contributions are primarily made through student financial aid (Pell grants and loans), veteran's benefits, or federal research grants and contracts (Laderman et al., in press; Pew Charitable Trusts, 2019). From a publicness perspective, because most federal funding flows through student tuition and fees, institutions would maximize federal resources by focusing on meeting the needs of students who pay tuition and not the federal government. When institutions receive more funding from students, they

might focus more on meeting the needs of their students or customers and less on the needs of government entities (Andrews et al., 2011). The exception is federal research funding, which institutions receive directly from the federal government. Federal research funding is tied to institutional research output and has been studied as a federal and institutional goal for higher education (Feeney & Welch, 2012; Laderman et al., in press; Lee, 2017).

Figure 1 shows the distribution of revenue sources for all public four-year institutions, research universities, RCUs, and MSIs in fiscal year 2020. Research institutions are notable for their high reliance on federal support, which primarily consists of federal research grants. RCUs and MSIs are more reliant on state support. These institution classifications are not exclusive, and many institutions are included in more than one institution type. The methodology used to classify each institution type and calculate revenues is described in Chapter Three.

Figure 1

Distribution of Public Higher Education Revenues at Four-Year Institutions, 2020

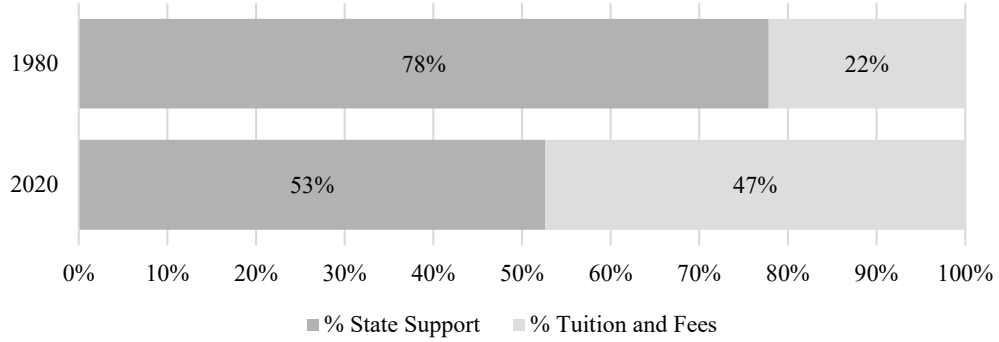


Note. Data from the U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS).
Government support includes appropriations plus operating and non-operating grants and contracts.

Figure 2 shows how the two largest revenue sources at public institutions (state funding and tuition and fee revenues) have changed over time. In 1980, 78% of revenues at public institutions came from state support. In 2020, only 53% of revenues came from state support. Due to data limitations in earlier years of data, Figure 2 does include student financial aid.

Figure 2

Change in Public Higher Education State Support and Tuition and Fee Revenues, 1980-2020



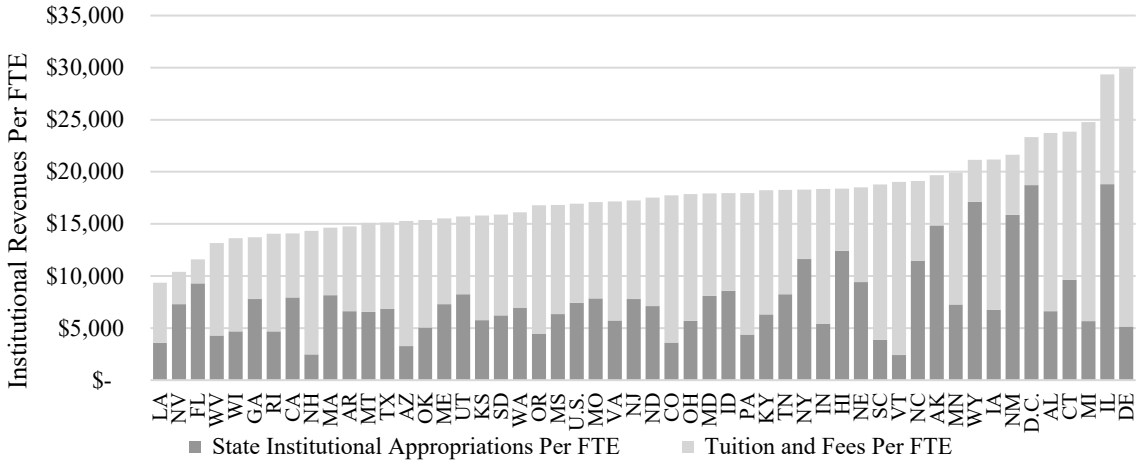
Note. Data from the State Higher Education Executive Officers Association (SHEEO), State Higher Education Finance (SHEF) Dataset.
State support includes appropriations plus operating and non-operating grants and contracts.

In addition to notable changes over time, total revenues at public institutions vary by state, as do the relative proportions of state funding and tuition revenue (Laderman & Kunkle, 2022).

Figure 3 shows 2020 per-FTE state institutional appropriations to four-year public institutions compared with tuition and fee revenues to demonstrate this variation. States vary in the total revenue available at public institutions to educate students (the full height of the bars), as well as the proportion that comes from state and tuition sources. State financial aid is excluded from this figure because, from a publicness framework, financial aid is paid by students to institutions in the same way as private tuition dollars (Bozeman & Moulton, 2011; Welch, 2014; Whitney, 2004).

Figure 3

Higher Education Revenues Per FTE at Four-Year Public Institutions by State, 2020



Note. Data from the State Higher Education Executive Officers Association (SHEEO), State Higher Education Finance (SHEF) Dataset.
State institutional appropriations are state tax- and non-tax operating appropriations to public four-year institutions, excluding funding for research and medical schools. FTE refers to full-time-equivalent (FTE) enrollment.

Determinants of Higher Education Revenues. Higher education revenues are predicted by several factors, each of which is important to consider when analyzing changes in publicness (which is itself impacted by changes in different streams of higher education revenues depending on their source). State funding and tuition and fees both depend on political and economic factors (Lowry, 2001; McLendon et al., 2013; Tandberg, 2010). Higher education state funding is highly cyclical with state economies and is often the largest budget area cut when state tax revenues decline during a recession (Delaney & Doyle, 2011; Laderman, 2019; Weeden, 2019). State funding is also subject to the composition of state legislatures and the strength of higher education interest

groups in each state (Tandberg, 2010). In some contexts, researchers have found that Democratic controlled states are more sympathetic to higher education and provide higher levels of state funding and suppress tuition growth (McLendon et al., 2013; Okunade, 2004). In addition, because higher education is a discretionary item in state budgets and has alternative revenue sources (unlike most other state responsibilities), funding for higher education depends on the relative needs of other state budget areas such as Medicaid and K-12 education (Okunade, 2004; Weeden, 2019). Research has also found that tuition and fees are higher when public universities have more financial autonomy from the state (Lowry, 2001), particularly when they can set their own tuition rates (Kim & Ko, 2015).

There are also important interactions between the primary revenue sources at public institutions. The most well-known of these interactions is the negative relationship between state funding and tuition revenues. As state funding declines, tuition revenues increase—but the size of this relationship is still debated, and evidence suggests the strength of the relationship has intensified over time. For example, earlier research suggested that declines in state appropriations explained most of the variation in tuition revenues per FTE (Koshal & Koshal, 2000). However, after controlling for differences in tuition-setting authority, Webber (2017) found that from 1987 to 2015, only 16% of the increase in tuition revenues could be explained by declines in state funding. Yet, the strength of this relationship has increased and since the Great Recession, 41% of the increase in tuition can be explained by decreases in state appropriations per student (Webber, 2017). It is likely that the relationship between state funding and tuition

revenues depends heavily on institution type as well as the institution's reliance on the state and any market limitations in increasing tuition rates or revenues (Baum et al., 2018). Two recent studies found that doctoral-granting institutions had a higher pass-through rate, meaning they increased tuition more than other institutions when faced with the same funding cuts (Webber, 2017; Zhao, 2018).

The determinants of higher education revenues described in this section provide useful context about the factors influencing levels of financial publicness over time and across institutions and states. However, revenue determinants do not necessarily relate to the ways that financial publicness impacts institutions. In the next section, I turn to a more relevant body of literature for the present study: known impacts of state investments in higher education on student and institutional outcomes.

Known Impacts of State Funding. State appropriations have been linked to a variety of institutional and student outcomes on alternative revenues and enrollment. In a study examining whether declines in state funding affected educational and research outcomes at public institutions, Bound and colleagues (2019) found that declining state support pushed institutions to shift toward tuition as their primary revenue source. In addition, selective research institutions increased in-state tuition rates and enrolled more out-of-state and international students rather than decreasing expenditures, while non-research institutions were not able to recruit out-of-state students and cut expenditures in addition to raising in-state tuition (Bound et al., 2019).

Jaquette and Curs (2015) examined the relationship between state funding and out-of-state enrollment at public institutions, finding that a 1% increase in state funding

led to a 0.46% decline in nonresident enrollment at research institutions and 0.21% decline at other public institutions. After further isolating the highest research institutions (research-extensive), a 1% increase in appropriations led to a 0.50% decline in nonresident enrollment (Jaquette & Curs, 2015). Using resource dependency theory to guide their analysis, Jaquette and Curs (2015) conclude that declines in state funding do indeed lead public institutions to "behave like private universities by focusing on attracting paying customers" (p. 535).

When considering how funding sources impact institutional behavior, state-funded financial aid, which flows through students rather than institutions, emerges as conceptually distinct from state appropriations for general operating expenditures. Publicness theory would suggest that when state funding flows through students, institutions direct their behavior towards meeting student goals rather than state goals (Bozeman & Moulton, 2011; Fowles, 2014; Moulton, 2009). While this is not a largely studied phenomenon, there is some evidence to suggest that transitioning from state general operating appropriations to state-funded financial aid changes institutional behavior. For example, in 2004 the Colorado legislature rerouted state funding for higher education from direct allocations to institutions and to a new voucher model that provided stipends to all students. The goal of this legislation was to make colleges "more attentive to consumer demands" (Hillman et al., 2014a, p. 601). The net result of the policy change was a reduction in educational access for underserved populations. Rerouting state funding through students led to reduced low-income enrollment at two-

year institutions and reduced enrollment for students of color at both two- and four-year public institutions (Hillman et al., 2014a).

The findings in Colorado demonstrate an important consideration on the impacts of state funding: the relationship between how state funding is allocated, and institutional outcomes, differs across institution types. Colorado reallocated funding from a public (general operating appropriations) to private (student tuition) source, thereby substantially reducing financial publicness and negatively impacting underserved populations across the state. After controlling for reliance on state funding, Chakrabarti and colleagues (2019) found that state appropriations led to lower student debt and reduced time-to-degree for students at four-year public institutions. Two-year institutions saw even more effects on student outcomes, including reduced likelihood of being delinquent on loans, increased educational attainment, increases in car and home ownership, and even increased credit scores (Chakrabarti et al., 2019). In a comprehensive analysis of the impacts of state funding declines on institutional outcomes, Zhao (2018) explores differences across institution types because they differ in their mission and objectives. When state funding per FTE declined by one standard deviation ($2,309), graduate degrees at doctoral institutions decreased significantly but undergraduate degrees did not. However, the opposite was true at masters and bachelor's institutions, where undergraduate degrees increased (Zhao, 2018).

Research shows that institutions heavily reliant on state funding are more impacted by declines in state appropriations (Taylor & Cantwell, 2019). Deming and Walters (2017) found that at heavily state-funded institutions, increasing total institutional

spending had a much larger effect on student outcomes than decreasing a student's net price. Total spending includes core expenses such as instruction, academics, and student services, as well as other areas like administration, scholarships, and capital improvements. Deming and Walters (2017) examined whether state funding was best used to reduce student price (via institutional financial aid) or increase institutional spending (by using the funding for general operations), conditional on an institution's reliance on state funding. The authors held total spending (which is similar to total revenue) constant when examining price changes, and vice-versa. A 10% increase in total spending led to a 3% increase in enrollment, while a 10% price decrease had no effect. Increased spending, but not decreased price, increased the persistence rates of previously enrolled students, leading to higher bachelor's degree completions (Deming & Walters, 2017). These findings suggest that total funding might matter for student outcomes more than the distribution of funding (as is measured in publicness).

While the above studies examined the impacts of changes in state funding levels, it is unclear whether changes in funding would have the same effect if total revenue were held constant (by proportional changes in private revenue sources). For example, it is possible that state funding cuts only lead to negative student and institutional outcomes because they occur alongside declines in the total resources an institution has to educate its students. This notion is supported by evidence that declines in state funding correspond to decreases in total revenue at public institutions. For example, Zhao (2018) found that for all public institution types, per-FTE state appropriation declines led to large decreases in all expenditure areas, with the largest effects in education and related

expenditures. However, Zhao (2018) does not answer the question of how much of the impacts of changes in state funding are caused by state funding itself, and how much can be explained by changes in total revenues available to institutions.

State funding is not the only way states seek to control the behavior of public institutions. Publicness theory suggests that state oversight also has the potential to drive institutional behavior and may be a critical predictor of realized publicness outcomes (Moulton, 2009). The next section focuses on the main components of state oversight for public higher education.

Oversight

The third dimension of empirical publicness measures the level of oversight or regulatory control that public entities have over the institution (Andrews et al., 2011; Bozeman & Moulton, 2011). At the state level, higher education oversight is comprised of varying governing structures and legislative powers over higher education. This dimension is often called control in the public administration literature (Andrews et al., 2011), but in this study, I refer to it as oversight because in higher education, the term control is usually used to refer to ownership categories such as public, not-for-profit, or for-profit (National Center for Education Statistics, 2019b).

State oversight consists of both structural or regulatory components and policy components. A broad pattern is that states have decreased their structural oversight while increasing policy components of oversight (American Council on Education, 2004). Due to this variation, a strong measure of state oversight should include measures of both authority and accountability (Fryar, 2012). For example, structural oversight could

include the extent to which institutional governance is centralized at the state level or diffuse with institutions and systems largely governing themselves (Fryar, 2012). Structural oversight or authority also includes activities such as requiring approval for capital infrastructure or new academic programs, budgetary oversight, and whether the state has tuition-setting authority over public institutions (Andrews et al., 2011). Policy components of oversight refer to accountability measures such as performance data reporting and PBF (Fryar, 2012).

Publicness research has generally considered state oversight to be an important predictor of organizational behavior but has not often distinguished between dimensions of state oversight. State oversight has changed significantly over time (Hearn et al., 2016), but states differ in whether those changes are towards increasing or decreasing oversight, as "each state seems to be setting off in its own direction, with varying levels of autonomy and accountability" (American Council on Education, 2004, p. 1). Many states have increased authority over public institutions while others have decentralized their higher education systems and have released authority over institutions in tuition pricing and program review, among other policies. Sometimes, decreased state authority and accountability are given to institutions as an acknowledgment that the state is no longer a major investor in public higher education (Travis, 2012). However, other states have seen declining state funding mixed with increased oversight measures as states attempt to retain control over institutional behavior in the absence of state funding (Hearn et al., 2016). While not conducted under a publicness framework, a larger body of

research has examined higher education authority, accountability, and institutional behavior.

States control public institutions through multiple forms of governance and accountability, and those trends often track in opposite directions, wherein one form of oversight might increase while another decreases. Therefore, in this study, I conceptualize the oversight component of publicness as consisting of two primary subcomponents: state authority and state accountability. In the following sections, I review extant literature on state authority and accountability.

State Authority. State authority consists of both state governance structures and the regulatory powers of those governance entities. States differ widely in the autonomy they grant public institutions (McGuiness, 2016), and little is known about if and how differences in state authority affect institutional contributions toward state goals or publicness. In this section, I describe the history and variation of state authority governance structures and regulatory control.

There is very little previous research on state authority measures of publicness and their relationship to higher education outcomes. Welch (2014) found a small relationship between state authority and institutional expenditures on public service. Her fixed effects models found that when an institution gained tuition-setting authority or retained their own tuition revenues, there was a 1% decline in public service as a percent of all expenditures. However, Welch's (2014) study used only two variables (tuition-setting authority and the entity that retains and allocates tuition) as a proxy for state authority. State authority includes more than just tuition control—states also vary in

governance structures, for example. The present study includes governance structures as an additional measure of state oversight.

Governance Structures. The state structures that govern higher education have changed over time in response to state needs and political conditions. Governance is an important component of empirical publicness because the ways in which policy decisions are made, and who makes those decisions, can influence the resulting policies and their effect on public institutions (McGuiness, 2016). Indeed, governance structures are intended to hold public institutions accountable to state's priorities for higher education (Knott & Payne, 2004).

No two states have the same governance structure and responsibilities for public higher education. Statewide structures that oversee higher education can be classified as administrative, coordinating, or governing boards (Fulton, 2019b). Administrative boards have limited authority over higher education institutions. Coordinating boards are considered weaker than governing boards, as they have substantially less authority over public institutions (McLendon, 2003). Thirty-six states had a single statewide board in 2020, roughly two-thirds of which were coordinating boards (Fulton, 2019a). Eight states had a combination administrative and coordinating board, one state had just an administrative board, and four had state-level governing boards. The remaining 14 states had no state-level governance structure for higher education; in those states, system-level agencies coordinated and governed higher education. There are six functions statewide higher education agencies focus on, and their degree of involvement in each depends

heavily on whether they are a coordinating or governing board (McGuiness, 2016). The six functions are:

1. State-level planning;
2. Budgeting and allocating state operating and capital appropriations;
3. Collecting, maintaining, and transforming institutional data for policymaker use;
4. Approving and/or regulating academic programs;
5. Administering state-level services such as financial aid programs; and
6. Directly governing higher education systems or institutions.

The power, prevalence, and structure of statewide boards for higher education have changed considerably over time. States began creating consolidated boards with state-level oversight of public higher education in the late 19th century (McGuiness, 2016). Throughout the early- to mid-20th century, as states rapidly adopted more centralized structures and state boards, they went from passive funding allocators to more active involvement in statewide planning and regulation (McLendon, 2003). Centralization of authority over public higher education reached its height in the 1970s and has since declined in many states (McLendon, 2003). In the 1980s, states began directly promoting policies and reforms intended to drive institutional behavior toward state priorities (McGuiness, 2016). Around the same time, states moved toward decentralization and as their accountability practices increased, state authority decreased. Throughout the 1990s and early 2000s, states moved from more centralized authority to systemwide governance structures, both by formally changing the structure of their state boards and by removing

state-level authority while keeping the same structure intact (McLendon, 2003). The trend toward decentralized state authority has continued since the early 2000s.

During the Great Recession, some states acknowledged that they had become minority investors in public institutions and considered or took steps toward intentionally releasing those institutions from their authority (Travis, 2012). Given these changes, the presence of a centralized state board does not provide enough information about state authority. Analysis of state authority on public higher education requires considering different types of state boards (i.e., administrative, coordinating, and governing) as well as their degree of regulatory control.

Regulatory Control. Publicness theory suggests that states with more regulatory control over public higher education would have a greater ability to drive institutions to meet state goals (Andrews et al., 2011). One of the primary ways states exert regulatory control over public institutions is through regulation of their tuition rates. States vary in their policies regulating public institutional tuition rates, and tuition-setting authority is a strong indicator of a state's regulatory control over higher education (Kim & Ko, 2015). When states hold centralized tuition-setting authority, they maintain direct control over an institution's ability to raise private revenues through tuition and fees, effectively forcing them to maintain the state's desired level of privatization (Armstrong et al., 2017). In states without centralized tuition-setting authority, systems and institutions have the ability to raise tuition rates whenever the institution deems it necessary. In such states, the state governor, legislature, and any state-level governance structures have reduced control over public institutions (Armstrong et al., 2017). In 2020, eight states had centralized

tuition-setting authority, meaning a state-level entity (governor, legislature, or state coordinating or governing board) had primary responsibility for setting undergraduate in-state tuition rates (SHEEO, 2022). Additional research is needed to fully understand the effects of state restrictions on tuition and institutional outcomes.

Known Impacts of State Authority. Theoretically, more centralized state structures and those with greater authority may more effectively drive institutions toward state goals because they "focus on state and system needs and priorities rather than advocating [institutional] interests" (Nicholson-Crotty & Meier, 2003, p. 85). For this reason, centralized state governance structures may impact the realized publicness outcomes in this study. While the typology and trends in state governance structures and regulatory power are well understood, there remains a more limited understanding of the impacts of state authority on institutional outcomes.

In many cases, studies examining the relationship between higher education governance have included only a binary indicator of the presence of a statewide board (Lowry, 2007). For example, Hicklin and Meier (2008) looked at the effects of various state structures on freshman enrollment levels for Black and Latinx students. The degree of centralization in state authority over public four-year higher education institutions was a binary variable wherein a 1 represented a centralized governing board, while a 0 represented a coordinating or planning board, as well as states without a single centralized structure at all (Hicklin & Meier, 2008). The presence of a consolidated statewide governing board was negatively correlated with Latinx student enrollments but did not affect Black student enrollment. Another example is C. Thomas's (2019)

dissertation on publicness fit. Publicness fit refers to the degree to which organizational leaders' past work environments have similar publicness to their current position. C. Thomas (2019) specifically examined the three dimensions of publicness (ownership, funding, oversight/regulatory control) but used a binary indicator of governance structure as the only measure of oversight. The study did not find significant effects, and one limitation was that the use of a binary measure for governance restricted variation in the analysis (C. Thomas, 2019).

Occasionally, more nuanced typologies of state boards have been developed and examined in the literature. For example, Volkwein and Tandberg (2008) created a four-point scale and classified state higher education agencies as either a consolidated governing board, regulatory coordinating board, weak coordinating board, or a planning agency. The purpose of the study was to determine whether state characteristics (size, affluence, demographics) or state governance and regulatory practices had a larger impact on institutional outcomes—measured at the state level—on affordability, benefits, completions, and more. Benefits referred to a category of state-level measurements on the benefits of higher education, such as lower unemployment rates, wages, the likelihood of voting, donating to charity, or volunteering. While state characteristics consistently predicted one or more of the outcomes, the only significant finding on governance was that more centralized structures were negatively related to institutional outcomes on affordability and benefits (Volkwein & Tandberg, 2008).

Another example of a more nuanced variable for state governance and regulatory power comes from Knott and Payne (2004), who tested whether centralized state boards

with stronger regulatory power were more likely to reflect state priorities for higher education, primarily low tuition, increased access, and a smaller focus on research publications. The study classified boards as governing, coordinating, or planning. From there, Knott and Payne (2004) identified high, medium, or low regulation: governing boards were always high, planning boards always low. Coordinating boards were classified based on whether they had regulatory authority over budget and/or academic program approval (authority over both meant high regulation). The study also isolated flagship institutions and found substantial differences in the relationship between regulatory power and institutional outcomes. For flagship institutions, revenues and publications were all negatively impacted by moderate or highly regulated boards (Knott & Payne, 2004). These effects were consistent across similar variables (i.e., in-state versus out-of-state tuition revenue) but were not seen at all other four-year institutions. Outside of flagships, the only significant impacts of state governance structures on institutional revenues occurred when the regulatory classification changed (i.e., reducing regulatory powers of state boards led to increased tuition). It is not clear how the relationships observed in this study may have changed over time—the study period was from 1987 to 1998 (Knott & Payne, 2004).

A similar framework has also been used to examine state policy innovations (Hearn & Griswold, 1994). Hearn and Griswold (1994) specifically isolated each type of possible authority for coordinating boards (budget and program, budget only, program only, or neither) and descriptively examined each of those boards separately from governing and planning agencies. However, their final regression analysis considered

only two binary variables: if the agency was a governing board or a strong coordinating board (Hearn & Griswold, 1994).

Although the studies mentioned above account for different types of state boards, most do not distinguish between a state-level versus system-level governing board (apart from Knott & Payne, 2003). This introduces additional complexity to what are often binary measures. System boards promote institutional goals and priorities, while state boards represent the state's interests in higher education (McLendon et al., 2006). Additional research is needed to determine the specific effects of state (rather than system) governance structures on institutional outcomes.

In terms of specific regulatory powers, there is some research on the specific impacts of tuition-setting authority on institutional behavior. Past studies have used tuition-setting authority as a control variable in studies looking at tuition rate increases (Kim & Ko, 2015; Webber, 2017). In a study on the impacts of state funding on out-of-state enrollment, Jaquette and Curs (2015) hypothesize that public institutions increase out-of-state enrollment in response to declines in state funding because they cannot always control their own tuition rates and therefore cannot raise in-state tuition as much as desired. However, the authors do not control for differences in tuition-setting authority. Similarly, in a study on the factors that influence tuition-setting at public universities, McLendon and colleagues (2013) do not consider the downstream effects of tuition-setting authority on institutional outcomes.

The studies described in this section indicate, at best, minimal impacts of state authority on institutional outcomes. There are also clear gaps in our understanding of the

relationship between state authority and institutional outcomes, particularly in more recent years. In a review of the literature, Enders and colleagues (2013) found "scarce, inconclusive, and methodologically problematic evidence" (p. 5) for a link between state authority and institutional performance. Additional research is needed to understand how changes in state authority might impact institutional outcomes that relate to state goals for public higher education.

State authority is not the only aspect of state oversight that might affect public institution outcomes—state accountability measures also warrant consideration. Unlike state authority, some of the impacts of state accountability on institutional outcomes have been thoroughly researched. In addition, accountability is often more directly tied to state funding yet, paradoxically, seems to increase in the absence of state funding.

State Accountability. The second component of state oversight is accountability. The purpose of state accountability in higher education is to drive institutional behavior toward state goals by "harnessing institutional self-interest" (Carey & Schneider, 2010, p. 5). Accountability measures are implemented by establishing objectives for institutional behavior and outcomes and occasionally monitoring progress toward the established state goals (Alexander, 2000). There has been a broad trend over the last two decades of increasing state accountability measures for higher education (McLendon, 2003; McLendon et al., 2006; Travis, 2012). One recent example is in West Virginia, where the senate considered legislation that would release public institutions from state regulatory control if they were able to meet set accountability metrics such as a six-year graduation rate above 45% (Quinn, 2020).

Despite the resurgence of accountability measures, there is limited evidence that accountability can drive institutional behavior. When states are not the primary funder of public higher education it is not clear that increased accountability will have its intended effect—it is possible that state funding is the primary driver of institutional accountability to state goals, and that public institutions become less responsive to state goals as they move toward other revenue sources (Orphan & Laderman, 2023). Even proponents of state accountability discuss this concern,

> Accountability systems rely on incentives to influence behavior. Given the relatively decentralized nature of higher education governance, the public purse strings often represent policymakers' most powerful levers for change. (Aldeman & Carey, 2009, p. 7)

Accountability measures range in intensity from data reporting requirements with no tie to funding, to PBF which often allocates a small proportion of state appropriations based on outcomes (Rosinger et al., 2022).

Data reporting requirements can signal a state's priorities, but they are limited by agency capacity and variation in data reporting does not necessarily reflect variation in state accountability efforts (Ewell, 2010; Whitfield et al., 2019). Recent innovations in state data collections from institutions focus largely on higher education's private economic benefits. For example, 46 out of 50 states currently link their higher education and workforce data (meaning they can track student workforce outcomes), up from just 15 in 2010 (Whitfield et al., 2019). On the other hand, only five states track some type of information on community engagement (Aldeman & Carey, 2009). However, variation in the extent of a state's data collection is largely driven by the structure of higher education

governance in the state, resources available to develop and analyze higher education data, and preexisting data structures for higher education and related agencies (Ewell, 2010; Whitfield et al., 2019). In 2018, 60% of state agencies reported that limited financial and personnel resources were a barrier to further developing their data reporting systems and 25% reported issues with incompatible data systems and structures (Whitfield et al., 2019).

Performance-Based Funding (PBF). Many states attempt to tie funding to accountability measures using the data reporting requirements described in the previous section. A popular accountability measure known as PBF attempts to drive institutional behavior toward state goals by directly attaching funding to desired institutional outcomes such as student retention and graduation rates (McLendon et al., 2006). An initial wave of PBF policies, known as performance funding 1.0, occurred in the 1980s and 1990s (Alexander, 2000). Performance funding 2.0, also known as outcomes-based funding, emerged in the 2010s and quickly spread over the last decade (Hillman, 2016). Twenty-two states had PBF policies implemented for four-year institutions in 2019 (Boelscher & Snyder, 2019). The metrics used in PBF policies are closely aligned with modern state goals for higher education, particularly outcomes such as access and graduation rates. Seventeen states with current PBF policies prioritized underrepresented students (usually with bonuses for low-income students, but occasionally with bonuses based on underrepresented race/ethnicity), and all 22 claimed to reflect differences in institutional missions (Boelscher & Snyder, 2019).

Despite the close alignment between state goals and the performance outcomes identified in PBF, there is a growing body of evidence suggesting that the ability of PBF to drive institutional behavior is limited and that it sometimes leads to unintended results (Chan et al., 2022; Hillman et al., 2014b; Kelchen & Stedrak, 2016; Tandberg & Hillman, 2014). For example, Hagood (2019) uses difference-in-difference methodology to find that performance funding policies "create systems of winners and losers across various institution types" (p. 208) within four-year public institutions. Highly resourced institutions (defined by Hagood as highly selective or research institutions) tend to see increased appropriations following the implementation of performance funding. Low-resource institutions (like RCUs) see decreases in state funding when PBF is implemented (Hagood, 2019). Hagood's study is particularly relevant because it is one of the few studies to control for a measure of publicness (the percentage of institutional revenue from state appropriations) and it implements a lead-lag analysis to show that some effects of PBF take one to three years to emerge (Hagood, 2019). Hagood's study adds to a growing body of research which has found that, with limited exceptions, performance funding is largely ineffective at driving institutional behavior toward intended state goals and may exacerbate inequities. For example, a review of studies on the effectiveness of PBF determined that states with PBF did not see improved outcomes when compared to states that had not adopted PBF (Hillman, 2016).

Despite this limited evidence, researchers often assume that accountability measures will drive institutional behavior. In a study on how performance funding impacts access for students of color and low-income students, Hillman and Crespin-

Trujillo (2018) directly measure the relationship between state accountability (PBF) and a state goal for higher education (broad access to higher education). They assert that given reduced state contributions to public institutional revenues, accountability policies that include even a small amount of funding are "likely to change institutional behavior" (Hillman & Crespin-Trujillo, 2018, p. 45). However, their analysis finds that even when PBF policies include equity metrics, the presence of PBF does not improve racial/ethnic diversity, and in some cases may reduce access for students of color (Hillman & Crespin-Trujillo, 2018).

There is some evidence that the ability of performance funding to drive institutional behavior depends on the type of institution. Birdsall (2018) used a differences-in-differences approach to determine how institutional outcomes changed when PBF was in place. Institutions that were less reliant on the state had increased graduation rates, but this came at the cost of increased selectivity and declines in the enrollment of students of color (Birdsall, 2018). Additionally, Hillman and Corral (2017) examined states that had adopted PBF to determine how state funding changed at MSIs following PBF adoption. MSIs lost funding in comparison to non-MSIs when exposed to performance funding and had lower levels of state funding than MSIs in non-PBF states (Hillman & Corral, 2017).

Almost all of the research described above uses a binary measure of performance funding to indicate whether a PBF policy was present in the state in a given year. However, states range widely in how much of their total appropriations are allocated through PBF (Rosinger et al., 2022). Six of the 22 states with PBF at four-year

institutions used their formula to allocate less than five percent of state appropriations, and only 10 allocated more than 25% of all state funding for general operations through the formula (Boelscher & Snyder, 2019). If the premise of using accountability policies to drive institutional behavior is correct, it follows that a more powerful PBF policy (one responsible for a larger proportion of funding allocations) might have larger impacts on institutional behavior and outcomes. Further research is needed to understand whether states that allocate a larger percentage of funding through PBF policies see better outcomes.

Summary

States vary widely in their funding structures and level of authority over public institutions of higher education. Higher education researchers have examined the impacts of state funding and tuition revenues on institutional outcomes, but little is known about how those outcomes are affected when total revenue is held constant and the distribution of revenues is the only changing variable. In addition, much of the research focuses on research or doctoral institutions, and rarely considers the unique relationships between other institution types and state funding.

There has been insufficient research on the relationship between state oversight and institutional outcomes. Although the literature on governance structures is well developed, few studies have isolated state (rather than system) boards and determined how those agencies and their relative power and control over public institutions impact institutional outcomes (McLendon et al., 2006), particularly across different institutional types. Additionally, the impact of tuition control on institutional outcomes is not well

understood. The impacts of state accountability measures are better understood (particularly those of PBF), but few studies have determined whether the percentage of state funding that flows through a PBF formula is relevant (Kelchen et al., 2019).

Overall, evidence suggests that certain components of state authority and accountability, such as centralized governance structures and PBF, have a limited ability to drive institutional behavior in higher education (Enders et al., 2013; Hillman, 2016; Lyall & Sell, 2006; Volkwein & Tandberg, 2008). Additional research on the relationship between state oversight and the institutional outcomes desired by states is necessary to fully understand the extent to which oversight impacts institutional behavior.

Still, there is a consensus among publicness researchers that oversight is a clear method with which government entities can set an institution's priorities (Andrews et al., 2011). Bozeman (1987) purports that oversight is the most influential dimension of publicness on institutional behavior. However, a literature review found that few prior studies have explored how public oversight impacts organizations (Andrews et al., 2011).

Publicness theory suggests that the funding structures and measures of state authority discussed in this section should be related to the realized publicness outcomes at institutions. This study tests the assumption that financial publicness and state oversight result in better realized publicness outcomes that match state goals. I add to the existing literature on the components of state oversight by separating system-level governing boards from state-level governing and coordinating boards, and by using the proportion of total general operating funding allocated through a PBF formula rather than a binary variable for the presence of PBF. PBF is appropriate to use in this analysis

because it is a commonly used accountability policy and has substantial variation over time. In the next section, I turn from the components of empirical publicness to the components of realized publicness, which broadly measure state goals for public higher education.

Realized Publicness

Realized publicness refers to public outcomes that are predicted by the extent to which an organization embodies or provides public values (Moulton, 2009). Realized publicness assumes public values are influenced by an institution's level of empirical publicness, which is measured through ownership, funding, and authority. Within this frame, public values (state goals for the public benefits of higher education) are inputs as well as outputs, and the dimensions of publicness predict how well state goals are translated into public higher education institutions producing public benefits (Moulton, 2009). Therefore, in this study realized publicness refers to the desired public good outcomes, or public benefits, that I expect will be influenced by state funding and oversight (Feeney & Welch, 2012; Moulton, 2009).

The public benefits of higher education are a large reason why public systems of colleges and universities exist. States founded public institutions, provide funding to those institutions, and attempt to exert some level of control over those institutions because higher education has clear and known benefits to serve and promote the public good (Enders & Jongbloed, 2007; Singh, 2012). When state and federal governments first involved themselves in funding higher education institutions, they did so in part to strengthen the public good, and the broad mission of higher education was originally

intended to enhance knowledge and benefit all of society in a multitude of ways (Ravitch, 1989).

However, very little research exists on the reasons behind the states' involvement in higher education. In some cases, prior research on publicness and privatization has addressed the goals institutions set for higher education, but these goals are usually limited to the broadly defined institutional goals of teaching, research, and service (Feeney & Welch, 2012; Lee, 2017). It is likely that states have slightly different goals for institutions than the goals institutions have for themselves. The closest prior research has come to measuring institutions' publicness and their contributions to the public good were Lee's (2017) and Welch's (2014) studies that examined the relationship between financial publicness (as well a single measure of state authority in Welch's case) and the proportion of institutional funds spent on public service. Each of these studies has key limitations and called for additional research in areas that the present study will address.

Lee's (2017) study found initial evidence that financial publicness is related to institutional behavior, measured via relative expenditures on areas like teaching, research, and public service. However, the study only considered revenues and expenditures for fiscal year 2012, which was the lowest year in history for state funding per FTE enrolled student (Laderman & Weeden, 2020). For this reason, the generalizability of the study is unclear; it is possible that trends in 2012, which marked the fourth straight year of deep cuts to state funding and associated sharp increases in tuition revenues (Laderman & Weeden, 2020), do not accurately represent the typical relationship between funding

publicness and institutional expenditures. Acknowledging this limitation, Lee (2017) calls for future research on this topic.

There are two additional limitations of Lee's study. First, although Lee (2017) examined all four-year institutions, the only control for institutional type was a binary indicator of whether an institution was doctoral-granting (Lee, 2017). Second, the study used Integrated Postsecondary Education Data System (IPEDS) finance data but did not appropriately handle reporting issues. Despite acknowledging that a significant portion of institutions in the sample did not report any data for the expenditure categories, such institutions were kept in the sample and coded as though 0% of funding went to each category (Lee, 2017). The missing institutions likely reported their financial data through another institution, which would create serious issues with the dataset and findings (Jaquette & Parra, 2016). I address these issues by more closely examining differences in institutional type and by creating a dataset that appropriately deals with the complex financial reporting relationships in IPEDS (see Chapter Three: Methodology).

In a conceptual analysis of how publicness can be applied to evaluate an institution's performance on different public values outcomes, Welch (2014) reviewed government documents such as meeting minutes, legislation on higher education governance and performance, university and state budgets and annual reports, and institution mission, vision, and value statements. The public values she identified were: upward mobility of marginalized students, improving gainful employment opportunities, promoting access to university services, fostering civic engagement, developing greater global awareness, and managing through shared governance (Welch, 2014). Some of

these values represent the institutional perspective more than the state perspective (such as shared governance), but Welch (2014) broadly calls for the development of measures of how well institutions of higher education fulfill public outcomes.

Moreover, my study responds to Welch's call for additional research that explores "the publicness of the outcomes that universities produce…such as a university's regional economic impact or the upward mobility generated for traditionally marginalized demographics" (Welch, 2014, p. 38). In addition, I address two limitations in her study. First, Welch (2014) followed prior researchers and only examined public research universities. I extend this analysis to consider differences across types of public four-year institutions. Second, Welch (2014) looked primarily at state funding, tuition-setting authority, and expenditures on public service. In the present study, I extend this research by considering a much broader set of realized publicness dimensions. The next section reviews what is known about state goals for higher education and the commonly agreed upon public mission and benefits of public higher education institutions.

Realized Publicness in Higher Education

Historically, the public mission for higher education has been to support local communities, increase democratic engagement, preserve and extend knowledge through research, reduce inequities across the population, and enhance people's ability to hold the government accountable for its actions (Kezar, 2005; Saltmarsh & Hartley, 2011). Following World War II and the influential Truman Commission on Higher Education report, the public purposes of higher education were expanded to include reducing inequality and providing equal access to education for all Americans (Enders &

Jongbloed, 2007; Gilbert & Heller, 2013). With federal support and encouragement, states created systems of public higher education to contribute to the public mission for higher education. States initially became involved in higher education to meet the following (paraphrased) objectives: enhance community life, achieve widespread education to sustain democracy, supply well-prepared people for professional roles, protect consumers from fraud or abuse, and provide equal educational opportunities for people (Russell, 1949). However, state goals for higher education have shifted over time with political and public interests and priorities (Lingenfelter, 2018; McGuiness, 2016), and there is very little concrete information about the public purposes of state involvement in higher education in today's world. One way to understand state goals for higher education is to examine the goal-oriented documents they produce, like mission and vision statements.

Mission Statements in Higher Education

Mission statements serve several purposes: they express the reason an organization exists, promote the common cause behind all actions of the organization, demonstrate the organization's strategic direction, and serve as a set of goals to help the organization reach its objectives (Morphew & Hartley, 2006; Özdem, 2011). Vision statements are focused toward the future. They are "expression[s] of a dream concerning a future desired state" (Özdem, 2011, p. 1889), often sharing the long-term objectives of an organization.

While mission statements reflect the distinct values of an organization and provide direction, research has shown that higher education missions are also symbolic,

signaling shared goals between institutions and their constituents (Morphew & Hartley, 2006). In the same way that institutional mission statements signal their values and goals to their constituents, I argue that state higher education agency mission statements signal the goals of the state for higher education writ large. Indeed, higher education governance structures are intended to hold public institutions to state's priorities for higher education (Knott & Payne, 2004). Historically, state boards for higher education have had a substantial role in developing the initial mission statements for public institutions (Berdahl, 1985; Carpenter, 1987; Caruthers, 1987). Some states have a formal role in institutional mission development (Carpenter, 1987), and in many states institutional missions "must reflect state concerns" (Berdahl, 1985, p. 305), and therefore provide a glimpse into state goals for public higher education.

Morphew and Hartley (2006) examined hundreds of institutional mission statements to determine the extent to which institutional missions were similar or unique. They found differences across institutional categories, particularly between public and private institutions. Public institutions of all levels focused on serving their local area and a commitment to diversity. These institutions also emphasized service and civic duty, and public institutions were unique in their focus on preparing citizens and promoting civic engagement. In discussing this finding, Morphew and Hartley (2006) note "the desire of the public group to link their work to serving the state" (p. 466). This language indicates, if nothing else, that academic researchers studying higher education missions expect that institutions will tailor their mission statements to state goals. Indeed, the authors argue that "institutions include in their mission what their benefactors value" (p. 467). These

findings suggest, albeit indirectly, that states value civic engagement, serving a local community, and diversity.

State- and System-Level Mission Statements. Given the tenuous link between institutional and state missions for higher education, it is important to understand how and why state higher education agencies developed their own mission and vision statements. In this study, *state higher education agencies* refers to the entity with the highest degree of oversight and/or control over public four-year higher education in each state. Such agencies are commonly referred to as SHEEO agencies. State agencies for higher education were initially created with the distinct purpose of representing the interests of the entire state, rather than individual institutions (Lingenfelter & Mingle, 2014). Given that state higher education agencies were created to focus on the public interest and carry forth state's goals for higher education (Lingenfelter, 2018), the mission and vision statements of such agencies represent the state's own purposes and goals for higher education.

As previously discussed, system-level agencies are often treated identically to state-level agencies in higher education governance research. However, state- and system-level higher education governance structures serve different purposes, with state boards focused on the interests of the state and system boards focused on the interests of their institutions (McLendon et al., 2006). State goals for higher education may differ in substantial ways from the goals of systems of institutions, and the governance structure surrounding public higher education in each state has important implications for this

analysis. To test this assumption, the analysis of state goals in this study is separate from the analysis of system-level agency goals.

The development of system-level agency missions is likely different from that of state-level missions, but the distinction between the two is not always clear in historical reports. For example, we know that in some cases, system-level missions were developed by compiling institutional mission statements, particularly when the system had a heavy hand in creating each institution's mission (Caruthers & Lott, 1981). However, Caruthers and Lott include a note that *system* in their analysis may refer to either a system or state higher education organization.

For some statewide agencies, the construction of a mission and vision for higher education may be more intentionally focused on the state's purposes for higher education, rather than an amalgamation of institutional goals. This is because statewide boards of higher education are primarily concerned with establishing statewide leadership for public higher education (Lingenfelter & Mingle, 2014). In addition, state-level agencies are concerned with setting the course for higher education, which begins with "articulating a vision for higher education" (T. E. Hollander, 1994, p. 2).

There is reason to believe that state higher education agency mission statements will have commonalities. At a 1994 meeting of SHEEOs, T. Edward Hollander shared that states share common goals for higher education, and that these shared goals lead to mission and vision statements that are "little different from one another" (p. 2). The common statewide goals for higher education shared in this presentation were: Universal access to higher education; special opportunities for previously excluded students;

programs of high quality that are responsive to public needs; research that improves the quality of life to our citizens; and service to community. However, T. E. Hollander (1994) explained that these shared goals translate differently across states given their respective historic, demographic, and enrollment contexts.

In summary, most research into mission and vision statements in higher education has largely focused on institutions, and little work has been done to examine the missions of the agencies that coordinate and govern public institutions. Prior examinations of state agency mission statements have focused on the process of developing or reviewing institutional statements (Caruthers, 1987; Caruthers & Lott, 1981), rather than the content or themes in state mission statements and how they vary across states. Additionally, prior research has conflated state- and system-level agencies, despite acknowledging their distinct perspectives (Caruthers & Lott, 1981). In this study, I examine the commonalities across states in their higher education agency mission and vision statements, but also focus on the differences between system-level and state-level mission and vision statements.

The present study is primarily concerned with the relationship between states and the outcomes at the public higher education institutions they founded. Therefore, I developed the realized publicness outcomes of interest from a qualitative analysis of state goals for higher education. The literature I review in the following sections is largely informed by the findings from the qualitative strand of this study, presented in the first part of Chapter Four: Results. In the next section, I review literature on each of the

realized publicness outcomes I developed and address prior literature indicating how empirical publicness might affect each outcome.

State Goals for Public Higher Education

Realized publicness outcomes at public institutions should be closely related to states' values and purposes for owning, funding, and regulating higher education (Moulton, 2009). Although there is evidence that states intended public institutions to provide public benefits (Russell, 1949), there is very little research examining state goals for public higher education.

Table 2 lists the commonly agreed-upon benefits of higher education, grouped by whether they are economic or social in nature and whether the benefit is primarily for society (public) or the individual (private). In this section, I review literature on what we know about different state goals for higher education. In addition, I address the primary factors that impact each goal, including any existing indication of how each goal might be impacted by changes in empirical publicness.

Table 2

Public and Private Benefits of Higher Education

Type	Public	Private
Economic	Increased tax revenues Greater productivity Increased consumption Increased workforce flexibility Decreased reliance on government financial support	Higher salaries and benefits Employment Higher savings levels Improved working conditions Personal/professional mobility
Social	Reduced crime rates Increased charitable giving/community service Increased quality of civic life Social cohesion/appreciation of diversity Improved ability to adapt to and use technology	Improved health/life expectancy Improved quality of life for offspring Better consumer decision making Increased personal status More hobbies, leisure activities

Note. Adapted from *Reaping the Benefits: Defining the Public and Private Value of Going to College,* by Institute for Higher Education Policy, 1998. Copyright 1998 by Institute for Higher Education Policy.

State goals for higher education overlap with these widespread benefits in some cases (such as employment and mobility) but also focus on equity, which ensures that everyone has access to the private benefits of higher education regardless of their life circumstances. The following sections review the literature on each of the four themes of state goals for higher education, which I identified using content analysis during the qualitative strand of my study. These themes are: education access and affordability, state attainment and student success, workforce and economic development, and community improvement. Chapters Three and Four provide more detail regarding the process of identifying each of the state goals reviewed in this section.

Education Access and Affordability. Education access and affordability are two of the common goals states have for their public higher education systems. Equitable access is an important benefit of higher education and has long been considered a key goal of public funding for higher education (McMahon, 2009; Perna & Finney, 2014). Ensuring that the private benefits of higher education are available to all fits with the broader framework of publicness, which considers equity an important outcome for public entities (Andrews et al., 2011). For higher education to be equitable, there must be equity in educational access and opportunity at public higher education institutions, and public institutions must be affordable, particularly for low-income students.

Access. For decades, there have been large gaps in college enrollment rates across demographic groups. From 2016 through 2018, 62% of Black and 63% of Latinx high school graduates enrolled in college compared to 70% of White and 78% of Asian American high school graduates (National Center for Education Statistics, 2019a). These differences remain after controlling for student demographics like high school performance and income. Flores and Park (2013) examined the college enrollment patterns of Asian American, Black, and Latinx students, and found that Latinx students were significantly less likely than other groups to enroll in higher education after controlling for pre-college factors (like advanced courses, test scores, and high school characteristics). Low-income high school graduates are also less likely to enroll in college than their high-income peers, even when comparing students with the same test scores (Ma, Pender, & Welch, 2019). From 2014 through 2016, 67% of low-income, 64%

of middle-income, and 83% of high-income high school graduates enrolled in college (National Center for Education Statistics, 2017).

State funding, policies, and authority have been shown to impact student access and enrollment. Toutkoushian and Hillman (2012) found that state appropriations and merit-based financial aid increased enrollment. Hillman and colleagues (2014a) found evidence that changing from state appropriations to a student voucher system in Colorado led to reduced enrollments for Latinx and low-income students. Prior studies on tuition-setting authority have found mixed effects on enrollment levels of Black and Latinx students (Flores & Shepherd, 2014; Hicklin & Meier, 2008).

These results do not provide a complete picture of the effects of state authority on graduation rates for students of color. Both studies only examined Black and Latinx students. In one case, the authors excluded Native American students because they have uneven geographical enrollment patterns across public four-year institutions and excluded Asian American students because "Asian Americans, although often considered a minority group, generally have not been identified in the higher education policy arena as 'historically disadvantaged'" (Hicklin & Meier, 2008, p. 856). While it is true that Asian American students have generally not been considered historically disadvantaged in higher education, the classification typically includes a wide range of student ethnicities, many of which are underrepresented in higher education (National Commission on Asian American and Pacific Islander Research in Education & Asian & Pacific Islander American Scholarship Fund, 2011). Asian American students vary widely in educational outcomes, and access remains a large issue for many Asian American ethnic groups

(Teranishi et al., 2014). Such limitations in the groups of students considered in prior studies point to the need for additional research on the effects of state authority on students of color.

Affordability. Public higher education in the US has become increasingly costly over recent decades. Between the 1990-1991 and 2020-2021 academic years, tuition and fee rates at public four-year institutions increased 178% after adjusting for inflation (Ma et al., 2020). However, most students do not pay the full tuition and fee rate (also known as sticker price). The difference is due to federal, state, and institutional financial aid. The net price is the amount an average student is asked to pay at a given institution. From 1990-1991 to 2020-2021, net price increased an inflation-adjusted 76% at public four-year institutions (Ma et al., 2020). There is also wide variation in public four-year tuition rates across states. In the 2020-2021 academic year, average published tuition and fees for in-state students ranged from less than $6,000 in Wyoming to over $17,500 in Vermont (Ma et al., 2020).

State funding is directly related to affordability at public institutions. For instance, Koshal and Koshal (2000) found that most of the variation in tuition could be explained by the level of state funding. However, this relationship is likely mediated by whether the state has control over institutional tuition-rate setting (a measure of state authority). When the state has tuition-setting authority, tuition rates at public four-year institutions are less likely to increase (Kim & Ko, 2015).

Prior evidence suggests that both dimensions of empirical publicness (state funding and state authority, particularly through tuition-setting authority) could impact

student affordability outcomes. However, the studies discussed here examined tuition revenues, which are conceptually and functionally distinct from net price. They also did not hold total revenue constant, which is important to isolate the impact of publicness on institutional outcomes.

Student Success and Attainment. Ensuring equitable student success and broad attainment are two important public benefits for higher education. Historically, there has been a greater focus on improving access to underrepresented students. In the last two decades, however, that focus has shifted to ensuring equal and/or equitable rates of student success for all demographic groups (Engle & Tinto, 2008).

Success. As with student access, White and high-income students are the most likely to graduate, regardless of their entering credentials like GPA (Ma, Pender & Welch, 2019). Across the U.S., the six-year completion rate for students at four-year public institutions ranged from 49% for Black students and 59% for Latinx students to 75% for White and 78% for Asian American students (Shapiro et al., 2019). Quantitative analyses consistently find disparities in graduation rates between students of color and White students. However, many analyses consider all students of color as one homogenous group (Ryan, 2004; Scott et al., 2006; Zhang, 2009), while others focus on only one or two minoritized populations (Flores & Park, 2013). Low-income students are also underserved—data on completion gaps between Pell grant recipients (which is often used as a proxy for low-income students) shows that at public four-year colleges, first-time Pell-recipients attending full-time are 16.4% less likely to graduate within eight years when compared to students who did not receive a Pell grant (Yuen, 2019).

In addition to race and income, the primary predictors of graduation rates are state funding, total institutional resources, measures of student preparedness such as GPAs and test scores, and student demographics (Scott et al., 2006; Zhang, 2009). State funding has been shown to impact graduation rates at public four-year colleges, and the effect holds for different Carnegie classifications (Zhang, 2009). However, the relationship between state funding versus total revenue or expenditures is not entirely clear—Scott et al. (2006) found that total institutional expenditures significantly predicted graduation rates after controlling for other factors. This effect was also found at Baccalaureate institutions, where expenditures on instruction and academic support were positively related to graduation rates (Ryan, 2004). It remains unclear whether state funding or expenditures impacted disparities in graduation rates for students of color.

The preparedness of successful applicants to an institution can be measured via selectivity or an institution's admit rate. Controlling for student preparedness or selectivity is important to isolate actual institutional behaviors from student characteristics that might impact graduation rates (Scott et al., 2006). Other student characteristics that impact graduation rates in ways that do not reflect institutional behavior include student age, whether they attend part-time, and commuter status (Scott et al., 2006). Overall, institutional characteristics can have a large impact on student graduation outcomes. In a study on college-going and graduation rates in Texas, the largest predictors of graduation rates for Black and Latinx students were characteristics of institutional wealth such as selectivity and per-student expenditures (Flores & Park, 2013).

Enrollment and graduation rates also differ by state (but state differences do not explain differences across race and income). While the national six-year completion rate for students at four-year public institutions is 66.7%, it is less than 40% in Nevada and above 80% in Iowa (Shapiro et al., 2019). This results in large disparities in the proportion of adults in each state with a bachelor's degree or above. For example, 20% of adults in West Virginia have a bachelor's degree, compared to 44% in Massachusetts (Ma, Pender, & Welch, 2019). It is possible that some of the unexplained differences in state graduation rates and education levels can be explained by differences in publicness, among other factors.

Attainment. Student success heavily impacts state attainment. State attainment focuses specifically on the proportion of credentials or degrees in the adult population. In recent years, states have become increasingly focused on attainment. One example of the heightened state interest in attainment is the concept of states adopting educational attainment goals for their populations. As of 2021, 46 states had identified measurable goals to improve state attainment (HCM Strategists, 2021). State attainment goals are largely specific to undergraduate higher education, focusing on increasing the proportion of the population with a range of undergraduate certificates and degrees. While state attainment is not institution-specific, an institution's ability to produce undergraduate degrees (controlling for its size) is an important indicator of its contributions to this public benefit. Degree production (the number of degrees granted) is considered one of the most important outputs for higher education institutions to produce (Titus, 2009; Zhao, 2018). Degree production is impacted by financial metrics such as institutional

expenditures and tuition prices (Zhao, 2018); it may also be impacted by financial publicness. In addition to student success and attainment, publicness may also explain differences in the third area of empirical publicness: workforce and economic development.

Workforce and Economic Development. Higher education has a long and important history of developing a state's workforce and economy (McMahon, 2009; Ogren, 2005; Perna & Finney, 2014; Thelin, 2011). In 2020, 35% of jobs required at least a bachelor's degree, and 65% required at least some higher education (Carnevale et al., 2014). Educated populations pay more taxes, which benefits and develops the entire state economy. On average, a college degree leads to $470,000 in additional tax revenues (Trostel, 2010). Unlike community engagement (described in the next section), there is a lot of quantitative information about how higher education institutions contribute to their state's workforce and economy (Aldeman & Carey, 2009).

Workforce Development. In this study, workforce development is concerned with the ability of an institution to contribute to and develop the workforce of the state. One component of an institution's contribution to the state workforce is the proportion of its students that remain in-state rather than moving to join another state's workforce. Students who attend an institution in their state of residence are much more likely to remain in the state and join the state workforce after graduation (National Center for Education Statistics, 2012; Perry, 2001), and the proportion of students remaining in-state after graduation has remained fairly consistent over time. In the 1990s, 81% of graduates who attended an in-state institution remained in their home state after four years,

compared to just 17% of students who attended out-of-state (Perry, 2001). In the 2000s, 75% of graduates from four-year public institutions remained in their home state (National Center for Education Statistics, 2012). There is also important variation by institution type. A recent analysis of resumes and social media profiles found that 40% of public university system graduates stay within 50 miles of their institution, compared to less than 10% of private elite university graduates (Sentz et al., 2018). However, Sentz and colleagues did not differentiate between types of public four-year institutions (all were grouped together as public university system graduates). National Center for Education Statistics data from 2017 show that 90% of graduates were at one point employed within the state of their college attendance at four-year public baccalaureate and master's degree granting institutions, compared to 80% at public doctoral-granting institutions (National Center for Education Statistics, 2020)

Common predictors of in-state enrollment include institutional selectivity, total institutional expenditures, and sticker price for in-state and out-of-state undergraduates (Jaquette & Curs, 2015). In addition, state merit aid programs significantly increase the proportion of students who attend college in-state (Toutkoushian & Hillman, 2012). State economic factors such as tax revenues, median household income, personal income per capita, and unemployment rates have also predicted in-state enrollment in prior studies (Jaquette & Curs, 2015; Rizzo & Ehrenberg, 2004; Toutkoushian & Hillman, 2012).

There is reason to believe that publicness might impact in-state enrollment rates. In-state enrollment is predicted by state funding, with higher state funding leading to higher in-state college-going rates (Toutkoushian & Hillman, 2012). Also, it may be

possible that in-state enrollment rates may be affected by changes in state authority. For example, Jaquette and Curs (2015) hypothesize that institutions increase out-of-state enrollment because they cannot always control their own tuition rates and therefore cannot raise in-state tuition as much as desired. However, they do not control for differences in tuition-setting authority.

An institution's ability to educate state residents who will go on to have higher employment rates is another important indicator of the institution's contribution to a state's workforce development—a key state goal for public institutions of higher education. Unemployment rates decline as educational attainment rises and an increasing proportion of jobs require higher education (Carnevale et al., 2014; Institute for Higher Education Policy, 2005; U.S. Bureau of Labor Statistics, 2018), but some institutions have stronger employment outcomes than others. For example, very high research universities may have stronger employment outcomes relative to their state population than other four-year public institutions (Mugglestone et al., 2019). Understanding the impacts of state funding and oversight on these metrics would shed light on the potential impacts of changing publicness on a state's workforce needs.

Economic Contributions. Economic mobility is a way to measure the public mission of higher education to promote economic justice and income equality (J. Williams, 2016). There are two components to economic mobility: the proportion of an institution's student body that comes from a low-income family, and the proportion of low-income students at an institution who move to the top of the income spectrum (Chetty et al., 2017). Based on the findings from my qualitative analysis of state goals, I

assert that the institutions that provide the most economic mobility, from a state perspective, are those with the highest combined economic mobility rate, or those that admit a higher number of low-income students and propel them to have higher incomes. When considering traditional bottom-to-top economic mobility, the institutions with the best outcomes are generally mid-tier public universities with moderate selectivity, many of which are RCUs (Chetty et al., 2017; Orphan, 2018b). Note that while some studies use the term social mobility, the metric is a purely economic calculation and does not consider a change in social capital or class. For that reason, in the present study, I refer to mobility estimates as economic mobility.

Traditional mobility rates only consider students that the institution moves from the lowest income quintile to the highest quintile (Chetty et al., 2017). This is not very meaningful to a state, which is concerned with the general economic contribution of an institution rather than its ability to make individuals very rich. The American Council on Education created an extended mobility rate, which includes all students who move from the bottom two income quintiles to the top two quintiles, a much broader measure of mobility (Espinosa et al., 2018). However, this measure still fails to capture the entire contribution of an institution to improved economic standing for students. According to Hoxby and Turner (2019), economic mobility studies overemphasize extreme disparities in socioeconomic status and penalize middle-of-the-road institutions by not counting low- to middle-income students and middle- to upper-middle income graduates.

Few studies have examined what predicts an institution's economic mobility rate. Espinosa and colleagues found that MSIs had higher mobility rates than non-MSIs,

concluding that they are engines of upward mobility for students (Espinosa et al., 2018). A recent study by the American Enterprise Institute looked at the factors related to extended mobility at comprehensive universities (de Alva, 2019). The study found that mobility varied widely across comprehensive universities and was only partially explained by differences in graduation rates, student body composition, and selectivity (de Alva, 2019). The authors also concluded that state funding is not a strong predictor of mobility, but conflated expenditures (which include state funding, tuition, and other revenues) with state funding in drawing this conclusion.

Hoxby and Turner (2019) demonstrate issues with popular measures of mobility, one of which is the conflation between the proportion of low-income students an institution enrolls and the institution's effort in enrolling low-income students. While more selective institutions have a broader pool of students to choose from, many institutions admit most students who apply and, therefore, their low-income student enrollment may be more of a function of their applicant pool than intentional behavior (Hoxby & Turner, 2019). The authors propose comparing each institution's income distribution to the available pool of students in their state—by examining the income distribution of all potential students with GPAs and test scores within the institution's average acceptance range (Hoxby & Turner, 2019). Selectivity likely also impacts economic mobility, both because selective institutions often admit fewer low-income students and because they may produce graduates with higher incomes (Hoekstra, 2009; S. Thomas, 2003). Research suggests that after controlling for selectivity, some MSIs might have the same labor market outcomes as other institutions (Park et al., 2018).

An institution's ability to improve its graduate's economic standing directly contributes to state goals for economic development. There is some evidence to suggest that certain institution types have unique contributions to economic development (de Alva, 2019; Espinosa et al., 2018). Economic development is a frequently cited reason for public funding for higher education (Enders & Jongbloed, 2007; McMahon, 2009; Trammel, 2005). However, very little is known about how publicness might impact economic mobility rates.

Community Improvement. Community improvement has long been a public purpose of higher education, as seen through the passing of the first Morrill Land Grant Act in 1862 (Hartley, 2009). In the 1980s, scholars and practitioners observed a decline in the public purposes of higher education and as a result, a concerted effort began to reclaim the civic purposes of higher education (Saltmarsh & Hartley, 2011). As a result of this movement, community-based activities were built into classrooms, and students were increasingly provided with opportunities to engage in service-learning (Hartley, 2009). The movement to reclaim the public purposes of higher education can be credited with an increase in community engagement and public service since the 80s, but over the last two decades declines in financial publicness have put pressure on institutions that may have led to reductions in community engagement and public service outcomes (Orphan, 2018a; Saltmarsh & Hartley, 2011; Saunders, 2007).

While research has demonstrated the private returns to higher education, comparatively little is known about quantitative social or community returns to public higher education (Lambert, 2017; Rizzo, 2005). This is largely due to the effects of

neoliberalism, which deemphasizes communal and non-economic or non-commodifiable practices of public institutions (Brackmann, 2015). Social benefits are hard to measure, particularly in economic terms (McMahon, 2009). Without a means by which to quantify the benefits of community improvement to individuals, community improvement becomes irrelevant to discussions about the value of higher education in a neoliberal paradigm (Harvey, 2005; McMahon, 2009; Rizzo, 2005). The lack of state attention to community improvement can be seen through data reporting capabilities. Only five states collect data on community engagement: Connecticut tracks creative products like art and media attributable to each institution, and four states use data from the National Survey of Student Engagement service-learning component to evaluate how their institutions contribute to civic development (Aldeman & Carey, 2009). There are no other states with systematic data collections of institutions' social and cultural contributions to their communities (Aldeman & Carey, 2009). Still, the societal benefits of higher education include increased community engagement and public service (Institute for Higher Education Policy, 2005).

Community Engagement. Community engagement refers to collaboration or partnership between an institution of higher education and its local or regional community to share knowledge and resources (Driscoll, 2009). Community engagement encompasses several institutional actions and commitments to engaging with communities through both curriculum and research (Driscoll, 2009). For example, some of the key indicators of an institution's commitment to community engagement include: courses with a service-learning component, faculty development on integrating

community engagement into diverse fields, campus structures that facilitate relationships between the community and the institution, funding for community partners, space to hear community voices, tenure and promotion guidelines that reflect community engagement values, and institutional mission/vision statements that articulate a commitment to community service (E. L. Hollander et al., 2002).

RCUs are particularly known for their mission-based commitments to community engagement and public service (Henderson, 2009; Orphan & McClure, 2019). However, Orphan (2018a) found that while some RCUs maintained commitments to community engagement despite accountability pressure from the state, others curtailed their community engagement efforts to focus more on economic development. Evidence suggests that MSIs might also have above-average outcomes in community engagement. For example, HBCUs have long had an outreach and public service mission (Esters & Strayhorn, 2013), and federal Hispanic-serving institution (HSI) grants can be used specifically for community engagement (Hegji, 2017).

States emphasize community improvement in their mission and vision statements for higher education, yet it is largely absent from state accountability measures such as data reporting requirements and PBF (Aldeman & Carey, 2009). This could mean that in an environment with low general operating appropriations and high accountability to other areas, institutions might deprioritize community improvement. In addition, the lack of prior research connecting state goals to institutional community improvement efforts points to the importance of understanding the relationship between state's goals for community improvement and the related outcomes public institutions produce.

Public Service. Public service is a specific component of the larger community engagement movement. Public service refers to an institution's external activities primarily intended to benefit the public or specific community groups (Hartley, 2009). Some of the first colleges in the U.S. were focused on educating their students for public service, and public service grew in importance and increased in the early 2000s (AmeriCorps, 2006; Thelin, 2011). While the previous measure (community engagement) evaluated whether community improvement was an integral part of an institution's mission and actions, public service more specifically measures an institution's financial commitment to its community. Public service benefits society by increasing long-term student civic engagement and responsibility, as well as altruism, voting patterns, cultural competence, and leadership skills (Celio et al., 2011).

The outside factors that might impact the relationship between publicness and public service outcomes remain somewhat unclear. For example, Welch (2014) found that land-grant status significantly predicted a higher proportion of funding would go to public service, which may be because land grant institutions are most directly tied to a public service mission. However, Lee (2017) did not find a significant relationship between land grant institutions and public service expenditures but did find that institution enrollment size was a significant predictor. Additionally, Lee (2017) tested whether total expenditures predicted public service spending and did not find a significant relationship. Despite this finding, it remains plausible that institutions with more total revenues would be able to dedicate more funding to public service, which is not a core function and may be seen as discretionary (Lee, 2017).

Public service is a key state goal for public institutions of higher education, but prior research on the effects of publicness on public service has found little to no relationship between limited measures of state funding and authority on public service expenditures (Lee, 2017; Welch, 2014). I was not able to find prior studies examining the impacts of state funding or oversight on how institutions allocate their work-study dollars. As with community engagement, additional research is needed to fully understand whether empirical publicness affects how institutions prioritize public service in their budgets.

Summary. In this section, I reviewed prior literature on the four components of realized publicness outcomes for higher education identified through my qualitative strand of analysis. By contributing to access and affordability, success and attainment, workforce and economic developments, and community improvement, public higher education institutions embody realized publicness (Moulton, 2009). In this study, I explore how measures of empirical publicness such as state funding, state authority, and state accountability might impact these realized publicness outcomes. The literature reviewed here informed my expected findings for each area of realized publicness. Many of the public benefits described in this section vary across institution types in their degree of output and potential relationships to publicness. In the next section, I provide a more detailed review of different types of public institutions and their relationship to the state and to state goals for the public benefits of higher education.

Institution Types and the Public Good

In order to meet their goals for higher education, states established different types of institutions that would each provide specific benefits. Public institutions in the United States are incredibly diverse in their missions and purposes. By design, institutions are specialized and focus their resources and behavior towards meeting different goals as laid out in their founding purposes (Birnbaum, 1983). For example, the 1960 California Master Plan intentionally segments their public system of higher education into three parts. The university system focuses on research production and graduate education in areas like medicine and law; the state university system focuses on undergraduate and graduate education, particularly in teaching; and the community college system is charged with developmental and vocational instruction (California State Department of Education, 1960). The design of California's higher education system is reflective of the design in many states, as it influenced state structures for higher education throughout the country (Marginson, 2016).

These differences can be seen in institutional mission statements, which differ based on institution type (Morphew & Hartley, 2006). The variation in mission and behaviors across institution types suggests that institutions might respond differently to state goals for higher education and to the state's attempts to hold institutions accountable to their goals. For example, an institution might be more likely to follow state goals when they are in line with the institution's specific mission. Public institutions vary based on characteristics such as their founding purpose (i.e., as a normal school or teacher's college); the range of degrees they offer; the extent to which they focus on and invest in

research; their commitment to community engagement; and the types of students they serve (Berdahl, 1985). Variation in mission statements and goals across four-year public institutions indicates that different institution types contribute in unique ways to realized publicness goals.

Four-year institutions can be broadly classified according to the Carnegie Classification of Institutions. Carnegie classifications were first developed in 1973 to aide in higher education research and policy analysis and are widely used to represent institutional differences (The Carnegie Classification Institutes of Higher Education, n.d.-a). The primary four-year institutional categories in the Carnegie classification are Baccalaureate colleges, Master's colleges and universities, and Doctoral universities (which are further broken down by research intensity).

In the following sections, I review literature on three specific types of four-year institutions and their known and assumed contributions to realized publicness. For each institution type, I review their classification and history. I also outline known or expected differences in each institution type's contributions to state goals for the public good.

Doctoral Research Institutions

Research universities were some of the first institutions of higher education founded in the United States (Thelin, 2011). Doctoral universities are any institutions that award at least 20 doctoral degrees or 30 professional degrees in at least two programs (The Carnegie Classification Institutes of Higher Education, n.d.-b). There are three categories within the Carnegie doctoral university classification: doctoral/professional universities, doctoral universities with high research activity, and doctoral universities

with very high research activity. Doctoral university research levels are determined based on their levels of research and development expenditures, research staff, and doctoral degrees awarded in research fields (The Carnegie Classification Institutes of Higher Education, n.d.-b). Doctoral universities with very high research activity are distinguished by having high index scores on both an aggregate and a per-capita measure of research activity. Among public institutions, very high research universities comprise only 5.6% of all institutions yet educate 21.3% of all students (The Carnegie Classification Institutes of Higher Education, 2020). In most states, the institution commonly considered the flagship is a selective very high research university (Mugglestone et al., 2019).

State Goals and the Public Good. Doctoral universities with a very high focus on research activity likely contribute to the public good in very different ways than other four-year institutions. These research universities offer more graduate degrees and are more likely to be expensive and selective in their admission, which might hinder their ability to provide education access and affordability outcomes. Prior research has shown that flagship institutions, which are almost always very high research universities, are disproportionately filled with White and affluent students when compared to their state's overall population (Mugglestone et al., 2019; Turner & Pusser, 2004). The lack of access at these institutions is hypothesized to directly impact the public goods these institutions produce, but this has yet to be directly measured (Turner & Pusser, 2004). On the other hand, very high research universities may have better than average outcomes in some public outcome measurements. For example, very high research universities often have

higher graduation rates and better employment outcomes than other public institutions (Mugglestone et al., 2019). Bound and colleagues (2019) also found evidence that doctoral universities are less likely to reduce expenditures when facing declines in state funding, which could protect some of their public good outcomes in the face of lower state support.

When compared with other public institutions, public research universities have more options to develop alternative revenue streams in response to declining state support (Ehrenberg, 2006). Because public doctoral research universities tend to have the most diverse revenue sources, they may be less responsive to state efforts to hold them accountable, particularly if they receive a small proportion of their total funding from the state (Hearn et al., 2016). For example, very high research universities were more likely than other institutions to increase out-of-state and international enrollments in response to declining state appropriations (Bound et al., 2020; Jaquette & Curs, 2015), and less likely to reduce expenditures, likely because there was an increase in student demand from out-of-state students in compared to other institutions (Bound et al., 2019). They are also less likely to face reduced enrollments if they raise tuition rates (Ehrenberg, 2006). On the other hand, low publicness at some very high research universities may not lead to poor public good outcomes. In interviews with state legislators, Lambert (2017) found that legislators had not seen evidence that their flagship institution's missions were moving away from serving the public good.

Prior research on publicness in higher education has generally excluded all institutions except doctoral research universities (Enders & Jongbloed, 2007; Feeney &

Welch, 2012; Rutherford & Rabovsky, 2018; C. Thomas, 2019; Welch, 2014). As a result, there is some empirical information about the relationship between publicness and public good outcomes at research universities. For example, prior research has found a small negative relationship between whether very high research universities can set their own tuition and the proportion of their expenditures they allocate to public service (Welch, 2014), and that the percentage of revenue from state governments was positively associated with higher graduation rates for Black students at research institutions (Rutherford & Rabovsky, 2018). In addition to whether an institution has the doctoral research classification, public institutions may have different public good outcomes based on whether they operate as an RCU and/or an MSI.

Regional-Comprehensive Universities

RCUs are four-year non-selective or semi-selective public institutions, most often in the Carnegie masters classification, although some are now considered doctoral institutions thanks to growth in education and other applied doctoral programs (Henderson, 2009). There are over 400 RCUs serving all 50 states and 20% of all undergraduates (Orphan & McClure, 2019). Among four-year public institutions, RCUs serve 70% of all undergraduates (Schneider & Deane, 2015). These institutions generally fulfill the role of the "state university system" outlined in California's master plan.

About half of RCUs began as normal schools, initially founded to respond to state needs in teacher education (Ogren, 2005). Normal schools have been called "instruments of great good" in the community and have served nontraditional populations like women, adults, rural, and low-income students since the late 1800s (Ogren, 2005, p. 5). The

remaining 50% of RCUs began as public university branch campuses or community colleges (Schneider & Deane, 2015). Over time and in response to state needs, many RCUs added graduate programs and, in some cases, invested more heavily in research (Fryar, 2015).

No single classification of RCUs currently exists, and there are not precise pre-existing proxies for the classification of RCUs (Fryar, 2015; Miller, 2020). While there is no technical listing of RCUs, many are members of the American Association of State Colleges and Universities, and those that are not members can be identified based on their history, mission, and enrollment profiles (Henderson, 2009; Orphan, 2018b). Regardless of their Carnegie classification, RCUs have a strong mission-driven focus on community engagement. They have historically been charged with providing vocational higher education and public service for the middle class and are often well-known in their region for the public service, research, and community resources they provide (Henderson, 2009; Ogren, 2005). RCUs have been called the "workhorses of American postsecondary education" because they provide such value to higher education (Schneider & Deane, 2015, p. 4).

State Goals and the Public Good. RCUs' specific regional focus and mission of access and public service may indicate that they have outsized contributions to state public good outcomes. RCUs are committed to providing affordable, broad-access education aimed at meeting state workforce needs—all important components of the public good (Fryar, 2015). However, there is limited research on RCUs and their

contribution to the public good. In general, RCUs have long been understudied and their value is often ignored (Schneider & Deane, 2015).

Following interviews with 19 RCU presidents, McClure (2018) found that RCUs uniquely contributed to the public good by transforming the lives of students that have traditionally been poorly served in higher education, remaining as affordable as possible, and "promoting the economic and cultural welfare of the region" (p. 128). Similarly, Orphan and McClure (2019) interviewed 17 institutional and community leaders to examine how a rural RCU served its community and found that the institution acted as an anchor for its region. The RCU played a vital role in promoting economic and civic development, supporting upward mobility, and contributing substantially to regional public health (Orphan & McClure, 2019).

A recent study by the American Enterprise Institute looked at the factors related to mobility rates at comprehensive universities (de Alva, 2019). The results showed that mobility varied widely across comprehensive universities. Economic mobility was only partially explained by differences in graduation rates, student body composition, and selectivity (de Alva, 2019).

In addition to their contributions to the public good, RCUs have a very different relationship with the state than most doctoral research institutions. RCUs are broadly more reliant on state funding than their peers and may be more reactive to changes in publicness over time (McClure, 2018; Taylor & Cantwell, 2019). For example, with fewer alternate streams of revenue, RCUs may continue following state goals in the

absence of funding or may be more responsive to state accountability than institutions that can more fully turn away from the state by increasing alternative revenue sources.

It is also possible that RCUs will respond to shrinking and unstable state funding by developing alternative revenue sources similar to their very high research peers. In a study of RCU responses to a new PBF accountability policy in Colorado, Orphan and Laderman (2018) found that RCUs were largely non-responsive to the state's attempts to hold them accountable to their performance goals. In large part, RCU leadership argued that because the state was a minority investor in higher education, they had no incentive to make real change for a few extra dollars. Instead, RCUs in Colorado looked toward public-private partnerships to increase lost revenues (Orphan & Laderman, 2023).

The studies described above focused on how senior leadership views the RCUs in their contribution to the public good and their relationship to state disinvestment and accountability. It is unclear whether these sentiments will translate into measurable differences in public good outcomes between RCUs and non-RCUs. The present study directly addresses this question. The final classification of institutions used in this study is MSIs.

Minority-Serving Institutions

MSI refers to multiple institutional designations, each designated to serve a particular group of historically underrepresented students of color (Hegji, 2017). These institutions receive federal funding intended to enhance and promote their ability to serve target populations. Twenty-eight percent of today's students are enrolled at an institution with enrollment levels that meet MSI eligibility guidelines, and this number will continue

to grow over time (Espinosa et al., 2017). In many cases, MSIs are also very high research universities and/or RCUs.

MSIs are defined by the students they enroll and, in some cases, by specific founding missions to serve students of color (Hegji, 2017). Two types of MSIs are determined based on their founding missions. With the passing of the 1965 Higher Education Act, HBCUs became the first MSI classification to receive federal recognition. HBCUs are colleges and universities established before 1964 with the primary mission and purpose of educating Black students (Allen et al., 2007). They vary widely in size, location, selectivity, control, and level. In fact, HBCUs can also be doctoral research institutions and 40% are also RCUs (Commodore & Njoku, 2020). These institutions are incredibly important for Black culture, community, and leadership development, and they graduate a disproportionately high number of Black community leaders, doctors, lawyers, and educators (Allen et al., 2007). HBCUs may provide different public benefits than other MSIs due to their founding missions and purposes.

The Tribally Controlled College or University Assistance Act of 1978 designated the second group of MSIs, tTribal Colleges and Universities (TCUs). TCUs are chartered by sovereign Indian nations with the specific purpose of providing higher education to American Indians (Hegji, 2017). TCUs provide robust contributions to their communities and serve as exemplars for truly integrating an MSI mission, but they are excluded from this analysis because they receive little to no state funding and are generally not subject to state authority like other public institutions (Nelson & Frye, 2016).

In addition to HBCUs and TCUs, there are five enrollment-based MSI classifications. Institutions apply for federal designation to each of these classifications, and their eligibility is determined by enrollment demographics (race and income). The first MSI group to receive federal designation was Hispanic-serving Institutions (HSIs), following the Higher Education Act of 1992 (Hegji, 2017). HSIs are any colleges or universities that enroll a large proportion of Latinx students (at least 25%) and receive federal funding to assist them in supporting those students (Laden, 2004). HSI grants can also be used for establishing community outreach programs, which would help these institutions align themselves with state goals for community engagement (Hegji, 2017). In 1998, a second enrollment-based MSI classification was created for Alaska Native and Native Hawaiian-serving (ANNH) institutions. Institutions must have at least 20% Alaska Native students or 10% Native Hawaiian students to be eligible for these grants (Hegji, 2017).

Three additional MSI programs began in 2008 with the College Cost Reduction and Access Act: the Asian American and Native American Pacific Islander-Serving institutions program (AANAPISI) for institutions with at least 10% Asian American or Pacific Islander students; the Native American-serving nontribal institutions program (NASNTI) for institutions with at least 10% Native American or American Indian student enrollment; and the Predominantly Black Institutions Program (PBI) for non-HBCUs with low educational and general expenditures per student, at least 40% Black enrollment, and at least 50% low-income students (Hegji, 2017).

Classification of the mission-based MSIs (HBCUs and TCUs) is easy to define with designations available in IPEDS. The enrollment-based MSIs are not as easy to classify. Most researchers, particularly those that focus on more than one type of MSI, use enrollment demographics to determine which institutions could quality as an MSI (Espinosa et al., 2017, 2018). However, simply enrolling a certain proportion of students does not mean that institution has indicated they intend to serve those students well (Garcia et al., 2019). A better measure of which institutions are, at least in some sense, committed to serving students of color is whether they have applied for and received funding under an MSI grant.

State Goals and the Public Good. The five enrollment-based MSI classifications are designated as serving a particular population, but unlike HBCUs and TCUs, there is no requirement that their mission be focused on serving the target population. Some institutions seek MSI designation solely to receive federal funding and are not focused on promoting student success for students of color (Garcia et al., 2019). For this reason, it is important to consider public benefits of HBCUs and enrollment-based MSIs separately. Nevertheless, by enrolling larger proportions of students of color, enrollment-based MSIs institutions make a unique contribution to the public good.

MSIs have the potential to provide substantial social and economic benefits to states, but there has not been much research on these contributions (Johnson et al., 2006). Initial evidence suggests that many MSIs have similar or better graduation rates for their target populations than non-MSIs and can be engines of extended upward economic mobility for students of color (Espinosa et al., 2017, 2018). There is also research

showing the public benefits of specific types of MSIs. For example, HBCUs have long provided extensive community outreach and public service (Esters & Strayhorn, 2013). In addition, an analysis of the impact of AANAPISI grants found measurable benefits to student success, including higher rates of completion and transfer (Teranishi et al., 2014). Despite this and other evidence suggesting that MSIs have numerous benefits for students, it is unknown whether they provide outsized contributions to state goals for the public good.

Summary

In addition to general analyses of all public four-year institutions, the current study examines the specific relationship between empirical publicness and realized publicness outcomes at three distinct types of institutions. Doctoral research universities are the most studied institution type and are often considered the most prestigious. These institutions have a wide body of research examining their contributions to society (particularly via their research activity) and are one of the only institution groups studied in publicness and privatization research (Enders & Jongbloed, 2007; Feeney & Welch, 2012; Rutherford & Rabovsky, 2018; C. Thomas, 2019; Welch, 2014). Doctoral universities, particularly those with very high research activity, may be less responsive to state goals because they tend to rely less on states for funding and have increased access to alternative revenue sources (Hearn et al., 2016).

RCUs are regionally-focused institutions without a single unifying classification structure (Fryar, 2015; Miller, 2020). Until recently, RCUs have long been understudied (Schneider & Deane, 2015). As a result, it is not known how the impacts of changes in

empirical publicness may uniquely affect these institutions. RCUs have a strong regional focus and mission of community engagement and service (Henderson, 2009). Because they are less selective, draw students largely from their regions and states, and focus on community engagement, RCUs may have outsized contributions to the public good. On the other hand, they are often more reliant on state funding and may be more severely impacted by low publicness (McClure, 2018).

MSIs refer to a cluster of federally designated mission- or enrollment-based institutions that serve a particular group of students of color (Hegji, 2017). Most studies on MSI outcomes use enrollment thresholds rather than examining institutions that have applied for and received MSI grants. Because MSIs serve populations that have been traditionally underrepresented in higher education, they are engines for upward mobility (Espinosa et al., 2018). Like RCUs, their public outcomes may suffer in states with low state funding.

This section has outlined measurable realized publicness components of state goals for higher education. The literature reviewed here informed my expected findings for each area of realized publicness. In this section, I have also reviewed literature on the different types of four-year public institutions of interest in my study: research universities, RCUs, and MSIs (both HBCUs and enrollment-based MSIs).

Conclusion

In this chapter, I have outlined my conceptual framework of privatization, empirical publicness, and realized publicness. I have reviewed literature on the empirical and realized measures of publicness in state public higher education. I have also reviewed

the specific contributions of different types of institution to state goals for the public good. In the next chapter, I describe the design of my mixed methods study and present the hypotheses I developed based on my conceptual framework and literature review. I describe the qualitative strand of data collection wherein I identified state goals for the public benefits of higher education. From there, I discuss how I conceptualized these goals into the quantitative strand and created variables used to measure each area of realized publicness. I present data definitions and data collection details as well as model construction for my quantitative strand. Finally, I outline the methodology I used to test my hypotheses about the relationships between empirical publicness and realized publicness outcomes and share the limitations of my study.

Chapter Three. Methodology

This chapter describes the data and methodology of the study. I discuss how I used the conceptual framework I developed with empirical and realized publicness (presented in Chapter 3) to guide my methodological decisions. First, I share my positionality as a researcher and how it informs my conception of the study and my methodological decisions. Second, I provide an overview of mixed method research and the research design I chose. Within the framing of my research design, I list the specific hypotheses I developed based on my research questions, conceptual framework, and review of prior literature. Third, I describe my data collection procedures for both the qualitative and quantitative strands of my study, including the construction of my quantitative dataset and detailed descriptions and sources for all primary independent variables, control variables, institution types, and outcome variables. I was guided by empirical and realized publicness theory in the development of independent and dependent variables in this study. I then move to data analysis, where I describe the qualitative procedures I used to determine state and system agency goals for higher education. Next, I explain how I operationalized the findings from my qualitative analysis to develop measurable outcome variables for my quantitative analysis. In the quantitative data analysis section, I describe how I used EFA to generate factors for each state goal. I then explain the descriptive statistics, ANOVA, random-effects models, and fixed-effects

models used to answer my last three research questions. Finally, I state the limitations of this study.

Researcher Positionality

I developed this study after participating in an interview with a reporter who asked me, as someone who is a proponent of state funding for higher education, why the decline or even elimination of state funding for public institutions should matter to the general public. I was surprised to find that, beyond discussing impacts on college access and student debt, I could not provide an evidence-based answer to the reporter's question about what benefit public institutions provide to the state as a whole. As an associate vice president at the SHEEO and the project lead for the State Higher Education Finance (SHEF) report (Laderman & Kunkle, 2022), I am in a professional position that advocates for state support for higher education and public governance of higher education. SHEEO is the membership association for state leaders of public higher education (with a clear interest in promoting public higher education), and SHEF is an authoritative source on trends in state funding for higher education.

I am also a product of multiple public university systems, and I credit them with changing my life. I began my college career in 2008, right as the Great Recession toppled our economy. I was a low-income student completely reliant on public funding and financial aid, and I dropped out and transferred twice to find affordable options after states cut funding for higher education and tuition rates increased rapidly. I was personally negatively impacted by declines in state funding and benefited greatly from

receiving a maximum Pell grant, additional federal and state grants, and federal and state work-study funding.

However, I also know that I was also able to successfully navigate through complex and changing higher education systems because I am privileged in two important ways. First, I am White, and most of the professors and administrators I interacted with looked like me. As a result, my professors had high expectations for me, were inclusive and supportive towards me, and did not commit microaggressions against me (Chesler, 1997). Second, my family is highly educated, and I was supported by my grandparents, who were college professors at the time and helped me navigate the higher education system, a privilege not shared by most first- or second-generation college students (Falcon, 2015).

My experiences in college during the Great Recession and while working at SHEEO undoubtedly shaped my interest in this topic, and I am acutely aware of my bias: I expect and hope to find that empirical publicness is important for the public good. At the same time, I am a trained researcher and will follow the evidence. A review of the literature has already shown me that the evidence for aspects of publicness driving institutional outcomes is murky at best (e.g., Deming & Walters, 2017; Enders et al., 2013; Hillman, 2016; Volkwein & Tandberg, 2008; Zhao, 2018), and that total revenues might be more important for the public good than where total revenues come from.

Positionality statements such as this one are uncommon in quantitative and mixed method research but provide important context about the researcher and his or her potential biases (Hernández, 2015; Wells & Stage, 2015). While I have attempted to

bracket or set my bias aside while reviewing state mission and vision statements and developing measures of realized publicness (Creswell & Poth, 2016), my strong stance on the importance of public higher education has likely impacted my methodological and conceptual decisions.

Research Design

The purpose of my study was to examine institutional contributions to state goals for the public good. Fulfilling this purpose required developing a framework of common state goals for higher education and developing a means with which to test the outcomes of those goals at an institutional level. Neither qualitative nor quantitative research designs alone could fully answer my research questions. The research design that was most appropriate to answer my research question is a mixed methodology design that includes both qualitative and quantitative analyses (Creswell & Clark, 2017). In this section, I provide a brief background on mixed method research and outline my mixed method research design, including details on my research approach to the qualitative and quantitative strands in my study.

Mixed Methods Research

Mixed method research combines methodology, research design, and theory or philosophy (Creswell & Clark, 2017). The key components of a mixed method study are to collect and analyze both quantitative and qualitative data rigorously in response to relevant research questions and combine or otherwise integrate the data and results. All decisions and procedures are framed within theory and research design. Through the use of mixed methods, we can offset the limitations inherent in either qualitative or

quantitative research. Using mixed methods research, we can "gain new knowledge that is more than just the sum of two parts" (Creswell & Clark, 2017, p. 13).

One requirement of mixed method designs is that both strands need similar data samples (Tashakkori et al., 2020). I address this by using a sequential identical sample, including all states in both my qualitative and quantitative strands. The qualitative strand uses documentary evidence (state mission and vision statements), while the quantitative strand uses numerous existing datasets and new data collections from government and organizational websites.

Exploratory sequential research designs were specifically created to help researchers establish procedures for exploring concepts to create better measurements (Creswell & Clark, 2017). In the current study, this research design allows me to determine high-level state goals for higher education, operationalize those goals into specific measurable variables, and test that the measurable variables are a valid construct with which to measure state goals for higher education. The research design also allows me to test the tool I have developed measuring state goals for higher education by examining the quantitative relationships between those state goals and different independent variables.

Exploratory Sequential Design

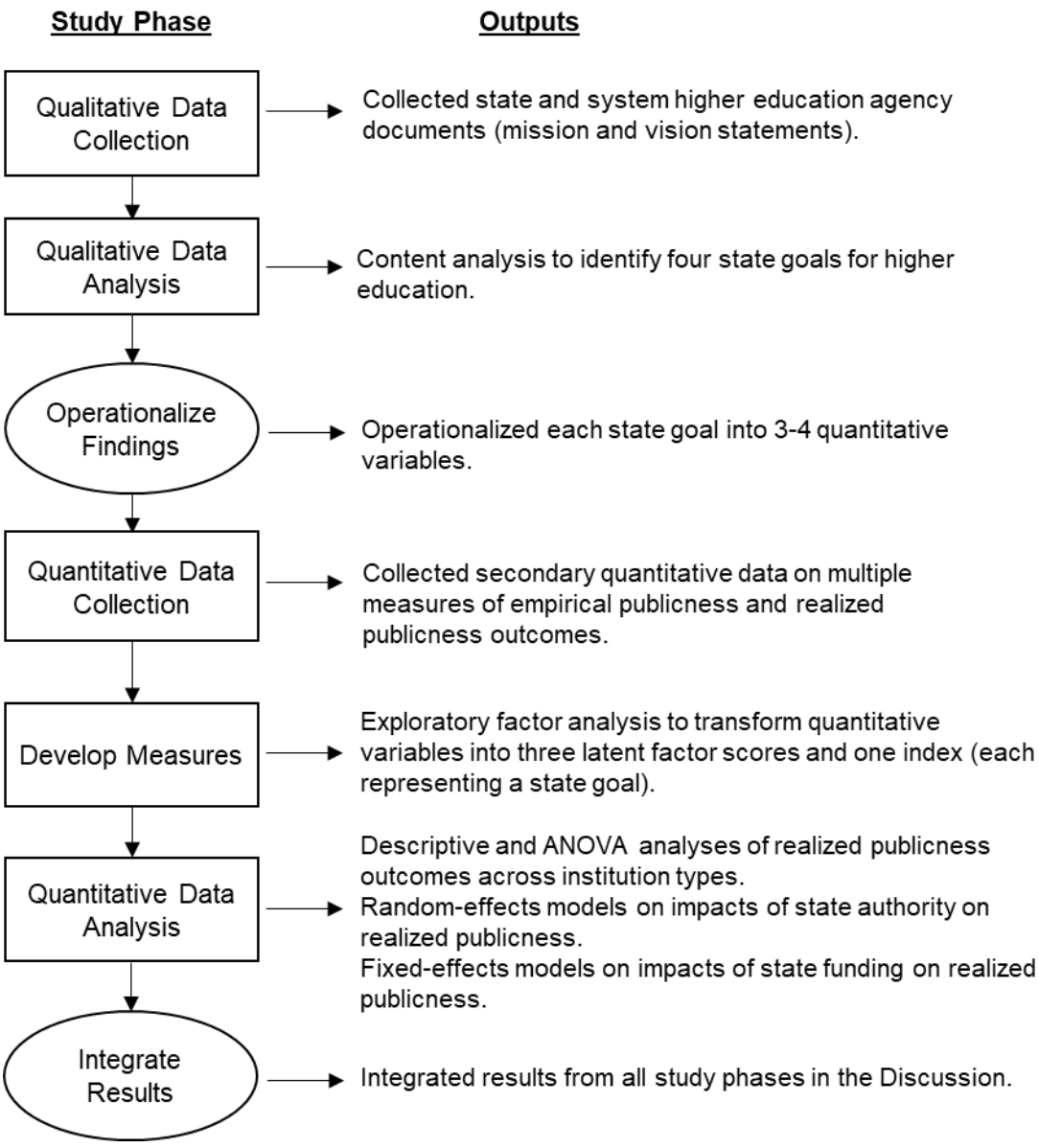
I used an exploratory sequential mixed methods design. In exploratory sequential designs, a qualitative component or strand of the study occurs first and is followed by the development of a tool. The tool is then used for the quantitative strand of the study (Creswell & Clark, 2017). I selected an exploratory sequential design because it most

closely aligns with my purpose and research questions. In exploratory sequential studies, the qualitative strand is used to explore a problem, and the quantitative strand is used to understand relationships among variables (Creswell & Clark, 2017). In this particular study, the qualitative strand is necessary to provide context and understand state's goals for higher education on a high level. The quantitative strand could not happen without the qualitative results being used to guide it—I operationalized the qualitative findings into measurable variables and created a tool using factor and index scores that measure multiple components of each state goal simultaneously. The integration stage of data analysis in this study occurs when I operationalize broadly defined state goals into measurable data elements that can be used to analyze institutional contributions to the public good. With the quantitative strand, I test the unique contributions of different institution types to the public good and test the relationship between state authority and funding on each outcome factor or index. In this way, the quantitative strand builds on the findings from the qualitative strand.

Figure 4 shows a diagram of my exploratory sequential mixed method approach. In this diagram, the boxes represent different phases of data collection and analysis I undertook in this study, and the circles represent stages (which have no new data or analyses). The circles are also the two primary points of inference, wherein I integrate my qualitative and quantitative work.

Figure 4

Mixed Method Design Diagram



Qualitative Strand

The qualitative strand of my study is, to my knowledge, the first analysis of state agency goals for higher education. This strand provides important context and

information regarding why states invest resources in public higher education and seek to control public institutions. My qualitative research purpose was to develop a theory of state goals for public higher education based on data collected from state agencies. This purpose most closely fits under a grounded theory approach (Creswell & Poth, 2016). Grounded theory research aims to generate a unified theory and provide a framework for future research; it is the best research approach to take when there is no existing theory available to explain a phenomenon (Creswell & Poth, 2016). A key component of grounded theory research is that the theories developed are not pre-existing, they are developed and drawn from the data (Creswell & Poth, 2016). Grounded theory research requires a large sample size and is unique among qualitative research for attempting to generalize beyond the sample. The qualitative strand of my study does not entirely align with grounded theory; I am not trying to explain a process (i.e., the process by which states develop their goals), only the end result. I am also not trying to explain *why* states have certain goals—that is beyond the bounds of my study. Additionally, traditional grounded theory involves simultaneous and iterative data collection and analysis, wherein data are collected and analyzed until the researcher feels that their sample is saturated and no new information can be obtained by continuing to collect data (Cho & Lee, 2014). I reviewed mission and vision statements for every state and system of public higher education, but a true grounded theory analysis would include additional source documentation. Still, I used a grounded theory approach as a broad frame or theoretical framework for my qualitative data collection, analysis, and interpretation decisions in this study.

I combined a high-level grounded theory approach with the specific qualitative method of content analysis (see Qualitative Data Analysis in this chapter). In some cases, grounded theory has been considered a theoretical framework while content analysis was more of a specific research method or strategy for data analysis (Cho & Lee, 2014; Patton, 2002)—this mixture of grounded theory and content analysis is the approach I took in the present study.

Quantitative Strand

A quantitative analysis typically follows the qualitative strand in exploratory sequential mixed methods research designs (Creswell & Clark, 2017). The quantitative strand is important in my study because higher education institutional leaders, policymakers, analysists, and the general public cannot currently quantitatively measure many of the effects of empirical publicness on institutional outcomes for the public good (Rizzo, 2005). In many cases, higher education does not have clear quantitative data on institutional contributions to the public good (Enders & Jongbloed, 2007). Such data is important to inform policymakers and the public about the public, non-economic benefits of higher education (Singh, 2012; Trammel, 2005). In the quantitative strand of my study, I developed and tested measures of each state goal for higher education.

My quantitative approach included two phases. The first phase was the development of my tool for measuring state goals for public higher education. I operationalized each state goal into specific measures based on the literature review I conducted of each state goal. I then used factor analysis to develop measurable constructs for each state goal (Yong & Pearce, 2013).

The second phase was to construct a cross-sectional institution-level dataset and conduct rigorous descriptive analyses and inferential statistics to answer my quantitative research questions. The foundation for this approach comes from econometrics and is an approach often used to answer policy questions when an experimental design is not possible (Bailey, 2016; Verbeek, 2017). The quantitative strand allowed me to describe state- and institution-level trends in ways that complement and expand upon qualitative studies that have explored the responses of institutional leaders to changes in state funding and accountability (e.g., Orphan & Laderman, 2023). My methodological choices were also informed by Fryar's call for empirical research on the impacts of privatization and McClure and colleagues' call for more multilevel and causal research designs to show how privatization affects institutions and states (Fryar, 2012; McClure et al., 2020). For each quantitative research question, I developed specific predictions based on my literature review and conceptual framework. I present my quantitative hypotheses in the next section.

Hypotheses

In this section, I list my hypotheses and expected findings for each quantitative and mixed research question and outcome area. I first outline specific hypotheses for each research question. Next, I justify my hypotheses by summarizing the rationale behind my expected findings for each outcome measure. I do not have hypotheses for my first two research questions because they are qualitative in nature.

My third research question is "to what extent can observed variables measuring institutional contributions accurately capture the components of state goals identified

through content analysis as latent constructs?" This mixed-method research question investigates the connection between my qualitative and quantitative strands. I hypothesize that I will sufficiently operationalize state goals for higher education identified in my qualitative strand, meaning that the observed variables will successfully form latent constructs (factors) that can be used to measure institutional contributions to each area of realized publicness outcomes. However, given the lack of quantitative data on community improvement, it is possible that the data elements available are insufficient to create a latent factor of community improvement.

The fourth research question focuses on differences across institution types, asking, "how do empirical publicness and realized publicness outcomes vary across four types of four-year public institutions: Historically Black Colleges and Universities (HBCUs), minority-serving institutions (MSIs), regional-comprehensive institutions (RCUs), and research universities?" I expect to see several differences:

a. MSIs and HBCUs will have better outcomes for equity in both access and success, while research institutions will have worse outcomes.
b. Workforce and economic development outcomes will be significantly higher at research institutions.
c. HBCUs, MSIs, and RCUS will have higher contributions to community improvement.

I expect that MSIs and HBCUs will have more equitable access and success than other public institutions because prior research has found that MSIs have smaller equity disparities in graduation rates than non-MSIs (Allen et al., 2007; Espinosa et al., 2017;

Teranishi et al., 2014). On the other hand, I expect that research institutions will have worse access and equitable success due to their selectivity. I expect that research institutions will have higher workforce outcomes because prior research has shown that graduates of research universities have lower unemployment rates than graduates from other institutions (Mugglestone et al., 2019). Finally, I expect MSIs and RCUs to have stronger contributions to community improvement because scholars have found that MSIs and RCUs have substantial contributions to community engagement (Esters & Strayhorn, 2013; Orphan & McClure, 2019).

My fifth research question asks, "what is the relationship between state oversight and an institution's contribution to different public benefits?" Due to the limited evidence that state oversight drives the behavior of public institutions (Enders et al., 2013; Hillman, 2016; Lyall & Sell, 2006; Volkwein & Tandberg, 2008), I predict smaller relationships between state oversight and public good outcomes. I expect that any significant relationships will be in the following direction:

a. State accountability is negatively related to both access and success.
b. State authority is negatively related to workforce and economic development, while state accountability is positively related to workforce and economic development.
c. State authority is positively related to community improvement, while state accountability is negatively related to community improvement.

Some evidence suggests that state oversight may hamper student success, but other evidence suggests it may help (by keeping tuition rates low, for example; Birdsall, 2018;

Umbricht et al., 2017; Volkwein & Tandberg, 2008). Performance funding is closely tied to student success outcomes, but prior research has consistently shown that PBF can have negative consequences for equity in student access and success (Birdsall, 2018; Umbricht et al., 2017). For workforce and economic development, prior research has found that states with more centralized authority have worse outcomes on measures such as unemployment rates and wages (Volkwein & Tandberg, 2008).

States with greater authority over higher education have more centralized governance structures and may have a greater ability to drive public institutional behavior toward meeting their broad goals, which include community improvement (Andrews et al., 2011). Additionally, evidence suggests that institutions with greater autonomy from state authority might reduce spending on public service (Welch, 2014). However, accountability structures such as PBF are intended to incentivize institutions to direct their behavior toward the specific metrics included in the formula, and have negative consequences for metrics not included in the formula (Birdsall, 2018; Hillman & Crespin-Trujillo, 2018; Kelchen & Stedrak, 2016). Therefore, while accountability could positively impact workforce and economic development, it could also lead to negative outcomes in other areas such as equitable access and success and community improvement.

My sixth and final research question asks, "what is the relationship between state financial publicness and an institution's contribution to different public benefits?" I hypothesize that financial publicness will be positively related to all four state goals for public higher education. I expect to see positive significant relationships between state

publicness and access and affordability, success and attainment, workforce and economic development, and community improvement. I expect to see significant relationships because conceptually, state funding is considered one of the state's "most powerful levers for change" (Aldeman & Carey, 2009, p. 7). There is also research suggesting a connection between state funding or financial publicness and student access and affordability (Hillman et al., 2014a; Webber, 2017; Zhao, 2018); student success and state attainment (Zhao, 2018); and economic development (Bound et al., 2019; Chakrabarti et al., 2019; Jaquette & Curs, 2015).

In my final chapter, I will assess and discuss the extent to which my hypotheses were supported. The rest of the present chapter explains the steps I took to examine the hypotheses presented here. In the next section, I outline how I collected data to answer my research questions and test my hypotheses.

Data Collection

This study includes two distinct data collection processes. First, I collected data for the qualitative strand in my study. Next, I used the findings from the qualitative strand to select variables for my quantitative strand. I then conducted data collection for my quantitative strand. The data collection processes used in both studies are described in the following sections.

Qualitative Data Collection Procedures

The qualitative strand of my study is concerned with determining state goals for the public benefits of higher education. To do this within my grounded theory approach (Creswell & Poth, 2016), I collected documentary evidence on state mission and vision

statements from which I would be able to determine each state's goals and priorities. Prior studies on mission and vision statements in higher education have used content analysis methods to analyze the missions and visions of universities themselves (Morphew & Hartley, 2006; Özdem, 2011; Welch, 2014). In this study, I applied this methodology to state-level mission and vision documents.

I collected government documents (state mission, vision, and goal statements) to develop a broad set of themes to cover the different public goals for state coordinating and governing agencies for public four-year higher education. I did not consider strategic plans because they often represent immediate priorities and may not reflect the state's long-term goals or original purposes for higher education (for example, see Colorado Department of Higher Education, 2019; Pennsylvania's State System of Higher Education, 2014). While some agency mission and vision statements are similarly recent, others are codified in statute and/or have existed for decades. For example, Virginia's higher education mission statement comes from its founding report in 1955 (Virginia Advisory Legislative Council, 1955).

A common practice in analyzing mission and vision statements is to review statements posted on institution websites and develop common themes and subthemes based on the language and phrases used (Morphew & Hartley, 2006; Özdem, 2011; Wilson et al., 2012). Following this methodology, I collected mission and vision statements for the coordinating and governing bodies of public higher education in each state (Fulton, 2019a). I collected mission and vision statements in July 2022. The list of agencies and their typological classifications came from the Education Commission of

the States (2020) 50-state comparison of state postsecondary governance structures (2020). Although there are multiple types of governance structures, they generally represent either a system of higher education institutions or all public higher education in the state (Fulton, 2019a). Of the 96 state and system boards I identified for higher education, 35 were state-level entities and 59 were system-level entities. There were nine administrative boards, 22 coordinating board, 62 governing boards, and one membership board (Table 3). Two agencies (the Kansas Board of Regents and Montana Board of Regents for Higher Education) do not fit cleanly into the state or system governance structure matrix. These two agencies have coordinating responsibility for all public higher education institutions in the state, but also serve as governing boards for a subset of public institutions.

Table 3

Level and Typology of Governance Structures for Public Higher Education Institutions

Structure	State	State and system	System	Total
Administrative	9	0	0	9
Coordinating	21	0	1	22
Coordinating and Governing	0	2	0	2
Governing	4	0	58	62
Membership	1	0	0	1
Total	35	2	59	96

I collected mission and vision statements from agency websites and, in some cases, strategic planning documents. In a handful of cases, mission and vision statements were not publicly available online and I obtained them via email communications with agencies. Out of the 96 state and system boards for higher education, 48 had both a

mission and vision statement, 41 had only a mission statement, four had only a vision statement, and three had neither statement. Two of the entities with neither statement were state-level administrative or coordinating bodies, which were offices within a department of education (and therefore did not create a higher-education specific mission or vision). The third entity with no mission or vision statement was the Ohio Department of Higher Education, which was restructured in 2015. My final dataset of mission and vision statements constituted a complete sample of all existing statements as of 2022. Sources for all state and system statements can be found in Appendix A.

In the following section on quantitative data collection procedures, I describe how I collected quantitative variables based on the results of my content analysis. Before I could collect quantitative data, I first had to operationalize the state goals identified in my qualitative strand. To do this, I conceptualized and contextualized each thematic area of state goals for higher education at system- and state-level agencies. This process is described in my data analysis section. After operationalizing these goals, I collected quantitative data for each independent and outcome variable.

Quantitative Data Collection Procedures

The quantitative strand of this study combines pre-existing datasets from multiple federal and intermediary policy organizations. Data were collected for institutions in all 50 states in fiscal year 2020, which ran in most states from July 1, 2019 through June 30, 2020, and corresponds to academic year 2019-2020, which began just one to two months later at most institutions. The latter half of this time-period includes the first few months

of the COVID-19 pandemic. However, the pandemic did not greatly impact institutional revenues until the next year (Laderman & Kunkle, 2022).

This study uses a cross-sectional dataset with institutions nested within states. The institution sample is derived from a set of all public four-year degree-granting institutions in the United States. I determined whether an institution is four-year based on its 2018 Carnegie classification (baccalaureate and above), the most recent year available (The Carnegie Classification Institutes of Higher Education, n.d.-a). Carnegie classifications are a widely-used framework for determining institution types (The Carnegie Classification Institutes of Higher Education, n.d.-a). I excluded baccalaureate/associates mixed colleges, tribally controlled institutions, and special-focus or specialized institutions. I excluded baccalaureate/associates mixed colleges because they are often community colleges that over time have begun to offer a large proportion of baccalaureate credentials, and may differ from primarily four-year degree-granting institutions. I excluded special-focus institutions because their funding structure and outputs may differ in ways that cloud quantitative analyses. I excluded tribally controlled institutions because they are not owned by states. Carnegie classification data come from the IPEDS Institutional Characteristics Survey (National Center for Education Statistics, 2022b).

Several additional institutions were removed from the dataset manually. First, I flagged military institutions and removed them from the sample by searching institution names for the following keywords: air force, air assault, army, military, maritime, marine, navy, naval. I removed military institutions because they are largely federally funded and

are generally not owned by states. Next, I flagged and removed online-only institutions using an IPEDS institutional characteristics variable, because online-only institutions likely differ substantially in their relationship to their community and in their public good outcomes. Two additional campuses without the IPEDS flag were manually coded as online-only: Purdue University Global, and Arizona State University Digital Immersion. Finally, I removed any institutions located in Colorado, because the state uses a voucher funding model that appropriates roughly half of state funding through students rather than directly to institutions (Hillman et al., 2014a). This alternative funding mechanism complicates how institutions receive revenues. If included in the study, most state funding in Colorado would be classified as financial aid and included with tuition revenue (corrections for missing data and data transformations are described in a later section).

There are three major types of variables used in this study: primary independent variables, secondary independent variables, and outcome variables. I used EFA, described in a later section, to determine weighted indices of the composite measures for realized publicness outcomes of education access and affordability, success and attainment, workforce and economic development, and community improvement. Unless otherwise described, data elements were matched using their IPEDS unitID, a unique identifier. Within the description of each variable, I note the variable name used in my analysis in italics. Lists of all quantitative independent and outcome variables used in this study can be found in Table 6 and Table 7. A complete list of all variables with definitions are in Appendix B. Appendix C lists the values for all primary independent variables by state.

Independent Variable Construction

This study includes four primary independent variables that I used to test the different components of an institution's publicness (public funding ratio, state governance, state regulatory control, state accountability). I present the primary independent variables first, followed by numerous secondary independent variables, which include institution-level control variables and the specific institution types used to examine differences in realized publicness outcomes. See Table 6 for a full list of quantitative independent variables used in this study.

State Support. State support (*statesupport*) is from the IPEDS Finance Survey "revenue and other additions" component (National Center for Education Statistics, 2022b). State support is the sum of state appropriations and grants and contracts. State support is a broad measure of the state's contributions to institutions, excluding capital appropriations. State appropriations refer to allocations from a state government for current institutional general operating expenses. Grants and contracts (*contracts*) are revenues from government agencies that are for research or other projects. These revenues are more restricted than appropriations. In some cases, state grants and contracts may include state financial aid programs, however, in most cases state financial aid is reported through tuition discounts and allowances (National Center for Education Statistics, 2022b).

Government Financial Aid. Government financial aid (*totalaid*) includes any federal, state, or local discounts and waivers applied to tuition and fees. These awards consist of grants or scholarships allocated directly to students that are not expected to be

paid back. Because institutional auxiliary revenues are excluded across the board in this study, only aid applied to tuition and fees is included in government financial aid. These data come from the IPEDS Finance Survey's "discounts and allowances by source of scholarships and fellowships" component (National Center for Education Statistics, 2022b).

Tuition and Fees. Tuition and fees (*tuition*) refer to revenue from any tuition charges and education or general fees and exclude any charges for room, board, or other services. Gross tuition and fees include any tuition revenue, even if it is derived from government financial aid. Net tuition and fees exclude any government financial aid. Net tuition and fees are part of the IPEDS Finance Survey "revenues and other additions" component and are combined with total aid described above (National Center for Education Statistics, 2022b).

Private Revenues. Private revenues (*privaterevs*) are the sum of all non-public revenue sources. Private revenues include net tuition and fees, government financial aid, gifts, investment income, sales and services of educational activities, and other non-government revenue sources. Revenues from hospitals, auxiliary enterprises, and other independent operations are not included because they are not used for general education activities (National Center for Education Statistics, 2022b).

Total Revenues. Total revenues (*totalrevenue*) are equal to the sum of all operating and non-operating revenue sources, not including capital appropriations, capital grants and gifts, or additions to permanent endowments.

Financial Publicness. I constructed a variable that measures state funding as a percentage of all institutional revenues, following prior studies on publicness and the theory behind financial publicness (Bozeman & Moulton, 2011; Rutherford & Rabovsky, 2018; Welch, 2014; Whitney, 2004). I used publicness theory to determine whether institutional leaders would view each funding source as being from the state. All finance data come from the IPEDS (National Center for Education Statistics, 2022b). The calculation I created for financial publicness uses state support as a numerator and total revenues as a denominator. The calculation is:

$$pubfund = \frac{state\ support}{total\ revenues}$$

I created an additional public funding variable as a sensitivity check to help ensure that results are not affected by construct creation. Instead of considering financial publicness as a proportion of total revenues, I instead structured financial publicness as the ratio of state support to private revenues. The inclusion of government financial aid in private revenues makes conceptual sense from the perspective of how an institution receives its funds (i.e., from the state versus from students or other private entities). However, to test whether this impacted the results, I removed government financial aid from the private side of the equation to determine whether state funding allocated directly to students impacts findings on the relationship between empirical and realized publicness. The alternative specification I created for a public funding ratio is:

$$pubfund1 = \frac{state\ support}{(private\ revenues - government\ financial\ aid)}$$

Governance Structures. Governance structures (*govstructure*) refer to the presence of a state-level administrative, coordinating, or governing agency for the public four-year sector of higher education. Governance structure data came from the Education Commission of the States and internal SHEEO documents (Fulton, 2019a). I used the Education Commission of the States database of state governance structures to determine the most centralized entity responsible for higher education in the state and created a scale to measure centralization and state authority in higher education governance. The development of this categorical variable was informed from the results of my qualitative analysis and my literature review of prior research on state governance structures. Prior studies have not distinguished between state-level and system-level governing boards (Lowry, 2007), but my qualitative findings (presented in Chapter Four: Results) show that there are important differences in the higher education goals of state- and system-level agencies. I classified two states with combined agencies that serve as coordinating boards for the entire state and governing boards for a particular system as state coordinating boards. System-level entities (membership, coordinating, governing boards) were given a zero (Table 4). I coded state administrative agencies as a 1. Administrative agencies demonstrate some degree of state-level coordinating over higher education, but have no responsibility for high-level planning for higher education in the state (Fulton, 2019a). I coded state coordinating agencies as a 2, as these agencies have substantial involvement in planning and coordinating all public institutions in the state, but are limited in their level of control. I coded state governing agencies as a 3, because those agencies have more power over and responsibility for public institutions in their state (Fulton, 2019b).

Table 4

State- and System-Level Boards for Public Higher Education

Type of board	Score	States
System membership, coordinating, or governing	0	14
State administrative	1	9
State coordinating	2	23
State governing	3	4

To test whether this classification impacted my results, I created two additional governance structure variables and conducted sensitivity tests. First, I created a second categorical variable wherein system-level agencies were zero, but I coded both administrative and coordinating agencies as a 1 and governing agencies as a 2 (*govstructure1*). Second, I created a binary variable where all state-level agencies received a 1, while system-level agencies received a zero (*govstructure2*). Governance structure variables are state-level and are therefore not included in any fixed-effects models (which include fixed effects for states).

Regulatory Control. I measured an agency's regulatory control using their tuition-setting authority (*centraltuit*). If a state actor (governor, legislature, or state-level agency) had primary authority over setting undergraduate in-state tuition rates, I coded the state as a 1. If an institution or system-level actor had primary authority, I coded the state as a 0. Survey responses were specific to the four-year public sector and were derived from the question "Which entity is primarily responsible for setting resident, undergraduate student tuition rates for the four-year sector in your state?" If states did not assign any entity as primarily responsible, the most centralized entity listed as having an

informal role was considered (i.e., if the governor has an informal role and no other entity has primary responsibility, I coded that as centralized tuition-setting authority). If multiple actors were listed as having primarily responsibility, I chose the most centralized actor (e.g., I coded the state as a 1 if any state-level entity was involved). Rhode Island did not respond to the 2021 edition of the survey with these data, so I used their response from the previous administration (2017) instead. Tuition-setting authority data came from the SHEEO survey on Tuition, Fees, and Financial Assistance (Armstrong et al., 2017; Colorado & Laderman, 2023). Centralized tuition-setting authority is a state-level variable and therefore is not included in any fixed-effects models.

Accountability. I measure state-level accountability using PBF. While PBF is not the only tool states use to hold institutions accountable, it is a very commonly used tool and has publicly available data (Boelscher & Snyder, 2019). The percent of funding from PBF (*pbfpct*) is a percentage of total state operating appropriations, ranging from 0-100%. Data are specific to the sector (meaning that no two-year PBF policies are included), and states without a PBF policy in place for the four-year public sector are coded as 0. Data on PBF come from the SHEOO's SHEF data collection (Laderman & Kunkle, 2022). PBF is a state-level variable and therefore is not included in any fixed-effects models.

Total Core Revenues. Total core revenues (*revenue_fte*) are any revenue sources used for essential educational activities. Core revenues are the sum of federal, state, and local government appropriations, tuition and fee revenue, federal, state, and local operating and non-operating grants and contracts, gifts, investment income, and other

sources. I adjusted for variation in institution size by dividing core revenues by FTE enrollment. I used this variable (reported in the thousands) in all models to control for an institution's total revenues and isolate the effects of changes in the distribution of funding. Total core revenues are aggregated from variables in the IPEDS Finance Survey (National Center for Education Statistics, 2022b).

Net Price. Net price (*netprice*) refers to the average yearly price charged to first-time, full-time undergraduate students receiving student aid, after deducting all financial aid. Net price is calculated by taking the total cost of attendance and subtracting the average amount of federal, state, local, and institutional grants and scholarships. Net price was used as a control variable for education access and affordability and education success and attainment, as an institution's net price can impact student enrollment and graduation rates. Net price data come from the IPEDS Student Financial Aid survey (National Center for Education Statistics, 2022b).

Percent Federal Revenue. The proportion of revenues an institution receives from the federal government (*federal_pct*) is used as a control for all regression models because federal appropriations, grants, and contracts are neither state support nor non-governmental revenues, and do not cleanly fit within either the numerator or denominator of the public funding variables. Federal revenues are the sum of federal appropriations and federal grants and contracts from IPEDS Finance Survey (National Center for Education Statistics, 2022b).

FTE Enrollment. FTE (*fte*) enrollment is calculated using the number of credit hours each institution reports for a given group in an academic year, reported in the

thousands. Credit hours are converted into a standard metric where one FTE equals 30 undergraduate and 24 graduate credit hours, with adjustments for institutions on the quarter system. I used FTE enrollment (in thousands) in this study as a control measure of institutional size. FTE enrollment comes from the IPEDS 12-month enrollment survey (National Center for Education Statistics, 2022b).

Selectivity. Selectivity is calculated by dividing the number of students admitted to an institution by the number of that institution's first-time degree-seeking undergraduate applicants (*admitrate*). The resulting admit-rate ranges from 0 to 1. Institutions with an open admission policy may have inaccurate application acceptance rate data. Therefore, if an institution marked that they have an open admission policy, it was automatically given a 1 on selectivity. In this study, selectivity was used as a control variable due to its impacts on institutional outcomes in education access, success, and workforce and economy (de Alva, 2019; Flores & Park, 2013; Jaquette & Curs, 2015; Park et al., 2018; Scott et al., 2006). Selectivity data comes from the IPEDS Admissions survey (National Center for Education Statistics, 2022b).

Land-Grant Status. Land-grant institutions (*landgrant*) were founded to provide teaching and research on agriculture, military tactics, and other areas. Land-grant status is a binary indicator where 1 = *land-grant institution* and 0 = *all other institutions*. Land grant status was used as a control variable for community improvement variables, which may be higher at land grant institutions. This variable comes from the IPEDS Institutional Characteristics Survey (National Center for Education Statistics, 2022b).

Graduation Rate. An institution's overall graduation rate (*gradrate*) is the percent of first-time full-time undergraduate students who graduate with a bachelor's degree in 150% time or six years. The six-year graduation rate is commonly used because it captures the majority of students who will graduate from an institution in an expected timeframe (Cook & Pullaro, 2010). Graduate students were not included in this variable because institutions differ in their ratio of undergraduate to graduate students, and graduate students may have different graduation rate patterns and length of degree programs. Graduation rate data comes from the IPEDS Graduation Rates survey, and excludes any deceased students, permanently disabled, or those who left school to serve in the military or to complete foreign service (National Center for Education Statistics, 2022b).

Very High Research Universities. Very high intensity research universities (*research*) are determined based on their Carnegie classification. All very high research institutions are doctoral/research universities. While Carnegie classifications do not directly measure differences in institutional missions, I used the classification as a proxy for the graduate and research university type outlined in the California Master Plan, which influenced the development of differentiated systems of higher education in many states (California State Department of Education, 1960). The current criteria for a very high research university are that the institution must have very high research expenditures, staff, and research doctoral completions when compared to other doctoral institutions (The Carnegie Classification Institutes of Higher Education, n.d.-b). Very

high research intensity status comes from the IPEDS Institutional Characteristics Survey (National Center for Education Statistics, 2022b).

Regional-Comprehensive Universities. RCU (*rcu*) classification is not as straightforward as the very high research classification. According to Fryar (2015), there are two ways to create a classification of RCUs. The first is historical and considers the founding mission of the institution. This is useful if looking at change or drift over time. The second is a contemporary classification, which excludes institutions that have become, for all intents and purposes, indistinguishable from flagships and other universities originally founded for the purposes of research and advanced graduate education (such as the University of California system). Because I am interested not in how RCUs have changed over time but in how well institutions with a regional, more open-access and less research focused mission serve the public good, I used the contemporary classification for this study (Fryar, 2015).

To create a dataset of RCUs, I created a list of flagship institutions in each state and excluded those institutions across all years in the dataset. The concept of a flagship institution is much more straightforward in states like North Carolina (the University of North Carolina Chapel Hill) and Washington (The University of Washington) than Texas, which has more than one primary university system. Flagships are generally the largest Carnegie classified very high research universities with a high proportion of doctoral degrees. In addition, I removed all non-HBCU land-grant universities (as defined by IPEDS).

Next, based on Fryar's (2015) analysis I excluded any institutions with the Carnegie very high research classification each year. I also considered selectivity and doctoral awards as a percentage of all degrees awarded at the institution to ensure that my dataset fits the contemporary definition of an RCU (Fryar, 2015). Finally, I compared my list to Miller's classification of comprehensive institutions, which was developed using social network analysis (Miller, 2020). The final list of all RCUs is listed in Appendix D.

Minority-Serving Institutions. MSIs are defined as any public four-year institution that has received federal funding under an MSI program (Nguyen et al., 2022). There is an important distinction between mission-based and enrollment-based MSIs. Mission-based MSIs (HBCUs and TCUs) received their MSI designation due to their founding missions and have very different funding structures than enrollment-based MSIs, which were founded as predominantly White institutions and over time enrolled a high enough proportion of students of color that they were able to apply for and receive funding as an MSI (Hegji, 2017). TCUs are excluded from this analysis because their publicness scores will not accurately reflect how public they are. While their contributions to the public good are immense, TCUs are not owned by states and therefore are not subject to the same type of state oversight. Additionally, with few exceptions, TCUs do not receive state general operating appropriations and therefore do not have the same financial publicness relationship with states as other public institutions (Nelson & Frye, 2016). HBCUs (*hbcu*) are included in this study but are examined separately from enrollment-based funded MSIs (*msi*) due to their fundamental differences in designation (founding mission vs. enrollment threshold) and variation in their funding

streams (Esters & Strayhorn, 2013; Hegji, 2017). The Department of Education publishes annual lists of institutions receiving each type of MSI award (U.S. Department of Education, 2020). I used the eligibility matrix for 2020 to determine which public institutions had received funding for an MSI program in that year. Enrollment-based institutions are considered MSI awardees if they received federal funding under one of the following programs:

- Master's Degree Programs at Predominantly Black Institutions
- Predominantly Black Institutions: Competitive Grants, Formula Grants
- Strengthening Institutions: American Indian Tribally Controlled Colleges and Universities, Alaska Native and Native Hawaiian-Serving Institutions, Asian American and Native American Pacific Islander-Serving Institutions, Native American-Serving Nontribal Institutions
- Hispanic-Serving Institutions Division: Developing Hispanic-Serving Institutions Program, Hispanic-Serving Institutions – Science, Technology, Engineering, or Mathematics and Articulation Programs, Promoting Postbaccalaureate Opportunities for Hispanic Americans PPOHA, College Cost Reduction and Access Act Hispanic-Serving Institutions Program

Table 5 lists the institutions classified as enrollment-based MSIs and HBCUs, as well as research institutions and RCUs. Institutions sometimes had multiple MSI designations and were included in more than one institution type. In total, there were 91 very high research universities in the sample, 379 RCUs, 63 enrollment-based MSIs, and 39

HBCUs. I created binary variables to indicate whether an institution was a member of each institution type.

Table 5

Public Very High Research Universities, RCUs, MSIs, and HBCUs

Institution Type	Research	RCU	MSI	HBCU
Research	79	0	12	0
RCU	0	313	39	27
MSI	12	39	12	0
HBCU	0	27	0	12
Total	91	379	63	39

Table 6

List of Independent Variables and Sources

Quantitative variables	Variable name	Source
Institution type		
Carnegie	*carnegie*	IPEDS Institutional Characteristics
Very high research	*research*	IPEDS Institutional Characteristics
RCU	*rcu*	Constructed using IPEDS data
Enrollment-based MSI	*msi*	U.S. Department of Education
HBCU	*hbcu*	U.S. Department of Education
Empirical Publicness		
State support	*statesupport*	IPEDS Finance
Government financial aid	*totalaid*	IPEDS Finance
Private revenues	*privaterevs*	IPEDS Finance
Total revenues	*totalrevenue*	IPEDS Finance
Public funding proportion	*pubfund*	IPEDS Finance
Public funding ratio	*pubfund1*	IPEDS Finance
Governance structure	*govstructure*	Education Commission of the States
Tuition-setting authority	*centraltuit*	State Higher Education Executive Officers
PBF	*pbf_pct*	State Higher Education Executive Officers
Secondary independent variables		
FTE enrollment	*fte*	IPEDS 12-Month Enrollment
Graduation rate	*gradrate_all*	IPEDS Graduation Rates
Total core revenues per FTE	*corerevenues_fte*	IPEDS Finance, IPEDS 12-Month Enrollment
Selectivity	*admitrate*	IPEDS Admissions
Net price	*netprice*	IPEDS Student Financial Aid
Percent federal revenue	*federal_pct*	IPEDS Finance
Land-grant	*landgrant*	IPEDS Institutional Characteristics

Outcome Variable Construction

Each outcome measure has one or two conceptually distinct subcomponents and is comprised of three or four distinct variables. The 15 outcome variables are described below and are grouped by the overall outcome measure. Table 7 lists all quantitative variables used in this study, and Table 11 provides summary statistics for each variable.

Education Access and Affordability. Education access and opportunity includes measures of access, opportunity, and affordability for students at four-year public higher education institutions. Data for these measures are limited to first-time, full-time students due to limitations with the IPEDS survey data. However, isolating the measures to a single cohort of students creates a more specific measure when considering how empirical publicness might change institutional behavior.

Equitable Enrollment by Race. Equity in enrollment by race (*enrollrace*) is the sum of the differences between the proportion of first-time full-time student headcount for each race/ethnicity group and the proportion of all adults aged 18-21 in the state who identified as each racial/ethnic group. For example, I compared the proportion of Latinx adults aged 18-21 in a state with the proportion of first-time full-time Latinx students at each institution in the state to determine whether the institution enrolled a disproportionately low number of Latinx students, compared to its individual state context. I chose adults aged 18-21 as a comparison group because they comprise 75% of all full-time undergraduate students at public four-year institutions, and an even greater proportion of first-time full-time students (National Center for Education Statistics, 2021).

When creating this variable, I considered disparities in all racial groups except White students because state goals specifically mentioned ensuring equal opportunity for students of color. Next, I weighted the disparities by the state population to accurately capture the relative impact of failing to serve a particular group. Keeping with the Latinx student example, if a state had a large Latinx population, enrollment disparities for those students were weighted more heavily than for races or ethnicities that make up less of the state population. Data for this variable came from the Fall Enrollment Survey in IPEDS and the U.S. Census Bureau's Current Population Survey (National Center for Education Statistics, 2022b; U.S. Census Bureau, 2020). For each race/ethnicity group,

$$EnrollRace = \sum\{(\%\ Headcount - \%\ Population) * \%\ Population\}$$

The U.S. Census Bureau does not separately report Hispanic as a race/ethnicity as in IPEDS. Instead, Hispanic origin is collected in addition to race and is a separate question. To adjust for this discrepancy in data availability, I adjusted the U.S. Census data to follow the IPEDS reporting guidelines, which state that if an individual identifies as Hispanic alone or Hispanic and any race category, they are reported to IPEDS as Hispanic (National Center for Education Statistics, 2022a).

Equitable Enrollment by Income. Equity in enrollment by income (*enrollincome*) is the percentage point difference between the proportion of first-time full-time freshmen awarded a Federal Pell Grant and the proportion of a state's population at or below the poverty line. While widely agreed upon as the best measure of low-income student enrollment over time, Pell grants are not a perfect measure of low-income student

enrollment—Pell eligibility and receipt likely underrepresents the amount of truly low-income students while simultaneously including some middle-income students (Delisle, 2017). Data for this variable come from the IPEDS Financial Aid survey and the U.S. Census Bureau's Historical Poverty Tables (National Center for Education Statistics, 2022b; U.S. Census Bureau, 2019).

Net Price. Net price refers to the average yearly price charged to first-time, full-time undergraduate students receiving student aid, after deducting all financial aid. Net price is calculated by taking the total cost of attendance and subtracting the average amount of federal, state, local, and institutional grants and scholarships. Net price directly measures student affordability at a given institution. Data come from the IPEDS Student Financial Aid survey (National Center for Education Statistics, 2022b).

Selectivity. Selectivity is calculated by dividing the number of an institution's first-time degree-seeking undergraduate applicants by the number of students admitted (*admitrate*). The resulting admit-rate ranges from 0 to 1. Institutions with an open admission policy may have inaccurate application acceptance rate data. Therefore, if an institution marked that they have an open admission policy, I assigned it a 1 on selectivity (the highest possible value). An institution's admit rate is a measure of its accessibility to students. Admit rate data come from the IPEDS Admissions survey (National Center for Education Statistics, 2022b).

Success and Attainment. Student success includes measures of equitable outcomes for students by income and race/ethnicity. Attainment measures an institution's contribution to the state's attainment level of individuals with a bachelor's degree.

Similar to access and affordability measures, measures of student success are limited to first-time full-time students.

Equitable Graduation by Race. Equity in graduation by race (*gradrace*) is the weighted sum of the difference between the 150% first-time full-time graduation rate for each race/ethnicity and the overall graduation rate. For every nonwhite race/ethnicity, I calculated the difference between their graduation rate and the average. I then multiplied the proportion of all students in the graduation rate cohort who identify as that race/ethnicity by the disparity, and summed the results for each nonwhite race/ethnicity to get the total value:

$$GradRace = \sum\{(Race\ Grad\ Rate - Average\ Grad\ Rate) * \%\ of\ Studnts\}$$

If the institution does not have an equity disparity for a certain group, this is reflected positively because their average disparity is reduced. Data for graduation equity by race came from the IPEDS Graduation Rates Survey (National Center for Education Statistics, 2022b).

Equitable Graduation by Income. Equity in graduation by income (*gradincome*) compares the 150% graduation rate for Pell-recipient students to the overall graduation rate for all first-time full-time students at each institution by subtracting the average graduation rate from the Pell graduation rate. The 150% graduation rate is commonly used and corresponds to a six-year graduation rate for a bachelor's degree (Scott et al., 2006). Graduation rate data comes from the IPEDS Graduation Rates Survey (National Center for Education Statistics, 2022b).

Degree Production. Degree production is a measure of an institution's contribution to state attainment. State attainment is commonly measured as the proportion of state residents with a bachelor's degree (HCM Strategists, 2021). Following prior conceptions of degree production, I created a measure of bachelor's degree production weighted to an institution's size using FTE enrollment (Zhao, 2018). Bachelor's degree production (*baprod*) is equal to the number of bachelor's degrees awarded divided by 12-month FTE enrollment. Data comes from the IPEDS Completions component and 2-month enrollment survey (National Center for Education Statistics, 2022b).

Economic and Workforce Development. Data on state economic and workforce development are focused on each institution's contribution to the state. Measurements of institutional contributions to the state workforce include the proportion of students who remain in the state to join the workforce (measured via a proxy) and the difference in unemployment rates for students who have attended or graduated from each institution. The measurements of economic development include the increase in earnings for graduates of each institution and the adjusted economic mobility rate.

Percent of Resident Enrollment. The most direct measure of workforce development would examine the proportion of an institution's graduates that remain in the state after some number of years, but these data are not systematically collected or available for all public institutions over time (it exists only in occasional federal sample surveys). Instead, the proportion of an institution's enrolled freshmen who come from the state is a reasonable approximation of the students who will remain in-state, since most

resident graduates remain in the state after graduation and most non-resident graduates do not (National Center for Education Statistics, 2012, 2020; Perry, 2001).

The percent resident enrollment (*instate_pct*) is the percentage of first-time undergraduate students attending a public four-year institution in their state of residence. Residency data comes from the IPEDS Residency and Migration Survey (National Center for Education Statistics, 2022b). This is similar to the methodology in prior studies on out-of-state enrollment, but the measure is flipped to focus on in-state students (Jaquette & Curs, 2015; McLendon et al., 2013). I coded student residency based on the student's home state and the location of the institution they attended. Therefore, I calculated in-state enrollment as the number of students from their home state divided by the total first-time cohort.

Unemployment Rate Disparity. While in-state enrollment is a proxy for the proportion of students who will join the state workforce, the adjusted unemployment rate considers the other half of the equation: the proportion of students who are employed following their college attendance. The unemployment rate disparity (*unemploy*) is the difference between state employment rates and institution employment rate a set number of years after a student enrolls (state unemployment – institutional unemployment). Institutional unemployment data comes from the College Scorecard and U.S. Treasury (U.S. Department of Education, 2022). I measured student employment outcomes six years after enrollment (to align with a 150% six-year graduation rate) and divided the number of students not working and not enrolled by the total number of students in the earnings cohort.

Institutional unemployment rates might be a reflection of a state's economy. To correct for this, I calculated the difference between the institutional outcomes and each state's unemployment rate. Positive numbers mean that the institution has a strong employment record compared to the state economy. State unemployment data come from the U.S. Bureau of Labor Statistics Local Area Unemployment Statistics program (U.S. Bureau of Labor Statistics, 2020). The U.S. Bureau of Labor Statistics unemployment data excludes individuals who have opted out of the workforce. For this reason, statewide unemployment rates tend to be lower than the unemployment rates in the College Scorecard. I am not able to correct for this, but I made the assumption that the differences between the two datasets, wherein one accounts for opt-outs and the other does not, is consistent across institutions and states.

The unemployment data described above is limited because it includes all students and is not limited to graduates. However, this more accurately captures the outcomes for all students that attend an institution, rather than just their graduates. However, a more precise measure of how institutional graduates fare in the workforce would also closely measure institution's contributions to the state workforce. In addition, the College Scorecard has not published this unemployment variable since 2015, and the older data may not reflect recent changes in empirical publicness. Therefore, I created a second variable (*unemploy_comp*) which includes completers only and measures their employment outcomes one year after graduation. These data are much more recent, using the 2016-2017 and 2017-2018 pooled cohort measured in 2018 and 2019 (U.S. Department of Education, 2022).

Earnings Premium. The earnings premium (*earnings_hs*) is a measurement of an institution's contribution to the state economy. The earnings premium is measured as the percent of students earning more than a high school graduate six years after entry. As with the first unemployment variable, this measure includes all students and is reflective of an institution's ability to raise earnings for all students, regardless of if they graduated. Data for the percent of students earning more than a high school graduate are for the 2011-2012 and 2012-2013 pooled cohort measured in 2018 and 2019. These data come from the College Scorecard and U.S. Treasury (U.S. Department of Education, 2022).

Adjusted Economic Mobility Rate. From a state perspective, any time an institution moves a student to a higher income quintile, the institution is contributing to state economic development. I created an adjusted economic mobility rate (*mobilityorstay*) by summing the conditional probabilities that a student would end up in a higher income quintile than their parents and the conditional probability that a student whose family was in the top two quintiles would remain in those quintiles. With the inclusion of students who remain in the top two quintiles, the adjusted economic mobility rate captures both an institution's ability to improve student's economic outcomes and its ability to provide students who can earn higher incomes, supporting the state through higher tax revenues. Economic mobility came from the Opportunity Insights project at Harvard University (Chetty et al., 2017; Opportunity Insights, 2018). One limitation is that students are tied to the institution that they attended the longest, not necessarily the institution from which they graduated. However, an institution that spent the most time educating a student likely had the largest impact on that student's economic mobility.

The Opportunity Insights project data use tax forms to collect family Income data, and those tax forms sometimes use institution names that are aggregated beyond the OPEID or UnitID level (two unique institution identifiers). In these cases, multiple institutions within a system have the same unique identifier and the same adjusted mobility rates. Because I cannot assume that the mobility rates across multiple institutions within a system are the same, I did not include mobility rates for the 94 grouped institutions that cannot be uniquely identified in the mobility rate dataset.

Community Improvement. Quantitative data on community improvement efforts in higher education are limited (Aldeman & Carey, 2009; Rizzo, 2005). In fact, it is difficult for institutions themselves to collect and track information about community improvement (Noel & Earwicker, 2014, 2015). The best sources of information about community improvement at a national level include membership lists of community-engaged institutions and measures of financial commitments to public service.

Carnegie Engaged Institution. Since 2006, the Carnegie Foundation has occasionally released a list of institutions it classifies as community engaged in addition to the regular Carnegie classification of all institutions by type. The classification is considered similar to an accreditation process in that it is voluntary and institutions must apply, but the classification is not given as an award; instead, it is given to indicate that the institution meets certain standards for a commitment to community engagement (Swearer Center, 2020). In 2020, 359 public and private institutions received the Carnegie Engaged Institution designation (Association of Public & Land-Grant Universities, 2020).

Scholars have shown that when institutions receive the Carnegie classification, their commitment to community engagement deepens. For example, studies examining the challenges and impacts of applying for the Carnegie Engaged Institution classification found that institutions often struggled to collect the data needed for their applications, but that the process of applying for and receiving an Engaged Institution designation led to shifts in institutional culture and behavior as institutional actions became more in line with their community engagement missions (Driscoll, 2009; Noel & Earwicker, 2014, 2015).

Carnegie Engaged Institution (*ce*) is a binary indicator of whether an institution received the Carnegie Classification for Community Engagement classification. Data on Carnegie Engaged Institutions came from the Swearer Center at Brown University (Swearer Center, 2020). Because applications are due two years prior to each classification cycle, the 2018 Carnegie Classification for Community Engagement was used to match the 2020 fiscal/academic year in this study.

Campus Compact Membership. Campus Compact is a national organization created to help institutions increase their commitment and efforts in community engagement (Hartley, 2009). Campus Compact was founded in 1985 by a group of institutional presidents who were concerned with higher education's waning commitment to civic engagement (Hartley, 2009). Campus Compact encourages institutions to make community engagement an institutional priority, and membership to Campus Compact is thus an indicator of an institution's commitments to community engagement (Campus Compact, n.d.-a). Over 1,000 public and private institutions were members of Campus

Compact in 2020, either through a regional office or by applying directly to the national organization (Campus Compact, n.d.-b). Unlike the Carnegie Engaged Institution classification, Campus Compact members do not need to demonstrate a pre-existing commitment to community engagement. However, by paying membership dues for an organization that provides support and opportunities for community engagement, the institution demonstrates an interest in community engagement (Campus Compact, n.d.-a).

Campus Compact membership (*cc*) is a binary indicator of whether an institution was a member of the Campus Compact community engagement organization in 2020. Current members of Campus Compact are listed on their website, but those may differ from the members in 2020 (Campus Compact, n.d.-b). I used the Internet Archive WayBack machine to scrape the Campus Compact website for their 2020 membership list. I exported that list and used institution names and states (which were provided on the list) to match each institution to its IPEDS UnitID. When an institution did not have an exact match due to differences in the institution's name, I manually matched institutions by using the IPEDS institution lookup and viewing institutions' websites. In some cases, data did not match because the Campus Compact state was listed incorrectly; in other cases, the institution had merged or changed its name.

Percent of Expenditures on Public Service. Unlike most other components of state goals for higher education, studies on publicness in higher education have examined public service as an outcome. Prior studies measured an institution's commitment to public service by considering the percent of its total annual expenditures that went toward public service (Lee, 2017; Welch, 2014). All public institutions report their total

expenditures to the Federal government annually according to a set group of functional categories, one of which is public service (National Center for Education Statistics, n.d.). Public service includes any primarily non-instructional expenses that benefit external groups rather than students, faculty, or staff of the institution. Public service expenditures include community service and Cooperative Extension Service allocations (National Center for Education Statistics, n.d.). The percent of expenditures an institution spends on public service (*pubsvc_pct)* measures the institution's financial commitment to external service operations as a proportion of total core expenditures. The data on public service expenditures as a percent of core expenditures come from the IPEDS Finance Survey (National Center for Education Statistics, 2022b).

Public service as a percent of total institutional expenditures was adjusted to account for its reliance on core revenues per FTE. The institutions with the highest public service percentage also had very high core revenues per FTE, indicating that greater resources might impact an institution's ability to fund public service. For example, flagship institutions dedicated 10% of expenditures to public service, compared to 3% at all other institutions. Flagships averaged $50,000 in core revenues per FTE, compared to $27,000 at other institutions. To adjust for this phenomenon, I calculated an index of each institution's core revenues per FTE compared to average. If an institution had above average core revenues, their index would be greater than 1. I then divided the percent spent on public service by this index to calculate a revenue-adjusted variable. For institutions with very low core revenue, I adjusted their percentage upward using the index to account for their reduced ability to fund public service. This adjustment was an

attempt to account for institutional effort to fund public service, given their available revenues. With this correction, the average percentage did not change, but the maximum percent of expenditures on public service decreased from 58% (at an institution with very high core revenues per FTE) to 29%.

Percent of Federal Work-Study on Public Service. The second measure of institutional prioritization of public service is the percent of federal work-study awards an institution spends on public service. The proportion of federal work-study spent on public service has been used as a proxy for community service in a popular alternative college ranking system (Longman, 2019). This measure has also been used to develop the President's Higher Education Community Service Honor Roll, which listed institutions with a community service orientation. The President's Honor Roll has not been updated since 2015, so the percent of federal work-study spent on community service projects is a more up-to-date measure (AmeriCorps, n.d.-a). The proportion of federal work-study funds an institution allocates to public service (*pubsvcws*) comes from the Federal Corporation for National and Community Service, which tracks this data and makes it available upon request (AmeriCorps, n.d.-b).

Table 7

List of Outcome Variables and Sources

Quantitative variables	Variable name	Source
Access and affordability	*accessafford*	
Equitable enrollment by race	*enrollrace*	IPEDS Fall Enrollment, U.S. Census Bureau
Equitable enrollment by income	*enrollincome*	IPEDS Financial Aid, U.S. Census Bureau
Selectivity	*admitrate*	IPEDS Admissions
Net price	*netprice*	IPEDS Student Financial Aid
Success and attainment	*success*	
Equitable graduation by race	*gradrace*	IPEDS Graduation Rates
Equitable graduation by income	*gradincome*	IPEDS Financial Aid
Bachelors degree production	*baprod*	IPEDS Completions
Economic and workforce development	*workecon*	
Percent of resident enrollment	*instate_pct*	IPEDS Residency and Migration
Unemployment rate disparity (all students)	*unemploy*	College Scorecard, U.S. Treasury
Unemployment rate disparity (completers)	*unemploy_comp*	College Scorecard, U.S. Treasury
Earnings premium	*earnings_hs*	College Scorecard, U.S. Treasury
Adjusted economic mobility rate	*mobilityorstay*	Opportunity Insights at Harvard University
Community improvement	*commimp*	
Carnegie Engaged Institution	*ce*	Swearer Center at Brown University
Campus Compact membership	*cc*	Campus Compact
Percent of expenditures on public service	*pubsvc_pct*	IPEDS Finance
Percent of Federal Work-Study on public service	*pubsvcws*	Corp. for National and Community Service

Data Analysis

In the following sections I describe the methodology I used to conduct data analysis in my qualitative and quantitative strands (separately). The qualitative data

analysis was a content analysis used primarily to determine state goals for public higher education, while the quantitative strand was used for two purposes. First, I used exploratory factor analysis to create single scores for each area of state goals. Then, I used descriptive analysis as well as random- and fixed-effects regression models to test the relationships between empirical and realized publicness. The following sections describe the data analysis procedures I followed, as well as techniques I used to ensure validity, reliability, and that all statistical assumptions were met prior to running my results.

Qualitative Data Analysis

I used principles of grounded theory and specific methods of content analysis to drive my qualitative data analysis decisions (Cho & Lee, 2014; Creswell & Poth, 2016). Following a grounded theory approach, I began with open coding (Creswell & Poth, 2016). I used summative content analysis and descriptive coding to identify and count the occurrence of keywords in state mission and vision statements (Hsieh & Shannon, 2005; Saldaña, 2009). Descriptive coding is a useful technique for researchers interested in cataloging topics or creating an index of the topics included in a qualitative dataset (Saldaña, 2009). In this process, there are no pre-conceived codes; instead, codes emerge from the data as it is analyzed (Saldaña, 2009). Content analysis also includes a data reduction process of limiting analysis to data that is relevant to my research questions (Cho & Lee, 2014).

I analyzed state- and system-level mission and vision statement documents using NVIVO. I combined mission and vision statements in my analysis and through my

coding process, I assigned an average of 6.5 codes for each agency. After counting the frequency of keywords in each mission or vision statement, I used focused coding to cluster codes into 38 categories by considering the underlying meaning of each code (Hsieh & Shannon, 2005; Saldaña, 2009). Focused coding involves determining the most salient categories in a dataset and making decisions about which codes make the most analytical sense (Saldaña, 2009). I then conducted another round of focused coding to group similar categories (Saldaña, 2009), creating the final 17 themes listed alphabetically in Table 8. Next, I separated out system-level agencies from state-level agencies and determined the most common themes for each agency type (Table 9).

Table 8

Themes in System- and State-Level Mission and Vision Statements for Higher Education

Theme	Frequency	%
Access and opportunity	55	57
Accountability	7	7
Advocacy	11	11
Affordability	22	23
Attainment and success	17	18
Commercialization	11	11
Community, civic, social, and cultural development	47	49
Cost efficiency	18	19
Creation, preservation, and dissemination of knowledge	29	30
Educational quality	46	48
Equity and diversity	20	21
Preparation and development of students	42	44
Serving beyond the state	20	21
Serving the state	40	42
Status, notability, and prestige	31	32
Teaching, research, and service	45	47
Workforce and economic development	35	36

Table 9

Themes in System- and State-Level Mission and Vision Statements for Higher Education, by Agency Level

Theme	State		System	
	Frequency	%	Frequency	%
Access and opportunity	27	77	26	44
Accountability	4	11	2	3
Advocacy	9	26	2	3
Affordability	11	31	11	19
Attainment and success	11	31	6	10
Commercialization	3	9	8	14
Community, civic, social, and cultural development	11	31	35	59
Cost efficiency	8	23	10	17
Creation, preservation, and dissemination of knowledge	2	6	27	46
Educational quality	15	43	30	51
Equity and diversity	5	14	14	24
Preparation and development of students	12	34	28	47
Serving beyond the state	1	3	19	32
Serving the state	7	20	32	54
Status, notability, and prestige	6	17	25	42
Teaching, research, and service	1	3	42	71
Workforce and economic development	12	34	21	36

Note. Two agencies with both system- and state-level responsibilities are excluded from state and system counts and percentages.

In grounded theory studies, the final stage of coding is selective coding, wherein the researcher takes the findings and develops hypotheses about the relationships between coding categories. I did this by grouping conceptually similar but distinct (through measurement) codes, such as access and affordability (Creswell & Poth, 2016). Therefore, the final step in my analysis was to determine the over-arching goals consistent across missions and visions of both system and state agencies. I once again

used focused coding to determine which themes fit into similar categories, and which themes were both salient in mission and vision statements and made analytical sense to include in a list of state goals (Saldaña, 2009).

For system-level agencies, I started with any theme that was present in more than 30% of all system statements. From there, I made two adjustments. First, many of the most common themes included in agency mission and vision statements are encapsulated by the teaching, research, and service mission. Second, the system-level focus on serving the state and beyond also incorporated a focus on developing communities, providing culture, and developing the workforce.

At the state level, I again started with any theme that was present in more than 30% of all state agency statements, and made three adjustments. First, affordability was regularly mentioned but was often discussed in the context of ensuring all state residents had access to an affordable higher education, so I included it in the access and opportunity goal. Second, student preparation and development was commonly included because it would enhance the state workforce and develop state communities, so I did not include it as a separate state goal. Third, I dropped quality because state agencies used it to either describe access (such as providing reasonable access to quality educational options) or was used to describe goals for higher education institutions (such as ensuring institutions meet quality standards) rather than public goals for the entire state.

Validity and Reliability. Credible content analysis should include at least three strategies to demonstrate validity and reliability (Creswell & Poth, 2016). In Chapter Four, when I present findings from the qualitative strand, I demonstrate evidence of

trustworthiness and credibility in my content analysis by presenting evidence of state mission and vision statements that corresponded to each theme (Hsieh & Shannon, 2005). I also include disconfirming evidence throughout the findings in Chapter Four (Creswell & Poth, 2016). I establish validity through exploratory factor analysis (described in the quantitative strand), wherein I operationalize state goals and create a tool based on the results of the content analysis. I then test the extent to which my tool measures the hypothetical unobserved constructs (state goals) it is intended to measure (Hox & Bechger, 1998; Kline, 2015). This process of operationalizing state goals, wherein I turn my qualitative findings into measurable quantitative variables, is described in the next section.

Operationalizing State Goals

Following my qualitative content analysis, I operationalized the findings into measurable variables. The process of operationalizing qualitative state goals into quantitative measurements is similar to the development of a tool, which is a signature component of exploratory sequential mixed method analyses. For each state goal identified through the qualitative strand, I conducted literature reviews to determine the appropriate variables that could be used to measure the goal (described in the "State Goals for Public Higher Education" section of Chapter Three: Conceptual Framework and Literature Review). I began by examining literature on each component of the goal itself (for example, educational access). Throughout that review, I noted constructs that were consistently used to measure the goal. I then narrowed my literature review to focus

on different conceptions and definitions of a given construct, eventually developing the final quantitative variable(s) that would be used to measure the goal.

In operationalizing state goals into measurable quantitative variables, I relied on prior studies and how those studies conceptualized and measured each area of interest. However, I adjusted commonly used variables to address known critiques whenever possible. For example, workforce development and economic contributions are likely the most well-understood components of realized publicness. I add to prior literature by addressing a key critique of past studies on economic mobility: that traditional measures of economic mobility privilege institutions with more extreme outcomes and with a large potential pool of the lowest-income students (Hoxby & Turner, 2019). In the present study, I adjust Espinosa's mobility rate to include any students with an increased income bracket following graduation. This is similar to Hillman's (2017) study on mobility in education deserts, in which he considers all bands of upward mobility (any increase from a lower to higher bracket) but examines them separately rather than as one index.

In some cases, the most appropriate quantitative variable available for a given state goal could also be used to measure another state goal. This is because some outcome variables such as in-state enrollment and economic mobility fulfill more than one state goal for public higher education. I included each variable where it was most applicable. For example, one aspect of economic mobility measures low-income enrollment, but a student is considered successful for economic mobility purposes when they earn more than their parents after joining the workforce. Therefore, economic mobility is considered a part of workforce and economy rather than educational access.

While some of the societal benefits of higher education can be measured using publicly available data at the state level, many statewide benefits are not easily tied to a single institution (Institute for Higher Education Policy, 2005). In these cases, this study considers the measurement of the corresponding private benefit. For example, it is difficult to tie greater productivity at the state level to an individual institution's outcomes, but employment (or unemployment) rates for college graduates can be compared to rates for the entire state.

Additionally, in several situations there were no clear direct measurements of a state goal. This was most apparent in community improvement, which has very few known quantitative measurements at the institution level. Quantitative data on community engagement is limited and can even be a challenge for institutions to collect (Noel & Earwicker, 2014, 2015), but remains an important yet poorly understood component of realized publicness (Welch, 2014). When data were not available to directly measure a state goal, I used the closest proxy that I could justify based on the purpose of my study as well as my conceptual framework and literature review on each topic.

EFA (described in an upcoming section) was used to validate the operationalization of state goals into quantitative variables. I removed several of the variables with proxies or difficult measurements from factor analysis based on the results of that analysis. The resulting factor scores use multiple observed quantitative variables to measure conceptually distinct and not directly observable state goals for public higher

education. This part of the variable operationalization (or tool development) process is further explained in the quantitative data analysis section that follows.

Quantitative Data Analysis

Quantitative data analysis consisted of three primary stages, and each stage build off the findings from the qualitative strand of this study. All statistical analyses were conducting using Stata SE 15.1. After transforming data and running assumptions tests (described below), I used exploratory factor analysis to determine whether I had successfully operationalized a model to quantify the realized publicness outcomes related to state goals for public higher education. Following that analysis, in the second stage of data analysis I ran descriptive analyses on primary independent and outcome variables. I descriptively analyzed the institution-level component of empirical publicness and all components of realized publicness for all states and for each institution type. I also ran ANOVAs examining outcomes by institution type. With this analysis, I was able to determine the differences in the ways in which each institution type contributes to public good outcomes. Following descriptive and ANOVA analyses, I entered the third stage of quantitative data analysis and used random-effects regression models to test the ability of state authority to predict institution-level realized publicness outcomes. Next, I used fixed-effects regression models to test the extent to which financial publicness predicted institution-level realized publicness outcomes. Finally, I ran sensitivity tests with alternative independent variable constructions to ensure that my findings were robust. The following sections describe each phase of quantitative data analysis in greater detail.

Data Transformations. I transformed or modified data for three reasons: to align scales for factor analysis, to handle missing data, and to deal with outliers. In early EFA estimations, net price led to issues in the model because it was on a different scale than all other variables. I rescaled net price by dividing each figure by the highest net price, so the scale went from 0 to 1.

The final dataset included 531 public four-year U.S. Title IV eligible degree-granting institutions. A number of variables included missing data. Missing data was handled differently based on the data source. For variables that came from IPEDS, I inputted missing variables for 2020 using the institution's data from 2019. Data were missing for less than 5% of cases across all IPEDS variables, and all variable means changed by 1% or less after data imputation, with one exception: the FTE enrollment mean decreased 3% after imputing 23 missing values with 2019 data (4% of the total sample). Some institutions did not have complete IPEDS finance data and were excluded from the analysis.

In some cases, IPEDS finance data is not available at the institution level because of parent-child reporting relationships (Blom et al., 2020). Parent-child reporting refers to instances in which a multi-campus institution or a system of institutions report data aggregate finance data through a "parent" institution, while the branch campuses or individual system "child" campuses report limited finance data (Blom et al., 2020). Complete parent-child reporting has become much less common over time but is an important issue to address when using data from the IPEDS finance survey (Jaquette & Parra, 2014). To address parent-child reporting issues in the IPEDS finance data, I

excluded the 22 institutions that were part of a parent-child reporting relationship wherein the child does not report complete revenue data in the finance survey, including any parent institutions reporting for at least one child institution (Jaquette & Parra, 2014). In addition, while most public institutions reported data based on the same accounting standards (GASB), eight institutions used a different set of accounting standards (FASB). Institutions reporting data through FASB can choose to report financial aid as tuition revenues or as government funding (National Center for Education Statistics, n.d.), which complicates the separation of governmental and private revenues (Blom et al., 2020). Due to the variation in tuition revenue reporting, I excluded the eight institutions that reported data using the FASB accounting standards.

In total, 55 institutions were excluded due to missing IPEDS finance data, parent-child report relationships, or the use of the FASB finance survey. In several states, these exclusions removed a substantial proportion of institutions from the sample, removing 86% of institutions in Arizona, 50% in Delaware, 100% in Washington, D.C. (one institution), 44% in Ohio, 64% in Pennsylvania, and 38% in Washington.

When matching variables from multiple sources, even federal ones, it is common to lose several institutions. As with IPEDS, missing data from other sources (such as the College Scorecard) were due to institutional reporting differences, and prior year data were not available for imputation. I could not be certain that these data were missing at random, so I did not impute or alter the data. The adjusted economic mobility rate had the highest proportion of missing data, with only 377 institutions. These data were missing due to a different level of aggregation (SuperOPEID) and could not be imputed.

To test for outliers, I created *z* scores for all variables used in analysis. In all cases in which a *z* score was above or below three standard deviations from the mean, I reviewed a dotplot of all values and examined the institution's values. Because most institutions with *z* scores above or below three standard deviations still contained realistic numbers that were important to include in the analysis, I only treated values with a *z* score of |4 as outliers. To address these extreme outliers, I replaced four values with the next highest value within a variable: three institutions had public service percentages that seemed unfeasibly high (30%-50% of core revenues spent on public service), and one institution had core revenues per FTE of $286,000 (the next highest was less than half that amount). Summary statistics for independent and outcome variables, including the number of institutions (*N*) and means, minimums, and maximums after all data transformations, can be found in Table 10 and Table 11. I reported FTE and core revenues per FTE in the thousands.

Table 10

Summary Statistics for Independent Variables

Variable	*n*	*M*	*SD*	Min	Max
pubfund	476	0.33	0.12	0.03	0.75
pubfund1	476	1.00	0.73	0.12	5.95
centraltuit	530	0.20	0.40	-	1.00
govstructure	530	1.26	0.90	-	3.00
pbfpct	531	0.14	0.32	-	1.00
federal_pct	476	0.16	0.07	0.01	0.44
msi	531	0.12	0.32	-	1.00
hbcu	531	0.07	0.26	-	1.00
rcu	531	0.71	0.45	-	1.00
landgrant	531	0.13	0.33	-	1.00
research	531	0.17	0.38	-	1.00
revenue_fte	505	28.08	14.46	10.33	88.93
fte	531	12.37	12.32	0.22	61.15
gradrate_all	524	0.54	0.17	0.12	0.94

Note. Revenue per FTE and FTE are in thousands. Net price is indexed from zero to one.

Table 11

Summary Statistics for Outcome Variables

Variable	*n*	*M*	*SD*	Min	Max
enrollrace	510	0.00	0.06	(0.25)	0.23
enrollincome	509	0.31	0.16	(0.05)	0.75
admitrate	527	0.77	0.17	0.14	1.00
netprice	504	0.51	0.14	0.12	0.92
gradrace	507	(0.01)	0.02	(0.08)	0.05
gradincome	523	(0.06)	0.05	(0.22)	0.07
baprod	531	0.19	0.04	-	0.47
instate_pct	528	0.81	0.16	0.23	1.00
unemploy	522	(0.03)	0.03	(0.16)	0.03
unemploy_comp	529	(0.00)	0.02	(0.09)	0.04
earnings_hs	526	0.67	0.10	0.34	0.89
mobilityorstay	377	0.47	0.07	0.26	0.67
ce	531	0.34	0.48	-	1.00
cc	531	0.58	0.49	-	1.00
pubsvc_pct	505	0.04	0.04	-	0.25
pubsvcws	481	0.14	0.08	-	0.51

Note. Unemployment rates are relative to the state unemployment rate. Public service percent is adjusted for institutional resources using an index of total core revenues per FTE.

Factor Analysis. I used factor analysis to develop individual constructs of my primary dependent variables. The factors I created measured the four state goals I identified through content analysis. Factor analysis is a type of structural equation modeling that allows the researcher to measure unobserved constructs (called latent factors) and make theory-driven inferences about the relationships between latent factors and a set of related observed indicator variables (Kline, 2015). Factor analysis is strongly connected to theory, and many decisions made during factor analysis are theoretically driven, with the resulting model representing hypotheses about the connections between measured variables (indicators) that are plausibly connected to unobserved phenomena

(factors; Kline, 2015). Factor analysis is a multivariate technique with the ability to estimate relationships between multiple dependent variables at once (Hox & Bechger, 1998).

EFA refers to one of two broad categories of factor analysis. In EFA, all relationships between individual measured constructs and unobserved factors are measured. In other words, EFA is an unrestricted measurement model (indicators are allowed to depend on all factors). This means you cannot directly measure the exact correspondence between indicators and factors (Kline, 2015). EFA was used rather than confirmatory factor analysis because, while there was an a priori hypothesis about the relationships between observed indicators, many variables were proxy measures and the data collection relied on pre-existing data originally collected for other purposes, which may not directly measure the unobserved factors (state goals). Additionally, some variables (such as in-state enrollment and mobility) were conceptually related to more than one factor.

EFA is a very useful tool for summarizing and interpreting the underlying relationships across a dataset (Yong & Pearce, 2013). It is often used in the development of instruments. EFA is a useful technique to reduce data (in my case, from 15 to four variables) and obtain a parsimonious measure or tool that can be used in further analysis. I used EFA both to test the validity of operationalization of state goals into quantitative variables and to develop four factor scores that could be used to measure each institution's contribution to the state goals identified in my qualitative analysis.

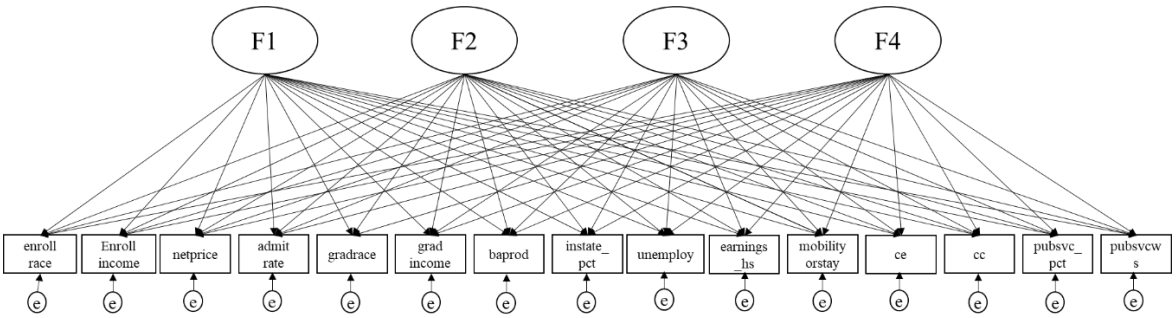
Prior to conducting EFA, I conducted several pre-tests which are necessary to ensure that data are suitable for factor analysis (Kline, 2015; Yong & Pearce, 2013). First, I ran Bartlett's test for sphericity. This was significant ($p < .001$, chi-square 1708.189, $df = 105$), indicating that there are sufficient correlations to conduct factor analysis. I also ran the Kaiser-Meyer-Olkin Measure of Sampling Adequacy, which determines whether there is sufficient but not excessive overlap so that the factor analysis will not produce spurious results. The Kaiser-Meyer-Olkin test was greater than .5 (.691), indicating that my variables are sufficiently related for factor analysis.

EFA also requires that several assumptions be met. First, data should not have extreme collinearity (Kline, 2015). I ran regressions with all indicators used in my model, rotating using each as the dependent variable. The R^2 values for all variables were below 0.7, which is below the 0.9 threshold for extreme collinearity. EFA also requires somewhat normally distributed variables. I examined kdensity plots for each variable and determined that all variables approximated a normal distribution after transformations and outlier adjustments (described in a previous section).

I conducted EFA using the *factor* command in Stata SE 15 (StataCorp, 2017). Figure 5 shows the initial EFA model of the four realized publicness outcomes developed through the qualitative strand of my study. In this model, observed indicators are shown in rectangular boxes while latent factors are in ovals. Direct lines between each indicator and factor show that each indicator is a conceptualized as a subcomponent of a factor. Error terms capture unexplained variation for each indicator (Hox & Bechger, 1998). In the initial model, all indicators are connected to all factors.

Figure 5

Initial Exploratory Factor Analysis Model



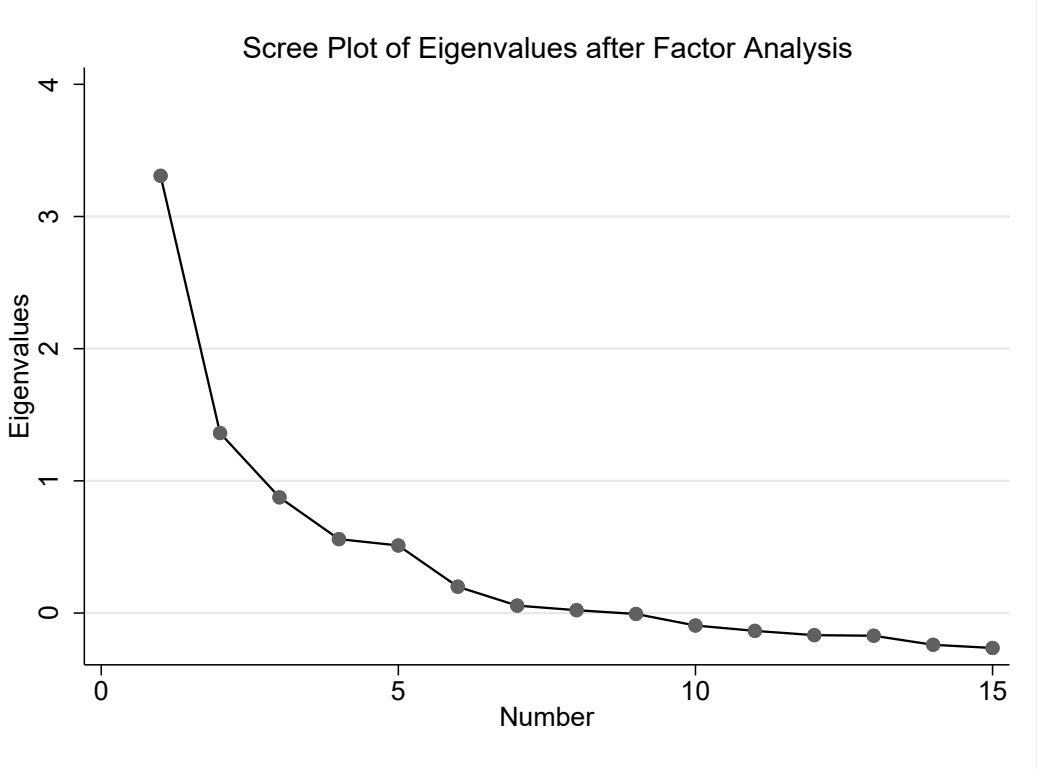
Fitting a final EFA model is an iterative process, wherein variables and factors are adjusted following the output of an initial model (Yong & Pearce, 2013). I adjusted and reran the EFA model several times based on the results. I began with 360 institutions (lower than my overall sample due to the inclusion of the adjusted economic mobility rate), 15 indicators, and the identification of eight factors. I examined the uniqueness score of all 15 indicators. The uniqueness score is the variance that is unique to the indicator and is not shared with any other indicators (Stata, n.d.). Uniqueness can either be due to variation in the item from latent factors not captured in the model or from measurement error. Public service work study had a very high uniqueness score (0.9092) and was removed from the model.

At this point, I also reduced the number of factors based on their eigenvalues (Kline, 2015). Guidelines for determining the number of factors to retain vary from those with an eigenvalue of 1 or above (Kaiser's criterion), or those with an eigenvalue of 0.7 or above (Jolliffe's criterion; Yong & Pearce, 2013). I identified four factors with high eigenvalues, each above 0.95. I examined a scree plot to ensure that the number of factors

was appropriate. The downward slope of the scree plot evens out after the fourth factor, indicating that retaining four factors is appropriate (Cattell, 1966).

Figure 6

Scree Plot from Factor Analysis with 15 Factors



After running the model with four retained factors, I began to look more closely at how my items loaded onto each factor. Most variables loaded cleanly onto their factors as expected, but I removed four variables due to conceptual mismatches or cross-loading. Conceptual mismatches occurred when an indicator did not load with the state goal it was meant to measure. This occurred for selectivity, which loaded with measures of student success, and in-state enrollment, which loaded with community improvement indicators.

Cross-loading refers to when one indicator loads at 0.32 or higher on two or more factors. Bachelors degree production cross-loaded across both workforce development and community improvement, and economic mobility cross-loaded with both access and community improvement. At this point, I added the second unemployment variable (*unemploy_*comp) as a replacement for lost indicators. Following the removal of these variables and the addition of the second unemployment variable, I reran the EFA and all factors had individual loadings greater than 32%, and there were minimal cases of cross-loading, meaning they were statistically meaningful (Yong & Pearce, 2013).

Community Improvement Index. After the removal of the indicators described above, the three remaining measures of community improvement were loading sufficiently on factor four yet had high levels of uniqueness (0.73-0.82). Two of the remaining community improvement variables were binary indicators (*cc* and *ce*). Together, these issues led me to remove the community improvement indicators from the factor analysis. Instead, I developed an index of community improvement using Carnegie Community Engaged classification, Campus Compact membership, and public service as a percent of all expenditures. I transformed the public service variable into a binary indicator (*pubsvc_bin*) to match the other community improvement variables by determining the median (0.12) and assigning a 1 if the institution allocated a greater-than-median proportion of their expenditures to public service, and a zero otherwise. The community improvement index (*commimp*) was calculated by summing the three binary variables (*ce, cc,* and *pubsvc_bin*). An institution was given a 3 if they had each designation.

Final Exploratory Factor Analysis Model. Following the removal of community improvement indicators, I generated my final EFA model with three factors. I then rotated my model prior to interpreting the results. In EFA, retained factors are rotated to increase their interpretability (Kline, 2015). Factor rotation is a method that simplifies the factor structure by loading each variable on as few factors as possible (Yong & Pearce, 2013). I used orthogonal varimax rotation, which is a common rotation technique used when the researcher does not want factors to covary in their rotation (Kline, 2015). I did not allow covariances across factors in my model because I am interested in isolating disparate factor scores.

After rotating my factor model, I created predicted factor scores for each institution using the three latent variables retained through the EFA process. Predicted factor scores (and the community improvement index) served as dependent variables in my descriptive and regression analyses. The final retained factors and factor structure are included in Chapter Four: Results.

Descriptive Analysis. After developing factor and index scores, I turned to descriptive analysis. Descriptive analysis is a useful tool for identifying patterns in data, particularly for topics in which there is no clear existing literature describing the topic (Loeb et al., 2017). Quality descriptive analysis goes beyond creating large tables with descriptive results for each variable in a study; it includes close iterative analysis to determine observable and meaningful patterns in data. Put simply, "descriptive research does not describe data—it uses data to describe the world" (Loeb et al., 2017, p. 17).

In this study, regression models examine the effects of empirical publicness on realized publicness outcomes. Descriptive analysis supports and sets the stage for these analyses by explaining the current state and basic characteristics of realized publicness across states and institution types (Loeb et al., 2017). Meaningful descriptive analysis focuses on identifying the patterns in the data which are most important to convey important findings (Loeb et al., 2017). Therefore, while I begin with broad tables, figures, and maps of all variables, my descriptive analysis focuses on differences across institution types, which tell an important story.

I conducted an initial examination of factor and index scores using descriptive analysis. I examined descriptive statistics (mean, median, standard deviation, minimum, and maximum) for each outcome variable. I also created maps, which provide useful geographic context in descriptive analyses (Loeb et al., 2017). I then analyzed the descriptive statistics for each outcome variable across groups of institution types. I examined each outcome variable separately for research institutions, RCUs, enrollment-based MSIs, and HBCUs and compared the results so I could assess the unique contributions of each institution type to the public good.

Analysis of Variance. I built on the descriptive analyses described above through the use of multi-way ANOVA. ANOVAs are a useful tool to directly compare means across multiple populations (Lind et al., 2020). I used ANOVAs to examine whether there are differences in realized publicness outcomes across research, RCU, MSI, and HBCU institution types. ANOVA is useful in this study because the size of each population can differ (Lind et al., 2020); this is important because there are far more RCUs than

research, MSI, and HBCU institutions. I separately examined outcomes for factors on education access and affordability, student success and attainment, workforce and economic development, and the community improvement index. As factors, my dependent variables were normally distributed and had no outliers (two requirements for ANOVA). I conducted four ANOVAs in Stata SE 15 using the *anova* command (StataCorp, 2017). To obtain coefficients for each institution type, I followed each ANOVA with the *regress* command (StataCorp, 2017).

Random- and Fixed-Effects Regression. I conducted regression analyses to answer my final two research questions, which ask about the ability of different components of empirical publicness (state authority, state funding) to predict realized publicness outcomes. Ordinary least squares (OLS) regression is commonly used to predict outcomes, but is not appropriate to use in this study because it requires that all observations be independent of one another (Bailey, 2016). This independence assumption is violated in my study because institutions within a given state are more similar to each other than they are to institutions across states. All institutions in a state likely share characteristics and common variation due to their shared state ownership, funding, and oversight.

Fortunately, regression models are available to analyze data when the independent observation assumption is violated. The most common techniques to use in this case are fixed effects and random effects models (Bailey, 2016). Fixed- and random-effects account for dependence (also called clustering) of units within groups in a cross-sectional or time-series dataset, but they do so in different ways (Bell et al., 2019).

Fixed effects models include dummy variables for each variable that is designated as a fixed effect (Clark & Linzer, 2015). A fixed effect refers to a variable (like a state) that does not change within each group and theoretically causes the same fixed change to each unit in the analysis. Fixed effects are linear regression models wherein there is not one intercept, instead, the intercept varies across groups, and each state has its own intercept (Bailey, 2016). Fixed effects regression models are useful because they remove any unobserved variation between unit groups (states in this case), thereby allowing researchers to examine potential causal relationships between policy and outcomes without the need for a randomized-control trial (Zhang, 2010). Using fixed-effects modeling on a cross-sectional dataset, there is a reduced risk of omitted variable bias and researchers can isolate changes within units (such as an institution) within a state, while simultaneously controlling for common variation caused by states across the dataset (Zhang, 2010).

Random effects models also account for shared variation, but do so in a different way than fixed effects. Random effects models assume that groups (such as states) are distinct but not completely unrelated as they are treated in the fixed effects model. Random effects models use partial-pooling, where unit effects are drawn from an underlying distribution (Bell et al., 2019). Random effects can be preferable to fixed effects because they are a more efficient estimator (Clarke et al., 2010). However, because they assume that independent variables are not correlated with unobserved effects, random effects are not consistent if there is common unobserved variation in states correlated with the independent variables (Bell et al., 2019; Zhang, 2010).

Overall, fixed-effects models are a less stable estimator than random-effects models, but random effects models can be biased if the state accounts for a significant portion of variation across institutions (Bell et al., 2019; Clark & Linzer, 2015). Therefore, I consider both types of models. My analysis uses a stacked approach to fixed-effects modeling, wherein I begin with a random-effects model to examine differences both within and between states, and then and add state-level fixed effects to examine only the differences within states. I used a Hausman Test to determine whether the random effects coefficients are significantly different than fixed effects coefficients; if the test is not significant, random effects can be used (Hausman, 1978).

In this study, the results of the Hausman test were significant for all models. However, this does not mean that the random effects models should be entirely abandoned; Hausman tests are often used to determine whether fixed- or random-effects should be used, but what they really tell us is whether state context (in this case) has an impact on the estimation—essentially whether the effect size is equal for institutions within a state and across states (Bell et al., 2019). For both methodological and conceptual reasons, it can be appropriate to use random-effects despite the results of a Hausman test. Methodologically, the higher efficiency of the random-effects model might be worth the increased bias (Clark & Linzer, 2015). Conceptually, a random-effects model must be used to capture important variation which research questions are focused on differences between groups (Bell et al., 2019).

Based on the significant Hausman test results, I used fixed-effects models wherever possible; that is, for all models where the independent variables of interest

occur at the institution level (financial publicness). I used random-effects models to examine the impacts of my state-level primary independent variables (state governance, regulation, and accountability). In my state-level independent variable models, there is no variation across the primary independent variables within each state, and a model with state fixed effects was not feasible.

I estimated random- and fixed-effects models using the *areg* and *xtreg* commands in Stata SE 15. The commands produce identical estimates, but *areg* produces an interpretable adjusted R^2 variable while *xtreg* is more functional with post-estimation tests (StataCorp, 2017). Both fixed and random effects models assume that error terms are not correlated across institutions and states. To test whether this occurred, I conducted a modified Wald statistic for heteroskedasticity (*xttest3*). The Wald statistic was significant for all models, indicating that my models had heteroskedastic error terms. Therefore, I used robust clustered standard errors at the state level to eliminate bias in the design (Verbeek, 2017). I also examined the variance inflation factor to assess whether there is multicollinearity in my dataset. Variance inflation factor was less than three in all models, indicating that there is no multicollinearity (Verbeek, 2017).

I estimated separate equations for each outcome variable. The public funding proportion is measured at the institution level, while state authority and accountability are measured at the state level. Secondary independent variables are grouped by level (institution or state) and vary by outcome measure. All outcomes are measured at the institution level.

My first models include random effects. These models provide estimates of the separate variation that occurs between states and within states but between institutions. In the equation below, states (*s*) are a grouping variable, containing an unbalanced (unequal) number of institutions (*i*). For each realized publicness outcome *RP* where *SF*, *GV*, *CT,* and *PF* are the state funding proportion, governance structure, centralized tuition-setting authority, and performance-based funding (respectively), *IC* are institutional control variables, and ε is the error term to capture any unobserved variation across both institutions and states in the model:

$$RP_{si} = \beta_0 + \beta_1 SF_{si} + \beta_2 GV_s + \beta_3 CT_s + \beta_4 PF_{si} + \beta_5 IC_i + \varepsilon_{si}$$

Following this analysis, I create subsequent models that include fixed effects for states (*a*). The fixed effects model examines the differences within states while holding constant any unobserved variation between states:

$$RP_{si} = \beta_0 + \beta_1 SF_{si} + \beta_2 GV_s + \beta_3 CT_s + \beta_4 PF_{si} + \beta_5 IC_i + a_s + \varepsilon_{si}$$

Several of the community improvement outcomes in this study (*cc, ce,* and *commimp*) did not have a linear distribution and required adjusted fixed and random effects models. For *cc* and *ce*, which are dichotomous variables (1/0), logistic regression is appropriate to use (Bailey, 2016; Verbeek, 2017). Logistic regression analyzes data for binary or dichotomous dependent variables by assuming the error terms have a logistic distribution (Bailey, 2016). I ran random-effects and fixed-effects logistic regressions with clustered standard errors using the *xtlogit* command in Stata (StataCorp, 2017).

Commimp is an index which ranges from 0 to 3. Variables with count type distributions can be analyzed using either a negative binomial regression (*xtnbreg*), or a

Poission regression (*xtpoisson*; StataCorp, 2017; Verbeek, 2017). Both models had significant Wald tests, indicating that they are not equal to zero and are sufficient—however, the Poisson model had a higher log likelihood, which makes it preferable to use (Verbeek, 2017). Following my primary random and fixed effects analyses, I ran each model separately for each institution type (*research, rcu, msi, HBCU*) to determine the specific effects of empirical publicness on realized publicness at each type of institution. The results of these additional analyses can be found in Appendix G and Appendix I.

In addition to the fixed-effects models described above, I ran sensitivity tests to ensure that my constructs were robust to changes in measure construction. While they are newly developed, the outcome variable factors and index were created through EFA and do not need additional construct validity. However, my measurement scale for governance structure and the construction of financial publicness are novel and require additional sensitivity checks. I examined all random- and fixed-effects models using alternative specifications of these variables. The additional variables developed as sensitivity checks are described in the Independent Variable Construction section of this chapter, under the subheadings for public funding and governance structures.

Limitations

The present study has several important limitations. First and foremost, I am limited by publicly available national data on each measure of empirical and realized publicness. This is particularly noteworthy for community engagement, which lacks quantitative data and is represented in my study by two binary variables indicating membership in a community engagement organization. Similarly, all measures for

community improvement in this study are resource-intensive and may unintentionally privilege wealthier institutions. In my regression models, I account for the correlation between institutional wealth and the available measures of community improvement by controlling for total core revenues. However, the lack of community improvement data caused me to use an index rather than predicted factor scores for community improvement, and means that there is substantial measurement error present in my community improvement index. Another data limitation is that many of my outcome measures exclude part-time, transfer, and adult students due to limitations in the IPEDS and mobility datasets (National Center for Education Statistics, 2022b; The Equality of Opportunity Project, n.d.).

My quantitative analyses are limited through my use of cross-sectional data. With only one year of data, I am unable to determine how changes in empirical publicness might affect institutions over time. With one year of data, I cannot isolate whether institutional outcomes change in response to changes in publicness (within-institution change).

Additionally, my qualitative analysis of state goals for the public benefits of higher education is limited in three ways. First, my data collection was limited to state agency documents. I am therefore unable to capture state goals in states with no state-level coordinating or governing entity. My analysis assumes that the states with no state-level agency have the same goals as those with a state-level agency, which may not be accurate. Second, I used grounded theory as a framework but did not fully investigate the processes behind state goal-setting for higher education. A clearer understanding of the

process of states developing goals for higher education and an exploration of why states have certain goals would be necessary to develop a fully grounded theory on state goals for higher education. Finally, a major limitation of this study is in the assumption that mission and vision statements for higher education agencies are reflective of long-term state goals for higher education. In some cases, like for one governing agency in New York, the mission is codified in state law. However, some states likely treat mission and vision statements as a living document, and their statements are more modern and may be the result of policy fads and current policy priorities. For example, Alaska was developing a new mission statement as of 2022, and four system agencies and one state agency updated their mission statements with each new strategic plan. I attempted to correct for this by collecting, whenever possible, the year in which a mission or vision statement was enacted. I was only able to collect this information for 17 mission statements and 11 vision statements. Vision statements ranged from adoption in 1992 to 2022. Mission statements were generally slightly older, the earliest of which was established in 1874 in California.

The limitations described here impact the interpretation of the finding and results in this mixed method study. In the next chapter, I share my qualitative findings, mixed-method results, and quantitative results. Findings and results are presented in order of my research question, and I address the extent to which my quantitative results confirmed each of my hypotheses and predictions.

Chapter Four. Findings and Results

In this chapter, I present the findings and results from my qualitative and quantitative strands. The qualitative findings are based on my content analysis of state- and agency-level mission and vision statements. The quantitative results come from my descriptive analysis, ANOVA, and regression models. I also discuss my mixed method results from braiding the two strands of research together. Throughout this chapter, I frame my presentation of the findings and results based on my research questions.

Qualitative Findings

The qualitative findings presented in this section are based on my content analysis of the mission and vision statements put forth by coordinating and governing bodies of public higher education. System- and state-level agency goals for public higher education contained notable differences. In the following sections, I first describe the high-level goals identified from state-level agency mission and vision statements, then describe the high-level goals identified for system-level agency statements. I also explain shared phrases and sentiments and variation within shared themes. I used the findings in this to develop a set of measures tested and utilized in the quantitative strand to measure institutional outcomes related to state goals for the public benefits of higher education.

Research Question 1: State-Level Agency Goals

My first research question was, "what common goals do states have for how public higher education can serve their states?" To answer this question, I developed four high-level themes to represent state agency goals. System-level agency goals are not included in this analysis. The four themes are broadly aligned with the limited literature discussing state goals for public higher education (Lingenfelter, 2018). I conceptualize the primary state-level agency goals for public higher education as:

1. Providing affordable and equal access and opportunity to all state residents.
2. Increasing state attainment through student success.
3. Enhancing the state workforce and providing economic development.
4. Developing communities through civic engagement.

In the sections that follow, I discuss each of the primary state-level agency goals for public higher education in turn.

Providing Affordable and Equal Access and Opportunity to All State Residents. The goal that higher education be available to all citizens reflects higher education's ability to promote the public good by reducing income inequality through providing equal access to affordable public education for all state residents, regardless of race or income. Over three quarters (77%) of state agencies included themes of access and opportunity in their mission and vision statement. Access and opportunity were thus usually limited to state residents. "Equal opportunity" and "higher education opportunities for all" were common phrases, but the most common statement referred to access for all Alaskans, Arizonans, Coloradans, and so forth. For example, one mission

statement included the directive to "ensure that Massachusetts residents have the opportunity to benefit from a higher education." However, not all states specified a goal of access for residents alone. Illinois' vision statement included a broad statement of "equitable paths to opportunity for all, especially those facing the greatest barriers."

Thirty-one percent of states' statements specifically called out affordability as a component of access and opportunity. For example, New Jersey's mission aimed to "provide students from all backgrounds accessible and affordable higher education opportunities." Affordability was not the only equity component of state goals for access and opportunity, but it was more explicitly named than other factors like race and ethnicity. The Illinois mission statement calling for equitable paths for those facing the greatest barriers is a good example of calling for equitable access without naming who has been inequitably served. Similarly, Oregon's vision statement calls out "those whom our systems have underserved and marginalized" but does not provide detail on which specific populations are underserved and marginalized.

Increasing State Attainment Through Student Success. States focused their mission statements on increasing state attainment or degree production through improving student success. However, attainment and success were less common than access and opportunity in state-level mission and vision statements, with mentions of student success in 31% of states. Increasing state attainment through student success was often mentioned in conjunction with providing postsecondary access, and 26% of states included conceptions of both access and success in their statements. For example, Tennessee's mission stated that the state was "relentlessly focused on increasing the

number of Tennesseans with a post-secondary credential," and that they "pursue this goal by innovating for student access and success." In another example, Oregon's mission aims to both "dramatically and equitably improve postsecondary educational attainment levels" and "ensure that Oregon students have affordable access to colleges and universities."

Several state statements focused exclusively on success, graduation, or attainment regardless of access, using phrases such as "increasing the number of college graduates," "increasing educational attainment," and "promoting student success." In some cases, student success was framed as a goal for state residents regardless of their life circumstances. For example, the mission of the state-level governing board in Utah aims to provide "every Utahn—in every place and every circumstance—an affordable certificate or degree." In Minnesota, the mission supported "the pursuit and completion of a higher education credential by every Minnesotan, regardless of race, gender, or socio-economic status." Overall, the state goal of increasing state attainment through student success was closely tied to that of affordable access and opportunity. States were focused on ensuring that their public institutions increased degree production and state attainment by serving resident students from all backgrounds.

Enhancing the State Workforce and Providing Economic Development. State agency mission and vision statements also focused on higher education's ability to develop the state's educated workforce and contribute to the state economy. In 34% of state agency statements, I found themes of economic growth and development, strengthening the economy, prosperity, and workforce training, and workforce

development. For example, North Dakota refers to enhancing economic growth for the state, and Nebraska's vision states that "each postsecondary institution will fulfill its role and mission with distinction by being responsive to changing academic, workforce…economic…and community development needs." In Nebraska, statements framed an economic imperative for public higher education in relation to prestige of the state and international engagement. Nebraska's vision espoused the goal of "position[ing] Nebraska to excel in the global economy." Texas had a similar focus, with their higher education mission aiming to result in "a globally competitive workforce that positions Texas as an international leader." Such references to prestige and notability were otherwise rare for state-level agencies.

State statements occasionally loosely tied economic development goals to equity. For example, Illinois' vision referred to "building an inclusive economy," and Kentucky's vision to an "equitable economy." These goals build upon the desire to ensure equitable student success and attainment. Overall, enhancing the state workforce and providing economic development focused on the ability of higher education to provide economic mobility to citizens and an educated workforce to the state.

Developing Communities through Civic Engagement. Mission and vision statements for higher education often mention improving communities through civic engagement as a state goal for higher education. State statements referred to this goal in numerous ways, including "cultural development," "providing culture to the state," "enhancing democracy," "providing societal benefits," "civic development for the state," "civic growth and engagement," "community improvement," "engagement," and

"advancement," "community service," "strengthening or serving the community," and "social development or progress." In total, 31% of state statements included themes of community development and civic engagement. For example, Rhode Island's vision was to "enrich the civic, social and cultural life of all living in the state of Rhode Island." Similarly, Maryland's coordinating board included in their vision that public higher education in the state would advance "contributions to civic life…and social progress of the state." Other states described preparing students to improve civic engagement. For example, Pennsylvania aimed to prepare students to become responsible, involved citizens. Developing communities through civic engagement is directly related to the public or societal benefits of higher education, which include increased civic engagement and community service.

Research Question 2: System-Level Agency Goals

My second research question was "in what ways do state goals for public higher education differ from those of system-level agencies?" To answer this question and determine whether system-level governing boards were representative of state interests for public higher education, I developed four high-level themes through content analysis to represent system-level agency goals. The four goals of system-level public higher education agencies are:

1. Teaching and providing a quality education; the creation and dissemination of knowledge through research; and public service.
2. Serving the state and beyond through community, social, cultural, workforce, and economic development.

3. Providing educational access and opportunities for student development.
4. Obtaining status, notability, and prestige.

In this section, I discuss each of these four system-level goals in turn.

Teaching and Providing a Quality Education; The Creation and Dissemination of Knowledge Through Research; and Public Service. Teaching, research, and service was the most common theme in mission and vision statements of system-level public higher education agencies. It was also the largest difference between system- and state-level missions, with inclusion in 71% of system-level statements and only 3% of state-level statements. Systems often based their entire mission statement around the three components of teaching, research, and service. For example, one a system-level governing board in Minnesota described a threefold mission of research and discovery, teaching and learning, and outreach and public service, and used those three criteria as the three bullet points when describing their full mission. Some system-level agencies did not specifically list teaching, research, and service, but their mission statements were still organized around those three concepts. One example is the mission statement for this governing board in Washington:

> To advance knowledge through creative research and scholarship across a wide range of academic disciplines. To extend knowledge through innovative educational programs in which emerging scholars are mentored to realize their highest potential and assume roles of leadership, responsibility, and service to society. To apply knowledge through local and global engagement that will improve quality of life and enhance the economy of the state, nation, and world.

Knowledge dissemination was related to both research and teaching. Almost half (46%) of systems focused on the creation, preservation, and dissemination of knowledge in their mission and vision statements, compared to only six percent of state agencies. The phrase "knowledge dissemination" or "dissemination of knowledge" was very common, as were references to advancing, creating, extending, preserving, and communicating knowledge.

Educational quality, which was mentioned in 51% of system-level statements, was often described within the broader goal of teaching as a part of the teaching, research, and service mission. A system in Massachusetts provides a clear example, with a mission to provide "accessible education of high quality and to conduct programs of research and public service." The tripart mission of teaching, research, and service was the most common theme across system-level agencies, but systems statements also focused on serving the state.

Serving the State and Beyond Through Community, Social, Cultural, Workforce, and Economic Development. Developing or serving the state was a common ideal found in system-level agency statements. Over half (54%) of system missions mentioned serving or developing the state, in comparison to only 20% of state-level agencies. Systems were also far more likely to also talk about serving the nation and the world in addition to their state. Providing service beyond the state was a theme in 32% of system missions and only 3% of state agencies (representing just one agency, which broadly referred to "serving the public interest" in addition to their state). On the other hand, systems commonly referred to serving, providing access to, or improving lives of the nation, and the world, as well as making global change, transforming the

world, and having a global impact. For example, here is one Indiana system agency's vision talking about developing the state and beyond, with their goal of "engaging in the economic, social, civic, and cultural development of Indiana, the nation, and the world by building on the base of excellence in research and education." A system governing board in Connecticut included the following in their mission statement: "We promote the health and well-being of Connecticut's citizens through enhancing the social, economic, cultural and natural environments of the state and beyond." Overall, system-level agencies were much more focused on serving the state than were state-level agencies. In addition to providing service to the state and beyond, system agency statements focused on providing access and opportunity.

Providing Educational Access and Opportunities for Student Development. Almost half (44%) of system-level agencies described access and opportunity in their mission statements. Access and opportunity were often reserved for current students of the system, or for those who qualify based on some measure of merit (rather than access and opportunity for all residents of the state). For example, an Arizona system mission specified "ensuring access for qualified residents of Arizona to undergraduate and graduate institutions". System agency statements often described access and opportunity as part of student development. For example, a California system agency's mission seeks "to provide opportunities for individuals to develop intellectually, personally, and professionally." Opportunity for individual development is conceptually distinct from the broad access and opportunity discussed in state-level statements.

Forty-seven percent of system-level mission and vision statements explicitly called for student development and the preparation of students. Goals related to student development included a wide range of phrases, such as preparing students for society and the workforce, preparing responsible citizens, student growth and transformation, talent development, transforming lives, intellectual growth, meeting the needs of students, helping students reach their potential, and helping students achieve their goals. Overall, system-level agency goals for access and opportunity were more specifically tailored to access certain groups or certain types of opportunity than those of state-level agencies. The final set of system-level agency goals were focused on obtaining status.

Obtaining Status, Notability, and Prestige. Systems were far more likely to mention notability, prestige, or status when compared to state agencies. At system-level boards, notability and prestige were present in 42% of mission and vision statements, compared to 17% of state-level boards. Notability references were focused on recognition of the system of institutions as being a household name, admired around the world, or known worldwide as a leader in some context, for example, one Illinois system vision statement referenced "a future in which the…system is the recognized leader among public research university systems." Prestige and status references included the higher education system being "the best," "greatest," "premier," or "top research" or academic institution. For example, "To be one of the great research universities of the 21st century and to be the preeminent institution of higher education in Indiana." This quote from an Indiana system vision statement shows that status is a primary goal for some systems. In addition to the four system-level agency goals outlined above, I examined similarities and

differences between the underlying phrases and sentiments in system- and state-level agency goals.

Similarity and Variation in Phrases and Sentiments

Within states, system- and state-level agencies sometimes shared certain phrases across the mission and vision documents for each entity. For example, across the six system-level governing boards of Texas public institutions, four focused on commercialization and the use of research for economic development (a very uncommon theme across other states). These agencies made references to industry connections, research serving "as an engine for economic development," supporting "research and commercial development that result in new technologies and products," and commercializing technology.

Even across states, there were shared phrases. These two state-level agency mission and vision statements share a clear resemblance:

- "The vision of MHEC [Maryland Higher Education Commission] is to ensure that Maryland residents have the opportunity to benefit from a higher education that enriches their lives and advances their contributions to civic life, economic development, and social progress of the State."
- "The mission of the Board of Higher Education is to ensure that Massachusetts residents have the opportunity to benefit from a higher education that enriches their lives and advances their contributions to the civic life, economic development, and social progress of the Commonwealth."

My analysis has found that overall, state- and system-level agencies have differing goals for public higher education. In this section, I asses some potential disconfirming evidence. In several cases, system- and state-level mission and vision statements included shared goals when viewed at a surface level. However, these shared themes were commonly directed toward different audiences or purposes.

While both state- and system-level agencies included themes of equity and diversity, systems tended to focus on diversity on campus (diverse communities, diverse student body, diverse faculty), while state agencies mentioned equity and diversity for the entire state (often through providing equitable access and success, and in Kentucky by breaking cycles of generational poverty). In some cases, state agencies more specifically called out ensuring equity regardless of gender, race, or socioeconomic status. For example, part of the state-level board in Minnesota's mission is to "support the pursuit and completion of a higher education credential by every Minnesotan, regardless of race, gender, or socio-economic status" Despite this overall theme of more institutionally focused statements at system-level agencies, some systems, often those with a wide range of institutional types, had mission statements that followed a state perspective. One example comes from the mission statement for a system governing board in Pennsylvania:

> To provide high-quality education at the lowest possible cost to students; to increase educational attainment in the Commonwealth of Pennsylvania; to prepare students at the undergraduate and graduate levels for professional and personal

success in their lives; and to contribute to the economic, social, and cultural development of Pennsylvania's communities, the commonwealth, and the nation.

Another example of states and systems with similar themes but different purposes behind those themes is in how systems and states framed community, civic, social, and cultural development, which was mentioned in 31% of state agency missions and 59% of system missions. State missions that mentioned this theme were focused on the use of higher education for community and cultural development of the region and state—their focus was on how higher education could serve the state to further develop its civic and social life (for example, see the Maryland and Massachusetts agency statements quoted above). While some systems like the California State University system and University of North Carolina system shared a similar purpose, including specific mentions of "providing culture" to the state, most were focused on providing cultural awareness to the students they served and providing public services that enriched the institutions of their system.

In summary, I found numerous differences between state- and system-level agency mission and vision statements. While there is some overlap, state- and system-level agencies have markedly different goals. In cases where there were shared goals, the specific foci within those themes often differed in purpose or direction. Based on this analysis, I concluded that system-level agency mission and vision statements could not be used to measure state-level goals for higher education; only state-level goals were considered for the mixed-method and quantitative strands of the study. In the following section, I explain how I took the four state goals reviewed in this section and operationalized them into specific measurable variables for the quantitative strand.

Mixed-Method Results

Research Question 3: Operationalizing State-Level Agency Goals and Factor Analysis

My third research question was "to what extent can observed variables measuring institutional contributions accurately capture the components of state goals identified through content analysis as latent constructs?" Answering this research question required determining how to measure the four state goals defined through my qualitative strand and testing whether my measurements appropriately measured each state goal. Guided with the findings from my literature review on each goal (presented in Chapter Two), in this section I present the specific variables I selected with which to measure each state goal.

Operationalized State-Level Agency Goals. State-level agency goals for the public benefits of higher education are broad and cannot be directly analyzed using a single measurement. Instead, I selected proxy, component, or indirect measures that together provide a complete picture of how a public institution contributes to a given state goal. The four state goals and the quantitative variables I selected to measure them follow.

Education access and Affordability. Data on education access and affordability is readily available and commonly measured by federal and state entities. Four variables measure education access and affordability. The focus for several of these variables, based on findings from the qualitative strand, is on equitable access to enrollment at each institution. Enrollment equity by race is a measure of how representative each institution's enrollment is of the racial composition of the state. Enrollment equity by

income measures how representative each institution's enrollment is of the low-income composition of the state. Net price measures affordability through the average price paid for students receiving financial aid. Selectivity measures an institution's accessibility through the proportion of applicants who are admitted to the institution.

Student Success and Attainment. Numerous quantitative measures of student success and state attainment are easily available. Three measures comprise student success and attainment. As with education access and affordability, two out of three measures of student success and attainment focus on the extent to which the institution provides equitable student outcomes. Graduation equity by race measures the weighted disparities between graduation rates for students of color and all students. Graduation equity by income measures the disparity between graduation rates for low-income students compared to all students. Degree production measures an institution's overall contribution to the state's educational attainment.

Economic and Workforce Development. Data on workforce contributions are not as directly available at the institution-level as measures of access and success, but recent efforts to collect and share these data have improved the availability of quantitative measures on institutional contributions to the state economy and workforce. There are five measures of economic workforce and development. The percent of resident enrollment is a proxy measure for the percent of students who remain in-state after graduation and contribute to the state workforce. The unemployment rate disparity for all students is the likelihood of unemployment six years after first enrolling, compared to the state unemployment rate, regardless of whether the student graduates. The unemployment

rate disparity for graduates is the likelihood of unemployment one year after completion compared to the state unemployment rate. The earnings premium is the percent of students earning more than a high-school graduate six years after first enrolling, regardless of whether the student graduates. Finally, the adjusted economic mobility index is the proportion of students who either increase in their income quintile after attending an institution, or remain in one of the top quintiles (if that is where they started).

Community Improvement. Data on community improvement are much more limited than for the other state goals for the public benefits of higher education. There are four variables I developed to measure community improvement. However, unlike the variables developed for every other state goal, two community improvement variables are binary. The Carnegie Engaged institution classification measures whether the institution applied to and received a classification designating them as a community engaged institution. Campus Compact membership refers to membership in an association intended to help institutions increase commitment to community engagement. The percent of expenditures on public service measures how much of an institution's core expenses are for public service activities. Finally, the percent of federal work-study on public service is a measurement of how much of federal work-study awards an institution allocates toward public service projects.

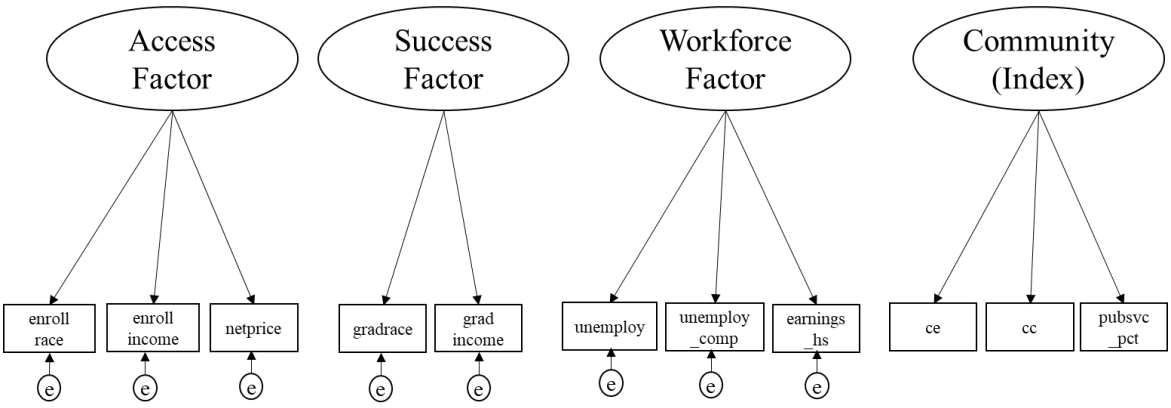
Each of the variables listed here are an attempt to capture at least one part of a state goal for the public benefits of higher education. While many of these variables have been used to measure institutional outcomes in the past, their application to state goals is

novel. Therefore, after operationalizing each state goal into the measurable constructs described in this section, I developed a model to explore whether my operationalized variables together measured the constructs I had developed. The steps I took to develop this model are explained in the Quantitative Data Analysis subsection of Chapter Three – Methodology.

Exploratory Factor Analysis. The final EFA model included eight observed indicators measuring three factors across 494 institutions. The retained factors were for education access and affordability, student success and attainment, and workforce and economic development. Figure 7 shows a diagram of the final EFA model with three factors and the community improvement index. In this diagram, the community improvement index does not have error terms because it is not a true factor.

Figure 7

Final Exploratory Factor Analysis Model



After orthogonal varimax rotation, factor one (AccessAfford) explained 48% of variation with an eigenvalue of 1.96; factor two (WorkEcon) explained 35% of variation with an eigenvalue of 1.41; and factor three (Success) explained 28% of the total variance with an

eigenvalue of 1.13. Unique variance was less than 62% for all indicators. All final factor loadings are listed in Table 12, with factor loadings less than 30% suppressed. Negative loadings indicate inverse impacts on the factor. For example, *enrollrace, enrollincome,* and *netprice* all load on factor one. However, netprice had a negative loading, meaning that lower net prices are related to higher scores (smaller disparities) by race and income. *Netprice* was cross-loaded with factor two, but was kept with factor one because it directly measures affordability and not workforce outcomes. The *gradrace* and *gradincome* indicators both loaded cleanly onto factor three (Success). Finally, *unemploy, unemploy_comp,* and *earnings_hs* loaded with factor two. Unemploy_comp negatively cross-loaded with success and earnings_hs negatively cross-loaded with AccessAfford, but because these are both post-college outcomes and do not conceptually fit with either educational access or student success, they were kept with the WorkEcon factor.

Table 12

Exploratory Factor Analysis Factor Loadings

Variable	Factor 1 (AccessAfford)	Factor 2 (WorkEcon)	Factor 3 (Success)	Uniqueness
enrollrace	0.7082			0.4181
enrollincome	0.8569			0.2068
netprice	-0.4257	0.4386		0.6161
gradrace			0.6185	0.6134
gradincome			0.6669	0.4378
unemploy		0.7947		0.3196
unemploy_comp		0.6469	-0.3942	0.4245
earnings_hs	-0.6354	0.3287		0.4520

I used the *predict* command in Stata 15 (StataCorp, 2017) to calculate regression coefficients that estimate individual scores on each of the three factors for each public four-year institution in my sample. Factor scores were estimated separately to isolate the indicators chosen to load on each factor. For example, AccessAfford factor scores were estimated using *enrollracecap, enrollincome,* and *netprice,* but *netprice* was not included in the factor score estimation for WorkEcon despite its cross loading. Table 13 lists the regression coefficients used to estimate factor scores for each institution.

Table 13

Predicted Factor Score Components

Variable	Factor 1 (AccessAfford)	Factor 2 (WorkEcon)	Factor 3 (Success)
enrollrace	0.2918		
enrollincome	0.5662		
netprice	-0.1420		
gradrace			0.4067
gradincome			0.4067
unemploy		0.5813	
unemploy_comp		0.2635	
earnings_hs		0.1507	

As previously discussed, three community improvement variables (*cc, ce,* and *pubsvc_pct)* sufficiently loaded onto a fourth factor. However, community improvement could not be included in the final factor analysis due to two of the three variables being dichotomous. In place of a factor score, I created an index of community improvement (*commimp_bin,* described in the previous chapter). I used the community improvement index alongside the three predicted factor scores as outcome variables in further analyses. In the following section, I share results from the quantitative strand of my study, which

built on the qualitative and mixed-method strands. I begin in the next section by presenting descriptive statistics for each of the outcome variables discussed here.

Quantitative Results

Quantitative results presented in this section come from my descriptive analysis, ANOVA, random-effects regression models, and fixed-effects regression models. There were notable differences in institutional contributions to the public good across institution types, and important relationships between empirical publicness (particularly financial publicness) and institutional realized publicness outcomes. In the following sections, I first present descriptive analyses for the three factors and index created during EFA. I then present descriptive analyses for these factors across institution types and compare their means for significant differences. Finally, I present the results from my regression models, which examined the impacts of state oversight and state funding on each outcome (including sensitivity checks).

Research Question 4: Descriptive Analysis and Analysis of Variance

My fourth research question was "how do empirical publicness and realized publicness outcomes vary across types of four-year public institutions (minority-serving institutions, regional-comprehensive institutions, and research universities)? I used descriptive analyses and ANOVA to answer this question. In this section, I present variation across realized publicness outcomes, both overall and by institution type.

Realized Publicness. In this section, I describe the components of each factor and the predicted factor (or index) scores in the following order: access and affordability, success, workforce and economic development, and community improvement. Factors

were generally weakly correlated, as shown in Table 14. Access and affordability had the strongest correlations with other factors, with a weak-to-moderate positive correlation to success (r = 0.35) and a moderate negative correlation to workforce and economic development (r = -0.40; Akoglu, 2018). The weakest correlation was between success and the community improvement index (r = -0.04). Descriptive statistics for all variables used to measure realized publicness are listed in Table 15. Table 15, and the results presented in this section, do not include variables such as *admitrate* that were not retained in the final factor analysis model.

Table 14

Factor Correlation Matrix

Factor	accessafford	success	workecon	commimp
accessafford	1			
success	0.3513	1		
workecon	-0.4029	-0.1983	1	
commimp	-0.2545	-0.0356	0.2035	1

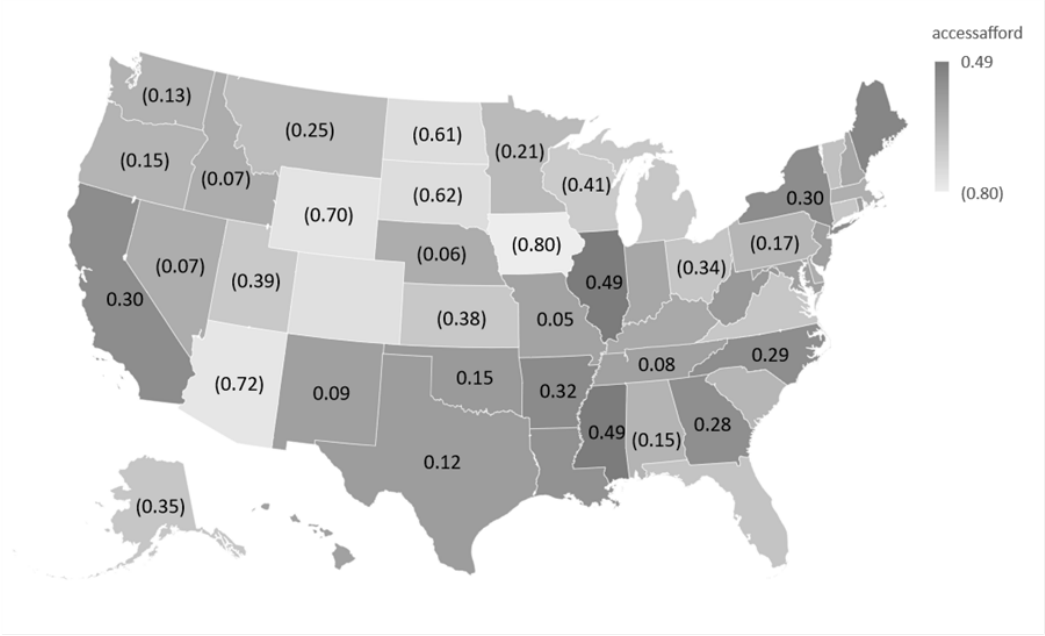
Access and Affordability. Equitable enrollment by race (*enrollrace*) ranged from -0.15 to 0.23 with a mean of 0.1, and 41% of institutions had positive scores. A negative score on this variable indicated that the institution enrolled a lower proportion of students of color than their state population. Equitable enrollment by income (*enrollincome*) ranged from -0.05 to 0.75 with a mean of 0.31, with the same explanation for a negative score. Only three institutions had a negative score on equitable enrollment by income, likely due to variable construction and how low-income populations were defined. The three institutions with negative equitable enrollment by income were Auburn University,

Georgia Institute of Technology, and Miami University Oxford. The net price (*netprice*) presented in Table 15 is scaled to align with the other variables for factor analysis. The true net price averaged $14,216 with a standard deviation of $4,012. The minimum net price was $3,270 at Elizabeth City State University, and the maximum was $25,548 at The Pennsylvania State University (after removing outliers).

Predicted scores for access and affordability (*accessafford*) were produced for 504 institutions. Access and affordability scores ranged from -2.04 to 2.47. All factor scores had a set mean of zero. The minimum score for access and affordability was at Auburn University, and the highest was at Alcorn State University. At the state level, Illinois and Mississippi had the highest average scores (0.49), and Arizona (-0.72) and Iowa (-0.80) had the lowest average scores on access and affordability. As shown in Figure 8, states in the Northeast and South regions of the United States had the highest average predicted access and affordability scores. An important note for interpreting state averages is that the number of institutions in each state ranged from just one in Wyoming and two in Delaware and Rhode Island to more than 30 institutions in California, New York, Texas, and Pennsylvania.

Figure 8

State Map of Average Predicted Access and Affordability Scores



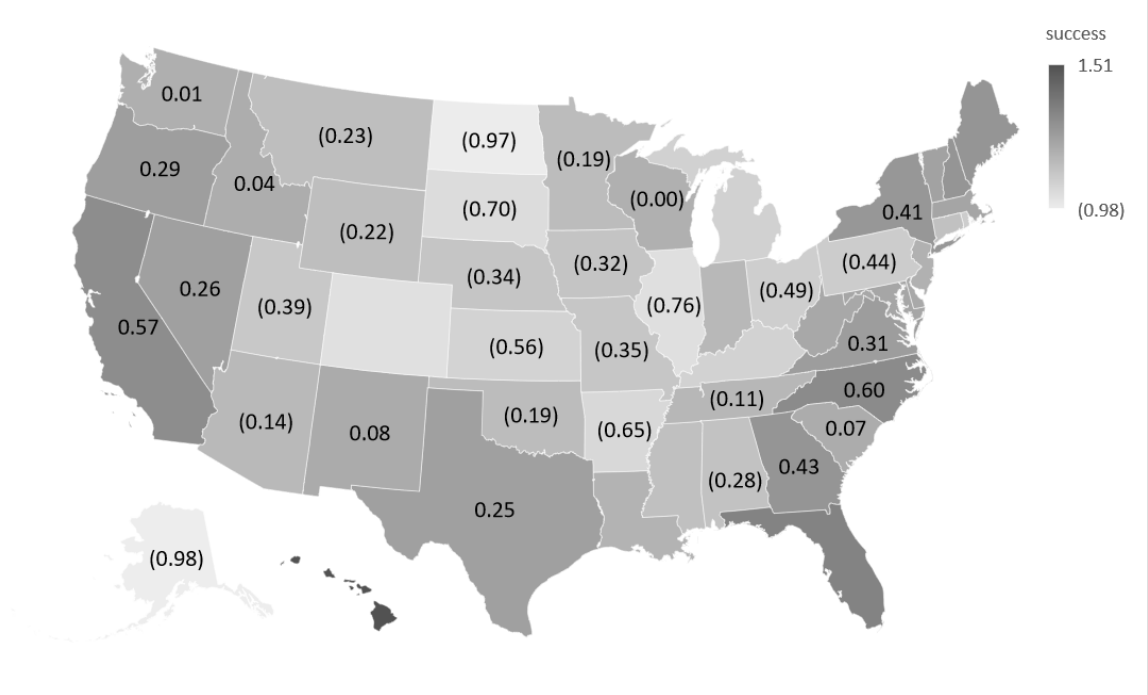
Student Success and Attainment. Equitable graduation by race (*gradrace*) averaged -0.01 and ranged from -0.07 at Southern Illinois University Carbondale and Western Illinois University to 0.05 at the University of Hawaii at Manoa. A negative score indicates that the institution graduates students of color at a lower rate than its average. A positive score means students of color (weighed for their enrollment proportion) have higher graduation scores than average. Ninety-three institutions (18%) had positive equitable graduation by race outcomes. Equitable graduation by income (*gradincome*) averaged -0.05 with a range from -0.22 at the University of Science and Arts of Oklahoma to 0.07 at the University of Hawaii Hilo. Only 25 institutions (5%) had a positive score on equitable graduation by income, wherein Pell grant recipients had higher graduation rates than average.

Predicted scores for the student success and attainment factor (*success*) were produced for 506 institutions. Success factor scores ranged from -2.11 to 1.93, with the lowest score at Southern Illinois University Carbondale and the highest score at University of Hawaii at Hilo. As shown in

Figure 9, the highest scores on student success and attainment were along states on the west coast (including Hawaii) and east coast. Alaska and North Dakota had the lowest scores, both less than -0.90. Hawaii had the highest average predicted scores (1.51). All other states averaged less than one on student success.

Figure 9

State Map of Average Predicted Student Success and Attainment Scores



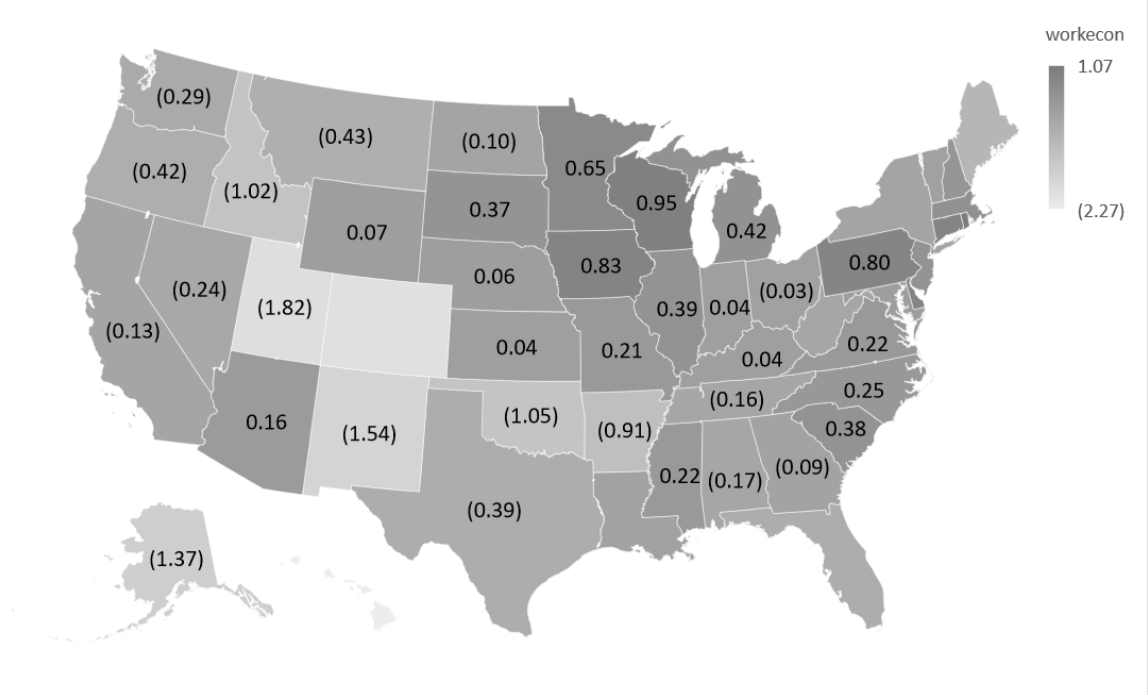
Workforce and Economic Development. The unemployment disparity for all students (*unemploy*), which compares unemployment rates six years after enrollment to

state unemployment rates, ranged from -0.13 to 0.03 with a mean of -0.03. Only 11% of institutions had positive unemployment disparities; in part, this is because the state unemployment rate excludes people who are not currently looking for work, while the institutional unemployment rate does not. The unemployment disparity for completers (*unemploy_comp*) compares the unemployment rates one year after completion to state unemployment rates. The unemployment disparity for completers ranged from -0.09 to 0.04 with a mean of 0, and 46% of institutions had a rate greater than one (meaning that completers had lower unemployment rates than all enrolled students). The percent of enrolled students earning above a the average high school graduate (*earnings_hs*) six years after enrolling ranged from 0.34 to 0.89 with an average or 0.67, and was positive for 100% of institutions. The lowest rate was at Mississippi Valley State University, where only 34% of students earned more than a high school graduate after six years. The highest rate was at Georgia Institute of Technology, where 89% of students earn more than a high school graduate, regardless of completion status.

The predicted workforce and economic factor (*workecon*) ranged from -3.65 to 1.75. The University of Hawaii at Hilo had the lowest score (-3.65). The next lowest score was -3.09 at the Evergreen State College. The highest scores were at Illinois State University (1.75) and Michigan Technological University (1.57). Figure 10 shows the average predicted workforce and economic development scores by state. The lowest average predicted scores were in Hawaii (-2.27) and Utah (-1.82), and the highest average scores were in Rhode Island (1.07) and Wisconsin (-.95). In general, states in the Northeast and Midwest had the highest workforce factor scores.

Figure 10

State Map of Average Predicted Workforce and Economic Development Scores



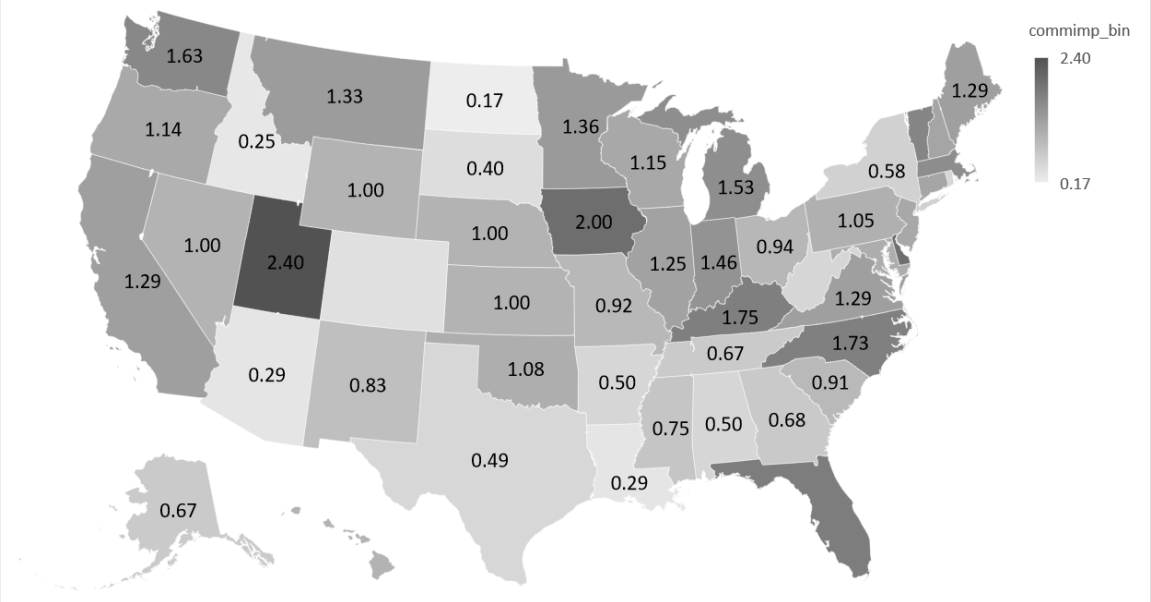
Community Improvement. Public service expenditures as a percent of all total core expenditures (*pubsvc_pct*) averaged 4% with a range from 0% to 19%. Eighty-six institutions (17%) allocated 0% of expenditures to public service. Six institutions were outliers on this variable and were set to the seventh highest amount (19%). Campus Compact membership (*cc*) and Carnegie Engaged designation (*ce*) are binary measures, wherein all institutions received either a zero or a one. Overall, 58% of institutions had Campus Compact membership, and 34% were Carnegie Engaged institutions. In 13 states, all institutions were Campus Compact members. In three states (Idaho, New Mexico, and North Dakota) there were no Campus Compact member institutions. In Iowa

and Utah, all institutions had Carnegie Engaged designations. Five states had no institutions with the Carnegie Engaged designation.

The community improvement index (*commimp_bin*) counts each binary measure, plus 1 if the institution has above median public service expenditures. One hundred and sixty-five institutions (31%) received a zero on the community improvement index, and only 14 received a 3 (the highest score). The mean was 1.02. North Dakota (0.17) and Idaho (0.25) had the lowest average scores, while Utah (2.4), Iowa (2.0), and Delaware (2.0) had the highest. As shown in Figure 11, southern states (including some states in the southwest) tended to have lower scores on the community improvement index.

Figure 11

State Map of Average Community Improvement Index Scores



Institutions in states like Hawaii and Illinois consistently show up as either the best or worst across variables and factors. This serves as an important reminder that state

context impacts the outcome variables presented in this section. One of the limitations of descriptive analysis is that outside controls cannot be accounted for. In later analyses, I add additional institution-level independent variables and state fixed effects to control for state-by-state contextual factors (like unemployment rates and minimum wage) that likely impact the outcome variables presented here.

Table 15

Descriptive Statistics for Realized Publicness Outcomes

Outcome	*n*	*M*	*SD*	Min	Max
Equitable enrollment by race	510	0.01	0.06	-0.15	0.23
Equitable enrollment by income	509	0.31	0.16	-0.05	0.75
Net price	504	0.51	0.14	0.12	0.92
Access and affordability factor	504	0.00	0.87	-2.04	2.47
Equitable graduation by race	507	-0.01	0.02	-0.07	0.05
Equitable graduation by income	523	-0.06	0.05	-0.22	0.07
Success and attainment factor	506	0.00	0.70	-2.11	1.93
Unemployment disparity (all students)	522	-0.03	0.03	-0.13	0.03
Unemployment disparity (completers)	529	0.00	0.02	-0.09	0.04
Pct earning above high school graduates	526	0.67	0.10	0.34	0.89
Workforce and economic factor	520	0.00	0.84	-3.65	1.75
Public service pct of core expenses	505	0.04	0.04	0.00	0.19
Carnegie Engaged institution	531	0.34		0.00	1.00
Campus Compact institution	531	0.58		0.00	1.00
Community improvement index	531	1.02	0.83	0.00	3.00

Realized Publicness by Institution Type. In this section, I share results from my descriptive analysis on realized publicness outcomes by institution type. I focus specifically on very high research institutions (*research*), regional comprehensive universities (*rcu*), enrollment-based minority-serving institutions (*msi*), and Historically Black Colleges and Universities (*hbcu*). In many cases, institutions are included in

multiple categories (i.e., an RCU can also be an MSI). While this section focuses exclusively on averages (means), complete descriptive tables for all realized publicness outcomes by institution type are presented in Appendix E and Appendix F.

As shown in Table 16, research institutions (n = 91) had the lowest average scores on all access and affordability measures. HBCUs (n = 39) had the highest scores on equitable enrollment by race, equitable enrollment by income, and access factor; MSIs (n = 63) had the lowest average net price. HBCUs had the highest scores on all success and attainment measures. RCUs (n = 379) had the lowest score on equitable graduation by race and the success factor and research institutions had the lowest score on the equitable graduation by income, but the range of mean scores in success across institution types was much smaller than for access. This indicates that the selected types of four-year public institutions had greater variation in access and affordability than in equitable student success. Research institutions had the highest scores in all workforce and economic indicators but one (the unemployment disparity for completers, which varied minimally across institution types and was slightly higher at RCUs). MSIs had the lowest scores in both unemployment rate disparity indicators and in the workforce factor, but there was little variation in means across institution types. HBCUs had the lowest percent of students earning above high school graduates. There was more variation in the proportion earning above high school graduates: only 49% of HBCU students earned more than someone with a high school diploma six years after enrolling compared to 65% and 68% at RCUs and MSIs (respectively), and 75% at research institutions. Finally, research institutions had the highest scores in all measures of community improvement.

MSIs allocated the smallest portion of their expenses for public service, but these results should be interpreted with caution because total institutional expenditures are not controlled for in this analysis. HBCUs were the least likely to receive the Carnegie Engaged institution designation or to be members of Campus Compact. As a result, HBCUs had the lowest average score on the community improvement index.

Descriptive statistics paint an informative picture of how realized publicness outcomes vary by institution type. However, in many cases the variation and/or differences are small and should be interpreted with caution. In the next section, I present results showing whether there are statistically significant differences by institution type in the means of the three factors and the index score.

Table 16

Realized Publicness Outcome Means by Institution Type

Outcome	All Institutions 531	Research 91	RCU 379	MSI 63	HBCU 39
Equitable enrollment by race	0.01	-0.02	0.01	0.04	0.13
Equitable enrollment by income	0.31	0.15	0.34	0.40	0.58
Net price	0.51	0.61	0.50	0.42	0.47
Access and affordability factor	0.00	-0.78	0.14	0.58	1.60
Equitable graduation by race	-0.01	-0.01	-0.02	-0.01	0.00
Equitable graduation by income	-0.06	-0.07	-0.06	-0.03	-0.02
Success and attainment factor	0.00	0.06	-0.06	0.43	0.70
Unemployment disparity (all students)	-0.03	-0.02	-0.03	-0.05	-0.03
Unemployment disparity (completers)	0.00	-0.01	0.00	-0.02	0.00
Pct earning above high school graduates	0.67	0.75	0.65	0.68	0.49
Workforce and economic factor	0.00	0.21	-0.01	-0.57	-0.30
Public service pct of core expenses	0.04	0.07	0.03	0.03	0.05
Carnegie Engaged institution	0.34	0.62	0.28	0.37	0.05
Campus Compact institution	0.58	0.67	0.55	0.48	0.46
Community improvement index	1.02	1.48	0.93	0.89	0.56

Note. For each variable, the best (green) and worst (red) means are highlighted. For all variables except net price, a higher mean indicates a better outcome.

Analysis of Variance. In this section, I report results on my multi-way ANOVA analyses. In these analyses, I examined predicted factor and index realized publicness scores across institution types. I conducted separate multi-way ANOVA analyses for each factor (*accessafford, success, workecon*) and for the *commimp* index.

For access and affordability, there were significant differences at research institutions ($f(1) = 46.38$, $p < 0.001$), HBCUs ($f(1) = 261.53$, $p < 0.001$), and MSIs ($f(1) = 93.00$, $p < 0.001$). Access and affordability did not significantly differ between RCUs and non-RCUs ($p = 0.3405$). Post-hoc regression base-level analysis showed that research institutions had significantly lower access and affordability than non-research institutions

(β = -0.7204, $p < 0.001$), while MSIs (β = 0.8151, $p < 0.001$) and HBCUs (β = 1.7089, $p < 0.001$) had significantly higher access and affordability factor scores than non-MSIs and non-HBCUs (respectively).

The equitable student success factor was significantly different for MSIs ($f(1) = 15.63$, $p < 0.001$) and HBCUs ($f(1) = 23.50$, $p < 0.001$). Research institutions ($p = 0.9550$) and RCUs ($p = 0.0501$) were not significantly different from their base populations (base populations are institutions not in a given designation). Post-hoc regression base-level analysis found that both MSIs (β = 0.5425, $p < 0.001$) and HBCUs (β = .8317, $p < 0.001$) had significantly higher predicted scores on equitable student success, on average.

Workforce and economic development was significant at research institutions ($f(1) = 3.95$, $p < 0.05$), MSIs ($f(1) = 23.91$, $p < 0.001$), and HBCUs ($f(1) = 4.05$, $p < 0.05$) when compared to their base populations. Once again, RCUs were not significantly different than non-RCUs on workforce and economic development ($p = 0.2691$). Post-hoc regression base-level findings showed that research institutions had significantly higher predicted workforce factor scores (β = 0.3423, $p < 0.05$) than non-research institutions. Meanwhile, MSIs (β = -.6653, $p < 0.0010$) and HBCUs (β = -0.3451, $p < 0.05$) had significantly lower predicted scores on workforce and economic development, when compared to non-MSIs and non-HBCUs.

The community improvement index ANOVA was significant for research institutions ($f(1) = 8.20$, $p < 0.001$) and HBCUs ($f(1) = 6.26$, $p < 0.01$). MSIs ($p = 0.0677$) and RCUs (0.6704) were not significantly different from their base populations. Post-hoc regression base-level analysis showed that compared to non-research institutions,

research institutions had significantly higher community improvement factor scores ($\beta = 0.4849$, $p < 0.001$). On the other hand, HBCUs had significantly lower community improvement factor scores than non-HBCUs ($\beta = -0.4276$, $p < 0.01$).

Overall, the ANOVA analysis findings show that research institutions have lower predicted scores on access and affordability, but have higher scores on both workforce and economic development and community improvement. Enrollment-based MSIs have higher factor scores for access and affordability and student success, but lower scores on workforce and economic development. Finally, HBCUs have higher scores on access and affordability and student success factors, but lower scores in workforce and economic development as well as community improvement. These findings are largely in line with my hypotheses for research question four. However, I did not predict that MSIs and HBCUs would have significantly lower scores on workforce and economic development. Additionally, the results for community improvement were opposite to my expectation; I predicted that HBCUs, MSIs, and RCUs would have higher contributions to community improvement. Instead, research institutions had higher contributions and HBCUs had lower contributions to community improvement.

The descriptive and ANOVA results presented here are likely impacted by substantial institution-level and state-level factors that impact the scores of each institution type, like variations in total revenue at each institution type and economic conditions in states with higher proportions of certain institution types (like HBCUs in the south). These findings also do not tell us anything about how publicness might have influenced these findings. In the next section, I present results from my regression

analyses, which control for institution- and state-level factors that might impact realized publicness outcomes.

Research Question 5: Random-Effects Regression

My fifth research question was "what is the relationship between state oversight and an institution's contribution to different public benefits?" I used random effects regression models with institutional controls for each outcome variable to address this question. Descriptive statistics for all independent variables are listed in Table 17. I included secondary independent variables in the analyses for which they were relevant. For example, net price was not included in models examining the access and affordability factor, because net price is a component of the *accessafford* factor. Similarly, I only included land grant status for community improvement due to its expected impact on community improvement outcomes. Net price and admit rate are secondary independent variables in some models and dependent variables in other models. In the following sections, I present random effects regression results for each outcome (education access and affordability, student success and attainment, economic and workforce development, and community improvement). The random effects regression results for state-level predictors (governance structure, centralized tuition-setting authority, and PBF percentage) are of primary interest in this section; although I present results for state funding, state funding is an institution-level predictor and my Hausman test results indicated that fixed effects are the preferred estimator for those analyses. Finally, while I do not discuss random effects regression results specific to each institution type in this chapter, they included in Appendix G for reference.

Table 17

Descriptive Statistics for Variables in Regression Analyses

Variable	*n*	*M*	*SD*	Min	Max
Independent Variables					
pubfund	476	32.91	12.10	3.40	74.93
pubfund1	476	1.00	0.73	0.12	5.95
govstructure	530	1.26	0.90	0.00	3.00
centraltuit	530	0.20	0.40	0.00	1.00
pbfpct	531	13.69	31.94	0.00	100.00
revenue_fte	505	28.08	14.46	10.33	88.93
federal_pct	476	15.61	6.63	0.77	43.65
fte	531	12.37	12.32	0.22	61.15
admitrate	527	77.45	16.89	14.00	100.00
netprice	504	0.51	0.14	0.12	0.92
gradrate_all	524	53.65	16.62	12.00	94.00
landgrant	531	0.13	0.33	0.00	1.00
Outcome Variables					
enrollrace	510	0.01	0.06	-0.15	0.23
enrollincome	509	0.31	0.16	-0.05	0.75
accessafford	504	0.00	0.87	-2.04	2.47
gradrace	507	-0.01	0.02	-0.07	0.05
gradincome	523	-0.06	0.05	-0.22	0.07
baprod	531	0.19	0.04	0.06	0.33
success	506	0.00	0.70	-2.11	1.93
instate_pct	528	80.80	15.70	23.00	100.00
unemploy	522	-0.03	0.03	-0.13	0.03
unemploy_comp	529	0.00	0.02	-0.09	0.04
earnings_hs	526	66.80	9.91	33.80	89.37
mobilityorstay	377	0.47	0.07	0.26	0.67
workecon	520	0.00	0.84	-3.65	1.75
pubsvc_pct	505	0.04	0.04	0.00	0.19
pubsvcws	481	0.13	0.08	0.00	0.44
cc	531	0.58	0.49	0.00	1.00
ce	531	0.34	0.48	0.00	1.00
commimp	531	1.02	0.83	0.00	3.00

Note. Revenue per FTE and FTE are in thousands. Net price is indexed from zero to one. All percentages, previously 0-1 for factor analysis, were multiplied by 100 for regression analysis interpretation.

Education Access and Affordability. In this section, I present linear random effects regression models for all education access and affordability outcome variables. A regression model for institutional selectivity (*admitrate*) is included, but *admitrate* was not used in the development of the *accessafford* factor. I predicted that state funding (financial publicness) would be positively related to access and affordability outcomes. In the random effects model for access and affordability (Table 18), the public funding percentage (*pubfund*) had a positive significant impact on *enrollincome* ($p < 0.05$) and a negative significant impact on *netprice* ($p < 0.001$). For *netprice,* a decrease is a positive outcome for student affordability. *Pubfund* also had a positive marginally significant impact on *admitrate* ($p < 0.10$), and a significant positive impact on the *accessafford* factor ($p < 0.01$). Holding all other variables in the model constant, a 10 percentage point (pp) increase in financial publicness (*pubfund*) resulted in a 0.014 point increase in equitable enrollment by income (*enrollincome*), which is equivalent to nine percent of a standard deviation in equitable enrollment by income. A 10pp increase in financial publicness resulted in a 0.031 decline in the *netprice* index, which translates to a $852 decrease in net price. Additionally. a 10pp increase in financial publicness resulted in a 2.14pp increase in the admit rate. Overall, a 10pp increase in financial publicness resulted in a 0.145 point increase in the predicted *accessafford* factor score, or 17% of a standard deviation. While these results are in line with my hypotheses for the impacts of financial publicness on access and affordability, the random effect models do not account for variation between states that might impact these results.

I predicted that state authority (governance structure and tuition-setting authority) would have no relationship with access and affordability, but that state accountability (pbf) would be negatively related to access and affordability. PBF (*pbfpct*) had a marginally significant negative impact on *enrollincome* ($p < 0.10$), where a 10pp increase in *pbfpct* led to a 0.0042 decline in *enrollincome,* 3% of a standard deviation. PBF was also negatively significantly related to net price ($p < 0.05$), with a 10pp increase in PBF allocations as a percent of state operating appropriations associated with a 0.007 ($189) decline in net price

Centralized tuition-setting authority (*centraltuit*) had a significant negative impact on *admitrate* ($p < 0.05$), where the average institutional admit rate was 8pp lower, on average, when the state had tuition-setting authority. Centralized tuition-setting authority had no other significant effects on education access and affordability variables. Governance structure (*govstructure*) had several significant impacts on access and affordability outcomes. Compared to states with no state-level governance structure for higher education, states with an administrative agency had marginally significantly higher *enrollincome* scores ($p < 0.10$, $b = 0.07$ or 46% of a standard deviation) and a significantly higher *netprice* ($p < 0.01$, $b = 0.08$ or $2,214). States with coordinating agencies had marginally significantly higher *enrollincome* scores ($p < 0.10$, $b = 0.04$ or 25% of a standard deviation). Finally, compared to states with no statewide higher education agency, states with governing agencies had significantly lower *enrollincome* ($p < 0.01$, $b = -0.08$ or 52% of a standard deviation) and *accessafford* predicted factor scores ($p < 0.01$, $b = -0.4$, or 46% of a standard deviation). These findings are partially in

line with my hypotheses; I expected a negative relationship between PBF and access and affordability and did not expect to find relationships between tuition-setting authority or governance structure and access and affordability.

Several secondary independent variables significantly predicted access and affordability and its components (Table 18). Notably, the percent of revenues from federal sources (*federal_pct*) significantly predicted all dependent variables except the admit rate. The effects of the federal percentage on the *accessafford* factor were substantially larger than the effects of *pubfund,* which is the state percentage—a 10pp increase in the federal percent led to a 0.67 increase in access and affordability (76% of a standard deviation). These results were expected, largely because *federal_pct* includes federal Pell grant revenue and *enrollincome* (which makes up part of *accessafford*) is based on the proportion of Pell grant recipients relative to the state's low-income population.

Core revenues per FTE (*revenue_fte*) had a significant positive relationship with net price ($p < 0.05$, $b = 0.0014$), where each $1,000 increase in core revenue per FTE resulted in a $38 increase in net price. This relationship is expected, because net price is related to net tuition, a component of core revenues. Core revenue per FTE also had a significant negative relationship with admit rate ($p < 0.001$), wherein $1,000 of additional revenue was associated with a 0.28pp decline in admit rate. Core revenues per FTE were not significantly associated with *accessafford.*

Table 18

Education Access and Affordability Random-Effects Models

Independent variable	(1) enrollrace	(2) enrollincome	(3) netprice	(4) admitrate	(5) accessafford
pubfund	0.000567	0.00144*	-0.00308***	0.214+	0.0145**
	(0.000465)	(0.000673)	(0.000927)	(0.109)	(0.00480)
pbfpct	-0.000101	-0.000423+	-0.000682*	0.0395	-0.000271
	(0.0000984)	(0.000219)	(0.000318)	(0.0323)	(0.000992)
centraltuit	0.00740	0.00159	-0.00300	-8.028*	0.0811
	(0.0112)	(0.0280)	(0.0238)	(3.572)	(0.121)
govstructure					
1. administrative	0.0104	0.0734+	0.0800**	-7.900	0.0501
	(0.00876)	(0.0378)	(0.0293)	(4.864)	(0.107)
2. coordinating	-0.000721	0.0397+	0.0368	1.413	-0.00152
	(0.00859)	(0.0238)	(0.0226)	(2.751)	(0.0981)
3. governing	-0.0121	-0.0819**	0.0121	6.491+	-0.397**
	(0.0116)	(0.0290)	(0.0377)	(3.513)	(0.151)
revenue_fte	-0.0000516	-0.000563	0.00139*	-0.284***	-0.00407
	(0.000289)	(0.000658)	(0.000675)	(0.0787)	(0.00434)
fte	-0.000632+	-0.00360***		-0.183*	-0.0173***
	(0.000355)	(0.000560)		(0.0896)	(0.00437)
admitrate	0.000168	0.000811+	0.000442		0.00112
	(0.000252)	(0.000430)	(0.000411)		(0.00274)
instate_pct	-0.000272	0.000605	-0.00108**	-0.000862	0.00710*
	(0.000204)	(0.000503)	(0.000383)	(0.0560)	(0.00285)
netprice	-0.0531	-0.406***		8.082	
	(0.0344)	(0.0659)		(5.828)	
federal_pct	0.00418***	0.00977***	-0.00567***	-0.109	0.0665***
	(0.000792)	(0.00150)	(0.00131)	(0.157)	(0.00849)
_cons	-0.0342	0.236***	0.696***	81.23***	-1.837***
	(0.0390)	(0.0690)	(0.0649)	(8.466)	(0.468)
n	473	473	473	473	473

Note. Accessafford is a predicted factor score using *enrollrace, enrollincome*, and *netprice.*

+ $p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Student Success and Attainment. In this section, I present linear random effects regression model results for all outcome variables associated with student success and attainment. Although bachelor's degree production (baprod) is not included in the *success* factor, I include a model with it as the dependent variable in this section. For student success and attainment, I expected to find a positive impact from financial publicness. Financial publicness (*pubfund*) had a marginally significant positive relationship with *gradincome* ($p < 0.10$) and a significant positive relationship with *baprod* ($p < 0.001$). The interpretation of this is that for a 10pp increase in financial publicness, graduation equity by income increased by 0.004 points, or 9% of a standard deviation. Additionally, with a 10pp increase in financial publicness, bachelor's degree production increased by 0.007 degrees per FTE, or 17% of a standard deviation. For an institution with average FTE, a 10pp increase in financial publicness would correspond to 84 additional bachelor's degrees awarded.[1] Contrary to my expectation, financial publicness did not significantly impact *gradrace* or *success.*

I predicted that state accountability (*pbf*) would be negatively related to student success and attainment, and that governance structure and tuition-setting would not have significant effects. The PBF percentage had a significant negative effect on *gradincome* ($p < 0.01$) but did not impact predicted *success* factor scores. With a 10pp increase in the proportion of operating funding allocated through PBF, equity in graduation rates by income declined by .0025, or five percent of a standard deviation. Centralized tuition-

[1] Additional degrees awarded = baprod coefficient * 10pp pubfund increase * mean FTE

setting had a marginally significant positive effect on *baprod* ($p < 0.10$). Governance structure had no significant effects. In states with centralized tuition-setting authority, bachelor's degree production per FTE was 0.013 higher. At an institution with average FTE, this would correspond to an additional 166 bachelor's degrees.

The percent of funding from federal sources was significant for all student success and attainment outcomes ($p < 0.001$ on all). For the *success* factor, a 10pp increase in *federal_pct* increased success by 0.23, or 32% of a standard deviation. Core revenues per FTE significantly predicted *gradrace* ($p < 0.01$), *baprod* ($p < 0.001$), and *success* ($p < 0.05$). However, the effect size of core revenues per FTE on student success was small: for every $1,000 increase in total revenue per FTE, predicted *success* factor scores increased by 0.006, one percent of a standard deviation.

Table 19

Student Success and Attainment Random-Effects Models

Independent variable	(1) gradrace	(2) gradincome	(3) baprod	(4) success
pubfund	-0.0000603	0.000437+	0.000682***	-0.0000561
	(0.0000887)	(0.000223)	(0.000160)	(0.00348)
pbfpct	-0.0000111	-0.000251*	-0.0000970	-0.00281
	(0.0000332)	(0.000101)	(0.0000894)	(0.00183)
centraltuit	0.00106	0.00464	0.0134+	0.101
	(0.00216)	(0.00833)	(0.00748)	(0.142)
govstructure				
1. administrative	-0.00571	0.00306	-0.000989	-0.157
	(0.00426)	(0.0111)	(0.00749)	(0.220)
2. coordinating	-0.00475	-0.00519	-0.00356	-0.208
	(0.00298)	(0.00805)	(0.00621)	(0.149)
3. governing	0.000351	-0.0132	0.00182	-0.125
	(0.00827)	(0.0204)	(0.0157)	(0.409)
revenue_fte	0.000143**	0.0000651	-0.000549***	0.00613*
	(0.0000557)	(0.000202)	(0.000114)	(0.00268)
admitrate	-0.000102+	-0.000107	-0.0000412	-0.00524*
	(0.0000536)	(0.000141)	(0.000123)	(0.00233)
netprice	-0.00390	-0.0569***	0.0209	-0.383
	(0.00603)	(0.0142)	(0.0143)	(0.315)
federal_pct	0.000440***	0.00168***	-0.000907***	0.0226***
	(0.0000887)	(0.000288)	(0.000226)	(0.00492)
gradrate_all			0.000672***	-0.00692+
			(0.000193)	(0.00358)
_cons	-0.00922+	-0.0608**	0.157***	0.544
	(0.00501)	(0.0188)	(0.0199)	(0.337)
n	471	470	471	470

Note. Success is a predicted factor score using *gradrace* and *gradincome*.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Economic and Workforce Development. In this section, I present results from linear random effects regression models for each outcome related to economic and workforce development. I include results for the in-state percent (*instate_pct*) and economic mobility (*mobilityorstay*) even though they are not included in the final

workecon factor. I expected to see positive effects of financial publicness on economic and workforce development. The state funding proportion was positively significantly related to *in_state* ($p < 0.001$), a proxy for the percentage of students who would remain in-state after graduation. For every 10pp increase in *pubfund, instate_pct* increased by 3.81pp. For all other workforce variables, *pubfund* did not have the impact I predicted. There was a negative significant impact of *pubfund* on the proportion of students earning more than a high school graduate ($p < .01$). For every 10pp increase in financial publicness, the *earnings_hs* proportion declined by 1.3pp. There were no significant relationships between financial publicness and unemployment (either variable), mobility, or the predicted workforce and economic development factor.

I expected to find that state accountability would be positively related to workforce and economic development. This hypothesis was generally supported; *pbfpct* had significant positive effects on *unemploy_comp* ($p < 0.05$), as well as marginally significant positive effects on *mobilityorstay* ($p < 0.10$), and *workecon* ($p < 0.10$). For every 10pp increase in the proportion of operating appropriations allocated through PBF, the unemployment disparity for completers improved by 0.0013, 8% of a standard deviation. For every 10pp increase in *pbfpct,* the proportion of students either increasing their economic mobility quintile or remaining in the top two quintiles increased by a small amount (0.0028pp). Predicted scores on the workforce and economic development factor increased 0.0332 (4% of a standard deviation) for every 10pp increase in *pbfpct.*

I expected that state authority would be negatively related to workforce and economic development outcomes. Centralized tuition-setting had a marginally significant

negative association with the unemployment rate disparity for completers ($p < 0.10$), with 0.007 (45% of a standard deviation) worse outcomes for institutions in states with centralized tuition-setting authority. However, *centraltuit* did not significantly impact predicted *workecon* factor scores.

As I expected, institutions in states with more centralized governance over public higher education institutions generally had worse workforce outcomes (Table 20). Compared to institutions in states without a state-level agency, institutions in states with state-level governing boards had significantly worse *unemploy* disparities ($p < 0.001$, b = -0.041, 1.5 standard deviations); they also had significantly worse *unemply_comp* disparities ($p < 0.05$, b = -0.023, 1.4 standard deviations), and significantly worse predicted *workecon* scores overall ($p < 0.01$, b = -1.16, 1.4 standard deviations). However, governing boards were associated with marginally significantly higher *earnings_hs* ($p < 0.10$), where the percentage of students earning more than a high school graduate was 5.1pp higher for institutions in states with governing boards, compared to institutions in states without a state-level agency. Additionally, states with administrative agencies had significantly higher outcomes for *earnings_hs* and *mobilityorstay* ($p < 0.01$). Compared to institutions in states without a state-level agency, institutions in a state with an administrative agency had 4.47pp higher *earnings_hs* and a 0.036 higher *mobilityorstay* proportion (54% of a standard deviation). There were no significant effects of state-level coordinating boards on workforce and economic development outcomes.

The federal percentage had significant negative relationships with *instate_pct* ($p < 0.01$), and *earnings_hs* ($p < 0.001$), a negative marginally significant relationship with *unemploy_comp* ($p < 0.10$) as well as a significant positive relationship with *mobilityorstay* ($p < 0.01$). However, *federal_pct* did not significantly impact the workforce and economic development factor. On the other hand, core revenue per FTE significant negative effects on *instate_pct* ($p < 0.001$), *unemploy* and *unemploy_comp* ($p < 0.01$), and *workecon* ($p < 0.01$). The interpretation of the effect of revenue per FTE on the workforce and economic development factor is that for every $1,000 increase in core revenue per FTE, *workecon* declined 0.012, or 1% of a standard deviation.

Table 20

Workforce and Economic Development Random-Effects Models

Independent variable	(1) instate pct	(2) unemploy	(3) unemploy comp	(4) Earnings hs	(5) mobility-orstay	(6) work-econ
pubfund	0.381***	-0.000102	0.000167	-0.134**	-0.000287	-0.00205
	-0.0965	-0.000271	-0.000117	-0.0466	-0.000461	-0.00797
pbfpct	-0.0216	0.0000788	0.000126*	-0.0175	0.000280+	0.00332+
	-0.0428	-0.000064	-0.0000503	-0.0173	-0.000146	-0.00194
centraltuit	1.427	-0.00556	-0.00752+	1.503	-0.0065	-0.215
	-3.772	-0.00515	-0.00426	-1.377	-0.0122	-0.163
govstructure						
1. administrative	3.007	0.0027	0.00444	4.740**	0.0358**	0.199
	-5.235	-0.00632	-0.00502	-1.784	-0.0123	-0.184
2. coordinating	3.162	-0.00466	-0.00486	-0.114	0.0148	-0.177
	-3.796	-0.00473	-0.00345	-1.632	-0.0135	-0.141
3. governing	-8.382	-0.0409***	-0.0234*	5.106+	0.00811	-1.160**
	-6.125	-0.011	-0.00969	-2.77	-0.0332	-0.361
revenue_fte	-0.170***	-0.000343**	-0.000191**	-0.0409	0.00012	-0.0113**
	-0.0492	-0.000133	-0.0000642	-0.0334	-0.000321	-0.00401
admitrate	-0.00428	0.000107	0.0000947+	0.00714	-0.000879***	0.00389
	-0.0371	-0.0000826	-0.0000544	-0.021	-0.000226	-0.0026
gradrate_all	-0.0421	0.000990***	0.000302***	0.339***	-0.00231***	0.0308***
	-0.0627	-0.00012	-0.000067	-0.0393	-0.000327	-0.00312
federal_pct	-0.414**	0.0000199	-0.000186+	-0.304***	0.00173**	-0.00635
	-0.127	-0.00019	-0.000109	-0.0652	-0.000639	-0.00555
_cons	77.70***	-0.0748***	-0.0203+	56.73***	0.621***	-1.369*
	-7.609	-0.0196	-0.0108	-4.507	-0.0488	-0.582
n	471	465	469	468	357	463

Note. Workecon is a predicted factor score using *unemploy, unemploycomp,* and *earnings_hs.*
*** p<0.001, **p<0.01, * p<0.05, + p<0.10; Clustered robust standard errors in parentheses

Community Improvement. In this section, I present my random effects regression results for community improvement outcomes. I ran models with each community improvement outcome as the dependent variable, but *pubsvcws* was not included in the final *commimp* index. As with all previously discussed regression models,

models 1 and 2 in Table 21 are linear regression random effects models. However, models 3 and 4 are logistic regressions with random effects, and model 5 is a Poisson regression with random effects. The interpretation for models 3-5 differs from interpretation for the other random effects models presented in this chapter. Odds ratios for models 3 and 4 are shown in Table 22. All models have clustered robust standard errors at the state level.

I predicted that financial publicness (*pubfund*) would have a positive significant relationship with community improvement. This hypothesis was partially supported by my findings; *pubfund* had a significant positive effect on *pubsvcws* ($p < 0.01$). Given a 10pp increase in the percentage of funding coming from the state, the allocation of an institution's work-study to public service increased 0.01, or 11% of a standard deviation (Table 21). However, *pubsvcws* was highly different than all other community improvement variables in factor analysis and may not be an accurate measure of community improvement. Financial publicness also had a significant positive effect on Campus Compact membership (*cc*), where a 10pp increase of *pubfund* would increase the odds of being a member of *cc* by 1.5 times (Table 22).[2] Contrary to my prediction, *pubfund* did not significantly predict scores on the *commimp* index.

I predicted that state authority (*centraltuit, govstructure*) would be positively related to community improvement. I also predicted that state accountability (*pbf*) would be negatively related to community improvement. However, my findings did not align

[2] Odds of Campus Compact membership = e ^ (cc coefficient * 10pp pubfund increase)

with these predictions; *centraltuit* and *pbfpct* had no significant effects on any community improvement outcomes. While *govstructure* had some isolated impacts, both were negative: institutions in states with administrative agencies had significantly lower *pubsvc_pct* ($p < 0.01$, $b = -1.018$, 44% of a standard deviation), and institutions in states with coordinating agencies had significantly lower odds of receiving *ce* designation ($p < 0.05$, odds ratio 0.73). No governance structure significantly impacted the *commimp* index.

In fact, the only significant predictor of *commimp* was FTE ($p < 0.05$). For every 1,000 in additional FTE, the incidence rate ratio for *commimp* increased 1.02. FTE was also significantly positively related to both *cc* and *ce.* The odds of Campus Compact membership increased by 1.07 for every 1,000 FTE, and the odds of Carnegie Engaged designation increased 1.10 for every 1,000 FTE at an institution (Table 22). Although it is not included in models 1 and 2 below (because there was no conceptual reason to expect an effect of FTE on *pubsvc_pct* or *pubsvcws,* after reviewing the results of FTE on *commimp* I reran both models 1 and 2 including FTE and did not find a significant effect of FTE on either outcome.

Table 21

Community Improvement Random-Effects Models

Independent variable	(1) pubsvc_pct	(2) pubsvcws	(3) cc	(4) ce	(5) commimp
pubfund	-0.000254	0.000928*	0.0408*	0.0107	0.00464
	(0.000187)	(0.000381)	(0.0161)	(0.0145)	(0.0130)
pbfpct	0.000119	-0.0000501	-0.0176	0.00501	-0.00191
	(0.000114)	(0.000115)	(0.0111)	(0.00377)	(0.00461)
centraltuit	-0.00724	-0.0123	0.466	-0.478	0.0338
	(0.00872)	(0.0133)	(0.797)	(0.381)	(0.179)
govstructure					
1. administrative	-0.0181**	0.00103	-0.774	-0.315	-0.167
	(0.00672)	(0.0169)	(0.849)	(0.355)	(0.442)
2. coordinating	-0.00214	-0.00482	-0.378	-0.633*	-0.126
	(0.00623)	(0.0138)	(0.763)	(0.301)	(0.296)
3. governing	0.0148	0.0234	-1.364	-0.320	-0.109
	(0.0114)	(0.0219)	(1.829)	(0.918)	(0.516)
revenue_fte	0.000496***	-0.000336	-0.00673	-0.0182*	-0.00256
	(0.000149)	(0.000251)	(0.00869)	(0.00900)	(0.00305)
landgrant	0.0412***	0.0164	0.0287	0.371	0.161
	(0.00514)	(0.0137)	(0.540)	(0.380)	(0.389)
federal_pct	-0.0000299	0.000567	-0.0180	-0.0693**	-0.0258
	(0.000308)	(0.000604)	(0.0242)	(0.0235)	(0.0400)
fte			0.0637**	0.0973***	0.0218*
			(0.0200)	(0.0211)	(0.00991)
_cons	0.0358***	0.108***	-0.184	-0.318	0.120
	(0.00919)	(0.0210)	(0.921)	(0.720)	(1.109)
n	476	456	476	476	476

Note. Commimp is an index score using *pubsvc_pct, cc,* and *ce.* Models 1 and 2 are linear fixed effects regression; models 3 and 4 are logistic fixed effects regression; model 5 is Poisson fixed effects regression.
+$p < 0.10$, *$p < 0.05$, ** $p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Table 22

Odds Ratios and Incidence Rate Ratios (IRR) for Community Improvement Random-Effects Models

Independent variable	cc		ce		commimp	
	odds ratio	robust *SE*	odds ratio	robust *SE*	IRR	robust *SE*
pubfund	1.0416	0.0167	1.010711	0.0146271	1.004656	0.0130917
pbfpct	0.9825	0.0109	1.005021	0.003791	0.9980912	0.0045994
centraltuit	1.5938	1.2705	0.6200934	0.2364264	1.034425	0.1852862
federal_pct	0.9821	0.0238	0.9330318	0.0219185	0.9745029	0.0389435
govstructure						
1. administrative	0.4611	0.3914	0.7295727	0.2586875	0.846138	0.3740547
2. coordinating	0.6850	0.5228	0.5310471	0.1600215	0.8819662	0.261119
3. governing	0.2557	0.4677	0.7261647	0.666296	0.8964448	0.4621955
revenue_fte	0.9933	0.0086	0.9819945	0.0088333	0.9974445	0.0030396
landgrant	1.0291	0.5555	1.448601	0.5507015	1.174211	0.4566209
fte	1.0657	0.0213	1.102157	0.0232194	1.022026	0.0101307
_cons	0.8316334	0.7661818	0.7276901	0.5238303	1.127363	1.25015
lnsig2u / lnalpha	1.056283	0.3453029	-2.945509	2.712199	-2.730809	13.38494
sigma_u	1.695778	0.2927785	0.229293	0.3109442		
rho	0.4664096	0.0859361	0.0157296	0.0419907		

Note. CC and CE are logistic fixed effects regression models, *commimp* is a Poisson fixed effects regression model.

In addition to the random effects models described above, I ran models for each outcome with alternative specifications of my newly constructed primary independent variable *govstructure*. Overall, I find that the impacts of *govstructure* on public good outcomes are robust to alternative specifications. I describe the results of these sensitivity tests in the next section.

Sensitivity Tests. I conducted sensitivity tests with my random effects models to estimate alternative specifications to my governance structure variable because it had not previously been used. Appendix H shows the results for three specifications of *govstructure* on each outcome variable model. *Govstructure* distinguishes between

system-level agencies (0), state-level administrative agencies (1), state-level coordinating agencies (2), and state-level governing agencies (3). In *govstructure1,* state-level administrative and coordinating agencies are treated as equal (1). In *govstructure2,* all state-level agencies are treated the same (1). Across the board, all model specifications do not have a significant impact on either the *success* factor or the *commimp* index (Appendix H). In both *govstructure* and *govstructure1,* state-level governing boards have negative impacts on the *accessafford* and *workecon* factors. The effect sizes are also very similar, suggesting that consolidating administrative and coordinating agencies into a single group does not impact the relationships between state-level governance structures and realized publicness outcomes. *Govstructure2* has no significant impacts on factors. The lack of a significant relationship between *govstructure2* and *accessafford* and *workecon* suggests that the isolation of state-level governing boards may be an important component in this relationship.

Research Question 6: Fixed-Effects Regression

My sixth and final research question was "what is the relationship between state financial publicness and an institution's contribution to different public benefits?" To answer this question, I used fixed effects regression models to isolate variation across institutions within each state (Mummolo & Peterson, 2018). This means that institutions are only compared to the other institutions in their state and are not compared to institutions in other states. State authority variables were dropped out of the fixed effects models because they do not vary within states. Although I do not discuss them in this

chapter, fixed effect regression results specific to each institution type are included in Appendix I for reference.

Education Access and Affordability. In this section, I present linear fixed effects regression model results for all education access and affordability outcome variables. I expected that financial publicness would positively impact access and affordability. In my random effects models, I found that the public funding percentage had a marginally significant positive impact on *enrollincome* and significant impacts on *netprice*, *admitrate*, and the *accessafford* factor (which includes all access and affordability dependent variables except *admitrate*). In the fixed effects model, which eliminates variation due to states, the same outcome variables were significantly impacted by financial publicness or *pubfund* at the $p < 0.05$ level, and the coefficients were mostly larger (Table 23). *Enrollrace* was not significantly related to financial publicness. For every 10pp increase in financial publicness, *enrollincome* increased 0.02, or 13% of a standard deviation; *netprice* decreased 0.03, or $816; *admitrate* increased 3.3pp; and the *accessafford* factor increased 0.15, 18% of a standard deviation. For each of the access and affordability variables, the fixed effect models effect size of financial publicness was either comparable *(*for *netprice*) or larger (for all other variables) than the random effects model size.

In both the random effects and fixed effects models, the percent of funding from federal sources significantly predicted the *accessafford* factor, as well as all individual outcome variables except for *admitrate* ($p < 0.01$ on all). For every 10pp increase in *federal_pct,* predicted *accessafford* scores increased by 0.74, or 85% of a standard

deviation. This decreases to 0.4 and 46% of a standard deviation if *HBCU* and *MSI* are included as additional controls, suggesting that this strong relationship is in part because MSIs and HBCUs receive special federal funding and are endogenous to *enrollrace,* a component of *accessafford. MSI and HBCU* control variables are not included in the main models due to this endogeneity.

Total core revenue per FTE (*revenue_fte)* was marginally positively significantly related to *netprice* ($p < 0.10$) and significantly negatively related to *admitrate* ($p < 0.01$) but did not significantly impact the *accessafford* factor (Table 23). These results are close to the random effects results for revenue per FTE. In the random effects model, there were significant relationships with both *netprice* and *admitrate* but revenue per FTE did not significantly impact access and affordability. In summary, the results presented in this section supported by predictions about the positive impact of financial publicness on education access and affordability.

Table 23

Education Access and Affordability Fixed-Effects Models

Independent variable	(1) enrollrace	(2) enrollincome	(3) netprice	(4) admitrate	(5) accessafford
pubfund	0.000583	0.00202*	-0.00295*	0.330*	0.0154*
	(0.000547)	(0.000776)	(0.00141)	(0.134)	(0.00731)
revenue_fte	-0.000162	-0.000404	0.00146+	-0.255**	-0.00586
	(0.000251)	(0.000627)	(0.000849)	(0.0885)	(0.00432)
fte	-0.000589	-0.00349***		-0.0949	-0.0208***
	(0.000466)	(0.000606)		(0.0842)	(0.00527)
federal_pct	0.00497***	0.0101***	-0.00519***	-0.104	0.0743***
	(0.00103)	(0.00163)	(0.00146)	(0.166)	(0.0105)
admitrate	0.000334	0.000931*	0.000291		0.00377
	(0.000235)	(0.000452)	(0.000411)		(0.00249)
instate_pct	-0.000441	0.000212	-0.000805+	0.0315	0.00112
	(0.000285)	(0.000594)	(0.000459)	(0.0713)	(0.00346)
netprice	-0.110*	-0.452***		5.773	
	(0.0421)	(0.0686)		(6.314)	
_cons	-0.0135	0.282***	0.689***	70.75***	-1.605**
	(0.0416)	(0.0723)	(0.0817)	(10.34)	(0.535)
n	473	473	473	473	473
adj. R-sq	0.337	0.640	0.404	0.345	0.496

Note. Accessafford is a predicted factor score using *enrollrace, enrollincome*, and *netprice. Netprice* is an outcome variable but is also used as a control variable for unrelated models (models 1-2 and 4). Similarly, *admitrate* is the outcome variable in model 4 but is a control variable for unrelated models (models 1-3 and 5).
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Student Success and Attainment. In this section, I present my linear fixed effects regression results for student success and attainment variables, including the *success* factor which was developed based on *gradrace* and *gradincome.* I present results for *baprod* because it is an attainment outcome despite not aligning with the other variables in factor analysis. I predicted a positive significant relationship between financial publicness (*pubfund*) and *success,* but as with the random effects models, there

was no significant effect of *pubfund* on *success*. The only significant effect of financial publicness on student success and attainment was *baprod* ($p < 0.001$). As shown in Table 24, for every 10pp increase in *pubfund, baprod* increased 0.007, 16% of a standard deviation. This means that for every 10pp increase in financial publicness, an institution with average FTE would produce 84 additional bachelors degrees. In addition, *gradrace* was marginally significantly negatively related to *pubfund* ($p < 0.10$). For every 10pp increase in financial publicness, *gradrace* declined 0.02, or 12% of a standard deviation. However, this relationship did not exist in the random effects model.

The fixed effects model for education success and attainment includes an additional control variable for *hbcu.* This was added because *federal_pct* was highly significantly related to *success,* but *hbcu* entirely explains that relationship. HBCU, a binary variable indicating whether each institution receives HBCU funding, is significantly and positively related to *success* ($p < 0.01$). HBCUs have 0.584 higher predicted *success* scores than non-HBCUs (83% of a standard deviation). Core revenue per FTE also had a significant and positive impact on *success* ($p < 0.05$), but the effect size was very small. For every $1,000 increase in core revenue, predicted *success* scores increased 0.005, or one percent of a standard deviation Table 24. Overall, my predicted relationship between financial publicness and student success did not hold true; but there was a relationship between financial publicness and state attainment (*baprod*).

Table 24

Student Success and Attainment Fixed-Effects Models

Independent variable	(1) gradrace	(2) gradincome	(3) baprod	(4) success
pubfund	-0.000183+	0.000214	0.000676***	-0.00382
	(0.000101)	(0.000270)	(0.000157)	(0.00383)
revenue_fte	0.000115*	0.0000211	-0.000459**	0.00471*
	(0.0000471)	(0.000200)	(0.000148)	(0.00230)
federal_pct	0.0000651	0.00102*	-0.00000270	0.00976
	(0.000137)	(0.000436)	(0.000326)	(0.00666)
admitrate	-0.0000908	-0.0000428	-0.000128	-0.00400
	(0.0000625)	(0.000161)	(0.000113)	(0.00255)
netprice	-0.00815	-0.0657***	0.0388*	-0.610+
	(0.00686)	(0.0140)	(0.0174)	(0.346)
hbcu	0.0148***	0.0298**	-0.0358***	0.584**
	(0.00416)	(0.0101)	(0.00923)	(0.171)
gradrate_all			0.000338+	-0.00510
			(0.000188)	(0.00408)
_cons	-0.00113	-0.0458*	0.159***	0.694+
	(0.00611)	(0.0220)	(0.0167)	(0.371)
n	471	470	471	470
adj. R-sq	0.319	0.447	0.475	0.455

Note. Success is a predicted factor score using *gradrace* and *gradincome. Gradrate_all* is not included as a control for models 1 and 2 because it is endogenous to *gradrace* and *gradincome.*
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Economic and Workforce Development. In this section, I present my results for linear fixed effects regression analyses of workforce and economic development variables. I include results for *instate_pct* and *mobilityorstay* even though they were not retained in the final *workecon* factor. I predicted that there would be positive significant relationships between workforce and economic development and financial publicness. In both the random effects models presented previously and the fixed effects models in

Table 25, my hypothesis was not supported and I did not find a significant impact of financial publicness on the *workecon* predicted factor scores. However, I did find significant and positive relationships between financial publicness and the proportion of students are state residents (*instate_pct, p* < 0.01) and the gap in employment between recent graduates and the state average (*unemploy_comp, p* < 0.05). For every 10pp increase in *pubfund, instate_pct* increased 3.5pp (similar with random effects). For every 10pp increase of *pubfund* in the fixed effects model, *unemploy_comp* increased 0.003, or 18% of a standard deviation (not significant with random effects). In addition, there was a significant negative impact of *pubfund* on the proportion of students earning more than a high school graduate (*earnings_hs, p* < 0.01). For every 10pp increase in *pubfund, earnings_hs* decreased 0.16pp.

The percent of funding from federal sources had significant impacts on some workforce and economic development outcome variables, but was not significantly related to the *workecon* factor (Table 25). However, total revenue per FTE had a significant but negative relationship with predicted factor scores for *workecon* (*p* < 0.05). For every $1,000 increase in revenue per FTE, *workecon* declined 0.0096, or 1% of a standard deviation (similar with random effects). Overall, despite the presence of some relationships between financial publicness and workforce outcomes, my predictions were not supported for the impacts of financial publicness on the workforce and economic development factor.

Table 25

Workforce and Economic Development Fixed-Effects Models

Independent variable	(1) instate_pct	(2) unemploy	(3) unemploy_ comp	(4) earnings_hs	(5) mobilityorstay	(6) workecon
pubfund	0.347**	0.0000358	0.000301*	-0.160**	-0.000368	0.00284
	(0.112)	(0.000353)	(0.000143)	(0.0570)	(0.000688)	(0.0103)
revenue_fte	-0.179**	-0.000265+	-0.000168*	-0.0514	0.000212	-0.00957*
	(0.0518)	(0.000151)	(0.0000706)	(0.0380)	(0.000353)	(0.00468)
federal_pct	-0.388**	0.0000696	-0.000184	-0.269***	0.00183*	-0.00477
	(0.139)	(0.000204)	(0.000116)	(0.0696)	(0.000750)	(0.00598)
admitrate	0.00916	0.000124	0.0000824	0.0109	-0.000866***	0.00401
	(0.0403)	(0.0000781)	(0.0000562)	(0.0231)	(0.000244)	(0.00259)
gradrate_all	-0.0409	0.000972***	0.000350***	0.332***	-0.00244***	0.0313***
	(0.0686)	(0.000146)	(0.0000809)	(0.0425)	(0.000390)	(0.00393)
_cons	82.83***	-0.0859***	-0.0311*	58.70***	0.643***	-1.752*
	(7.203)	(0.0230)	(0.0123)	(4.499)	(0.0555)	(0.692)
n	471	465	469	468	357	463
adj. R-sq	0.504	0.551	0.450	0.728	0.445	0.568

Note. Workecon is a predicted factor score using unemploy, unemploycomp, and earnings_hs.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Community Improvement. In this section, I present fixed effects results for my community improvement outcome variables. Models 1 and 2 in Table 26 are linear regression models, while models 3 and 4 are logistic regression models. Model 5 examines the *commimp* model, a Poisson regression using the *commimp* calculated index scores. I include results for *pubsvcws* in Table 26, but due to dissimilarity in factor analysis, *pubsvcws* was not included in the community improvement index. I predicted that financial publicness (*pubfund*) would be positively significantly related to community improvement outcomes. This hypothesis was not supported. The only

significant relationship was with Campus Compact membership (*cc, p* < 0.01). For every 10pp increase in *pubfund,* the odds of Campus Compact membership increased by 1.6 (Table 27),[3] similar to the random effects model. The only significant predictors of the community improvement index were FTE (*p* < 0.001) and the percent of funding from federal sources (*federal_pct, p* < 0.05). For each 1pp increase in *federal_pct,* the incidence rate ratio for *commimp* declined 0.98. For every 1,000 increase in FTE, the incidence rate ratio for *commimp* increased 1.02. Overall, my hypothesis was not supported and *commimp* was unrelated to financial publicness.

Table 26

Community Improvement Fixed-Effects Models

Independent variable	(1) pubsvc_pct	(2) pubsvcws	(3) cc	(4) ce	(5) commimp
pubfund	-0.0000194	0.000746	0.0472**	0.0127	0.00907
	(0.000257)	(0.000566)	(0.0181)	(0.0165)	(0.00686)
revenue_fte	0.000442*	-0.000295	-0.00637	-0.0215*	-0.00242
	(0.000172)	(0.000274)	(0.0106)	(0.0107)	(0.00269)
fte	0.000320+	-0.0000847	0.0692***	0.0933***	0.0240***
	(0.000172)	(0.000389)	(0.0179)	(0.0164)	(0.00464)
federal_pct	-0.0000281	0.000539	-0.00373	-0.0559*	-0.0194*
	(0.000338)	(0.000699)	(0.0216)	(0.0238)	(0.00930)
landgrant	0.0402***	0.0136	-0.158	0.313	0.107
	(0.00522)	(0.0142)	(0.468)	(0.448)	(0.133)
_cons	0.0194+	0.110***			
	(0.0109)	(0.0297)			
n	476	456	377	437	473
adj. R-sq	0.396	0.092			

Note. Commimp_bin is an index score using *pubsvcws, cc,* and *ce.* Models 1 and 2 are linear fixed effects regression; models 3 and 4 are logistic fixed effects regression; model 5 is Poisson fixed effects regression.
+*p* < 0.10, **p* < 0.05, ***p* < 0.01, ****p* < 0.001; Clustered robust standard errors in parentheses

[3] Odds of Campus Compact membership = e ^ (cc coefficient * 10pp pubfund increase)

Table 27

Odds Ratios and Incidence Rate Ratios (IRR) for Community Improvement Fixed-Effects Models

Independent variable	cc		ce		commimp	
	odds ratio	robust *SE*	odds ratio	robust *SE*	IRR	robust *SE*
pubfund	1.0483	0.0190	1.0127	0.0167	1.0091	0.0069
revenue_fte	0.9937	0.0106	0.9788	0.0104	0.9976	0.0027
federal_pct	0.9963	0.0215	0.9456	0.0225	0.9807	0.0091
landgrant	0.8537	0.3998	1.3682	0.6129	1.1126	0.1479
fte	1.0716	0.0191	1.0978	0.0181	1.0243	0.0048

Note. CC and CE are logistic fixed effects regression models, *commimp* is a Poisson fixed effects regression model.

In addition to the fixed effects models described in this section, I ran models for each outcome with an alternative specification for my newly constructed primary independent variable *pubfund*. Overall, I find that the impacts of *pubfund* on public good outcomes are robust to an alternative specification. I describe the results of these sensitivity tests in the next section.

Sensitivity Tests. In this section, I present results for my fixed effects sensitivity tests on the newly created financial publicness variable. The two variable specifications presented here differ in scale, so it is important not to directly compare coefficients in Table 28. *Pubfund* is the public funding proportion, or state support as a percentage of total institutional revenues. *Pubfund1* is the public funding ratio, or state support relative to private revenues (not including government financial aid). These two variables are more than alternative constructions of a single variable; they are two different ways to analyze financial publicness (as a percentage of total funding versus in a ratio of public to private funding). Both *pubfund* and *pubfund1* had significant and positive impacts on the

accessafford factor ($p < 0.05$). For comparison purposes, I compared the effects of a 17% increase in the range of each measure of financial publicness. For *pubfund,* the interpretation is that for every 12pp increase in financial publicness, *accessafford* increased 0.18, or 21% of a standard deviation. For *pubfund1,* the interpretation is that for every one unit increase of *pubfund1* (which represents 17% of the total variation in *pubfund1*), *accessafford* increased 0.25, or 29% of a standard deviation.

Both financial publicness variables did not significantly impact the *success* or *workecon* factors, or the *commimp* index. While *pubfund* and *pubfund1* had similar impacts on each factor, there were differences in individual outcome scores. *Pubfund1* had a significant positive impact on *enrollrace* ($p < 0.05$), while *pubfund* did not. On the other hand, *pubfund* had significant impacts on *netprice* ($p < 0.05$), *admitrate* ($p < 0.05$), and *instate_pct* ($p < 0.01$) and marginally significant impacts on *gradrace* ($p < 0.10$), while *pubfund1* did not. Note that *admitrate* and *instate_pct* were not retained in their respective factors. Overall, the measures I developed for financial publicness are robust to specification when considering each institution's factor and index scores as outcomes, but not when considering individual outcome variables.

Table 28

Sensitivity Tests for Fixed-Effects Models

Outcome	pubfund		pubfund1	
(1) enrollrace	0.000583	(0.000547)	0.0152*	(0.00668)
(2) enrollincome	0.00202*	(0.000776)	0.0344**	(0.0123)
(3) netprice	-0.00295*	(0.00141)	-0.0358	(0.0226)
(4) admitrate	0.330*	(0.134)	2.493	(2.552)
(5) accessafford	0.0154*	(0.00731)	0.252*	(0.125)
(6) gradrace	-0.000183+	(0.000101)	-0.00200	(0.00185)
(7) gradincome	0.000214	(0.000270)	0.000584	(0.00318)
(8) baprod	0.000676***	(0.000157)	0.00573*	(0.00257)
(9) success	-0.00382	(0.00383)	-0.0421	(0.0563)
(10) instate_pct	0.347**	(0.112)	1.162	(1.175)
(11) unemploy	0.0000358	(0.000353)	0.00168	(0.00585)
(12) unemploy_comp	0.000301*	(0.000143)	0.00395+	(0.00233)
(13) earnings_hs	-0.0160**	(0.00570)	-0.0319***	(0.00687)
(14) mobilityorstay	-0.000368	(0.000688)	-0.00305	(0.00951)
(15) workecon	0.00284	(0.0103)	0.0515	(0.165)
(16) pubsvc_pct	-0.0000194	(0.000257)	-0.00236	(0.00349)
(17) pubsvcws	0.000746	(0.000566)	0.00916	(0.0110)
(18) cc	4.717**	(1.808)	0.616+	(0.328)
(19) ce	0.0127	(0.0165)	0.126	(0.231)
(20) commimp	0.00907	(0.00686)	0.0951	(0.0879)

Note. Each row corresponds to a model with the outcome variable listed in the first column. Additional predictors from the original *pubfund* specification were included in each model but are not shown here. Models 1-17 are linear random effects regression. Models 18 and 19 are logistic random effects regression models. Model 20 is a Poisson random effects regression.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Summary of Regression Results

In the sections above, I presented the results for a set of random-effects and fixed-effects regression models analyzing each realized publicness outcome. I found numerous impacts of empirical publicness predictors on realized publicness outcomes at public

four-year higher education institutions. The results for the empirical publicness independent variables of interest on each of the 20 outcomes are summarized in Table 29 and Table 30. In the next chapter, I integrate my qualitative findings and quantitative results, and contextualize and situate my results within prior literature and publicness theory.

Table 29

Financial Publicness Random- and Fixed-Effects Regression Results

	Outcome	pubfund random effects	pubfund fixed effects
(1)	enrollrace	0.000567	0.000583
(2)	enrollincome	0.00144*	0.00202*
(3)	netprice	-0.00308***	-0.00295*
(4)	admitrate	0.214+	0.330*
(5)	accessafford	0.0145**	0.0154*
(6)	gradrace	-0.0000603	-0.000183+
(7)	gradincome	0.000437+	0.000214
(8)	baprod	0.000682***	0.000676***
(9)	success	-0.0000561	-0.00382
(10)	instate_pct	0.381***	0.347**
(11)	unemploy	-0.000102	0.0000358
(12)	unemploy_comp	0.000167	0.000301*
(13)	earnings_hs	-0.134**	-0.160**
(14)	mobilityorstay	-0.000287	-0.000368
(15)	workecon	-0.00205	0.00284
(16)	pubsvc_pct	-0.000254	-0.0000194
(17)	pubsvcws	0.000928*	0.000746
(18)	cc	0.0408*	0.0472**
(19)	ce	0.0107	0.0127
(20)	commimp	0.00464	0.00907

Note. Random effects results are in column 1; fixed effects results are in column 2. Models 1-17 are linear regression. Models 18 and 19 are logistic regressions. Model 20 is a Poisson regression.
+$p < 0.10$, *$p < 0.01$, **$p < 0.05$, ***$p < 0.001$

Table 30

State Authority Random-Effects Regression Results

	Outcome	pbfpct	centraltuit	1. admin govstructure	2. coord govstructure	3. gov govstructure
(1)	enrollrace	-0.000101	0.00740	0.0104	-0.000721	-0.0121
(2)	enrollincome	-0.000423+	0.00159	0.0734+	0.0397+	-0.0819**
(3)	netprice	-0.000682*	-0.00300	0.0800**	0.0368	0.0121
(4)	admitrate	0.0395	-8.028*	-7.900	1.413	6.491+
(5)	accessafford	-0.000271	0.0811	0.0501	-0.00152	-0.397**
(6)	gradrace	-0.0000111	0.00106	-0.00571	-0.00475	0.000351
(7)	gradincome	-0.000251*	0.00464	0.00306	-0.00519	-0.0132
(8)	baprod	-0.0000970	0.0134+	-0.000989	-0.00356	0.00182
(9)	success	-0.00281	0.101	-0.157	-0.208	-0.125
(10)	instate_pct	-0.0216	1.427	3.007	3.162	-8.382
(11)	unemploy	0.0000788	-0.00556	0.0027	-0.00466	-0.0409***
(12)	unemploy_comp	0.000126*	-0.00752+	0.00444	-0.00486	-0.0234*
(13)	earnings_hs	-0.0175	1.503	4.740**	-0.114	5.106+
(14)	mobilityorstay	0.000280+	-0.0065	0.0358**	0.0148	0.00811
(15)	workecon	0.00332+	-0.215	0.199	-0.177	-1.160**
(16)	pubsvc_pct	0.000119	-0.00724	-0.0181**	-0.00214	0.0148
(17)	pubsvcws	-0.0000501	-0.0123	0.00103	-0.00482	0.0234
(18)	cc	-0.0176	0.466	-0.774	-0.378	-1.364
(19)	ce	0.00501	-0.478	-0.315	-0.633*	-0.320
(20)	commimp	-0.00191	0.0338	-0.167	-0.126	-0.109

Note. Models 1-17 are linear random effects regression. Models 18 and 19 are logistic random effects regressions. Model 20 is a Poisson random effects regression.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Chapter Five. Discussion

The American public, including many policymakers, have become increasingly skeptical of the value and benefits produced by higher education institutions (Jones, 2018; Pearlstein, 2018; Salhotra, 2022; Shell, 2018; Tretina, 2022). In an attempt to convince these audiences that higher education is a worthwhile investment, journalists, institutional leaders, and the field of higher education policy have increasingly focused on measuring and proving the individual economic benefits of earning a degree (Carnevale et al., 2019; Newton, 2018; Third Way, 2022). As a result, the higher education community has drifted away from conversations regarding the founding purposes of higher education, particularly public systems and institutions of higher education. This shift in discourse surrounding the benefits of public higher education is particularly concerning because higher education provides vast societal benefits beyond individual financial gains and relies on state funding in order to do so (Enders & Jongbloed, 2007; Singh, 2012). The purpose of my study was to identify what state higher education agencies see as the public benefits of higher education. In addition, I sought to quantify and measure the public benefits provided by public institutions of higher education and assess the extent to which state oversight and funding impact those public benefits. I employed an exploratory sequential mixed-method research design to address this purpose.

In this chapter, I provide a high-level summary and interpretation of my results integrated across the qualitative and quantitative strands of this mixed-method study. I connect my findings and results to existing literature and discuss the extent to which publicness can explain my results. Finally, I provide implications and recommendations for state higher education agencies, state public policy, theory, and future research.

Summary and Interpretation of Integrated Results

Six research questions guided my research design, data collection, and analysis. In this section, I briefly review the answers to each of my research questions. My first and second questions were qualitative in nature. My first question was: What common goals do states have for how public higher education can serve their states? I found four common goals in state-level mission and vision statements for public higher education. These goals were access and affordability for all state residents regardless of their demographic background; equal student success and state attainment for all residents; growing the state workforce and providing state economic development; and improving communities through community engagement and public service.

My second research question asked: In what ways do state goals for public higher education differ from those of system-level agencies? I found marked differences between system-level agencies and state-level agencies. System-level agency goals included a three-part mission of teaching, research, and service; serving the state, nation, and world; providing access and opportunities for student development; and obtaining status, notability, and prestige. The differences between state and system agency mission and vision statements were substantial enough that I found that system-level agencies do

not reflect state goals or interests and should not coded or treated the same as state-level agencies in research. I expand further on the differences between system- and state-level agencies in the following section.

My third and fourth research questions were quantitative in nature but were used to transition my qualitative findings into measurable variables for the quantitative strand in my study. My third research question was: To what extent can observed variables measuring institutional contributions accurately capture the components of state goals identified through content analysis as latent constructs? I predicted that I would sufficiently operationalize state goals into quantitative variables that formed latent factors. I found that existing data was sufficient to develop predicted factor scores measuring educational access and affordability, student success and attainment, and workforce and economic development. However, measures of equitable student success were not similar enough to overall student success and state attainment to include in a single factor. In addition, I found that there are insufficient existing quantitative measures of community improvement, and that the existing measures are not suitable for factor analysis.

My fourth research question asked: How do empirical publicness and realized publicness outcomes vary across types of four-year public institutions (minority-serving institutions, regional-comprehensive institutions, and research universities)? I predicted that there would be significant differences, and I found that these three institution types were not equal in the public good outcomes they provide. As I predicted, research institutions had significantly worse access and affordability outcomes, but had higher

workforce outcomes than non-research institutions. Research institutions also had better community improvement outcomes, which I did not predict. I predicted that minority—serving institutions (MSIs) and Historically Black Colleges and Universities (HBCUs) would have significantly better access and affordability and student success outcomes, which they did. However, I did not predict my finding that MSIs and HBCUs had significantly lower workforce outcomes than non-MSIs and HBCUs. Contrary to my expectation that HBCUs, MSIs, and regional-comprehensive institutions (RCUs) would have higher community improvement outcomes, HBCUs also had lower community improvement outcomes than non-HBCUs. I conducted additional analyses to further explore these results.

Publicness theory indicates that if institutions receive a small portion of their funding from the state and/or are largely autonomous from state oversight, the institution might behave differently than public institutions with more state funding and strict oversight (Bozeman & Moulton, 2011). My fifth and sixth research questions explored this theory. Question five asked: What is the relationship between state oversight and an institution's contribution to different public benefits? Question six asked: What is the relationship between state financial publicness and an institution's contribution to different public benefits? I found partial support for the theory that empirical publicness predicts realized publicness outcomes at public four-year institutions of higher education.

I predicted a positive significant relationship between financial publicness and all four state goals for higher education. Financial publicness was positively related to several outcome measures of state goals for public higher education, but not all. Financial

publicness primarily impacted the more immediately actionable state goals (those for access and affordability). Financial publicness also increased degree production in the state, but did not significantly impact student success. Financial publicness had a mixed relationship with workforce and economic development outcomes, and significantly improved only one of four measures of community improvement.

I had mixed predictions for state oversight. State oversight consists of both authority (governance structure and regulatory abilities) and state accountability measures. States with more powerful governance structures had worse access and affordability outcomes, contrary to publicness theory and my prediction. I predicted that state accountability would be negatively related to access and success; I found partial support for this hypothesis, with accountability negatively impacting access and success for low-income students. Beyond access and affordability, the primary impacts of state oversight on realized publicness outcomes were on state workforce and economic development. As predicted, I found that greater state authority was negatively related to workforce outcomes, while state accountability was positively related to workforce outcomes. Finally, I predicted that state authority would be positively related to community improvement and accountability negatively related to community improvement, but I did not find significant results pointing to a relationship between state authority or oversight and community improvement outcomes.

Specific significant relationships between state financial publicness or state oversight and realized publicness outcomes should be interpreted with some caution; when examining multiple regression models there is an increased likelihood of

committing type I error, where a significant result is found despite no meaningful relationship existing between the two variables. To account for this, my interpretation primarily focuses on relationships and effects that I found for multiple related variables, across both the fixed- and random-effects models, or that were present in my sensitivity tests, which included alternative specifications of my primary independent variables of interest. Additionally, the significance of a particular regression may be less meaningful than the effect size; in some cases, empirical publicness had significant but very small effects on realized publicness outcomes. While any effect of the state on institutional outcomes is important, the findings with the largest magnitude (presented as percentages of a standard deviation throughout the results section) are perhaps the most noteworthy.

The following sections summarize my findings and results in greater depth and connect them to prior literature. I first provide an interpretation of my findings on state- and system- level agency goals for higher education. Next, I integrate my qualitative findings and quantitative results and discuss the extent to which empirical publicness impacted realized publicness outcomes for each state goal.

State and System Goals for Higher Education

I identified similarities between states in their state-level agency mission statements, supporting T. E. Hollander's (1994) assertion that states share common goals for higher education, leading to similar mission and vision statements. State agencies are concerned with setting the course for public higher education and are focused on the state's purposes for higher education (Lingenfelter & Mingle, 2014). My findings show that state-level higher education agencies have four common goals for how public higher

education can serve their states. I review the findings for each of these goals in the upcoming sections.

In answering my second research question, I found that state-level goals are substantially different than the goals of system-level agencies. For example, system agencies were more likely to talk about serving or developing their state than state agencies (54% compared to 20%). This finding may be evidence that system-level agencies view their purpose as serving the state rather than being part of the state, while state-level higher education agencies consider themselves part of the state and are not in service to it.

Building on previous evidence found for higher education institutional mission statements (Morphew & Hartley, 2006), I find that system- and state-agency mission statements are symbolic, signaling the goals of each entity. Following their constituent groups, system agency mission statements reflect a mixture of the goals of their state and the goals of their institutions, and state agency mission statements reflect the goals of the state for higher education more broadly.

The system-level goals identified through my analysis are somewhat, but not entirely, aligned with prior research on institutional mission statements (Morphew & Hartley, 2006). One of the largest similarities between institution- and system-level goals is in the frequency of the teaching, research, and service mission. This could be due to a practice wherein system-level entities develop their missions by compiling institutional mission statements (Caruthers & Lott, 1981). States did not share this institution- and system-level mission commonality: Seventy-one percent of system-level agencies

included this traditionally institutional tri-part mission, compared to only three percent of states. This wide discrepancy signals major differences between state- and system-level agencies that could have impacts for states with powerful agency-level boards or without any state-level board.

System-level agency mission and vision statements were not entirely aligned with institution-level statements, however. A notable difference between system- and institutional goals concerns prestige, notoriety, and status. Morphew and Hartley (2006) found that aspirational elements like prestige or status were relatively rare in institutional mission statements. They theorized that institutions relied less on these components in their mission statements because their stakeholders don't care about prestige. The relative prevalence of prestige in system-level mission statements, then, could mean that systems are responding to different stakeholders, some of whom do care about and desire a shared goal of prestige (potentially the institutions themselves). Overall, I found that the content of system-level agency statements included elements of both institution-level and state-level mission statements. This commonality may be because system higher education agencies are intermediaries between the state and institutions and are reflecting the values of each of those stakeholders.

Education Access and Affordability

In this section, I integrate my qualitative findings and quantitative results related to education access and affordability.

Summary of State Goal. The goal of education access and affordability focuses on the ability of public institutions to provide broad access to higher education for all

state residents, regardless of their race/ethnicity or family's income. States tied education access to affordability of public institutions, aiming to provide accessible and affordable higher education. Providing equal access has long been one of the public purposes of higher education (Enders & Jongbloed, 2007; Gilbert & Heller, 2013; Russell, 1949), and is a key goal of public funding (McMahon, 2009; Perna & Finney, 2014). The goal of education access and affordability is also reflected in Hollander's (1994) assertion that universal access to higher education and special opportunities for previously excluded students were common statewide goals for higher education. The equity components of education access and affordability are supported by publicness theory, because ensuring equity is considered an important outcome for public entities (Andrews et al., 2011). While system-level agencies also focused on access, opportunities were reserved for current students or qualified future students, not all residents of the state, showing a clear difference in the access missions of systems and states.

Factor Development. I identified four variables to measure the different aspects of educational access and affordability. The enrollment equity by race is a measure of how representative each institution's enrollment is of the racial composition of the state. The enrollment equity by income measures how representative each institution's enrollment is of the low-income composition of the state. Net price measures affordability through the average price paid for students receiving financial aid. Selectivity measures an institution's accessibility through the proportion of applicants who are admitted to the institution. In factor analysis, selectivity was removed from the access and affordability factor because it cross-loaded with measures of student success.

Institutional Realized Publicness Outcomes. I analyzed the extent to which certain types of four-year public institutions contributed to realized publicness outcomes in education access and affordability. I found that research institutions had significantly worse access and affordability outcomes. This was expected and is in line with prior research, which found that flagship institutions have disproportionately high White and wealthy student enrollment (Mugglestone et al., 2019; Turner & Pusser, 2004). Additionally, I found that HBCUs and enrollment-based MSIs had significantly better access and affordability outcomes than non-HBCUs and MSIs (respectively). This was largely expected because by their nature, HBCUs and other MSIs enroll a very high proportion of students of color (Espinosa et al., 2017). Still, my study provides important evidence that HBCUs and MSIs provide outsized benefits to states interested in ensuring equitable access and affordability. I found that RCUs had above average access and affordability factor scores, but their outcomes were not significantly greater than non-RCUs. This was surprising, given prior qualitative studies which suggested that RCUs provide outsized contributions to education access and affordability based on their missions and commitments to access (Fryar, 2015; McClure, 2018). Following this analysis, I examined the impacts of empirical publicness on each realized publicness outcome.

Impacts of Empirical Publicness. I predicted that state financial publicness would positively impact education access and affordability, and this prediction was strongly supported—I found direct and positive impacts of financial publicness on education access and affordability in my fixed-effect regression analysis. An increase in

the percent of revenues coming from state funding led to a significant increase in equitable enrollment by income, a significant increase in admit rates, a significant decline in net price, and a significant increase on the access and affordability factor. These findings are supported by prior research on the impacts of state funding for institutions rather than students (Hillman et al., 2014b). These findings are also supported by both publicness and resource dependency theory, which argue that institutions direct their attention and efforts to serving the interests of their primary funders (Bozeman & Moulton, 2011; Fowles, 2014; Pfeffer & Salancik, 1978).

My random-effect regression analysis examined the effects of state authority on realized publicness outcomes related to education access and affordability. I expected to find a negative effect of accountability on student access; this hypothesis was supported by my finding that institutions with PBF had significantly lower equitable enrollment by income. Prior research has found that PBF can limit college access for low-income populations (Umbricht et al., 2017). I also found that PBF was associated with a significant decline in net price. My findings provide further evidence that PBF is related to reduced access and student affordability outcomes.

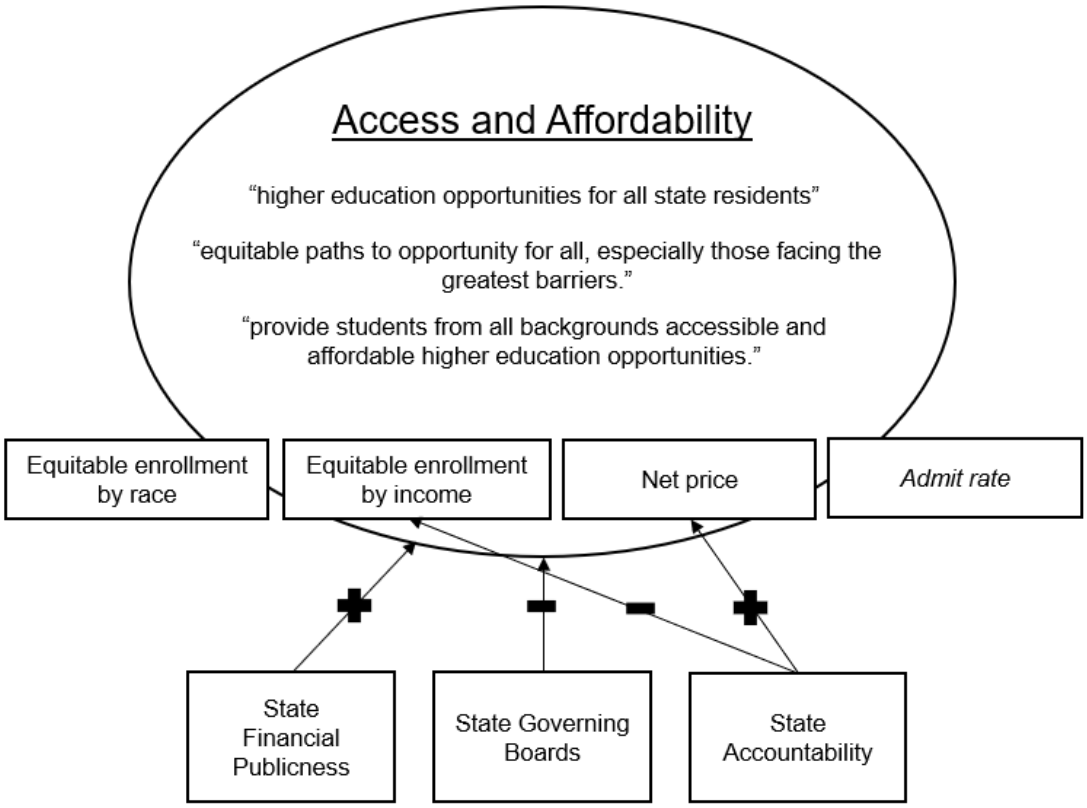
I did not expect to find a relationship between state authority and education access and affordability. However, I found that institutions were more selective, with lower admit rates when the state had tuition-setting authority. Contrary to prior research (Kim & Ko, 2015), centralized tuition-setting authority was not related to greater affordability at public institutions. Although net price was lower in states where the state set tuition rates, the relationship was not significant. One possible explanation for these unexpected results

is that states may institute centralized tuition control in response to high prices and selectivity at public four-year institutions. Additionally, I found that state agencies impacted access and affordability. States with administrative and coordinating agencies had significantly more equitable enrollment by income. Statewide governing boards, on the other hand, led to significantly lower access and affordability outcomes. These findings are supported by prior research; Hicklin and Meier (2008) found that consolidated statewide governing boards were negatively related to Latinx student enrollment, and Volkwein and Tandberg (2008) found that more centralized governance structures were negatively related to student affordability.

Model of Education Access and Affordability. The visual in Figure 12 present an integrated model of my mixed-method findings and results for the state goal of education access and affordability. The access and affordability factor (shown as a circle) lists quotes from state mission and vision statements related to access and affordability. The quantitative variables I identified to measure access and affordability realized publicness outcomes are in squares within the factor. The components of empirical publicness thought to impact realized publicness are below the factor, with arrows indicating their significant effects (if any) on the access and affordability factor and/or individual outcome variables. This model is a visual representation of how I integrated the findings from my qualitative strand with the results from my quantitative strand to answer my research questions.

Figure 12

Model of Education Access and Affordability



Note. Arrows represent significant regression effects. A positive impact refers to a decrease in net price. Specific relationships with individual outcomes are shown for components of empirical publicness that did not significantly impact the access and affordability factor. Italicized outcomes were not retained in factor analysis.

Student Success and Attainment

In this section, I discuss my integrated qualitative findings and quantitative results related to education student success and attainment.

Summary of State Goal. States aimed to improve state attainment by increasing degree production and ensuring equitable levels of student success for all students. State

agency mission and vision statements often mentioned student success in conjunction with student access, and was somewhat less common than the access mission described in the previous section. Still, some states were incredibly focused on student success, which may be a result of the recent student completion agenda (HCM Strategists, 2021; Perna & Finney, 2014). However, student success as a state goal for public higher education is not a new phenomenon; state attainment was one of the initial reasons why states became involved in higher education, with the goal to achieve widespread education to sustain democracy (Russell, 1949). As mentioned above, publicness theory argues that ensuring equity in public outcomes is an important outcome for public entities (Andrews et al., 2011), further supporting the equity components of promoting equal student success and attainment.

Factor Development. I measured student success and state attainment using three variables. Graduation equity by race measures the weighted disparities between graduation rates for students of color and all students. Graduation equity by income measures the disparity between graduation rates for low-income students compared to all students. Degree production measures an institution's overall contribution to the state's educational attainment. Initially, I also planned to include an institution's overall graduation rate as a measure of student success; however, equitable graduation rates were too dissimilar from overall graduation rates to be included in the same factor. Additionally, degree production cross-loaded with workforce development and community improvement and was not retained in the final factor. As a result, the final

student success factor had only two variables: graduation equity by income and graduation equity by race.

Institutional Realized Publicness Outcomes. I compared four types of public four-year institutions to determine their different contributions to equitable student success. I found that research institution and RCU student success scores did not significantly differ, but HBCUs and enrollment-based MSIs had significantly higher student success outcomes when compared to non-HBCUs and non-MSIs (respectively). Prior research has shown that MSIs have similar or better graduation rates for target populations (Espinosa et al., 2017, 2018). This finding provides evidence that MSIs are serving students of color better than non-MSIs, on average. These findings speak to the ability of enrollment-based MSIs to actually serve their designated populations (Garcia et al., 2019). In part, these higher outcomes could be due to federal grants these institutions receive increasing their total revenue. A prior study found that institutions receiving Asian American and Native American Pacific Islander-serving institution Wgrants had measurable benefits to student success, including higher rates of completion and transfer (Teranishi et al., 2014). In the next section, I explore the impacts of empirical publicness on student success outcomes.

Impacts of Empirical Publicness. I expected to find a positive significant effect of financial publicness on student success and attainment. In my fixed-effects analysis, I found that financial publicness had a marginally significant positive impact on graduation rate equity by income and a significant positive impact on bachelors degree production (which was removed from the final factor due to cross-loading). Despite prior research

showing that higher financial publicness was associated with higher graduation rates for Black students (Rutherford & Rabovsky, 2018), I found no relationship between financial publicness and equity in graduation rates by race or ethnicity.

Additionally, I did not find a significant effect of financial publicness on the final student success factor. This may be because the factor only included two measures, which is not ideal for factor analysis. Essentially, the issue was that equitable student success is not correlated to overall student success or bachelor's degree production, so it was not possible to create a factor comprised of aspects of both. The lack of an effect of financial publicness on student success outcomes could stem from the position of some publicness scholars who argue that general block grant type funding such as state operating appropriations do not sufficiently incentivize institutions to change their behavior (Andrews et al., 2011).

Unlike financial publicness, I found that core revenue per FTE had a significant positive effect on the student success factor. While prior studies found that overall graduation rates were higher when states had greater revenue (Scott et al., 2006; Zhang, 2009), my study furthers these results by showing that institutions with greater revenue per FTE also have more equitable graduation rates for students of color. Flores and Park (2013) similarly found that per-student expenditures were one of the largest predictors of graduation rates for Black and Latinx students.

Taken together, the results showing that total revenue and not financial publicness affects student success support the notion that total revenue matters more than the composition of that revenue, as suggested by prior research (Deming & Walters, 2017;

Scott et al., 2006). Deming and Walters (2017) found that institutional persistence and completion rates were better when state funding was used to increase institutional spending (through general operating funding) rather than to reduce student price (through student financial aid). In addition, prior research found that state attainment is positively impacted by institutional expenditures (Zhao, 2018), a similar measure to revenue per FTE. However, my results show a negative significant relationship between revenue per FTE and bachelors degree production, but a positive significant impact of financial publicness on bachelors degree production. This suggests that total revenue may matter for overall student success, while the source of funding may matter more than total revenue for institutional outcomes on degree production and contributions to state attainment.

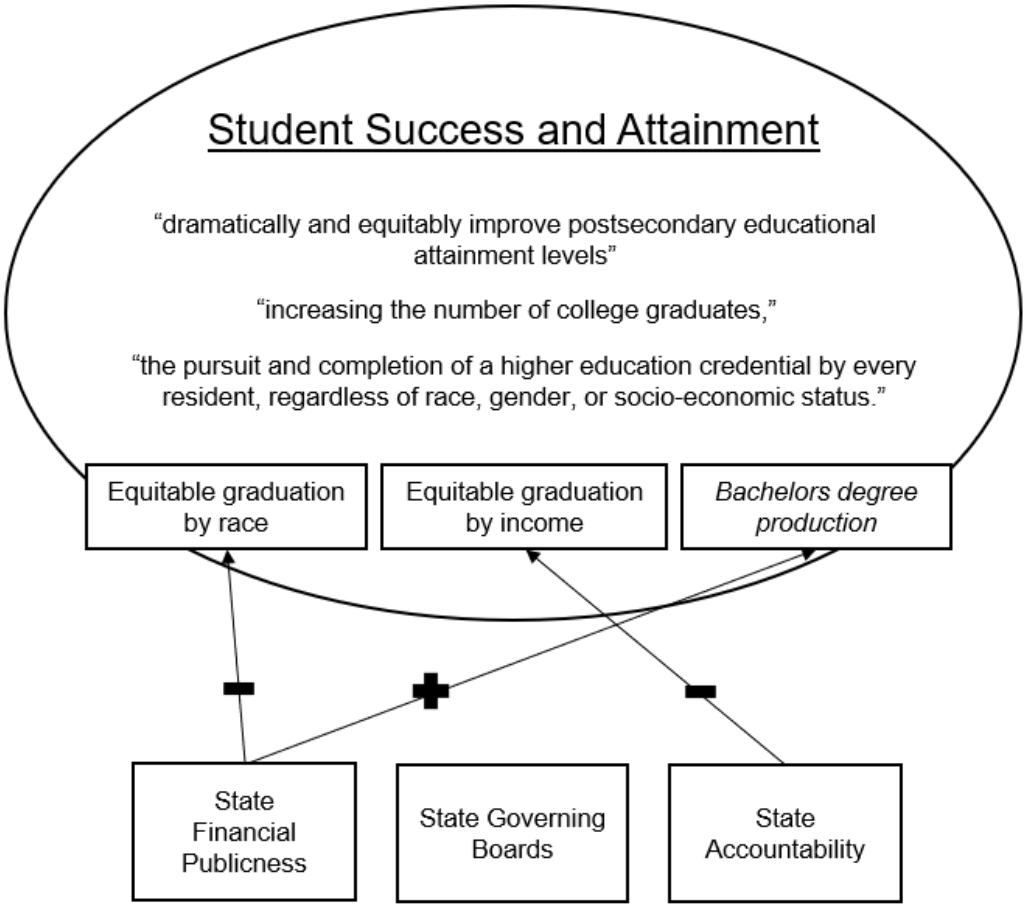
In my random-effects models on the impacts of state authority on realized publicness outcomes, I expected to find that state authority had no effect on student success, and that state accountability was negatively related to student success. My prediction held for state authority, and I found no real effects of state authority on student success. For state accountability, I found partial support for this hypothesis. There was no relationship between the proportion of funding allocated through PBF and the student success factor. However, I did find that PBF negatively impacted graduation equity by income. This builds on Birdsall (2018), who found that after PBF implementation, institutions with lower financial reliance on states had declines in low-income student enrollment. PBF is particularly pertinent to consider with student success and attainment outcomes, because those outcomes are a primary focus of PBF policies (Rosinger et al.,

2022). If the premise of using accountability policies to drive institutional behavior is correct, it follows that a more powerful PBF policy (one responsible for a larger proportion of funding allocations) might have larger impacts on institutional behavior and outcomes. My results did not support this notion.

Model of Student Success and Attainment. Figure 13 shows the integrated model of my mixed-method findings and results for the student success and attainment state goal. The student success factor (shown as a circle) lists quotes from state mission and vision statements related to student success and attainment. The quantitative variables I identified to measure student success and attainment components of realized publicness are in squares within the factor. The primary components of empirical publicness that could impact realized publicness are below the factor, with arrows indicating their significant effects (if any) on the student success factor and/or individual outcome variables. This model shows a visual representation of how I integrated my qualitative findings on student success and attainment with the quantitative variables I developed and tested in my quantitative strand.

Figure 13

Model of Student Success and Attainment



Note. Arrows represent significant regression effects. Specific relationships with individual outcomes are shown for components of empirical publicness that did not significantly impact the student success factor. Italicized outcomes were not retained in factor analysis.

Workforce and Economic Development

In this section, I discuss my integrated qualitative findings and quantitative results related to workforce and economic development.

Summary of State Goal. The third state goal for public higher education was to produce educated students that build the state workforce and provide economic development to the state. This state goal is well supported by prior literature. Supplying well-prepared people for the state workforce was one of the initial reasons states began funding higher education institutions (Russell, 1949). While not entirely aligned, one of T. E. Hollander's (1994) common state goals was programs of high quality that are responsive to public needs, which is closely related to the connection between higher education and state workforce development. Additionally, economic development is a frequently cited reason for public funding for higher education (Enders & Jongbloed, 2007; McMahon, 2009; Trammel, 2005). In a classification of the public and private values of college, the Institute for Higher Education Policy (1998) listed increased tax revenues, greater productivity, increased workforce flexibility, employment, and professional mobility as some of the economic benefits of higher education. While many of these cannot currently be measured at the institution-level, they support the overall theme of workforce and economic development as a benefit of higher education.

Factor Development. I measured workforce and economic development using five variables, three of which were included in the final factor. I used the percent of resident enrollment as a proxy measure of how many students will join the state's workforce. This variable was not retained in factor analysis due to cross-loading with other measures, which makes sense given the proxy measurement was an enrollment variable. I used two measures of student employment. First, the unemployment rate disparity for all students compares unemployment rates six years after students enroll to

state unemployment. Second, the unemployment rate disparity for graduates compares the unemployment rate one year after completion to state unemployment. The earnings premium is the percent of students earning more than a high-school graduate six years after students enroll. Finally, the adjusted economic mobility index is the proportion of students who either increase in their income quintile or remain in one of the top quintiles. The adjusted economic mobility rate was not retained in the workforce and economic development factor due to cross-loading with access and community improvement.

Aldeman and Carey (2009) asserted that there is robust quantitative data on how higher education institutions contribute to workforce and economic development. I found this to be somewhat true; while there were multiple pre-existing data sources on workforce and economic development, they were primarily focused on individual measurements like unemployment and earnings. From a state perspective, these measurements are important, but so too are measurements of an institution's ability to graduate students who will join the state's workforce. I had to develop a proxy measurement for this variable, but it was not successfully retained in factor analysis.

Institutional Realized Publicness Outcomes. I compared the contributions of each institution type to workforce and economic development outcomes. I found that research institutions had significantly higher workforce outcomes than non-research institutions. This finding supports prior research which found that research universities have stronger employment outcomes (Mugglestone et al., 2019). In addition, I found that HBCUs and MSIs had significantly lower workforce outcomes. Prior research suggests that this may be due to differences in institutional selectivity, which I was not able to

control for in this analysis (Park et al., 2018). Racial discrimination is another contributing factor to lower workforce outcomes at HBCUs and MSIs. Black, Indigenous, and people of color are discriminated against by potential employers in the hiring process (Bertrand & Mullainathan, 2004; Nunley et al., 2015). Systematic racial discrimination likely impacts institutional outcomes at institutions like HBCUs and MSI which serve a high population of students of color (Espinosa et al., 2017). To further explore realized publicness outcomes, I next examined the impacts of empirical publicness on workforce and economic development.

Impacts of Empirical Publicness. I expected that financial publicness would be positively related to workforce and economic development. This hypothesis was tested with my fixed-effects models, which found mixed impacts of financial publicness on individual measures and no relationship between financial publicness and the workforce and economic development factor. Prior research found that higher state funding led to higher in-state college-going rates (Toutkoushian & Hillman, 2012). Building on this, I found that financial publicness also significantly increased the percent of students who attend institutions in-state (which is highly correlated to the percent of graduates who join the state workforce). I also found that financial publicness positively impacted unemployment rates for completers one year after graduation. Prior research had not examined this relationship, but this finding is supported by the broad idea that state funding would drive institutions to meet their goals (Bozeman & Moulton, 2011).

In my random-effects models, I predicted that state accountability would be positively related to workforce and economic development, while state authority would

negatively impact these outcomes. My results supported my prediction for state accountability, and an increase in PBF corresponded to increases in unemployment rates for completers, economic mobility, and the workforce and economic development factor. Although PBF does not always directly measure or attempt to incentivize workforce outcomes, PBF may be associated with higher workforce outcomes because the presence of PBF is a sign of a neoliberal paradigm for higher education in the state (Dougherty & Natow, 2019), as is an increased focus on workforce and economic development outcomes for higher education (Saunders, 2013; Slaughter & Rhoades, 2009). It is possible that states and institutions with PBF have a stronger neoliberal conception of the purpose of higher education, and therefore have a greater focus on workforce outcomes.

As expected, I found that state authority (including both centralized tuition-setting and state-level governing boards) negatively impacted workforce and economic development. States with centralized tuition-setting authority had lower employment rates for completers (adjusted for each state's unemployment rate). However, I did not find a significant impact of tuition authority on in-state enrollment as predicted by Jaquette and Curs (2015). Also following my prediction, I found that the strongest centralized governance structures (state-level governing boards) negatively impacted workforce and economic development, supporting prior research which found negative impacts of those agencies on unemployment rates and wages (Volkwein & Tandberg, 2008).

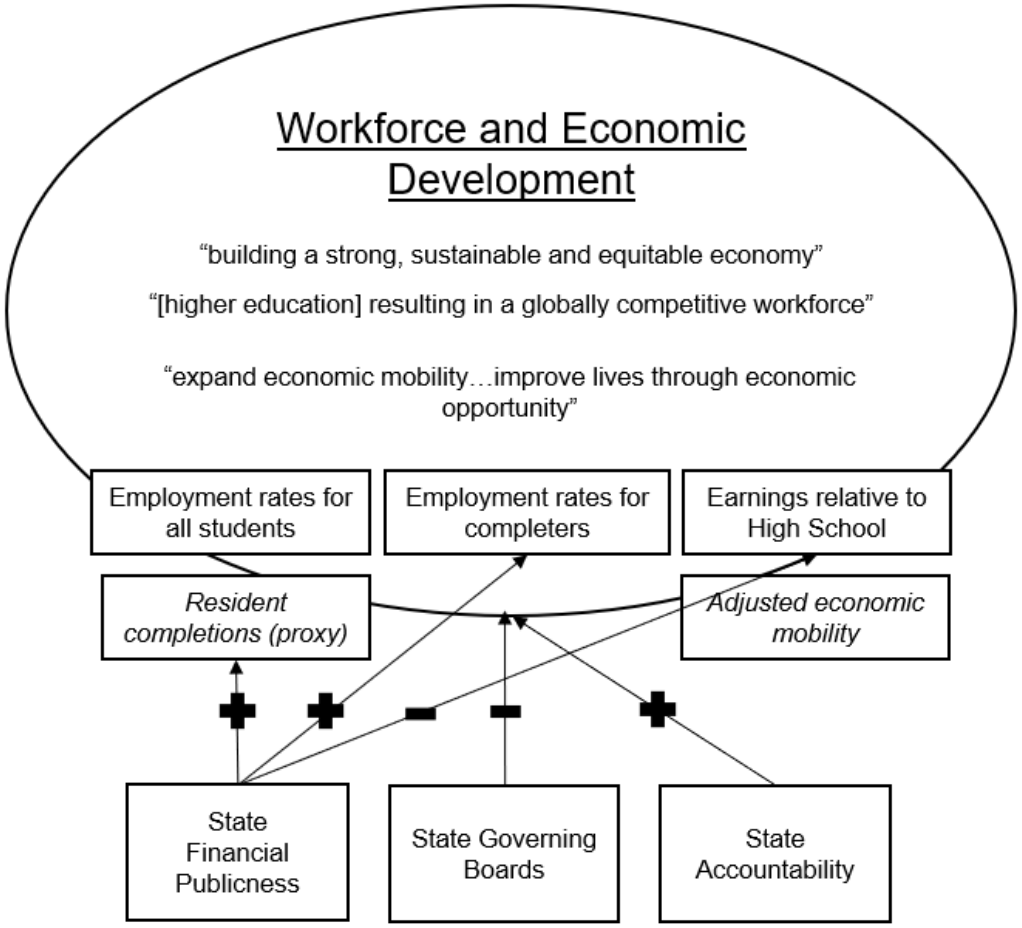
The largest and only positive predictor of the workforce and economic development factor was an institution's overall graduation rate. Financial publicness,

federal funding, and institutional selectivity were not related, and higher core revenues and higher state authority had a negative impact on workforce outcomes. These findings indicate that states have little control over institutional employment outcomes, and that their attempts at control may not work. Beyond graduating students at a high rate (which predicts workforce outcomes), these results also suggest that institutions may not have much control over student's workforce outcomes.

Model of Workforce and Economic Development. Figure 14 shows the integrated model of my mixed-method findings and results for the state goal of workforce and economic development. The workforce and economic development factor (shown as a circle) lists quotes from state mission and vision statements related to this goal. The quantitative variables I identified to measure workforce and economic development, as part of institutional realized publicness, are in squares within the factor. The primary components of empirical publicness that could impact realized publicness are below the factor, with arrows indicating their significant effects (if any) on the workforce and economic development factor and/or individual outcome variables. This model is a visual representation of how I integrated the workforce and economic development findings from my qualitative strand with the related results from my quantitative strand to answer my research questions.

Figure 14

Model of Workforce and Economic Development



Note. Arrows represent significant regression effects. Specific relationships with individual outcomes are shown for components of empirical publicness that did not significantly impact the workforce and economic development factor. Italicized outcomes were not retained in factor analysis.

Community Improvement

In this section, I discuss my integrated qualitative findings and quantitative results related to community improvement.

Summary of State Goal. States viewed community improvement as a primary goal for public higher education, with the aim of improving social, cultural, and civic life for all state residents through higher education community engagement or development and public service. Community improvement is a widely recognized benefit of higher education, and Russell (1949) described enhancing community life as one of the initial objectives for state involvement in higher education. T. E. Hollander (1994) listed the following common state goals for higher education: service to community and research with the purpose of improving citizen quality of life. Finally, the Institute for Higher Education Policy's (1998) classification of the public and private values of college includes increased community service and civic life as two social public benefits of higher education. Despite the interest of states in community improvement as a public benefit of higher education, there is very limited quantitative data on community improvement relative to the other state goals.

Community Improvement Index Development. I measured community improvement using four variables, two of which were binary. After removing one of the non-binary variables from factor analysis due to high uniqueness, I found that the available data on community improvement was not sufficient to create a latent factor. Instead, I created an index for community improvement using the remaining three variables. The three variables included in my index were: the Carnegie Engaged institution classification, which measures whether the institution received a classification designating them as a community engaged institution; Campus Compact membership, which refers to membership in an association that helps institutions increase commitment

to community engagement; and how much of an institution's core expenses were used for public service activities. The fourth variable which was not included in my index was the percent of federal work-study on public service, a measurement of how much of federal work-study awards an institution allocates toward public service projects. I was surprised to find that the percent of federal work-study on public service was so unique relative to my other variables, given its use in the Washington Monthly rankings for community engagement (Longman, 2019). The two binary indicators (Community Engaged and Campus Compact) may reflect institutional capacity or situation more than true commitments to community service. For example, Campus Compact membership is highly related to where an institution is located. In 13 states, all institutions were Campus Compact members.

Institutional Realized Publicness Outcomes. Despite the measurement issues with community improvement data which meant I was unable to measure community improvement using factor analysis, I examined the contributions of different institution types to the community improvement index. I found that research institutions had significantly higher community improvement outcomes than non-research institutions. This finding may be influenced by institutional resources if research institutions, which have the highest average per-student revenues, were better positioned to fund public service due to their available revenues. This finding might also be influenced by the inclusion of land-grant institutions, which have high public service and are also commonly research institutions (Welch, 2014).

Contrary to my expectations, RCUs did not have significantly different community improvement outcomes. Prior research discusses the strong mission-drive focus on community engagement at RCUs (Henderson, 2009; Ogren, 2005; Orphan & McClure, 2019). RCUs are a very large category of institutions and 72% of the institutions in my sample were RCUs. There may be heterogeneity across these institutions due to their multiple founding missions—RCUs were primarily founded as normal schools, community colleges, or university branch campuses (Ogren, 2005; Schneider & Deane, 2015). Heterogeneity may have increased as RCUs responded differently to privatization pressures, with some focusing on research and graduate programs and others maintaining their undergraduate education mission (Fryar, 2015). Additionally, it is noteworthy that RCUs (along with HBCUs and MSIs) made substantial contributions to public good outcomes despite having lower total revenue than research institutions (Ahlman, 2019; Hillman, 2020; Mugglestone et al., 2019; Taylor & Cantwell, 2019).

Finally, HBCUs had significantly lower community improvement outcomes than non-HBCUs. This finding is also contrary to prior research and the founding purposes of HBCUs, which show that HBCUs have an outreach and public service mission (Esters & Strayhorn, 2013; Randle Scott, 2000). Overall, these unexpected findings provide evidence that new measures of community improvement must be developed to accurately assess institutional contributions to this state goal for public higher education.

Impacts of Empirical Publicness. In this section, I outline the impacts of empirical publicness on the available measures of community improvement. I interpret

these results with caution due to the limited data on institutional contributions to community improvement. I expected to find a positive significant relationship between financial publicness and community improvement, but my fixed effect models found significant effects only for two individual outcome variables—public service spending on work study (the first variable removed from factor analysis) and Campus Compact membership. Prior studies had not examined or found a relationship between state funding and community improvement outcomes. However, publicness theory indicates that states with higher financial publicness should see higher institutional realized publicness outcomes in community improvement (Moulton, 2009). My results did not support this theory.

In my random effects models, I expected that state authority would be positively related to community improvement, while state accountability would be negatively related to community improvement. My results did not support this prediction. However, given the absence of community improvement in accountability measures, I was not surprised to find no relationship between community improvement and PBF (Aldeman & Carey, 2009). Unlike Welch (2014), I found no relationship between state authority and public service as a percent of all expenditures. This difference could be due to two differences in our studies: first, the period of time studied was almost a decade apart (Welch, 2014). Second, I controlled for governance structure, which did have a significant relationship with public service and may have accounted for that variation.

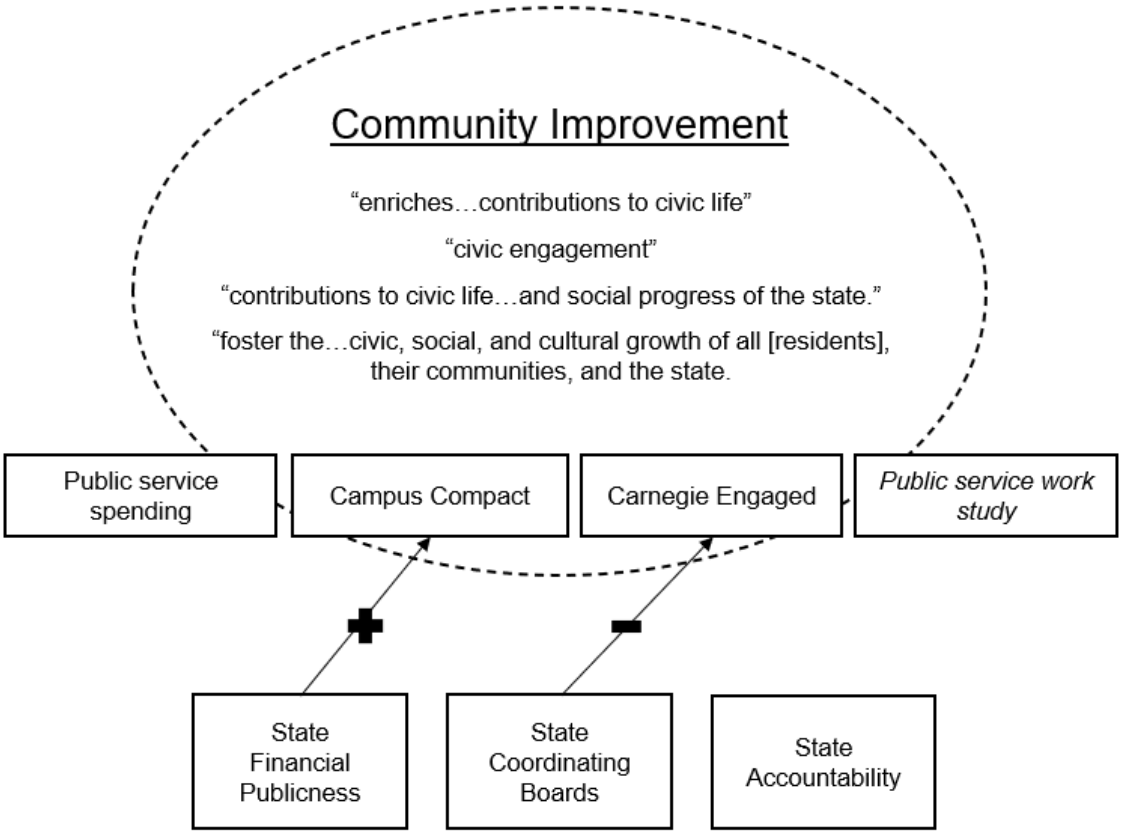
Building on Lee's (2017) findings related to public service outcomes, I found that institution size (FTE) significantly predicted increases in measures of community

improvement. Other than FTE, the only significant predictor of the community improvement index was the percent of funding from federal sources. It is possible that federal funding predicted community improvement due to higher federal funding at land-grant institutions, which often has community improvement requirements (Association of Public & Land-Grand Universities, n.d.): 13% of institutions had land-grant status, but 46% of institutions within the top 5% of the percent of funding from federal sources had land-grant status. However, controlling for land-grant status did not impact the relationship between federal funding and community improvement. Given the limited availability of community improvement data, broad statements about the effects of empirical publicness on institutional contributions to community improvement should be made with caution.

Model of Community Improvement. In Figure 15, I show the integrated model of my mixed-method findings and results for the community improvement state goal. The community improvement index (shown as a dotted-line circle) lists quotes from state mission and vision statements related to this goal. The index does not have a solid line because community improvement data was not sufficient to create predicted factor scores. The quantitative variables I identified to measure community improvement are in squares within the index. The primary components of empirical publicness that could impact realized publicness are below the index, with arrows connecting the individual outcome variables related to community improvement. This model is visual representation of the integration of my qualitative findings on community improvement with the quantitative variables I created and tested in the quantitative strand.

Figure 15

Integrated Model of Community Improvement



Note. Arrows represent significant regression effects. Specific relationships with individual outcomes are shown for components of empirical publicness that did not significantly impact the community improvement index. Italicized outcomes were removed in factor analysis and not included in the index.

Implications and Recommendations

There are important implications of the findings and results from my mixed-method analysis on the impacts of empirical publicness on institutional realized publicness outcomes related to state goals for public higher education. My study has also led me to make recommendations for state policy and state higher education agencies as

well as recommendations for the further development of publicness theory in higher education and future research on this topic. In this section, I describe the implications and recommendations of my study on each of these areas (state policy, state agencies, publicness theory, and future research).

Implications and Recommendations for Practice

In this section, I present two implications and related recommendations for practice, each focused on practice within state-level higher education agencies. First, my findings suggest that states may not be effectively communicating state goals to systems and public institutions. While it is expected that system-level and institution-level goals would differ from state goals for public higher education (Lane & Kivisto, 2008), a common theme in system-level agency mission and vision statements was service to the state, indicating that systems see themselves, in part, as serving the state. Despite this, system-level higher education agencies had mission and vision statements that were in many ways more similar to the missions of public institutions than the missions of state agencies. Therefore, my recommendation is that state agencies should work with systems and institutions to align their missions and convey state priorities for the public benefits of higher education.

In addition to creating stronger alignment between the goals of state, system, and institutions, my second implication for practice focuses on the data elements collected by states. As part of my quantitative measure development, I found that state agencies currently do not measure the outcomes related to their goals on certain metrics, such as each institution's ability to educate students who will remain in the state, degrees related

to workforce needs, and institutional contributions to community improvement. Despite the lack of publicly available data on certain areas of state workforce development, there is ample information on student workforce outcomes (employment rates and earnings) which serve as a proxy for a true measure of an institution's contribution to the state workforce.

The lack of data on community improvement is most striking; only five states track some type of information on community engagement, and these measures are very limited (Aldeman & Carey, 2009). Additionally, although states say PBF measures institutional outcomes related to state goals and priorities (McLendon et al., 2006), no state has a measure of community improvement in their PBF models. States' inattention to community improvement in their data collection and reporting is likely due to the effects of neoliberalism, which emphasizes economic and commodifiable practices of public institutions (Brackmann, 2015). The lack of state agency data collection on community improvement is critical because "what we assess…tends to influence what matters in higher education. It is therefore important to assess the things that count" (O'Meara & Meekins, 2012, p. 12). Without a way to quantify and measure the benefits of community improvement to the state, community improvement loses focus and becomes irrelevant to discussions about the value of higher education in a neoliberal paradigm (Harvey, 2005; McMahon, 2009; Rizzo, 2005).

To address this implication, my recommendation is that state higher education agencies work to align data collection and reporting with state goals. State agencies should also work closely with institutions, communities, community leaders, and a

representative group of students to understand how to best measure community improvement and broaden our currently limited quantitative understanding of the ways public institutions provide public service and community engagement. Working with students is particularly important given my finding that despite extensive evidence that HBCUs have a community improvement mission (Esters & Strayhorn, 2013; Randle Scott, 2000), HBCUs had below average community improvement index scores using the existing measures of community improvement. Research has shown that existing measurements of community engagement, like the Carnegie Engaged classification and the National Survey of Student Engagement service-learning component, were developed with a white frame of reference for what community engagement looks like (Alcantar, 2014; Mitchell et al., 2012). As a result, when developing measures for community engagement, state agencies should consider how community engagement may present differently at different types of institutions and move beyond the traditional (white, liberal arts, full-time student, residential campus) idea of community engagement and service learning (Diaz, 2022). For example, how does community engagement look at commuter campuses? What does it look like for students with jobs, children, family members they care for? How do oppressed populations engage with, serve, and improve their communities?

Newly developed measures for community improvement should also incorporate and account for the unique missions of different types of institutions. For example, community improvement at RCUs may be more closely focused on the institution's region than the entire state (Orphan & McClure, 2022). Orphan and McClure propose

potential new measures of community improvement for RCUs, which include some measure of partnerships between the institution and its community, the direct economic impact of an RCU on its region, and service-learning courses (Orphan & McClure, 2022).

Overall, the findings of my study indicate the need for better state-level data collection efforts related the goals states have for public higher education. In particular, state agencies should work with institutions and students to develop measures of institutional contributions to community improvement and non-individual measures of state workforce and economic development. Without better data, community improvement will remain an afterthought in policy discussions (Rizzo, 2005), and the community benefits of public higher education cannot be clearly articulated to the public.

Implications and Recommendations for Public Policy

In this section, I share my implications and related recommendations for public policy, with a specific focus on state policy. First, there is a role for public policy to address my implications for practice, particularly to support state agencies in developing measures and collecting data on community improvement. States should provide funding to state agencies to measure and collect data on community improvement and state-level workforce outcomes. Additional funding would help reduce resource constraints, which 60% of states indicated were a barrier to further developing their data reporting systems (Whitfield et al., 2019).

I have two additional implications and related recommendations for public policy as a result of my study. First, I found that system-level governance structures do not embody state goals expressed by state-level higher education agenices. System-level

agencies governing higher education have markedly different goals for public higher education, yet almost a third of states have no state-level structure to administer, coordinate, or govern higher education. While the effects of state-level governing agencies on realized publicness outcomes were mixed and often negative, states cannot expect that public institutions will recognize, understand, or share their goals if there is no state-level intermediary to align public institutions with the state's interests (Tandberg et al., 2018). The decentralized structure of higher education governance is a relatively new phenomenon in many states (McLendon, 2003), and may have important impacts for the ability of states to influence the goals and outcomes of public institutions of higher education.

My recommendation for public policy to address this implication is for states to consider developing state-level coordinating agencies for higher education. I found evidence that state-level governing boards can lead to worse workforce outcomes; these findings support prior research which found a similarly negative effect of governing boards on workforce outcomes (Volkwein & Tandberg, 2008). However, states need some degree of statewide coordination and planning for higher education to ensure that the leaders of public institutions understand and are aligned with state goals for higher education; a single statewide coordinating agency for all public higher education can serve this planning and coordination purpose and ensure that state goals are prioritized in public higher education. My assertion is supported by Knott and Payne (2004), who found that governance structures impacted institutional behavior, and institutions with a

more decentralized and less regulatory state-wide board (such as a coordinating board) had the highest productivity and resources.

The next implication for public policy is that publicness, particularly financial publicness, affects institutional inputs like access and affordability but has more limited impacts on institutional outcomes (such as workforce and economic development) that are further removed from the state and institution's control. While financial publicness had significant positive impacts on education access and affordability, financial publicness had limited impacts on all other state goals, affecting particular outcome variables but not the predicted student success and workforce factors or the community improvement index. State policymakers should consider looking to other levers to attempt to improve these further removed outcomes. For example, total revenue per FTE positively affected student success, as found in prior research (Deming & Walters, 2017; Flores & Park, 2013; Scott et al., 2006; Zhao, 2018). If total revenue matters more than the proportion of that funding which comes from the state, this could be a sign that institutional goals are aligned with state goals, and simply need the proper resources to positively impact student success. States should consider allowing tuition revenue to increase as long as student affordability is not compromised, rather than restricting tuition in response for state funding increases (and especially during times where state funding is cut). Workforce and economic development outcomes are negatively affected by state governance and are not affected by financial publicness; for these outcomes, states should consider alternative incentives that encourage institutions to focus on their workforce

outcomes, such as state funding for career centers and facilitating connections between employers and institutions.

When addressing this implication, states should consider and address institutional funding and capacity needs before (or alongside) increasing expectations. I found that state regulation and accountability have minimal and mixed impacts on institutional outcomes, supporting prior research which found negative effects and unintended consequences of PBF on equitable student outcomes (Chan et al., 2022; Hillman & Crespin-Trujillo, 2018; Li, 2019). Additionally, mission-alignment is an important component for successful state-level higher education accountability policy (Birdsall, 2018). Therefore, states should not increase accountability and expectations blindly; additional state funding, mission alignment, and institutional capacity-building are important precursors to increasing the expectations of institutions.

Implications and Recommendations for Theory

Publicness theory drove the design of my study and provided the rationale for linking state goals to institutional outcomes on related measures. However, my study provides evidence that for many state goals, publicness has mixed impacts on institutional behavior. This finding follows prior studies on publicness which have found limited effects of empirical publicness on a variety of agency outcomes (Andrews et al., 2011; Enders et al., 2013). However, this finding runs contrary to the idea that institutions change their behavior in response to state funding, a component of publicness and also resource dependency theory (Feeney & Welch, 2012; Fowles, 2014; Moulton, 2009; Pfeffer & Salancik, 1978), or the purpose of government accountability for public

institutions, which assumes that state oversight will change institutional outcomes (Aldeman & Carey, 2009; Andrews et al., 2011; Carey & Schneider, 2010).

Publicness theory has had limited use thus far in higher education, and my study provides evidence that empirical publicness may not entirely account for the complex impacts of state factors like governance structures, regulatory control, accountability, and funding on public higher education outcomes. There are implications for both state financial publicness and state oversight. For state financial publicness, publicness scholars have expressed concerns that block grants, which are similar to state operating appropriations, may not be an efficient mechanism by which to achieve state goals (Andrews et al., 2011). My study provides evidence that for some (but not all) state goals, increasing the proportion of an institution's revenue from state operating appropriations may not be an effective mechanism for achieving some state goals. Although publicness may not drive institutional behavior as expected (Aldeman & Carey, 2009; Enders & Jongbloed, 2007), I did find clear effects of financial publicness on educational access and affordability. Still, publicness theory is not able to explain many of my results for state goals beyond access and affordability.

In addition to financial publicness, publicness theory posits that state authority will push institutions toward meeting state goals (Bozeman, 1987) because centralized state authority leads institutions to focus on state needs rather than advocating for their own interests (Nicholson-Crotty & Meier, 2003). However, I found negative effects of state-level governing boards, which have the greatest centralized authority, on institutional outcomes for access and affordability and workforce and economic

development. Publicness theory does not account for why higher state authority would lead to worse realized publicness outcomes.

Additionally, publicness theory on the impacts of state oversight on institutional outcomes does not align with prior research, which found that certain components of state authority and accountability have a limited ability to drive institutional behavior (Enders et al., 2013; Hillman, 2016; Lyall & Sell, 2006; Volkwein & Tandberg, 2008). Despite theoretical assertions contending that oversight is the most influential dimension of publicness on institutional behavior (Bozeman, 1987), I did not find evidence that increased state oversight has a positive impact on realized publicness outcomes (in fact, I found evidence that increased state oversight can lead to negative institutional outcomes). Similarly, publicness theory indicates that states with more regulatory control over institutions would have an increased ability to drive institutions to meet state goals (Andrews et al., 2011). I found minimal evidence of this using tuition-setting authority as a measure of state regulatory control.

I have several recommendations for how publicness theory can be further developed to address its limitations. First, realized publicness theory should consider how close desired outcomes are to publicness inputs. I found evidence that state goals related to institutional graduation and post-college outcomes may be harder for states to control through state oversight and financial publicness. However, there is no publicness framework for how to consider the differential effects of empirical publicness on realized publicness outcomes across a spectrum of immediacy or proximity to the state's influence in existing realized publicness literature (Andrews et al., 2011; Moulton, 2009). For

example, publicness may be more able to control institutional inputs (e.g., enrollment trends and the price charged to students), less able to control institutional outcomes (e.g., graduation rates), and minimally able to control post-institutional outcomes (e.g., workforce outcomes). It is also very possible that the breakdown in control over outcomes is not only between states and institutions, but also in the ability of an institution to control its own outcomes (particularly when there are insufficient resources to serve students). Should under-resourced institutions be expected to respond similarly to sufficiently resourced institutions when there are increases in financial publicness and state oversight? These questions and possibilities require further development.

Another recommendation for the further development of publicness theory is to continue examining how states and institutions treat revenue sources, particularly those with quasi-governmental attributes. Overall, the sensitivity specifications I developed for financial publicness were robust to specification when considering each institution's factor and index scores as outcomes, but not when considering individual outcome variables. This result indicates that care should be taken in how we think about and specify financial publicness, thoroughly considering the different revenue sources and their inclusion on each side of the publicness equation.

In particular, the inclusion or exclusion of financial aid as either a public revenue from the government or a private revenue received as tuition dollars by institutions should be carefully considered. Publicness theory differentiates between public (governmental) and private (market-based) sources of revenue (Moulton, 2009). However, the current theory does not account for government revenue sources that are

allocated through market-based means. For example, in higher education, student financial aid comes from government sources but is received by institutions as tuition revenue, blurring the lines between public and private revenues. In my sensitivity tests, I found that when excluding financial aid from other private revenues, the public funding ratio no longer significantly predicted net price, institutional selectivity, student residency, or equity in graduation rates by race (which was a negative effect). These differences warrant further investigation.

Another area for future development in publicness is that realized publicness theory should further conceptualize how outcomes are impacted by international and global engagement and competition. In the qualitative strand of my study, I found that state agencies are, in most cases, singularly focused on meeting the needs of their state residents. On the other hand, systems of institutions have many service goals and focus populations, including serving and developing students, serving their state, serving their nation, and serving the world. Additionally, systems were focused on international prestige and positioning themselves in a global economy. A further application of realized publicness theory could examine the extent to which realized publicness outcomes can be global, and explore how realized publicness works (and how could it be measured) in a global society.

My final recommendation in this section is for both theory and research. I encourage further development of a true grounded theory of state goals for public higher education (Creswell & Poth, 2016). My study used a partial grounded theory approach to determine state goals for public higher education (Cho & Lee, 2014). However, further

research on the process of states developing goals for higher education and an exploration of why states have certain goals is necessary to develop a fully grounded theory on state goals for higher education (Cho & Lee, 2014; Creswell & Poth, 2016).

Implications and Recommendations for Research

My findings reveal multiple areas for additional research on the topic of state goals for higher education and the ability of empirical publicness to predict institutional outcomes related to those goals. First, additional research is needed on how realized publicness outcomes have changed over time. In my study, I found significant differences between institutions within a state and across states on their realized publicness outcomes, but I was not able to determine whether financial publicness or state authority change an institution's outcomes over time. For example, the proportion of funding from PBF (a state accountability policy) led to greater inequities in enrollment by income and graduation rates by income. However, it is not clear if PBF worsened these gaps within each institution over time, or if PBF was implemented by states in response to poor enrollment and graduation rates for low-income students. Future research could examine individual trends over time within each institution.

Additionally, I found that accountability was positively related to workforce and economic development. These relationships between accountability, equitable enrollment and graduation by student income, and workforce and economic development may be impacted by the interaction of financial publicness with accountability. Orphan and Laderman (2018) found evidence that in a state with low funding, PBF did not impact institutional behavior. Future research should examine the extent to which the impacts of

accountability on realized publicness outcomes are diminished when financial publicness is low. This is particularly pertinent in light of evidence that PBF leads to lower funding for already low-resourced institutions like RCUs, MSIs, and HBCUs (Hagood, 2019; Hillman & Corral, 2017).

I also see a need for additional research on the public good contributions of RCUs. I did not find any significant differences between RCUs and non-RCUs when examining institutional contributions to realized publicness outcomes, which could be due to the heterogeneous nature of the RCU classification, wherein multiple types of institutions are considered RCUs. Additionally, my methodology for identifying RCUs was largely through exclusion of non-RCUs. Future research should consider mission-based classifications of RCUs (Orphan, in press), and examine contemporary RCU subtypes such as branch campuses, expanded community colleges, and past teacher's colleges, which may have different contributions to the public good.

Another important area for further research is on federal publicness, or the proportion of an institution's direct funding that comes from federal appropriations and research grants. My study brings up questions such as: what are the federal government's goals for higher education, and how does the degree of federal support of public (or private) institutions impact institutional contributions to those goals? I found that the percent of funding from federal sources was significantly related to access and affordability and community improvement, as well as individual outcomes within student success and workforce and economic development. It remains to be seen, however,

whether the state goals I was measuring are aligned with federal goals for higher education.

Turning to my findings on state oversight, I found that state authority, primarily state governance structures, had strong negative impacts on workforce and economic development outcomes. In my sensitivity checks, the impacts of governance structure on realized publicness outcomes were fairly robust to alternative specifications—as long as state-level governing boards are distinct from other state boards, I found a strong negative relationship between governing boards and workforce outcomes (as did Volkwein & Tandberg, 2008). This is a very minimally researched area and future research should examine why states with consolidated governing boards have worse workforce outcomes.

My qualitative findings on the differences between state agency and system agency goals call for future research examining their differential impacts on institutions and students. I found that system-level agencies have markedly different goals than state-level agencies and do not consider themselves part of the state. With one exception (Knott & Payne, 2004), prior studies have not separately considered the differential effects of state-level boards and system-level boards on institutional outcomes. Therefore, future research should consider state- and system-level boards as distinct and should not group them together. Future research should also examine the differences between the goals of each type of agency more closely. For example, what does it mean for state higher education goals and priorities when there are system-level agencies without those goals or priorities governing higher education?

Building on this difference, in my analysis of state goals I also found that status and prestige were far more common at system-level agencies than state-level agencies. System-level goals surrounding status and prestige likely conflict with state-level goals of broad access for all residents. An important area of future research would consider how the composition of each system may be predictive of state goals in this and other areas. For example, a system of RCUs may be less likely to cite goals around prestige, particularly when compared to a research-based system.

Finally, I only reviewed and coded agencies that oversee four-year public institutions. Future research should look at the mission and vision statements of the coordinating and governing bodies of two-year institutions like community colleges and asses the extent to which two-year system-level agencies have shared or dissimilar goals to both four-year system-level agencies and state-level agencies. Analysis of the cohesion (or lack thereof) in the mission and vision statements of public higher education agencies within a single state would shed further light on the extent to which system agencies reflect state goals.

Conclusion

In this study, I identified and measured the contributions of different types of four-year public institutions to state goals for public higher education. I undertook this study in response to a reporter's question about why the decline or elimination of state funding for public higher education should matter to the general public. This reporter's question stemmed from larger questions about the value higher education provides to our society. Advocates for public higher education have struggled to articulate the broad value

proposition of higher education and increasingly focus on individual economic benefits of earning a degree (Carnevale et al., 2019; Third Way, 2022), and a primary purpose of this study was to identify and quantitatively measure the public benefits of higher education. Through a mixed-method analysis, I found that states aimed for public institutions to contribute to society by providing broad access to affordability education regardless of a student's demographic background, by ensuring equal success for all students and boosting state attainment, by educating the state's workforce and providing economic development, and by engaging with their communities and providing community development. The various contributions of public institutions to each of these state goals varied by the type of institution and, to a certain extent, varied based on the empirical publicness of the institution.

My study was one of the first to consider the concept of publicness in higher education, and was the first to consider how well institutions meet the goals of the public entities that fund them (Feeney & Welch, 2012; Fryar, 2012). I found that institutions that were more reliant on public funding (those with higher financial publicness) provided better equitable student access and affordability. While financial publicness did not impact student success, total revenues per student did improve student success. I found mixed effects of state authority on institutional outcomes for the public good—states with PBF policies had better workforce outcomes, but states with state-level governing boards for public higher education had worse access, affordability, and workforce outcomes. Additionally, I found no relationship between state publicness and an institution's contributions to community improvement—although my ability to measure community

improvement was very limited. These findings add to existing evidence on the downstream impacts of lawmaker's funding decisions on institutions and students.

My findings provide evidence of the breadth public benefits of higher education, directly testing the assumption that publicness and privatization impact institutions and the states. While there is still more to be explored regarding the impacts of empirical publicness on institutional realized publicness outcomes, I found evidence that the long-term trend toward privatization in higher education revenues negatively affects some of states' primary purposes for higher education. Higher education policy cannot and should not continue to focus solely on the individual economic benefits of higher education; higher education provides substantial benefits to states and the public (many of which were not measured here), and these benefits must become a greater part of the conversation around the value of higher education.

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Appendices

Appendix A. Qualitative Data Collection Sources

State	Level	Mission/vision URL
Alabama	State	https://ache.edu/ACHE_Other.aspx
Alabama	System	https://uasystem.edu/about
Alaska	State	https://acpe.alaska.gov/About-Us
Alaska	System	https://www.alaska.edu/alaska/uasystem/about/index.php
Arizona	System	https://azregents.edu/board/mission-vision-history
Arizona	State	https://highered.az.gov/node/39
Arkansas	State	https://adhe.edu/about/about-the-agency
Arkansas	System	https://www.uasys.edu/about/university-of-arkansas-mission/
Arkansas	System	https://www.asusystem.edu/about/vision-mission-and-goals/
California	System	https://www.ucop.edu/uc-mission/
California	System	https://www.calstate.edu/csu-system/about-the-csu/Pages/mission.aspx
Colorado	System	https://www.cu.edu/mission-university-colorado-guiding-principles-and-vision-statement
Colorado	System	https://csusystem.edu/we-are-colorado/
Colorado	State	https://highered.colorado.gov/about-dhe/general-information/department-of-higher-education-mission
Connecticut	State	https://www.ohe.ct.gov/AboutUs.shtml
Connecticut	System	https://www.ct.edu/regents/mission
Connecticut	System	https://boardoftrustees.uconn.edu/university-mission-statement/
Delaware	State	*None, per email communication*
Florida	System	https://www.flbog.edu/wp-content/uploads/2011-11-28_Strategic_Plan_2012-2025_FINAL-1.pdf
Georgia	System	https://www.usg.edu/strategic_plan/
Hawaii	State	https://www.hawaii.edu/about-uh/
Idaho	State	https://boardofed.idaho.gov/wp-content/uploads/2021/01/FY23-K-20-Strategic-Plan.pdf
Illinois	State	https://ibhestrategicplan.ibhe.org/pdf/A_Thriving_Illinois_06-15-21.pdf
Illinois	System	https://www.uillinois.edu/about/mission
Illinois	System	https://siusystem.edu/about/strategic-plan/components/SIUSystemStrategicPlanReport-BOT011922.32.pdf
Indiana	State	https://www.in.gov/che/files/2020_College_Value_Report_04_01_2020_pages.pdf
Indiana	System	https://strategicplan.iu.edu/mission-values-vision/index.html#:~:text=Indiana%20University's%20mission%20is%20to,cultural%20programs%20and%20student%20services.
Indiana	System	*Received via email communication*
Iowa	System	https://www.iowaregents.edu/media/cms/0222_ITEM_10__Strategic_Plan_4AF789F6E110D.pdf
Kansas	State	https://www.kansasregents.org/about/policies-by-laws-missions/missions
Kentucky	State	http://cpe.ky.gov/ourwork/documents/2022-30strategicagenda.pdf
Louisiana	State	https://regents.la.gov/about/
Louisiana	System	https://www.ulsystem.edu/about-2/
Louisiana	System	https://www.sus.edu/page/sus-mission-vision
Louisiana	System	https://lsu.edu/about/mission.php
Maine	System	https://umaine.edu/about/mission-2/, https://umaine.edu/visionandvalues/
Maryland	State	https://mhec.maryland.gov/About/Documents/MHEC%20Strategic%20Plan%202016-2019.pdf
Maryland	System	https://www.usmd.edu/about_usm/

State	Level	Mission/vision URL
Massachusetts	State	https://www.mass.edu/bhe/aboutbhe.asp
Massachusetts	System	https://www.massachusetts.edu/about
Michigan	State	https://www.masu.org/about/our-mission
Michigan	System	https://president.umich.edu/about/mission/
Minnesota	System	https://regents.umn.edu/sites/regents.umn.edu/files/2019-09/policy_mission_statement.pdf
Minnesota	System	https://www.minnstate.edu/board/docs-summaries/1996/december-mission.html
Minnesota	State	https://www.ohe.state.mn.us/mPg.cfm?pageID=916
Mississippi	System	http://www.mississippi.edu/about/
Missouri	State	https://dhewd.mo.gov/cbhe/
Montana	State	https://mus.edu/board/meetings/Archives/StratAction%20plans.htm
Nebraska	State	https://ccpe.nebraska.gov/sites/ccpe.nebraska.gov/files/CompPlan.pdf
Nebraska	System	https://nebraska.edu/-/media/unca/docs/offices-and-policies/documents/strategic-plans/university-of-nebraska-five-year-strategy.pdf
Nebraska	System	https://www.nscs.edu/about
Nevada	System	https://nshe.nevada.edu/tasks/sites/Nshe/assets/File/BoardOfRegents/Agendas/2016/jan-mtgs/bor-refs/BOR-3b.pdf
New Hampshire	System	https://www.usnh.edu/about/mission-vision-values
New Hampshire	State	*None, per email communication*
New Jersey	State	https://www.state.nj.us/highereducation/stateplan.shtml, https://www.state.nj.us/highereducation/documents/pdf/StateEducationplan.pdf
New Mexico	State	https://hed.state.nm.us/about
New Mexico	System	https://nmsu.edu/about_nmsu/index.html
New Mexico	System	https://www.enmu.edu/about/enmu-administration/university-mission-vision
New Mexico	System	https://opportunity.unm.edu/vision/index.html
New York	System	https://www.suny.edu/about/mission/
New York	System	https://www.cuny.edu/about/
New York	State	http://www.highered.nysed.gov/about.html
North Carolina	System	https://www.northcarolina.edu/about-us/
North Dakota	State	https://ndusbpos.sharepoint.com/:w:/s/NDUSPoliciesandProcedures/EW4G8jxxj7BOpfqYe-jqn9EBtIACdP_3Ua6G1OOBaJtpIQ?rtime=cSiDSaxt2kg
Ohio	State	*None, per email communication*
Ohio	System	https://oaa.osu.edu/assets/files/documents/ohio-state-vision-mission-values-goals.pdf
Ohio	System	https://www.ohio.edu/about
Oklahoma	State	*Email request*
Oklahoma	System	https://www.ruso.edu/about
Oklahoma	System	https://www.ou.edu/provost/mission
Oklahoma	System	https://regents.okstate.edu/mission-statement.html
Oregon	State	https://www.oregon.gov/highered/policy-collaboration/Pages/mission.aspx, https://www.oregon.gov/highered/about/Documents/News-Updates/HECC-2-pager.pdf
Pennsylvania	System	https://www.passhe.edu/About/Pages/About.aspx
Pennsylvania	State	https://www.education.pa.gov/Pages/Mission.aspx
Pennsylvania	System	https://strategicplan.psu.edu/plan/mission/, https://strategicplan.psu.edu/plan/vision/
Rhode Island	State	https://www.riopc.edu/page/Council%20overview/
South Carolina	State	https://www.che.sc.gov/CHE_Docs/executivedirector/2018-2019_CHE_Accountability_Rpt_Combined(Final).pdf
South Dakota	System	https://www.sdbor.edu/the-board/StrategicPlan/Documents/StrategicPlan_22_27.pdf

State	Level	Mission/vision URL
Tennessee	State	https://www.tn.gov/thec/about-thec-tsac.html
Tennessee	System	https://tennessee.edu/, https://plan.tennessee.edu/
Texas	State	https://www.highered.texas.gov/about-us/board-commissioner/agency-mission-vision-philosophy-core-values-key-functions/
Texas	System	https://www.utsystem.edu/about/mission
Texas	System	https://assets.system.tamus.edu/files/strategicplan/pdf/2016-2021-TAMUS_Long_FINAL.pdf
Texas	System	https://www.untsystem.edu/about-us/index.php
Texas	System	https://www.texastech.edu/about.php
Texas	System	https://uhsystem.edu/uh-system/mission-statements/index.php
Texas	System	https://www.tsus.edu/about-tsus.html
Utah	State	https://ushe.edu/board/strategic-plan/
Vermont	System	https://www.vsc.edu/system-facts/mission-vision/
Virginia	State	https://www.schev.edu/about/overview
Washington	State	https://wsac.wa.gov/mission-and-vision
Washington	System	https://www.washington.edu/about/visionvalues/
Washington	System	https://wsu.edu/about/leadership/
West Virginia	System	https://www.wvhepc.edu/master-plan-leading-the-way/#:~:text=Through%20a%20collaborative%20effort%20among,impact%20on%20its%20economic%20future.
Wisconsin	System	https://www.wisconsin.edu/about-the-uw-system/
Wyoming	System	http://www.uwyo.edu/president/mission-statement/

Appendix B. Quantitative Variables, Sources, and Descriptions

Quantitative variables	Source	Description
Access and Affordability		
Equitable enrollment by race	IPEDS Fall Enrollment, U.S. Census Bureau	The sum of the differences between the proportion of first-time full-time students from each race/ethnicity and that group's proportion of the 18-21 state population.
Equitable enrollment by income	IPEDS Financial Aid, U.S. Census Bureau	The difference between the proportion of first-time full-time freshmen awarded a Federal Pell Grant and the state population at or below the poverty line.
Selectivity	IPEDS Admissions	The number of first-time students admitted divided by first-time degree-seeking student applicants.
Net price	IPEDS Student Financial Aid	Average price for first-time full-time students receiving aid, net of all financial aid.
Success and Attainment		
Equitable graduation by race	IPEDS Graduation Rates	The weighted sum of the difference between the 150% first-time full-time graduation rate for each race/ethnicity and the average graduation rate.
Equitable graduation by income	IPEDS Financial Aid	The difference between the 150% graduation rate for Pell-recipients and the average graduation rate.
Bachelors degree production	IPEDS Completions	Bachelor's degree completions on a per-FTE enrollment basis.
Economic and Workforce Development		
Percent of resident enrollment	IPEDS Residency and Migration	The proportion of an institution's first-time undergraduates who are state residents.
Unemployment rate disparity (all students)	College Scorecard, U.S. Treasury	The difference between state employment rates and institutional student employment rates six years after enrolling.
Unemployment rate disparity (completers)	College Scorecard, U.S. Treasury	The difference between state employment rates and institutional completer employment rates one year after graduating.
Earnings premium	College Scorecard, U.S. Treasury	Percent of students earning more than a high-school graduate six years after enrolling.
Adjusted economic mobility rate	Opportunity Insights at Harvard University	The sum of the conditional probability that a student will end up in a higher income quintile than their parents or will remain in the top two quintiles.
Community Improvement		
Carnegie Engaged	Swearer Center at Brown University	Carnegie Engaged Institution designation.
Campus Compact	Campus Compact	Campus Compact membership.
Expenditures on public service	IPEDS Finance	Percent of expenditures on public service as a proportion of total core expenditures.
Percent of Federal Work-Study on public service	Corp. for National and Community Service	Percent of federal work study awards spent on public service.
Institution Type		
Carnegie	IPEDS Institutional Characteristics	2018 Carnegie classification, aggregated to the bachelors, masters, and doctoral level.
Very high research	IPEDS Institutional Characteristics	Doctoral universities with a very high research Carnegie classification.

Quantitative variables	Source	Description
RCU	Constructed using IPEDS data	Regional comprehensive institutions.
Enrollment-based MSI	U.S. Department of Education	Enrollment-based minority-serving institutions receiving funding in 2020.
HBCU	U.S. Department of Education	Historically Black Colleges and Universities.
Empirical Publicness		
State support	IPEDS Finance	State appropriations plus grants and contracts.
Government financial aid	IPEDS Finance	Federal, state, and local grants and scholarships applied to tuition and fees.
Private revenues	IPEDS Finance	The sum of all non-public revenue sources, excluding auxiliary enterprises and capital appropriations. Financial aid is included as tuition.
Total revenues	IPEDS Finance	The sum of all revenue sources, excluding capital appropriations.
Public funding proportion	IPEDS Finance	State support divided by total revenues.
Public funding ratio	IPEDS Finance	State support divided by private revenues net of government financial aid.
Governance structure	Education Commission of the States	State-level administrative, coordinating, or governing board.
Tuition-setting authority	State Higher Education Executive Officers	Centralization of tuition-setting authority (state, legislature, or governor).
PBF	State Higher Education Executive Officers	Percent of four-year general operating appropriations allocated through performance-based funding.
Secondary Independent Variables		
FTE enrollment	IPEDS 12-Month Enrollment	Full-time equivalent (FTE) student 12-month enrollment.
Graduation rate	IPEDS Graduation Rates	The percent of first-time full-time undergraduates who complete a bachelor's degree in six years.
Total core revenues per FTE	IPEDS Finance, IPEDS 12-Month Enrollment	The sum of all revenue sources used for essential educational activities, on a per-full-time equivalent (FTE) basis.
Selectivity	IPEDS Admissions	The number of first-time students admitted divided by first-time degree-seeking student applicants.
Net price	IPEDS Student Financial Aid	Average price for first-time full-time students receiving aid, net of all financial aid.
Percent federal revenue	IPEDS Finance	Federal appropriations plus grants and contracts as a percent of total revenues.
Land-grant	IPEDS Institutional Characteristics	Land-grant institution status.

Appendix C. Primary Independent Variable Averages by State

State	Institutions	Pubfund	Pubfund1	Govstructure	Centraltuit	PBFpct
Alabama	14	0.26	0.71	2.00	0	0.00
Alaska	3	0.49	1.79	1.00	0	0.00
Arizona	7	0.20	0.40	1.00	0	0.00
Arkansas	10	0.38	1.39	2.00	0	0.01
California	31	0.41	1.35	0.00	1	0.00
Connecticut	5	0.37	0.92	1.00	0	0.00
Delaware	2	0.29	0.99	1.00	0	0.00
Florida	14	0.47	2.05	0.00	1	0.10
Georgia	19	0.31	1.06	0.00	0	0.00
Hawaii	3	0.52	2.22	3.00	0	0.00
Idaho	4	0.39	1.02	3.00	0	0.00
Illinois	12	0.24	0.48	2.00	0	0.00
Indiana	13	0.32	0.70	2.00	0	1.00
Iowa	3	0.22	0.68	0.00	0	0.00
Kansas	7	0.26	0.58	2.00	0	0.10
Kentucky	8	0.28	0.89	2.00	1	0.97
Louisiana	14	0.23	0.54	2.00	1	0.91
Maine	7	0.39	1.23	0.00	0	0.00
Maryland	12	0.38	1.67	2.00	1	0.00
Massachusetts	11	0.37	0.98	2.00	0	0.00
Michigan	15	0.18	0.34	0.00	0	0.01
Minnesota	11	0.37	1.15	1.00	0	0.00
Mississippi	8	0.29	1.04	0.00	0	0.00
Missouri	13	0.27	0.78	2.00	0	0.00
Montana	6	0.32	0.85	2.00	0	0.06
Nebraska	6	0.38	1.16	2.00	0	0.00
Nevada	3	0.37	0.98	0.00	0	0.18
New Hampshire	5	0.17	0.31	1.00	0	0.00
New Jersey	13	0.29	0.63	1.00	0	0.02
New Mexico	6	0.45	1.63	2.00	0	0.07
New York	33	0.47	1.76	1.00	0	0.00
North Carolina	15	0.43	1.90	0.00	0	0.00
North Dakota	6	0.36	0.90	3.00	1	1.00
Ohio	16	0.23	0.57	2.00	0	0.98
Oklahoma	13	0.28	0.75	2.00	1	0.03
Oregon	7	0.29	0.74	2.00	0	0.49
Pennsylvania	39	0.30	0.80	1.00	0	0.00
Rhode Island	2	0.27	0.71	2.00	0	0.04
South Carolina	11	0.28	0.73	2.00	0	0.00
South Dakota	5	0.29	0.62	0.00	0	0.00
Tennessee	9	0.38	1.05	2.00	0	0.97
Texas	35	0.31	0.72	2.00	0	0.02
Utah	5	0.27	0.68	3.00	0	0.03
Vermont	3	0.15	0.28	0.00	0	0.00

State	Institutions	Pubfund	Pubfund1	Govstructure	Centraltuit	PBFpct
Virginia	14	0.26	0.87	2.00	0	0.00
Washington	8	0.37	0.98	2.00	1	0.00
West Virginia	10	0.34	1.09	0.00	0	0.00
Wisconsin	13	0.21	0.38	0.00	0	0.00
Wyoming	1	0.43	1.34	0.00	0	0.00

Note. Pubfund and pubfund1 are state averages of all institutions. All other variables are consistent across the state.

Appendix D. List of Regional Comprehensive Universities (RCUs)

Alabama, Alabama A & M University, 100654
Alabama, Alabama State University, 100724
Alabama, Athens State University, 100812
Alabama, Auburn University at Montgomery, 100830
Alabama, Jacksonville State University, 101480
Alabama, Troy University, 102368
Alabama, University of North Alabama, 101879
Alabama, University of South Alabama, 102094
Alaska, University of Alaska Anchorage, 102553
Alaska, University of Alaska Southeast, 102632
Arizona, Arizona State University-Downtown Phoenix, 448886
Arizona, Arizona State University-Polytechnic, 420574
Arizona, Arizona State University-West, 407009
Arizona, Northern Arizona University, 105330
Arizona, University of Arizona-Sierra Vista, 487296
Arkansas, Arkansas State University, 106458
Arkansas, Arkansas Tech University, 106467
Arkansas, Henderson State University, 107071
Arkansas, Southern Arkansas University Main Campus, 107983
Arkansas, University of Arkansas at Little Rock, 106245
Arkansas, University of Arkansas at Monticello, 106485
Arkansas, University of Arkansas-Fort Smith, 108092
Arkansas, University of Central Arkansas, 106704
California, California State Polytechnic University-Pomona, 110529
California, California State University-Bakersfield, 110486
California, California State University-Channel Islands, 441937
California, California State University-Chico, 110538
California, California State University-Dominguez Hills, 110547
California, California State University-East Bay, 110574
California, California State University-Fresno, 110556
California, California State University-Monterey Bay, 409698
California, California State University-Sacramento, 110617
California, California State University-San Bernardino, 110510
California, California State University-San Marcos, 366711
California, California State University-Stanislaus, 110495
California, Humboldt State University, 115755
California, San Francisco State University, 122597
California, San Jose State University, 122755
California, Sonoma State University, 123572
California, University of California-Merced, 445188
Colorado, Adams State University, 126182
Colorado, Colorado Mesa University, 127556
Colorado, Colorado State University Pueblo, 128106
Colorado, Fort Lewis College, 127185
Colorado, Metropolitan State University of Denver, 127565
Colorado, University of Colorado Colorado Springs, 126580
Colorado, University of Northern Colorado, 127741
Colorado, Western Colorado University, 128391
Connecticut, Central Connecticut State University, 128771
Connecticut, Eastern Connecticut State University, 129215
Connecticut, Southern Connecticut State University, 130493
Connecticut, Western Connecticut State University, 130776
District of Columbia, University of the District of Columbia, 131399
Florida, Florida Atlantic University, 133669
Florida, Florida Gulf Coast University, 433660
Florida, New College of Florida, 262129
Florida, University of North Florida, 136172
Georgia, Albany State University, 138716
Georgia, Augusta University, 482149
Georgia, Clayton State University, 139311
Georgia, Columbus State University, 139366
Georgia, Fort Valley State University, 139719
Georgia, Georgia College & State University, 139861
Georgia, Georgia Gwinnett College, 447689
Georgia, Georgia Southern University, 139931
Georgia, Georgia Southwestern State University, 139764
Georgia, Kennesaw State University, 486840
Georgia, Middle Georgia State University, 482158
Georgia, University of North Georgia, 482680
Georgia, University of West Georgia, 141334
Georgia, Valdosta State University, 141264
Hawaii, University of Hawaii at Hilo, 141565
Hawaii, University of Hawaii-West Oahu, 141981
Idaho, Boise State University, 142115
Idaho, Idaho State University, 142276
Idaho, Lewis-Clark State College, 142328
Illinois, Eastern Illinois University, 144892
Illinois, Illinois State University, 145813
Illinois, Northeastern Illinois University, 147776
Illinois, Northern Illinois University, 147703
Illinois, Southern Illinois University-Carbondale, 149222
Illinois, Southern Illinois University-Edwardsville, 149231
Illinois, University of Illinois Springfield, 148654
Illinois, Western Illinois University, 149772
Indiana, Ball State University, 150136

Indiana, Indiana State University, 151324
Indiana, Indiana University-East, 151388
Indiana, Indiana University-Kokomo, 151333
Indiana, Indiana University-Northwest, 151360
Indiana, Indiana University-Purdue University-Indianapolis, 151111
Indiana, Indiana University-South Bend, 151342
Indiana, Indiana University-Southeast, 151379
Indiana, Purdue University Fort Wayne, 151102
Indiana, University of Southern Indiana, 151306
Iowa, University of Northern Iowa, 154095
Kansas, Emporia State University, 155025
Kansas, Fort Hays State University, 155061
Kansas, Pittsburg State University, 155681
Kansas, Washburn University, 156082
Kansas, Wichita State University, 156125
Kentucky, Eastern Kentucky University, 156620
Kentucky, Kentucky State University, 157058
Kentucky, Morehead State University, 157386
Kentucky, Murray State University, 157401
Kentucky, Northern Kentucky University, 157447
Kentucky, Western Kentucky University, 157951
Louisiana, Grambling State University, 159009
Louisiana, Louisiana State University-Alexandria, 159382
Louisiana, Louisiana State University-Shreveport, 159416
Louisiana, Louisiana Tech University, 159647
Louisiana, McNeese State University, 159717
Louisiana, Nicholls State University, 159966
Louisiana, Northwestern State University of Louisiana, 160038
Louisiana, Southeastern Louisiana University, 160612
Louisiana, University of Louisiana at Lafayette, 160658
Louisiana, University of Louisiana at Monroe, 159993
Louisiana, University of New Orleans, 159939
Maine, University of Maine at Augusta, 161217
Maine, University of Maine at Farmington, 161226
Maine, University of Maine at Fort Kent, 161235
Maine, University of Maine at Machias, 161244
Maine, University of Maine at Presque Isle, 161341
Maine, University of Southern Maine, 161554
Maryland, Frostburg State University, 162584
Maryland, Morgan State University, 163453
Maryland, Salisbury University, 163851
Maryland, St. Mary's College of Maryland, 163912
Maryland, Towson University, 164076
Maryland, University of Baltimore, 161873
Maryland, University of Maryland Eastern Shore, 163338
Maryland, University of Maryland Global Campus, 163204
Maryland, University of Maryland-Baltimore County, 163268
Massachusetts, Bridgewater State University, 165024
Massachusetts, Fitchburg State University, 165820
Massachusetts, Framingham State University, 165866
Massachusetts, Massachusetts College of Liberal Arts, 167288
Massachusetts, Salem State University, 167729
Massachusetts, University of Massachusetts-Boston, 166638
Massachusetts, University of Massachusetts-Dartmouth, 167987
Massachusetts, University of Massachusetts-Lowell, 166513
Massachusetts, Westfield State University, 168263
Massachusetts, Worcester State University, 168430
Michigan, Central Michigan University, 169248
Michigan, Eastern Michigan University, 169798
Michigan, Ferris State University, 169910
Michigan, Grand Valley State University, 170082
Michigan, Lake Superior State University, 170639
Michigan, Michigan Technological University, 171128
Michigan, Northern Michigan University, 171456
Michigan, Oakland University, 171571
Michigan, Saginaw Valley State University, 172051
Michigan, University of Michigan-Dearborn, 171137
Michigan, University of Michigan-Flint, 171146
Michigan, Western Michigan University, 172699
Minnesota, Bemidji State University, 173124
Minnesota, Metropolitan State University, 174020
Minnesota, Minnesota State University Moorhead, 174358
Minnesota, Minnesota State University-Mankato, 173920
Minnesota, Saint Cloud State University, 174783
Minnesota, Southwest Minnesota State University, 175078
Minnesota, University of Minnesota-Crookston, 174075
Minnesota, University of Minnesota-Duluth, 174233
Minnesota, University of Minnesota-Morris, 174251
Minnesota, Winona State University, 175272
Mississippi, Alcorn State University, 175342
Mississippi, Delta State University, 175616
Mississippi, Jackson State University, 175856
Mississippi, Mississippi University for Women, 176035
Mississippi, Mississippi Valley State University, 176044
Missouri, Missouri Southern State University, 178341
Missouri, Missouri State University-Springfield, 179566
Missouri, Missouri University of Science and Technology, 178411
Missouri, Missouri Western State University, 178387
Missouri, Northwest Missouri State University, 178624
Missouri, Southeast Missouri State University, 179557
Missouri, Truman State University, 178615
Missouri, University of Central Missouri, 176965

Missouri, University of Missouri-Kansas City, 178402
Missouri, University of Missouri-St Louis, 178420
Montana, Montana State University Billings, 180179
Montana, Montana State University-Northern, 180522
Montana, Montana Technological University, 180416
Montana, The University of Montana-Western, 180692
Nebraska, Chadron State College, 180948
Nebraska, Peru State College, 181534
Nebraska, University of Nebraska at Kearney, 181215
Nebraska, University of Nebraska at Omaha, 181394
Nebraska, Wayne State College, 181783
Nevada, Nevada State College, 441900
New Hampshire, Granite State College, 183257
New Hampshire, Keene State College, 183062
New Hampshire, Plymouth State University, 183080
New Hampshire, University of New Hampshire at Manchester, 183071
New Jersey, Kean University, 185262
New Jersey, Montclair State University, 185590
New Jersey, New Jersey City University, 185129
New Jersey, Ramapo College of New Jersey, 186201
New Jersey, Rowan University, 184782
New Jersey, Rutgers University-Camden, 186371
New Jersey, Rutgers University-Newark, 186399
New Jersey, Stockton University, 186876
New Jersey, Thomas Edison State University, 187046
New Jersey, William Paterson University of New Jersey, 187444
New Mexico, Eastern New Mexico University-Main Campus, 187648
New Mexico, New Mexico Highlands University, 187897
New Mexico, New Mexico Institute of Mining and Technology, 187967
New Mexico, Western New Mexico University, 188304
New York, College of Staten Island CUNY, 190558
New York, CUNY York College, 190691
New York, Fashion Institute of Technology, 191126
New York, SUNY at Fredonia, 196158
New York, SUNY at Purchase College, 196219
New York, SUNY Brockport, 196121
New York, SUNY Buffalo State, 196130
New York, SUNY College at Geneseo, 196167
New York, SUNY College at Old Westbury, 196237
New York, SUNY College at Oswego, 196194
New York, SUNY College at Plattsburgh, 196246
New York, SUNY College at Potsdam, 196200
New York, SUNY College of Agriculture and Technology at Cobleskill, 196033
New York, SUNY College of Environmental Science and Forestry, 196103
New York, SUNY College of Technology at Canton, 196015
New York, SUNY Empire State College, 196264
New York, SUNY Polytechnic Institute, 196112
North Carolina, Appalachian State University, 197869
North Carolina, East Carolina University, 198464
North Carolina, Elizabeth City State University, 198507
North Carolina, Fayetteville State University, 198543
North Carolina, North Carolina A & T State University, 199102
North Carolina, University of North Carolina at Asheville, 199111
North Carolina, University of North Carolina at Charlotte, 199139
North Carolina, University of North Carolina at Greensboro, 199148
North Carolina, University of North Carolina at Pembroke, 199281
North Carolina, University of North Carolina Wilmington, 199218
North Carolina, Winston-Salem State University, 199999
North Dakota, Dickinson State University, 200059
North Dakota, Mayville State University, 200226
North Dakota, Valley City State University, 200572
Ohio, Bowling Green State University-Main Campus, 201441
Ohio, Central State University, 201690
Ohio, Cleveland State University, 202134
Ohio, Kent State University at Kent, 203517
Ohio, Miami University-Hamilton, 204006
Ohio, Miami University-Middletown, 204015
Ohio, Miami University-Oxford, 204024
Ohio, Ohio University-Main Campus, 204857
Ohio, Shawnee State University, 205443
Ohio, University of Akron Main Campus, 200800
Ohio, University of Toledo, 206084
Ohio, Wright State University-Lake Campus, 206613
Ohio, Wright State University-Main Campus, 206604
Ohio, Youngstown State University, 206695
Oklahoma, Cameron University, 206914
Oklahoma, East Central University, 207041
Oklahoma, Northeastern State University, 207263
Oklahoma, Northwestern Oklahoma State University, 207306
Oklahoma, Oklahoma Panhandle State University, 207351
Oklahoma, Rogers State University, 207661
Oklahoma, Southeastern Oklahoma State University, 207847
Oklahoma, Southwestern Oklahoma State University, 207865
Oklahoma, University of Central Oklahoma, 206941
Oklahoma, University of Science and Arts of Oklahoma, 207722
Oregon, Eastern Oregon University, 208646
Oregon, Oregon Institute of Technology, 209506
Oregon, Portland State University, 209807
Oregon, Southern Oregon University, 210146
Oregon, Western Oregon University, 210429

Pennsylvania, Bloomsburg University of Pennsylvania, 211158
Pennsylvania, California University of Pennsylvania, 211361
Pennsylvania, Cheyney University of Pennsylvania, 211608
Pennsylvania, Clarion University of Pennsylvania, 211644
Pennsylvania, East Stroudsburg University of Pennsylvania, 212115
Pennsylvania, Edinboro University of Pennsylvania, 212160
Pennsylvania, Indiana University of Pennsylvania-Main Campus, 213020
Pennsylvania, Kutztown University of Pennsylvania, 213349
Pennsylvania, Lincoln University, 213598
Pennsylvania, Lock Haven University, 213613
Pennsylvania, Mansfield University of Pennsylvania, 213783
Pennsylvania, Millersville University of Pennsylvania, 214041
Pennsylvania, Pennsylvania State University-Penn State Abington, 214801
Pennsylvania, Pennsylvania State University-Penn State Altoona, 214689
Pennsylvania, Pennsylvania State University-Penn State Beaver, 214698
Pennsylvania, Pennsylvania State University-Penn State Berks, 214704
Pennsylvania, Pennsylvania State University-Penn State Brandywine, 214731
Pennsylvania, Pennsylvania State University-Penn State Erie-Behrend College, 214591
Pennsylvania, Pennsylvania State University-Penn State Fayette- Eberly, 214759
Pennsylvania, Pennsylvania State University-Penn State Great Valley, 214607
Pennsylvania, Pennsylvania State University-Penn State Greater Allegheny, 214786
Pennsylvania, Pennsylvania State University-Penn State Harrisburg, 214713
Pennsylvania, Pennsylvania State University-Penn State Hazleton, 214768
Pennsylvania, Pennsylvania State University-Penn State Lehigh Valley, 214670
Pennsylvania, Pennsylvania State University-Penn State New Kensington, 214625
Pennsylvania, Pennsylvania State University-Penn State Schuylkill, 214810
Pennsylvania, Pennsylvania State University-Penn State Scranton, 214652
Pennsylvania, Pennsylvania State University-Penn State Shenango, 214634
Pennsylvania, Pennsylvania State University-Penn State Wilkes-Barre, 214643
Pennsylvania, Pennsylvania State University-Penn State York, 214829
Pennsylvania, Shippensburg University of Pennsylvania, 216010
Pennsylvania, Slippery Rock University of Pennsylvania, 216038
Pennsylvania, University of Pittsburgh-Bradford, 215266
Pennsylvania, University of Pittsburgh-Greensburg, 215275
Pennsylvania, University of Pittsburgh-Johnstown, 215284
Pennsylvania, West Chester University of Pennsylvania, 216764
Rhode Island, Rhode Island College, 217420
South Carolina, Coastal Carolina University, 218724
South Carolina, College of Charleston, 217819
South Carolina, Francis Marion University, 218061
South Carolina, South Carolina State University, 218733
South Carolina, University of South Carolina Beaufort, 218654
South Carolina, University of South Carolina-Upstate, 218742
South Carolina, Winthrop University, 218964
South Dakota, Black Hills State University, 219046
South Dakota, Dakota State University, 219082
South Dakota, Northern State University, 219259
Tennessee, Austin Peay State University, 219602
Tennessee, East Tennessee State University, 220075
Tennessee, Middle Tennessee State University, 220978
Tennessee, Tennessee State University, 221838
Tennessee, Tennessee Technological University, 221847
Tennessee, The University of Tennessee-Chattanooga, 221740
Tennessee, The University of Tennessee-Martin, 221768
Tennessee, University of Memphis, 220862
Texas, Angelo State University, 222831
Texas, Lamar University, 226091
Texas, Midwestern State University, 226833
Texas, Prairie View A & M University, 227526
Texas, Sam Houston State University, 227881
Texas, Stephen F Austin State University, 228431
Texas, Sul Ross State University, 228501
Texas, Tarleton State University, 228529
Texas, Texas A & M International University, 226152
Texas, Texas A & M University-Corpus Christi, 224147
Texas, Texas A & M University-Kingsville, 228705
Texas, Texas A&M University-Central Texas, 483036
Texas, Texas A&M University-Texarkana, 224545
Texas, Texas Southern University, 229063
Texas, Texas State University, 228459
Texas, Texas Woman's University, 229179

Texas, The University of Texas at San Antonio, 229027
Texas, The University of Texas at Tyler, 228802
Texas, The University of Texas Permian Basin, 229018
Texas, The University of Texas Rio Grande Valley, 227368
Texas, University of Houston-Clear Lake, 225414
Texas, University of Houston-Downtown, 225432
Texas, University of Houston-Victoria, 225502
Texas, University of North Texas at Dallas, 484905
Texas, West Texas A & M University, 229814
Utah, Southern Utah University, 230603
Utah, Utah Valley University, 230737
Utah, Weber State University, 230782
Vermont, Castleton University, 230834
Vermont, Northern Vermont University, 230913
Virginia, Christopher Newport University, 231712
Virginia, James Madison University, 232423
Virginia, Longwood University, 232566
Virginia, Norfolk State University, 232937
Virginia, Old Dominion University, 232982
Virginia, Radford University, 233277
Virginia, The University of Virginia's College at Wise, 233897
Virginia, University of Mary Washington, 232681
Virginia, Virginia State University, 234155
Washington, Central Washington University, 234827
Washington, Eastern Washington University, 235097
Washington, The Evergreen State College, 235167
Washington, University of Washington-Bothell Campus, 377555
Washington, University of Washington-Tacoma Campus, 377564
Washington, Western Washington University, 237011
West Virginia, Bluefield State College, 237215
West Virginia, Concord University, 237330
West Virginia, Fairmont State University, 237367
West Virginia, Glenville State College, 237385
West Virginia, Marshall University, 237525
West Virginia, Shepherd University, 237792
West Virginia, West Liberty University, 237932
West Virginia, West Virginia State University, 237899
West Virginia, West Virginia University Institute of Technology, 237950
Wisconsin, University of Wisconsin-Eau Claire, 240268
Wisconsin, University of Wisconsin-Green Bay, 240277
Wisconsin, University of Wisconsin-La Crosse, 240329
Wisconsin, University of Wisconsin-Oshkosh, 240365
Wisconsin, University of Wisconsin-Parkside, 240374
Wisconsin, University of Wisconsin-Platteville, 240462
Wisconsin, University of Wisconsin-River Falls, 240471
Wisconsin, University of Wisconsin-Stevens Point, 240480
Wisconsin, University of Wisconsin-Stout, 240417
Wisconsin, University of Wisconsin-Superior, 240426
Wisconsin, University of Wisconsin-Whitewater, 240189

Appendix E. Realized Publicness Outcomes for Research Institutions and RCUs

Outcome	*n*	*M*	*SD*	Min	Max
Very High Research Institution					
Equitable enrollment by race	91	-0.02	0.05	-0.15	0.20
Equitable enrollment by income	90	0.15	0.11	-0.05	0.51
Net price	90	0.61	0.14	0.32	0.92
Access and affordability factor	90	-0.78	0.59	-2.04	1.82
Equitable graduation by race	90	-0.01	0.01	-0.05	0.05
Equitable graduation by income	90	-0.07	0.05	-0.17	0.02
Success and attainment factor	90	0.06	0.70	-1.99	1.71
Unemployment disparity (all students)	91	-0.02	0.02	-0.09	0.01
Unemployment disparity (completers)	91	-0.01	0.01	-0.04	0.03
Pct earning above high school graduates	91	0.75	0.07	0.53	0.89
Workforce and economic factor	91	0.21	0.60	-1.73	1.21
Public service pct of core expenses	87	0.07	0.05	0.01	0.19
Carnegie Engaged institution	91	0.62		0.00	1.00
Campus Compact institution	91	0.67		0.00	1.00
Community improvement index	91	1.48	0.89	0.00	3.00
Regional Comprehensive University					
Equitable enrollment by race	358	0.01	0.06	-0.15	0.23
Equitable enrollment by income	358	0.34	0.14	-0.01	0.75
Net price	355	0.50	0.13	0.12	0.92
Access and affordability factor	355	0.14	0.76	-1.72	2.47
Equitable graduation by race	357	-0.02	0.02	-0.07	0.03
Equitable graduation by income	374	-0.06	0.05	-0.22	0.07
Success and attainment factor	357	-0.06	0.70	-2.11	1.93
Unemployment disparity (all students)	373	-0.03	0.03	-0.13	0.03
Unemployment disparity (completers)	377	0.00	0.02	-0.09	0.04
Pct earning above high school graduates	376	0.65	0.09	0.34	0.84
Workforce and economic factor	371	-0.01	0.88	-3.65	1.75
Public service pct of core expenses	357	0.03	0.04	0.00	0.19
Carnegie Engaged institution	379	0.28		0.00	1.00
Campus Compact institution	379	0.55		0.00	1.00
Community improvement index	379	0.93	0.78	0.00	3.00

Appendix F. Realized Publicness Outcomes for MSIs and HBCUs

Outcome	*n*	*M*	*SD*	Min	Max
Enrollment-based minority-serving institution					
Equitable enrollment by race	63	0.04	0.07	-0.15	0.22
Equitable enrollment by income	62	0.40	0.14	0.10	0.66
Net price	62	0.42	0.14	0.14	0.64
Access and affordability factor	62	0.58	0.87	-1.28	2.46
Equitable graduation by race	62	-0.01	0.02	-0.04	0.05
Equitable graduation by income	62	-0.03	0.03	-0.14	0.07
Success and attainment factor	62	0.43	0.62	-1.14	1.93
Unemployment disparity (all students)	63	-0.05	0.02	-0.13	-0.01
Unemployment disparity (completers)	63	-0.02	0.02	-0.09	0.02
Pct earning above high school graduates	63	0.68	0.08	0.46	0.81
Workforce and economic factor	63	-0.57	0.69	-3.65	0.55
Public service pct of core expenses	63	0.03	0.04	0.00	0.19
Carnegie Engaged institution	63	0.37		0.00	1.00
Campus Compact institution	63	0.48		0.00	1.00
Community improvement index	63	0.89	0.81	0.00	2.00
Historically Black College or University					
Equitable enrollment by race	39	0.13	0.08	-0.10	0.23
Equitable enrollment by income	39	0.58	0.10	0.34	0.75
Net price	39	0.47	0.12	0.12	0.72
Access and affordability factor	39	1.60	0.58	0.30	2.47
Equitable graduation by race	39	0.00	0.02	-0.06	0.03
Equitable graduation by income	39	-0.02	0.02	-0.09	0.03
Success and attainment factor	39	0.70	0.52	-1.41	1.58
Unemployment disparity (all students)	39	-0.03	0.02	-0.09	0.00
Unemployment disparity (completers)	39	0.00	0.02	-0.04	0.04
Pct earning above high school graduates	39	0.49	0.08	0.34	0.64
Workforce and economic factor	39	-0.30	0.61	-1.79	0.78
Public service pct of core expenses	38	0.05	0.04	0.00	0.16
Carnegie Engaged institution	39	0.05		0.00	1.00
Campus Compact institution	39	0.46		0.00	1.00
Community improvement index	39	0.56	0.64	0.00	2.00

Appendix G. Random-Effects Factor Regression Results by Institution Type

Factor Random-Effects Models for MSIs

Independent Variable	(1) accessafford	(2) success	(3) workecon	(4) commimp
pubfund	0.0214+	-0.0102	0.00207	0.0168
	(0.0118)	(0.0110)	(0.00501)	(0.0116)
centraltuit	-0.130	0.316	-0.433	0.274
	(0.739)	(0.565)	(0.279)	(0.618)
govstructure				
1. administrative	0.179	-0.285	-0.541*	-0.398
	(0.777)	(0.550)	(0.222)	(0.718)
2. coordinating	0.449	-0.146	-0.355+	0.146
	(0.487)	(0.380)	(0.211)	(0.306)
3. governing	0.126	1.840**	-2.439***	0.339
	(0.831)	(0.587)	(0.281)	(0.560)
pbfpct	-0.0324	0.00575	-0.0189	-0.0167
	(0.0417)	(0.0203)	(0.0147)	(0.0318)
revenue_fte	-0.0204+	-0.00862	-0.000413	-0.0102
	(0.0118)	(0.00703)	(0.00459)	(0.0114)
federal_pct	0.0543	0.000875	-0.0124	-0.0255
	(0.0383)	(0.0293)	(0.0103)	(0.0355)
fte	-0.000239			0.0320***
	(0.00981)			(0.00603)
admitrate	-0.00804	-0.00479	0.0130***	
	(0.00643)	(0.00322)	(0.00370)	
instate_pct	0.0229			
	(0.0182)			
netprice		-0.865		
		(0.587)		
gradrate_all		0.00341	0.0293***	
		(0.00626)	(0.00621)	
landgrant				0.661
				(0.734)
_cons	-2.148	1.564*	-2.331***	-0.783
	(1.360)	(0.662)	(0.645)	(0.893)
n	60	60	60	61

Note. Models 1-3 are linear random effects regression. Model 4 is a Poisson random effects regression.

+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Factor Random-Effects Models for HBCUs

Independent variable	(1) accessafford	(2) success	(3) workecon	(4) commimp
pubfund	-0.00126	-0.00655	-0.0189	0.0804*
	(0.0125)	(0.0111)	(0.0118)	(0.0314)
centraltuit	-0.358	0.0192	-0.0788	0.473
	(0.262)	(0.125)	(0.156)	(0.402)
govstructure				
1. administrative	-0.423	-0.0318	-0.217	1.396+
	(0.662)	(0.192)	(0.510)	(0.724)
2. coordinating	-0.0955	-0.126	0.104	0.0887
	(0.388)	(0.204)	(0.208)	(0.552)
3. governing	.	.	.	
	.	.	.	
pbfpct	0.00506+	-0.0000807	0.00234	-0.00342
	(0.00305)	(0.00186)	(0.00155)	(0.00930)
revenue_fte	-0.00741	0.00331	0.00378	-0.0134
	(0.0100)	(0.00686)	(0.0117)	(0.0315)
federal_pct	-0.0138	-0.00511	-0.0282	0.0604
	(0.0152)	(0.0190)	(0.0255)	(0.0500)
fte	-0.0820+			0.119+
	(0.0446)			(0.0718)
admitrate	-0.00623	-0.00519	-0.00369	
	(0.00415)	(0.00395)	(0.00518)	
instate_pct	-0.00558			
	(0.00843)			
netprice		-0.424		
		(0.450)		
gradrate_all		-0.00312	0.0287*	
		(0.0107)	(0.0142)	
landgrant				0.220
				(0.359)
_cons	3.507*	1.802	0.305	-5.821*
	(1.783)	(1.127)	(1.845)	(2.800)
n	37	37	37	37

Note. Models 1-3 are linear random effects regression. Model 4 is a Poisson random effects regression.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Factor Random-Effects Models for RCUs

Independent variable	(1) accessafford	(2) success	(3) workecon	(4) commimp
pubfund	0.0170**	0.00340	-0.0136	0.00757
	(0.00565)	(0.00485)	(0.00831)	(0.0114)
centraltuit	-0.0358	0.0908	-0.273+	0.110
	(0.116)	(0.159)	(0.164)	(0.276)
govstructure				
1. administrative	0.114	-0.283	0.203	-0.0113
	(0.159)	(0.201)	(0.177)	(0.470)
2. coordinating	0.0439	-0.332*	-0.194	-0.141
	(0.111)	(0.162)	(0.151)	(0.298)
3. governing	-0.376*	-0.301	-1.258***	-0.0346
	(0.161)	(0.415)	(0.376)	(0.409)
pbfpct	-0.00110	-0.00232	0.00260	-0.000850
	(0.000968)	(0.00205)	(0.00185)	(0.00435)
revenue_fte	0.0000519	0.00708	-0.00407	-0.000753
	(0.00778)	(0.00494)	(0.00477)	(0.00706)
federal_pct	0.0817***	0.0278**	-0.00243	-0.0270
	(0.0103)	(0.00867)	(0.00837)	(0.0715)
fte	-0.0103+			0.0375*
	(0.00545)			(0.0152)
admitrate	0.00243	-0.00257	-0.0000522	
	(0.00258)	(0.00277)	(0.00254)	
instate_pct	-0.00222			
	(0.00341)			
netprice		-0.114		
		(0.438)		
gradrate_all		-0.00471	0.0336***	
		(0.00550)	(0.00432)	
landgrant				0.121
				(0.812)
_cons	-1.617***	-0.0441	-0.972+	-0.230
	(0.484)	(0.602)	(0.564)	(1.723)
n	339	338	332	341

Note. Models 1-3 are linear random effects regression. Model 4 is a Poisson random effects regression.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Factor Random-Effects Models for Research Institutions

Independent variable	(1) accessafford	(2) success	(3) workecon	(4) commimp
pubfund	-0.0199***	-0.00461	0.00184	-0.0133+
	(0.00421)	(0.0124)	(0.00726)	(0.00787)
centraltuit	0.196	0.0109	-0.251	-0.158
	(0.144)	(0.226)	(0.213)	(0.246)
govstructure				
1. administrative	0.141	0.872**	-0.102	-0.647**
	(0.141)	(0.303)	(0.127)	(0.237)
2. coordinating	-0.226*	0.156	-0.0154	-0.218
	(0.112)	(0.292)	(0.144)	(0.173)
3. governing	0.567*	0.905	-1.121***	0.297
	(0.259)	(0.919)	(0.268)	(0.319)
pbfpct	0.00181	-0.00200	0.00287	0.00206
	(0.00169)	(0.00253)	(0.00233)	(0.00227)
revenue_fte	-0.00400	-0.00385	-0.00417	-0.00465
	(0.00502)	(0.00790)	(0.00326)	(0.00475)
federal_pct	0.0299*	0.00785	0.00599	-0.00332
	(0.0143)	(0.00962)	(0.0134)	(0.0176)
fte	-0.00379			0.00205
	(0.00528)			(0.00840)
admitrate	0.0104*	-0.00812+	0.00958***	
	(0.00425)	(0.00461)	(0.00281)	
instate_pct	0.0250***			
	(0.00375)			
netprice		-2.066***		
		(0.557)		
gradrate_all		-0.00169	0.0339***	
		(0.00901)	(0.00562)	
landgrant				0.332**
				(0.124)
_cons	-3.035***	1.927	-2.724***	0.883*
	(0.606)	(1.269)	(0.517)	(0.359)
n	76	76	76	77

Note. Models 1-3 are linear random effects regression. Model 4 is a Poisson random effects regression.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Appendix H. Sensitivity Tests for Random-Effects Models

Random-Effects Models for Govstructure

	govstructure					
Independent variable	1. administrative		2. coordinating		3. governing	
(1) enrollrace	0.0104	(0.00876)	-0.000721	(0.00859)	-0.0121	(0.0116)
(2) enrollincome	0.0734+	(0.0378)	0.0397+	(0.0238)	-0.0819**	(0.0290)
(3) netprice	0.0800**	(0.0293)	0.0368	(0.0226)	0.0121	(0.0377)
(4) admitrate	-7.900	(4.864)	1.413	(2.751)	6.491+	(3.513)
(5) accessafford	0.0501	(0.107)	-0.00152	(0.0981)	-0.397**	(0.151)
(6) gradrace	-0.00571	(0.00426)	-0.00475	(0.00298)	0.000351	(0.00827)
(7) gradincome	0.00306	(0.0111)	-0.00519	(0.00805)	-0.0132	(0.0204)
(8) baprod	-0.000989	(0.00749)	-0.00356	(0.00621)	0.00182	(0.0157)
(9) success	-0.157	(0.220)	-0.208	(0.149)	-0.125	(0.409)
(10) instate_pct	3.007	(5.235)	3.162	(3.796)	-8.382	(6.125)
(11) unemploy	0.00270	(0.00632)	-0.00466	(0.00473)	-0.0409***	(0.0110)
(12) unemploy_comp	0.00444	(0.00502)	-0.00486	(0.00345)	-0.0234*	(0.00969)
(13) earnings_hs	4.740**	(1.784)	-0.114	(1.632)	5.106+	(2.770)
(14) mobilityorstay	0.0358**	(0.0123)	0.0148	(0.0135)	0.00811	(0.0332)
(15) workecon	0.199	(0.184)	-0.177	(0.141)	-1.160**	(0.361)
(16) pubsvc_pct	-0.0181**	(0.00672)	-0.00214	(0.00623)	0.0148	(0.0114)
(17) pubsvcws	0.00103	(0.0169)	-0.00482	(0.0138)	0.0234	(0.0219)
(18) cc	-0.774	(0.849)	-0.378	(0.763)	-1.364	(1.829)
(19) ce	-0.315	(0.355)	-0.633*	(0.301)	-0.320	(0.918)
(20) commimp	-0.167	(0.442)	-0.126	(0.296)	-0.109	(0.516)

+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Random-Effects Models for Govstructure1 and Govstructure2

	govstructure1				govstructure2	
Independent variable	1. admin / coordinating		2. governing		governing (binary)	
(1) enrollrace	0.00233	(0.00740)	-0.0110	(0.0112)	0.00155	(0.00730)
(2) enrollincome	0.0493*	(0.0227)	-0.0791**	(0.0278)	0.0375+	(0.0228)
(3) netprice	0.0493*	(0.0199)	0.0160	(0.0395)	0.0466*	(0.0197)
(4) admitrate	-1.463	(2.991)	5.551	(3.841)	-0.831	(2.976)
(5) accessafford	0.0134	(0.0851)	-0.391**	(0.147)	-0.0102	(0.0855)
(6) gradrace	-0.00503+	(0.00279)	0.000284	(0.00829)	-0.00453	(0.00285)
(7) gradincome	-0.00274	(0.00733)	-0.0126	(0.0199)	-0.00369	(0.00721)
(8) baprod	-0.00277	(0.00565)	0.00202	(0.0156)	-0.00232	(0.00572)
(9) success	-0.193	(0.141)	-0.121	(0.405)	-0.186	(0.141)
(10) instate_pct	3.116	(3.718)	-8.387	(6.160)	1.995	(3.674)
(11) unemploy	-0.00245	(0.00404)	-0.0403***	(0.0115)	-0.00602	(0.00464)
(12) unemploy_comp	-0.00189	(0.00335)	-0.0229*	(0.0102)	-0.00385	(0.00367)
(13) earnings_hs	1.334	(1.598)	5.494+	(3.015)	1.711	(1.579)
(14) mobilityorstay	0.0205+	(0.0122)	0.0107	(0.0345)	0.0198	(0.0122)
(15) workecon	-0.0633	(0.125)	-1.132**	(0.386)	-0.163	(0.142)
(16) pubsvc_pct	-0.00701	(0.00553)	0.0134	(0.0111)	-0.00527	(0.00558)
(17) pubsvcws	-0.00318	(0.0129)	0.0238	(0.0216)	-0.000966	(0.0129)
(18) cc	-0.506	(0.704)	-1.392	(1.831)	-0.581	(0.713)
(19) ce	-0.530+	(0.274)	-0.294	(0.907)	-0.513+	(0.280)
(20) commimp	-0.137	(0.317)	-0.111	(0.511)	-0.135	(0.285)

Note. Each row corresponds to a model with the outcome variable listed in the first column. The first section lists results from the original categorical *govstructure* specification. The second section lists results for the two alternate specifications, categorical *govstructure1* and binary *govstructure2*. Additional predictors from the original govstructure specification were included in each model but are not shown here. Models 1-17 are linear random effects regression. Models 18 and 19 are logistic random effects regression models. Model 20 is a Poisson random effects regression.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Appendix I. Fixed-Effects Factor Regression Results by Institution Type

Factor Fixed-Effects Models for MSIs

Independent variable	(1) accessafford	(2) success	(3) workecon	(4) commimp
pubfund	0.0371***	-0.0110	0.00456	0.00306
	(0.00701)	(0.0148)	(0.00585)	(0.0208)
revenue_fte	-0.0184	-0.00743	-0.00430	-0.0252
	(0.0144)	(0.00896)	(0.0101)	(0.0172)
federal_pct	0.0796+	0.00212	0.00363	0.0243
	(0.0395)	(0.0332)	(0.0167)	(0.0435)
fte	0.000592			0.0264**
	(0.0115)			(0.0101)
admitrate	-0.00309	-0.00490	0.0137*	
	(0.00790)	(0.00392)	(0.00478)	
instate_pct	-0.0115			
	(0.0253)			
netprice		-0.911		
		(0.737)		
gradrate_all		0.000792	0.0327**	
		(0.00818)	(0.00947)	
landgrant				-0.233
				(0.816)
_cons	-0.430	1.753	-3.310**	
	(2.288)	(1.018)	(1.015)	
n	60	60	60	54
adj. R-sq	0.493	0.383	0.605	

Note. Models 1-3 are linear fixed effects regression. Model 4 is a Poisson fixed effects regression.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Factor Fixed-Effects Models for HBCUs

Independent variable	(1) accessafford	(2) success	(3) workecon	(4) commimp
pubfund	0.0300	0.0143	-0.0576+	-0.0480+
	(0.0278)	(0.0276)	(0.0285)	(0.0280)
revenue_fte	-0.0544	-0.0138	0.0309	0.0282
	(0.0353)	(0.0177)	(0.0225)	(0.0199)
federal_pct	0.0435	0.0267	-0.0859	-0.181
	(0.0351)	(0.0666)	(0.0640)	(0.125)
fte	-0.108			0.152+
	(0.0751)			(0.0860)
admitrate	-0.00841	-0.00269	-0.00799	
	(0.00539)	(0.00875)	(0.0133)	
instate_pct	-0.0252			
	(0.0166)			
netprice		-2.067		
		(1.530)		
gradrate_all		0.0104	0.00890	
		(0.0349)	(0.0381)	
landgrant				-0.155
				(0.235)
_cons	3.743	0.688	3.594	
	(2.183)	(2.677)	(3.316)	
n	37	37	37	15
adj. R-sq	0.735	-0.396	-0.016	

Note. Models 1-3 are linear fixed effects regression. Model 4 is a Poisson fixed effects regression.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Factor Fixed-Effects Models for RCUs

Independent variable	(1) accessafford	(2) success	(3) workecon	(4) commimp
pubfund	0.0213*	-0.00122	-0.00922	0.0120
	(0.00855)	(0.00599)	(0.0123)	(0.00869)
revenue_fte	-0.000902	0.00723	-0.00414	0.000407
	(0.00811)	(0.00504)	(0.00573)	(0.00406)
federal_pct	0.0842***	0.0266**	-0.000528	-0.00308
	(0.0113)	(0.00928)	(0.00934)	(0.0119)
fte	-0.0111			0.0420***
	(0.00667)			(0.00902)
admitrate	0.00255	-0.00375	0.00125	
	(0.00261)	(0.00312)	(0.00283)	
instate_pct	-0.00452			
	(0.00429)			
netprice		-0.119		
		(0.497)		
gradrate_all		-0.00794	0.0336***	
		(0.00681)	(0.00551)	
landgrant				-0.0790
				(0.375)
_cons	-1.556**	0.167	-1.360+	
	(0.526)	(0.660)	(0.750)	
n	339	338	332	332
adj. R-sq	0.536	0.436	0.603	

Note. Models 1-3 are linear fixed effects regression. Model 4 is a Poisson fixed effects regression.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses

Factor Fixed-Effects Models for Research Institutions

Independent variable	(1) accessafford	(2) success	(3) workecon	(4) commimp
pubfund	-0.0315+	-0.0370+	0.0113	0.000505
	(0.0184)	(0.0187)	(0.0136)	(0.0109)
revenue_fte	-0.00645	-0.00835	-0.00480	0.00180
	(0.00838)	(0.00796)	(0.00463)	(0.00591)
federal_pct	0.0387	0.00418	0.0113	0.000758
	(0.0252)	(0.00923)	(0.0208)	(0.0257)
fte	-0.0141			0.00557
	(0.0145)			(0.00990)
admitrate	0.0104	-0.00123	0.00587	
	(0.01000)	(0.00659)	(0.00523)	
instate_pct	0.0230			
	(0.0143)			
netprice		-1.534+		
		(0.756)		
gradrate_all		-0.0100	0.0408***	
		(0.0125)	(0.00937)	
landgrant				0.236+
				(0.123)
_cons	-2.334*	2.980*	-3.398***	
	(0.857)	(1.265)	(0.816)	
n	76	76	76	61
adj. R-sq	0.279	0.706	0.627	

Note. Models 1-3 are linear fixed effects regression. Model 4 is a Poisson fixed effects regression.
+$p < 0.10$, *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$; Clustered robust standard errors in parentheses