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The Financial Health Of R2, Land-Grant Universities: The Relationship Of Government Appropriations And Other Major Revenue Streams On Overall Financial Health

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THE FINANCIAL HEALTH OF R2, LAND-GRANT UNIVERSITIES:
THE RELATIONSHIP OF GOVERNMENT APPROPRIATIONS AND
OTHER MAJOR REVENUE STREAMS ON OVERALL FINANCIAL HEALTH

by

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A Dissertation

Submitted to the Graduate Faculty

of the

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in partial fulfillment of the requirements

for the degree of

Doctor of Philosophy

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December
2022

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To my children Kinlee, Avery, Nora, and Andersen

May all your dreams come true!

ABSTRACT

College and university administrators must be able to process large amounts of financial information quickly and be able to communicate information about financial performance to governing boards. Financial ratio analysis provides a framework for administrators to identify financial and operational concerns as well as variances from institutional plans and policies. Modern financial ratio analysis in the higher education industry relies on a set of standard ratios that comprise the Composite Financial Index (CFI). With more frequent debilitating economic events such as the Great Recession and the COVID-19 pandemic and the predicted enrollment cliff on the horizon, college and university administrators must be able to interpret financial information quickly and be able to respond strategically to aid in the continuity of operations and to ensure the financial health of the institution under extraordinary circumstances. This study examined the relationship of institutional financial health as measured by the CFI to four major revenue streams in six high-research, land-grant institutions over a five-year period leading into the COVID-19 pandemic. This research found that the four revenue streams of interest did not have any statistically significant relationships to institutional financial health, however, that there was a statistically significant increase in financial health between fiscal years 2020 and 2021.

CHAPTER I

INTRODUCTION

Land-grant universities have had a tremendous impact on the education of Americans since their inception with the passage of the Morrill Act of 1862. These important universities have not only increased the population of the areas where they are located, but also contribute to the higher incomes and home values belonging to a younger and more educated populace (Mack & Stolarick, 2014). Even though land-grant universities have thrived and become important economic engines both locally and nationally, these universities are not shielded from the tremendous impacts that economic downturns have on colleges and universities. In particular, the housing crisis and the Great Recession of 2008 affected American society over the next decade in many ways. One of those ways was how an already high-priced and rising cost of a postsecondary education continued to outpace the level of national inflation (Glater, 2007). Between 2007/08-2017/18, the price of an education at a public institution of higher education (IHE) rose 31% (*The NCES Fast Facts Tool Provides Quick Answers to Many Education Questions*, n.d.). Why has the price of higher education increased so much? There are many reasons, but a significant contributing factor to the increased price of a college education is declining government support through decreased financial appropriations stemming from those recessionary impacts (Griswold & Marine, 1996).

Recessions realign the way that governments spend their money, leading to direct impacts on the way that publicly funded colleges and universities operate. Barr and Turner (2013) found that the Great Recession dramatically altered the tuition rates that private individuals paid for a college education, which represented a drastic reduction in

state support. In a recession, the economy scales back as taxpayers lose their jobs and the government collects less taxes from its citizens (Edgmand et al., 1996). As a result, public programming will realize setbacks as government officials work to balance budgets with smaller revenue pools.

Often, public institutions of higher education (IHEs) are easy targets for cuts to appropriations. There is the public perception that a college education is a luxury (Pasquerella, 2019). Also, IHEs have a unique ability to generate large amounts of revenue via *de facto privatization* in other ways compared to other agencies of State government (Lyll & Sell, 2006).

Recessions also present public IHEs with challenges in their ability to stay afloat and maintain existing levels of programming as they face the threat of declining state appropriations. According to Brint et al. (2016), the “keys to surviving and thriving for a large, public university during a recession include enrollment growth, tuition increases, and the recruitment of out-of-state and international students” (p. 880). Raisanen and Birkeland (2016) had similar findings with their research focusing on the relationship between undergraduate borrowing and state appropriations. Their research suggested that one of the most common ways for IHEs to recover these lost appropriations is through increases to tuition and fees.

Koshal and Koshal (2000) researched the relationship between state appropriations and tuition rates and found that the association between them indicated a strong, negative relationship. In other words, as state appropriations decline, tuition rates rise. As a result of an economic recession, both resident and non-resident students are at greater risk of paying higher prices for a college education. Most often, non-residents pay

higher tuition rates, and those rates are subjected to larger and more frequent increases. As appropriations decrease and the rates of tuition increase, how do students pay for the rising cost of college? Raisanen and Birkeland (2016) found that students will borrow more to pay for higher tuition rates in response to a university charging more when appropriations decrease.

State policy makers look for ways to keep the cost of education down for resident students by subsidizing the resident cost with higher non-resident rates (Jaquette & Curs, 2015). Politically, it is imperative that state lawmakers and public IHEs keep tuition rates lower for resident students as legislators tend to make decisions that will increase their likelihood of being re-elected (Coughlin & Ereksen, 1986). Targeting the higher paying non-resident students keeps the price of education low for resident students.

Tuition increases, however, are not always the result of decreased state funding. When this happens, an interesting phenomenon occurs as policymakers try to keep IHEs both accountable and affordable. Boatman and L'Orange (2006) documented how elected officials in some states used threats to punish high tuition at colleges and universities by reducing future appropriations. These trends of high tuition and record spending have led to greater calls from lawmakers for more accountability in public higher education.

Accountability for Better Results (2005) was a report issued at a time when increasing calls for more accountability in higher education became more prevalent. This important report, prepared by the State Higher Education Executive Officers (SHEEO), highlighted many of the reasons why more accountability was important for the future of higher education. These reasons include low 6-year graduation rates, low enrollment rates of minorities, and rising prices and overall costs versus stagnant state and federal support.

This report found that it is critical to the accountability process for IHEs and state leaders to “create data systems, establish goals, create policies to coordinate resources to focus on public policies, and to monitor results” (p. 16). Accountability in higher education is still a hot topic today as one organization, the Brookings Institution, outlined in their report on accountability and performance in higher education a tool that would help organizations explore accountability metrics (Restrepo & Turner, 2021).

The calls for greater accountability just prior to the Great Recession led many states to put into place performance funding mechanisms, although performance funding had been around since the 1970s with the state of Tennessee implementing the first performance-based system in the United States (Bogue & Johnson, 2010). Performance funding is a mechanism that ties state support for higher education to key metrics such as graduation rates, enrollment of minorities, and job placement rates. Today, performance-based funding either exists or has existed in some form in 41 of the 50 American states (Ortagus et al., 2020). Some research has shown that performance-based funding fails to produce the intended results or perhaps even leads to unintended consequences. For example, in states that were having a difficult time balancing budgets, performance-based systems have been suspended or discontinued as those states were unable to meet obligations (Dougherty et al., 2012).

Lawmakers use policies such as performance-based funding packages to influence the operations and decision-making of public IHEs to keep college education affordable. Ultimately, these decisions affect affordability and impact the accessibility of disadvantaged groups such as minorities or first-generation students as well as increasing the student debt load for all students who fund their education with student loans.

Jaquette and Curs (2015) studied the relationship between state appropriations and non-resident enrollment and found that IHEs that lose state funding increase their tendency to behave like private institutions and focus their efforts on the recruitment of higher paying non-resident students. In these situations, IHEs must recover their lost revenue by focusing their recruitment and enrollment efforts on the higher paying non-resident. Instead of the state government subsidizing the cost of the resident student, non-resident students end up contributing a greater share of tuition towards overall revenues to make up for those revenue deficiencies. As a result, non-resident students are more likely to incur a greater burden of student debt.

During the Great Recession, birth rates started to decline as the economy struggled, and as a result college enrollments were predicted to shrink by more than 15% by 2025 (Kline, 2019). While many experts predicted that the decline would be short-term in nature, the birth rate has not yet rebounded. This presents many challenges for IHEs in terms of how to maintain current programming levels while faced with an uncertain future and revenue shortfalls. With a decreasing pool of students that annually enroll each fall, competition among IHEs increases for the recruitment, enrollment, and retention of both resident and non-resident students. Institutions that struggle in these areas will have to search for new ways to maintain existing levels of financial health.

Financial health can be a good indicator of an institution's ability to handle periods of economic uncertainty. Doti (2013) researched the financial characteristics of private universities with high net asset growth. Fischer et al. (2015) researched the same topic but focused on public IHEs. Like Doti, Fischer et al., found that financially healthy IHEs tended to have "high net assets, large student bodies, high tuition revenue and

tuition per full-time equivalent (FTE) student, steady investment returns, low operating expenses per FTE student, and lower net losses” (p. 158). What is not clear, however, is how public support and other key financial performance indicators for IHEs impact the overall financial health of colleges and universities.

Statement of the Problem

State support for higher education has been on the decline since before the Great Recession and in the years since, even though the economy had recovered up until the onset of the COVID-19 pandemic that surfaced in 2020. Between 2008 and 2018, state appropriations to IHEs fell by 13% when adjusted for inflation (Mitchell et al., 2019). Recent reductions of state appropriations fueled a significant increase in the overall cost of education for students as IHEs rely on other sources of revenue, such as increases to tuition and fees, to offset the losses realized from cuts to their state appropriations.

As IHEs continue to adjust their operating model to find efficiencies to keep the cost of education down for students while compensating for state revenue losses, uncertainty remains as the threats of economic collapse from unpredictable circumstances such as the COVID-19 pandemic or from the looming enrollment cliff that continue to stress college and university finances. The uncertainty has important implications for other revenue streams such as federal appropriations and research revenues.

Unfortunately for students, an easy and popular way for universities to generate revenue to cover losses is to raise tuition and fees and to look at strengthening these other revenue streams (Barr & Turner, 2013). This practice has shifted the burden of funding higher education from “the states to the students” (p. 169), and has been referred to as the *de facto privatization* of public universities in the United States (Lyall & Sell, 2006).

The focus of public universities to operate more like private universities by increasing tuition and fees for reasons other than losses to state funding do not come without consequences. Raisanen and Birkeland (2016) found that lawmakers may be incentivized to make cuts to future appropriations if IHEs raise the cost of education even when maintaining levels of state appropriations. For this reason, institutions that are struggling to maintain levels of financial health that are up to industry standards have limited options to strengthen their financial position through revenue increases without fear of losing future state funding in response. Looking forward, college and university administrators will look for ways to use financial ratio analysis to help find alternative ways of strengthening financial health without those tuition increases that jeopardize future levels of state appropriations.

Conceptual Framework

State appropriations and other revenue streams fluctuate for many reasons, and these revenue streams can have an influence on the behavior of IHEs as they seek to compensate for lost revenue to minimize the impacts to financial health. Typical responses to declines in state appropriations include diversifying revenues, streamlining costs, and adopting technology (Lyll & Sell, 2006). Weerts and Ronca (2008) examined state higher education appropriations from three perspectives: rational, political, and cultural. They found that the reasons for fluctuations in state support of higher education are many, but that those forces affecting the allocation are largely in play at the state level and out of the control of the university. What can be done, however, is regular monitoring of financial health and performance through ratio analysis to help influence decision-making to achieve greater strategic results.

Financial ratio analysis has been around for decades as organizations have searched for systematic ways to assess financial health. According to Tahey et al. (2010), “ratio analysis is a method of financial review that measures and analyzes financial information” (p. 109). Furthermore, “ratio analysis can measure success factors against institution-specific objectives and provide the institution with the tools to improve its financial profile to carry out its mission” (p. 109).

Altman (1968) was the first to find ratio analysis an effective tool at assessing the financial condition of entities. The methodology was applied to the higher education industry with Dickmeyer and Hughes (1979) framework for analyzing the financial health of colleges and universities. These researchers used several ratios to assess the financial health of eight small, private colleges and found them useful at providing information pertaining to financial strength, risk, and financial and non-financial resources. Although their research found usefulness in the ratio analysis method and its ability to inform financial policy, they concluded that no specific set of ratios comprehensively measured financial health. Other researchers have also shown how critical understanding financial health is to understanding a university’s overall condition (Cirtin & Lightfoot, 1996; Jenny & Minter, 1993), with the Composite Financial Index (CFI) being one of those critical, financial ratio tools available to understanding financial health.

The CFI was “developed in 1980 by predecessor firms of KPMG to help colleges, universities, and their stakeholders use a set of common financial ratios to better understand and interpret financial statements” (Tahey et al., 2010, p. iv). According to them, the purpose is to help strategic decision making by monitoring financial health and

managing financial risks through ratio analysis calculated over several years. The CFI focuses on four strategic financial ratios:

- Primary Reserve Ratio: Measures financial health by analyzing whether resources are sufficient and flexible enough to support the mission.
- Viability Ratio: Measures the effectiveness of strategic debt management.
- Return on Net Assets Ratio: Measures whether asset performance and management support the strategic direction.
- Net Operating Revenues Ratio: Measures whether the institution is operating within available resources.

Together, these four ratios are widely accepted as an industry benchmark indicating institutional financial health. Institutional leaders can apply this measure to determine the extent to which a university is appropriately resourced and able to achieve its strategic mission.

Purpose of the Study

The purpose of this quantitative study was to examine the utility of the Composite Financial Index (CFI) in helping public colleges and universities, specifically Carnegie R2, land-grant universities, respond strategically to changes in major funding sources such as government appropriations, auxiliaries, and non-resident enrollment. A primary focus of this research centered on debilitating economic events such as the 2008 Great Recession and the COVID-19 pandemic.

Research Questions

The research questions for the study were:

- 1) What is the difference over time between state appropriations and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 2) What is the difference over time between auxiliary enterprise revenues and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 3) What is the difference over time between federal revenues and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 4) What is the difference over time between out-of-state enrollment and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 5) What were the observed trends of the COVID-19 pandemic to the financial health, as measured by the CFI, of high research activity land-grant universities?

Rationale for the Study

The attention to declining state appropriations in recent decades is widespread, as are the reasons for those declines and the subsequent institutional and societal impacts. The tendency of the institutional response to those declines is to focus on developing other revenue sources such as research enterprises or increasing tuition for non-residents. Recent trends in demographic data such as the declining birth rate following the Great Recession and the ensuing enrollment cliff indicate that financial challenges will continue into the future (Kline, 2019). In response, IHEs will need to be efficient and effective in

their deployment of financial resources. The results of this research study help public universities in their strategic decision-making by providing guidance of where resources, financial and otherwise, might be deployed to be most effective in their financial responses to fluctuations in funding levels of government appropriations and other major revenue streams.

Significance of the Study

IHEs are faced with difficult prospects of maintaining levels of educational programming while being stymied by both stagnant revenues and costs of education that continue to grow at a pace that exceeds inflation. The CFI gives financial administrators and professionals a set of tools to analyze the financial health and performance of today's IHEs so that they can enhance financial decision-making to align with strategic plans to be responsive to circumstances beyond their control. With the information yielded from the study, those who administer university finances will efficiently and effectively guide their institution to make informed decisions that will help to minimize the impacts that revenue losses (primarily to government appropriations) will have on overall institutional financial health.

Definition of Terms

The following definitions were used for key terms in this study:

Composite Financial Index (CFI). A financial metric that assists IHEs in the financial analysis component of strategy setting and risk management (Tahey et al., 2010). The CFI is comprised through a unique calculation involving four individual ratios: the Return on Net Assets Ratio, the Viability Ratio, the Primary Reserve Ratio, and the Net Operating Revenues Ratio. Collectively, when these ratios are calculated to

their corresponding strength factors and weighting factors, the CFI gives IHEs and their management the ability to understand their financial position to a greater extent that will allow them to strategize and more effectively allocate resources towards achieving the institutional mission.

Change in Net Assets. For public IHEs, the change in the Governmental Accounting Standards Board (GASB) total net assets plus the change in the Financial Accounting Standards Board (FASB) component unit net assets regardless of expendability or restriction (Tahey et al., 2010). The Statement of Revenues, Expenses, and Changes in Net Position (for GASB institutions) or the Statement of Activities (for FASB component units) reports this information.

Expendable Net Assets. Those assets the institution can access quickly and spend to meet its operating and capital requirements (Tahey et al., 2010). For public GASB institutions, expendable net assets include all unrestricted net assets and all expendable restricted net assets, excluding those to be invested in plant, plus unrestricted and temporarily restricted net assets. For FASB component units, expendable net assets excludes net investment in plant and those temporarily restricted net assets that will be invested in plant (Tahey et al., 2010).

Long-term Debt. Amounts borrowed and outstanding that traditionally include items from the financial statements such as bonds payable, notes payable, notes, and capital leases. In addition, non-traditional financing methods through affiliated foundations and subsidiaries such as long-term operating leases are also considered long-term debt. Overall, all obligations that use an institutions long-term debt capacity, even if

not included on the balance sheet or disclosed in the notes to the financial statements should be included in the definition (Tahey et al., 2010).

Operating Income (Loss). Includes revenue and expenses from operations in addition to non-operating revenue and expenses such as government appropriations, investment income, gifts, and interest in plant debt since these support university operations (Tahey et al., 2010). Items excluded from operating income (loss) include plant and endowment gifts and capital appropriations. For public institutions, operating income (loss) can be found in the Statement of Revenues, Expenses, and Changes in Net Position for those institutions reporting under GASB and in the Statement of Activities for component units reporting under FASB.

Operating Revenues. GASB total operating revenues plus net nonoperating revenues, excluding capital appropriations and gifts and additions to permanent endowments, plus FASB component units' total unrestricted revenues, gains and other support, including net assets released from restrictions. Investment gains or losses are excluded from operating revenues, except for endowment payout and working capital investment gains or losses (Tahey et al., 2010).

Total Expenses. For public institutions, comprises all expenses on a GASB basis in the Statement of Revenues, Expense and Changes in net Position, including operating expenses and nonoperating expenses such as interest expense, plus FASB component unit total expenses in the statement of activities. Investment losses should be excluded from expenses for both the institution and its component units (Tahey et al., 2010).

Total Net Assets. The beginning of the year total net assets that can also be found in the GASB statement of revenues, expenses and changes in net assets and the FASB component unit statement of activities (Tahey et al., 2010).

Overview of the Composite Financial Index

The first publication of the CFI came through a report referred to as *Ratio Analysis in Higher Education* in 1980 by predecessor firms of KPMG (Tahey et al., 2010). Subsequent editions issued in 1982, 1995, 1999, 2002, 2005, and 2010 marked the beginning of collaborations between KPMG and other firms such as Prager, Sealy & Co., LLC and Attain LLC. A smaller edition was also issued in 2016 that updated many important formulas from the 2010 report, notably expendable net assets. The 2010 edition of this report, *Strategic Financial Health for Higher Education*, will be the focus of this research.

Core Ratios of the CFI

Broadly speaking, the CFI consists of four individual ratios that as a whole measure institutional financial health when weighted and combined. The first ratio, the Primary Reserve Ratio, seeks to provide information whether “institutional resources are sufficient and flexible enough to support the university’s primary mission” (Tahey et al., 2010, p. 86). This ratio measures expendable net assets compared to total expenses. The Primary Reserve Ratio for public institutions can be calculated as follows:

$$\text{Primary Reserve Ratio} = \frac{\text{Expendable Net Assets} + \text{Component Unit Expendable Net Assets}}{\text{Total Expenses} + \text{Component Unit Total Expenses}}$$

Goldstein (2019) provides that the minimum score for this ratio that would indicate financial health is 0.40x. CFI standards suggest that a Primary Reserve Ratio of

.40x or better is an indicator of financial health and that institutions will have more financial flexibility when it comes to meeting strategic priorities.

A 0.40x ratio equates to about 5 months of being able to cover operating expenses without taking on other external cash streams to cover short-term expenses. Ratios less than this threshold suggest that IHEs will have less buying power when it comes to strategic investments and more at risk to adverse financial events.

The second ratio in the CFI is the Viability Ratio. The Viability Ratio “measures how well an institution manages debt resources to advance the mission” (Tahey et al., 2010, p. 86). This ratio measures expendable net assets to plant related debt and can be calculated as follows:

$$\text{Viability Ratio} = \frac{\text{Expendable Net Assets} + \text{Component Unit Expendable Net Assets}}{\text{Plant Related Debt} + \text{Component Unit Plant Related Debt}}$$

Unlike the Primary Reserve Ratio, the Viability Ratio does not have a set standard that institutions should be benchmarking against when developing institutional strategy. Institutions should develop their own targets when planning to allow themselves to meet institutional objectives. However, like the Primary Reserve Ratio, as the ratio threshold decreases so does an institution’s ability to meet financial obligations. They are more likely to become financially strained. Although according to Tahey et al. (2010), many IHEs do operate at those minimum levels and are able to effectively manage their resources to meet institutional goals. However, according to Goldstein (2019), the minimum Primary Reserve Ratio for an institution to be considered financially healthy is 1.25x, meaning that reserves exceed debt obligations by one quarter.

The third ratio of the CFI is the Return on Net Assets Ratio. The goal of the Return on Net Assets Ratio is to assess whether “asset performance and management

support the strategic direction” (Tahey et al., 2010, p. 86). From a financial perspective, this ratio measures performance based on total economic return. This ratio can be calculated as follows:

Return on Net Assets Ratio

$$= \frac{\text{Change in Net Assets} + \text{Component Unit Change in Net Assets}}{\text{Total Net Assets} + \text{Component Unit Total Net Assets}}$$

Interestingly, a decline in this ratio is not necessarily cause for concern as there might be legitimate reasons for the decline such as a declining economy or a large allocation of resources with a focus on institutional mission. The minimum standard that institutions must achieve to be financially healthy under this ratio is 6%, meaning that net assets have increased by 6% from the beginning of the year (Goldstein, 2019).

The final ratio of the CFI is the Net Operating Revenues Ratio. The Net Operating Revenues Ratio determines if “an institution is living within its available resources” (Tahey et al., 2010, p. 86). The Net Operating Revenues Ratio can be calculated using the following formula:

$$\begin{aligned} & \text{Net Operating Revenues Ratio} \\ & \text{Operating Income (Loss) + Net Non Operating Revenues} \\ & = \frac{\text{(Expenses) + CU Change in Unrestricted Net Assets}}{\text{Operating Revenues + Nonoperating Revenues +}} \\ & \quad \text{Component Unit Total Unrestricted Net Assets} \end{aligned}$$

The Net Operating Revenues Ratio is what is referred to as a “primary indicator” (Tahey et al., 2010, p. 127), meaning that its components (i.e. operating income) affects the three other ratios of the CFI. The relationship is based on how operating income (loss) is related to net assets. If there is a surplus in operating income, then net assets will increase. The individual components of this ratio can be found within the Statement of Revenues, Expenses, and Changes in Net Assets (SRECNA) for public, GASB

institutions. FASB component unit information can be found in the Statement of Activities.

If the Net Operating Revenues Ratio is positive, it corresponds to an operating surplus for that year (Tahey et al., 2010). If the ratio is negative, it means that it was operating at a deficiency. Generally, an operating surplus means that that institution was operating within the means of its available resources. Institutions should be careful to monitor that they are not underspending resources when it comes achieving their institutional mission so that they are fully leveraging their available resources. At a minimum, financially healthy institutions should have a Net Operating Revenues Ratio of 2%, meaning that operating revenues exceed operating expenses by that mark (Goldstein, 2019).

Chapter Summary

This chapter provided the background and rationale for this research study. It outlines not only the research questions that the study seeks to answer, but it also gives a brief overview into the conceptual framework and significance of the research. Using ratio analysis and the CFI as a tool for financial management is one of the many important instruments that finance administrators must use in their portfolio of methodology to manage the day-to-day operations of the large, complex organizations that colleges and universities have become. This research is important because it will enable university administrators to make more informed decisions on where to strategically focus their financial assets in response to declining government appropriations and the changing financial environment that IHEs are faced with in the modern age of education. In addition, lawmakers at the state level will be able to use this

information to make better, informed decisions on whether their funding priorities for IHEs strategically align with both their own and constituent desires for how higher education is funded within their legislative districts.

The next chapter focuses on the theoretical framework that surrounds this research. It includes an overview of the current literature in the field supported by research and other guidance that can help guide IHEs through periods of financial distress. Chapters 3-5 will discuss the methods used in this study, the results of the quantitative analysis, and a discussion on the results and how they pertain to each of the research questions. Throughout this research review, the importance of the CFI as a tool for financial management will be used to guide the framework.

CHAPTER II

LITERATURE REVIEW

A college education is an important milestone in the emotional and intellectual development of our youth. For some individuals, the opportunity that a college education represents may never come to fruition. Many factors influence whether students ever make it to college, and many of those factors may have an impact on whether students succeed and graduate. Some of these factors, such as socio-economic status and first-generation status, are part of the reason why many potential college students have a more difficult time navigating the higher education system and achieving their dreams (Jury et al., 2017). The cost of higher education and the families these students are born into, unfortunately, impacts their likelihood of collegiate success when compared to students who are born to college educated parents (Burger & Naude, 2019).

A challenging theme to modern higher education that limits the rates of success for students is the rising cost of college, often at rates that exceed the national rate of inflation (Johnstone, 2016). These challenges are exacerbated as colleges and universities look for ways to raise revenue to maintain service levels to offer the most attractive experience that contemporary college students expect. The role that state and federal governments play for public IHEs is to subsidize the cost of education to keep the overall cost affordable, specifically to keep higher education in reach for the most vulnerable populations who are more likely to be price sensitive. Federal revenues for IHEs primarily consist of direct support to the university through research grants and contracts and other appropriations (ie. Coronavirus Aid, Relief, and Economic Security Act, or CARES), or through student financial aid such as Pell Grants and federal student loans

(Two Decades of Change in Federal and State Higher Education Funding, 2019). State support for higher education is largely in the form of general-purpose appropriations, but support for students through aid grants and direct appropriations for specific purposes such as agriculture and medical purposes also represents a portion of state budgets (*Two Decades of Change in Federal and State Higher Education Funding, 2019*). For this research, state appropriations and federal revenues will not include those revenues tied to student support for education.

This chapter reviews federal and state support for IHEs primarily through the history of land-grant legislation and relevant research in the field of higher education finance as it pertains to this study. These topics represent part of the relationship between the financial health of land-grant institutions, state support for higher education, and other key financial indicators. Specifically, the review covers several topics including a brief overview of the history of land-grant legislation, state support of higher education, the history of financial health in colleges and universities, performance funding, the financial health theoretical framework of this research, scholarly research that utilizes the CFI, and tools of the CFI to test state support to higher education.

Review of Land-grant Legislation

The following sections review the history of land-grant legislation enacted to proliferate the expansion of higher education across the United States and the methods used in the calculation of the CFI as an indicator of financial health.

The expansion of the United States in the mid-19th century from the east coast to the west coast of America proliferated new states and territories, where it became imperative that the federal government look for ways to encourage the education of a

migrating population in the arts of agriculture and mechanics. In what would become known as land-grant institutions, the mission of these institutions focused on three pillars: teaching, research, and extension (Croft, 2019). Today, there are 112 land-grant institutions that were formed through the legislation (Croft, 2019). With the expansion across America, land-grant institutions were formed with the 1862 Morrill Act (57 institutions), the 1890 Morrill Act and its focus on Historically Black Colleges and Universities (19 institutions), and the Equity in Educational Land-Grant Status Act of 1994 and its focus on Native American serving colleges and universities (36 institutions) (Croft, 2019).

The Morrill Act of 1862

On July 2nd, 1862, President Abraham Lincoln signed into law legislation that would lead to the creation of new colleges and universities across the United States (Croft, 2019). The Morrill Act, as it would come to be known, was the fruition of over eight years of political struggles and jockeying by Justin S. Morrill and other politicians that set aside 30,000 acres of land, most often within each state, for every U.S. Senator or Representative serving those states (Croft, 2019). Because of this and due to the population differences between the states, some were the beneficiaries of much larger endowments than the others. There were limits to the size of the gift, however, in that the grants could not exceed 1 million acres (*The Land-Grant Tradition*, 2012). These land gifts to the states would be sold and the proceeds would be placed into an endowment where only the interest would be used to support higher education focused on the agricultural and mechanical arts (*The Land-Grant Tradition*, 2012).

The legislation did not have many restrictions, but there was one important restriction on how the money could be spent and several other regulations pertaining to eligibility. The only restriction placed on how the money could be spent from the first Morrill Act was that it was not to be used to purchase, repair, or erect any buildings or to purchase land (*The Land-Grant Tradition*, 2012). There were some additional stipulations that regulated how the money be managed. If any portion of the endowment was lost, it would have to be replaced by the state. If the interest accumulated did not exceed 5%, the state would have to make up the difference. Also, if the state did not establish a college within the first five years of the act, then the funds would have to be returned. There would also have to be an annual report filed regarding both progress and how the funds were spent, one of the first instances of institutional accountability required by the Federal government. Unsurprisingly, because this Act was passed during the Civil War, those Confederate states who were at war with the U.S. government were not entitled to the funds, but the legislation was later amended to include those states.

The sale of the lands were distinct from state to state. Although the Act specifies that the lands be sold for \$1.25 per acre which was the standard government price at the time, the actual proceeds varied greatly (Williams, 1991). Prices for the land ranged from \$.40 cents per acre to over \$5.00 per acre. In total, the Morrill Act distributed 17,430,000 acres of land.

Land-grant colleges and universities were initially slow to develop and primarily held back by the Civil War. By 1870, there were 37 colleges that had opened their doors or were close to it (Williams, 1991). Williams goes on to say that these colleges in the early days were not very successful. Enrollments lagged and growth was slow. There

were lots of preparatory courses and dropouts were high. These colleges and the professoriate were plagued by tough working conditions and low wages. The life endured at these universities was not the glamour enjoyed by the Ivy Leagues of the East Coast, but better times did lie ahead. An amendment to this Act in 1866 allowed added time for states to establish their colleges and for new states to be eligible for the benefits.

The Hatch Act of 1877 and Smith-Lever Act of 1914

Campbell (1998) described the importance of research to the land-grant mission, and how it became imperative that the new colleges formed out of the 1862 Morrill Act expand beyond classroom teaching to advance educational opportunity. The Hatch Act of 1877 established agricultural experiment stations through an annual federal appropriation of \$15,000 that would be used to support agriculture research initiatives at the land-grant institutions. Their research and new knowledge would then be dispersed to the public and agricultural community through partnerships with Cooperative Extension Services that became possible through the eventual passage of the Smith-Lever Act of 1914 (Campbell, 1998). Through the Smith-Lever Act, each state was to be appropriated \$10,000 annually for the support of the extension services that was to not exceed 50% of their total operations. The remainder of operational funding was to come from local sources.

The Morrill Act of 1890

The Second Morrill Act was passed on August 30, 1890, and was an important extension of the first Morrill Act in that it provided federal support for higher education that went beyond the agricultural and mechanical arts and now included other general academic programs (Williams, 1991). Each state or territory that was previously eligible

under the 1862 Act would now receive an annual appropriation of \$15,000 that would increase by \$1,000 every year for 10 years to a maximum of \$25,000 (Campbell, 1998). This Act provided a great deal for the benefit of underprivileged groups such as Native Americans and African Americans as it carried specific policy against exclusionary admission practices. The 1890 Morrill Act specifically barred those institutions that had policies which limited or prohibited admissions to disadvantaged groups from receiving funds. In all, Campbell states that the 1890 legislation did a great deal to strengthen educational opportunities to African Americans with the establishment and support of eighteen African American land-grant institutions. Many of these colleges today are known as HBCU's, or Historically Black Colleges and Universities.

Coupled with the passage of the Hatch Act of 1877 which established agriculture experiment stations and annual \$15,000 payments for their operations, the Second Morrill Act helped stimulate growth (Williams, 1991). By 1900, there were over 19,000 students and 65 colleges operating under the land-grant program. The combination of these two Acts did a great deal to expand higher education opportunity. Through the Hatch Act, there was a heavier emphasis on federally supported research. This legislative emphasis provided greater opportunity for both national and local economic growth and for students to become researchers themselves and to take their studies to the field. With the added flexibility for land-grant colleges to spend money on programs other than agriculture and mechanics, the 1890 Act stimulated growth in other fields such as science, math, and teaching.

The Nelson Amendment of 1907

The Nelson Amendment of 1907 provided additional funding to land-grant institutions that were previously established under the Acts of 1862 and 1890. This amendment provided an additional \$25,000 of support to enhance the agricultural mission of these institutions. Added together with the funding provided from the 1890 Morrill Act, there was over \$50,000 of direct federal aid supporting agricultural education in almost every state (United States, 1925).

Equity in Educational Land-Grant Status Act of 1994

In 1994, federal legislation was passed to establish a Native American Institutions Endowment Fund that would allow institutions to receive payments based on a statutorily established formula from interest earned (Croft, 2019). This legislation added 36 Native American IHEs to the overall count of land-grant institutions. While this was a big step in terms of equity, these institutions receive a much smaller share of federal funding than the 1862 or 1890 institutions, with the average funding per institution coming in at only \$100,000 (Croft, 2019).

State Support for Higher Education

State support for higher education is a common funding mechanism found in the American higher education system. State support for higher education is a complex topic that has seen considerable research in the past, particularly in times where there have been economic recessions. This review breaks down the state support literature into the following sections: Reasons for State Support for Higher Education, Declines in the State Support for Higher Education, and the Institutional Responses to Declines in State Support for Higher Education.

Reasons for State Support of Higher Education

State support for higher education is rooted in the need to increase the access and opportunity for education, particularly for those students who come from disadvantaged backgrounds. At the core, there are three basic ways that states fund higher education (Hauptman, 2011):

1. State appropriations;
2. Setting tuition policy, directly or indirectly; and
3. State funded student award programs.

Declines to state support in the form of appropriations have been prevalent in recent years, but other forms of state support (i.e. student financial aid) have seen increases. According to the State Higher Education Executive Officers Association (2021), state public financial aid per FTE increased 7% from 2019 to 2020. For this research, state support for higher education was limited to state appropriations that are not student financial aid.

Historically, up until the passing of the G.I. Bill in 1944 and the unprecedented growth that followed it, state support for higher education was meant to keep the cost for students at public institutions either at “low or no tuition levels” (Hauptman, 2011, p. 61). Following the passage of the G.I. Bill and the Higher Education Act of 1964, college enrollments doubled between 1955-1965 and again between 1965-1975 (*Digest of Education Statistics*, 2009, table 188). During this time, state support for higher education became the other primary method that colleges and universities had available to fund operations.

McLendon et al. (2014) conceptualized four categories to explain state government financing policies to higher education based on a compilation of prior

research. At their core, these financing policies focus on the redistribution of wealth. The four categories that have an impact on these state policies are:

1. Economic and fiscal conditions;
2. Demographic pressures and post-secondary enrollment patterns;
3. Attributes of state politics; and
4. Post-secondary policy climates.

Economic and fiscal conditions can have a tremendous impact on the higher education financing policies adopted by state governments. Following economic downturns, notably the Great Recession of 2008, a negative relationship usually exists between unemployment rates and direct appropriations to IHEs (McLendon et al., 2009; Tandberg, 2010; Toutkoushian & Hollis, 1998). As unemployment rates increase, tax collections decrease and direct appropriations to IHEs can be reduced as a result of budgetary reductions. Economic recessions can have other financial impacts as well. Interestingly, the opposite effect happens for levels of need-based aid given to students during periods of economic downturn. As unemployment levels increase, more citizens will qualify for need-based aid, thereby increasing state spending in unemployment related programs (McLendon et al., 2014)

Declines in State Support for Higher Education

State support for higher education has been on the decline recently after many decades of tremendous growth. Between 2001/02 and 2011/12, state support for higher education dropped from \$54.5 billion to \$45 billion on a national scale (Jaquette & Curs, 2015). With the extensive losses to their revenues and ability to keep college affordable for students, IHEs were left scrambling with not only how to deal with the crisis but also

contemplating if they could have better predicted the inevitable drop. For college and university administrators, it is important to look back and understand the reasons why state support of higher education is not currently at levels that it once was in years past.

State support for higher education fluctuates for a variety of reasons such as economic factors, regional spending differences, demographics, and political environments (Li, 2017). Of this group, perhaps the greatest reason that state support for higher education has been on the decline is due to economic conditions. Generally, state governments that have less money will look for ways to balance their budgets. The Great Recession of 2008 caused by the housing crash and the subsequent decline of the stock market had wide-ranging impacts on the ability of consumers to make and spend money. These declines led to a sharp decrease in tax collections that left governments searching for answers on how to balance their budgets, often at the expense of colleges and universities. IHEs are an easy target for funding cuts from state governments because of their ability to raise funds from other sources such as tuition and fees (Delaney & Doyle, 2011).

Political factors are another reason why IHEs often have a target on their backs for cuts to state appropriations. Many studies have found that Democratic legislatures and Democratic governors are more generous when it comes to spending on support for higher education (Archibald & Feldman, 2006; McLendon et al., 2009; Tandberg, 2009, 2010). These researchers suggest that states where Republican majorities reside are more likely to make significant cuts to higher education. The same pattern where Democratic states supporting higher education more also holds true for states whose populations are more liberal in the majority (Tandberg, 2009).

Other demographic patterns also can reveal where states are most likely to make cuts to higher education. States that have older populations tend to support higher education less, and states that have younger populations tend to support higher education more (McLendon et al., 2009; Tandberg, 2009). These patterns are reminiscent of political factors. Younger Americans tend to be more liberal in their political views, as older Americans tend to be more conservative in their political views. Older Americans tend to get more conservative in their spending as they age and support more spending in programs that will benefit them in their retirement such as Medicare (Li, 2017).

Li (2017) also contends that state support for higher education is influenced by regional associations. She draws support for this assertion in her statement that colleges in the Midwest, particularly Big 10 affiliated institutions, place a greater value on education than their institutional counterparts located up and down the east coast of the United States. Foundationally, this is reminiscent of the innovation and diffusion theory of public policy that examines the policy choices and budget appropriations that diffuse among proximate states, simply where governments are primarily influenced by other governments that lie in close proximity (Berry and Berry, 1990).

Institutional Responses to Declines in State Support

Reductions in state support for IHEs leave colleges and universities with difficult choices to make on how to balance budgets. How do IHEs respond to the dramatic losses to their state support? To put it simply, there are two fundamental choices: IHEs can either increase revenue or cut expenses in response to decreased appropriations.

When faced with budget deficiencies due to cuts in state appropriations, one of the options available to college and university administrators is to increase tuition and fee

rates to students. Researchers found that IHEs increase tuition and fees in response to declining state appropriations (e.g., Desrochers & Wellman, 2011; Ehrenberg, 2012). Some researchers even found that public universities target non-resident students for larger increases to tuition rates (Rizzo & Ehrenberg, 2004). For example, Montana State University (MSU), increased non-resident enrollment 111% from 2007/08-2017/18 in response to unequal state appropriation distribution policies enacted by the Board of Regents for Higher Education of Montana (Schontzler, 2017). Non-resident tuition was MSU's single biggest revenue stream that accounted for an astonishing 44% of MSU's operating budget. As a comparison, MSU's non-resident enrollment comprised only 33% of the overall student body (*Headcount Enrollment*, 2017).

Other researchers suggest that IHEs replace lost state appropriations through an additional focus on research enterprises (Slaughter & Leslie, 1997; Slaughter & Rhoades, 2004). Research enterprises are an important source of revenue for major universities where they can charge facilities and administrative (F&A) expenses to grants. F&A costs are indirect costs and overhead such as electricity, heat, maintenance, and shared administrative expenses such as accounting and human resources services. F&A dollars provide funding for other university staff that provide indirect support to research enterprises.

In addition to finding other ways to raise revenue to cover budget deficiencies, IHEs can cut expenses to offset losses realized by cuts to state support for higher education. There are many ways that IHEs can cut costs such as downsizing faculty and staff or freezing salaries, reorganizing colleges and academic programs, rethinking and reorganizing the way that IHEs use space and buildings, making cuts to administrative

spending, and reducing deferred maintenance capital improvement programs whose purpose are to improve the quality of campus buildings that have deteriorated over time (Desrochers & Wellman, 2011).

Performance Funding of IHEs

The higher education industry is constantly evolving as evidenced when evaluating state government support over the past few decades, particularly in recent years. Since the 2008 Great Recession, state governments suffered from decreased tax collections as the economy dug itself out while recovering from economic collapse. As tax collections tapered off, the need for greater accountability and increased spending efficiency were common themes among elected officials and constituents. In response to greater calls for increased accountability, universities and legislatures across the nation adopted a financing mechanism for higher education that in theory is supposed to increase accountability, increase transparency, and allow for the achievement of targeted performance objectives. This funding mechanism is widely known as performance-based financing. Barr and McClellan (2011) state that performance-based funding models allow for increased transparency and strength in how it serves state priorities. In higher education, the model promotes increased accountability and the achievement of specific funding objectives.

Barr and McClellan (2011) offer perspectives on different types of budgeting for higher education institutions. According to them, performance funding and budgeting techniques tie funding levels to the achievement of objectives. These authors list several distinct advantages and disadvantages of this model. The advantages of this model are that it increases transparency and aligns itself with state priorities. Unfortunately, politics

and other state budgeting priorities can easily manipulate this funding method. A cost-benefit analysis can determine the effectiveness of this model after many years of formula stability.

Lasher and Green (2001) contend that performance funding ties institutional performance to meeting certain objectives. For instance, if a college tries to achieve higher graduation rates, they might tie their institutional funding to credits completed. Institutions would receive more funding for students who are getting closer to graduation. If more students graduate, then that performance is rewarded.

There has been significant research into the effectiveness of the performance funding model and its ability to meet objectives. Budget instability has been a limiting factor in the ability to measure the performance of this funding method. As previously stated, Barr and McClellan (2011) refer to political manipulation as being one of the main disadvantages of this model. As time goes on, if the model suffers from alterations, then it is very difficult to know if the model meets its objectives. Burke and Modarresi (2001) also identify similar practical problems that reduce the functionality of performance funding. Among these are a change in state priorities and the prevention of budget stability.

Studies on the effectiveness of the performance model that measured its ability to meet performance objectives show unfavorable results. Shin and Milton (2004) found that growth of graduation rates in performance funding jurisdictions did not outpace those jurisdictions without performance funding. Shin (2010) found that graduation rates were not impacted by the implementation of performance funding. Hillman and Tandberg

(2014) reported that on average there was no increase in graduation rates after the implementation of performance funding.

A significant reason for the failure of this model to achieve its objectives is that not enough time passes for objectives to be measured before the funding formula is changed. Burke and Modarresi (2001) identify some practical problems that reduce the functionality of performance funding. Among these are a change in state priorities and the prevention of budget stability. The lack of budget stability, particularly for those portions of the budget dependent on state appropriations to subsidize operations, and the trickle-down effect of the loss of those appropriations and its relationship to overall institutional financial health is a primary theme to this research.

Financial Health in Colleges and Universities

The financial health of IHEs has been a topic of discussion and research for many decades. Early research focused on the identification of financial indicators that would comprehensively predict an institution's financial position, but limited and inconsistent data made the pursuit difficult. Brubaker (1979) summarized some of this early work from the mid-1970s, reporting progress with regard to the amount and quality of available data. However, many of the studies that Brubaker reviewed failed to identify standard financial indicators because of both the lack of conceptual frameworks and intended uses of those indicators. For instance, Dickmeyer and Hughes (1979) worked on developing a financial workbook that was aimed at helping university stakeholders assess financial condition. Their research focused on eight small, private colleges and the exploration of a set of statistical indicators used to evaluate financial condition. Results of their research showed that no single indicator was able to capture institutional financial health.

However, their research did show that combinations of certain indicators, such as revenue increases and proportionate resources, were useful in gaining an understanding of an IHEs financial position.

At the time, the financial health indicators used by researchers in education finance tended to focus on the framework of financial and non-financial flows (Dickmeyer, 1980). For instance, “many researchers sought to measure the rate of change of inflows and outflows, the relative rate of change of both inflows and outflows, changes in financial and nonfinancial resource levels, and changes in the need for financial resources” (p. 15). Generally, an excess of financial inflows over financial outflows would lead to a buildup of resources and is a general indicator of financial health.

Some research illustrates how to combine and analyze a set of indicators to comprehensively show how IHEs compare to one another and across the industry. Dickmeyer and Farmer (1979) developed a set of 21 financial indicators across four categories — financial resources, estimated risk, changes affecting financial resources, and changes in non-financial resources. Their research allowed for the comparison of universities that were reflective of institutional pressures and where the grouping of institutions allowed for comparisons. For example, high performing institutions were compared to underperforming institutions.

Up until the early 1980s, much of the research on institutional financial health was either limited or flawed (Gilmartin, 1984). According to Gilmartin, “many studies have been based on too few institutions or have combined public and private colleges in the analyses” (p. 80). In response, Gilmartin developed a longitudinal file derived from multiple data sources that included financial and non-financial statistics for nearly every

college and university in the country. Gilmartin's new set of statistics was used as a tool to successfully measure financial distress through a viability index.

Other researchers worked to publish methodology to aid IHEs in their pursuit of a set of indicators that could yield information on financial health. Klynveld, Peat, Marwick & Goerdeler (KPMG), laid the groundwork for a set of financial ratios that today is widely accepted across the higher education industry as being the benchmark for measuring financial health: the Composite Financial Index (CFI).

The Composite Financial Index (CFI) as a Tool of Financial Health

The CFI gives institutions of higher education a mechanism to measure financial health (Tahey et al., 2010). The single index is a tool for governing boards and other stakeholders to understand important financial information that is useful in developing institutional strategy when presented alongside other institutional metrics such as enrollments, staffing levels, and research activity. The CFI can facilitate comparisons made over time, but care should be given to understanding unique circumstances when making comparisons between institutions because of institutional differences such as enrollment, private/public status, or diversity of revenue sources to name a few. To accommodate fluctuations in annual CFI calculations, it is acceptable, but not required, to use three year rolling averages when making the calculations to minimize the annual impacts of those fluctuations.

Research using Financial Ratios

In its early stages, the CFI was a tool that was developed to help primarily private institutions assess financial health (Tahey et al., 2010). With this focus, there is a considerable amount of research about using the CFI to assess the effectiveness of private

institutions. Grandgenett (2007) studied the relationship between financial performance and changes in strategies and external factors in small, non-profit institutions. Using Integrated Postsecondary Education Data System (IPEDS) data to calculate CFI scores, Grandgenett ran a statistical analysis on the dependent variable (CFI scores) and the independent variables (change strategy and other external factors) using data that were gathered through a Likert-style survey. The research concluded that the strategies deployed by these institutions were insufficient in their ability to reduce the impacts of events that were detrimental to their operations.

Hunter (2012) presented a quantitative study of an integrated institutional health framework that relied on ratio analysis to explore positive and negative indicators of financial stability of small, private colleges. Hunter's study utilized data from IPEDS, institutional websites, Guidestar.com, Peterson's Four-Year Colleges Undergraduate Guides, and regional accreditors. The research focused on assessing the relationship between four independent variables and their relationship to the Department of Education's Test of Financial Strength. Hunter focused on four-year, private colleges that had enrollments of fewer than 2,000 students. Results indicated that both internal and external factors, such as enrollments, endowments, cash reserve, and other financial indicators, have a statistically significant relationship to the Department of Education Test of Financial Strength score and therefore an influence on the overall financial health of small, private institutions.

As the CFI matured into the 2000s, the methodology behind it evolved so that it applied to public institutions as well. Humburg (2012) conducted research that examined the relationship between the CFI and student success rates at 15 community colleges in

the state of Iowa, both on a collective basis and individual institutional basis, to determine if the CFI had any impact on the success rates of students. Data were collected from each individual campus and from the Iowa Department of Education for fiscal year 2000-2001 through 2009-2010. The research ultimately found that there was no statistical relationship between the CFI and student success rates in Iowa community colleges.

Shuford (2018) used the CFI to research financial health based on whether an institution used a budget model that utilized Responsibility Center Management (RCM). Her study focused on four public institutions, two of which were in Iowa and two were in Michigan. She made comparisons within each state, where one of each institutions adopted either RCM or non-RCM budget models. Results from this research showed that there was no statistically significant relationship between an institution's budget model and annual changes to the CFI.

Some research showed that the CFI was effective at being deployed for assessing institutional health at international colleges and universities. Mohanlingam and Linh (2013) studied the financial health of Australian universities using the CFI following the financial crisis of 2008. They used descriptive statistics to gauge the overall financial health using the CFI as the metric to make those judgements. In addition, they ran correlations on the relationship of variables such as the number of employees, the number of academic programs, and the number of employees. Results of the correlations indicated that while there were weak relationships between these variables and financial performance, none of them crossed the threshold as being statistically significant.

Kuzmina (2021) applied the CFI to her analysis of the financial sustainability of private IHEs in Latvia, where efficiency and effectiveness were primary concerns of

management. Results of this research indicated that the CFI was not only applicable for managerial decision-making in Latvia, but also in universities in other countries looking to benchmark financial performance in support of decision-making.

Other research has implications for how this study will explore institutional financial health and its relationship to other primary revenue streams, including government appropriations. Wekullo and Musoba (2020) studied alternative funding strategies and their relationship to institutional financial health. Their research used net tuition, government funds, research, endowment, and auxiliary income as the dependent variables to focus on their relationship to institutional health using the independent variable CFI. They concluded that a majority of very high activity research institutions were financially healthy. The dependent variables government funds and endowment had a statistically significant relationship to overall institutional financial health. The results of Wekullo and Musoba's study help to inform this research that intends to assess institutional financial health during the years impacted by the COVID-19 pandemic.

Chapter Summary

This chapter reviewed relevant research on how government funding plays a role in the financial health of colleges and universities. The chapter began with a brief overview of land-grant legislation, followed by state support for higher education. Other sections included not only the industry trends of recent declines in state support but also the institutional responses to declines in appropriations. A review of performance funding literature indicated those models tend to be ineffective in achieving legislative objectives to increase institutional performance and accountability. Although performance funding can be an ineffective way for state governments to entice IHEs to achieve state education

objectives, it is an important component to the narrative on the reasons why state support for higher education trends downward. Finally, sections on ratio analysis and recent CFI research highlight that measuring financial health using ratios is an effective means of showing that financial performance is connected to an institutions ability to achieve its mission.

Through ratio analysis, this research informs college and university administrators and state policy makers on the importance of state appropriations and other key financial indicators to overall institutional financial health of public, land-grant colleges and universities. The literature shows that recent research has focused on alternative funding mechanisms and their relationship to financial health (Wekullo & Musoba, 2020), but more needs to be done to inform interested parties on the overall impact of losses to state appropriations, especially in the face of the COVID-19 pandemic. The distinction could help IHEs prepare for future losses of revenues during economic downturns that would enable them to endure with confidence so that they know where the impacts will lie and what an appropriate institutional response might look like.

CHAPTER III

METHODOLOGY

This chapter describes the methodology that I used for this quantitative study. I present sections on the research design, data sources, collection techniques, measures, variables, limitations, and biases with a focus on delivering the details of these important components of quantitative research. Existing literature has shown that very little has been put forth to explain how college and university fiscal health, measured by the CFI, is impacted by changes to government appropriations and other important revenue streams stemming from economic declines, particularly due to generational-type events such as the COVID-19 pandemic (Wekullo & Musoba, 2020).

The issue that this research helps us to understand is whether changes in funding to land-grant institutions cause predictable changes to the Composite Financial Index (CFI), and also whether responses to fluctuations in the CFI can be coordinated by impacted institutions to either offset or minimize negative financial impacts. For this research, I used data from IPEDS and institutional financial statements to conduct a quantitative analysis of the relationship between state appropriations, federal revenues, auxiliary sales and service revenues, and non-resident enrollment percentages with institutional CFI scores. I conducted a fixed effects panel regression to analyze the relationship between the dependent and independent variables. This project was not subject to review by the Institutional Review Board because I collected and analyzed publicly available institutional data and there were no data points that represented human subjects.

Research Questions

The specific questions guiding this research were:

- 1) What is the difference over time between state appropriations and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 2) What is the difference over time between auxiliary enterprise revenues and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 3) What is the difference over time between federal revenues and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 4) What is the difference over time between out-of-state enrollment and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 5) What were the observed trends of the COVID-19 pandemic to the financial health, as measured by the CFI, of high research activity land-grant universities?

Research Design

This research utilized quantitative analysis to study the relationship between institutional CFI scores and state appropriations, federal revenues, auxiliary sales and service revenues, and non-resident enrollment rates. In this section, I describe the institutions selected for this study, data sources, data collection processes, variables, and how the data analysis was carried out.

Institutions of Focus

This research focused on how changes in funding impacted the financial health of public, land-grant institutions where the institutional research activity is classified as Carnegie R2. The Carnegie Classification system is the leading framework for describing institutional diversity in the United States (*The Carnegie Classification of Institutions of Higher Education*, n.d.). In 2020, 16 universities fit the Integrated Postsecondary Education Data System (IPEDS) classification of being a land-grant institution that had high research activity based on the IPEDS definition being Carnegie Classification 2018 - Basic.

Table 1 lists the IHEs that qualify as Carnegie R2, land-grant universities that were the focus of this study.

Table 1

Carnegie R2, land-grant institutions

IPEDS Unit ID	Institution Name	FTE Fall 2020	State Appropriations 2020
130934	Delaware State University	4,376	\$ 43,434,322
133650	Florida Agricultural and Mechanical University	8,308	\$ 122,766,288
188030	New Mexico State University-Main Campus	12,167	\$ 172,185,252
199102	North Carolina A & T State University	11,578	\$ 95,490,569
200332	North Dakota State University-Main Campus	11,302	\$ 115,671,036
219356	South Dakota State University	9,515	\$ 74,851,441
221838	Tennessee State University	6,306	\$ 54,886,375
102614	University of Alaska Fairbanks	4,385	\$ 150,263,790
445188	University of California-Merced	8,966	\$ 206,801,000
142285	University of Idaho	9,025	\$ 148,595,878
161253	University of Maine	9,841	\$ 98,581,000
163338	University of Maryland Eastern Shore	2,376	\$ 45,885,966
217484	University of Rhode Island	15,660	\$ 79,141,738
231174	University of Vermont	12,405	\$ 51,710,000
240727	University of Wyoming	10,310	\$ 209,451,000
230728	Utah State University	21,953	\$ 207,618,928

Note: Data retrieved from IPEDS database at <https://nces.ed.gov/ipeds/use-the-data>

Data Sources

Data for this research was extracted from the Integrated Postsecondary Education Data System (IPEDS), the Common Dataset, and institutional websites including institutional and component unit financial reports and demographic information. IPEDS is a comprehensive data collection system operated by the National Center for Education Statistics (NCES) that collects postsecondary institutional data on enrollments, admissions, program completions, graduation rates, retention rates, student federal aid, tuition and fees, faculty, staff, libraries, and most importantly for this research, finances (“Integrated Postsecondary Education Data System (IPEDS),” 2019). IPEDS is a mandatory function of all institutions that receive federal student financial assistance and maintains eligibility for Title IV funds under the Higher Education Act of 1965.

Over the years, IPEDS has evolved in response to changing technologies and other emerging issues in higher education. In the 2000/2001 reporting year, the original paper-based collection system was changed over to a web-based reporting system (“Integrated Postsecondary Education Data System (IPEDS),” 2019). For the academic year 2017-2018, 6,642 Title IV institutions plus another 73 administrative offices submitted data reports to IPEDS (“Integrated Postsecondary Education Data System (IPEDS),” 2019)..

Institutional financial and demographic reports that are available on public websites are an important data source for this research. IPEDS has only recently begun collecting data with the information necessary to calculate the CFI and corresponding ratios. Other research has used data available within IPEDS to make the calculations, but that research has lacked the necessary data from the FASB component units to get to the

true CFI (Wekullo & Musoba, 2020). According to Tahey et al. (2010), the CFI for public institutions should be calculated using the FASB component unit information. Any research that leaves out this important data is incomplete and leaves gaps in existing research and in the interpretation of results. Therefore, this study relied on data from not only IPEDS, but also from institutional websites and their corresponding component units, where available, to provide a more complete picture of how government appropriations affect the CFI. For those institutions where component unit information could not be located or was incomplete, the CFI was calculated either using judgment or by excluding the FASB component unit information when unavailable information was deemed to be immaterial to the calculation.

Data Collection

Data collection for this research study utilized structured review of existing data. I extracted this data from the IPEDS database as well as institutional annual financial statements and other publicly available information found on institutional websites to calculate the four individual ratios of the CFI and the Financial Health (CFI) variable itself. The IPEDS database was used to extract information about the independent variables for land-grant universities for years 2017-2020. For many institutions, fiscal year 2021 information was not yet available in the IPEDS database, and this information was extracted from institutional websites where available. In total, I collected and analyzed data for the fiscal years 2017-2021, resulting in five years of financial data analyzed in SPSS. For consistent financial data, this research utilized only institutions that have adopted the financial reporting standards of the Government Accounting Standards Board (GASB).

Variables

The dependent variable in this study was Financial Health as measured by the CFI. The variable was determined by calculating the four core ratios of the CFI: the Primary Reserve Ratio, the Viability Ratio, the Net Return on Assets Ratio, and the Net Operating Revenues Ratio between academic years 2016/17-2020/21. These ratios were plugged into the formula to calculate the CFI dependent variable for each institution. The independent variables that were used in this study include state appropriations, federal revenues, auxiliary sales and service revenues, and non-resident enrollment percentages presented longitudinally over time. A summary of the variables used in this study are contained in the following paragraphs and Table 2.

Financial Health: A continuous variable that represents an institution's Composite Financial Index (CFI) as calculated by the researcher. This variable is limited to the range of -10 – 10 and is represented in SPSS by its numerical value rounded to two decimal places. The CFI will include information from each institutions FASB component units and exclude changes due to GASB pronouncements 68/75.

State Appropriations: The amount of revenue reported in institutional financial statements for a state government's financial contribution to an institution's operating budget. For this research, this number does not include student financial aid. This continuous variable is yielded from institutional financial statements and reported in SPSS as its numerical value rounded to two decimal places.

Auxiliary Sales and Service: The amount of revenue reported in institutional financial statements from sales and service type activities such as residence life, dining,

and parking enterprises. This continuous variable is yielded from institutional financial statements and is reported in SPSS as its numerical value rounded to two decimal places.

% Non-resident: The percentage of undergraduate students seeking degrees from the Fall census who are from out-of-state and excluding international/nonresident aliens from the numerator and denominator. This value is gathered from the Common Dataset and will be recorded in SPSS as a continuous variable from 0-1 rounded to two decimal places.

Federal Revenues: The amount of revenue reported in institutional financial statements that represents the sum of federal appropriations (if applicable) and grants and contracts revenues. For the purposes of this study, Federal revenues included the Coronavirus Aid, Relief, and Economic Security Act (CARES) Act revenue that is presented separately on the financial statements. This continuous variable was recorded in SPSS as its numerical value rounded to two decimal places.

Table 2

Description of Variables and Data Sources

Variable	Description	Data Source
Financial Health	The computation of the CFI	Calculated by the researcher
State Appropriations	Revenue from State Appropriations	Institutional financial statements
Auxiliary Sales and Service	Revenue from Auxiliary Enterprises	Institutional financial statements
% Non-Resident	Percentage of Non-resident Undergraduates	Common Dataset
Federal Revenues	Federal Appropriations and Grants and Contracts Revenues	Institutional financial statements

Calculating the Composite Financial Index

At the macro level, there is a four-step methodology to calculating the CFI (Tahey et al., 2010). The first step involves gathering data and computing the four individual

ratios that comprise the CFI. Step two requires that these ratios be converted to strength factors along a common scale. The third step requires that the strength factors be multiplied times weighting factors. The fourth and final step requires that the weighted factors be added to come to the CFI. Specific details on steps two through four can be found in the following paragraphs. Step one calculating the four individual ratios that comprise the CFI was covered in Chapter One.

The second step requires that each ratio be converted to strength factors so that the four ratios “articulate to one another to achieve a commonality along the range of scales” (Tahey et al., 2010, p. 134). To accomplish this, the corresponding values of the four individual ratios should be divided by the strength factors in Table 3:

Table 3

The Composite Financial Index Strength Factors

Ratio	Strength Factor
Primary Reserve	0.133
Viability	0.417
Return on Net Assets	2.00%
Net Operating Revenues	1.30%

Note: Adapted from *Using Financial Ratios to Assess Institutional Health* by L.

Goldstein, 2019, College Business Management Institute, University of Kentucky,

Kentucky, United States. Copyright 2019 by Campus Strategies, LLC.

A sample strength factor calculation using a Primary Reserve ratio value of 1.25x, considered the minimum value for financial health (Goldstein, 2019), can be calculated as follows:

$$\text{Strength Factor of Sample Primary Reserve Ratio} = \frac{1.25}{0.133} = 9.39$$

The third step of the process to calculate the CFI requires that the calculated value from the second step be multiplied times a weighting factor. Weighting of the strength factors allows weaker scores to be offset by stronger scores, thereby increasing the ability of the CFI to be a measure of overall financial health (Tahey et al., 2010). See Table 4 for the specific weight factors for each of the four core CFI ratios.

Table 4

The Composite Financial Index Weight Factors

Ratio	Strength Factor
Primary Reserve	0.35
Viability	0.35
Return on Net Assets	0.20
Net Operating Revenues	0.10

Note: Adapted from *Using Financial Ratios to Assess Institutional Health* by L. Goldstein, 2019, College Business Management Institute, University of Kentucky, Kentucky, United States. Copyright 2019 by Campus Strategies, LLC.

A sample calculation to weight the Primary Reserve Ratio strength factor that was calculated in the previous equation is as follows:

$$\text{Weighted Primary Reserve Ratio Strength Factor} = 9.39 * 0.35 = 3.28$$

Once the strength factor is weighted, this process is repeated for each core ratio using the corresponding values in Table 3 and Table 4. If the calculated strength factor exceeds 10, thought should be given to limiting the threshold to 10. Although the CFI can be calculated using strength factors that exceed a value of 10, strong consideration should be given to the impacts of doing so. Strength factors that exceed a value of 10 can lead to the CFI being inflated to where it potentially will hide areas of weakness in the other

ratios (Tahey et al., 2010). A summary of the process to calculate the CFI from beginning to end is detailed in Table 5 using ratio values that are considered the minimum for financially healthy institutions.

Table 5

Example CFI Scoring Sheet

Ratio	VALUE	STRENGTH: Divide Value by These Factors	WEIGHT: Multiply Strength by these Factors	CFI Score
Primary Reserve	0.40	0.133	0.35	1.1
Viability	1.25	0.417	0.35	1.0
Return on Net Assets	0.06	2.00%	0.20	0.6
Net Operating Revenues	0.20	1.30%	0.10	1.5
CFI Score				4.2

Note: Adapted from *Using Financial Ratios to Assess Institutional Health* by L.

Goldstein, 2019, College Business Management Institute, University of Kentucky, Kentucky, United States. Copyright 2019 by Campus Strategies, LLC.

After the CFI scores are calculated, an institution can begin the process of interpreting their score. For the sample CFI scoring sheet provided in Table 5, the CFI score calculated to a value of 4.2. According to the scoring guide presented in Table 6, this institution should direct resources to allow transformations aimed at positioning itself better so that it is more likely to achieve its mission. Generally, CFI scores lower than 3 indicate a lack of financial health and that the institution should reinvent itself and reassess its mission and priorities. A score of greater than 3 indicates good financial health and that the institution should direct resources to achieving a more robust mission and expanding opportunities and initiatives.

Table 6*The Composite Financial Index Scoring Guide*

Scale Level	CFI Scoring Range	Action
One	-1 to 1	Assess viability of institution's survival
Two	0 to 2	Reengineer the institution
Three	1 to 3	
Four	2 to 4	Direct resources toward transformation
Five	3 to 5	
Six	4 to 6	Focus resources to compete
Seven	5 to 7	
Eight	6 to 8	Experiment with new initiatives
Nine	7 to 9	Experiment with new initiatives; achieve a robust mission
Ten	> 9	Deploy resources to achieve a robust mission

Note: Retrieved from *Composite Financial Index Worksheet*, by NACUBO, n.d.,

(<https://www.nacubo.org/->

[/media/Nacubo/Documents/business_topics/CFI_Other_Ratios_and_Trend_table.ashx?la=en&hash=0C7B81321CD4CC2918888F4EB37902E30E0DC750](https://www.nacubo.org/-/media/Nacubo/Documents/business_topics/CFI_Other_Ratios_and_Trend_table.ashx?la=en&hash=0C7B81321CD4CC2918888F4EB37902E30E0DC750)).

Data Analysis

The primary test used for this quantitative statistical analysis was a fixed effects panel regression. The type of data used in this analysis was a cross section of data measured repeatedly on dependent and independent variables. Using this cross-section of data, I sought to answer questions pertaining to the effects of the time varying predictors on the time varying outcome predictor variable. The purpose of this test was to determine if there was a statistically significant relationship between these variables over time.

Research question 1 focused on the difference between state appropriations and financial health. With this regression, the Financial Health dependent variable (CFI

score) was tested for a relationship to the independent variable State Appropriations over time.

Research question 2 focused on the difference between auxiliary sales and service revenues and financial health. With this regression, the Financial Health dependent variable (CFI score) was tested for a relationship to the independent variable Auxiliary Sales and Service over time.

Research question 3 focused on the difference between federal revenues and financial health. With this regression, the Financial Health dependent variable (CFI score) was tested for a relationship to the independent variable Federal Revenues over time.

Research question 4 focused on the difference between out-of-state enrollment and financial health. With this regression, the Financial Health dependent variable (CFI score) was tested for a relationship to the independent variable % Non-resident over time.

Research question 5 looked for changes to the mean CFI score between the fiscal years 2019, 2020, and 2021. Descriptive statistics such as the mean, median, and mode yielded important information about the central tendency of changes to institutional financial health during before and during the COVID-19 pandemic. Measures of variability such as the standard deviation, variance, and minimums and maximums were also included. The fixed effects panel regression also tested for changes to financial health between fiscal years.

In total, six out of 16 total Carnegie R2, land-grant institutions were included in this research study due to a lack of available information for some schools selected for

the study and is discussed further in the following pages. A summary of the descriptive statistics is found in Table 7.

Table 7

Descriptive Statistics

<u>Institution</u>	<u>Variable</u>	<u>N</u>	<u>M</u>	<u>SD</u>	<u>Min</u>	<u>Max</u>
Delaware State University	CFI	5	2.80	3.28	0.14	8.07
	ST Appropriations	5	\$38,150,173	\$3,262,670	\$35,967,358	\$43,434,322
	Federal Revenues	5	\$27,161,927	\$11,328,088	\$19,376,864	\$45,438,767
	Auxiliary Revenues	5	\$21,991,995	\$5,241,085	\$13,495,575	\$26,151,768
	NR UG Enrollment	5	0.50	0.02	0.47	0.52
New Mexico State University	CFI	5	5.74	2.97	3.80	10.00
	ST Appropriations	5	\$200,338,778	\$8,669,660	\$190,893,756	\$212,257,252
	Federal Revenues	5	\$87,734,840	\$3,436,912	\$82,542,027	\$91,596,098
	Auxiliary Revenues	5	\$14,369,699	\$427,995	\$13,646,408	\$14,733,291
	NR UG Enrollment	5	0.26	0.01	0.26	0.27
North Dakota State University	CFI	5	3.83	1.09	2.69	5.30
	ST Appropriations	5	\$118,134,684	\$5,435,695	\$112,020,735	\$124,986,789
	Federal Revenues	5	\$66,996,275	\$16,874,713	\$57,710,734	\$97,049,872
	Auxiliary Revenues	5	\$41,695,447	\$2,817,460	\$38,883,018	\$45,258,273
	NR UG Enrollment	5	0.57	0.01	0.56	0.58
University of Idaho	CFI	5	2.49	1.52	1.39	4.98
	ST Appropriations	5	\$145,500,816	\$2,737,600	\$141,971,100	\$148,595,878
	Federal Revenues	5	\$71,957,186	\$1,178,767	\$70,250,684	\$73,123,057
	Auxiliary Revenues	5	\$22,424,742	\$5,550,819	\$15,883,334	\$31,093,403
	NR UG Enrollment	5	0.23	0.02	0.21	0.25
U. of Maryland - Eastern Shore	CFI	5	1.24	1.42	0.15	3.66
	ST Appropriations	5	\$44,021,520	\$2,695,890	\$41,124,261	\$47,398,557
	Federal Revenues	5	\$8,819,841	\$852,138	\$7,937,227	\$9,994,660
	Auxiliary Revenues	5	\$22,907,643	\$4,424,274	\$17,625,008	\$27,313,268
	NR UG Enrollment	5	0.20	0.01	0.19	0.22
University of Wyoming	CFI	5	7.84	0.69	7.27	8.97
	ST Appropriations	5	\$210,574,107	\$13,953,411	\$194,747,662	\$231,839,871
	Federal Revenues	5	\$73,342,961	\$13,925,228	\$51,557,174	\$87,975,000
	Auxiliary Revenues	5	\$36,516,915	\$10,159,436	\$21,855,000	\$46,162,099
	NR UG Enrollment	5	0.35	0.02	0.33	0.38

Note: CFI scores are limited to numerical values between -4 and 10

Delimitations

I focused this study on Carnegie R2, land-grant universities. Previous research (Wekullo & Musoba, 2020) studied the impacts of revenue changes to financial health for both R1 and R2 universities. Larger universities with higher research activity have a much greater ability to diversify and expand their revenue streams due to a greater availability of resources. My approach narrowed the population of study into a more manageable dataset that yielded important information about how smaller universities with lesser resources can navigate economic downturns.

The further stratification of this dataset down to land-grant institutions sought to answer questions about how the financial health of those institutions are affected by fluctuations, whether positive or negative, to major revenue streams even with the added benefit of land-grant appropriations from the federal government. The impact of land-grant revenues themselves and their relationship to overall financial health was not tested due to the lack of availability of publicly available land-grant appropriation information. However, Federal appropriations (which *likely* included land-grant revenues for most institutions) was tested for a relationship to institutional financial health.

According to the authors of the CFI, the ratios are best calculated over a three-year period so long-term results are measured (Tahey et al., 2010). This allows for a smoothing of the ratio in years where there are large investments or if there is an economic downturn that leads to a decline. However, this research analyzed financial health using the annual CFI ratio so that the impacts of revenue changes were measured against the true ratio.

Limitations

This research was limited by the availability of publicly posted financial information by either the universities of interest or their component units. In some cases, component unit financial statements were not publicly available. In those cases, they were dropped from the dataset in cases where alternative calculations had a material effect on the CFI. In addition, IPEDS survey information for 2021 was not available in the timeframe that this research was performed. To accommodate this, the researcher gathered financial and demographic information for the universities of interest that was publicly available on their websites. To answer the research question related to the impact of the COVID-19 pandemic on financial health, the most recent fiscal year 2021 financial information was sought. However, the fiscal year 2021 was not yet available for many institutions. For the institutions that did not yet have data available or where information presented in their financial statements deemed the extraction of relevant information impossible, these institutions were dropped from the analysis.

The calculation of the CFI was impacted by changes to accounting standards that were adopted within the research window academic years 2016/17-2020/21. Specifically, GASB pronouncements 68 and 75 changed the way that public IHEs accounted for pension and other post-employment benefits. These changes first took effect in fiscal year 2018. To accommodate for this change, the CFI was calculated by excluding the impacts of the GASB 68 and 75 pronouncements.

Researcher Bias

The researcher is an employee at an R1 research institution that has recently seen consistent state appropriations and land-grant revenues alongside increasing research expenditures. However, little is known internally at the researcher's home university

about the impacts that changes in these independent variables have on the CFI, overall financial health, and how these fluctuations impact the behavior across other areas within the university.

Chapter Summary

This chapter provided the background on the quantitative methodology that was used to answer the research questions central to this study pertaining to the longitudinal relationship of college and university financial health to state appropriations, federal revenues, auxiliary sales and service revenues, and non-resident enrollment percentages. Included in this chapter were sections that detailed the research design such as data sources, data collection, institutions of focus, variables, data analysis techniques, research limitations and delimitations, and researcher bias. Also included were tables that summarized the specific institutions and the variables that were central to answering the research questions. Finally, this chapter identified the specific technique of analysis that was used in this research, a primary test involving a quantitative statistical analysis using fixed effects panel regression with longitudinal data.

CHAPTER IV

RESULTS

The purpose of this quantitative study was to examine the utility of the Composite Financial Index (CFI) in helping public colleges and universities, specifically Carnegie R2, land-grant universities, respond strategically to changes in major funding sources such as state appropriations, federal revenues, and auxiliary revenues. Additionally, this research examined the impacts of non-resident undergraduate enrollment on financial health as measured by the CFI. A primary focus of this research was on debilitating economic events such as the 2008 Great Recession, the COVID-19 pandemic, and how financial health of colleges and universities trended in the wake of those events.

The null hypothesis states that there is not a statistically significant relationship between the dependent variable CFI score and the independent variables State Appropriations, Auxiliary Sales and Service Revenues, Federal Revenues, and Out-of-State Enrollment. The specific questions that are guiding this research are:

- 1) What is the difference over time between state appropriations and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 2) What is the difference over time between auxiliary enterprise revenues and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 3) What is the difference over time between federal revenues and institutional financial health, as measured by the CFI, of high research activity land-grant universities?

- 4) What is the difference over time between out-of-state enrollment and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 5) What were the observed trends of the COVID-19 pandemic to the financial health, as measured by the CFI, of high research activity land-grant universities?

This study utilized an ex post facto, non-experimental research strategy. The IHEs that comprised this research are land-grant institutions that have high research activity. IPEDS identified 16 institutions that fit this category, and the lack of publicly available financial information on the fiscal years being studied further narrowed down the population to six IHEs. This study gathered the dependent and independent variables over a 5-year period (fiscal years 2017-2021) to represent a longitudinal view of the relationships between the dependent and independent variables. A fixed effects panel regression for repeated measures test using a least squares dummy variable approach was used to conduct the analysis.

Results of the Fixed Panel Regression

Table 8 presents the results of the fixed effects panel regression of the relationship of major revenue streams, non-resident enrollment, and fiscal years with institutional financial health. Data for the dependent and independent variables between the fiscal years 2017-2021 were tested using a fixed effects panel regression. Results show that there was a lack of statistically significant findings between the independent variables and their relationship to institutional financial health between the fiscal years 2017-2021. Further results did, however, indicate that there was a statistically significant relationship

($t = 3.932$, $p < .01$) to the change in institutional financial health between the fiscal years 2020 and 2021.

Table 8

Results of the Fixed Effects Panel Regression

<u>Variable</u>	<u>B</u>	<u>St. Error</u>	<u>t</u>	<u>Sig.</u>
State Appropriations	-3.60E-08	0.000	-0.593	0.427
Federal Revenues	1.94E-08	0.000	1.438	0.585
Auxiliary Revenues	1.17E-07	0.000	1.559	0.139
Non Resident Enrollment	38.064	22.527	1.690	0.110
Fiscal Year 2018	0.012	0.781	0.016	0.987
2019	0.111	0.760	0.145	0.886
2020	1.175	0.952	1.234	0.235
2021	4.685	1.191	3.932	0.001*

*Note . * Significant at .01 level; sample size = 6; observations = 24.*

Results specific to the individual research questions are presented in the following sections.

Research Question 1

The first research question was, “What is the difference over time between state appropriations and institutional financial health, as measured by the CFI, of high research activity land-grant universities?” For this question, data for annual state appropriations was extracted from publicly available, institutional financial statements for the fiscal years 2017-2021. Mean (M) annual state appropriations for these institutions ranged from \$38,150,173 to \$210,574,107 with the Standard Deviations (SD) ranging from \$2,695,890 to \$8,669,660. These ranges represent a broad spectrum of state support to public institutions in the form of annual appropriations between institutions, but those appropriations are relatively stable from year-to-year within institutions. Annual state appropriations for each institution in this study are displayed in Table 9.

Table 9

Annual State Appropriations

Institution	2017	2018	2019	2020	2021
Delaware State University	\$ 35,967,358	\$ 35,999,006	\$ 36,123,603	\$ 43,434,322	\$ 39,226,578
New Mexico State University	193,515,000	190,893,756	199,928,700	212,257,252	205,099,182
North Dakota State University	124,986,789	112,020,735	115,371,329	115,671,036	122,623,529
University of Idaho	141,971,100	144,473,100	147,937,000	148,595,878	144,527,000
University of Maryland - ES	41,124,261	41,614,710	44,084,104	45,885,966	47,398,557
University of Wyoming	231,839,871	194,747,662	214,139,000	209,451,000	202,693,000
Average	128,234,063	119,958,162	126,263,956	129,215,909	126,927,974

The period examined for this study shows relative stability in annual state appropriations for most of these institutions, with relatively minor percentage-based fluctuations from year-to-year. The University of Wyoming realized the biggest, single year loss both in terms of dollar value and percentage between fiscal years 2017 and 2018 at -\$37,092,209, or a 16% decline in state appropriations. On average, between all institutions from 2017 to 2018, support in the form of state appropriations declined by 6.45%. Following this decline, two years of increases in 2019 and 2020 at 5.26% and 2.34%, respectively, were followed by a 1.77% decline in state appropriations in 2021 as the pandemic started to mature. Figure 1 depicts the trends in average state appropriations between all six institutions presented in this study.

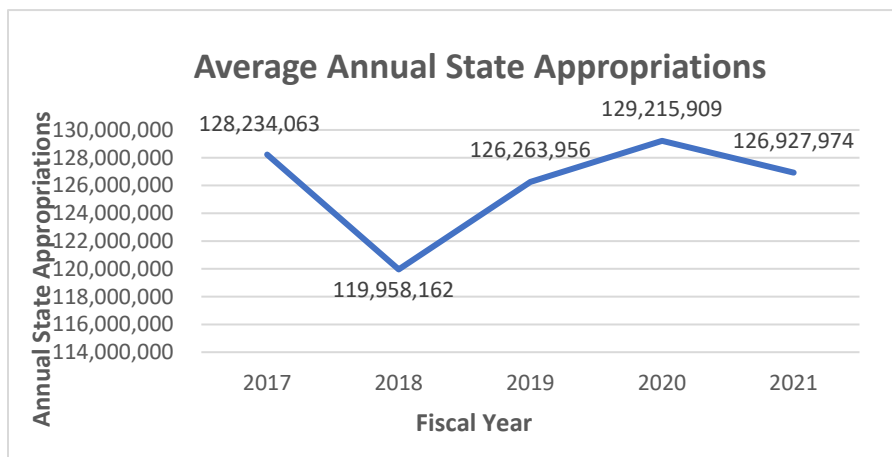


Figure 1. Average state appropriations for all institutions combined.

Statistical analysis tested for significant differences between the CFI scores and state appropriations for Delaware State University (M = \$38.15 million, SD = \$3.26 million), New Mexico State University (M = \$200.34 million, SD = \$8.67 million), North Dakota State University (M = \$118.13 million, SD = \$5.44 million), University of Idaho (M = \$145.50 million, SD = \$2.74 million), University of Maryland-Eastern Shore (M = \$44.02 million, SD = \$2.70 million), and the University of Wyoming (M = \$210.57 million, SD = \$13.95 million).

Results indicated that state appropriations do not have a statistically significant relationship to institutional financial health as measured by the CFI, ($t(6) = -0.593, p > .05$). Thus, the amount of state appropriations is not a significant predictor of institutional health over time.

Research Question 2

The second research question was, “What is the difference over time between auxiliary enterprise revenues and institutional financial health, as measured by the CFI, of high research activity land-grant universities?” For this question, data for annual auxiliary revenues was extracted from publicly available, institutional financial statements for the fiscal years 2017-2021. On an individual institutional basis, mean (M) auxiliary revenues for these institutions ranged from \$14,369,699 to \$41,695,447 with the Standard Deviations (SD) ranging from \$427,995 to \$10,159,436. Auxiliary revenues for each of the six institutions included in this research are presented in Table 10.

Table 10

Auxiliary Revenues

<u>Institution</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>
Delaware State University	\$ 25,003,658	\$ 24,938,687	\$ 26,151,768	\$ 20,370,288	\$ 13,495,575
New Mexico State University	14,637,709	14,733,291	14,441,402	13,646,408	14,389,685
North Dakota State University	43,999,768	45,258,273	40,934,016	38,883,018	39,402,162
University of Idaho	31,093,403	20,697,095	23,284,674	21,165,206	15,883,334
University of Maryland - ES	26,690,506	27,313,268	23,949,613	18,959,822	17,625,008
University of Wyoming	45,056,475	46,162,099	38,342,000	31,169,000	21,855,000
Average	31,080,253	29,850,452	27,850,579	24,032,290	20,441,794

The University of Wyoming (UW) realized the biggest single year drop decreasing from \$31,169,000 to \$21,855,000 between fiscal years 2020 and 2021. This accounts for a large 29.88% decrease in overall auxiliary revenues. In the prior year at UW, auxiliary revenues decreased \$7.1 million, or 18.71% from fiscal year 2019.

Figure 2 reveals the trends with average annual auxiliary revenues when all institutions were combined. It was found that the mean revenues steadily decreased for all fiscal years 2017-2021. Trending shows that auxiliary revenues decreased dramatically between fiscal years 2019-2020 and 2020-2021 at 13.71% and 14.94%, respectively.

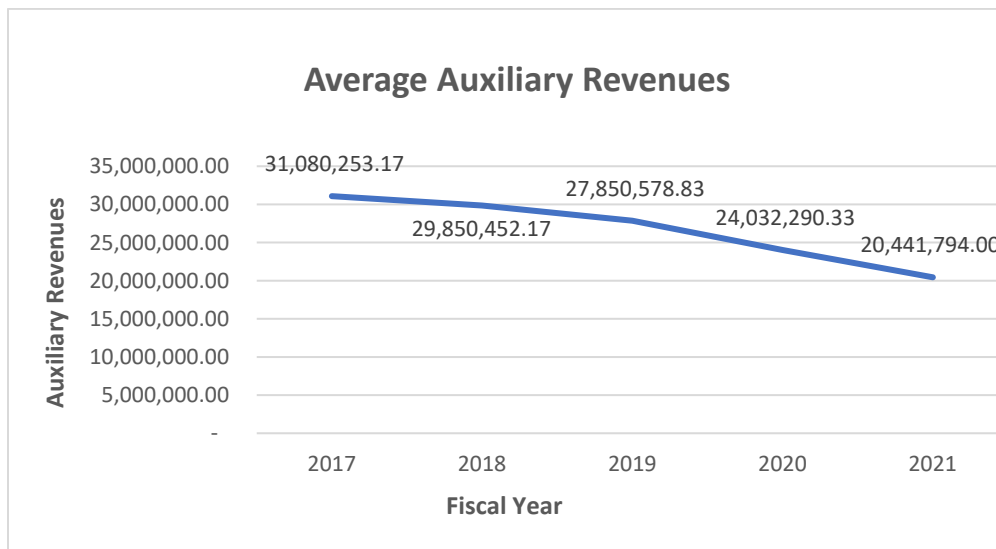


Figure 2. Average auxiliary revenues for all institutions combined.

A fixed effects panel regression tested for significant differences over time between the CFI and auxiliary revenues. There were no significant differences between the CFI scores and auxiliary revenues for Delaware State University (M = \$21.99 million, SD = \$5.24 million), New Mexico State University (M = \$14.37 million, SD = \$0.42 million), North Dakota State University (M = \$41.70 million, SD = \$2.82 million), University of Idaho (M = \$22.42 million, SD = \$5.55 million), University of Maryland-Eastern Shore (M = \$22.90 million, SD = \$4.42 million), and the University of Wyoming (M = \$36.52 million, SD = \$10.16 million). Results indicated that auxiliary revenues do not have a statistically significant relationship to institutional financial health as measured by the CFI, ($t(6) = 1.559, p > .05$). Thus, the amount of auxiliary sales and service revenues is not a significant predictor of institutional health over time.

Research Question 3

The third research question was, “What is the difference over time between federal revenues and institutional financial health, as measured by the CFI, of high research activity land-grant universities?” For this question, data for annual federal revenues was extracted from publicly available, institutional financial statements for the fiscal years 2017-2021 and consists of both federal appropriations and federal grants and contracts revenues. For this research, federal revenues does not include federal student financial aid, but does include CARES Act revenues. Mean (M) revenues for these institutions ranged from \$8,819,841 to \$87,734,840 with the Standard Deviations (SD) ranging from \$852,138 to \$16,874,713. Federal revenues for each of the six institutions included in this research are presented in Table 11.

Table 11

Federal Revenues

<u>Institution</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>
Delaware State University	\$ 20,187,909	\$ 19,376,864	\$ 19,753,800	\$ 31,052,295	\$ 45,438,767
New Mexico State University	89,478,461	82,542,027	86,468,214	88,589,399	91,596,098
North Dakota State University	58,336,008	60,141,027	57,710,734	61,743,735	97,049,872
University of Idaho	72,154,006	71,358,145	72,900,040	70,250,684	73,123,057
University of Maryland - ES	9,299,334	8,104,084	9,994,660	7,937,227	8,763,899
University of Wyoming	51,557,174	69,547,632	76,309,000	87,975,000	81,326,000
Average	50,168,815	51,844,963	53,856,075	57,924,723	66,216,282

With a holistic approach examining the trends of this revenue stream, it was found that the mean combined federal revenues of all institutions included in this study steadily increased for all fiscal years 2017-2021. Of those six institutions, only the University of Wyoming realized a decrease in federal revenues between fiscal years 2020 and 2021. For two of the institutions of study, it was found that federal revenues increased dramatically in fiscal years 2020 and 2021, with NDSU increasing 57% and Delaware State University increasing 46%. Figure 3 depicts the trend in the average federal revenues between these six institutions that shows the gradual incline over time.

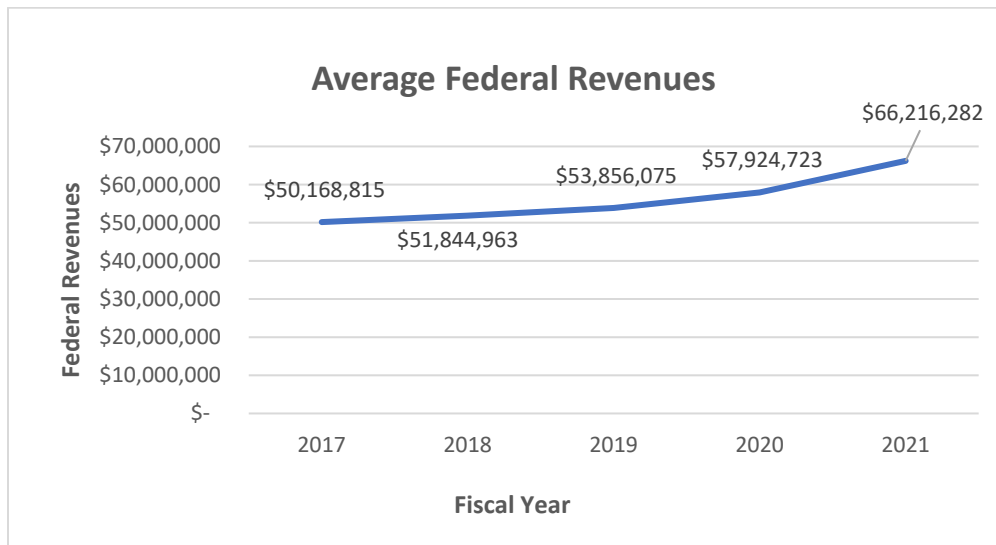


Figure 1. Average federal revenues for all institutions combined.

A fixed effects panel regression tested for significant differences over time between the CFI and federal revenues. There were no significant differences between the CFI scores and federal revenues for Delaware State University (M = \$27.16 million, SD = \$11.33 million), New Mexico State University (M = \$87.73 million, SD = \$3.44 million), North Dakota State University (M = \$66.0 million, SD = \$16.88 million), University of Idaho (M = \$71.96 million, SD = \$1.18 million), University of Maryland-Eastern Shore (M = \$8.82 million, SD = \$0.85 million), and the University of Wyoming (M = \$73.34 million, SD = \$13.93 million).

This study focused on the longitudinal changes for each independent variable for its relationship to changes in the dependent variable over time. Results indicated that federal revenues do not have a statistically significant relationship to institutional financial health as measured by the CFI, ($t(6) = 1.438, p > .05$). Thus, the amount of federal revenues is not a significant predictor of institutional health over time.

Research Question 4

The fourth research question was, “What is the difference over time between out-of-state enrollment and institutional financial health, as measured by the CFI, of high research activity land-grant universities?” For this question, data to identify the enrollment percentage of non-resident undergraduates was extracted from publicly available information obtained from institutional websites, most frequently from the Common Dataset for the fiscal years 2017-2021. On an individual institutional basis, mean (M) nonresident undergraduate enrollment for these institutions ranged from 23% to 57% with the Standard Deviations (SD) ranging from 1% to 2%. Nonresident

enrollment rates for each of the six institutions included in this research are presented in Table 12.

Table 12

Percent of Nonresident Undergraduates

<u>Institution</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>
Delaware State University	47%	48%	51%	51%	52%
New Mexico State University	26%	26%	26%	27%	27%
North Dakota State University	57%	58%	58%	58%	56%
University of Idaho	22%	21%	22%	23%	25%
University of Maryland - Eastern Shore	21%	20%	22%	21%	19%
University of Wyoming	38%	33%	34%	35%	34%
Average	35%	34%	35%	36%	35%

On an individual institutional basis, the percent of nonresident undergraduate enrollment remained relatively stable among institutions. Figure 4 reveals the trends with average nonresident undergraduate enrollment percentage when all institutions are combined. It was found that the mean, non-resident enrollment fluctuated up and down between fiscal years 2017-2021. After a small decline in fiscal year 2018, two years of steady increases were realized before the pandemic began to mature in fiscal year 2021.

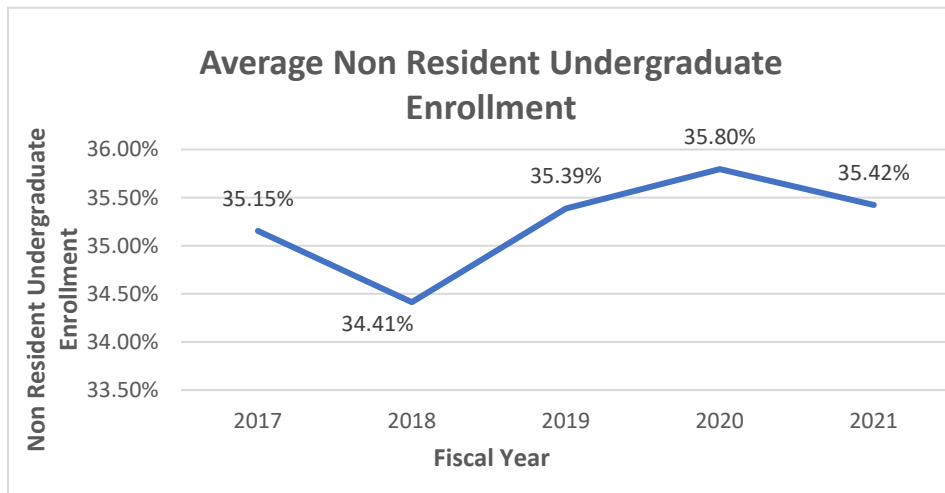


Figure 4. Average nonresident undergraduate enrollment percent for all institutions combined.

A fixed effects panel regression tested for significant differences over time between the CFI and out-of-state enrollment. There were no significant differences between the scores for Delaware State University (M = 0.50, SD = .02), New Mexico State University (M = 0.26, SD = 0.01), North Dakota State University (M = 0.57, SD = 0.01), University of Idaho (M = 0.23, SD = 0.02), University of Maryland-Eastern Shore (M = 0.20, SD = 0.01), and the University of Wyoming (M = 0.35, SD = 0.02).

This study focused on the longitudinal changes for each independent variable for its relationship to changes in the dependent variable over time. Results indicated that nonresident enrollments do not have a statistically significant relationship to institutional financial health as measured by the CFI, ($t(6) = 1.690, p > .05$). Thus, the rate of non-resident undergraduate enrollments is not a significant predictor of institutional health over time.

Research Question 5

The fifth research question was, “What were the observed trends of the COVID-19 pandemic to the financial health, as measured by the CFI, of high research activity land-grant universities?” This research study calculated the CFI for each of the six institutions for the five fiscal years 2017-2021. One institution, Delaware State University, is highly volatile in its level of financial health with CFI scores ranging from 0.14 to 8.07. The University of Wyoming is less volatile in its financial health and scores higher for all years with CFI scores ranging from 7.27 to 8.97 indicating high levels of financial health and stability over time. A summary of individual CFI scores for each institution is presented in Table 13.

Table 13

CFI Scores

<u>Institution</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>Avg</u>
Delaware State University	0.93	0.14	0.92	3.93	8.07	2.80
New Mexico State University	3.80	4.81	4.83	4.24	10.00	5.54
North Dakota State University	2.69	3.55	3.03	4.60	5.30	3.83
University of Idaho	2.92	1.63	1.39	1.53	4.98	2.49
University of Maryland - Eastern Shore	0.90	0.15	0.27	1.23	3.66	1.24
University of Wyoming	7.29	7.75	7.89	7.27	8.97	7.83
Average	3.09	3.01	3.06	3.80	6.83	3.96

Note : CFI scores are limited to numerical values between -4 and 10.

Figure 5 provides a time series visual depiction of the Mean CFI scores between these institutions and how the CFI trended over time leading into the COVID-19 pandemic. A visual scan of this important graph reveals that the average institutional financial health of these institutions increased over time from fiscal years 2019 to 2021, with a large jump from 3.80 to 6.83 as the pandemic matured.

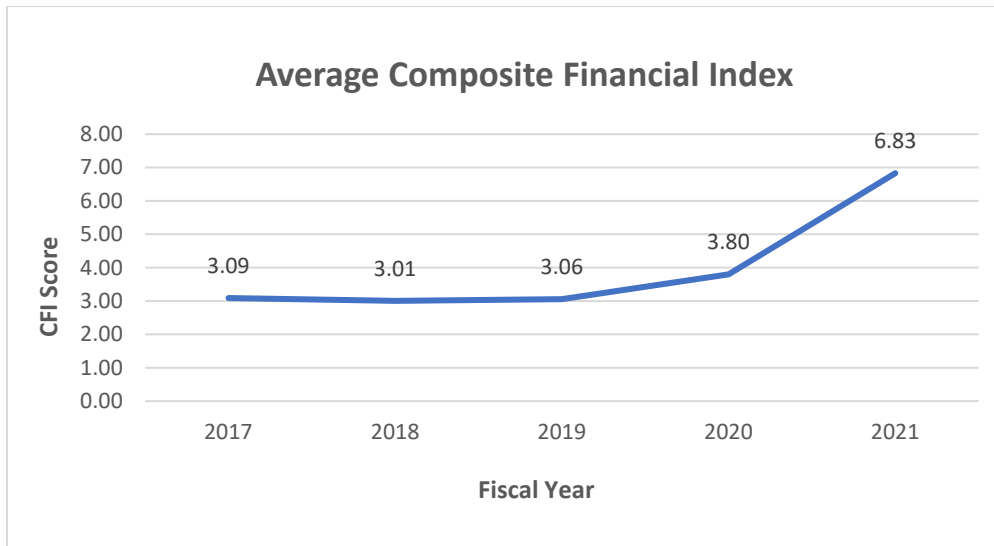


Figure 5. Average CFI scores for all institutions combined.

A fixed effects panel regression indicated no significant differences between the CFI and fiscal years 2017-2020, but a significant statistical relationship was found

between the mean CFI scores between fiscal years 2020 and 2021, ($t(6) = 3.932, p < .05$).

Chapter Summary

This chapter presented the test results of whether the identified major revenues streams (state appropriations, federal revenues, and auxiliary revenues) and non-resident enrollment rates had a significant statistical relationship to institutional financial health. The null hypothesis states that there were no significant differences between the means of the dependent and independent variables over time.

Results showed that there was no significant difference between the relationship of the dependent and independent variables over time and the null hypothesis of the between variable tests failed to be rejected, yet that there was a significant difference in the means of the dependent variable CFI between fiscal years 2020 and 2021. These results indicate that the changes in institutional health between fiscal years 2020 and 2021 were significant and we can reject the null hypothesis that there were no significant changes between the mean institutional health scores (CFI) between fiscal years 2020 and 2021.

Chapter V

DISCUSSION

This chapter presents a discussion of the findings for this quantitative study on the relationship of state appropriations, auxiliary sales and service revenues, federal revenues, and non-resident enrollment to the institutional financial health of high research, land-grant universities. This chapter includes an overview of the study, a discussion of the findings, implications and recommendations for practice and for future research, and conclusions. The primary findings of this research were that the major revenue streams and non-resident enrollment rates failed to produce a statistically significant relationship to institutional financial health, but that there were statistically significant changes to financial health as measured by the CFI between fiscal years 2020 and 2021. These findings hold merit on the importance of how administrators might respond to significant economic events where large levels of uncertainty exist on an institution's ability to maintain existing levels of revenue to carry out their mission.

Overview of the Research

The purpose of this research was to examine the utility of the Composite Financial Index (CFI) in helping public colleges and universities, specifically Carnegie R2 land-grant universities, respond strategically to changes in major funding sources such as government appropriations, auxiliary revenues, and non-resident enrollment. A primary focus of this research centered on debilitating economic events such as the 2008 Great Recession and the COVID-19 pandemic. The research method utilized a fixed effects panel regression that tested for longitudinal changes to relationships between the dependent and independent variables.

This research is important so that administrators might understand what does and does not impact the financial health of their universities, which in turn allows them to respond strategically through ratio analysis to market changes such as enrollment declines and negative economic events. According to Tahey et al. (2010), “ratio analysis can measure success factors against institution-specific objectives and provide the institution with the tools to improve its financial profile and carry out its mission” (p. 106). Ratio analysis is an important tool that enables users to interpret complex financial information quickly. “Ratio analysis can serve as a yardstick to measure the use of financial resources to achieve its institutional mission” (p. 106). The use of financial ratios in strategic decision-making allows institutions to align their mission to its financial goals, which ultimately helps them to manage risk and to increase the chances of institutional success (Tahey et al., 2010).

The research questions that guided this research were:

- 1) What is the difference over time between state appropriations and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 2) What is the difference over time between auxiliary enterprise revenues and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 3) What is the difference over time between federal revenues and institutional financial health, as measured by the CFI, of high research activity land-grant universities?

- 4) What is the difference over time between out-of-state enrollment and institutional financial health, as measured by the CFI, of high research activity land-grant universities?
- 5) What were the observed trends of the COVID-19 pandemic to the financial health, as measured by the CFI, of high research activity land-grant universities?

Discussion of the Findings

The primary theme of this research was the focus of financial health based on the CFI and its relationship to major revenue streams and non-resident enrollment. The CFI is a modern set of financial analysis ratios that assists college and university administrators in their assessment of financial health, strategy, and risk management (Tahey et al., 2010). There are four individual ratios that comprise the CFI, the primary reserve ratio, the net operating revenues ratio, the return on net assets ratio, and the viability ratio. Each of the individual ratios are multiplied by a strength factor and weighted. The individual scores are added together to arrive at the CFI. With the institutions included in this research, the average CFI score during the five years examined was 3.96 with a minimum average score of 3.01 for fiscal year 2018 and maximum average CFI score of 6.83 in fiscal year 2021.

On an individual institutional basis, the University of Wyoming (UW) had the highest average five-year score at 7.83 and the University of Maryland – Eastern Shore (UMES) had the lowest average five-year score at 1.24. The broad range of CFI scores for the institutions presented in this study reflect the diverse types of institutions included and their varying characteristics, all of which have an influence on their financial health

according to the CFI. Some larger institutions with high enrollments have a large percentage of their annual revenue coming from state support. One of these institutions, UW, is the only four-year university within their state boundaries (*University of Wyoming - The Princeton Review College Rankings & Reviews*, n.d.). This allows their state government to focus more resources and appropriations dedicated to their success and financial health. Other institutions on the lower end of the enrollment and financial health spectrum, such as the University of Maryland – Eastern Shore (UMES), are smaller and in comparison, hold a lesser share of their overall state appropriations. Keeping these between institutional differences in mind is a key to understanding how to interpret financial health using the CFI. When making broad comparisons as an administrator working for a college or university, one needs to understand that a strategy that works for one institution might not always work the same for another.

The primary statistical test used in this research was a fixed effects panel regression. This statistical method was used to test the relationships over time between state appropriations, auxiliary enterprise revenues, federal revenues, and out-of-state enrollment to institutional financial health as measured by the CFI. This research failed to find any statistically significant relationships between the dependent and independent variables. Other studies found a statistically significant relationship between state appropriations and institutional financial health (Wekullo & Musoba, 2020). Even though the results of this research failed to yield significant results in the relationships of the selected variables to financial health, important trends in the variables were observed over time. With the six institutions selected for this study, average auxiliary revenues

decreased leading into the pandemic and average federal revenues increased leading into the pandemic.

A troubling trend in financial health between the different types of institutions presented in this study were observed through the CFI scores. As the only Historically Black College and University (HBCU) represented in this study, the relatively low financial health of UMES in comparison to its largely white, flagship counterparts, such as NDSU and UW, is reflective of recent trends in funding and a corresponding lack of resources held by land-grant HBCU's. The Hatch Act requires amounts provided to the states for research and extension in excess of \$90,000 require matching funds from the state (*Colleges of Agriculture at the Land Grant Universities: A Profile*, 1995). This requirement has resulted in many HBCU's not being able to maximize the amount of federal funding that they are allocated due to a lack of state support, with 61.2% of land-grant HBCU's failing to yield the full 100% required match of state funds needed to realize full federal Hatch Act appropriations form 2010-2012 (Lee & Key, 2013). In dollars, this failure to meet that match requirement led to a net loss of \$56.6 million to 1890 land-grant HBCU's (Lee & Key, 2013).

According to Adams and Tucker (2022), HBCU's were underfunded by \$12.8 billion between 1987 and 2020 when measuring total funding by state governments on a per-pupil basis as compared to their predominantly white, land-grant counterparts located in the same jurisdictions. Of this, UMES was underfunded by \$416 million (Adams & Tucker, 2022). Table 14 presents the full scope of HBCU underfunding between 1987-2020.

Table 14*Total Underfunding of HBCU's (1987-2020)*

<u>Institution</u>	<u>Location</u>	<u>Full-time enrollment</u>	<u>Amount underfunded</u>
North Carolina A&T State University	Greensboro, NC	11,681	\$2,758,683,044
Florida A&M University	Tallahassee, FL	9,434	\$1,936,182,954
Tennessee State University	Nashville, TN	6,582	\$1,917,395,299
Southern University and A&M College	Baton Rouge, LA	6,031	\$1,370,392,619
Prairie View A&M University	Prairie View, TX	8,621	\$1,081,126,113
Fort Valley State University	Fort Valley, GA	2,474	\$577,153,763
West Virginia State University	Institute, WV	2,408	\$504,017,689
University of Arkansas at Pine Bluff	Pine Bluff, AR	2,289	\$457,535,855
Alabama A&M University	Huntsville, AL	2,943	\$437,319,814
South Carolina State University	Orangeburg, SC	6,221	\$424,096,615
University of Maryland Eastern Shore	Princess Anne, MD	2,294	\$416,599,100
Langston University	Langston, OK	2,129	\$367,734,293
Alcorn State University	Lorman, MS	3,454	\$306,282,890
Virginia State University	Petersburg, VA	4,231	\$147,735,930
Lincoln University	Jefferson City, MO	1,866	\$109,499,602
Kentucky State University	Frankfort, KY	1,669	\$1,664,746
Delaware State University	Dover, DE	4,547	\$0
Central State University	Wilberforce, OH	2,049	\$0

Note: Retrieved from Adams & Tucker, 2022, Forbes Magazine,

(<https://www.forbes.com/sites/susanadams/2022/02/01/for-hbcus-cheated-out-of-billions-bomb-threats-are-latest-indignity/?sh=7e570c20640c>).

Recent reports, however, indicate that some HBCU's are making progress in their push for increased state funding. In Maryland, a bill signed in 2021 provided a total \$577 million in funding to the state's HBCU's which includes UMES (Adams & Tucker, 2022). In Missouri, lawmakers recently voted to allocate the full state match to Lincoln University so that they would be able to receive the full amount of federal land-grant funding available (Rivas, 2022).

An additional finding of this research is the trend in how the COVID-19 pandemic and corresponding economic downturn impacted the CFI and related financial health. Between the fiscal years 2020 and 2021, there was a statistically significant

difference in CFI scores across all institutions, regardless of size, where ($t = 3.392$, $p < .05$). The reasons for this significant change in CFI scores between these two fiscal years are unclear and outside the boundaries of this research. However, this researcher hypothesizes that conservative spending coupled with an influx of COVID relief funds had a positive influence on institutional financial health in response to the pandemic.

Following the Great Recession of 2008, the American economy realized 113 straight months of economic gain leading up into the COVID-19 pandemic (*Chart Book*, 2022). At the beginning of the pandemic and after nearly a decade of 2.3% average, annual economic growth, a reduction in annual GDP occurred in March 2020 where the annual GDP rate declined by a 5.1% annualized rate in the second quarter and 31.2% in the third quarter (*Chart Book*, 2022).

Since the third quarter of 2020, the American economy has been on an up-and-down recovery where inflation rates spiked to levels not seen since the early 1980's (Desilver, 2022). According to Pew Research, the U.S. economy experienced an 8.6% annualized rate of inflation in May 2020 (Desilver, 2022). Figure 6 charts the annual percent change in GDP between 2007 and 2022 and clearly demonstrates the economic trough that coincides with the beginning of the COVID-19 pandemic.

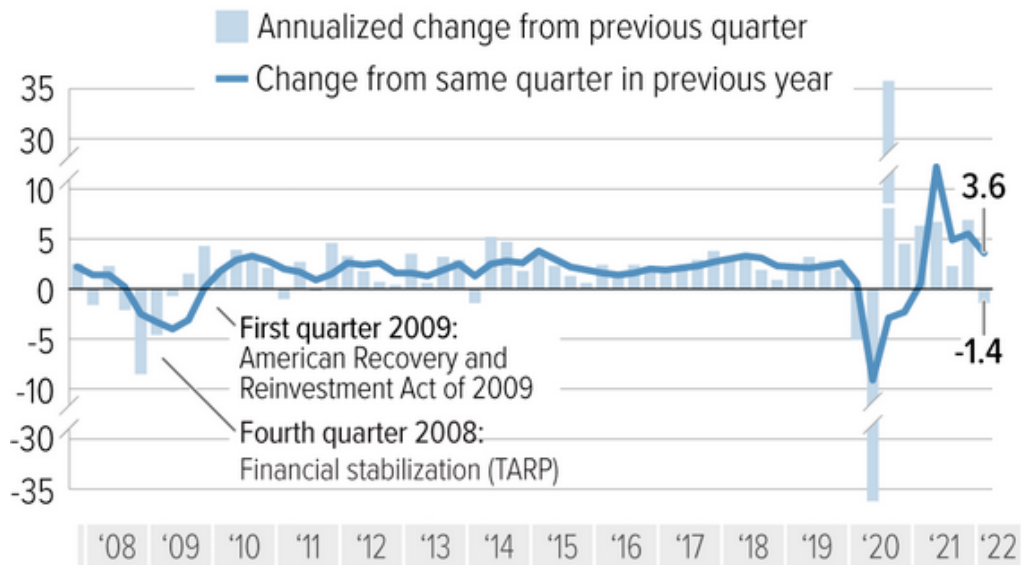


Figure 6. Percent change in real GDP. Extracted from Chart Book:

Tracking the post-Great Recession economy. (2022, July 8). *Center on Budget and Policy Priorities*.

<https://www.cbpp.org/research/economy/tracking-the-post-great-recession-economy>

As the U.S. economy faced declines attributed to the uncertainty surrounding the pandemic, the United States Congress passed a series of bills intended to provide fast and direct economic aid to the American people impacted by the negative effects of the pandemic (*CARES Act*, 2021). The first of these bills, known as the Coronavirus Aid, Relief, and Economic Security Act (*CARES*) was passed by Congress on March 27, 2020 (*CARES Act*, 2021). This bill provided \$2.2 trillion of direct aid to the American people, with \$14 billion of those funds provided to the Office of Postsecondary Education to distribute to colleges and universities through the Higher Education Emergency Relief Fund, or HEERF (*CARES Act*, 2021).

Two subsequent stimulus packages were passed by the U.S. Congress that appropriated additional dollars to institutions of higher education. The Coronavirus Response and Relief Supplemental Appropriations Act, or CRRSAA, was signed into law on December 27, 2020, and authorized an additional \$81.88 billion to HEERF (*CRRSAA*, 2021). Finally, on March 11, 2021, the third and likely final American stimulus act, the American Rescue Plan (ARP), was passed into law that appropriated an additional \$39.6 billion to institutions of higher education (*ARP*, 2022). Collectively, these three laws combine for over \$132 billion in aid intended to relieve institutions from coronavirus related costs.

Although this research failed to find any statistically significant findings between the dependent and independent variables for research questions one through four, the importance that these revenue streams hold for universities cannot be overlooked. With a diversified and strong revenue portfolio, today's college and universities have a greater chance of success in reducing the cost burden of a college education for today's students and being able to reduce the likelihood of significant and debilitating economic events to have a negative impact on an IHE's ability to carry on operations without disruption. As an example, during the beginning stages of the COVID-19 pandemic, most universities shut down in person operations and issued refunds for room and board plans students paid for as part of their education package. With these refunds, revenues from auxiliary operations declined. Without healthy cash reserves and/or direct aid provided by the Federal government (CARES), financial health for IHEs most likely would have been negatively impacted instead of the financial health increase that this research showed between fiscal years 2020 and 2021.

Implications and Recommendations for Higher Education Practice

College and university administrators must be able to interpret complex financial information to assist in their ability to carry out institutional missions. One of the tools at their disposal is financial ratio analysis. According to Woelfel (1987), “with the use of ratio analysis, financial and operational concerns as well as variances from institutional plans and policies can be identified” (p. 86). With this knowledge, administrators can adjust the day-to-day operations and keep governing boards informed of the institutional operating position and how effectively the institution is adhering to strategic priorities.

Implementing financial ratio analysis into the day-to-day activities of an institution is not without its complexities. As accounting standards and principles change, as was experienced recently with changes to pension and other post-employment benefits reporting (*Statement No. 74 Financial Reporting for Postemployment Benefit Plans Other than Pension Plans*, 2015), the year-to-year comparability becomes difficult. With these changes, there are different methods in how to calculate the individual ratios of the CFI that makes year-to-year comparisons easier, which some institutions publicly providing these different iterations of the CFI. For example, North Dakota State University includes different renditions of these ratios in the institution’s individually prepared financial statements that both includes and excludes pension and OPEB and component unit information (*Annual Financial Report*, 2021). With the maturation of technology as a tool to help automate the calculation of these ratios, some institutions such as the University of Maine are delivering this information to the public in simple dashboards that display years of CFI data (*Financial KPI*, 2020). With these dashboards available in

real time, administrators and stakeholders will have a greater ability to make strategic decisions that can have positive and lasting impacts on institutional success.

Of the institutions presented in this study, one (NDSU) had publicly available CFI data included in its financial statements (*Annual Financial Report, 2021*). Starting in fiscal year 2020, IPEDS began reporting the necessary components to make CFI calculations. As time goes on and more data becomes available, research similar to what was presented in this study will become more prevalent without the need to make complex calculations for the individual ratios that comprise the CFI. However, there is still much to be done to make the CFI more widespread and available. Greater consistency could also be achieved in financial reporting by requiring the CFI to be included in annual financial reports, which is something that is currently provided at institutional discretion. In addition, greater guidance from the authors of the CFI (Tahey et al., 2010) and IPEDS on how the ratio calculations differ when excluding or including important information such as pension, OPEB, and component units financial information, which can potentially have material impacts on the scores of the CFI and its individual ratios. This guidance would be a welcome resource for institutions that don't have the required knowledge and experience to make the calculations.

Recommendations for Future Research

Ratio analysis has been proven to be a useful tool for college administrators to judge the financial performance of their institutions. This study found that although there were no significant findings related to the revenue streams tested for analysis, there was a statistically significant relationship in the change in levels of the CFI between fiscal years 2020 and 2021. In contrast to the results presented here, a previous study did find that

state appropriations and endowments had a statistically significant relationship to institutional financial health (Wekullo & Musoba, 2020). The following paragraphs contain recommendations for possible future research.

1. Additional explorations of comparable institutions and how their financial health was impacted by the pandemic would add further context to the results presented with this study. For this research, the number of institutions available for study was limited due to a lack of availability of the fiscal year 2020 and 2021 financial statements. As more institutional financial statements become available for these most recent years, follow-up testing of the relationships presented in this study to see if the results hold for a larger sample of institutions would be meaningful.

2. An exploration of the financial health of HBCU's as compared to their flagship, land-grant counterparts. This research would add insights into the underfunding of HBCU's and potentially add valuable data to help these important institutions lobby for a greater share of state funding within their jurisdictions so that they are able to maximize the amount of federal research and extension dollars allocated to them under the Hatch Act.

3. Further research on the financial indicators that factored into the statistically significant increase in financial health that occurred between fiscal years 2020 and 2021. This research could focus on other revenue streams and expenditure volume and activity.

4. A qualitative exploration of the ways that institutions managed finances during the pandemic. With the increase to institutional financial health between the fiscal years 2020 and 2021, a survey to Chief Financial Officers to explore the initial reactions and the ways that institutional behavior changed because of the pandemic. This research

could explore the possibility that certain institutional reactions and behaviors were associated with either increases or decreases to institutional financial health.

In uncertain economic environments, college and university administrators must look for financial strategies that enable their institution to maintain operations. As budgets tighten, administrators must be flexible and look for innovative revenue streams even as they streamline their spending (Wiseman, 2011). With the prevalence of large, economic crises in the prior decade and the looming enrollment cliff on the near horizon, there are ample opportunities for researchers to discover new ways to use financial health through ratio analysis to inform decision-makers in colleges and universities.

Conclusion

Ratio analysis in higher education finance using the CFI is becoming more widespread and used in more institutions to set operating benchmarks that easily tie into strategic plans. With the growing trend of using ratio analysis through the CFI, organizations such as IPEDS have recognized the utility of the CFI in financial statement analysis in higher education and have now required this information as part of their annual survey.

This study did not find any statistically significant relationships between financial health and state appropriations, federal revenues, auxiliary revenues, and non-resident enrollment. Nevertheless, important trends were observed with these variables over time as the COVID-19 pandemic matured from fiscal years 2020 and 2021. During this time, a statistically significant change occurred with the financial health of the institutions presented in this study where the financial health *increased* in the beginning stages of an economic recession.

With the huge influx of cash support from the federal government allocated to the higher education industry to offset the impacts of the pandemic, surprising results indicated that there was no statistically significant relationship between federal revenues and financial health. This finding raises important questions as to the reasons for the increase in financial health. If a statistically significant relationship did not exist between federal revenues and financial health given the large amount cash assistance provided by the federal government to subsidize institutions for costs related to the pandemic, what were the reasons for this increase?

With many questions raised by the results of this research left unanswered, further research should focus on expanding the sample of institutions included in this study to see if the results hold firm. In addition, new research on the specific behavioral reactions taken by institutions in response to the pandemic, such as reducing expenses in the face of uncertain enrollment due to changes in course delivery during the early stages of the pandemic, would yield potentially beneficial guidance that would help institutions when faced with a new, debilitating economic event.

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