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Predicting Shutdown: Exploring Commonalities in Higher Education Institutional Failure at Faith-Based Institutions

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**PREDICTING SHUTDOWN: EXPLORING COMMONALITIES IN HIGHER
EDUCATION INSTITUTIONAL FAILURE AT FAITH-BASED INSTITUTIONS**

A dissertation submitted to
the Graduate College of
Marshall University
In partial fulfillment of
the requirements for the degree of
Doctor of Education

In

Leadership Studies

by

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Approved by

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May 2022

APPROVAL OF DISSERTATION

We, the faculty supervising the work of **Edward James Barton**, affirm that the dissertation, *Predicting Shutdown: Exploring Commonalities in Higher Education Institutional Failure at Faith-Based Institutions*, meets the high academic standards for original scholarship and creative work established by the Ed.D. Program in **Leadership Studies** and the Graduate School of Education and Professional Development. This work also conforms to the editorial standards of our discipline and the Graduate College of Marshall University. With our signatures, we approve the manuscript for publication.

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DEDICATION

This dissertation is dedicated to my patient, loving, and understanding family – especially my two teenage daughters. I hope that they can see that learning can be fun and rewarding. This is also dedicated to the faculty, monks, staff, students, administration, trustees, and Saint Martin’s University alumni in Lacey, Washington. Without seeing the results of their passion for creating an inclusive, accepting, and attainable Catholic Benedictine education available to traditionally marginalized students, I would never have undertaken this study.

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TABLE OF CONTENTS

List of Tables	viii
Abstract	ix
Chapter 1: Introduction	1
Introduction.....	1
Background	3
Statement of the Problem.....	10
Purpose of the Study.....	10
Research Questions	11
Significance of the Study	11
Limitations of the Study	12
Definition of Terms	13
Methods	16
Summary.....	17
Chapter 2: Literature Review.....	19
A Brief History of the FRR Composite Score	20
Quantitative Based Studies	24
Qualitative Based Studies	32
Summary of Literature.....	36
Chapter 3: Research Design and Methodology	37
Introduction.....	37
Research Design	37
Research Questions	37

Data Collection.....	38
Population.....	40
Instrumentation and Data.....	41
Data Analysis	43
Chapter 4: Results	46
Introduction.....	46
Descriptive Statistics	46
Logistic Regression	48
Findings	51
First Research Question	51
Second Research Question	54
Chapter 5: Summary and Conclusion	61
Introduction.....	61
Summary of Findings	61
Recommendations for Stakeholders	63
Generalizability.....	64
Recommendations for Further Research.....	65
Conclusion	66
References	68
Appendices	74
Appendix A - Private Faith-Based Higher Education Institutions on Heightened Cash Monitoring as of June 1, 2016.....	74

Appendix B – Control Group of 100 Faith-Based Institution not on Heightened Cash Monitoring as of June 1, 2016.....	76
Appendix C – Institutions Closed or Announcing Closure – AY 2019 & 2020.....	80
Appendix D – Data Fields, Sources and Calculations.....	81
Appendix E – Descriptive Statistical Data – Closed Institutions.....	86
Appendix F – Descriptive Statistical Data – Heightened Cash Monitoring Institutions...	90
Appendix G – Descriptive Statistical Data – Random Control Institutions	94
Appendix H – Results of t-Test: Two-Sample Assuming Unequal Variances – Research Question 1	98
Appendix I – Results of t-Test: Two-Sample Assuming Unequal Variances – Research Question 2	100
Appendix J – Marshall University Institutional Review Board Exemption Letter.....	101

LIST OF TABLES

Table 1 - Five Most Relevant Indicators of Financial Fragility in Order of Occurrence.....	5
Table 2 - Seven Major Causes of Fragility Among Religiously Affiliated Institutions	6
Table 3 - NAICU Recommendations for Improving the Use of the FRR Score.....	7
Table 4 - Department of Education FRR Recalculation Triggers	8
Table 5 - Dickmeyer’s Five Indicators of Financial Health	21
Table 6 - Sturm’s Eight Key Variables	25
Table 7 - Martin and Samels Risk Indicators	26
Table 8 - Denneen and Dretler Risk Factors	28
Table 9 - Bunn’s Good to Great Sustainability Areas of Focus	33
Table 10 - Select Descriptive Statistics for Independent Variables Used in Logistic Regression Model.....	47
Table 11 - Regression Coefficients Predicting Closure – 13 Variable Model	49
Table 12 - Regression Coefficients Predicting Financial Fragility – 13 Variable Model.....	50
Table 13 - Regression Coefficients FRR Only Models	51

ABSTRACT

The findings of this study suggest that while the FRR score provides a reasonable indication of financial fragility over a subsequent five-year period, the FRR score is little better than a coin flip in predicting whether a religiously affiliated higher education institution will be financially troubled enough to close within the subsequent five years. The study found that using a multi-factor model to predict closure results in higher predictive accuracy during the observed period.

CHAPTER 1: INTRODUCTION

Introduction

In October 2019, when Cincinnati Christian University (CCU) announced it would close at the end of the Fall 2019 semester, marking the end of the faith-based institution's 95-year history, it came as a shock to some students, disappointment to many, and disrupted the athletic and academic careers of about 350 students (DiTirro, 2019). While the decision to close before the end of the academic year came as a surprise to many, the Chronicle of Higher Education reported on CCU's financial strain on July 19, 2019 – noting that decisions to invest in athletic programs while cutting costs, staff, and faculty and simultaneously adjusting the mission of the school were “among the many that have pushed Cincinnati Christian toward the brink of financial ruin and put it at risk of losing its accreditation” (Kelderman & Bauman, 2019).

Unfortunately, the story of Cincinnati Christian is a familiar one to thousands of students, faculty, and staff at private, faith-based institutions nationwide. In the years leading up to the pandemic-induced crisis, financial pressures on institutions and families were nothing new. Since 2016, more than 50 private, not-for-profit institutions have announced their closure or consolidation due to financial failure (Busta, 2020). The worldwide COVID-19 pandemic in 2020 served to exacerbate the financial strain on the budgets of thousands of colleges and universities and millions of families responsible for paying the tuition, room, and board for the students enrolled at those institutions.

To assess the financial strength and stability of institutions receiving federal student loans or grants, the United States Department of Education utilizes a measure known as the Financial Responsibility Ratio (FRR). The FRR is a composite of three ratios calculated utilizing the

institution's audited financial statements. The three ratios measure cash reserves, unencumbered assets, and net income. The composite score reflects institutions' overall relative financial health along a scale from negative 1.0 to positive 3.0. A score greater than or equal to 1.5 indicates that the institution is considered financially responsible. Schools with scores of less than 1.5 but greater than or equal to 1.0 are considered financially responsible but require additional monitoring. Schools with a score less than 1.0 are considered not financially responsible (Federal Student Aid, 2020a).

The FRR is a retrospective measure of financial performance. However, governing boards and administrators need to have predictive risk measures at their disposal to effectively manage the risk of closure and avoid taking unnecessary risks when attempting to manage an institution struggling with maintaining viability. Other factors, such as local area demographics, enrollment levels, endowment levels, graduation rates, and staffing levels, which extend beyond the operational, financial data measured by the FRR and traditional financially focused metrics, are some of the root causes of these failures.

With increased financial pressures placed on institutions because of the 2020 pandemic, stakeholders will need practical tools to assess institutional stability and viability. This study explores multiple risk factors faced by private, religiously affiliated higher education institutions issuing undergraduate degrees and provides governing boards, administrators, accrediting bodies, and regulators with the common financial and demographic factors which appeared to have a significant predictive value of failure among those institutions that closed from 2016 to 2020.

Background

As measured on June 1, 2016, there were 184 not-for-profit colleges and universities subjected to Heightened Cash Monitoring (HCM) by the United States Department of Education (“Department”). Of these 184 institutions, 91 were subjected to HCM because they showed an FRR score below 1.5 as the sole reason for inclusion in HCM (Federal Student Aid, 2020b), a calculation known as the Financial Responsibility Ratio (FRR). Other reasons for inclusion in HCM protocols were late or missing audits and financial statements (72), administrative capability (6), severe findings in reviewing the financial aid program (5), accreditation problems (2), payment method changes (1), eligibility problems (1), severe audit problems (1), and provisional certification (1). Of the institutions on HCM on June 1, 2016, 43 were not-for-profit religiously affiliated institutions that offered undergraduate degrees in the 2017 academic year. Appendix A provides a list of those institutions.

Section 498(c) of the Higher Education Act of 1965, as amended, requires for-profit and non-profit institutions to annually submit audited financial statements to the Department to demonstrate they are maintaining the standards of financial responsibility necessary to participate in the Title IV student loan and grant programs administered by the Department. One of many standards, which the Department utilizes to gauge an institution’s financial responsibility, is a composite of three ratios derived from an institution’s audited financial statements. The three ratios are a primary reserve ratio, an equity ratio, and a net income ratio. These ratios gauge the fundamental elements of the financial health of an institution, not the educational quality of an institution.

The simplicity of calculating the FRR score, coupled with its use by state and federal governments in assessing financial stability and eligibility for participation in many students aid and research grant programs, makes the score a popular measure. The calculation and results are public data utilized by governing boards and state legislatures as part of their respective oversight roles. However, the FRR does not provide a holistic assessment of an institution's health. The FRR has many critics who note that it is backward-looking, disregards changes to Generally Accepted Accounting Principles, and the interventions required to meet Department of Education mandates may exacerbate the school's financial challenges rather than protect the stakeholders (Sokol & Cao, 2019). In analyzing the data, of the 50 institutions that closed between 2016 and 2020, 21 of them had healthy FRR scores in FY 2016. Conversely, of the 140 institutions receiving a failing FRR score in 2016, 119 institutions were still operating in 2020 (Busta, 2020; Federal Student Aid, 2020a).

Complicating matters for governing boards and administrators faced with a weak FRR score, demographic shifts make it more challenging for less selective colleges and universities to compete for enrollment and maintain financial stability, mainly if they are heavily reliant on tuition to meet operating funding requirements (Eide, 2018). Based on the 2016 – 2020 FRR and closure data, local and regional demographic shifts, tuition discounting, enrollment trends, and admissions selectivity may provide a far more accurate prediction of institutional viability. However, these factors are rarely reported or analyzed in predicting institutional distress.

Recognizing the increasing challenges faced by religiously affiliated institutions, Andringa (2009) noted that of the nine hundred religiously affiliated schools identified; many were “fragile or on the brink” of failure (p.168). As President of the Council for Christian Colleges and Universities (CCCCU), Andringa (2009) surveyed one hundred CCCC member

institutions and reviewed the most fragile members of the organization to identify common traits among the weakest institutions. Fifty-four institutions responded. The results noted five key indicators, noted in Table 1 below, were frequently identified in the most fragile institutions.

Table 1

Five Most Relevant Indicators of Financial Fragility in Order of Occurrence

1. The institution is on probation, warning, or financial watch with the regional accreditor or a specialty degree licensor.
2. Short-term bridge financing was required in the final quarter of the last five fiscal years.
3. Deferred maintenance is at least 40 percent unfunded.
4. A majority of the faculty do not hold terminal degrees.
5. Debt service is more than 10 percent of the operating budget.

Adapted from “Keeping the faith: leadership challenges unique to religiously affiliated colleges and universities” by R.C. Andringa, 2009, in *Turnaround: leading stressed colleges and universities to excellence*. J. Martin & J.E. Samels (Eds.), p. 175. Copyright 2013 by Johns Hopkins University Press.

Of the five elements noted by Andringa (2009), only the fifth element, the level of debt service, is a component of the FRR calculation. The four more relevant indicators are not measured by the FRR, although the placement on probation may be, in part, the result of a poor FRR score.

Andringa (2009) took the survey results one step further and looked to identify the root causes of financial fragility identified in the organizational membership. Table 2 summarizes the causes presented by Andringa. While many of the causes are institutional, such as relations with sponsoring congregations or religious requirements of the sponsoring congregations, Andringa (2009) noted that the number one cause of institutional fragility was “location, location,

location” (p. 171). Noting that many of today’s current students would rather eschew the generally rural and pastoral settings of small religiously affiliated institutions for larger institutions in urban settings, this trend, coupled with a tuition-dependent financial structure, is a significant negative factor for these institutions.

Table 2

Seven Major Causes of Fragility Among Religiously Affiliated Institutions

1. Location
2. “The burden of the liberal arts.”
3. Church relations
4. Church-Campus governance conflicts
5. Institutional independence and political decision making
6. Cost of residence life
7. Faith and accountability

Adapted from “Keeping the faith: leadership challenges unique to religiously affiliated colleges and universities” by R.C. Andringa, 2009, in *Turnaround: leading stressed colleges and universities to excellence*. J. Martin & J.E. Samels (Eds.), p. 171-174. Copyright 2013 by Johns Hopkins University Press.

In a 2012 *Report of the NAICU Financial Responsibility Task Force*, the National Association of Independent Colleges and Universities (NAICU) examined the FRR score considering the failure of over 100 private colleges and universities. The report notes six recommendations for improving the use of the FRR to evaluate higher education institutions' financial condition. Table 3 below summarizes these recommendations. The report identified seven inconsistencies between Department of Education accounting definitions and Generally Accepted Accounting Principles (GAAP) (p.18), which, at best, distort the institution's financial

position and may create confusion or miscalculation on the part of the institutions reporting the data.

Table 3

NAICU Recommendations for Improving the Use of the FRR Score

1. Ensure that the Department of Education follows its regulations and uses standard accounting definitions when applying the FRR.
2. The Department of Education should either not treat endowment losses as expenses for FRR calculations or expand the primary reserve ratio to include all net assets in the calculation.
3. The current regulations allow institutions to demonstrate financial responsibility with alternative methods as provided in the statute, and these need to be retained for institutional flexibility.
4. The Department of Education needs to develop a consistent appeals process as part of the FRR reporting process to allow for amendment and correction.
5. The Secretary of Education should “fully implement” (National Association of Independent Colleges and Universities, 2012, p.7) the requirement to thoroughly examine the “total financial circumstances” of institutions that fail ratios stated in the Higher Education Act of 1965, Section 498(c)(3)(C) and not just apply a bright-line test in assessing penalties and corrective measures.
6. The Department of Education needs to establish an advisory panel of objective expert practitioners of not-for-profit accounting to provide technical guidance.

Adapted from *Report of the NAICU Financial Responsibility Task Force* p. 5-17 by Copyright 2012 by the National Association of Independent Colleges and Universities.

In 2019, the Department of Education made changes in the regulations designed to protect student borrowers and assess the financial health and stability of institutions receiving Federal Title IV loan funds in response to the failure of Corinthian Colleges. Subsequently, the Department of Education identified shortcomings in the FRR measurement when examining borrowers' defenses to repay student loans. The Department of Education (Student Assistance General Provisions, 2019) identified five automatic triggers that would cause a recalculation of the FRR and eight discretionary triggers to recalculate the FRR and assess the institutional total financial circumstances as required by the Higher Education Act of 1965, Section 498(c)(3)(C). Table 4 provides a summary of these triggers.

Table 4

Department of Education FRR Recalculation Triggers

Required Triggers

1. Debts arising from a judicial or administrative proceeding or settlement.
2. Borrower defense-related lawsuits.
3. Other litigation with significant loss potential.
4. Accrediting agency actions requiring a teach-out plan when closing a branch or additional location.
5. Gainful employment programs that could become ineligible for federal aid in the following award year.

Discretionary Triggers

1. Significant fluctuations year-to-year in the amount of Pell Grant and Direct Loan funds received by the institution.

2. Citation by state licensing or authorizing agency for failing requirements.
3. Failing a financial stress test devised or adopted by the Department of Education.
4. High annual dropout rates.
5. Accreditation status on probation, show-cause order, or similar action.
6. Violation of a provision of a requirement in a loan agreement that allows the creditor to increase collateral.
7. Pending claims of borrower relief discharge.
8. Significant borrower defense claims are expected due to lawsuit, settlement, judgment, or findings.

Adapted from Student Assistance General Provisions 84 Fed. Reg. p. 49788-49933. Published September 23, 2019.

The 2019 addition of enumerated mandatory and discretionary triggers, which include non-financial measures, provides indicia that the Department of Education recognizes the limitation of the FRR on assessing the sustainability of the financial institution. First proposed in 2016 and revised with the August 30, 2019, promulgation and effective date of July 1, 2020, these regulations represent a broadening of the assessment of institutions and a movement away from the use of the FRR as a sole bright-line test - which consists of a clearly defined objective standard and measurement, leaving little open to interpretation by the user – and a movement towards a more holistic assessment of the institutional health by the Department of Education.

While there is an emerging consensus that the FRR is inadequate as a sole measure of institutional stability, the search for more effective predictors has continued to focus primarily on measures internal to the institution. As shown with the studies noted above, the research literature analyzes the financial measures of the institution. While a literature review finds the

common threads of budgetary control, ratio analysis and endowment, and enrollment levels, few integrate the demographic and external factors that potentially impact the institution's sustainability.

Statement of the Problem

Governing boards and other stakeholders often focus on bright-line measures of objective factors and easy-to-understand key performance indicators (KPIs) to trigger significant changes in leadership and strategy. These factors and KPIs are easy to evaluate and tend to produce certainty in the user's evaluation of whether the institution achieved the desired level of performance. However, this simple approach may not lead to balanced or equitable decisions—the most-reported metric, the FRR, may be a poor predictor of institutional failure. Decisions made utilizing the FRR as the primary predictor of institutional distress may provide false or delayed financial stability or instability signals and ultimately result in poor decision-making. Much of the research and approaches to analysis rely on financial measures, which tend to be lagging. Additionally, while financial failure is the last and most apparent step in the road to institutional failure, other factors were the root cause of the institution's financial performance. New measurements and metrics are required to better predict institutional distress at faith-based institutions and allow stakeholders to manage those factors that will most impact the institution's future.

Purpose of the Study

The purpose of this quantitative study is to examine financial and demographic factors which may predict institutional failure for faith-based, not-for-profit higher education institutions. This study aims to provide insights into critical influences on institutional financial performance for use by governing boards, administrators, and regulatory agencies.

The nature of the study requires the use of statistical analysis over an extended period. This study provides stakeholders with additional information on how heavily to weigh and best manage these factors when determining the financial stability of an organization, developing strategies for institutional success, and assessing the likelihood of institutional failure.

Research Questions

To understand how data may be utilized as a trigger to change leadership and strategy, the study asked two research questions:

1. What factors predict institutional health for private, faith-based non-profit higher education institutions as determined by the institution's inclusion on the Department of Education's Heightened Cash Monitoring list in the 2018-2019 Academic Year as measured by a reported FRR Score below 1.5 for the 2018-2019 Academic Year?
2. What factors can be used to predict institutional closure for private, faith-based non-profit higher education institutions?

Significance of the Study

The findings of this study will benefit policymakers, institutional governing boards, and university administrators in determining the financial health of educational institutions and developing operational, financial, and leadership strategies. Increased financial stressors resulting from the COVID-19 pandemic and the impact of volatility in financial markets on institutional endowments will heighten scrutiny on institutional financial stability and performance. To facilitate strategy development and tactical decisions, stakeholders increasingly rely on KPIs and other data points to summarize vast financial and operational information. Understanding critical variables of financial stability utilizing the data from the institutions that predicted institutional financial distress or failure during the 2014-2019 timeframe will provide

key stakeholders with the information needed to assess whether the institution appears to have a path to viability, which elements are most impactful, and to establish a strategy for institutional assessment and recovery.

Limitations of the Study

The analysis does not include the perspectives of governing boards or other leadership stakeholders to determine what weighting they give the FRR score or other factors in the decision-making process. The data comprise five years from 2013-2014 through 2018-2019. This period saw a recovery from unprecedented financial disruption and worldwide recession ending in 2010. It was in the middle of a nearly ten-year economic expansionary period, as well as a period of significant regulatory change impacting private, for-profit institutions.

The population sets of HCM (Appendix A) and closed (Appendix C) institutions represent the entire population of faith-based, not-for-profit private institutions falling within those parameters for the period analyzed. This limits the potential applicability of the data, and the findings are not generalizable. The control group of 100 institutions (Appendix B) used in the study represents 17% of the approximately 593 faith-based, not-for-profit private institutions not on HCM in 2016.

The study is limited in applicability to public-funded institutions as well. Public institutions have potential recourse to state funding and donors, bonding, and other sources of fundraising, which may make the data incompatible with private institutions.

Another limitation is that the data were not collected for the purpose for which it was used. Additionally, because of the focus on the FRR score, institutions may have failed to accurately report their financial statements or their FRR score to the Department of Education.

The Integrated Postsecondary Education Data System (IPEDS) information on other variables may be inaccurate.

Finally, the study utilized an ex post facto non-experimental design. This type of study limits manipulating the variables within a controlled setting to further test and validate predictive power (Ex post facto study, 2012).

Definition of Terms

While the study initially analyzed 139 variables, only 13 were selected based on statistical differences in the means that help answer the research questions. The definitions of the key terms are as follows:

Core Expenses: Core expenses for Financial Accounting Standards Board (FASB) (primarily private, not-for-profit, and for-profit) institutions include instruction, research, public service, academic support, student services, institutional support, net grant aid to students and other expenses. For FASB institutions, core expenses exclude auxiliary enterprises (e.g., bookstores, dormitories), hospitals, and independent operations (National Center for Education Statistics, 2020a).

Core Revenues: Core revenues for private, not-for-profit, and public institutions reporting under the FASB standards include tuition and fees; government appropriations (federal, state, and local); government grants and contracts; private gifts, grants, and contracts; investment return; sales and services of educational activities; and other sources. In general, core revenues exclude auxiliary enterprises (e.g., bookstores, dormitories), hospitals, and independent operations (National Center for Education Statistics, 2020a).

Distance Education: The number of students completing one or more classes by distance education enrolled in the Fall semester (National Center for Education Statistics, 2020a).

Endowment funds: Funds whose principal is nonexpendable (true endowment) and intended to be invested to provide earnings for institutional use. It also includes term endowments and funds functioning as endowments (National Center for Education Statistics, 2020a).

Financial aid: Federal Work-Study, grants, loans to students (government and private), assistantships, scholarships, fellowships, tuition waivers, tuition discounts, employer aid (tuition reimbursement), and other monies (other than from relatives/friends) provided to students to meet expenses. This excludes loans to parents (National Center for Education Statistics, 2020a).

Financially fragile: An institution with an FRR score below 1.5. (Federal Student Aid, 2020a).

Full-Time Equivalent (FTE) Staff: The full-time-equivalent (FTE) of staff is calculated by summing the total number of full-time staff from the Employees by Assigned Position (EAP) component and adding one-third of the total number of part-time staff.

Full-Time Equivalent (FTE) Students: The number of FTE students is calculated based on fall student headcounts reported by the institution on the IPEDS Enrollment. The FTE of the institution's part-time enrollment is estimated by multiplying the factors noted below times the part-time headcount. These are then added to the full-time enrollment headcounts to obtain an FTE for all students enrolled in the fall (National Center for Education Statistics, 2020a).

Graduation rate: The rate required for disclosure and reporting purposes under the Student Right-to-Know Act. This rate is calculated as the total number of completers within 150% of standard time divided by the revised adjusted cohort (National Center for Education Statistics, 2020a).

Part-Time Enrollment: Undergraduate: A student enrolled for either less than 12 semester or quarter credits or less than 24 contact hours a week each term. Graduate: A student enrolled for less than nine semester or quarter credits (National Center for Education Statistics, 2020a).

Pell Grant: (Higher Education Act of 1965, Title IV, Part A, Subpart I, as amended.) Provides grant assistance to eligible undergraduate postsecondary students with demonstrated financial need to help meet education expenses (National Center for Education Statistics, 2020a).

Retention rate: A measure of the rate students persists in their educational program at an institution, expressed as a percentage. For four-year institutions, this is the percentage of first-time bachelor (or equivalent) degree-seeking undergraduates from the previous fall who are again enrolled in the current fall. For all other institutions, this is the percentage of first-time degree/certificate-seeking students from the previous fall who either re-enrolled or completed their program by the current fall (National Center for Education Statistics, 2020a).

Tuition and fees: The amount of tuition and required fees covering a full academic year most frequently charged to students. These values represent what a typical student would be charged and may not be the same for all students at an institution. If tuition is charged on a per-credit-hour basis, the average full-time credit hour load for an entire academic year is used to estimate average tuition. Required fees include all fixed sum charges required of such a large proportion of all students that the student who does not pay the charges is an exception (National Center for Education Statistics, 2020a).

Tuition discount rate: Institutional support divided by tuition (National Center for Education Statistics, 2020a).

Methods

The study first reviewed the performance of three cohorts of faith-based institutions from the 2013-2014 to the 2018-19 academic year across 139 financial and demographic variables to assess which variables were likely to have a statistically significant impact on the institution's viability. The study utilized descriptive statistics to compare the cohort of 43 institutions noted in Appendix A on HCM in June 2016 with a cohort of 100 randomly selected faith-based, not-for-profit higher education institutions that were not on HCM in June 2016, as listed in Appendix B. The study compared their financial performance and the underlying demographic trends at the institutions from the 2013-2014 academic year to the 2018-2019 academic year and identified common trends or indicators that provided leading indicators of financial distress that may be more useful than the FRR score. Additionally, 11 institutions announced they would close or did close during the 2019 and 2020 academic years. These 11 institutions are listed in Appendix C and include four from Appendix A.

The study then identified the 13 factors that showed a high probability for statistical significance based on an analysis of their descriptive statistics and a pairwise t-test across the three cohorts. These factors were logistically regressed for the three cohorts to determine the probability that they could accurately predict whether an institution would be either financially fragile or closed during the 2019-2020 academic year. The study compared these results to a logistic regression where the FRR score was the sole variable for determining the probability of either financial fragility or closure.

The study compiled the analyzed data using FRR and HCM information available from the United States Department of Education and the National Center for Education Statistics Integrated Postsecondary Education Data System (IPEDS) on institutional enrollment data,

student demographic data, tuition data, financial data categorized by Generally Accepted Accounting Principles classification, endowment level, admissions rate, and tuition discount rate. The study recorded the self-stated denomination affiliation for each institution. Finally, the study analyzed the United States Census Bureau's localized population and economic data.

The study examined trends in the data beginning with the 2013-2014 academic year through the 2018-2019 academic year by cohort based on both absolute level and the percentage change from the base year of 2013-14.

The study calculated descriptive statistics on each population. The study then utilized a two-sample t-test test to determine the difference between the means and standard deviations of the variables. This step was utilized to determine which categorical variables differed between the closed and control populations to identify the probable significant factors.

Multivariate logistic regression analysis was then used to calculate a probability in predicting institutional fragility and closure for the institutions. The results were compared to logistic regression for the same factors utilizing only FRR as the independent variable. The probabilities were then compared, and the results analyzed.

Summary

Religiously affiliated higher education institutions comprise approximately 16% of the degree-granting institutions in the United States (National Center for Education Statistics, 2020b) but represent over 23% of the institutions on HCM in June 2016. The fragility of these institutions relative to the general population of higher education institutions creates a challenge for the administrators, governing boards, and regulators charged with the operation and oversight of these institutions to provide a stable educational environment. Understanding the drivers of financial distress before they become a crisis will allow for more proactive management and

mitigation of these drivers. By analyzing cohorts of fragile and stable institutions across a set of key data points, this study will help identify those drivers that appear to have significant impacts on institutional stability and provide those insights into institutional stakeholders to assist with management, oversight, and decision making.

CHAPTER 2: LITERATURE REVIEW

This literature review intends to summarize the critical research, works, and findings in using key performance indicators in assessing the health of higher education institutions generally and not-for-profit private religious higher education institutions specifically.

Much of the literature is based on information that is decades old, and the data relied on by the authors predates the most recent wave of closures. Some of the literature must be analyzed intuitively, as the focus of many studies was on turnaround strategies rather than institutions that ultimately failed.

Leslie and Fretwell (1997) developed a four-factor analytical model consisting of institutional financial condition trends, external factors, stability and openness in management, and vitality of education programs. They determined that monitoring these four factors and their interaction would predict future financial distress. The Leslie and Fretwell study is now 25 years old, and higher education and demographics have changed considerably over that time, and a comprehensive update is necessary.

The study organizes Chapter 2 by section based on the following criteria. The first section presents a brief history of the development of the FRR score and the legislation leading to its use as the primary measure by the Department of Education to assess institutional financial viability. The second section reviews quantitative studies and research on the viability of higher education institutions, focusing on the measures and inputs that appear to predict closure. The third section reviews qualitative research exploring these same factors. The goal is to understand the existing relevant research and how it may predict the closure of faith-based higher education institutions.

A Brief History of the FRR Composite Score

Increased focus on using ratio analysis and key performance indicator (KPI) measurements to assess higher education institutions' financial viability began in the early 1970s with three converging influences. The first was the 1973 publication of the *Industry Audit Guide: Audits of Colleges and Universities* by the American Institute of Certified Public Accountants. The second was a report by the National Commission on the Financing of Postsecondary Education the same year, which recommended the development of KPIs for higher education institutions as part of an expanding college and university enrollment in the wake of the Vietnam War. Finally, in 1974, the National Association of College and University Business Officers (NACUBO) published *College and University Business Administration*, which developed GAAP and classifications for higher education institutions. These three elements created the framework for developing the first sets of commonly used financial ratios by the accounting firm of Peat Marwick (Curry, 1998).

Development of additional financial models continued during the 1970s and 1980s in response to increasing institutional borrowing and enrollment trends. Dickmeyer (1980) published a technical report on KPIs and other indicators to assess the financial health of universities in 1980. The Dickmeyer study focused on environmental and internal financial factors and identified that multiple revenue streams, limited competition, low tuition, and high institutional demand combine to create a sustainable higher education business model. In contrast, operational inefficiencies and suboptimal market segments could combine to undermine institutional financial stability (Dickmeyer, 1980, p.5-6). The study identified five indicators to monitor to assess the financial health of a higher education institution, shown below in Table 5:

Table 5

Dickmeyer's Five Indicators of Financial Health

1. The changes in the potential for institutional distress are measured by the ability to manage during economic downturns and add academic programs to meet changing market needs.
2. Changes in institutional financial resources.
3. Changes in academic emphasis.
4. Changes in the extent of academic opportunity.
5. Increased need for additional financial resources.

Adapted from "Concepts Related to Indicators of College and University Financial Health" by N. Dickmeyer, 1980, *Technical Report No. 12 American Institutes for Research in the Behavioral Sciences*. p.17. Copyright 1980 by National Center for Education Statistics.

These represent some of the foundational studies on the development of KPI reporting and the increasing influence ratio analysis and KPI management had on assessing institutional financial strength. Additional studies continued this trajectory over the next twenty years.

Based on a number of these studies, the National Association for College and University Business Officers (NACUBO) published *Financial Self-Assessment: A Workbook for Colleges 2nd edition* in 1987. The revisions in this edition from the first edition of the work published in 1981 further expanded on Dickmeyer's 1980 study and developed institutional factors including financial resource measures, instructional expenditures, staffing levels, staffing level changes, flexibility, and selectivity in accepting students. The workbook identified these elements as critical influences on the financial risk borne by the institution.

NACUBO continued gathering information and conducted a two-year benchmarking project of KPIs and major financial trends – gathering data from nearly 150 participating institutions. This project resulted in a 1992 release of a national database of KPIs and benchmarks for 38 functional areas in the higher education institution, including admissions, academic affairs, staffing levels, facilities, and endowment management. While the study did not provide prescriptive solutions for those institutions falling outside the benchmark ranges, it did provide effective benchmarks to guide administrators and other stakeholders with indicia of under- or over-performance in these key functional areas (Kempner & Shafer, 1993).

On September 20, 1996, the Department of Education published proposed rulemaking that would create a requirement for all financial institutions receiving Title IV aid to submit audited financial statements to help ensure that there was no defalcation of federal aid and that the institutions were maintaining adequate controls and appropriate financial resources. The Department of Education had engaged KPMG, the successor firm to Peat Marwick – who initiated the development of the initial financial ratio studies in the 1970s as noted in Curry (1998) – to develop an approach that could utilize existing measures of institutional performance to evaluate the financial stability of institutions receiving Title IV aid (Student Assistance General Provisions, 1997a).

The final rules promulgated on November 25, 1997 (Student Assistance General Provisions, 1997b) established the methodology for calculating the FRR. The model developed by KPMG and adopted by the Department of Education normalized responses from the financial statements utilizing three ratios: the primary reserve ratio, the equity ratio, and the net income ratio. The calculation of the FRR must tie back to the audited financial statements prepared by

the auditor of the institution's choice. The three base ratios developed by the Department of Education were:

1. Primary Reserve Ratio – calculated by dividing the expendable net assets by total expenses.
2. Equity Ratio – calculated by dividing modified net assets as defined by the modified assets as defined.
3. Net Income Ratio – calculated by dividing the change in unrestricted net assets by total unrestricted revenues.

Following the period covered in this study, in 2020, the Department of Education promulgated changes in calculating the FRR score. This was driven, in part, as a reaction to the global pandemic caused by COVID-19. Under the new regulation, the mitigation requirements for institutions on Heightened Cash Monitoring are reduced. The calculations consider changes in GAAP relating to gains, losses, endowment, debt, and pension obligations. For most institutions, these changes will have little impact on their calculations (Towne & Ostapenko, 2020).

The literature is best analyzed in terms of quantitative studies, which explore the relationship of institutional stability to variables within a quantitative framework, and qualitative studies, which explore the impacts of leadership and non-quantitative factors on institutional stability. These two groups organize the literature review, and within them, by recency.

Quantitative Based Studies

In 2001, Wanczyk conducted a quantitative examination of various factors to predict an institution's short- and long-term viability within a case study environment at a flagship public institution. The Wanczyk study built on the 1996 study by Leslie and Fretwell and attempted to apply the four-factor model to a real-life situation. The case study noted that the Leslie and Fretwell model worked well to identify high-level trends and evaluate alternative financial and operational policies. The study noted that the model was limited in predicting future revenue streams and enrollment trends, the time and difficulties to implement corrective action, and the very high analysis level, limiting the ability to develop specific budgetary or policy prescriptions. As it pertains to this study, the Wanczyk study was focused on a flagship public university, not a private institution. The ability to gather and analyze data at institutions with the level of resources at a flagship institution is greater, but making rapid change is likely significantly lower. However, the four-factor model, including external factors, appears to have predictive value. As shown in the literature review, these external factors are often excluded from similar studies and warrant examination as part of this study.

Trussel, Greenlee, and Brady (2002) developed a "Financial Vulnerability Index" (FVI) designed to measure institutional financial distress. The FVI was used by Certified Public Accountants and other financial stakeholders when assessing issues such as the probability of an institution continuing as a going concern. The authors noted that the methods used in the for-profit sector for assessing financial viability do not necessarily translate well to the not-for-profit sector. The five-step model looks at the debt ratio, revenue concentration, surplus margin, administrative cost ratio, and institutional size to arrive at an index score. That score is then compared to benchmarks, and the FVI is determined to be strong, vulnerable, or inconclusive.

The authors note that “Other financial and nonfinancial information should also be considered when evaluating an organization” (Trussel et al, 2002, p.3). However, these nonfinancial measures are not provided, and the approach is focused on a use case that is designed to provide, in the case of a going concern opinion, a twelve-to-twenty-four-month time horizon.

Sturm (2005) identified eight key variables that indicated financial distress (Table 6). Of the eight variables identified in the study as being significant predictors, three of the eight were unrelated to the instruction of students. Instead, they were based on a diversification of revenue streams: giving, grants, and auxiliary enterprises. The most significant variables were the balance of the cost of instruction, total costs, and current revenues and expenditures. The bottom line is that higher education institutions fail because their financial resources degrade, their productivity declines, and enrollment decreases. Since the publication of the Sturm study over fifteen years ago, Generally Accepted Accounting Principles have dramatically changed for private institutions, and fund accounting is no longer used. Additionally, changes in online and graduate programs following the 2008-2009 financial crisis may limit the current applicability.

Table 6

Sturm’s Eight Key Variables

1. Ratio of Freshmen FTE to Undergraduate FTE
2. Ratio of Current Fund Expenditure Transfers to Revenues
3. Ratio of Instructional Expenditures to Total Current Fund Expenditures
4. Ratio of Gifts, Grants, and Contract Revenues to Total Current Funds Revenues
5. Ratio of Auxiliary Enterprises Revenues to Auxiliary Enterprises Expenditures
6. Ratio of Student Services Expenditures to Total Current Fund Expenditure Transfers
7. Ratio of Research Expenditures to Total Current Fund Expenditure Transfers

8. Ratio of Other Income Revenues to Total Current Fund Revenues

Adapted from *Knowing When A Higher Education Institution is in Trouble*, by P.S. Sturm. 2005. p. 116-117. Marshall University Doctoral Dissertation. Copyright 2005 by P.S. Sturm.

Among the books written about turning around higher education in distress, Martin and Samels (2013) analyzed the critical at-risk indicators for assessing institutional stress as part of a broader look at the experiences of two hundred leaders facing institutional distress and tasked with turning around higher educational institutions. While the book was focused on providing leaders with advice on identifying and shoring up institutional weaknesses leveraging the experience of other leaders, their study also identified twenty at-risk indicators for institutions, comprising both qualitative and quantitative factors (Table 7). Martin and Samels assessed the risk factors to understand root causes of distress and assist college leaders in developing strategies to mitigate or correct these root causes. However, their analysis is now over ten years old and did not account for externalities like local economic or demographic trends.

Table 7

Martin and Samels Risk Indicators

1. Tuition discount is more than 35%.
2. Tuition dependency is more than 85%.
3. Debt service is more than 10% of the annual operating budget.
4. There is less than a 1 to 3 ratio between the endowment and the operating budget.
5. Student default rate is above 5%.
6. Average tuition increase is greater than 8% for five years.
7. Deferred maintenance is at least 40% unfunded.

8. Short-term bridge financing is required in the final quarter of each fiscal year.
9. Less than 10% of the operating budget is dedicated to technology.
10. Average annual alumni gift is less than \$75.
11. Institutional enrollment is 1,000 students or lower.
12. Conversion yield is 20% behind that of primary competitors.
13. Student retention is more than 10% behind primary competitors.
14. The institution is on probation, warning, or financial watch with a regional accreditor or a specialty degree licenser.
15. The majority of faculty do not hold terminal degrees.
16. Average age of full-time faculty is 58 or higher.
17. The leadership team averages fewer than three years or more than 12 years of service at the institution.
18. No complete online program has been developed.
19. No new degree or certificate program has been developed for at least two years.
20. Academic governance and curriculum development systems require more than one year to approve a new degree program.

Adapted from *Turnaround: Leading Stressed Colleges and Universities To Excellence*, by J. Martin and J.E. Samels, 2013. p 9-20. Copyright 2013 by Johns Hopkins University Press.

Geyer (2009) conducted a study to assess the statistical significance of leadership on the growth or decline of 14 universities. The research surveyed over 100 faculty members with an online instrument to assess the impact of leadership, market orientation, and charisma on the institution's performance. The data assembled by Geyer showed that the leadership style and charisma of the president as measured by the Conger-Kanungo measure of charismatic

leadership had had little statistical impact on the institution's performance (p.138). The data also showed that an effective leadership style match to the institutional market orientation was typical and provided a smoother running organization (p.138). However, the study failed to demonstrate a correlation between market orientation in relation to the growth or decline of the university (p.141). These findings may indicate that while leadership and market orientation are perceived as having significant impacts on institutional performance, other factors separate from leadership or market orientation are driving the institution's performance.

In analyzing the challenges faced by non-selective institutions, Denneen and Dretler (2012) identified twelve key risk factors which inhibit institutional stability (Table 8). They also noted that long term debt, interest expense, property, plant and equipment, administrative costs, and non-core support expenses were the fastest rising expense categories at institutions, and that the growth of tuition and expenses at a rate of 3.2 times the rate of inflation in 2013 and projected to accelerate to 6.5 times the rate of inflation by 2030 would make the current approach unsustainable in the long term.

Table 8

Denneen and Dretler Risk Factors

1. Admissions levels fall as admissions costs rise.
2. Median salaries for graduates have remained flat for several years.
3. Endowment is small, and a large percentage is restricted.
4. Debt expense increasing faster than instruction expense.
5. Property Plant and Equipment assets are increasing faster than revenue.
6. Declines in tuition revenue.

7. Institutional bond rating degrades.
8. Trouble accessing government funding.
9. Consistent increases in tuition to the top of the range.
10. Lowering of admission standards to meet enrollment targets.
11. Cutting back on financial aid.
12. Reductions in faculty headcount.

Adapted from “The Financially Sustainable University: A Focused Strategy Can Help Colleges and Universities Reinvent Their Industry and Stop Spending Beyond Their Means” by J. Denneen and T. Dretler, 2012. p.7.
Copyright 2013 by Bain & Company.

Lyken-Segosebe and Shepherd (2013) analyzed 57 institutions that closed between 2004 and 2011. They compared the financial and enrollment trends at these institutions relative to their peer groups. Forty-two percent of the closures were either small religious or non-Carnegie classified institutions. For those institutions, the ratio of full-time students to part-time students was four to one at open institutions and below three to one at closed institutions. Additionally, closed institutions averaged tuition levels of approximately \$9,000 per student versus \$13,000 at the institutions that comprised the peer group. Institutions that failed also reported tuition dependency over 50% of revenues, versus less than 25% for those institutions in the peer group. This peer group did not include public institutions and indicated a high endowment level and giving at healthy schools.

Examining the role of tuition discounting and the relationship between the discount rate and financial vulnerability, Crawford (2017) hypothesized that the impacts of the 2008 recession had significant impacts on institutional vulnerability and scholarship rates at public institutions with an enrollment of more than 5,000 students. The study utilized the Financial Vulnerability Index (FVI) developed by Trussel et al. (2002) discussed above to measure the before and after

impacts of the recession, particularly changes in tuition discounting, on financial vulnerability. The findings showed that while tuition and tuition discounting were impacted by the 2008 recession, the financial vulnerability of the institutions remained stable. The assumption made by the researcher was that institutions adjusted or deferred other spending to account for changes in funding, and the impacts of changes in state funding, tuition, and discount rates had limited impacts on the institutional FVI. The study shows that institutions generally managed to effectively control their financial vulnerability across the observed population by managing the internal resources and spending. The implication is that administrators and governing bodies generally can respond with competent action to maintain financial viability if the inputs to those measures are under their control.

Eide (2018) identified that the failing private colleges included accepting more than half of all applicants and maintaining high tuition discount levels. The stated tuition levels at many private institutions are similar – whether Ivy League or non-selective – students require significant student aid to meet enrollment targets. Eide also noted that the Council of Independent Colleges put out a report noting that in examining approximately 560 private schools, those schools with enrollments below 1,000 were financially weaker than institutions with greater than 1,000 students.

Assessing the impacts of FRR on enrollment trends, Abron (2019) examined the impact of FRR score on enrollment trends for 37 private 4-year degree-granting historically Black colleges and universities (HBCUs) from 2006 to 2016. The study found that enrollment and fiscal responsibility composite scores are significantly correlated, and that accreditation probation status adversely impacted the FRR score. The probation status and FRR scores combine to create additional contingencies for the institution. The study explored the concept of

an “environmental contingency theory” to understand the effect of external factors on financial performance. The research implied that institutions must develop multiple revenue streams and focus on fiscal health outside of enrollment and endowment funds. Among the income streams, Abron analyzes the impact of awarding advanced degrees and the recent trend of HBCUs to explore these streams considering their traditional undergraduate mission.

The Abron study was limited to a cohort of 37 of 107 total HBCUs. All the institutions in the Abron study were accredited by the Southern Association of Colleges and Schools Commission on Colleges. This study provides a small sample size, with limited demographic and geographic diversity, which potentially inhibits the general applicability to a broader base of institutions.

A similar study limited to 213 Catholic colleges and universities was published by Agostinelli (2020). That study showed that while increasing enrollment may bring in more revenue, it did not solve more significant financial responsibility concerns, as the incremental expenses may offset the revenue gains. Like Abron, Agostinelli found that institutional financial stability is rooted in improving financial concerns from multiple avenues and that mere increases in enrollment would not solve all fiscal challenges. The study observed that while there were statistically significant relationships between FRR scores and student loan default rates and enrollment levels, those variables had a negligible effect on the FRR scores relative to other factors.

The study also found that the Catholic religious order played a significant role in the FRR score. The author suggests that additional research in this area is warranted to better understand the reasons for this observation.

Qualitative Based Studies

The literature also contains several case studies of university leadership where institutions experienced distress and faced closure or, more typically, a turnaround. Examination of these case studies is helpful to identify commonalities in root causes of distress and commonalities in corrective action taken by administrators and governing boards. These commonalities help identify variables for analysis. While generally limited to one to three institutions, treating these case studies as a meta-analysis reveals several commonalities.

Brockenbrough (2004) examined the use of financial ratios by four populations: presidents and chief financial officers at HBCUs and non-HBCUs, and whether there was a difference in their use or perception. The study revealed that CFOs and presidents at HBCU and majority institutions find financial ratios useful. There was no statistical difference between HBCU and majority institutions in these measures. However, Brockenbrough noted that CFOs tend not to have the same level of interest in these ratios as the institutional presidents (pp. 83-85). Brockenbrough examines this finding considering several individual ratios and across the four populations. The general finding was that the use of these ratios is valuable. The use of ratios assists with communicating the institution's financial condition and provides input into the institution's strategic plan, particularly among non-financial managers and stakeholders. The study indicates that the ease of ratio analysis in decision-making is not limited to regulatory agencies and that stakeholders commonly use this approach in the planning and governance functions.

In their book *Turning Around Failing Schools: Leadership Lessons From the Organizational Sciences* (2008), Murphy and Meyers examine the causes and symptoms of degeneration of educational institutions. While primarily focused on the role of leadership in the

decline and recovery of institutions, Murphy and Meyers also looked at the financial elements of institutions. They identified the increasing debt as a significant contributor to university decline. In addition to debt levels, Murphy and Meyers found that lack of a clear mission and direction and ineffective administrative management were significant factors in the organizational decline. This ineffective management extended from the development of a clear mission and vision and a failure on the part of the administration to honestly assess the institution's condition, particularly considering the current market demand, and take action necessary to reverse the institutional decline. Murphy and Meyers identify leadership inaction and lack of self-assessment and self-awareness considering the people, processes, and systems in which the institution is operating as precipitating a slow decline over a long period.

Bunn (2010) studied the leadership and turnaround at Lee University within the framework of *Good to Great*, the management book by Jim Collins. Bunn identified a focused improvement pattern in seven areas that the university president identified as critical drivers for institutional stability and sustainability, as noted in Table 9. While focused mainly on the “good to great” leadership traits of the university president, Bunn noted that the planned vision and strategic execution focused on these eight areas within a turnaround framework. Bunn's analysis is wholly qualitative. However, the identified areas of focus of the administration are turning around, and then driving a “good to great” program for the institution is an indicator of critical elements for institutional sustainability and stability.

Table 9

Bunn's Good to Great Sustainability Areas of Focus

1. Enrollment level
2. Campus expansion

3. Financial resources and endowment levels
4. Institutional reputation
5. Range of student programs
6. Athletics
7. Academic quality

Adapted from *Navigating Change and Leading an Institution of Higher Education: A Case Study of the Missional Leadership of a University President*, by C.E. Bunn, 2010. p.198. Southeastern Baptist Theological Seminary Doctoral Dissertation. Copyright 2010 by C.E. Bunn.

In another case study, Ford (2011) examined the revitalization approach at faith-based colleges demonstrating financial distress. The dissertation explored revitalization at Davis and Elkins College, Oral Roberts University, and Mississippi College. Among the common elements identified by Ford as crucial success measures for turnaround engagement and success included utilizing compensation raises to signal a return to stability or tying future pay increases to specific and achievable goals. While staff layoffs were common, faculty layoffs or breaking tenure was not used. Most importantly, all three institutions relied heavily on fundraising as the key to revitalizing campus, paying down debt, and stabilizing cash reserves. Ford did not provide a quantitative analysis of debt levels, fundraising, and cash reserves as crucial elements, though noting the parallels across the three institutions indicates their importance in institutional survival.

Whelan (2011) conducted a similar case study on the revitalization of Notre Dame College of Ohio. In addition to noting that the accreditation reports for Notre Dame College accurately predicted the distress experienced by the institution nearly a decade before their existential crisis based on endowment usage and levels, Whelan found that failure to enforce budget accountability led to financial distress, and required solid presidential leadership to

correct. The budget failures tended to be associated with program expansions and a lack of goals and goal review periodically. While the case study was qualitative, identifying endowment level and budget failures align with the findings noted by the Sturm and Martin and Samels studies.

Carey (2013) conducted a qualitative research study that analyzed the characteristics of two private universities that successfully executed a turnaround strategy. While extremely limited in scope and applicability, this study primarily focused on the leadership styles of the successful turnaround presidents and consisted of interviews of 18 stakeholders. The findings from the study emphasized that in addition to the ability of the president to provide clarity of focus and promote the institution's uniqueness, the ability to execute a significant fundraising effort successfully was critical in both turnaround efforts. Carey (2013) notes that the fundraising support and the momentum from the fundraising effort helped propel the revitalization of the institution and drove the infusion of additional resources (pp.110-111). Carey (2013) also notes that “The impact of fundraising revenue was something not often noted in previous studies regarding turnaround schools and was a major factor toward success for the two institutions” (p. vi).

The Miller (2014) study on the failure of Antioch College focused on the impacts of old and new institutionalism and internal power dynamics as the college attempted to execute a strategic pivot into distance and non-traditional education. Miller’s conclusions emphasized the impacts of institutional “saga” (p. 139) on the capabilities of the institution to execute a strategic pivot, as well as noting that dramatic risk shifts are present when looking to execute an expansionary pivot, including risks with attracting different student profiles and significant culture shift. Miller briefly discusses the decision of Antioch, in the face of declining tuition and enrollment, to execute a bold expansion strategy. However, as is evidenced in many of the

studies, the root causes of the enrollment declines, which led to the decision to pivot Antioch University's strategy, were largely unexplored. The literature Miller reviewed focused on the decisions by liberal arts colleges to become more comprehensive in their educational offering and public-school competition as contributing factors in their enrollment declines (pp. 25-27) but did not explore the demographic shifts which may have led to those decisions.

Summary of Literature

The Leslie and Fretwell four-factor model reflects demographic elements and trends that are decades old. Much of the intervening research has focused on analyzing financial ratios, enrollment trends, discounting, economic and non-demographic environmental, leadership and market factors. Research updating the Leslie and Fretwell findings or integrating demographic analysis with other performance factors is notably absent in recent literature. Research updating the Leslie and Fretwell findings or integrating demographic analysis with other performance factors is notably absent in recent literature.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

Introduction

This chapter discusses the research design and methodology utilized to assess the factors that impact the potential for closure of faith-based colleges and universities.

Research Design

This quantitative methods study assessed the critical demographic and financial factors available to regulators, governing boards, and university administrators, which may predict institutional failure for faith-based, not-for-profit higher education institutions. This correlational study utilized a longitudinal analysis over five years and is designed to explore the relationships between 139 data factors and the financial stability of faith-based colleges and universities. These 139 data factors were then reduced to 13 factors that were assessed to be most likely to be statistically significant in the determination of institutional health. These 13 factors were logistically regressed to determine their ability to predict institutional financial fragility or closure compared to the FRR scores for the same institutions during the observed timeframe.

Research Questions

The objective of the data analysis is to answer the two research questions:

1. What factors predict institutional health for private, faith-based non-profit higher education institutions as determined by the institution's inclusion on the Department of Education's Heightened Cash Monitoring list in the 2018-2019 Academic Year as measured by a reported FRR Score below 1.5 for the 2018-2019 Academic Year?
2. What factors can be used to predict institutional closure for private, faith-based non-profit higher education institutions?

Data Collection

The quantitative research method utilized in the study consisted of the analysis of 139 data points, exclusive of name, institutional location and religious affiliation data. The data consists of internal factors, such as institutional financial performance, admissions information, demographic information, and external factors focusing on local demographic information. The data were gathered from publicly available sources maintained by the United States Census Bureau and The United States Department of Education.

It utilizes descriptive statistics and the comparison of means utilizing t-tests between pairs of cohorts and one-way analysis of variance across the three population cohorts to identify statistically significant differences between cohorts, identifying potential factors that predict institutional failure or health for the institution.

By utilizing pairwise t-test analyses across the three cohorts, the study reduced the number of independent variables from 139 to 13. The 13 independent variables which the study assessed to have a high probability of being statistically significant in the determination of institutional health, as defined in the research questions, were:

- Distance education students enrolled in the Fall semester in the base year 2013-2014.
- Full-Time Equivalent (FTE) Students as reported for the base year 2013-2014.
- Endowment funds per FTE student reported for the base year 2013-2014.
- Financial Responsibility Ratio (FRR) as reported for the base year 2013-2014.
- Full-time staff to FTE student ratio as measured in the base year 2013-2014.
- 6-year graduation rate reported to IPEDS for the base year 2013-2014.
- 2010 Census reported population for the town, city, or smallest metropolitan area containing the institution.

- The percentage of students receiving Pell grants as reported in the base year 2013-2014.
- Full-time student to part-time student ratio as calculated for Fall of the base year 2013-2014.
- First-time, full-time retention rate percentage as reported in the base year 2013-2014.
- Applicants attending as reported in the base year 2013-2014.
- Tuition and mandatory fees as reported in the base year 2013-2014.
- Tuition discount rate for the base year 2013-2014 as calculated by dividing the institutional support expense by the gross tuition reported by IPEDS.

Data validity may be impacted because some institutions failed to report for all IPEDS fields, resulting in data values noted as “N/A” in the data tables. These values were removed from calculations. There were validity risks associated with the selection of the control group. While the methodology was random, excluding closed and HCM institutions from the list, the relatively small size of these institutions versus the population may have skewed the control group towards larger institutions and reduced the randomness.

The statistical analysis conducted in this study may also have Type I or Type II errors. A Type I error occurs where there is a possibility of error in rejecting the null hypothesis when it is true. A Type II error occurs when there is an error in not rejecting a null hypothesis when the alternative hypothesis is true. To reduce the probability of making a Type I error, the significance level of the tests was set at 95%. To reduce the probability of a Type II error, the entire populations of HCM and closed institutions were utilized. A relatively large sample of institutions not in the HCM or closed cohorts was utilized.

Because the research conducted did not include any human subjects, the study is exempt from review by the Marshall University Office of Research Integrity Institutional Review Board. The exemption letter is attached as Appendix J.

Population

The entire population set of faith-based, not-for-profit higher education institutions under Heightened Cash Monitoring (HCM) as of June 1, 2016, is attached as Appendix A and represents one analysis cohort. Utilizing data provided by Busta (2020), a list of 12 institutions closing between 2016 and 2020 was compiled and is attached as Appendix C to this dissertation and comprises the closed cohort.

The control group of 100 institutions (Appendix B) used in the study represents 17% of the approximately 593 faith-based, not-for-profit private institutions not on HCM in 2016.

The confidence interval that this sample population represents the 593-faith based not-for-profit institutions, not on HCM in 2016 is calculated as follows:

:

$$s_p = \sqrt{\frac{p(1-p)}{N}}$$

1. Confidence Level desired – 95%, resulting in a z-value of 1.96
2. The sample proportion (p) was calculated as 100/593, or .1683
3. The sample proportion multiplied by 1-p = .14
4. The result from Step 3 was divided by the sample size (N) of 100 to arrive at .0014
5. The square root of the result of Step 4 results in a value of .0374
6. Multiplying the standard error by the confidence level of 1.96 results in 7.33%.

This calculation resulted in an approximate 7% margin of error with a 95% confidence interval that the sample population reflects the general population. This control group was selected by listing the 593-faith based not-for-profit private institutions not on HCM in 2016 in a worksheet in Microsoft Excel and then utilizing the RAND function in Excel to assign a random number to each institution. The combined columns of random number and corresponding institution were sorted by the assigned random value from smallest to largest, resulting in a sort order of completely random institutions. The first 100 institutions from the randomly generated list were then used as the control group.

Instrumentation and Data

Utilizing the Financial Responsibility Composite Scores database published by the United States Department of Education, a dataset of the FRR scores for these institutions identified in the Appendix was compiled from the 2013-2014 academic year through the 2018-2019 academic year. This dataset was available as a downloadable Excel file.

Utilizing the National Center for Education Statistics Integrated Postsecondary Education Data System (IPEDS) (National Center for Education Statistics, 2020a), the population cohort data were augmented with fall enrollment data, admissions and test scores data, graduation rate data, student financial and net price data, human resources data, and financial data for academic years 2013-2014 and 2018-2019. IPEDS is the primary data collection system for the United States Department of Education and provides a standardized data format and set of questionnaires to gather data from higher education institutions participating in Department of Education Title IV financial aid programs. The National Center for Education Statistics published the *2012 Revision of NCES Statistical Standards: Final* (National Center for Education Statistics, 2012), which provides a standardized methodology for data gathering. (This dataset

was available as a .csv file.) The primary instrument used to collect this data is an annual questionnaire submitted by institutions to the United States Department of Education, comprised of the annual financial statement audit and a report of financial position submitted as required by Section 498(c) of the Higher Education Act of 1965, commonly known as the IPEDS data collection questionnaire.

Utilizing data available from the United States Census Bureau QuickFacts (United States Census Bureau QuickFacts, 2020) information, changes in population estimate for the state and locality as a percentage, the median income, poverty rate, and local racial demographic data was added to the dataset for the period 2010-2020. The United States Census Bureau conducts a comprehensive population survey every ten years and publishes the data on state and local populations. The Census Bureau data are updated periodically for changes in local population estimates and published on the Bureau website. Because the Census Bureau data is collected decennially, the study treats the trends in demographic and census data from 2010 to 2020 as applying to the subset period studied here.

The data was downloaded from the sources and placed into tables by academic year. The identified variables utilized the institutional name as the primary standard data key between the sources. A list of the data fields, calculations, and sources is attached as Appendix D.

The study utilized Microsoft Excel with Analysis Tool Pak for data analysis.

Data Analysis

The study engaged in a two-step quantitative analysis. The first step of the analysis consisted of pairwise t-test analyses across the three cohorts to reduce the number of independent variables from 139 to 13. The study utilized the Excel Data Analysis Tool Pak function “t-Test: Two-Sample Assuming Unequal Variances” to assess where the mean values were statistically different between the three cohorts and looked at both one and two tail significance. Thirteen variables were then identified based on the pairwise t-tests and summary descriptive statistics for inclusion in the logistic regression model.

In the second step, a logistic regression model was used to determine the probability of whether an institution would be subject to the Department of Education’s Heightened Cash Monitoring program or would close or not based on the 13 variables identified. Logistic regression is a common method for determining a predictive probability when analyzing binary dependent variables with a data set of non-binary independent variables. The study utilized Microsoft Excel with Data Analysis ToolPak as the primary analysis software. The study utilized Excel because most stakeholders would have access to and familiarity with the software. It also makes it easier for future updates of the Study over time by a broad base of researchers who may not have access to, or familiarity with, more sophisticated statistical software packages.

To conduct logistic regression in Excel, the study followed the following steps, derived from Buskirk (2017):

Step 1: Input the data for each institutional observation.

Step 2: Enter 14 cells for regression coefficients – one for each independent variable and one for the intercept in the model.

Step 3: Create the logit for each observation by multiplying each independent variable by the regression coefficient, summing the results, and then adding the intercept coefficient.

Step 4: Calculate the value of e^{logit} for each observation by utilizing the “=EXP()” Excel formula function.

Step 5: Calculate the probability for each observation utilizing the following Excel formula: “=1/(1+e^{logit})”.

Step 6: Calculate the natural logarithm of the probability (“Log Probability”) of each observation utilizing the “=LN()” Excel formula function.

Step 7: Sum the Log Probability for all observations.

Step 8: Utilize the Solver function in Excel to maximize the value of the Log Probability by changing the regression coefficients established in Step 2. This will calculate the regression coefficient probability that the dependent variable will equal 0.

Step 9: Multiply the results of Step 8 by -1 to calculate the probability that the dependent variable will equal 1.

Step 10: The regression coefficients can be used to find the probability that the dependent variable will equal 1 (on HCM or Closed) utilizing the formula: Probability =
$$e^{(b_0+b_1(x_1)+b_2(x_2)+\dots+b_{15}(x_{15}))} / 1 + e^{(b_0+b_1(x_1)+b_2(x_2)+\dots+b_{13}(x_{13}))}$$

To answer the first research question, the study utilized logistic regression utilizing the 13 independent variables identified in the first step against a binary dependent variable of whether an institution had an FRR score under 1.5 in the academic year 2018-2019 and therefore was subject to the Department of Education’s Heightened Cash Monitoring program. The logistic regression calculated a probability based on the 13 independent variables that the institution would be subject to inclusion in the Department of Education’s Heightened Cash Monitoring

program five years after the measurement date. Excel was utilized to conduct the analysis. This result was then compared to a logistic regression model utilizing the FRR score for the 2013-2014 academic year as the sole independent variable, and the results were analyzed.

To answer the second research question, the study performed a logistic regression utilizing the 13 independent variables identified in the first step against a binary dependent variable of whether an institution had closed or announced its closure by 2020. The logistic regression calculated a probability based on the 13 independent variables that an institution would close or announce closure within five years of the measurement date. This result was then compared to a logistic regression model utilizing only the FRR score for the 2013-2014 academic year and the results analyzed.

CHAPTER 4: RESULTS

Introduction

The study investigated the possibility that improved multivariate modeling factoring in variables beyond just the FRR score would better predict the likelihood that an institution would close or experience financial fragility as measured by having an FRR score below 1.5 and being placed on the United States Department of Education Heightened Cash Monitoring list.

The first step of the analysis calculated descriptive statistics and pairwise t-test analysis across three cohorts of institutions to reduce the number of factors from 139 to 13. The second step utilized logistic regression analysis to predict the probability of imminent financial fragility or closure.

The study compiled FRR and HCM information available from the United States Department of Education, information from the National Center for Education Statistics Integrated Postsecondary Education Data System (IPEDS) with information on institutional enrollment data, student demographic data, tuition data, financial data categorized by Generally Accepted Accounting Principles classification, endowment level, admissions rate, and tuition discount rate. Additionally, the study analyzed localized population and economic data gathered from the United States Census Bureau and the United States Bureau of Economic Analysis.

Descriptive Statistics

The data points were first analyzed to calculate the descriptive statistics across the three populations. The three cohorts' mean, standard deviation, and ranges were assembled and calculated across the 139 quantitative data points. The results of these calculations by cohort are summarized in Appendix E for the closed cohort, Appendix F for those institutions in the Heightened Cash Monitoring cohort, and Appendix G for the control group of institutions.

To isolate probable predictive independent variables, the 2013-2014 academic year data were analyzed for statistically significant differences in the means between the three cohorts of institutions. The screening criteria for the independent variables included the information that would have been available to the institution during the 2013-2014 academic year and where the mean difference was statistically different between the three cohorts. The study analyzed both one and two tail significance of a difference at a minimum of 90% confidence either in the 2013-2014 means, or a similar confidence interval in the mean percentage change of that variable between the 2013-2014 and 2018-2019 data.

Thirteen variables were then identified based on the pairwise t-tests and summary descriptive statistics for inclusion in the logistic regression model. The descriptive statistics for the thirteen variables selected are shown in Table 10 below:

Table 10

Select Descriptive Statistics for Independent Variables Used in Logistic Regression Model

Variable	Closed Mean	HCM Mean	Non-HCM Mean	Closed-HCM 1 Tailed Test Confidence	Closed-Non HCM 1 Tailed Test Confidence	HCM-Non HCM 1 Tailed Test Confidence
FT/PT Student Ratio - 5	8.87	10.37	14.05	67.03%	93.87%	91.78%
Distance Ed - 5	15.00	97.76	94.16	93.28%	99.99%	93.64%
FT Staff-Student -5	8.54	6.80	7.03	76.44%	84.65%	66.48%
FTE Students - 5	1,471.25	820.50	2,076.91	84.39%	81.81%	99.99%
6 Year Graduation Rate - 5	35.36%	41.89%	51.38%	92.86%	99.98%	99.86%
FRR - 5	1.65	1.10	2.19	99.35%	99.58%	99.99%
Applicants Attending - 5	178.89	164.82	349.64	60.10%	99.45%	99.99%
2010 Population	97,465.58	121,152.47	186,700.09	66.08%	91.47%	91.77%
Endowment Funds -5	8,500,899.25	11,219,427.45	54,386,608.81	85.10%	99.99%	99.99%

Pell Grant Percentage – 5	55.67%	53.66%	44.08%	64.47%	98.67%	99.64%
FTFT Retention – 5	65.33%	66.21%	71.07%	58.34%	94.07%	95.28%
Tuition and Fees – 5	22,090.67	18,275.14	24,096.34	95.13%	82.93%	99.99%
Tuition Discount Rate - 5	40.30%	37.85%	48.30%	67.97%	95.56%	99.75%

The full-time staff to student ratio was the only variable that did not meet a minimum 90% confidence in a mean difference between any two cohorts. This was utilized because the differences in the means of both components – full-time staff and FTE students - were statistically significant at a 95% or higher confidence interval across cohorts, as can be seen in Appendix O. However, both variables correlate strongly with each other on institutional size. The researcher elected to analyze the ratio to normalize the impact of gross institutional size and instead analyze the impact of institutional staffing levels relative to the student population on the probability of closure or inclusion in the Department of Education’s Heightened Cash Monitoring program.

Logistic Regression

Logistic regression is utilized when the dependent variable is categorical. This study has two categorical dependent variables – (a) whether an institution was on the Department of Education’s Heightened Cash Monitoring program, and (b) whether an institution closed or had announced a pending closure. In this case, the logistic regression is binary – meaning that the institution does not meet the criteria noted above.

As noted by Robinson (2018), logistic regression has several limitations. Logistic regression requires that each data point be independent of other data points. Failure to achieve

complete independence will tend to overweight the significance of those observations. Logistic regression does not require that the relationship between the independent and dependent variables is either linear or normally distributed. The researcher selected variables based on their statistical significance and relative independence to reduce this propensity to overweight specific financial data available as part of the FRR score.

This study’s logistic regression analysis portion utilized Microsoft Excel for Microsoft 365 MSO, version 2110. The use of Excel for the logistic regression was based on two factors – the first being the ease of use for the typical stakeholder to replicate the results, and the second being its near-ubiquitous availability both inside and outside the academy. Utilizing Excel, however, requires a caveat to the researcher. The Solver function in Excel is heavily dependent on the initial assumed value for each variable. This study used an initial value of 0.00001 for all variables.

The modeling process resulted in the following logistic regression coefficients for predicting the institution’s closure. These variables are the components for calculating the logit and cannot be directly utilized to predict closure:

Table 11

Regression Coefficients Predicting Closure – 13 Variable Model

Variable	Coefficient
Constant	0.00251316454
FT/PT Student Ratio – 5	0.05551489069
Distance Ed – 5	0.0366797261
FT Staff-Student -5	0.01580695503
FTE Students - 5	-0.00068033549
6 Year Graduation Rate - 5	0.00126474595
FRR - 5	0.00379987396
Applicants Attending - 5	0.00625989358
2010 Population	0.00000421162
Endowment Funds -5	0.00003602459
Pell Grant Percentage – 5	0.00093661678

FTFT Retention – 5	0.00126653396
Tuition and Fees – 5	-0.00001864051
Tuition Discount Rate - 5	0.0003220366

The modeling process also resulted in the following logistic regression coefficients for predicting the financial fragility of an institution, as measured by inclusion on the Department of Education’s Heightened Cash Monitoring list. These variables are the components for calculating the logit and cannot be directly utilized to predict financial fragility:

Table 12

Regression Coefficients Predicting Financial Fragility – 13 Variable Model

Variable	Coefficient
Constant	-0.00000214086
FT/PT Student Ratio – 5	0.00000650916
Distance Ed – 5	-0.00079854044
FT Staff-Student -5	-0.00011613581
FTE Students - 5	0.00019304577
6 Year Graduation Rate - 5	0.00001554501
FRR - 5	0.00009805158
Applicants Attending - 5	0.00394854393
2010 Population	0.00000047250
Endowment Funds -5	0.0000171654
Pell Grant Percentage – 5	-0.00000460494
FTFT Retention – 5	0.00000286132
Tuition and Fees – 5	-0.00003244059
Tuition Discount Rate - 5	0.00001291683

The coefficients need to be multiplied by the independent variable value to calculate the probabilities of closure or financial fragility. This calculation provides the researcher with the logit value. This value is then applied using the =EXP function in Excel, which gives the constant e (approximately 2.718) to the value of the calculated logit. Mathematically, this would be displayed as e^{logit} . This value is then evaluated using the equation $1/1+ e^{\text{logit}}$ to determine the probability.

The researcher performed the same calculation utilizing only FRR score as an independent variable to answer the research questions. The coefficient results of that logistic regression are shown in Table 14:

Table 13

Regression Coefficients FRR Only Models

Closure Scenario

Variable	Coefficient
Constant	0.574880035
FRR - 5	1.061364955

Financial Fragility Scenario

Variable	Coefficient
Constant	-2.057131482
FRR - 5	1.576012922

Findings

First Research Question

The first research question asks: What factors predict institutional health for private, faith-based non-profit higher education institutions as determined by the inclusion of the institution on the Department of Education’s Heightened Cash Monitoring list in the 2018-2019 Academic Year as measured by a reported FRR Score below 1.5 for the 2018-2019 Academic Year?

The study ran the logistic regression of the FRR only and the thirteen variable model to determine the calculated probability that an institution would appear on the 2018-2019 HCM list.

A count of those predicting a greater than 50% probability was compared to the published HCM list. A summary of the results is as follows:

Utilizing the FRR score alone, of the 54 institutions closed or on HCM at 2018-2019 academic year, the model correctly predicted that 32 out of 54 of the institutions appearing on the list would have a better than even chance of appearing five years prior, or a 59.25% accuracy. The highest predicted correct probability was 97.425% for Ohio Valley University, and the lowest predicted probability for those appearing on the list was 6.471% for Maple Springs Baptist Bible College and Seminary. The mean probability across the 54 institutions utilizing this model was 54.404%, and the standard deviation was 23.875%.

Utilizing the FRR score alone, of the 100 institutions in the control group that did not appear on the 2018-2019 HCM list, the model correctly predicted that 88 out of 100 institutions would not have a better than even chance to appear on the HCM list in 2018-2019, an 88% accuracy. The highest predicted probability of these institutions appearing on the list was 95.270% for Northeast Catholic College, and the lowest predicted probability was 6.471% for Averett University. The mean probability across the 100 control institutions utilizing this model was 24.622%, and the standard deviation was 20.109%.

Conducting the same analysis on the thirteen-factor model of the 54 institutions closed or on HCM at 2018-2019 academic year, the model correctly predicted that 19 out of 54 of the institutions appearing on the list would have a better than even chance of appearing five years prior, or a 35.19% accuracy. The highest predicted correct probability was 63.192% for Unification Theological Seminary, and the lowest predicted probability for those appearing on the list was 16.58% for Virginia Wesleyan College. The mean probability across the 54 institutions utilizing this model was 42.609%, and the standard deviation was 12.98%.

Utilizing the thirteen-factor model of the 100 institutions in the control group that did not appear on the 2018-2019 HCM list, the model correctly predicted that 84 out of 100 institutions would not have a better than even chance to appear on the HCM list in 2018-2019, an 84% accuracy. The highest predicted probability of these institutions appearing on the list was 64.193% for Providence Christian College, and the lowest predicted probability was 0.001% for Fordham University. The mean probability across the 100 control institutions utilizing this model was 28.948%, and the standard deviation was 17.40%.

The results were then analyzed utilizing the Excel t-Test: Two-Sample Assuming Unequal Variances function both within and across models for significance. Within the thirteen-factor model, the t-test evaluating the differences of the means of the probabilities between the institutions on HCM and those that were not on HCM was statistically significant at the 99.99% level – indicating that while the probability percentage may have limited value, the factors within the calculation are demonstrating significant differences between the two populations. Similarly, within the FRR only model, the t-test evaluating the differences of the means of the probabilities between the institutions on HCM and those that were not on HCM was statistically significant at the 99.99% level – indicating that while the probability percentage may have limited value, the FRR is a directionally correct predictor of future financial fragility.

A second analysis examined the differences between the mean probabilities across the thirteen-factor and FRR only models. Across the two models, the differences in the means of the probabilities for predicting the institutions that were on HCM were statistically significant at the 99.78% confidence level, with the FRR score alone model appearing to be the more accurate predictor of financial fragility as measured by inclusion on the HCM list five years hence based on the correct prediction statistics and the probability measures.

The same cross-modal analysis was also conducted on the non-HCM institutions. Across the two models, the differences in the means of the probabilities for predicting the institutions that were not going to appear on HCM were statistically significant at the 89.28% confidence level, with the FRR score alone model appearing to be the more accurate predictor of financial fragility as measured by inclusion on the HCM list five years hence based on the correct prediction statistics and the probability measures.

The results of these calculations may be found in Appendix H.

In answering the first research question, it appears that the best predictor of the financial fragility of an institution in five years based on the analyzed measures is the current year FRR score. Suppose a stakeholder uses a 50% probability cutoff based on the model that an institution will or will not subsequently appear on the FRR list in 5 years. In that case, there is a 77.92% chance that the model will have returned the correct binary outcome versus a 67.14% chance for the thirteen-factor model.

Second Research Question

The second research question was: What factors can be used to predict institutional closure for private, faith-based non-profit higher education institutions?

The study ran the logistic regression of the FRR only and the thirteen variable model to determine the calculated probability that an institution would close or announce the closure. A count of those predicting a greater than 20% probability was compared to the published HCM list. A 20% probability was utilized in this scenario because examining a 5-year time horizon corresponded to a one in five probability for closure. Additionally, the severity of an institutional

closure would warrant a lower probability threshold for stakeholder action. A summary of the results are as follows:

Utilizing the FRR score alone, of the 12 institutions closed or on HCM at 2018-2019 academic year, the model correctly predicted that 2 out of 12 of the institutions appearing on the list would have a better than 20% chance of closing five years prior, or a 16.67% accuracy. The highest predicted correct probability was 36.011% for Urbana University, and the lowest predicted probability for those appearing on the list was 3.811% for Martin Methodist College. The mean probability across the 12 institutions utilizing this model was 12.06%, and the standard deviation was 8.80%.

Utilizing the FRR score alone, of the 143 institutions in the control group and HCM group that did not announce the closure, the model correctly predicted that 123 out of 143 institutions would not have a higher than 20% rate of closure, an 86.6% accuracy measure given the parameters. The highest predicted probability of these institutions appearing on the list was 61.928% for Ohio Valley University, and the lowest predicted probability was 2.278% for Maple Springs Baptist Bible College and Seminary. The mean probability across the 143 control institutions utilizing this model was 10.560%, and the standard deviation was 10.86%. The FRR only model predicted three institutions with a greater than 50% chance of closure within five years – Northeast Catholic College (51.548%), Emmanuel College (59.396%), and Ohio Valley University (61.928%). All three institutions remain open as of November 2021.

Conducting the same analysis on the thirteen-factor model of the 12 institutions closed or having announced closure before the 2020 academic year and for which data were available, the model correctly predicted that 7 out of 12 of the institutions appearing on the list would have a better 20% chance of closure within the following five years, or a 58.33% accuracy. The highest

predicted correct probability was 44.696% for Urbana University, and the lowest predicted probability for those appearing on the list was 4.597% for MacMurray College. The mean probability across the 12 institutions utilizing this model was 21.504%, and the standard deviation was 13.429%.

Of the 143 institutions in the control group and HCM group that did not announce the closure, the model correctly predicted that 119 out of 143 institutions would not have a higher than 20% rate of closure, an 83.2% accuracy measure given the parameters. The highest predicted probability of these institutions appearing on the list was 55.527% for William Carey University, and the lowest predicted probability was 0.000% for 17 institutions. The mean probability across the 143 control institutions utilizing this model was 8.615%, and the standard deviation was 12.305%. The thirteen-factor model predicted two institutions with a greater than 50% chance of closure within five years – Yeshiva Shaarei Torah of Rockland (50.301%) and William Carey University (55.527%). Both institutions remain open as of November 2021.

The results were then analyzed utilizing the Excel t-Test: Two-Sample Assuming Unequal Variances function both within and across models for significance. Within the thirteen-factor model, the t-test evaluating the means of the probabilities between closed institutions and open institutions was statistically significant at the 99.53% level – indicating that while the probability percentage may have limited value, the factors within the calculation are demonstrating significant differences between the two populations. However, within the FRR only model, the t-test evaluating the means of the probabilities between the institutions that were closed and not closed was not statistically significant – with a two-tailed t of 1.76 and only a 39.76% confidence that the means are statistically different. This result indicates that the

thirteen-factor model appears to be directionally correct. Utilizing the FRR only model provides little better predictive power than a random chance that the results will predict closure.

A second analysis looked at the differences between the mean probabilities across the two models. Across the two models, the differences in the means of the probabilities for predicting the institutions that were closed were statistically significant at the 93.41% confidence level, with the thirteen-factor model appearing to be the more accurate predictor of closure five years hence based on the correct prediction statistics and the probability measures.

The same cross-modal analysis was conducted on the non-closed institutions as well. Across the two models, the differences in the means of the probabilities for predicting the institutions that were not going to close were statistically significant at the 83.06% confidence level, with the thirteen-factor model appearing to be the more accurate predictor of the probability that the institution will remain open five years hence based on the correct prediction statistics and the probability measures.

The results of these calculations may be found in Appendix I.

The averages for the sample population in Appendix B were modeled utilizing the thirteen-factor model. The output resulted in a predicted 0.28% probability that the average institution listed in Appendix B would close within the next five years.

Each independent variable was then adjusted to determine the impacts of a change on the probability of closure while holding all other variables constant. Following these changes in the values of the independent variables, the following impacts were noted:

For the independent variable “Distance education students enrolled in the Fall semester in the base year 2013-2014”, an increase of 10%, from an initial value of 94.1616 to 103.5778, resulted in a decrease in the probability of closure from 0.28% to 0.20%. A corresponding 10%

decrease from 94.1616 to 84.7454 resulted in an increase in the probability of closure from 0.28% to 0.39%.

For the independent variable “Full-Time Equivalent (FTE) Students as reported for the base year 2013-2014”, an increase of 10%, from an initial value of 2,076.9091 to 2,284.6, resulted in an increase in the probability of closure from 0.28% to 0.32%. A corresponding 10% decrease from 2,076.9091 to 1,869.2182 resulted in a decrease in the probability of closure from 0.28% to 0.24%.

For the independent variable “Endowment funds per FTE student as reported for the base year 2013-2014”, an increase of 10%, from an initial value of \$26,186.32 to \$28,804.95, resulted in a decrease in the probability of closure from 0.28% to 0.25%. A corresponding 10% decrease from \$26,186.32 to \$23,567.69 resulted in an increase in the probability of closure from 0.28% to 0.30%.

For the independent variable “Financial Responsibility Ratio (FRR) as reported for the base year 2013-2014,” an increase of 10%, from an initial value of 2.1888 to 2.4077, resulted in less than a 0.0003% decrease in the probability of closure. A corresponding 10% decrease saw a similar 0.0002% increase in the probability of closure.

For the independent variable “Full-time staff to FTE student ratio as measured in the base year 2013-2014”, an increase of 10%, from an initial value of 6.3733 to 7.0106, resulted in a decrease in the probability of closure from 0.28% to 0.27%. A corresponding 10% decrease from 6.3733 to 5.7360 increased the probability of closure by less than .002%.

For the independent variable “6-year graduation rate reported to IPEDS for the base year 2013-2014”, an increase of 10%, from an initial value of 51.79% to 56.97%, resulted in a

decrease in the probability of closure of less than 0.0001%. A corresponding 10% decrease from 51.79% to 46.61% increased the probability of closure by less than 0.0001%.

For the independent variable, “2010 Census reported population for the town, city or smallest metropolitan area containing the institution”, an increase of 10%, from an initial value of 186,700.09 to 205,370.01, resulted in a decrease in the probability of closure from 0.28% to 0.26%. A corresponding 10% decrease from 186,700.09 to 168,030.08 resulted in an increase in the probability of closure from 0.28% to 0.30%.

For the independent variable “The percentage of students receiving Pell grants as reported in the base year 2013-2014,” an increase of 10%, from an initial value of 44.08% to 48.49%, resulted in a decrease in the probability of closure of less than 0.0001%. A corresponding 10% decrease from 44.08% to 39.67% increased the probability of closure by less than 0.0001%.

For the independent variable “Full-time student to part-time student ratio as calculated for Fall of the base year 2013-2014”, an increase of 10%, from an initial value of 4.7531 to 5.2284, resulted in a decrease in the probability of closure from 0.28% to 0.27%. A corresponding 10% decrease from 4.7531 to 4.2778 resulted in an increase in the probability of closure by 0.007%.

For the independent variable “First-time, full-time retention rate percentage as reported in the base year 2013-2014”, an increase of 10%, from an initial value of 71.07% to 78.18%, resulting in a decrease in the probability of closure of less than 0.0001%. A corresponding 10% decrease from 71.07% to 63.96% increased the probability of closure by less than 0.0001%.

For the independent variable “Applicants attending as reported in the base year 2013-2014”, an increase of 10%, from an initial value of 349.6364 to 384.6, resulted in a decrease in

the probability of closure from 0.28% to 0.22%. A corresponding 10% decrease from 349.6364 to 314.6728 resulted in an increase in the probability of closure from 0.28% to 0.34%

For the independent variable “Tuition and mandatory fees as reported in the base year 2013-2014”, an increase of 10%, from an initial value of \$24,096.34 to \$26,505.97, resulted in an increase in the probability of closure from 0.28% to 0.29%. A corresponding 10% decrease from \$24,096.34 to \$21,686.71 resulted in a decrease in the probability of closure from 0.28% to 0.26%.

For the independent variable “Tuition discount rate for the base year 2013-2014 as calculated by dividing the institutional support expense by the gross tuition as reported by IPEDS”, an increase of 10%, from an initial value of 48.79% to 53.67%, resulted in a decrease in the probability of closure of less than 0.0001%. A corresponding 10% decrease from 48.79% to 43.91% increased the probability of closure by less than 0.0001%.

The calculator used to perform this data analysis is available at the following URL: https://docs.google.com/spreadsheets/d/1i0vRuNCpxXuYuARdK9hXOwnmOkuiQIeG1RSpezya_8o/edit?usp=sharing

In answering the second research question, it appears that the better predictor of institutional closure in five years based on the analyzed measures is a multifactor model, which includes but is not exclusive to the FRR score. The FRR score alone provides little more than a random coin flip about whether the institution will remain open or close within the next five years.

CHAPTER 5: SUMMARY AND CONCLUSION

Introduction

The purpose of this quantitative study was to examine financial and demographic factors which may predict institutional failure for faith-based, not-for-profit higher education institutions. This study aimed to provide insights into critical influences on institutional financial performance for use by governing boards, administrators, and regulatory agencies.

Summary of Findings

The first step of the analysis calculated descriptive statistics and pairwise t-test analysis across three cohorts of institutions to reduce the number of factors from 139 to 13. The second step utilized logistic regression analysis to predict the probability of imminent financial fragility or closure.

Utilizing multivariate logistic regression, the study built a model that predicts institutional closure better than the commonly used Financial Responsibility Ratio (FRR). The study applied this model to two research questions:

1. What factors predict institutional health for private, faith-based non-profit higher education institutions as determined by the institution's inclusion on the Department of Education's Heightened Cash Monitoring list in the 2018-2019 Academic Year as measured by a reported FRR Score below 1.5 for the 2018-2019 Academic Year?
2. What factors can be used to predict institutional closure for private, faith-based non-profit higher education institutions?

In response to the first research question, it appears that the FRR score as currently utilized is a better predictor of the financial fragility of an institution in five years based on the analyzed measures. Suppose a stakeholder uses a 50% probability cutoff based on the model that

an institution will or will not subsequently appear on the FRR list in 5 years. In that case, there is a 77.92% chance that the model will have returned the correct binary outcome versus a 67.14% chance for the thirteen-factor model.

However, in response to the second research question, where the question is the ability to predict the closure of an institution, it appears that the thirteen-factor model proves a better predictor of institutional closure in five years based on the analyzed measures a multi-factor model which includes but is not exclusive to the FRR score. The FRR score alone provides little more than a random coin flip about whether the institution will remain open or close within the next five years. Utilizing a lower 20% probability of closure as the threshold for stakeholder intervention, the thirteen-factor model correctly predicted 58.33% of the institutions that ultimately failed and correctly predicted 83.2% of the institutions that remained open in the subsequent five-year period. This compares to the FRR score only – which correctly predicted only 16.67% of the institutions that ultimately failed.

Several independent variables responded significantly to the sensitivity analysis and may be influenced by institutions looking to mitigate their risk factors for closure. The most significant variables falling within this category included the number of distance education students, where each additional student reduced the probability of closure by approximately 0.01% in the model. A second impact is a corresponding reduction in the number of FTE students. Basic math would indicate that the higher the distance education to FTE student ratio is based on this model, the less likely the institution will close. Based on the literature review or other studies, this result was not expected or predicted.

Several independent variables in this controllable category were expected to be more influential than they proved to be in the model. The FRR score, the 6-year graduation rate, the

Pell Grant percentage, the retention rate, and the tuition discount rate had relatively low sensitivity on the model when a 10% change was applied. Each of those variables is also relatively difficult for an institution to quickly effect significant changes.

The researcher's experience as a Chief Business Officer at one of the institutions appearing on the Department of Education's Heightened Cash Monitoring list in this study during the period studied was that governing boards and financial institutions tend to focus on the simplistic FRR score as an indicator for institutional financial risk. However, while the FRR score appears to have the ability to predict that a private religiously affiliated higher education institution will continue to have a low FRR score five years on, it provides little value in determining if an institution will remain open at that same five-year point.

Instead, a multi-factor model focusing on the student body, local population, financial aid, and student success in addition to the FRR score (See Table 12), provides a significantly more accurate indicator of closure risk.

Recommendations for Stakeholders

While the FRR score is required for reporting to the United States Department of Education and is utilized as an indicator of financial fragility, the FRR score is an incomplete view of the holistic financial health of the university and a poor predictor of closure within the subsequent five years.

The link below provides Google Sheets access to the probability calculator. Based on the model, if an institution shows a higher than 20% probability of closure, the stakeholders should look to take remedial action to ensure that the institution is financially and operationally managed in such a way as to mitigate the risk of closure. Based on the institution's baseline data

and manipulation of the model, the institutional stakeholders can determine which changes will have the highest impact in reducing the probability of closure.

The model may be found at the following link:

https://docs.google.com/spreadsheets/d/1i0vRuNCpxXuYuARdK9hXOwnmOkuiQIeG1RSpezya_8o/edit?usp=sharing

A simplistic application of the findings of this study by a governing board based on the findings of the model would be, for example, to increase the number of distance education students at a high discount rate to stave off institutional failure. This approach would be shortsighted and potentially detrimental to the institution's long-term viability. While the model and study identify factors for consideration in developing a strategy, the model development and limitations in the data discussed throughout the study do not make it the final word in either predicting institutional closure or developing mitigation strategies.

There are other variables – some of which (such as institutional culture, majors offered, limitations in the ability on the part of governing boards, administration, faculty and staff, and athletic programs to name a few) were not included in this study and are often more qualitative. Stakeholders should apply the lessons learned from this study as part of a holistic approach to institutional strategy development and risk mitigation.

Generalizability

The dataset was limited to a small subset of religiously affiliated higher education institutions. Only 12 institutions closed or announced closure during the period, and the data available for several of those institutions were limited in IPEDS. In addition, the study looked at a small segment in time. Therefore, the findings from the study may not apply to a broader population.

Recommendations for Further Research

One of the most interesting elements from the study results was that institutions with a high level of distance education students tended to have a very low probability of closure. The researcher's experience with distance education as an administrator, faculty member, and student would indicate that the cost for delivery is significantly lower than with traditional students, while the tuition differential between distance education tuition and traditional on-campus tuition is often de minimis. Given this finding, additional research on the relationship between financial fragility, institutional closure, and distance education is warranted.

This study utilized five years from the academic years 2013-2014 to 2018-2019. These factors may change over time, and additional research for differing periods and lengths of time provides indications of changes in both the composition and the magnitude of the predictor variables.

The study utilized Microsoft Excel and Google Sheets for the regression analysis. The choice to utilize these tools derived from the near-ubiquitous availability and ease of use for stakeholders – particularly governing board members – in assessing their institution's financial health and updating the model moving forward. Additional research using a more robust statistical modeling package, supporting a complete logistic regression across 139 factors, and optimizing for predictive power may result in additional insights and predictive ability of closure and financial fragility.

Research conducting a similar analysis across secular private and public institutions and comparing them to the results of this study may provide future researchers with commonalities in predicting financial fragility and closure across higher education institutions. Stakeholders may

then utilize this study in developing broader mitigation strategies and key performance indicators for higher education institutions beyond the FRR score.

Conclusion

The findings of this study suggest that while the FRR score provides a reasonable indication of financial fragility over a subsequent five-year period, it is little better than a coin flip in predicting whether a religiously affiliated higher education institution will be financially troubled enough to close within that period. The study found that using a multi-factor model to predict closure results in higher predictive accuracy during the observed period.

Based on the findings of this study, the researcher identified the following 13 factors that appear to provide insights into the probability of institutional closure:

- Distance education students enrolled in the Fall semester in the base year 2013-2014.
- Full-Time Equivalent (FTE) Students reported for the base year 2013-2014.
- Endowment funds per FTE student reported for the base year 2013-2014.
- Financial Responsibility Ratio (FRR) as reported for the base year 2013-2014.
- Full-time staff to FTE student ratio as measured in the base year 2013-2014.
- 6-year graduation rate reported to IPEDS for the base year 2013-2014.
- 2010 Census reported population for the town, city, or smallest metropolitan area containing the institution.
- The percentage of students receiving Pell grants as reported in the base year 2013-2014.
- Full-time student to part-time student ratio as calculated for Fall of the base year 2013-2014.
- First-time, full-time retention rate percentage as reported in the base year 2013-2014.
- Applicants attending as reported in the base year 2013-2014.

- Tuition and mandatory fees as reported in the base year 2013-2014.
- Tuition discount rate for the base year 2013-2014 as calculated by dividing the institutional support expense by the gross tuition reported by IPEDS.

The use of the model derived from this study and further research as suggested above will provide stakeholders – including regional accrediting agencies, governing boards, and administrators – insights into the future of these institutions. These insights may then be factored into the holistic development of a go-forward strategy by the leadership teams at religiously affiliated higher education institutions.

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Appendices

Appendix A - Private Faith-Based Higher Education Institutions on Heightened Cash Monitoring

as of June 1, 2016

<u>Institution</u>	<u>City</u>	<u>State</u>	<u>Affiliation</u>
Alaska Bible College	Palmer	AK	Nondenominational
University of Mobile	Mobile	AL	Baptist
Spring Hill College	Mobile	AL	Roman Catholic
Arkansas Baptist College	Little Rock	AR	Baptist
Ecclesia College	Springdale	AR	Nondenominational
San Diego Christian College	Santee	CA	Nondenominational
Hobe Sound Bible College	Hobe Sound	FL	Wesleyan
Emmanuel College	Franklin Springs (Franklin)	GA	Pentecostal
Iowa Wesleyan University	Mount Pleasant	IA	United Methodist
MacMurray College	Jacksonville	IL	United Methodist
Bethel College	Mishawaka	IN	Missionary Church
Bethany College	Lindsborg (McPherson)	KS	Evangelical Lutheran
Bethel College	North Newton (Harvey)	KS	Mennonite
Central Christian College	McPherson	KS	Free Methodist
MidAmerica Nazarene University	Olathe	KS	Church of the Nazarene
Kentucky Wesleyan College	Owensboro	KY	United Methodist
Boston Baptist College	Boston	MA	Baptist
Eastern Nazarene College	Quincy	MA	Church of the Nazarene
Maple Springs Baptist Bible College & Seminary	Capitol Heights (Prince George's)	MD	Baptist
Finlandia University	Hancock (Houghton)	MI	Evangelical Lutheran
Kuyper College	Grand Rapids	MI	Protestant
Rochester College (now University)	Rochester Hills	MI	Church of Christ
Evangel University	Springfield	MO	Assemblies of God
Central Christian College of The Bible	Moberly	MO	Church of Christ
William Peace University	Raleigh	NC	Presbyterian
Carolina Christian College	Winston-Salem	NC	Church of Christ
Unification Theological Seminary	Barrytown (Red Hook)	NY	Nondenominational
Yeshiva Shaarei Torah of Rockland	Suffern	NY	Jewish
Cincinnati Christian University	Cincinnati	OH	Church of Christ
Wilberforce University	Wilberforce (Greene)	OH	AME
St. Gregory's University	Shawnee	OK	Roman Catholic

New Hope Christian College	Eugene	OR	Protestant
Clarks Summit University	South Abington Township	PA	Baptist
University of Valley Forge	Phoenixville	PA	Assemblies of God
Allen University	Columbia	SC	AME
Bethel University	McKenzie	TN	Presbyterian
Williamson Christian College	Franklin	TN	Nondenominational
Hiwassee College	Madisonville	TN	United Methodist
Virginia Wesleyan College	Norfolk	VA	United Methodist
Green Mountain College	Poultney (Rutland)	VT	United Methodist
Faith International University	Tacoma	WA	Protestant
Saint Martin’s University	Lacey	WA	Roman Catholic
Ohio Valley University	Vienna	WV	Church of Christ

Note: Data for institutional closure from Busta, H. (2020, July 9). How many colleges and universities have closed since 2016? Retrieved July 18, 2020, from <https://www.educationdive.com/news/how-many-colleges-and-universities-have-closed-since-2016/539379/> Data for FRR scores from Federal Student Aid. (2020a). Retrieved February 18, 2020, from <https://studentaid.gov/data-center/school/composite-scores>

*Appendix B – Control Group of 100 Faith Based Institution not on Heightened Cash Monitoring
as of June 1, 2016*

<u>Institution</u>	<u>City</u>	<u>State</u>	<u>Affiliation</u>
Huntingdon College	Montgomery	AL	Methodist
Judson College	Marion (Marion)	AL	Baptist
Stillman College	Tuscaloosa	AL	Presbyterian
Talladega College	Talladega	AL	United Church of Christ
Central Baptist College	Conway	AR	Baptist
John Brown University	Siloam Springs	AR	Nondenominational
Lyon College	Batesville	AR	Presbyterian
Ouachita Baptist University	Arkadelphia	AR	Baptist
Philander Smith College	Little Rock	AR	United Methodist
Holy Names University	Oakland	CA	Roman Catholic
Loma Linda University	Loma Linda	CA	Seventh Day Adventist
Pepperdine University	Malibu	CA	Churches of Christ
Providence Christian College	Pasadena	CA	Nondenominational
San Diego Christian College	Santee	CA	Nondenominational
Vanguard University of Southern California	Costa Mesa	CA	Assemblies of God
Trinity College of Florida	Trinity (Pasco)	FL	Nondenominational
Point University	West Point (Troup)	GA	Church of Christ
Shorter University	Rome	GA	Baptist
Wesleyan College	Macon (Macon)	GA	United Methodist
Brigham Young University-Hawaii	Laie	HI	LDS
Central College	Pella	IA	Reformed Church
Graceland University-Lamoni	Lamoni (Decatur)	IA	Evangelical Protestant
Morningside College	Sioux City	IA	United Methodist
Benedictine University	Lisle	IL	Roman Catholic
Judson University	Elgin	IL	Baptist
Lincoln Christian University	Lincoln	IL	Church of Christ
Methodist College	Peoria	IL	Methodist
Millikin University	Decatur	IL	Presbyterian
Olivet Nazarene University	Bourbonnais	IL	Church of the Nazarene
Quincy University	Quincy	IL	Roman Catholic
Telshe Yeshiva-Chicago	Chicago	IL	Jewish
Wheaton College	Wheaton	IL	Evangelical Protestant

Huntington University	Huntington	IN	United Brethren
Manchester University	North Manchester	IN	Church of the Brethren
Saint Mary of the Woods College	Saint Mary of the Woods (Vigo)	IN	Roman Catholic
Baker University	Baldwin City (Douglas)	KS	Methodist
Ottawa University	Ottawa	KS	American Baptist
Southwestern College	Winfield	KS	United Methodist
Sterling College	Sterling (Rice)	KS	Presbyterian
Sterling College	Sterling (Rice)	KS	Evangelical Nondenominational
Georgetown College	Georgetown	KY	Baptist
Thomas More College	Crestview Hills (Kenton)	KY	Roman Catholic
College of Our Lady of the Elms	Chicopee	MA	Roman Catholic
Loyola University Maryland	Baltimore	MD	Roman Catholic
Saint Joseph's College of Maine	Standish	ME	Roman Catholic
Calvin University	Grand Rapids	MI	Christian Reformed
Cornerstone University	Grand Rapids Charter Township	MI	Nondenominational
Great Lakes Christian College	Lansing	MI	Church of Christ
The College of Saint Scholastica	Duluth	MN	Roman Catholic
Central Methodist University-College of Liberal Arts and Sciences	Fayetteville (Johnson)	MO	Methodist
Rockhurst University	Kansas City	MO	Roman Catholic
Rockhurst University	Kansas City	MO	Roman Catholic
Saint Louis University	St Louis	MO	Roman Catholic
Webster University	Webster Groves	MO	Roman Catholic
Blue Mountain College	Blue Mountain (Tippah)	MS	Baptist
William Carey University	Hattiesburg	MS	Baptist
Rocky Mountain College	Billings	MT	Church of Christ
Belmont Abbey University	Belmont	NC	Roman Catholic
Carolina University/Piedmont Int'l	Winston-Salem	NC	Baptist
Gardner-Webb University	Boiling Springs	NC	Baptist
Greensboro College	Greensboro	NC	United Methodist
North Carolina Wesleyan College	Rocky Mount	NC	Methodist
Pfeiffer University	Misenheimer (Stanly)	NC	United Methodist
Hastings College	Hastings	NE	Presbyterian

Midland University	Fremont	NE	Lutheran
Northeast Catholic College (now Magdalen)	Warner (Merrimack)	NH	Roman Catholic
Rivier University	Nashua	NH	Roman Catholic
Centenary University	Hackettstown	NJ	United Methodist
College of Mount Saint Vincent	Bronx	NY	Roman Catholic
Davis College	Johnson City	NY	Nondenominational
Fordham University	Bronx	NY	Roman Catholic
Bluffton University	Bluffton (Allen)	OH	Mennonite
Capital University	Columbus	OH	Lutheran
Defiance College	Defiance	OH	United Church of Christ
Muskingum University	New Concord (Muskingum)	OH	Presbyterian
Notre Dame College of Ohio	Cleveland	OH	Roman Catholic
Wittenberg University	Springfield	OH	Lutheran
Family of Faith Christian University	Shawnee	OK	Nondenominational
Randall University	Moore	OK	Free Will Baptist
Southern Nazarene University	Bethany	OK	Church of the Nazarene
Northwest Christian University	Eugene	OR	Disciples of Christ
DeSales University	Center Valley (Lehigh)	PA	Roman Catholic
Elizabethtown College	Elizabethtown	PA	Church of the Brethren
Gratz College	Melrose Park (Cheltenham Township)	PA	Jewish
La Salle University	Philadelphia	PA	Roman Catholic
Mercyhurst University	Erie	PA	Roman Catholic
Benedict College	Columbia	SC	Baptist
Erskine College	Due West (Abbeville)	SC	Reformed Presbyterian
Newberry College	Newberry	SC	Evangelical Lutheran
American Baptist College	Nashville	TN	Baptist
Baptist Memorial College of Health Sciences	Memphis	TN	Baptist
Carson – Newman University	Jefferson City	TN	Baptist
Messenger College	Bedford	TX	Protestant
Our Lady of the Lake University	San Antonio	TX	Roman Catholic
Southwestern Assemblies of God University	Waxahachie	TX	Assemblies of God
Southwestern Christian College	Terrell	TX	Church of Christ

Averett University	Danville	VA	Baptist
Emory & Henry College	Emory (Washington)	VA	United Methodist
Alderson Broaddus University	Philippi (Barbour)	WV	American Baptist
West Virginia Wesleyan College	Buckhannon	WV	United Methodist

Note: Data for FRR scores from: Federal Student Aid. (2020a). Retrieved February 18, 2020, from

<https://studentaid.gov/data-center/school/composite-scores>

Appendix C – Institutions Closed or Announcing Closure – AY 2019 & 2020

<u>Institution</u>	<u>City</u>	<u>State</u>	<u>Affiliation</u>
Wesley College	Dover	DE	United Methodist
MacMurray College	Jacksonville	IL	United Methodist
Nebraska Christian College	Papillion	NE	Church of Christ
College of New Rochelle	New Rochelle	NY	Roman Catholic
Cincinnati Christian University	Cincinnati	OH	Church of Christ
Urbana University	Urbana	OH	Swedenborgian
Concordia University of Portland	Portland	OR	Lutheran
Hiwassee College	Madisonville	TN	United Methodist
Martin Methodist College	Pulaski	TN	United Methodist
College of St. Joseph	Rutland	VT	Roman Catholic
Green Mountain College	Poultney (Rutland)	VT	United Methodist
Holy Family College	Manitowoc	WI	Roman Catholic

Note: Data for institutional closure from Busta, H. (2020, July 9). How many colleges and universities have closed since 2016? Retrieved July 18, 2020, from <https://www.educationdive.com/news/how-many-colleges-and-universities-have-closed-since-2016/539379/> Data for FRR scores from Federal Student Aid. (2020a). Retrieved February 18, 2020, from <https://studentaid.gov/data-center/school/composite-scores>

Appendix D – Data Fields, Sources and Calculations

<u>Data Field</u>	<u>Source</u>	<u>Description</u>
Institution	IPEDS	Institution Name
City	IPEDS	Institution City
State	IPEDS	Institution State
Religious Affiliation	IPEDS	Denominational Affiliation
Close Year	Busta	Year Institution Closed
Population -5	US Census Bureau	City or Metropolitan Area Population in 2015 (or 2010 Census if 2015 estimate was unavailable)
Population -1	US Census Bureau	City or Metropolitan Area Population in 2019 (or 2020 Census if 2019 estimate was unavailable)
Population % Chg.	Calculated	Calculated Change from 2015 to 2019
Median Income	US Census Bureau	City or Metropolitan Area Median Income
Poverty rate	US Census Bureau	City or Metropolitan Area Poverty Rate
Under 18 (2019)	US Census Bureau	City or Metropolitan Area Population under age 18
White Pop %	US Census Bureau	City or Metropolitan Area Population identifying as White
BIPOCO	Calculated	City or Metropolitan Area Population identifying as Black, Indigenous, or other Persons of Color - Calculated by subtracting white percentage from 100%
FT Enrollment - 5	IPEDS	Fall full-time Enrollment reported to IPEDS for Fall 2014
FT Enrollment - 1	IPEDS	Fall full-time Enrollment reported to IPEDS for Fall 2019
FT Enrollment % Chg.	Calculated	Calculated Change from 2014 to 2019
PT Enrollment - 5	IPEDS	Fall part-time Enrollment reported to IPEDS for Fall 2014
PT Enrollment - 1	IPEDS	Fall part-time Enrollment reported to IPEDS for Fall 2019
PT Enrollment % Chg.	Calculated	Calculated Change from 2014 to 2019
Women as % of Enrollment - 5	IPEDS	Fall women enrollment reported to IPEDS in 2014
Women as % of Enrollment -1	IPEDS	Fall women enrollment reported to IPEDS in 2019
Women % Chg.	Calculated	Calculated Change from 2014 to 2019
FT/PT Student ratio – 5	Calculated	Ratio of full time to part-time students as of Fall 2014 - Calculated by dividing full-time students by part-time students
FT/PT Student ratio – 1	Calculated	Ratio of full time to part-time students as of Fall 2019 - Calculated by dividing full-time students by part-time students
FT/PT % Chg.	Calculated	Calculated Change from 2014 to 2019
Distance Ed -5	IPEDS	Students reported as distance education only in Fall 2015
% Distance Ed – 5	Calculated	Distance education students as a percentage of full-time plus part-time students in Fall 2014
Distance Ed -1	IPEDS	Students reported as distance education only in Fall 2019

% Distance Ed - 1	Calculated	Distance education students as a percentage of full-time plus part-time students in Fall 2019
% Distance Ed Chg.	Calculated	Calculated Change from 2014 to 2019
FTFT Retention -5	IPEDS	Full-time, first-time retention for Fall 2014
FTFT Retention - 1	IPEDS	Full-time, first-time retention for Fall 2019
FTFT % Chg.	Calculated	Calculated Change from 2014 to 2019
% BIPOC - 5	IPEDS	Percentage of students identifying as BIPOC reported to IPEDS in Fall 2014
% BIPOC - 1	IPEDS	Percentage of students identifying as BIPOC reported to IPEDS in Fall 2019
% BIPOC - % Chg.	Calculated	Calculated Change from 2014 to 2019
No Applied -5	IPEDS	Number of undergraduate applicants reported for the academic year 2015
No Accepted -5	IPEDS	Number of applicants accepted for the academic year 2015
% Accepted -5	Calculated	Percentage of applicants that the institution accepted for the academic year 2015
Applicants Attending - 5	IPEDS	Number of applicants for the 2015 academic year that attended in Fall 2014
% Accepted Attending - 5	Calculated	Percentage of 2014 applicants that were accepted and attended in Fall 2014
No Applied -1	IPEDS	Number of undergraduate applicants reported for the academic year 2020
No Accepted -1	IPEDS	Number of applicants accepted for the academic year 2020
% Accepted -1	Calculated	Percentage of applicants that the institution accepted for the academic year 2020
Applicants Attending - 1	IPEDS	Number of applicants for the 2020 academic year that attended in Fall 2019
% Accepted Attending - 1	Calculated	Percentage of 2019 applicants that were accepted and attended in Fall 2019
6-year grad rate - 5	IPEDS	The six-year graduation rate of students as measured in Fall 2014
6-year grad rate - 1	IPEDS	The six-year graduation rate of students as measured in Fall 2019
6-year grad rate - % Chg.	IPEDS	Calculated Change from 2014 to 2019
% Pell Grant -5	IPEDS	Percentage of students receiving a Pell Grant in Fall 2014 - this is an indicator of student financial need and economic means
% Pell Grant -1	IPEDS	Percentage of students receiving a Pell Grant in Fall 2019 - this is an indicator of student financial need and economic means
Pell % Chg.	IPEDS	Calculated Change from AY 2015 to AY 2020
Tuition & Fees - 5	IPEDS	Stated full-time tuition and mandatory fees for Academic Year 2015
Tuition & Fees - 1	IPEDS	Stated full-time tuition and mandatory fees for Academic Year 2020
T&F % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
Receiving Institutional Aid% -5	IPEDS	Percentage of undergraduate students receiving institutional aid or discounts for Academic Year 2015
Amount Aid - 5	IPEDS	The average amount of institutional aid or discounts for Academic Year 2015

T&F Discount - 5	Calculated	The calculated percentage of discount as calculated by dividing Amount Aid by Tuition & Fees
Receiving Institutional Aid% -1	IPEDS	Percentage of undergraduate students receiving institutional aid or discounts for Academic Year 2020
Amount Aid - 1	IPEDS	The average amount of institutional aid or discounts for Academic Year 2020
T&F Discount - 1	Calculated	The calculated percentage of discount as calculated by dividing Amount Aid by Tuition & Fees
T&F Discount Chg.%	Calculated	Calculated Change from AY 2015 to AY 2020
FT Staff -5	IPEDS	Number of full-time staff as reported in Fall 2014
FT Staff -1	IPEDS	Number of full-time staff as reported in Fall 2019
FT Staff - % Chg.	Calculated	Calculated Change from 2014 to 2019
FT Instructor -5	IPEDS	Number of full-time instructors as reported in Fall 2014
FT Instructor -1	IPEDS	Number of full-time instructors as reported in Fall 2019
FT Instructor - % Chg.	Calculated	Calculated Change from 2014 to 2019
PT Instructor -5	IPEDS	Number of part-time instructors as reported in Fall 2014
PT Instructor -1	IPEDS	Number of part-time instructors as reported in Fall 2020
PT Instructor - % Chg.	Calculated	Calculated Change from 2014 to 2019
FT Inst % -5	Calculated	Calculated percentage of full-time instructors as a percentage of all instructors in Fall 2014
FT Inst % -1	Calculated	Calculated percentage of full-time instructors as a percentage of all instructors in Fall 2019
FT/PT Inst % Chg.	Calculated	Calculated Change from 2014 to 2019
FT Staff/Student - 5	Calculated	The ratio of full-time students to staff as calculated by dividing the FTE student count by FT Staff in Fall 2014
FT Staff/Student % - 1	IPEDS	The ratio of full-time students to staff as calculated by dividing the FTE student count by FT Staff in Fall 2020
FT Staff/Student % - % Chg.	Calculated	Calculated Change from 2014 to 2019
FT Inst/Student % -5	IPEDS	The ratio of full-time students to full-time instructors as calculated by dividing the FTE student count by FT Staff in Fall 2014
FT Inst/Student % -1	IPEDS	The ratio of full-time students to full-time instructors as calculated by dividing the FTE student count by FT Staff in Fall 2019
FT Inst/Student % -% Chg.	Calculated	Calculated Change from 2014 to 2019
Endowment -5	IPEDS	Reported restricted net assets in IPEDS for Academic Year 2015
Endowment -1	IPEDS	Reported restricted net assets in IPEDS for Academic Year 2020
Endowment % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
Endowment/FT E -5	Calculated	Calculated dollars of Endowment divided by the number of FTE students to get endowment per FTE student in Academic Year 2015
Endowment/FT E -1	Calculated	Calculated dollars of Endowment divided by the number of FTE students to get endowment per FTE student in Academic Year 2020
E/FT % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
Tuition & Fees per FTE -5	IPEDS	Total tuition and fees revenue per FTE student as reported to IPEDS for AY 2015

Tuition & Fees per FTE -1	IPEDS	Total tuition and fees revenue per FTE student as reported to IPEDS for AY 2020
T&F % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
GGC -5	IPEDS	Government Grants and Contracts per FTE student as reported to IPEDS for AY 2015
GGC -1	IPEDS	Government Grants and Contracts per FTE student as reported to IPEDS for AY 2020
GGC % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
PGGC -5	IPEDS	Private Gifts, Grants, and Contracts per FTE student as reported to IPEDS for AY 2015
PGGC -1	IPEDS	Private Gifts, Grants, and Contracts per FTE student as reported to IPEDS for AY 2020
PGGC % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
Investment -5	IPEDS	Investment returns per FTE student as reported to IPEDS for AY 2015
Investment -1	IPEDS	Investment returns per FTE student as reported to IPEDS for AY 2020
Investment % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
Other Core -5	IPEDS	Other Core Revenues per FTE student as reported to IPEDS for AY 2015
Other Core -1	IPEDS	Other Core Revenues per FTE student as reported to IPEDS for AY 2020
Other Core % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
Tuition% of Core -5	Calculated	Measuring tuition reliance - calculated by measuring tuition as a percentage of total core revenue (Tuition & Fees, GGC, PGGC, Investment, Other Core) for AY 2015
Tuition% of Core -1	Calculated	Measuring tuition reliance - calculated by measuring tuition as a percentage of total core revenue (Tuition & Fees, GGC, PGGC, Investment, Other Core) for AY 2020
Tuition % of Core % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
Instruction -5	IPEDS	Instruction expense per FTE student as reported to IPEDS for AY 2015
Instruction -1	IPEDS	Instruction expense per FTE student as reported to IPEDS for AY 2020
Instruction % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
Research -5	IPEDS	Research expense per FTE student as reported to IPEDS for AY 2015
Research -1	IPEDS	Research expense per FTE student as reported to IPEDS for AY 2020
Research % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
PS -5	IPEDS	Public Service expense per FTE student as reported to IPEDS for AY 2015
PS-1	IPEDS	Public Service expense per FTE student as reported to IPEDS for AY 2020
PS% Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
AS -5	IPEDS	Academic Support expense per FTE student as reported to IPEDS for AY 2015
AS -1	IPEDS	Academic Support expense per FTE student as reported to IPEDS for AY 2020
AS% Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
SS -5	IPEDS	Student Services expense per FTE student as reported to IPEDS for AY 2015
SS -1	IPEDS	Student Services expense per FTE student as reported to IPEDS for AY 2020

SS % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
IS -5	IPEDS	Institutional Support expense per FTE student as reported to IPEDS for AY 2015
IS -1	IPEDS	Institutional Support expense per FTE student as reported to IPEDS for AY 2020
IS % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
Other Core -5	IPEDS	Other Core expenses per FTE student as reported to IPEDS for AY 2015
Other Core -1	IPEDS	Other Core expenses per FTE student as reported to IPEDS for AY 2020
Other Core % Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
Instruction % Exp -5	Calculated	Percentage of total expenses spent on Instruction expense in AY 2015
Instruction % Exp -1	Calculated	Percentage of total expenses spent on Instruction expense in AY 2020
Instruction % Exp -% Chg.	Calculated	Calculated Change from AY 2015 to AY 2020
Total Revenues - 5	IPEDS	Total Revenue per FTE student as reported to IPEDS for AY 2015
Total Expenses -5	IPEDS	Total Expenses per FTE student as reported to IPEDS for AY 2015
Surplus/Deficit -5	Calculated	Excess or deficit per FTE student as calculated by subtracting Total Expenses from Total Revenues for AY 2015
FTE -5	IPEDS	Total FTE equivalent students as reported to IPEDS for Fall 2014
Total Revenues - 1	IPEDS	Total Revenue per FTE student as reported to IPEDS for AY 2020
Total Expenses -1	IPEDS	Total Expenses per FTE student as reported to IPEDS for AY 2020
Surplus/Deficit -1	Calculated	Excess or deficit per FTE student as calculated by subtracting Total Expenses from Total Revenues for AY 2020
FTE -1	IPEDS	Total FTE equivalent students as reported to IPEDS for Fall 2019
TR % Chg.	Calculated	Calculated Change in Total Revenue per FTE student from AY 2015 to AY 2020
TE % Chg.	Calculated	Calculated Change in Total Expenses per FTE student from AY 2015 to AY 2020
S/D % Chg.	Calculated	Calculated Change in Surplus or Deficit per FTE student from AY 2015 to AY 2020
FTE % Chg.	Calculated	Calculated Change in FTE student count from Fall 2014 to Fall 2019
FRR -2016	Financial Responsibility Composite Scores	FRR score for the institution as reported by the United States Department of Education in June 2016
FRR -2019	Financial Responsibility Composite Scores	FRR score for the institution as reported by the United States Department of Education in June 2019
FRR % Chg.	Calculated	Percentage change in FRR score between 2016 and 2019
2016 HCM	Heightened Cash Monitoring	Whether the institution was on Heightened Cash Monitoring list in June 2016

Appendix E – Descriptive Statistical Data – Closed Institutions

Appendix D contains the data definitions, sources, and any transformation calculations.

N=12

<u>Data Field</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Max</u>	<u>Min</u>
Population -5	97,465.58	172,808.28	583,793	4,737
Population -1	103,693.75	191,955.76	654,741	5,002
Population % Chg.	6.39%	6.00%	12.115%	-8.47%
Median Income	50,868.25	16,986.36	80,918	29,722
Poverty rate	16.87%	6.62%	27.2%	4.1%
Under 18 (2019)	20.54%	2.57%	25.0%	16.7%
White Pop %	78.38%	18.2%	96.4%	44.3%
BIPOCO	21.62%	18.20%	55.70%	3.6%
FT Enrollment -5	766.58	719.81	2,666	121
FT Enrollment -1	652	556.96	2,003	124
FT Enrollment % Chg.	-14.95%	18.51%	14.23%	-39.61%
PT Enrollment -5	210.58	297.95	1,085	15
PT Enrollment -1	90.08	102.34	302	9
PT Enrollment % Chg.	-57.22%	46.63%	50%	-95.11%
Women as % of Enrollment - 5	58.42%	11.96%	89%	45%
Women as % of Enrollment - 1	58.08%	14.28%	83%	35%
Women % Chg.	-0.57%	17.9%	43.48%	-27.08%
FT/PT Student ratio - 5	3.64	9.45	34.81	.58
FT/PT Student ratio - 1	7.24	18.32	57.20	2.26
FT/PT % Chg.	98.82%	603.64%	1,978.52%	-39.39%
Distance Ed -5	15	22.41	79	0
% Distance Ed - 5	1.54%	2.16%	6.28%	0%
Distance Ed -1	20.67	46.53	164	0
% Distance Ed -1	2.78%	3.48%	10.93%	0%
% Distance Ed Chg.	81.42%	100.84%	172.24%	-100%
FTFT Retention -5	65.33%	11.20%	81.00%	44.00%
FTFT Retention - 1	59.25%	12.32%	85.00%	45.00%
FTFT % Chg.	-9.31%	35.43%	93.18%	10.00%
% BIPOC - 5	36.5%	22.12%	94.00%	10.00%
% BIPOC - 1	42.92%	16.48%	88.00%	27.00%
% BIPOC - % Chg.	17.58%	87.98%	300.00%	-21.95%
No Applied -5	1,300	1,208.96	3,231	241
No Accepted -5	689.11	602.96	1,832	141
% Accepted -5	53.01%	12.45%	78.37%	38.53%
Applicants Attending - 5	178.89	147.15	431	45
% Accepted Attending - 5	25.96%	15.98%	68.79%	14.69%

No Applied -1	1,602.25	834.23	2,960	161
No Accepted -1	692.83	539.89	1,830	54
% Accepted -1	65.22%	21.23%	99.61%	33.54%
Applicants Attending - 1	162.92	106.01	321	25
% Accepted Attending - 1	23.51%	20.67%	76.27%	12.14%
6-year grad rate - 5	35.36%	10.84%	55.00%	21.00%
6-year grad rate - 1	39.67%	9.37%	54.00%	25.00%
6-year grad rate - % Chg.	12.17%	36.63%	92.86%	-30.56%
% Pell Grant -5	55.67%	15.20%	87.00%	39.00%
% Pell Grant -1	58.83%	13.02%	84.00%	41.00%
Pell % Chg.	5.69%	24.50%	58.49%	-26.58%
Tuition & Fees -5	22,090.67	6,465.94	32,192.00	11,300.00
Tuition & Fees -1	25,382.03	6,953.61	37,252.00	16,469.00
T&F % Chg.	14.90%	11.48%	48.94%	4.11%
Receiving Institutional Aid% -5	93.25%	9.17%	100.00%	67.00%
Amount Aid - 5	9,742.42	4,835.09	19,781.00	3,451.00
T&F Discount -5	41.13%	14.14%	59.60%	15.44%
Receiving Institutional Aid% -1	95.00%	9.19%	100.00%	68.00%
Amount Aid - 1	14,193.25	6,244.94	25,107.00	5,309.00
T&F Discount -1	53.12%	11.24%	67.40%	30.62%
T&F Discount Chg.%	29.17%	59.91%	192.65%	-13.11%
FT Staff -5	131.25	106.30	349	22
FT Staff -1	122.08	98.18	359	21
FT Staff - % Chg.	-6.98%	16.46%	29.53%	-29.03%
FT Instructor -5	43.58	29.85	97.00	6.00
FT Instructor -1	37.00	26.40	86.00	6.00
FT Instructor - % Chg.	-15.11%	24.16%	22.86%	-52.38%
PT Instructor -5	106.00	176.51	586.00	0
PT Instructor -1	73.83	83.50	289.00	0
PT Instructor - % Chg.	-30.35%	37.68%	28.13%	-100.00%
FT Inst % -5	29.14%	28.74%	100.00%	11.48%
FT Inst % -1	33.38%	23.69%	100.00%	15.27%
FT/PT Inst % Chg.	14.58%	59.45%	133.52%	-84.73%
FT Staff/Student - 5	11.21	4.73	21.36	3.39
FT Staff/Student % - 1	9.28	2.95	13.58	4.82
FT Staff/Student % - % Chg.	-17.18%	45.78%	138.31%	-36.43%
FT Inst/Student % -5	33.76	23.14	98.09	10.18
FT Inst/Student % -1	30.63	19.23	77.38	13.80
FT Inst/Student % -% Chg.	-9.26%	53.89%	145.54%	-27.83%
Endowment -5	8,200,899.25	5,150,348.94	17,077,901.00	1,352,977.00
Endowment -1	8,339,643.50	6,974,420.09	20,245,921.00	0.00
Endowment % Chg.	-1.90%	39.75%	18.55%	-100.00%
Endowment/FTE -5	5,778.01	9,931.48	31,743.31	1,956.40

Endowment/FTE -1	7,358.51	11,808.49	38,869.73	0.00
E/FT % Chg.	27.35%	51.55%	80.44%	-100.00%
Tuition & Fees per FTE -5	12,010.67	4,111.09	22,666.00	7,997.00
Tuition & Fees per FTE -1	11,602.42	3,644.73	17,034.00	5,014.00
T&F % Chg.	-3.40%	36.11%	80.40%	-57.15%
GGC -5	533.00	747.65	2,479.00	0.00
GGC -1	982.67	1,312.06	3,661.00	0.00
GGC % Chg.	84.37%	237.23%	445.95%	-100.00%
PGGC -5	3,997.17	4,160.65	13,826.00	68.00
PGGC -1	5,240.25	6,773.74	20,681.00	342.00
PGGC % Chg.	31.10%	395.18%	1,332.35%	-94.62%
Investment -5	1,381.58	2,434.80	8,863.00	10.00
Investment -1	649.00	766.27	2,554.00	0.00
Investment % Chg.	-53.02%	134.52%	377.92%	-100.00%
Other Core -5	1,229.08	1,465.05	4,596.00	0.00
Other Core -1	558.83	577.20	1,968.00	0.00
Other Core % Chg.	-54.53%	56.13%	75.20%	-100.00%
Tuition% of Core -5	62.71%	15.03%	85.12%	45.42%
Tuition% of Core -1	60.96%	19.75%	86.30%	23.25%
Tuition % of Core % Chg.	-2.80%	23.86%	38.61%	-49.50%
Instruction -5	6,251.17	2,562.60	12,504.00	2,545.00
Instruction -1	6,809.92	2,818.25	12,227.00	2,376.00
Instruction % Chg.	8.94%	33.48%	58.52%	-58.03%
Research -5	41.75	144.63	501.00	0.00
Research -1	85.92	297.62	1,031.00	0.00
Research % Chg.	105.79%	N/A	105.79%	105.79%
PS -5	183.83	636.82	2,206.00	0.00
PS-1	40.92	141.74	491.00	0.00
PS% Chg.	-77.74%	N/A	-77.74%	-77.74%
AS -5	1,646.50	1,391.61	4,174.00	339.00
AS -1	1,607.67	1,295.38	4,142.00	238.00
AS% Chg.	-2.36%	42.15%	105.88%	-38.33%
SS -5	4,445.67	2,635.28	11,274.00	2,117.00
SS -1	5,602.00	1,937.26	9,767.00	3,314.00
SS % Chg.	26.01%	69.63%	231.99%	-52.94%
IS -5	4,902.33	2,588.72	9,427.00	1,490.00
IS -1	5,517.92	2,754.71	12,655.00	2,071.00
IS % Chg.	12.56%	81.57%	264.72%	-50.93%
Other Core -5	1,287.67	1,704.92	4,533.00	0.00
Other Core -1	860.08	1,671.51	5,381.00	0.00
Other Core % Chg.	-33.21%	37.19%	-14.91%	-100.00%
Instruction % Exp -5	28.06%	6.82%	40.36%	15.83%
Instruction % Exp -1	28.91%	6.34%	37.56%	19.01%

Instruction % Exp -% Chg.	3.05%	12.01%	23.56%	-20.39%
Total Revenues - 5	23,351.67	11,202.59	56,505.00	14,198.00
Total Expenses -5	22,278.25	8,105.26	45,541.00	16,082.00
Surplus/Deficit -5	1,073.42	3,664.57	10,964.00	-3,756.00
FTE -5	1,471.25	2,070.82	7,455.00	112.00
Total Revenues - 1	23,067.17	8,578.07	38,426.00	7,516.00
Total Expenses -1	23,552.00	6,957.35	38,059.00	11,543.00
Surplus/Deficit -1	-484.83	4,598.71	12,280.00	-5,565.00
FTE -1	1,133.33	1,366.01	4,875.00	135.00
TR % Chg.	-1.22%	41.52%	92.35%	-63.05%
TE % Chg.	5.72%	36.52%	99.14%	-51.42%
S/D % Chg.	-145.17%	692.85%	80.12%	-2,412.62%
FTE % Chg.	-22.97%	49.15%	145.54%	-36.50%
FRR -2013	1.65	0.53	2.50	0.60
FRR -2019	1.27	1.23	3.00	-0.90
FRR % Chg.	-23.24%	66.64%	85.71%	-150.00%

Appendix F – Descriptive Statistical Data – Heightened Cash Monitoring Institutions

Appendix D contains the data definitions, sources, and any transformation calculations.

N=43

<u>Data Field</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Max</u>	<u>Min</u>
Population -5	121,152.47	166,969.03	863,420.00	4,737
Population -1	129,144.95	180,356.98	909,327.00	5,002
Population % Chg.	6.60%	8.25%	32.81%	-6.49%
Median Income	56,457.42	17,356.08	94,808.00	29,722.00
Poverty rate	15.24%	6.04%	27.20%	4.00%
Under 18 (2019)	21.29%	3.30%	31.00%	15.00%
White Pop %	75.34%	17.46%	97.00%	27.10%
BIPOCO	24.66%	17.46%	72.90%	3.00%
FT Enrollment -5	628.17	610.32	3,445.00	3.00
FT Enrollment -1	566.86	544.90	2,981.00	0
FT Enrollment % Chg.	-9.76%	32.91%	80.56%	-100.00%
PT Enrollment -5	129.86	217.29	1,347.00	0.00
PT Enrollment -1	124.19	252.10	1,579.00	0.00
PT Enrollment % Chg.	-4.36%	128.00%	475.00%	-100.00%
Women as % of Enrollment - 5	50.43%	12.23%	69.00%	0.00%
Women as % of Enrollment -1	49.76%	11.98%	70.00%	0.00%
Women % Chg.	-1.32%	15.25%	48.94%	-27.08%
FT/PT Student ratio - 5	4.84	12.24	61.59	0.05
FT/PT Student ratio - 1	4.56	18.95	95.46	0.04
FT/PT % Chg.	-5.64%	3.49%	197.90%	-88.55%
Distance Ed -5	98	344.62	2,195.00	0.00
% Distance Ed - 5	12.90%	15.28%	66.53%	0.00%
Distance Ed -1	87.40	267.75	1,734.00	0.00
% Distance Ed -1	12.65%	14.37%	61.82%	0.00%
% Distance Ed Chg.	-1.93%	121.13%	376.71%	-100.00%
FTFT Retention -5	66.21%	16.59%	100.00%	33.00%
FTFT Retention - 1	64.35%	16.88%	100.00%	0.00%
FTFT % Chg.	-2.82%	42.91%	203.03%	-100.00%
% BIPOC - 5	42.12%	26.08%	100.00%	0.00%
% BIPOC - 1	45.19%	24.18%	100.00%	6.00%
% BIPOC - % Chg.	7.29%	32.32%	122.22%	-43.14%
No Applied -5	972.35	1,066.86	6,245.00	14.00
No Accepted -5	571.56	592.89	3,233.00	14.00
% Accepted -5	58.78%	17.53%	100.00%	32.35%
Applicants Attending - 5	164.82	124.59	636.00	7.00
% Accepted Attending - 5	28.84%	22.26%	90.32%	6.64%

No Applied -1	1,397.39	1,594.34	8,587.00	22.00
No Accepted -1	877.32	1,053.02	5,648.00	17.00
% Accepted -1	62.78%	17.01%	100.00%	32.03%
Applicants Attending - 1	180.19	108.04	412.00	8.00
% Accepted Attending - 1	20.54%	18.01%	76.27%	5.47%
6-year grad rate - 5	41.89%	16.96%	100.00%	3.00%
6-year grad rate - 1	43.65%	20.59%	100.00%	0.00%
6-year grad rate - % Chg.	4.20%	57.09%	233.33%	-37.93%
% Pell Grant -5	53.66%	19.31%	100.00%	0.00%
% Pell Grant -1	52.42%	16.54%	90.00%	18.00%
Pell % Chg.	-2.31%	24.04%	38.24%	-73.33%
Tuition & Fees -5	18,275.14	7,378.09	32,482.00	4,025.00
Tuition & Fees -1	20,589.07	8,767.61	37,584.00	5,645.00
T&F % Chg.	12.66%	16.89%	98.76%	-15.24%
Receiving Institutional Aid% -5	82.49%	26.95%	100.00%	0.00%
Amount Aid - 5	8,718.29	5,791.05	21,596.00	0.00
T&F Discount -5	39.35%	20.36%	69.27%	0.00%
Receiving Institutional Aid% -1	84.61%	22.50%	100.00%	12.00%
Amount Aid - 1	11,108.50	6,579.16	29,411.00	886.00
T&F Discount -1	45.65%	18.16%	78.25%	1.47%
T&F Discount Chg.%	16.00%	118.68%	671.30%	-68.53%
FT Staff -5	116.31	109.60	586	7
FT Staff -1	106.74	96.27	488	5
FT Staff - % Chg.	-8.23%	22.36%	70.00%	-62.16%
FT Instructor -5	37.26	35.40	185.00	1.00
FT Instructor -1	34.95	35.00	183.00	1.00
FT Instructor - % Chg.	-6.20%	31.36%	125.00%	-68.97%
PT Instructor -5	56.81	63.41	313.00	0.00
PT Instructor -1	50.21	47.15	235.00	0.00
PT Instructor - % Chg.	-11.61%	60.96%	300.00%	-100.00%
FT Inst % -5	39.61%	24.53%	100.00%	5.26%
FT Inst % -1	41.04%	22.11%	100.00%	3.70%
FT/PT Inst % Chg.	3.61%	56.34%	266.67%	-70.00%
FT Staff/Student - 5	7.05	2.39	12.50	1.92
FT Staff/Student % - 1	6.37	2.31	13.00	0.00
FT Staff/Student % - % Chg.	-9.75%	36.37%	88.03%	-100.00%
FT Inst/Student % -5	22.02	11.30	69.00	3.13
FT Inst/Student % -1	19.44	15.19	83.00	2.33
FT Inst/Student % -% Chg.	-11.70%	46.86%	180.65%	-48.77%
Endowment -5	11,219,427.45	13,528,374.43	56,802,477.00	0.00
Endowment -1	12,360,805.76	14,515,882.49	64,923,447.00	0.00
Endowment % Chg.	10.17%	49.91%	211.29%	-100.00%
Endowment/FTE -5	13,673.89	15,601.84	55,420.98	0.00

Endowment/FTE -1	18,189.12	17,699.37	60,712.70	0.00
E/FT % Chg.	33.02%	58.04%	232.76%	-100.00%
Tuition & Fees per FTE -5	10,704.40	3,325.41	18,695.00	3,424.00
Tuition & Fees per FTE -1	10,835.79	3,986.92	19,997.00	1,771.00
T&F % Chg.	1.23%	34.23%	103.61%	-73.48%
GGC -5	797.79	1,257.15	4,438.00	0.00
GGC -1	1,171.83	2,748.80	16,363.00	0.00
GGC % Chg.	46.89%	241.88%	1,123.53%	-100.00%
PGGC -5	4,300.50	3,909.42	16,025.00	160.00
PGGC -1	4,480.52	4,692.45	23,822.00	423.00
PGGC % Chg.	4.23%	115.35%	466.92%	-90.69%
Investment -5	864.29	1,092.26	5,218.00	0.00
Investment -1	741.55	1,132.67	5,080.00	-1,358.00
Investment % Chg.	-14.20%	81.22%	500.67%	-377.63%
Other Core -5	1,505.69	3,573.46	18,156.00	0.00
Other Core -1	1,252.74	2,793.79	14,365.00	0.00
Other Core % Chg.	-16.80%	252.11%	857.03%	-100.00%
Tuition% of Core -5	58.90%	17.07%	95.63%	22.12%
Tuition% of Core -1	58.62%	20.44%	97.86%	9.00%
Tuition % of Core % Chg.	0.48%	37.60%	123.16%	-77.63%
Instruction -5	6,398.05	2,525.87	14,223.00	2,234.00
Instruction -1	6,353.05	2,766.76	14,559.00	1,414.00
Instruction % Chg.	-0.70%	47.08%	204.77%	-71.18%
Research -5	28.19	155.81	581.00	0.00
Research -1	41.12	169.14	1,031.00	0.00
Research % Chg.	45.86%	305.71%	708.69%	-100.00%
PS -5	298.29	857.80	4,691.00	0.00
PS-1	184.24	392.83	1,167.00	0.00
PS% Chg.	-38.23%	285.89%	1,100.00%	-86.27%
AS -5	1,708.33	1,729.69	8,933.00	0.00
AS -1	1,707.24	1,545.86	8,466.00	0.00
AS% Chg.	-0.06%	66.45%	239.13%	-78.96%
SS -5	3,707.05	2,196.82	7,766.00	0.00
SS -1	4,154.74	2,511.37	9,886.00	46.00
SS % Chg.	12.08%	65.46%	202.19%	-97.18%
IS -5	5,097.60	3,246.79	15,881.00	819.00
IS -1	6,506.43	3,940.89	23,333.00	525.00
IS % Chg.	27.64%	131.01%	682.17%	-61.54%
Other Core -5	1,515.29	2,817.74	13,909.00	0.00
Other Core -1	1,567.55	2,362.62	11,584.00	0.00
Other Core % Chg.	3.45%	145.76%	556.07%	-100.00%
Instruction % Exp -5	28.62%	9.19%	59.21%	11.71%
Instruction % Exp -1	26.89%	9.89%	51.02%	11.11%

Instruction % Exp -% Chg.	-6.04%	31.62%	135.79%	-64.94%
Total Revenues - 5	22,046.71	8,180.48	46,516.00	8,512.00
Total Expenses -5	22,356.26	8,150.98	53,970.00	8,422.00
Surplus/Deficit -5	-310.19	3,578.98	12,458.00	-7,454.00
FTE -5	820.50	1,023.65	6,407.00	24.00
Total Revenues - 1	23,404.43	7,890.01	47,368.00	7,441.00
Total Expenses -1	23,625.09	7,478.45	48,073.00	6,959.00
Surplus/Deficit -1	-220.67	3,470.31	11,385.00	-6,966.00
FTE -1	679.57	642.78	3,381.00	14.00
TR % Chg.	6.16%	32.64%	121.32%	-46.05%
TE % Chg.	5.68%	25.32%	94.72%	-49.70%
S/D % Chg.	-28.86%	470.58%	1,607.55%	-876.15%
FTE % Chg.	-17.18%	21.99%	41.03%	-50.00%
FRR -2013	1.10	.81	3.00	-1.00
FRR -2019	1.41	1.06	3.00	-1.00
FRR % Chg.	.2818	1.18	2.43	-3.33

Appendix G – Descriptive Statistical Data – Random Control Institutions

Appendix D contains the data definitions, sources, and any transformation calculations.

N=100

<u>Data Field</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>Max</u>	<u>Min</u>
Population -5	186,700.09	392,211.21	2,695,652	5,370
Population -1	194,942.48	406,718.98	2,693,976	5,394
Population % Chg.	2.47%	7.44%	28.61%	-12.18%
Median Income	53,436.44	18,260.61	147,934	28,668
Poverty rate	17.09%	6.67%	34.60%	4.10%
Under 18 (2019)	21.82%	2.73%	28.40%	14.00%
White Pop %	72.08%	19.72%	96.90%	29.10%
BIPOCO	27.92%	19.72%	70.90%	3.10%
FT Enrollment -5	1,330.97	1,243.54	8,058	0
FT Enrollment -1	1,267.01	1,251.18	9,149	5
FT Enrollment % Chg.	-4.81%	0.61%	13.54%	-73.68%
PT Enrollment -5	280.02	562.49	5,238	0
PT Enrollment -1	246.31	401.98	3,342	0
PT Enrollment % Chg.	-12.04%	117.24%	655.56%	-91.54%
Women as % of Enrollment - 5	57.17%	13.88%	97.00%	0.00%
Women as % of Enrollment - 1	57.03%	13.38%	99.00%	0.00%
Women % Chg.	-0.25%	15.28%	131.82%	-25.35%
FT/PT Student ratio - 5	4.75	16.78	82.35	0
FT/PT Student ratio - 1	5.14	21.48	108.17	0.33
FT/PT % Chg.	8.22%	90.87%	408.63%	-91.23%
Distance Ed -5	94.16	173.41	860	0
% Distance Ed - 5	5.84%	15.17%	100.00%	0.00%
Distance Ed -1	92.71	137.53	723	0
% Distance Ed -1	8.33%	12.66%	70.00%	0.00%
% Distance Ed Chg.	42.60%	216.69%	994.07%	-100.00%
FTFT Retention -5	71.07%	11.86%	100.00%	29.00%
FTFT Retention - 1	69.95%	12.57%	100.00%	33.00%
FTFT % Chg.	-2.00%	12.57%	55.56%	-39.71%
% BIPOC - 5	37.62%	22.10%	99.00%	0.00%
% BIPOC - 1	40.30%	21.67%	100.00%	1.00%
% BIPOC - % Chg.	7.13%	22.49%	100.00%	-47.83%
No Applied -5	2,599.08	4,769.83	40,912	18
No Accepted -5	1,605.36	2,435.32	19,685	8
% Accepted -5	61.77%	15.62%	100.00%	33.43%
Applicants Attending - 5	349.64	329.35	2,258	4
% Accepted Attending - 5	21.78%	17.42%	100.00%	9.97%

No Applied -1	2,940.27	5,193.94	46,308	4
No Accepted -1	1,751.91	2,571.86	21,313	1
% Accepted -1	60.32%	16.32%	100.00%	25.00%
Applicants Attending - 1	339.37	320.22	2,299	0
% Accepted Attending - 1	19.37%	17.10%	100.00%	0.00%
6-year grad rate – 5	51.38%	15.21%	100.00%	10.00%
6-year grad rate - 1	50.79%	16.66%	87.00%	0.00%
6-year grad rate - % Chg.	-1.15%	26.48%	100.00%	-100.00%
% Pell Grant -5	44.08%	15.92%	100.00%	0.00%
% Pell Grant -1	46.39%	18.34%	100.00%	0.00%
Pell % Chg.	5.25%	23.82%	85.19%	-100.00%
Tuition & Fees -5	24,096.34	8,233.97	44,902.00	4,770.00
Tuition & Fees -1	27,062.93	9,640.21	51,992.00	5,400.00
T&F % Chg.	12.31%	8.86%	32.91%	-32.13%
Receiving Institutional Aid% -5	91.12%	16.58%	100.00%	0.00%
Amount Aid - 5	12,901.93	5,844.09	30,985.00	0.00
T&F Discount -5	48.79%	15.52%	78.38%	0.00%
Receiving Institutional Aid% -1	90.72%	20.57%	100.00%	0.00%
Amount Aid - 1	15,152.29	7,028.48	27,873.00	0.00
T&F Discount -1	50.80%	16.94%	82.62%	0.00%
T&F Discount Chg.%	4.11%	24.94%	93.31%	-93.57%
FT Staff -5	325.88	503.31	4,127	7
FT Staff -1	325.91	536.39	4,600	6
FT Staff - % Chg.	0.01%	16.27%	57.89%	-58.49%
FT Instructor -5	104.83	165.27	1,394	1
FT Instructor -1	103.16	157.96	1,315	1
FT Instructor - % Chg.	-1.59%	20.17%	133.33%	-38.46%
PT Instructor -5	118.93	189.57	1,425	0
PT Instructor -1	115.06	156.24	1,040	0
PT Instructor - % Chg.	-3.25%	1,000.67%	9,700.00%	-100.00%
FT Inst % -5	46.85%	22.26%	100.00%	10.00%
FT Inst % -1	47.27%	19.80%	100.00%	6.67%
FT/PT Inst % Chg.	0.28%	24.05%	69.48%	-61.06%
FT Staff/Student – 5	6.37	3.88	36.96	2.71
FT Staff/Student - 1	6.09	2.15	14.21	2.57
FT Staff/Student % - % Chg.	-4.43%	28.50%	122.22%	-87.26%
FT Inst/Student % -5	19.81	21.11	184.80	8.13
FT Inst/Student % -1	19.24	12.34	98.16	8.99
FT Inst/Student % -% Chg.	-2.87%	35.72%	231.58%	-66.04%
Endowment -5	54,386,608.81	101,011,802.87	602,601,967	0
Endowment -1	61,869,991.52	117,484,677.95	666,930,000	0
Endowment % Chg.	13.76%	535.33%	52.38%	-78.63%
Endowment/FTE -5	26,186.32	27,723.65	141,060.70	0.00

Endowment/FTE -1	28,735.18	29,597.61	146,493.26	0.00
E/FT % Chg.	9.73%	460.90%	4476.63%	-72.81%
Tuition & Fees per FTE -5	12,505.98	4,769.31	31,045.00	1,054.00
Tuition & Fees per FTE -1	13,079.48	5,093.52	35,083.00	966.00
T&F % Chg.	4.59%	62.85%	554.84%	-89.65%
GGC -5	999.95	1,798.85	11,595.00	0.00
GGC -1	1,227.07	3,457.73	27,910.00	0.00
GGC % Chg.	22.71%	139.35%	764.58%	-100.00%
PGGC -5	4,257.96	4,966.08	33,803.00	0.00
PGGC -1	4,797.82	5,652.53	35,161.00	215.00
PGGC % Chg.	12.68%	165.83%	1270.05%	-83.41%
Investment -5	3,467.29	4,438.52	25,194.00	0.00
Investment -1	2,200.35	2,945.32	20,807.00	-47.00
Investment % Chg.	-36.54%	340.37%	2,773.33%	-102.79%
Other Core -5	1,527.13	3,571.55	26,126.00	0.00
Other Core -1	1,200.78	1,865.45	11,414.00	0.00
Other Core % Chg.	-21.37%	800.16%	648.00%	-100.00%
Tuition% of Core -5	54.95%	19.30%	99.52%	5.08%
Tuition% of Core -1	58.12%	18.07%	97.86%	5.70%
Tuition % of Core % Chg.	5.76%	101.16%	968.23%	-80.50%
Instruction -5	7,881.60	3,752.61	25,295.00	1,399.00
Instruction -1	8,306.99	4,472.20	32,789.00	1,504.00
Instruction % Chg.	5.40%	25.88%	172.77%	-62.89%
Research -5	140.25	709.31	6,323.00	0.00
Research -1	138.01	649.97	5,558.00	0.00
Research % Chg.	-1.60%	35.21%	112.77%	-40.98%
PS -5	246.52	545.03	3,298.00	0.00
PS-1	259.30	656.73	4,433.00	0.00
PS% Chg.	5.18%	49.56%	123.66%	-100.00%
AS -5	1,912.48	1,417.06	7,858.00	0.00
AS -1	2,163.13	2,057.94	16,595.00	0.00
AS% Chg.	13.11%	104.72%	684.12%	-87.14%
SS -5	4,125.30	2,036.32	16,206.00	182.00
SS -1	4,487.63	2,003.58	10,951.00	520.00
SS % Chg.	8.78%	35.65%	185.71%	-76.50%
IS -5	5,035.36	2,801.01	16,185.00	1,137.00
IS -1	5,401.44	2,767.90	19,330.00	1,580.00
IS % Chg.	7.27%	46.04%	220.73%	-74.10%
Other Core -5	684.64	2,317.17	19,285.00	0.00
Other Core -1	852.46	2,704.84	23,038.00	0.00
Other Core % Chg.	24.51%	3,162.66%	15,712.50%	-100.00%
Instruction % Exp -5	33.07%	9.34%	56.36%	8.16%
Instruction % Exp -1	32.80%	9.76%	63.77%	3.24%

Instruction % Exp -% Chg.	-0.82%	20.42%	85.36%	-65.50%
Total Revenues - 5	27,169.72	12,148.00	71,741.00	4,741.00
Total Expenses -5	23,831.70	9,129.15	58,303.00	4,524.00
Surplus/Deficit -5	3,338.02	5,462.24	26,825.00	-12,637.00
FTE -5	2,076.91	2,453.63	14,940.00	19.00
Total Revenues - 1	27,312.69	12,019.08	77,599.00	12,853.00
Total Expenses -1	25,369.28	10,095.73	70,324.00	10,497.00
Surplus/Deficit -1	1,943.41	4,250.07	20,664.00	-12,791.00
FTE -1	1,985.12	2,314.18	15,926.00	41.00
TR % Chg.	0.53%	40.80%	264.31%	-72.90%
TE % Chg.	6.45%	38.57%	310.43%	-61.27%
S/D % Chg.	-41.78%	2,386.30%	1,312.54%	-23,075.00%
FTE % Chg.	-4.42%	36.73%	231.58%	-72.84%
FRR -2013	2.19	0.66	3.00	-0.60
FRR -2019	2.24	0.74	3.00	-0.10
FRR % Chg.	-2.45%	60.57%	100.00	N/A

Appendix H – Results of t-Test: Two-Sample Assuming Unequal Variances – Research Question 1

t-Test: Two-Sample Assuming Unequal Variances – 13
Factor Model

	<i>HCM</i>	<i>Non-HCM</i>
Mean	0.426092177	0.289476623
Variance	0.017160344	0.030599009
Observations	54	100
Hypothesized Mean Difference	0	
df	136	
t Stat	5.469988694	
P(T<=t) one-tail	1.04569E-07	
t Critical one-tail	1.656134988	
P(T<=t) two-tail	2.09138E-07	
t Critical two-tail	1.977560777	

t-Test: Two-Sample Assuming Unequal Variances - FRR
Only

	<i>HCM</i>	<i>Non-HCM</i>
Mean	0.544035891	0.246221936
Variance	0.058078976	0.040844066
Observations	54	100
Hypothesized Mean Difference	0	
df	94	
t Stat	7.730924318	
P(T<=t) one-tail	5.83387E-12	
t Critical one-tail	1.661225855	
P(T<=t) two-tail	1.16677E-11	
t Critical two-tail	1.985523442	

t-Test: Two-Sample Assuming Unequal Variances - HCM
Across Models

	<i>FRR Only</i>	<i>13 Factor</i>
Mean	0.544035891	0.426092177
Variance	0.058078976	0.017160344
Observations	54	54
Hypothesized Mean Difference	0	
df	82	
t Stat	3.159724724	
P(T<=t) one-tail	0.001106095	

t Critical one-tail	1.663649184
P(T<=t) two-tail	0.00221219
t Critical two-tail	1.989318557

t-Test: Two-Sample Assuming Unequal Variances - Non-HCM Across Models

	<i>FRR Only</i>	<i>13 Factor</i>
Mean	0.246221936	0.289476623
Variance	0.040844066	0.030599009
Observations	100	100
Hypothesized Mean Difference	0	
df	194	
	-	
t Stat	1.618277903	
P(T<=t) one-tail	0.053613687	
t Critical one-tail	1.652745977	
P(T<=t) two-tail	0.107227375	
t Critical two-tail	1.972267533	

Appendix I – Results of t-Test: Two-Sample Assuming Unequal Variances – Research Question 2

t-Test: Two-Sample Assuming Unequal Variances - FRR Only

	<i>Closed</i>	<i>Open</i>
Mean	0.120564045	0.105599527
Variance	0.008453673	0.011865599
Observations	12	142
Hypothesized Mean Difference	0	
df	14	
t Stat	0.533077589	
P(T<=t) one-tail	0.301170009	
t Critical one-tail	1.761310136	
P(T<=t) two-tail	0.602340018	
t Critical two-tail	2.144786688	

t-Test: Two-Sample Assuming Unequal Variances - 13 Factor Model

	<i>Closed</i>	<i>Open</i>
Mean	0.21504499	0.086149589
Variance	0.019673653	0.015249014
Observations	12	142
Hypothesized Mean Difference	0	
df	12	
t Stat	3.083958716	
P(T<=t) one-tail	0.004734008	
t Critical one-tail	1.782287556	
P(T<=t) two-tail	0.009468016	
t Critical two-tail	2.17881283	

t-Test: Two-Sample Assuming Unequal Variances - Cross Model
Closed

	<i>13 Factor</i>	<i>FRR Only</i>
Mean	0.21504499	0.120564045
Variance	0.019673653	0.008453673
Observations	12	12
Hypothesized Mean Difference	0	
df	19	
t Stat	1.951509309	
P(T<=t) one-tail	0.032948534	
t Critical one-tail	1.729132812	
P(T<=t) two-tail	0.065897067	
t Critical two-tail	2.093024054	

Appendix J – Marshall University Institutional Review Board Exemption Letter



Office of Research Integrity

January 10, 2022

Ed Barton
4435 Winding Oaks Circle
Mulberry, FL 33860

Dear Mr. Barton:

This letter is in response to the submitted dissertation abstract entitled "*Predicting Shut Down: Exploring Commonalities in Higher Education Institutional Failure at Faith-Based Institutions*." After assessing the abstract it has been deemed not to be human subject research and therefore exempt from oversight of the Marshall University Institutional Review Board (IRB). The Code of Federal Regulations (45CFR46) has set forth the criteria utilized in making this determination. Since the study does not involve human subjects as defined in DHHS regulation 45 CFR §46.102(e) it is not considered human subject research. If there are any changes to the abstract you provided then you would need to resubmit that information to the Office of Research Integrity for review and determination.

I appreciate your willingness to submit the abstract for determination. Please feel free to contact the Office of Research Integrity if you have any questions regarding future protocols that may require IRB review.

Sincerely,

Bruce F. Day, ThD, CIP
Director

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