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Rational Choice Theory for Financial Strategy in Rural Michigan Community Colleges

Nicholas John Brege
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Walden University

College of Management and Technology

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Nicholas J. Brege

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Walden University
2019

Abstract

Rational Choice Theory for Financial Strategy in Rural Michigan Community Colleges

by

Nicholas J. Brege

MBA, University of Michigan, 2006

BS, Kettering University, 2004

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Management

Walden University

August 2019

Abstract

Since 2011, drastic declines in tuition revenue for many rural community colleges have hindered institutional budgets and have been the primary driver for the financial strategy decisions made by college leaders. Recent declines in revenue for rural community colleges have created a constrained fiscal environment causing college leaders to increase focus on internal operations. The aim of this research was to expand the understanding of how management decisions influence tuition revenue when demand fluctuates. Data from multiple archival sources including several national and state statistical databases were used. This study used a multiple regression analysis to investigate the relationships between tuition revenue and (a) tuition rate setting strategy, (b) the management of institutional funds, (c) local economic conditions, and (d) age demographics. It was found that tuition rate setting strategy had the largest influence on tuition revenue among the internally controlled factors. Age demographics and economic conditions were found to be significant external factors that influence the tuition revenue at rural community colleges. This study promotes positive social change by providing financial leaders at community colleges greater insight into budgeting strategies that may help protect the financial viability of rural community colleges. The financial strength of community colleges is important for positive social change in rural communities because it assures that these institutions can continue to offer and expand solutions that meet the educational needs of the local communities they serve at a price affordable by all.

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Dedication

This dissertation is dedicated to the memory of my mother, Diane M. Brege, and the memory of my sister, Jill A. Byelich. My mother was a constant supporter who worked hard to make this opportunity possible for me. She was a first-generation college graduate that reinforced the importance of education to her children and urged me to pursue my dreams. She was also a manager and leader in her professional career from whom I learned many managerial strengths and leadership qualities. Her open-eared, caring, and logical approach to management is a model of integrity that has served as a guiding light in my professional management career.

My sister blazed a path for me to follow and helped me overcome many fears and anxieties by showing me that “it can be done” and encouraging me to try. She believed in me, challenged me, and set the bar high. If she had not gone to college and shared her experience with me, I probably would not have enrolled in college after high school. Both of these people were major influences on my life and guided me down a path of success and accomplishment. Without their love, support, and encouragement early in my life, I would not be in a position that allowed me to successfully complete this dissertation.

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I also owe very special thanks to my wife, Amy, who has supported me in this pursuit for a doctoral degree for 5 years. She provided me with encouragement when I needed it the most and helped me keep my focus on the goal of completing this dissertation. Although our two boys, John and Nathan, may be too young to fully understand the reasons why I chose this journey, I must also thank them for sacrificing time with me that could have been spent doing things that they may have found more fun. Without the support, sacrifice, and love of my family, this accomplishment would be far less meaningful.

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Chapter 1: Introduction to the Study

Community college revenue sources include state appropriations, tuition, fees, and local tax revenue. In recent years, deep cuts in state funding and a decline in enrollment have prompted community college leaders to look for new ways of improving efficiency and financial performance. In this chapter, I introduce the financial problem faced by leaders of community colleges and the need for a greater understanding of the internal and external factors that influence total demand and tuition revenue. This broader understanding may help community college leaders develop organizational strategies for maintaining a viable low-cost higher education solution. This chapter includes a background, problem, significance, and purpose of the study. I also state the specific research questions, hypotheses, theoretical foundation, and nature of this study. Lastly, the chapter includes a list of definitions, assumptions, scope, delimitations, and limitations for the study.

Background of the Study

Since 2011, drastic declines in tuition revenue for many community colleges have hindered institutional budgets and have been the primary driver for the financial strategy decisions made by college leaders. For example, in the period from 2011 to 2017, the enrollment headcount for Michigan community colleges had dropped 25% and the number of enrolled credit hours had dropped 28% (MACRAO Enrollment, 2017). In this same period, Michigan community college leaders reacted by increasing tuition rates by an average of 22%; meanwhile, statewide revenue from tuition and fees continued to decline by 5.6% over that period despite the tuition rate increases (Center for Educational

Performance and Information, 2018). These examples of the rapidly shifting enrollment and financial trends in community colleges highlight the need for managers to understand financial strategies that may protect the long-term financial stability of the institutions (Phelan, 2014). While earlier studies have demonstrated a relationship between tuition price elasticity, economic factors, age demographics, and tuition revenue, there has been little research in understanding whether the financial strategies for the management of institutional funds have a long-term effect on total revenue (Millea & Orozco-Aleman, 2017; Denning, 2017; Crouse, 2015).

Community college financial performance and efficiency is a topic that has gained the interest of researchers in recent years as community colleges face greater budget challenges. Belfield, Crosta, and Jenkins (2014) and Manning and Crosta (2014) studied measures of efficiency and return on investment for community college operational spending. The researchers determined that community college efficiency and the return on investment for program development was affected by the funding decisions and the financial strategy used by community college leaders (Belfield et al., 2014; Manning & Crosta, 2014). Similarly, Thornton and Friedel (2016) and Li and Kennedy (2018) were interested in how community college leaders are applying business-like principles. The results of these studies showed that the decision-making process used by community college leaders is influenced by an objective to maximize total revenue (Thornton & Friedel, 2016; Li & Kennedy, 2018). These studies provide a foundation that highlights the need for additional research into how the management of institutional

funds and financial decision-making strategy affects overall financial success for community colleges.

Earlier research supports that microeconomic and macroeconomic principles guide the tuition rate setting strategy used by community college leaders. Denning (2017), Millea and Orozco-Aleman (2017), Farhan (2014), and Langelett, Chang, Akinfenwa, Jorgensen, and Bhattarai, (2015) found that there is a price elasticity of demand for higher education that affects long-term total tuition revenue when college leaders decide to increase tuition rates to offset enrollment declines. In addition, Crouse (2015) concluded that community colleges are normal goods and substitutes for 4-year institutions. Crouse also revealed that macroeconomic conditions affect the price elasticity of demand. Crouse found that the elasticity of demand is different in prerecession, recessionary, and postrecessionary periods. While raising tuition may seem like a viable way to offset tuition income losses during periods of declining enrollment, additional research may provide insight for community college leaders to anticipate the effects of the price elasticity of demand.

There is also evidence that the conditions of the labor market influence community college demand. Wladis, Wladis, and Hachey (2014) found that the demand for specific programs or courses depends on perceived benefits such as the usefulness of the course content, wage markets for program graduates, and the job availability upon graduation from specific skills training programs. The findings of this study indicated that the demand for certain instructional areas varies with the anticipated wage levels and job availability projections for graduates of those programs (Wladis et al., 2014). The

funding of high-demand instructional programming could provide a return on investment by supporting higher enrollment, which would result in greater tuition income for the institution.

There may also be external factors that play a role in the tuition income for community colleges. In earlier studies, researchers have explored economic indicators that help explain the rapid rise in community college enrollment during the recession from 2007 to 2009 (Long, 2015). Similarly, the results from previous studies have indicated a link between falling unemployment rates and declining community college enrollment (Pennington, McGinty, & Williams, 2002; Long, 2015; Fincher & Katsinas, 2016). Pennington et al. (2002) examined the relationship between community college enrollment and national economic indicators such as unemployment rates, GDP, population statistics, and disposable household income. The authors found a significant correlation between economic factors and community college enrollment (Pennington et al., 2002). These changes in enrollment have a direct relationship with the tuition revenue generated by the institution.

Problem Statement

Recent declines in revenue for community colleges have created a constrained fiscal environment causing college leaders to increase focus on internal operations (Mullin, 2014). From 2011 to 2017, the number of enrolled credit hours in Michigan dropped 28%, tuition rates increased 22%, and revenue from tuition declined by 5.6% (Center for Educational Performance and Information, 2018). The general management problem is that long-term financial stability of an organization may be negatively affected

if leaders do not develop a financial strategy to fund and develop areas of the business in a way that maximizes total revenue when demand fluctuates. The specific management problem is that the long-term financial health of community colleges may be negatively affected if leaders do not understand the extent to which the management of institutional funds, tuition setting strategy, age demographics, and economic conditions influence tuition revenue. The aim of this research was to expand the understanding of how management decisions influence tuition revenue when demand fluctuates. Specifically, there is a gap in the existing research concerning the extent to which the financial strategy used by college leaders can improve the long-term financial health of the institution when changes in economic and age demographic conditions influence demand.

Purpose of the Study

The purpose of this quasi-experimental quantitative study was to investigate the extent to which the management of institutional funds, tuition rate setting strategy, age demographics, and economic conditions help explain the changes in tuition revenue for rural Midwest community colleges. The independent variable representing the management of institutional funds was the percentage of the total operating budget spent on instruction and instructional support for each college in each year. The independent variable used to indicate tuition rate setting strategy was the tuition rate for each community college from year to year. The independent variables representing age demographics were the estimated population size for the age groups 15 to 17 and 18 to 24 in each county for each year. The independent variable reflecting local economic conditions was the annual average county-level unemployment rate. The dependent

variable was the total tuition revenue for each community college in each year. For the analysis, I used historical financial data from the fall semester of 2011 through the fall semester of 2017.

Research Question and Hypotheses

Research Question

RQ1: To what extent, if any, do the management of institutional funds, tuition rate setting strategy, age demographics, and local economic conditions affect the total tuition revenue for rural Midwest community colleges?

Multiple Regression Model

The mathematical equation below represents the multiple regression model that was used in this study.

$$y_{ij} = \beta_0 + \beta_1 x_{1ij} + \beta_2 x_{2ij} + \beta_3 x_{3ij} + \beta_4 x_{4ij} + \beta_5 x_{5ij} + \varepsilon_{ij} \quad (1)$$

Where, y_{ij} is the annual tuition revenue for community college i in the year j . The subscript i goes from one to 10 for the 10 community colleges in this study and j goes from one to seven for years from 2011 to 2017 (2011 is year 1, 2012 is year 2, etc.). The independent variables are defined in Table 1. The constant β_0 is the y-axis intercept and β_1 through β_5 are the regression coefficients for the five independent variables. The term ε_{ij} is the error term.

Table 1

Independent Variables (IV) for Regression Model

| IV | Variable description | Values | Variable category |
|-------|----------------------|---|-----------------------------------|
| x_1 | Instruction | % of operating budget allocated to all instruction activity and instructional support | Management of institutional funds |
| x_2 | Tuition rate | Weighted average in-district and out-of-district tuition rate | Tuition setting strategy |
| x_3 | Age 15-17 population | Population of people 15-17 years old | Age demographic |
| x_4 | Age 18-24 population | Population of people 18-24 years old | Age demographic |
| x_5 | Unemployment | Unemployment rate | Economic indicator |

Hypotheses

The hypotheses associated with the regression model were as follows:

H_0 : There is no statistically significant relationship between tuition revenue and the percentage of the operating budget allocated to instruction and instructional support, change in tuition rate, the population of the age group 15-17, the population of the age group 18-24, or unemployment level.

H_1 : At least one of the independent variables has a statistically significant relationship with tuition revenue.

Theoretical Foundation

Becker's (1993) rational choice theory of behavioral economics is a guiding framework for this study. The rational choice theory posits that decisions are guided by an understanding of the costs and benefits associated with each option (Becker, 1993). This study is consistent with the rational choice theory in that managers make decisions based upon the potential costs and benefits associated with financial strategies while considering anticipated demand patterns, tuition revenue, and total costs of operation. This study is also grounded in human capital theory as it explains the rational choices associated with the demand for community college services (Becker, 1993). Human capital theory suggests that the demand for education follows aggregate rational behavior thus allowing demand to be influenced by management decisions that would alter the costs or benefits associated with attending community college (Becker, 1993).

Managers apply rational choice theory and human capital theory in the decision-making process for funding and developing specific program areas. Wladis et al. (2014) found that the demand for specific programs or courses depends on perceived benefits such as the usefulness of the course content, wage markets for program graduates, and job availability associated with specific skills training. In turn, managers apply rational choice theory in the decision-making process for funding the growth and development of certain program areas based upon the anticipated aggregate demand for those programs.

The microeconomic phenomena of substitutes, opportunity costs, and the price elasticity of demand also guide the management of institutional funds. The tuition-enrollment relationship exhibits a price elasticity of demand for higher education, which

is a function of the tuition cost, substitutes, and the available financial resources of the prospective students (Crouse, 2015; Millea & Orozco-Aleman, 2017). When leaders decide to increase tuition rates, there may be a resulting decline in demand, which could counteract the intended increase in total tuition revenue.

Nature of the Study

In this longitudinal quasi-experimental quantitative study, I used a multiple regression analysis of historical financial data to examine the relationship between the tuition revenue for rural Michigan community colleges and the management of institutional funds, tuition rate setting, economic conditions, and age demographics. I chose a quasi-experimental design because the sample groups cannot be randomly assigned to the treatments. Pennington et al. (2002) found a statistically significant relationship between community college enrollment and certain economic indicators on a national scale using a lag period of 1 year. I tested the relationship with no lag and a lag period of 1 year when analyzing the effects of economic indicators on tuition revenue. Millea and Orozco-Aleman (2017) also found that tuition rates and population statistics have a coincident effect on the demand for higher education and the resulting tuition revenue. I analyzed age demographic population statistics as both coincident and 1-year lagging variables in this regression analysis to determine which case has a stronger or more significant relationship with tuition revenue.

Definitions

Age demographics: Statistical data of people as categorized by age (Hermalin & Neidert, 2017; Green & Lee, 2016).

Instructional cost: All costs associated with operating educational programs including faculty compensation, support staff compensation, specialized equipment, and maintenance of specialized equipment (Price, Schneider, & Quick, 2016; Shulman et al., 2017).

Labor force: The population of people who are available for work and are actively seeking work (Hall & Schulhofer-Wohl, 2018).

Tuition rate: Prices that are established by college management and governing boards including the price for attending courses and the associated fees (Langelett et al., 2015; Heather, Shelia, Watkins, & Stucky, 2015).

Tuition revenue: Revenue that is received by the college in the form of tuition and fees (Crouse, 2015). Tuition revenue excludes any revenue generated from state, local, federal, or other funding sources (Crouse, 2015).

Unemployment (unemployment rate): The percentage of the labor force that is not employed or is temporarily laid-off (Hall & Schulhofer-Wohl, 2018).

Assumptions

This study hinged on two primary assumptions regarding the timing and nature of the figures reported in the data. First, I assumed that changes in total tuition and fees revenue that are not accounted for by changes in tuition rates or changes in total contact hours of enrollment are a result of changes in the amount of nontuition fees collected. Each college in this study reports revenue from tuition and fees as a combined total sum for each fiscal year. Likewise, each college reports the tuition rates per contact hour for each fiscal year. Nontuition fee categories and structures vary greatly from college to

college and are not reported as a comparable rate. Further, fees may be assessed differently depending on the academic program, course, or delivery method of instruction. The effect of changes in fees is accounted for using the figures that each community college provides for the total number of enrolled students, the total number of contact hours, the total revenue for tuition and fees, and the tuition rate per contact hour. This assumption was necessary in order to understand changes in revenue that were not consistent with changes in the total number of contact hours of enrollment and changes in tuition rates.

Secondly, I assumed that short-term fluctuations in the unemployment rate within a given calendar year do not have a significant effect on changes in community college enrollment. Monthly unemployment figures may vary seasonally as a result of the normal business and economic cycle. These cyclical changes could introduce noise because of factors that were outside the scope of this study. For this study, the average unemployment rate for the calendar year and the total tuition revenue for the reporting fiscal year were assumed to represent the values for that given year. This assumption allowed for a measure for the change in year over year employment statistics that captured the net effect of both seasonal and nonseasonal changes in employment.

In addition to these first two assumptions, the data used in this study must have met a set of assumptions necessary for multiple linear regression analysis. First, multiple linear regression analysis relies on the assumption that there is a linear relationship between the independent and dependent variables. Additionally, the assumptions for multiple linear regression analysis include normality of the residuals, zero conditional

mean, and homoscedasticity of the error variance. The model must also have met the assumption that no perfect collinearity exists between variables and no autocorrelation exists among the independent variables. Each of these assumptions were tested as outlined in the Data Analysis Plan in Chapter 3 of this paper.

Scope and Delimitations

This longitudinal quantitative study was aimed to understand how the management of institutional funds, tuition rate changes, state-level economic factors, and demographic factors affect the tuition revenue in rural Midwest community colleges. The scope of this research was limited to public 2-year colleges that operate in areas classified as a rural population density. In order to center the findings on the period following the most recent economic recession, I focused this study on data from the year 2011 through 2017. I chose this period to minimize the risk of introducing unintentional economic effects into the study.

I selected the focus on rural public community college because these regions of the Midwest have a diverse mix of both farming and nonfarming economic sectors that make up the regional economic output. Likewise, it was important to compare institutions with similar scales of tuition revenue and regional population density and those that fall under the same state funding rules. This study excluded private and public 4-year higher education institutions as well as large urban public community colleges. This approach may limit the generalization of the research findings but provided a greater depth of research into the specific research question addressed in this study.

One notable delimitation of this study was that it did not directly address the higher levels of Maslow's theory of the hierarchy of needs as it relates to the pursuit of higher education. Maslow's hierarchy of needs explains that the reasons for college enrollment may be related to a need for self-actualization (as cited in Petty, 2014). This need would imply that tuition revenue might vary according to factors other than cost, perceived benefits, or economic gain. I focused this study on management-related issues that may influence tuition revenue, and therefore understanding the reasons for personal choices to attend college was outside of the scope of this study.

Limitations

This study was subject to limitations regarding the history and maturation of the community college education system. Despite using 7 years of data, this study has threats to internal validity as the role of community colleges has changed over time. The advent and growth of dual enrollment and early college programs are examples of how the role of community colleges has changed throughout the history of their existence. Additionally, new educational program offerings can become new sources of revenue, which may offset tuition revenue losses in other areas of the college. Likewise, community colleges have matured through technological advancements that have changed education delivery methods. A technological and cultural shift towards online learning has improved the reach into rural communities where higher education opportunities have traditionally been limited. While community colleges have leveraged this delivery method to generate additional tuition revenue, this shift could pose a threat to the internal validity of this study as more competition is introduced for rural education.

To address these threats to validity, the period examined in this study was carefully considered to limit the effects of shifts in cultural or historical changes while including adequate data for meaningful results.

The design of this nonexperimental study helped to address the effects of bias and testing validity; however, it also introduced threats to external validity. Researcher bias needed to be carefully managed, because I as the researcher in this study was an employee in the community college system. This study included data from archival records, and therefore I did not directly control the effects of testing and test sampling and did not threaten the validity of the findings. Likewise, the use of archival data limited the opportunity to introduce researcher bias. On the other hand, the nonexperimental design limited the understanding of the impact of countermeasures and interventions for declining tuition revenue. Those interventions may include increased marketing effort, new course delivery methods, or new program offerings to meet specific educational needs. This threat to external validity was addressed by analyzing the relationships for instructional spending and instructional support spending for the college as a whole. Although the results of this analytical approach did not provide insight into which interventions were able to mitigate losses in tuition revenue, they showed whether certain colleges were able to direct instructional funds efficiently to control costs and generate higher revenue.

I used a purposive sampling technique to gather comparable data from institutions that operated under similar governmental controls and similar economies of scale. The sample group consisted of 10 community colleges in Michigan, and these colleges were

of similar size and located in similar areas of rural population density. This sampling technique presents some limitations to the findings and conclusions of the study.

Although random sampling improves the generalizability of the findings, it was not a good technique in this case because of the limited number of institutions that could be directly compared to one another. Limitations due to the sampling technique must be considered when applying the conclusions of this study to any case or subject outside the specific sample set examined in the study.

Significance of the Study

Significance to Theory

This study addresses the general management problem that the long-term financial stability of an organization may be negatively affected if organizational leaders do not develop a financial strategy to fund and develop areas of the business in a way that maximizes total revenue when total demand fluctuates. Community colleges and other forms of publicly funded higher education have traditionally been viewed and operated more as a public service and not necessarily in a business-like model (Siegel & Leih, 2018). As public funding continues to decline, the merger of economic theory and management theory in the postsecondary education setting is now a relevant and urgent subject in order for these institutions to remain sustainable (Mullin, 2014). I aimed this study to advance the knowledge of how managers and leaders in the field of postsecondary education engage in decision-making behavior that is consistent with the rational choice theory in order to address issues of organizational sustainability by developing a sound financial strategy.

Significance to Practice

Aligning resources to meet the goals and objectives of an organization is a primary function of management that includes an examination of internal and external factors (Essary, 2014; Grant, 2016). In the case of community colleges, an improved understanding of the effects of certain external factors may help managers identify potential threats or opportunities so that they may proactively adjust the financial strategy of the organization. These external factors include the changing economic and age demographic conditions that have occurred in the Midwest over the past decade (Pennington et al., 2002; Long, 2015; Fincher & Katsinas, 2016; Millea & Orozco-Aleman, 2017). Recent enrollment and financial trends in many Midwest community colleges highlight the need for an improved understanding of how operational sustainability is affected by the decision-making process used by community college leaders (Essary, 2014; MACRAO Enrollment, 2017). This improved understanding may allow leaders to adjust financial strategy ahead of rapid declines in enrollment to minimize budgetary shortfalls that could negatively affect the financial health and operations of the institution.

The decision-making process used by community college leaders is guided by an understanding of the costs and financial returns associated with funding decisions. Measuring costs and understanding the return on investment related to program funding and development have become critical issues for community college leaders (Manning & Crosta, 2014). Tuition revenue represents a large component of variable income for community colleges and has a direct relationship with tuition rates and total contact hours

of enrollment. Enrollment levels, tuition rates, and the resulting tuition income are often the focus of financial forecasting in the budgeting process (Leonard, 2017). The findings from this study may provide insight that could help college managers in the financial decision-making process. This insight may allow college managers to narrow the level of error in budget projections if a link could be established between financial strategy for the management of institutional funds and tuition revenue for community colleges.

Community college enrollment has shown periods of growth and decline in response to various economic conditions. Beginning in 2008, the United States entered an economic recession characterized by high levels of unemployment, financial market retraction, and declining GDP in the United States, which had a significant effect on the regional economic stability of the Midwest (Lin & Wang, 2016). During this recessionary period, many Midwest community colleges experienced high rates of enrollment expansion and tuition revenue (MACRAO Enrollment, 2017). Following this recession, a large proportion of Midwest community colleges experienced drastic drops in tuition revenue, which hindered college budgets (Phelan, 2014; Center for Educational Performance and Information, 2018). These rapidly shifting trends in community college revenue spark the urgency for an improved understanding of the effects of long-term financial strategies so that community college managers can make well-informed decisions regarding the management of institutional funds (Phelan, 2014).

Significance to Social Change

Community colleges have traditionally served populations that may not otherwise have access to higher education. They have offered a low-price alternative for the

educational development of individuals who may face financial or geographical barriers that would prevent them from receiving a postsecondary education in other forms (Crouse, 2015). The findings from this study could promote positive social change by providing insight for the decision-making process used by leaders to improve the financial strength of community colleges so that they may continue to offer and expand the technical, vocational, certificate, and degree-bearing educational needs of the local communities they serve. The viability and sustainability of community colleges also have implications for the economic and social conditions within their communities.

Communities, cultures, and societies thrive and advance through the benefits of regional higher education. The areas surrounding community colleges and other forms of higher education institutions benefit from positive spatial spillover effects that impact regional economic performance, production, and entrepreneurship (Drucker, 2016). Likewise, community colleges have a positive cultural value through individual advancement and societal gain through a higher level of education (Heather et al., 2015). The financial viability for community colleges is an important factor in ensuring that these positive social impacts will continue to grow. This study may help leaders understand ways to improve the financial condition of community colleges in order to support this positive social change in the communities they serve.

Summary and Transition

The immediate financial concerns facing community colleges warrant a closer look into the effectiveness of the allocation of institutional funds and the price-setting strategies used by managers. Likewise, previous studies indicated that unemployment and

age demographics may act as external factors that influence tuition revenue (Pennington et al., 2002; Long, 2015; Fincher & Katsinas, 2016). This study examined variables related to management of institutional funds, tuition price setting, age demographics, and unemployment in order to understand the relevance of management decisions on the financial success of the institution.

The main theories guiding this study included rational choice theory, human capital theory, and the economic principles of supply, demand, and price elasticity. Although the economic and social impacts of these theories are traditionally viewed through the lens of market trade and private enterprise, the changing landscape of the postsecondary education sector marks the need to further examine the viability of the community college business model (Siegel & Leih, 2018; Mullin, 2014). I aimed this study to expand the understanding of how these theories help explain the behaviors guiding management decisions and the financial impact of these decisions for community colleges. In the following chapter, I provide an overview of the existing literature pertaining to these topics and the previous research that supports the need for this study.

Chapter 2: Literature Review

The long-term financial stability of an organization may be negatively affected if organizational leaders do not develop a financial strategy to fund and develop areas of the business in a way that maximizes total revenue when total demand fluctuates. The specific management problem addressed in this study was that the long-term financial health of Midwest community colleges may be negatively affected if leaders do not understand the extent to which the management of institutional funds, tuition rate setting strategy, age demographics, and economic conditions influence tuition revenue. The purpose of this quantitative study was to investigate the extent to which the management of institutional funds, tuition rate setting strategy, age demographics, and economic conditions help explain the changes in tuition revenue for rural Midwest community colleges.

Current literature surrounding the topic of community college finance focuses on how leaders have applied entrepreneurial and creative solutions to overcome budgetary shortfalls. Researchers have highlighted major financial challenges due to the declines in traditional revenue sources such as tuition revenue and state aid (Mullin, 2014; Pucciarelli & Kaplan, 2016; Morris, 2017). This literature review begins with a synopsis of the seminal and relevant works surrounding rational choice theory, behavioral economics, and human capital theory. In addition, this chapter contains a discussion of the recent research that reveals the current financial landscape for community colleges throughout the United States. Likewise, this review highlights the literature that explores leadership responses to the current financial landscape in the areas of budgeting

strategies, tuition rate setting strategies, and approaches to ensuring organizational sustainability. Finally, the chapter concludes with a discussion of previous work in the areas of tuition price elasticity, the effects of the business cycle, population demographics, unemployment effects, and additional research supporting the choice of variables for this study.

Literature Search Strategy

An exhaustive search of existing literature was performed through the following databases: EBSCOhost, ProQuest, Business Source Complete, Educational Resource Information Center, Education Source, and Google Scholar. The following terms, phrases, and keywords were used alone or in combination to produce various search results: *community college finance, management of funds, budgeting strategy, unemployment, population declines, age demographics, college leadership strategy, economic factors, high school graduation rates, college layoffs, faculty salary, organizational sustainability, effects of the business cycle, elasticity of demand, tuition setting strategy, and enrollment forecasting*. In addition, the search for seminal theory articles and contemporary theory literature contained the following terms: *human capital, rational choice theory, behavioral economics, efficient market hypothesis, and supply and demand for college*. The scope of the search for contemporary research journal articles was research conducted since 2002 with a stronger focus on more recent articles published since 2014. The search strategy for seminal theory articles was not bound by the year the research was published. The literature reviewed in this section represents the

results of this search strategy that relate to the problem statement, purpose, and topic of this study.

Theoretical Foundation

Rational Choice Theory

Becker's (1993) rational choice theory posits that management decisions are guided by an understanding of the costs and benefits associated with each option. According to rational choice, a manager will be in favor of the option that provides the greatest benefit at a given cost level (Wladis et al., 2014). When considering decisions for the management of institutional funds, managers have several alternatives to consider. The rational choice theory explains that managers will choose to fund a particular budget item based on the comparative costs and benefits of all options (Becker, 1993; Wladis et al., 2014). Becker (1993) asserted that rational choice theory helps explain individual decisions when certain assumptions are met.

One of the primary assumptions for the rational choice theory is that the decision-making entities have perfect information. Community college budget managers must be keenly aware of factors that may influence income to the college, such as tuition revenue, competition, and political influences (Mullin, 2014). When making decisions about the management of institutional funds, managers are required to estimate changes in tuition revenue based on external factors such as the costs and availability associated with alternatives to a community college education (Mullin, 2014; Pucciarelli & Kaplan, 2016). These alternatives may include available employment in the job market that does not require continuing education (Mullin, 2014; Pucciarelli & Kaplan, 2016; Crouse,

2015). According to research in rational choice theory in the field of higher education, potential students weigh the costs and benefits of community college versus alternatives such as a 4-year university (Ovink, 2017). Likewise, the decision to obtain education through online classes or traditional face-to-face instruction is guided by a cost and benefit decision-making process (Wladis et al., 2014). Reliable information regarding external factors that influence tuition revenue is an important precursor to sound rational choice decision-making for the management of institutional funds.

The rational choice theory also has implications for the management decision to fund a particular academic program. Wladis et al. (2014) found that academic program enrollment is dependent on the perceived benefits of the program such as the usefulness of the course content, wage markets for program graduates, and job availability associated with specific skills training. Conversely, the related costs are the tuition, the workload, and the difficulty of the specific course or program (Wladis et al., 2014). These factors will influence the financial success of an academic program in terms of total tuition revenue generated as compared to the operational costs of the program. An understanding of the resulting macroeconomic shift in college demand as related to the job market and local economic prosperity informs the model for forecasting tuition revenue.

Microeconomic Theory

A fundamental construct of microeconomic theory implies that an efficient market's supply and demand are naturally maintained in an equilibrium state. Seminal works by economists Adam Smith and Alfred Marshall explain how external market

factors may disrupt this equilibrium resulting in shifts in demand or supply (as cited in Garegnani, 1983). In response to shifts in community college demand, Mullin and Phillippe (2009) asserted that community college leaders must “maintain flexibility in institutional operations to be better prepared to respond to dramatic environmental changes” (p. 4). Community college leaders may benefit from a greater understanding of the factors that influence this equilibrium so that they may adjust operational budgets proactively to meet the needs of the institution.

A recent example of macroeconomic shifts in community college supply and demand is the result of legislation changes in California. The supply of college education is partially dictated by state and federal education budgets, and these budgets are influenced by cyclical economic downturns (Bohn, Reyes, & Johnson, 2013; Pennington et al., 2002; Romano & Palmer 2016; Katsinas, Malley, & Warner, 2016; Morris, 2017). Enrollment rates in California reached 20-year lows because of the combined effects of state funding cuts and student fee increases (Bohn et al., 2013). This fiscal policy shift disrupted the equilibrium of supply and demand for community college education in California causing a significant downward shift in enrollment (Bohn et al., 2013;). The effect on the price for community college education effectively drove the demand lower, which had a negative effect on total tuition revenue.

Similarly, a change in the supply of community college may have compounding effects on the aggregated tuition revenue for community colleges. When California legislation cut the state-funded budgets for community colleges in the state, community college leaders reduced course offerings and combined course sections to reduce total

instructional costs (Bohn et al., 2013). When community college leaders chose to cut back course offerings, this may have caused a downward shift in the supply for community college education. Fewer course offerings translated into lower enrollment capacity, which could have reduced total tuition revenue for California community colleges.

Behavioral economics. Theories of behavioral economics incorporate insights from psychology and sociology to support that there is a price setting mechanism in an efficient market where a good or service offered at a given price and supply level will have a corresponding demand (Koch, Nafziger, & Nielsen, 2015). This supply-demand price setting mechanism has implications for college budgets. The financial loss realized by California community colleges due to fee increases is evidence of this price-setting mechanism (Bohn et al., 2013). Concurrent to the cuts in state funding, the California state legislature also increased the fees that students would pay to attend community colleges by 77% from 2010 to 2012 (Bohn et al., 2013). The increase in fees was intended to offset financial losses from state funding cuts (Bohn et al., 2013). However, the increases in fees did not cover the losses in state funding and the loss of tuition revenue caused by fewer course section offerings (Bohn et al., 2013). Likewise, the increase in fees may have triggered elastic demand behavior among prospective students, which would have a compounding effect on lower enrollment and lower total tuition revenue.

Human Capital Theory

The human capital theory is a concept applied by Becker (1993) to describe the value of a person's intellectual, creative, and social capacities. Also, Becker (1993) explains that individuals would expand personal human capital when the benefits exceed the costs. Further, the human capital theory posits that higher investment in human capital will yield higher economic output (Sweetland, 1996). Investments in higher education are an approach to increasing an individual's human capital, which would lead to higher lifetime earnings (Sweetland, 1996). However, the microeconomic mechanisms of human capital theory explain that these investments will only occur when it is perceived that the benefits outweigh the costs of education (Becker, 1993; Sweetland, 1996). This study tested how changes in the cost for community college education might influence the aggregate rational behavior for expanding human capital. These findings may provide community college managers with insight into the effects of changing tuition rates and total tuition revenue.

Studies that support the human capital theory demonstrate that there is a correlation between rising unemployment and rising community college enrollment. Pennington et al. (2002) and Sapkota and Bastola (2015) found that there was a positive correlation between unemployment and college enrollment. These studies support that an individual will seek to increase human capital when that individual's current skills and education become the limiting factor for earning opportunities in the labor market (Pennington et al., 2002; Sapkota & Bastola, 2015). This study built upon this earlier work by incorporating unemployment into a model that also considers the effects of the

elasticity of demand and the management of institutional funds as predictors of total tuition revenue.

Critics of the human capital theory argue that human development spans beyond simply increasing income or personal wealth. Hughes, Mitchell, and Molinari (2011) revealed a possible exception to human capital theory in times of higher unemployment. The study by Hughes et al. (2011) focused on the correlation between seminary enrollment and unemployment. Hughes et al. (2011) found that seminary enrollment increased with unemployment rates suggesting that individuals were more likely to seek spiritual-based careers when the opportunity costs were lower. These findings support a critical view of human capital theory by showing that individual choices do not exclusively align with a human capital investment that will result in greater economic output or personal wealth. Instead, critics argue that career choices and wage levels are a function of signaling between individuals and employers (Arteaga, 2018). Higher educational attainment and degree major subjects signal employers to the abilities and interests of the individual (Arteaga, 2018). When studying factors that influence tuition revenue in community colleges, it is important to acknowledge that tuition revenue from personal interest programs may be affected differently than vocational, technical, or transfer programs.

Literature Review

The subject of community college financial performance has been gaining the interest of researchers in recent years. Performance-based funding policies and state budget cuts combined with decreasing enrollment has drawn the attention of researchers

as they seek answers to how community college leaders can react in order to maintain organizational sustainability (Mullin, 2014; Pucciarelli & Kaplan, 2016; Morris, 2017). Researchers are beginning to explore how community college leaders engage in creative and entrepreneurial approaches that help combat the decline in traditional revenue streams (Mullin, 2014; Pucciarelli & Kaplan, 2016). In this section, I will examine contemporary research in the area of community college finance including financial strategy, budgeting challenges, tuition setting, and the effects of certain external factors on college budgets.

Budgeting Strategy

Shifts in enrollment trends for community colleges in the Midwest have caused a rapid decline in the tuition income for these colleges. Community college leaders face a changing financial landscape that warrants a more creative, skillful, and entrepreneurial approach to financial decision-making (Mullin, 2014; Pucciarelli & Kaplan, 2016). An increasing level of competition due to the emergence of massive open online courses along with state budget cuts has further stressed the financial position of community colleges (Mullin, 2014; Pucciarelli & Kaplan, 2016; Morris, 2017). On a national scale, community colleges are the lowest funded sector of education and, therefore, are required to manage financial resources with a greater sense of fiscal responsibility (Manning & Crosta, 2014). The tension between meeting financial expectations and maintaining academic values has altered the framework for higher educational leaders (Siegel & Leih, 2018). Leaders must carefully consider how to optimize the management of institutional funds so that academic quality and financial sustainability remain uncompromised.

The decline in tuition income and the strain that it has placed upon operational budgets has spurred changes in the leadership style of community college leaders. The behavior of leaders at higher educational institutions has shifted from a traditional mission and culture oriented approach to a more corporate-like set of values and priorities (Siegel & Leih, 2018). This shift has changed the landscape of community college leadership, and contemporary leaders must now engage employees in a competitive and cost-conscious educational arena (Price et al., 2016; Siegel & Leih, 2018; Walker & Okpala, 2017). Research reveals how specific leadership styles may play a role in overcoming these financial threats to the institution.

While the core mission and values of a community college have remained unwavering, the business environment in which these institutions exist has changed dramatically. These changes prompt research on how higher education leadership styles influence organizational success. When comparing various leadership styles, researchers found that community college leaders that exhibit a transformational and team management type of leadership style are able to balance the concern for meeting financial expectations and maintaining academic quality (Price et al., 2016; Walker & Okpala, 2017). Siegel and Leih (2018) support that a dynamic capabilities framework for strategic management provides higher education leaders an opportunity to examine budgetary constraints while addressing rising stakeholder expectations. Organizations with strong dynamic capabilities attributes are able to adapt to rapidly changing business environments by coordinating internal and external resources to extend into new opportunities (Teece, 2014). In the following section, I will review some of the major

financial challenges that have surfaced in the changing landscape of community college leadership.

Critical budget challenges. Community college leaders often shape budgeting strategies based upon the financial management challenges perceived to be the most critical to the institution. Price et al. (2016) summarized the top financial challenges facing community college leaders, which include lowering costs without damaging academic quality, maintaining student success, maintaining compliance with federal state laws, maintaining technology, and managing increasing compensation costs. Price et al. (2016) found that increasing compensation costs and the need to update technology are the leading financial concerns for community college leaders. For many colleges across the US, the financial challenge of the rising compensation and technology costs have been coupled with declining state funding and declining tuition revenue (Crouse, 2015; Katsinas et al., 2016). Understanding and managing these financial challenges is a critical component of a successful financial strategy.

Increasing compensation costs. Effective financial management involves a balance between maintaining competitive salaries and controlling costs. The work of Sazonov, Kharlamova, Chekhovskaya, and Polyanskaya (2015) showed that compensation levels are a major driver for financial decision-making in higher education. The authors asserted that institutional wage data provides an index for measuring the efficiency and quality of financial management for higher education institutions (Sazonov et al. 2015). Institutional leaders and governance boards may be able to use these wage indices to help track how effectively the budgeting process supports the goals of the

institution (Sazonov et al. 2015). Community college leaders must carefully weigh compensation into a total budget to ensure that institutional funds continue to support organizational sustainability and the mission of the college.

The costs associated with instruction and instructional support are largely a factor of faculty and support staff compensation. As total budget levels remain flat or decline, maintaining an attractive compensation that offsets cost of living increases is a rising challenge for higher education leaders (Shulman et al., 2017). The most recent wage data from the 2016-17 academic year shows that the salaries for full time higher education faculty increased by 2.6% as a national average (Shulman et al., 2017). After adjusting for inflation, this increase amounts to only 0.5% (Shulman et al., 2017). While this is only a modest increase in salary, educational leaders must carefully balance and prioritize the allocation of institutional funds towards instructional compensation among other important expenditures in the budget.

Updating technology. In order to ensure graduates have the appropriate abilities and knowledge needed to obtain skilled positions in the workforce, community colleges are expected to keep up with the ever-changing advances in technology. Changes in technology require a continuous reinvestment into learning technology so that the equipment used for training aligns with employment opportunities (Price et al., 2016). Drucker (2016) highlighted the importance for higher educational institutions to invest in the latest innovations in technology by revealing how this knowledge transfers directly into regional commerce and supports economic development. The knowledge spillover from education into industry sparks entrepreneurship and leads local economic growth in

a variety of economic sectors (Drucker, 2016; Lehmann & Menter, 2016). Community college leaders are challenged with maintaining an adequate budget that allows technology expenditures to align with the workforce development needs of the local economy in order to promote regional economic growth.

A clear understanding of the skills needed to support regional economic development is necessary in order to ensure that technology expenditures align with workforce needs. Many higher education institutions have engaged in partnerships with industry to address the challenge of finding funding for updating technology in natural science and engineering programs (Lehmann & Menter, 2016). These groups of industry partners are drawn to community colleges in particular because they exhibit a level of nimbleness to meet the rapidly changing needs of industry training (D'Amico, Morgan, Katsinas, Adair, & Miller, 2017). While there are mutual benefits for business partners to support technology investment in community colleges, the issue of rising technology costs remains a critical financial challenge that shapes the budgeting strategy for community college leaders. These mutual benefits provide an avenue for fundraising efforts to churn new revenue streams for community colleges.

Organizational Sustainability

As enrollment continues to decline and budgets are shrinking, maintaining organizational sustainability has become a primary focus for financial managers at community colleges. An increase in federal spending and a surge of unemployed workers who returned to community college to update their skills helped offset the state budget cuts that occurred during the 2008 recession (Price et al., 2016; Jepsen, Troske, &

Coomes, 2014; Romano & Palmer, 2016; Morris, 2017). Since then, those students who enrolled during periods of high unemployment have graduated with credentials and the economy has improved providing more jobs and lower unemployment levels (Romano & Palmer, 2016). Meanwhile, state funding for community colleges continues to decline in many states, and the recent enrollment drops have revealed budgetary shortfalls that are more challenging than ever before (Price et al., 2016; Mitchell & Leachman, 2015; Hollis, 2015; Katsinas et al., 2016; Morris, 2017). The result of the cuts in state appropriations means that community colleges must have a greater dependence on tuition revenue (Mullin, 2014; Katsinas et al., 2016; Morris, 2017). Community college leaders are now tapping unconventional revenue streams and are operating in a more business-like approach in order to maintain a viable financial position and to help ensure organizational sustainability.

Operational spending cuts have been the traditional method for reducing short term costs to maintain a balanced budget. Staffing reductions, academic program cuts, and utilizing part-time instructors in place of full-time faculty are a few of the traditional strategies used by community college leaders as a way to cut operational costs (Hollis, 2015; Price et al., 2016; Morris, 2017; Pulcini & Dennett, 2018). The outsourcing, layoff, or the elimination of nonessential services departments such as educational support staff, maintenance, food service, and janitorial services are easy targets for reducing operational spending (Phelan, 2014; Morris, 2017). While cutting noncrucial academic programs may provide a short term financial solution that offsets high instructional costs, the benefits of cost reduction are accompanied by the associated loss in tuition revenue

that results from a reduced academic program offering (Phelan, 2014; Price et al., 2016; Pulcini & Dennett, 2018). All of these cost reduction methods are examples of a more business-like cost and benefit analysis that community college leaders have embraced as a means to ensure that the institution is maximizing the value of the available funding.

Certificate programs have also been used as a short term income source for community colleges. One-year certificates generate fast and efficient income for community colleges due to the lower operating costs and the attractive expedited timeline for students who wish to join the workforce quickly. Likewise, a number of states are now using performance-based metrics, such as graduation rates, to determine state allocation funding (Li & Kennedy, 2018). These short tract certificate programs allow community colleges to show greater numbers of graduates in the short term, which boosts performance metrics in states using performance-based funding formulas (Li & Kennedy, 2018). The results of a study by Li and Kennedy (2018) suggest that performance-based funding models appear to promote more certificate programs because it is the easiest way for community colleges to demonstrate improved graduation rates. The growth of certificate level programs may be an unintended consequence of performance-based funding that focuses on the number of graduates. Regardless of the intent of performance-based funding, policymakers must carefully consider which metrics are included in the allocation formula to ensure that the incentive for funding drives the desired educational and training outcomes.

Creative and entrepreneurial community college leaders strive to offset tuition revenue losses by seeking new revenue streams. Technology and innovation are a

gateway to new revenue streams through grant funding and fundraising efforts (Mullin, 2014; Phelan, 2014; Pucciarelli & Kaplan, 2016). Grant funding steered towards specific industry advancement sparks funding for new research and academic program development (Price et al., 2016). Funneling grant monies into emerging areas of technology training or into programs that support growing sectors of the economy help close the gaps on job shortages in these industries (Price et al., 2016). In addition, philanthropic gifts help support the mission of community colleges by offering a funding stream for scholarship opportunities (Drummer & Marshburn, 2014). Gifts and donations also support the capital expansion of community colleges so that buildings and infrastructure can remain up-to-date and functional (Gyllin, Miller, Morris, & Grover, 2015; Pucciarelli & Kaplan, 2016; Drummer & Marshburn, 2014). Community college leaders use the short term benefits of gifts, grants, and donations for the development of successful academic programs and infrastructure to position the organization to grow long term revenue streams.

Globalization, increased competition, and the speed of change in the higher education marketplace affected the organizational sustainability strategies used by community college leaders. A key step in developing strategies for sustainability will be to define the extent to which the institution can embrace business practices and digital solutions in order to create a flexible organization that can quickly adapt to the changing nature of education (Pucciarelli & Kaplan, 2016). There is no clear answer as to how community college leaders should navigate these increasingly complex and uncertain challenges (Pucciarelli & Kaplan, 2016). Continued connections with external

stakeholders could enhance organizational sustainability as institutional leaders seek to respond to the ever-changing needs for employable skills and training in a timely manner.

Assessing Financial Health

Assessing the financial stability and health of education institutions is an important component of managing institutional funds in an optimized way. Developing meaningful metrics for assessing expenditures, borrowed funds, assets, and inventories have been a topic of scientific interest in the research of higher education financial management (Sazonov et al., 2015; Bers & Head, 2014). The simplest form of measuring the financial health of a community college is to determine if there is a balanced budget by comparing annual expenditures to annual revenues (Bers & Head, 2014). While this method may be effective for determining the short term solvency of the institution, researchers have begun to explore new models that explain the long term financial health of higher education institutions.

Assessing the long term financial viability of community colleges may require a more complex model of determining financial health than simply revenues and expenditures. Sazonov et al. (2015) suggested that higher education should monitor both financial stability and financial management quality indices and track performance against benchmarks or predetermined thresholds. Likewise, the Higher Learning Commission and other regional accreditation boards closely scrutinize the efficiency and effectiveness of all operations and services (Bers & Head, 2014). Tracking the efficiency and optimization of institutional funds continues to be an important factor in determining if community colleges are meeting the needs of students in the most cost effective way.

Effects of the Economy and Community College Financial Position

Large changes in enrollment levels affect the financial strength of community colleges because the changing enrollment levels cause changes in tuition income. Studies focusing on the relationship between the economy and community college enrollment at a national level have revealed evidence that there are strong and statistically significant relationships between economic variables and total enrollment headcount (Pennington et al., 2002; Barr & Turner, 2015; Katsinas et al., 2016). Pennington et al. (2002) were among the first researchers to focus on the relationship between national economic factors and the total number of students enrolled in community colleges in the United States. In this study, Pennington et al. (2002) examined the effect of national unemployment rates, GDP, Consumer Price Index, disposable household income, consumption expenditure, and average hourly wages. The researchers found that disposable income, unemployment, GDP, and consumption expenditure were all statistically significant predictors of community college enrollment (Pennington et al. 2002). These findings laid the framework for additional studies focusing on regional characteristics and economic responses to enrollment.

Studies performed after the Great Recession showed that some regions of the US had markedly different responses to economic decline and recovery. Barr and Turner (2015) found that there was a significant relationship between the rise of unemployment rates and increasing community college enrollment during the Great Recession on a national scale. However, this relationship does not hold true in all states (Tajalli & Ortiz, 2017). One study focused in Texas showed that there is a very weak and insignificant

relationship between unemployment and community college enrollment since the Great Recession (Tajalli & Ortiz, 2017). Although national statistics demonstrate a correlation and statistical significance to community college enrollment, regional differences may influence the relationship between the economy and enrollment (Barr & Turner, 2015; Katsinas et al., 2016; Pennington et al., 2002). It is important that community college leaders understand these regional characteristics in order to create a financial strategy that provides support for variation in enrollment.

Regional public policy influences. Studies support that the relationship between economic indicators and the financial performance of community colleges is affected by state-level funding decisions to support economic growth and unemployed workers. In a study conducted by Barr and Turner (2015) that focused specifically on the effects of labor market policy and community college enrollment in the United States, the authors concluded that variations in state-specific unemployment insurance benefits had a significant effect on enrollment rates. The authors noted that regions with prolonged unemployment insurance benefits had higher rates of enrollment in higher education during the Great Recession (Barr & Turner, 2015). These findings suggest that unemployment insurance may provide a medium for unemployed workers to update his or her skills and still have the income to cover the costs of living (Barr & Turner, 2015). Community colleges receive the financial benefit of additional tuition revenue as these unemployed workers return to higher education to obtain additional credentials.

Regional workforce development funding policy also plays a significant role in how community college tuition income responds to unemployment. D'Amico et al.

(2017) noted that state-level funding incentives for workforce development influence the unemployment-enrollment correlation. D'Amico et al. (2017) concluded that variation in state policy for workforce development funding has a significant effect on the financial performance of community colleges. These findings support that the financial performance of a community college is influenced by state and local-level decisions about how funding should be allocated to best respond to an economic downturn.

Effects of the business cycle. In addition to regional factors, the strength of the relationship between economic indicators and community college tuition income may also depend on phases of the business cycle. Research conducted using data from periods of economic growth show different results as compared to data from periods of economic downturn or recovery (Crouse, 2015; Romano & Palmer, 2016). Various studies suggest that the most recent economic recession led to a surge in community college enrollment (Romano & Palmer, 2016; Katsinas et al., 2016; Morris, 2017). This enrollment surge translates to a higher level of institutional cost, which is not proportionally supported by the increase in tuition income (Romano & Palmer, 2016). This financial burden was compounded by the deep cuts to state funding that occurred amid the recession (Romano & Palmer, 2016; Katsinas et al., 2016; Morris, 2017). The financial strain following the economic recession was even more pronounced in rural community colleges across the US (Katsinas et al., 2016). The differences in the data and findings from various studies suggest that the strength of the relationship between unemployment and community college enrollment is different in times of economic contraction versus times of economic expansion.

The timing of the effects of the business cycle on community college tuition income is also different in the short run versus the long run. Sapkota and Bastola (2015) expanded the body of knowledge on the relationship between community college enrollment and the business cycle. The work by Sapkota and Bastola (2015) shows that there are distinct short run and long run relationships between community college tuition income and the business cycle. Using a time series approach, Sapkota and Bastola (2015) concluded that college enrollment responds to changes in the unemployment levels in the short run while responses to the business cycle were pro-cyclical in the long run. Changes in tuition income are a function of the changes in enrollment combined with tuition increases. Understanding the patterns of tuition income and the business cycle could allow community college leaders to manage the effects of the business cycle effectively.

Unemployment. The unemployment rate provides a macroeconomic measure of job availability within a region. Along with GDP, the unemployment rate is often referenced as an indicator of the economic health of the nation or state. Since employment opportunities are often considered a substitute for pursuing higher education, the relationship between unemployment rates and community college enrollment is the subject of studies that are aimed to understand the influences of the economy on tuition income and enrollment for community colleges (Pennington et al., 2002; Frenzoz, 2005). These studies reveal that unemployment is a significant predictor of community college enrollment at the national, state, and regional level (Pennington et al., 2002; Frenzoz, 2005). This relationship may provide insight for community college

leaders to understand how unemployment rates may influence tuition revenue for an upcoming academic year.

The relative timing of unemployment changes and the start of the academic year may influence the financial effects experienced by community colleges. The influence of timing is the subject of regression studies that examine the correlation of unemployment to higher education enrollment levels and the corresponding financial effects (Sapkota & Bastola, 2015; Hughes et al., 2011; Pennington et al., 2002). Sapkota and Bastola (2015) noted that there are both short term and long term responses in community college enrollment when unemployment levels change. Utilizing an autoregressive distributive lag bound test, Sapkota and Bastola (2015) found a stable long term cointegrating relationship between unemployment rate and community college enrollment. Likewise, Pennington et al. (2002) and Hughes et al. (2011) discovered that the strength of the correlation changes when looking at different lag times between unemployment level changes and the corresponding changes in higher education enrollment. These studies show that unemployment is a significant indicator of higher education enrollment. Likewise, the results indicate the importance of considering the immediate, short term, and long term responses when examining the relationship between an institution's financial performance and a change in the unemployment rate.

Community Colleges Response to Funding Shortages

The increasingly challenging financial landscape for community colleges has prompted leaders to find ways to generate revenue for the institution. The increasing technology and compensation costs coupled with declining enrollment translate into a

higher cost per student base (Price et al., 2016; Shulman et al., 2017; Manning & Crosta, 2014). Many community colleges have chosen to increase tuition rates in response while others have developed non-credit revenue sources to offset losses in traditional credit bearing tuition income (Crouse, 2015; D'Amico et al., 2017). This section highlights the relevant literature that addresses the effects of tuition rate setting and non-credit program development.

Tuition rate setting. When revenue fails to support the financial needs of the college, increasing the tuition rate for students is one method used by community college leaders as a means to balance the budget. Although increasing tuition rates may have a short term benefit to institutional finances, studies show that higher education is a normal good and the long term effects of tuition increases may result in further declines in enrollment (Crouse, 2015; Langelett et al., 2015; Farhan, 2016). This elasticity of demand is a phenomenon that guides the tuition rate setting strategies for higher education leaders (Farhan, 2016). Langelett et al. (2015) were able to determine a curve for the probability of enrollment at various tuition rate levels for a university located in the Midwest US. The authors support that higher education exhibits a price elasticity of demand by demonstrating that the probability of attendance drops as tuition rates increase (Langelett et al., 2015). As higher education financial leaders search for options to balance the budget in times of declining enrollment, tuition rate adjustments influence the opportunity cost of attending community college in lieu of other alternatives such as joining the workforce or attending a competing higher education institution.

When community college leaders adjust tuition rates, it is important that they consider the price elasticity of demand for higher education. Tuition rate changes in community colleges exhibit an elastic behavior; as tuition rates increase, demand decreases and the income effect of raising tuition has a diminishing return on total tuition revenue (Millea & Orozco-Aleman, 2017; Crouse, 2015; Langelett et al., 2015; Sapkota & Bastola, 2015). Studies have shown that other variables such as economic conditions, regional characteristics, and socioeconomic attributes that affect the price elasticity of demand for higher education (Langelett et al., 2015; Crouse, 2015; Millea & Orozco-Aleman, 2017). Overall, studies show that higher education is a normal good; as household income levels increase, the demand for higher education also increases (Sapkota & Bastola, 2015; Millea & Orozco-Aleman, 2017). These findings suggest that budgeting strategy for community colleges is improved when tuition price increases are at appropriate levels and at a time when household income levels can support higher tuition rates.

Research on the subject of tuition elasticity of demand has shown that competition and local economies also play a role in how tuition rates influence overall tuition revenue. Crouse (2015) researched the price elasticity of community college demand in the West, Midwest, South, and Northeast regions of the US and found that regional effects demonstrate different responses in elasticity. Overall, Crouse (2015) found that a 1% increase in tuition resulted in a 0.207% decrease in in-state enrollment. Likewise, Millea and Orozco-Aleman (2017) concluded that a 1% increase in tuition resulted in a 0.3% decrease in enrollment for public universities in the Southeastern region of the US.

Further, Millea and Orozco-Aleman (2017) found that institutional enrollment is influenced by the tuition price of a competing institution. According to the study by Millea and Orozco-Aleman (2017), the enrollment of an institution increases by 0.726% for every 1% increase in a competing institution's tuition. These findings illustrate the regional microeconomic effects of competition and price elasticity of demand for community college education.

The effects of the tuition elasticity of demand on total tuition revenue may be offset by the average financial aid and scholarship opportunities for students. Langelett et al. (2015) studied the tuition price elasticity of demand for a single Midwestern university and found that financial aid opportunities created a turning point for the elasticity of demand at this institution. In this study, Langelett et al. (2015) discovered that scholarships and other financial aid offset the effects of the price elasticity of demand up to a certain level of total cost for enrollment. In the study, the researchers found that the demand for enrollment turned elastic at around the \$9000 price point for the subject institution (Langelett et al., 2015). Financial leaders in community colleges may be able to leverage additional income by raising tuition rates to a level that maximizes federal and state tuition-aid programs without triggering the effects of the price elasticity of demand.

Community colleges play a unique role in higher education by supporting a specific mission to offer low cost educational opportunities to the local communities they serve. This mission makes tuition rate increases a particularly sensitive issue for community college financial leaders (Crouse, 2015; Heather et al., 2015). Community

colleges are challenged to remain affordable to students with varying levels of socioeconomic status (Crouse, 2015; Heather et al., 2015). The tuition rate-setting strategies used by community college leaders have a strong dependence on the elasticity of demand and the potential effects on enrollment as well as overall stakeholder support.

Community college leaders weigh the potential financial benefits of tuition increases against stakeholder expectations and the potential loss of community support. Crouse (2015) found that community colleges exhibit a higher sensitivity to tuition rate increases than 4-year universities. Heather et al. (2015) reported that stakeholders of community college service areas perceive the lower tuition costs as a primary benefit of 2-year institutions. The assessment of additional fees beyond tuition is an alternative method to fund specific areas of operation such as facilities maintenance and technology (Heather et al., 2015). Heather et al. (2015) noted an emerging theme among focus group sessions regarding the communities' appreciation for the affordable education offered by community colleges. Community college leaders must be careful not to alienate community supporters, stakeholders, and students by increasing tuition as a means to offset operational shortfalls.

Non-credit program development. Although non-credit programs represent a shorter track for program completion and lower total tuition income-per-student for community colleges, the effects of developing non-credit curriculum may have greater financial benefits beyond those realized through non-credit program income. Frentzos (2005) examined this subject for an urban community college in Michigan. The correlation study performed by Frentzos (2005) focused on Michigan's state

unemployment rate as the predictor of enrollment in credit and non-credit courses at a Michigan community college. The researcher concluded that there was no correlation between state unemployment and credit classes at this institution during the period examined in the study (Frentzos, 2005). However, Frentzos (2005) found that there was a strong relationship between unemployment and non-credit classes.

Frentzos (2005) also asserts that as unemployment rates rise, the enrollment in non-credit courses declines. While Pennington et al. (2002) also found a significant relationship between unemployment and community college enrollment, the direction of the relationship between enrollment and unemployment found by Frentzos (2005) was opposite to the findings of Pennington et al. (2002). The study by Frentzos (2005) had some limitations worth noting. Frentzos (2005) focused the study on a single community college over a very short period between the year 2000 and 2002. These limitations to the study by Frentzos (2005) lessen the degree to which the findings can be applied to a financial prediction model. Understanding these cyclical effects of non-credit courses may allow community college leaders to leverage these programs when tuition revenue from credit bearing programs decline.

Studies also support that non-credit enrollment may spark additional tuition revenue through short term workforce development as well as additional income from students transitioning from non-credit to credit programs. The work by D'Amico et al. (2017) shows how funding sources for non-credit courses drive enrollment and tuition income in states that specifically focus on workforce needs to close short term unemployment gaps. D'Amico et al. (2017) conducted a nationwide survey to collect

information about non-credit program funding, business leader support, concerns of unemployment, and non-credit enrollment statistics. D'Amico et al. (2017) concluded that there were correlations between non-credit enrollment and the independent variables in the survey. Likewise, D'Amico et al. (2017) noted the importance of non-credit-to-credit program transitions, which enhance the educational value on non-credit programs for students while converting non-credit education into longer tract credit bearing tuition revenue for community colleges. The work of D'Amico et al. (2017) and Frentzos (2005) suggest that different mechanisms drive tuition income in non-credit courses as opposed to credit courses; this is especially true in times of heightened unemployment.

Regional Age Demographics.

The human population levels throughout many states in the Midwestern US have shown a steady declining trend in recent years, which has affected the total number of community college students. Recently, the state of Michigan experienced an 11.4% decline in population attributed mostly to lifetime migration (Hermalin, & Neidert, 2017). The decline in the population of those with a college degree was even greater (Hermalin, & Neidert, 2017). These migration trends and overall population declines have spurred numerous high school closures due to lower enrollment (Lee & Lubienski, 2017; Corrales, 2017). This decline in the number of high school students has shrunk the pool of prospective community college students, which could easily translate into lower enrollment and less tuition revenue if community college leaders do not respond to the challenge.

The number of high school graduates within a particular region affects the size of the pool of potential community college applicants. Studies focusing on the shifting educational landscape in urban regions of the Midwest demonstrate a link between the number of high school graduates and the enrollment in 2-year and 4-year colleges (Coca, Nagaoka, & Seeskin, 2017; Lee & Lubienski, 2017). In a study performed by Coca et al. (2017), the authors noted that the proportional rates for 2-year college enrollment had declined while the rates for 4-year colleges had increased in the period from 2006 to 2015. However, the total number of students enrolled in 2-year colleges increased over the 10-years examined in the study (Coca et al., 2017). In other words, 2-year college enrollment made up a smaller percentage of the total number of students enrolled in college in 2006 as compared to 2015, but the overall number of college students had increased along with the increases in the total number of high school graduates (Coca et al., 2017). These findings demonstrate that the number of high school graduates is an important metric for predicting community college enrollment. Conversely, the findings also show that other factors influence whether a student decides to attend either a 2-year or a 4-year college.

Summary and Conclusions

Community college financial performance has gained the attention of academic researchers in recent years. Enrollment trends, operational cost increases, and state funding cuts across the US become major financial challenges for community college leaders. The previous chapter outlines research that shows the reasons why leaders must carefully consider how to optimize the management of institutional funds in a way that

upholds the institutional mission, values, and academic quality while securing financial sustainability. The decline in tuition income and the strain that it has placed upon operational budgets have spurred changes in the leadership style of community college leaders. Likewise, the increasing costs of employee compensation and keeping up-to-date technology are primary financial concerns. Contemporary research reveals how new business-like leadership approaches may help overcome these financial threats to the institution. These business-like decisions appear to follow a rational choice pattern of decision-making.

As states continue to cut funding to community colleges, maintaining organizational sustainability has shifted to a primary focus for many community colleges. Community college leaders are now searching for new revenue streams as a means to offset income losses and maintain a viable financial position. External economic factors such as the unemployment rate may influence community college enrollment. Combined with the effects of tuition rate changes and the price elasticity of demand, these changes in enrollment affect the bottom line for community colleges. The present study will fill a gap in the research that exists by correlating the combined effects of external influences and internal management decisions to total tuition revenue. Further, this study will utilize a multiple regression analysis to provide a quantified measure for the strength of these relationships so that researchers and practitioners can understand the factors that have the greatest effect on the bottom line.

Chapter 3: Research Method

The purpose of this longitudinal quasi-experimental quantitative study was to investigate the extent to which the management of institutional funds, tuition rate setting strategy, age demographics, and economic conditions help explain the changes in tuition revenue for rural Midwest community colleges. This chapter presents the study's research design and rationale, methodology, data analysis plan, and threats to validity. The methodology discussion in this chapter is broken into several categories outlining the details of data collection including the population of the study, the sampling procedures, and a discussion of the archival data sources. I explore threats to validity for both internal and external validity. Likewise, this chapter provides an in-depth review of construct validity for the study and the process ensuring ethical procedures are used in the data collection for this study

Research Design and Rationale

I used a quasi-experimental research design in this study to examine the effects of management decision structures on total tuition revenue for community colleges. Likewise, the correlation study included external factors that may influence tuition revenue. The independent variables in this study were the percentage of the total operating budget spent on instruction and instructional support for each college in each year, the tuition rate for each community college in each year, the population size for the age groups 15 to 17 and 18 to 24 in each county for each year, and the annual average county-level unemployment rate. The dependent variable was the annual tuition revenue for each community college in the sample group.

The longitudinal design was appropriate for this study because changes in the allocation of funding for instructional programs and the residual effects of changes in tuition prices may not have an immediate effect on tuition revenue. Likewise, tuition revenue may have a delayed response to changes in external factors such as unemployment and changes in age demographics. Gradual changes in instructional spending may show a long-term effect on tuition revenue as enrollment responds to changes in fiscal support for certain educational programs. Increased spending on instruction and instructional support could be due to more course section offerings and higher equipment maintenance budgets. If these spending strategies are aimed at attracting more students, then the effects of these strategies may not be immediate.

A longitudinal approach was also the best method for this study because the price elasticity of demand for tuition prices may also have a delayed effect. The timing of tuition price changes may not influence those students who are already enrolled in community college or are continuing students. Those students who are in the process of completing a degree may be less likely to change course due to modest increases in price. However, the effects of the price elasticity for demand may be more pronounced in new student populations in subsequent years as they are making direct cost comparisons prior to first time enrollment. Therefore, I examined these variables with a longitudinal approach to understand how financial strategies used for the allocation of funds affected tuition revenue.

For this study I used a quasi-experimental design as there was no random assignment for the treatment or control. Management decision-making, economic

conditions, and age demographic data were not manipulated in this study in order to determine the effect on tuition revenue. Instead, I studied the effect of these variables on total tuition revenue as they have changed historically. On the same note, the group of institutions selected for this study were purposively selected based on institutional size, rural location, and geographical location. It was important that each of the institutions fell under the same state legislation for funding, tuition price setting, and instructional program development. Comparing institutions from different states, population densities, and overall size would unintentionally introduce additional variables that would not be accounted for in this study.

The first independent variable in this study was the percentage of the total operating budget spent on instruction and instructional support for each college in each year. This variable provided insight into the management of institutional funds and how managers adjust instructional expenses when revenue changes. Instructional expenses are a measure of the direct costs of instruction. These expenses include faculty salaries, instructional support staff salaries, equipment maintenance, and supplies that are necessary to deliver the educational programs of study at the community college. This study was designed to determine if there was a relationship between the amount of the operating budget allocated to instructional costs and the amount of tuition revenue that was generated by the instructional programming. Similarly, the results of this study may help determine if cuts in instructional spending led to further declines in tuition revenue.

The second independent variable was the tuition rate for each community college from year to year. The relationship between tuition price and tuition revenue showed

whether the demand for community college was elastic or inelastic. When examining this relationship revenue-price curve, if total revenue increases with price, then it exhibits an inelastic behavior. If tuition revenue declines as price increases, then it would exhibit an elastic demand pattern. This information is useful in determining whether increases in tuition rate will have a diminishing return.

The independent variables representing age demographics were the estimated population size for the age groups 15 to 17 and 18 to 24 in each county for each year. These age demographic categories are significant for community college tuition revenue because they represent the largest population of community college students. They also represent the population of students who will be graduating from high school within the next 1 to 3 years, which represents the future pool of potential community college students and may help predict future tuition revenue.

The independent variable reflecting local economic conditions was the annual average county-level unemployment rate. The service district for a community college is primarily the county where the college is located. The county-level unemployment rate provides insight into the local effects of unemployment on tuition revenue for rural community colleges. The county-level statistics were chosen for this study because state-level unemployment statistics would include the conditions of urban areas of the state. Economic conditions in densely populated cities can skew state-level unemployment data and overshadow the local conditions in rural areas of the state. While monthly data for unemployment is available, the annual average provides a clearer measure of employment conditions in each area. Monthly unemployment figures may be influenced

by seasonal economic effects and could provide misleading results if there is an aggregate transition of jobs between seasonal and nonseasonal employment. In addition, the relationship between monthly unemployment figures and tuition revenue may be subject to the timing of student registration in community colleges. Short term dips in employment are not likely to affect tuition revenue unless timed directly with the registration window to enroll in community college. Therefore, the annual average was the best measure of unemployment in order to understand the prolonged effects of changes in the job market on tuition revenue for community colleges.

The dependent variable was the total tuition revenue for each community college in each year. For the analysis, I used the historical financial data from the fall semester of 2011 through the spring semester of 2017 for each community college in this study. This period was selected for the study because it encompasses the period of economic expansion following the Great Recession. The period during the Great Recession had an extreme impact on the job market and may be considered an atypical situation for changes in community college revenue. In order to avoid introducing unintended variables regarding the extreme effects of the Great Recession, that period was excluded from the study. Similarly, the period from 2011 to 2017 was significant for this study because of the recent changes in the landscape of community college education. The trends for declining state appropriations, increased competition through massive open online courses, and declining enrollment has been a consistent theme throughout the period from 2011 to 2017.

Methodology

Population

The population for this study broadly encompassed postsecondary education institutions that collect tuition as a portion of their operating budget. This study was most pertinent to public 2-year community colleges within the United States. Furthermore, this study was focused particularly on rural community colleges, which make up roughly 328 of the approximately 1,279 public 2-year colleges in the United States (National Center for Education Statistics, *n.d.*). These population estimates were obtained from the National Center for Education Statistics (*n.d.*) and the Integrated Postsecondary Education Data System and represent an average population size over the period examined in this study.

Sampling and Sampling Procedures

The sample for this study resulted from a purposive sampling procedure focusing on small Midwest community colleges. Purposive sampling is a form of nonprobability sampling that consists of the selection of participants for a particular purpose (Etikan, Musa, & Alkassim, 2016). This sampling method was appropriate for this study because the population and scope of the study were centered on small rural public community colleges in the United States. The sample included colleges from a single state to avoid introducing effects of state-level legislation changes, which may influence community college funding and tuition revenue and was outside the scope of this study. Due to the longitudinal nature of the study, I narrowed the sample based upon the availability of historical data for tuition rates, total operating budget, and instructional expenses

spanning the years 2011 to 2017. I selected the sample based on comparable institutional size and total operating budgets.

The sample size was determined using power analysis results from G*Power 3.1.9.2 software. The sample size was determined using a standard effect size of 0.15, α error probability of 0.1, and five predictors (Cohen, 2013). The desired power was greater than 0.8, which corresponds to 43 observations for the study. The criterion for a minimum of 43 observations was met in this study because it was designed to span 7 years and included data from 10 institutions, which yielded 70 total observations. The G*Power 3.1.9.2 output plot for sample size and power is shown in Figure 1 below.

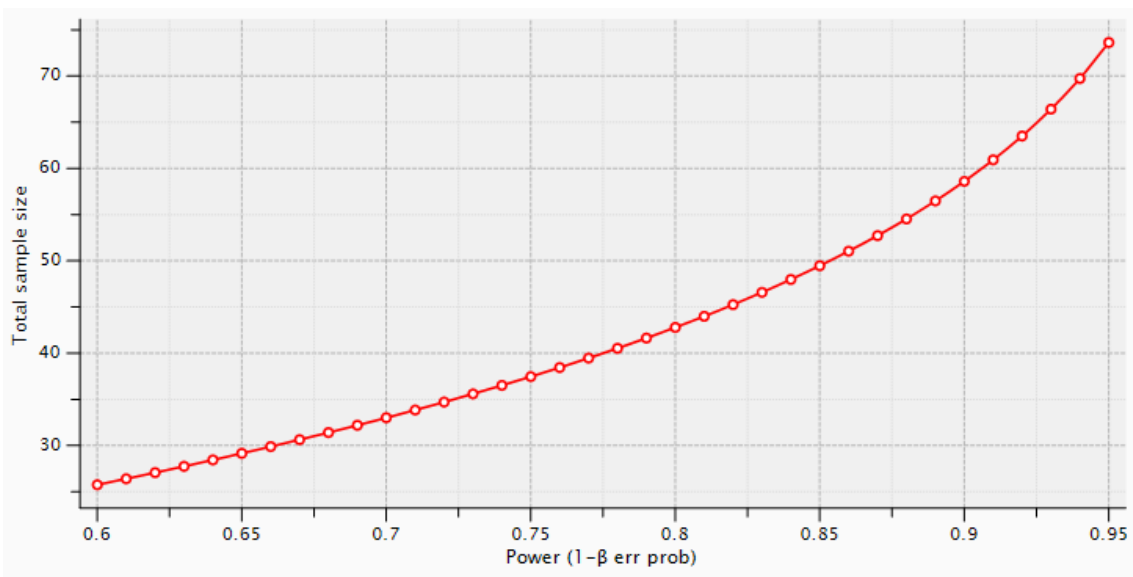


Figure 1. Total sample size and power plot for multiple linear regression: Fixed model, R^2 deviation from zero. Number of predictors = 5, α error probability = 0.1, effect size $f^2 = 0.15$.

Archival Data

This study used archival data from several national and state statistical databases. This data collection plan was reviewed for ethical considerations by the Institutional Research Board (IRB) and was approved to meet the ethical standards of Walden University. The Walden University IRB approval number for this study is 01-29-19-0580011. Information regarding age group population estimates will be obtained from the National Center for Health Statistics (NCHS) as reported by the Michigan Department of Health and Human Services (MDHHS) (Michigan Department of Health and Human Services, 2018). The latest estimations published by the NCHS for age population were released in June of 2017 and will be the dataset used in this study. The NCHS estimates age population statistics by utilizing postcensal population estimates based on data from the most recent U.S. Census Bureau national census. The NCHS uses a bridged race methodology for estimating the age population statistics for the overall population using census data across all race categories (Ingram et al., 2003). This data is available at the county-level for Michigan counties through the MDHHS.

I obtained data for unemployment rates from the Bureau of Labor Statistics division of the U.S. Department of Labor. To account for seasonal economic characteristics, I used the annual average labor force data for the service counties for each community college. The Bureau of Labor Statistics estimates unemployment rates using information from the Current Population Survey (CPS). The CPS is a monthly survey that uses a probability sampling procedure of approximately 60,000 households to gather data on monthly employment statistics (US Bureau of Labor Statistics, n.d.). Sample sizes

were targeted to maintain a maximum of 1.9% coefficient of variation of the unemployment level (US Bureau of Labor Statistics, n.d.). Archival data from this source was available as an annual average unemployment rate for each year that was included in this study.

Financial information for each institution within this study was collected from the Michigan Center for Educational Performance and Information. Each year, state law requires community colleges to submit audited financial information to the Center for Educational Performance and Information to be included in an annual report that is published by the agency called the Activities Classification Structure (ACS). The ACS report contains a variety of audited financial data including the amount of the total operating budget for each community college as well as the amount of money allocated to instruction and instructional support (Center for Educational Performance and Information, 2018). Likewise, the ACS contains the tuition and fees revenue and tuition rate for each year of this study (Center for Educational Performance and Information, 2018). Using this data, I determined the tuition rate each year and the percentage of the total operating budget that was allocated to instruction and instructional support for each community college in the sample group from 2011 to 2017.

Data Analysis Plan

This study employed a multiple regression analysis using IBM SPSS software to examine the strength of the relationship between the independent variables and tuition revenue. Data was screened using descriptive statistics and histograms to identify any outlying or missing data. Scatterplots and histograms of the data and residuals was used

to verify that the model meets the assumptions required for multiple linear regression including normality, linearity, zero conditional mean, and homoscedasticity of the error variance. I also included a correlation analysis between each independent variable to ensure that the data satisfies the assumption that no perfect collinearity exists between variables. The Durbin-Watson statistic was used to test the assumption that no autocorrelation exists among the independent variables. If these tests identified that the necessary assumptions for time-series analysis are violated, then the data was cleansed using a transformation method such as a log transformation.

Research Question

RQ1: To what extent, if any, do the management of institutional funds, tuition rate setting strategy, age demographics, and local economic conditions affect the total tuition revenue for rural Midwest community colleges?

Multiple Regression Model

The mathematical equation below represents the multiple regression model that was used in this study.

$$y_{ij} = \beta_0 + \beta_1 x_{1ij} + \beta_2 x_{2ij} + \beta_3 x_{3ij} + \beta_4 x_{4ij} + \beta_5 x_{5ij} + \varepsilon_{ij} \quad (1)$$

Where, y_{ij} is the annual tuition revenue for community college i in the year j . The subscript i goes from one to 10 for the 10 community colleges in this study and j goes from one to seven for the years from 2011 to 2017 (2011 is year 1, 2012 is year 2, etc.). The independent variables are defined in Table 1. The constant β_0 is the y-axis intercept and β_1 through β_5 are the regression coefficients for the five independent variables. The term ε_{ij} is the error term.

Assumptions for multiple regression. To utilize the multiple linear regression model shown above, it must meet a set of assumptions necessary for multiple regression analysis. First, multiple linear regression analysis relies on the assumption that there is a linear relationship between the independent and dependent variables. Additionally, the assumptions necessary for multiple linear regression analysis include normality, zero conditional mean, no perfect collinearity, no autocorrelation among the independent variables, and homoscedasticity of the error variance. Each of these assumptions was tested as outlined in the Data Analysis Plan above and the results of the test is reported in Chapter 4.

Hypotheses

The hypotheses associated with the regression model are as follows:

H_0 : There is no statistically significant relationship between tuition revenue and the percentage of the operating budget allocated to instruction and instructional support, change in tuition rate, the population of the age group 15-17, the population of the age group 18-24, or unemployment level.

H_1 : At least one of the independent variables has a statistically significant relationship with tuition revenue.

Analysis plan for RQ1. I ran the linear regression model outlined in Equation (1) above using the SPSS multiple linear regression analysis function to determine the overall significance of the model using an F -test. The model was considered significant at a threshold p -value of less than 0.05, which is in line with statistical standards for behavioral studies (Lavrakas, 2008). I determined the extent to which the model

explained the variance in total tuition revenue using the R^2 value as a percentage. I also examined the standardized coefficients for each independent variable to gauge the strength of the correlation in the model.

The null hypothesis H_0 for RQ1 was accepted or rejected based upon the p -value of the T -test statistic generated for each of the independent variables. The null hypothesis was evaluated using a p -value threshold of 0.05 for the significance associated with each independent variable. If the significance level for any of the independent variables fell below the p -value threshold criteria, then the null hypothesis was rejected. Conversely, if the significance values for all independent variables were greater than the .05 p -value threshold, then the null hypothesis was retained. If the p -value of the T -test for any predictor was greater than 0.05, then that predictor was determined to have no statistical significance in the regression model. If the null hypothesis was rejected, then the alternative hypothesis was supported.

Lagged variables. To determine if there is a lagging effect for some of the independent variables to the dependent variable, I repeated the multiple regression analysis using a lag period of 1 year for certain independent variables. The tuition revenue for the current year was correlated to the predictor variables from the previous year for unemployment and the population of the age 15 to 17. The condition of the economy may have a delayed effect on total tuition revenue because of delayed behavioral changes in the potential student population base (Crouse, 2015; Pennington et al., 2002). Likewise, the population of the age group from 15 to 17 represents the potential student base for community college enrollment for the upcoming 1 to 3 years.

It is possible that these certain variables did not demonstrate a significant relationship with tuition revenue as coincident variables, but were significant as lagged variables. If it was found that the magnitude of the standardized coefficient is larger when the data for a particular variable is lagged by 1 year (i.e., the strength of the relationship improves) and the relationship is significant ($p < 0.05$) then that variable was considered a lagging variable. Similarly, if an independent variable was found to be significant in the lagged model but not in the coincident model, then that variable was considered a lagging variable.

Threats to Validity

External Validity

The nonprobability sampling technique employed in this study presents some limitations to the findings and conclusions. Nonprobability sampling was chosen for this study because variations in institution size, operational budget size, and governing legislation add a great deal of variability to how institutional leaders manage operational funds. Generalizability of the study is threatened by the purposive sampling technique, which will be used to minimize the effects of institutional size and legislation that influence the independent variables. The sample of institutions for this study was purposively selected based on the comparable size of the institutions. This sample selection allows for a study with a manageable amount of data without introducing factors related to institutional size that would influence the tuition rate setting strategy or the relative percentage of the operating budget spent on instructional expenses.

Similarly, changes in legislation may create step changes in revenue and spending across the state. These changes may affect the way that tuition rates are set in a particular state, but would not affect institutions in other states. The sample was selected in a way that would flatten the effects of state-level legislative changes by choosing institutions that fall under the same legislative governance. This method minimizes the variability of the data that is a result of state-level legislative changes, which is outside the scope of this study.

The 7-year period that is the focus of this study may allow situational bias to become an external threat of validity to this study. During this period, the national economy was on an economic rebound, and the findings of this study may not apply in all phases of the business cycle. The period used in this study ensures that the findings will be current, relevant, and meaningful to the current business practices in the community college field. Prior to 2011, the nation was heavily affected by a deep recession that may have had indirect influences on tuition revenue that are outside of the independent variables considered in this study. Likewise, it is important to use recent information in this study in order to overcome additional noise due to the maturation of the community college business model. The community college business landscape has changed due to increased competition from massive open online courses, which had not been the case in prior decades. I have addressed the threats of situational bias by selecting the period of historical data that encompasses the current issues affecting the community college business landscape without introducing noise in the data due to the economic recession.

Internal Validity

Changes in leadership among the subject institutions could introduce a threat to internal validity for this study. The management of institutional funds and tuition rate setting strategy may be affected when an existing leader leaves the institution, and a new leader is appointed. These changes in leadership could introduce variability in the data that are not accounted for by the independent variables of the study. Threats to validity are minimized in this study by analyzing changes in each year independent of previous years so that changes in leadership have a minimal effect on the causal relationship between the independent and dependent variables. Likewise, the interpretation of the causal relationship in this study must consider the possibility that changes in leadership may have an influence on tuition revenue beyond the explanatory variables in this study.

The growing popularity of early college programs may also present a threat to the internal validity of this study. High school students can enroll in college classes before graduation in a growing number of states. These early college programs shift the age demographic that would be considered the traditional population for community college enrollment. To account for this, I have widened the age demographic of interest to include age 15 to age 17, which includes the upper classes of high school students who would be eligible to enroll in college through an early college program.

Construct Validity

The management of institutional funds consists of many components of spending and revenue opportunities, and it is not feasible to incorporate all of these components into a single study. Instead, I have chosen a measurement for the management of

institutional funds related to the direct costs of instruction as a percentage of the total budget. Operational spending on instruction and instructional support itself is a broad spending category that may also introduce a threat to construct validity in this study. It is important to note that any casual relationships for the management of institutional funds should be examined closely to ensure that the measure for instructional spending aligns with the management of institutional funds. Likewise, future studies could build upon this research to launch additional research that would explore the components of instructional spending that would have the greatest influence on the causal relationship between instructional spending and tuition revenue. The measure used in this study is intended to represent the strategy for funding and developing instructional programs as well as the strategies used to control operational costs related to instruction. The detailed analysis of the components that make up total instructional spending is beyond the scope of this study.

Ethical Procedures

The use of secondary archival data helps to ensure the anonymity of the participants. Data gathered from the Bureau of Labor Statistics, US Census Bureau, and the NCHS are presented as a summary of the survey results. These hosting agencies protect the original raw data and surveys, which assures that the survey participants are not linkable to the analysis or findings of this study. In addition, there are no special permissions needed to use the age population data or unemployment data gathered for this study. These agencies have published this information for public use in studies such

as this one. Similarly, the Michigan Center for Educational Performance and Information publishes the audited financial data for community colleges for public access.

The institutions included in this study are the recipients of state aid, tax revenue, and federal financial aid as part of their funding source. Therefore, these institutions are required to make financial information available to the public. Receiving public financial support as part of the operating revenue for the college means that the financial performance and decision-making strategies of these institutions are subject to public scrutiny. Since all of the participating institutions in this study fall within this funding category, there is no need to protect the identities of the institutions. On the other hand, there will be no individuals identified in this study because all of the data used in the study is based upon institutional performance and not directly linked to the decisions of specific individuals within the institution.

Summary

The design for this quantitative study uses longitudinal data in a quasi-experimental approach. The methodology chosen to address the research problem and research question is a multiple regression analysis of five predictor variables and one dependent variable. The primary purpose for this investigation is to determine the extent to which the management of institutional funds, tuition rate setting strategy, age demographics, and economic conditions help explain the changes in tuition revenue for rural Midwest community colleges. The results of the multiple regression analysis will determine the strength and significance of each predictor variable in the model for predicting total tuition revenue.

The longitudinal data used in this study will be obtained from secondary and archival sources. The identities of individuals participating in population and employment studies are protected by the original sources. These sources provide archival data as a summary of the survey results, and the original surveys are not available to the public. The anonymity of the participating institutions is not an ethical concern as these institutions receive federal and state funding from tax dollars, which inherently makes the financial performance of the institutions open to public analysis and scrutiny. I will use a purposive sampling technique to gather comparable data from institutions that operate under similar governmental controls and similar economies of scale. Although random sampling is a better option for generalizing the results from the data, it is not a good technique in this case because there are so few institutions that can be directly compared to one another. The details and results of this analysis will be presented in the coming chapters.

Chapter 4: Results

The purpose of this quasi-experimental quantitative study was to investigate the extent to which the management of institutional funds, tuition rate setting strategy, age demographics, and economic conditions help explain the changes in tuition revenue for rural Midwest community colleges. This study addresses a gap in the existing research concerning the extent to which the financial strategy used by college leaders can improve the long-term financial health of the institution when changes in economic and age demographic conditions influence demand. In this chapter, I describe the data collection details, evaluate and report statistical assumptions of the study, and present a detailed examination of the study results. This analysis was conducted in order to answer the following research question and test the following hypotheses.

RQ1: To what extent, if any, do the management of institutional funds, tuition rate setting strategy, age demographics, and local economic conditions affect the total tuition revenue for rural Midwest community colleges?

H_0 : There is no statistically significant relationship between tuition revenue and the percentage of the operating budget allocated to instruction and instructional support, change in tuition rate, the population of the age group 15-17, the population of the age group 18-24, or unemployment level.

H_1 : At least one of the independent variables has a statistically significant relationship with tuition revenue.

Data Collection

I collected data from multiple archival sources including several national and state statistical databases. Financial information for each institution in this study was collected from the Michigan Center for Educational Performance and Information. Each year, state law requires community colleges to submit audited financial information to the Center for Educational Performance and Information to be included in an annual report that is published by the agency called the Activities Classification Structure (ACS). The ACS groups Michigan colleges based upon their relative enrollment size and other operational similarities. In this study, I focused on Group 1 colleges in the ACS, which represents the 10 most rural and smallest group of community colleges in Michigan (Center for Educational Performance and Information, 2018). These colleges are listed in Table 2 below.

Table 2

Rural Michigan Community Colleges with Descriptive Statistics from 2011-2017

| Community college | County | Tuition revenue in dollars Mean (Std Dev) | Age group 15-17 | Age group 18-24 | Un-employment Rate | Instruction spending percent | Tuition rate in dollars |
|-------------------|-----------|---|-----------------|-----------------|--------------------|------------------------------|-------------------------|
| Alpena | Alpena | 6261316 (684884) | 1072 (40) | 2173 (75) | 8.0 (2.1) | 63.0 (0.6) | 139 (16.3) |
| Bay de Noc | Delta | 8464274 (839297) | 1371 (26) | 2646 (132) | 8.5 (1.9) | 58.5 (2.4) | 140 (11.2) |
| Glen Oaks | St Joseph | 3462899 (500121) | 2627 (48) | 5025 (84) | 6.6 (2.6) | 49.4 (2.6) | 104 (10.9) |
| Gogebic | Gogebic | 4253509 (153815) | 476 (42) | 1275 (68) | 8.9 (2.4) | 56.0 (1.7) | 127 (12.9) |
| Kirtland | Roscommon | 6007793 (342291) | 703 (52) | 1359 (63) | 11.4 (2.7) | 56.1 (1.8) | 112 (11.5) |
| Mid Michigan | Clare | 17957414 (647351) | 1130 (55) | 2270 (120) | 9.8 (2.5) | 57.4 (1.3) | 151 (14.5) |
| Montcalm | Montcalm | 5331146 (375720) | 2670 (77) | 5169 (70) | 7.9 (2.6) | 62.5 (2.9) | 113 (10.2) |
| North Central | Emmet | 6942136 (452655) | 1331 (59) | 2580 (55) | 9.5 (2.8) | 56.3 (1.0) | 125 (20.3) |
| Southwestern | Cass | 10927975 (867051) | 2145 (110) | 4094 (129) | 6.8 (2.0) | 51.5 (1.3) | 126 (10.5) |
| West Shore | Mason | 3178988 (185823) | 1081 (51) | 2176 (69) | 7.9 (2.1) | 49.9 (2.3) | 96 (8.5) |

Note. Small rural community colleges identified as Group 1 of the Activities Classification Structure in Michigan (Center for Educational Performance and Information, 2018).

The ACS report contains a variety of audited financial data including the amount of the total operating budget for each community college as well as the amount of money

allocated to instruction and instructional support (Center for Educational Performance and Information, 2018). Likewise, the ACS contains the tuition and fees revenue and tuition rate of each college for each year of this study (Center for Educational Performance and Information, 2018). I obtained this data to determine the weighted average tuition rate each year and the percentage of the total operating budget that is allocated to instruction and instructional support for each community college in the sample group from 2011 to 2017.

I obtained information regarding age group population estimates from the MDHHS website (Michigan Department of Health and Human Services, 2018). The MDHHS website contains a variety of reports and statistics related to health services including population trend data. The population estimate tables on the MDHHS website were prepared using data from the NCHS. The latest estimations published by the NCHS for age population were released in June of 2017 and are the dataset used in this study (Michigan Department of Health and Human Services, 2018). The NCHS estimates age population statistics by utilizing postcensal population estimates based on data from the most recent U.S. Census Bureau national census. The NCHS uses a bridged race methodology for estimating the age population statistics for the overall population using census data across all race categories (Ingram et al., 2003).

On the MDHHS website, the population data for each county in Michigan is presented by age groups for each year from 1990 to 2017. The counties that pertained to this study are listed in Table 2. The years included in this study were 2011 through 2017, and the age groups of interest were age 15 to 17 and age 18 to 24. The population

estimates for these years and age groups were obtained from the tables on the MDHHS website. Additionally, I obtained the population of the age group 15 to 17 for each county for the year 2010 so that this data could be used in a lagged-variable scenario. The data for the age group 15 to 17 was lagged by 1 year in part of this analysis and, therefore, the 1-year lagged value for the year 2011 was equal to the population of that age group in 2010.

I obtained data for unemployment rates in each county from the Bureau of Labor Statistics Division of the US Department of Labor. In order to account for seasonal economic characteristics, I used the annual average labor force data for the service counties for each community college. The counties associated with each college are listed in Table 2. The Bureau of Labor Statistics estimates unemployment rates using information from the CPS. The CPS is a monthly survey that uses a probability sampling procedure of approximately 60,000 households to gather data on monthly employment statistics (U.S. Bureau of Labor Statistics, *n.d.*). Sample sizes are targeted to maintain a maximum of 1.9% coefficient of variation of the unemployment level (U.S. Bureau of Labor Statistics, *n.d.*). Archival data from this source is available as an annual average unemployment rate for each year that is included in this study. Additionally, the unemployment rate for each county was obtained for the year 2010 so that this data could be used in a lagged-variable scenario. The data for the unemployment rate was lagged by 1 year so that the value for the year 2011 was equal to the population of that age group in 2010.

Study Results

The process of data analysis began by establishing an effective tuition rate that considers changes in both the in-district and out-of-district tuition rates. I used a weighted average to determine the net effect of tuition rate changes from year to year for a particular college using the number of credit hours for in-district and out-of-district enrollment as the basis for weighting. The formula used for the weighted average tuition rate is shown below:

$$\text{Weighted Average Tuition} = \frac{T_I E_I + T_O E_O}{E_I + E_O}$$

In this equation, T_I is the in-district tuition rate; T_O is the out-of-district tuition rate; E_I is the in-district enrollment in credit hours; and E_O is the out-of-district enrollment in credit hours for each college in each year of the study.

The instructional activity spending variables is a combination of two values reported in the ACS. The first value is the percentage of the operating budget allocated to the costs of direct instruction. The second value is the percentage of the budget allocated to instructional support. These two values were summed to establish the total value allocated to instructional activity and compose the instructional spending variable in this analysis. Table 2 shows the descriptive statistics that characterize the sample.

Hypotheses Testing

The hypotheses were tested using the multiple regression model, Equation (1), shown below. The hypotheses associated with RQ1 were as follows:

H_0 : There is no statistically significant relationship between tuition revenue and the percentage of the operating budget allocated to instruction and instructional

support, change in tuition rate, the population of the age group 15-17, the population of the age group 18-24, or unemployment level.

H_1 : At least one of the independent variables has a statistically significant relationship with tuition revenue.

Multiple Regression Model

The mathematical equation below represents the multiple regression model that was used in this study.

$$y_{ij} = \beta_0 + \beta_1x_{1ij} + \beta_2x_{2ij} + \beta_3x_{3ij} + \beta_4x_{4ij} + \beta_5x_{5ij} + \varepsilon_{ij} \quad (1)$$

In this equation, y_{ij} is the annual tuition revenue for community college i in the year j .

The subscript i goes from one to 10 for the 10 community colleges in this study and j goes from one to seven for years from 2011 to 2017 (2011 is year 1, 2012 is year 2, etc.).

The independent variables are defined in Table 1. The constant β_0 is the y-axis intercept and β_1 through β_5 are the regression coefficients for the five independent variables. The term ε_{ij} is the error term.

Assumption verification. While verifying the assumptions for linear regression, it quickly became clear that outlying data were causing the dataset to fail tests of normality and linearity. I used scatterplots to test the assumption of linearity for each independent variable as it related to tuition revenue. The analysis of these scatterplots revealed that the relationships were linear with the exception that Mid Michigan Community College was a consistent outlier for all of the variables included in this study (see Appendix A). This outlier effect was likely due to consistently higher tuition

revenues for this college compared to the remainder of the colleges in Group 1 of the ACS, as well as a difference in rurality of this particular community college.

The observation of the outlying data was also confirmed in the tests for normality. When the tuition revenue dataset included Mid Michigan Community College, the Kolmogorov-Smirnov normality test shows a p -value result of zero, indicating that the tuition revenue data are not normally distributed. When Mid Michigan Community College was removed from the dataset as an outlier, the Kolmogorov-Smirnov normality test for tuition revenue exhibited a p -value of 0.2, indicating that the tuition revenue data for the remaining Group 1 colleges are approximately normally distributed.

Based on the findings of the normality and linearity testing, Mid Michigan community college was eliminated from the data set in the multiple regression model. This left nine colleges over the 7-year span, which resulted in 63 data points. This number of data points satisfies the minimum number of observations needed based on the power analysis conducted in Chapter 3. The remainder of the assumptions and analyses discussed below were tested while excluding the data from Mid Michigan Community College.

The assumptions for homoscedasticity and zero conditional mean of the errors were tested by plotting the residuals and predicted values for tuition revenue. A fit line was then added to the scatterplot, and the slope of that fit line was essentially zero. Since the pattern of the residual and predicted value plot is almost perfectly flat, it was determined that the linear regression model meets the assumption of homoscedasticity. Further, a loess curve was added to the plot, which exhibited a relatively flat behavior

with no discernable conditional variations of the residuals from zero. Therefore, it was determined that the model meets the assumption of zero conditional means of the errors.

The collinearity of the variables was tested by using the Pearson correlation test. All of the independent variables demonstrated Pearson correlation coefficients of less than one. In general, all of the Pearson correlation coefficients were less than 0.5 except for the age statistics. When comparing the variable for the number of people in each county between the ages of 15 and 17 to the variable for ages of 18 to 24, these two variables had a Pearson correlation coefficient of 0.993 indicating that these variables were highly correlated, which is not surprising, because larger counties would have larger numbers in both age groups.

Finally, the assumption that there is no autocorrelation was tested using the Durbin-Watson test statistic. The Durbin-Watson test statistic is 1.653 for the data used in this model and falls within the critical range of 1.5 to 2.5 when testing for autocorrelation. Therefore, it was assumed that there was no autocorrelation in this multiple regression data.

Multiple linear regression analysis. The linear regression model outlined in Equation (1) above was run using the SPSS multiple linear regression analysis function and the data from the subject community colleges. The model showed a significance of $p < 0.05$ for the F -test and, therefore, the model has statistical significance. The adjusted R^2 for the model is 0.522, indicating that this model accounted for about 52% of the variation in tuition revenue for these small rural Michigan community colleges. The full results of the SPSS analysis are shown in Appendix B.

The significance level associated with the independent variables for tuition, age population 15 to 17, instructional spending, and unemployment were all found to be less than 0.05 and, therefore, these variables were significant predictors of tuition revenue in this model. The significance level for the age population from 18 to 24 in this model is $p=0.114$ indicating that it was not a statistically significant predictor variable in the model. The p -values and standardized coefficients for each independent variable in the model are listed in Table 3 below. Since four out of the five predictor variables were statistically significant, I can reject the null hypothesis and find support for the alternative hypothesis.

Table 3

Correlations Table for Tuition Revenue as Dependent Variable

| | Unstandardized β | Standardized β | T | Significance (p -value) |
|------------------------|---------------------------|-------------------------|--------|-------------------------------|
| Age group 15-17 | 5909 | 1.874 | 2.343 | .023 |
| Age group 18-24 | -2246 | -1.305 | -1.606 | .114 |
| Unemployment | 712956 | .776 | 5.518 | .000 |
| Tuition rate | 139794 | 1.086 | 7.841 | .000 |
| Instructional spending | -169328 | -.359 | -3.218 | .002 |

Note. Michigan Community Colleges ACS Group 1 colleges from 2011 to 2017 excluding Mid Michigan Community College.

The population of the age group from 15 to 17 years old had a standardized coefficient of 1.874 and had the strongest effect on tuition revenue. Although the population of 18 to 24 years old ranked second in strength with a standardized beta coefficient of -1.305, the significance level indicated that it was not a significant predictor. Tuition rate ranked third in predictive strength with a standardized beta

coefficient of 1.086 followed by unemployment with a 0.776 standardized beta coefficient. According to the data used in this multiple regression analysis, tuition revenue increases with the population in the age group 15 to 17, tuition rate, and the unemployment rate since the beta coefficient had a positive sign.

The percentage of the budget allocated to instructional activity had the weakest effect on tuition revenue with a -0.359 standardized beta coefficient. The negative sign of the beta coefficient indicated that tuition revenue decreases as the percent of the budget allocated to instructional activity increases. Although the *p*-value suggested that the instructional activity variable was a significant predictor of tuition revenue, the standardized beta coefficient showed that it was a very weak predictor variable.

Lagged variables. In order to determine if there is a lagging effect for some of the independent variables to the dependent variable, I repeated the multiple regression analysis using a lag period of 1 year for certain independent variables. The tuition revenue for the current year was correlated to the predictor variables from the previous year for unemployment and the population of the age 15 to 17. The condition of the economy may have a delayed effect on total tuition revenue because of delayed behavioral changes in the potential student population base (Crouse, 2015; Pennington et al., 2002). Likewise, the population of the age group from 15 to 17 represents the potential student base for community college enrollment for the upcoming 1 to 3 years, so the effects of changes in this age group may be delayed. The assumptions for linear regression analysis for the lagged model were verified using the same methods as the original model, and all assumptions are met.

In the model using lagged variables for unemployment and the age population from 15 to 17, it was found that all predictor variables had a $p < .05$ significance level. The tuition rate, percent instructional spending, age population from 18 to 24, lagged age population from 15 to 17, and the lagged unemployment rate were all significant predictors of tuition revenue in the lagged model. In addition, the adjusted R^2 value increased to 0.543, and the F -test for the lagged model showed a p -value very near zero, indicating that the model is significant. The interpretation of the adjusted R^2 value is that the lagged model explains 54.3% of the variation in tuition revenue for the community colleges in this study. The p -values and standardized coefficients for each independent variable in the lagged model are listed in Table 4 below. Since all five predictor variables are statistically significant, the null hypothesis was rejected, and the alternative hypothesis was supported.

Table 4

Correlations Table for Tuition Revenue as Dependent Variable–Lagged Model

| | Unstandardized β | Standardized β | T | Significance (p -value) |
|------------------------|---------------------------|-------------------------|--------|-------------------------------|
| Lagged age group 15-17 | 6682 | 2.139 | 2.760 | .008 |
| Age group 18-24 | -2764 | -1.606 | -2.047 | .045 |
| Lagged unemployment | 639297 | .777 | 5.545 | .000 |
| Tuition rate | 147902 | 1.149 | 8.197 | .000 |
| Instructional spending | -184946 | -.392 | -3.518 | .001 |

Note. Age Group 15-17 and Unemployment lagged by 1 year. Michigan Community Colleges ACS Group 1 colleges from 2011 to 2017 excluding Mid Michigan Community College.

The population of the age group from 15 to 17 years old had a standardized coefficient of 2.139 and has the strongest effect on tuition revenue in the lagged model and a stronger effect than the original model. The standardized beta coefficients of the other variables in the lagged model remained very similar to those of the original model. The strength of the percentage of the budget allocated to instructional activity remained the weakest with a -0.392 standardized beta coefficient. Similar to the original model, the standardized beta coefficient for the percentage of the budget allocated to instructional activity in the lagged model showed that it was a very weak predictor variable. The full SPSS output for the lagged model can be found in Appendix C.

Summary

The main research question associated with this study aims to determine the extent that the management of institutional funds, tuition rate setting strategy, age demographics, and local economic conditions affect the total tuition revenue for rural Midwest community colleges. Through linear regression analysis, it was found that these independent variables are significant predictors of tuition revenue. Based on this finding, the null hypothesis was rejected, and the alternative hypothesis was supported. The variables representing the management of institutional funds, tuition rate, age demographics, and employment conditions do, indeed, affect the total tuition revenue for rural Midwest community colleges according to the analysis. Age demographics appeared to have the strongest effect on tuition revenue while the percent of the operating budget allocated to instructional activity was the weakest predictor. These findings confirm the existing research in this field and expand the existing knowledge as discussed

in the following chapter. Likewise, I will discuss how the findings of this study may suggest additional topics for future research in the following chapter.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to investigate the extent to which the management of institutional funds, tuition rate setting strategy, age demographics, and economic conditions help explain the changes in tuition revenue for rural Midwest community colleges. The strength and significance of these factors were tested by fitting a multiple regression to data from nine small rural community colleges in Michigan from 2011 to 2017. This study addressed a gap in the existing research concerning the extent to which the financial strategy used by college leaders can improve the long-term financial health of the institution when changes in economic and age demographic conditions influence demand.

The overall model was found to be statistically significant with an adjusted R^2 of 0.52 for the coincident model and 0.54 for the lagged model. The findings of the study showed that the county population from age 15 to 17 years old and tuition rate were the strongest significant factors in predicting tuition revenue. However, the county population from 18 to 24 years old was not a significant factor in the coincident model but was marginally significant in the lagged model. The unemployment rate was also found to be statistically significant and had a moderate strength in predicting tuition revenue in the model. The percentage of the institutional budget allocated to instructional activity was a statistically significant factor in the model but was a relatively weak predictor of tuition revenue.

Interpretation of Findings

Much of the existing research involving regional economic influences and tuition rate setting for community colleges has focused on enrollment management. The findings of this study extend the existing knowledge into the financial implications for community colleges while confirming the relationships found in earlier studies. For example, earlier studies showed inconsistent findings regarding the impact that unemployment has on the financial strength of community colleges. The present study addressed these inconsistent findings and revealed that unemployment impacts the finances of small rural community colleges. In this section, I describe how the findings of the present study are related to the peer-reviewed literature discussed in earlier chapters. The analysis and interpretation of the findings are organized and presented for each independent variable separately followed by a discussion of the model as a whole. These variables include unemployment, tuition rate setting, age demographics, and instructional spending.

Unemployment

The findings of this study showed that unemployment has a statistically significant relationship with tuition revenue. The p -values in both the coincident model and lagged model were very near zero, indicating a high level of statistical significance. The unstandardized beta for the unemployment variable in the coincident model indicated that a 1% increase in unemployment corresponds to a \$712,956 increase in tuition revenue. The lagged model showed similar findings with a 1% increase in unemployment corresponding to a \$639,297 increase in tuition revenue.

The findings of the present study confirmed the statistical significance of unemployment in the operational performance of community colleges. Pennington et al. (2002) found that unemployment and community college enrollment demand have a statistically significant relationship on a national scale. Likewise, the direction of the relationship in the present study appeared to be consistent with the relationship found by Pennington et al. (2002). Pennington et al. (2002) found that the demand for community college increases as unemployment increases. With other factors held constant, an increase in enrollment demand results in an increase in tuition revenue, which was confirmed in the findings of this study and is consistent with the findings of Pennington et al. (2002).

Tuition Rate Setting

The findings of this study showed that the in-district and out-of-district weighted average tuition rate has a statistically significant relationship with tuition revenue. The *p*-values in both the coincident model and lagged model were very near zero, indicating a high level of statistical significance for this variable. The unstandardized beta for the tuition rate variable in the coincident model indicated that a one dollar increase in the weighted average tuition rate corresponded to a \$139,794 increase in tuition revenue. The lagged model showed similar findings with a one dollar increase in the weighted average tuition rate corresponding to a \$147,902 increase in tuition revenue.

In the present study, the standardized beta for the tuition rate variable indicated that tuition rate is among the strongest variables in the model for predicting tuition revenue. These findings indicated that the current conditions of the rural Michigan

community college tuition pricing are likely operating in the inelastic portion of the revenue curve associated with community college education. These findings are particularly important to the financial managers within the community colleges because moderate increases in tuition rate did not appear to have a price-elastic effect on demand within the current economic landscape. According to the data in this study, a financial strategy that incorporates moderate and consistent increases in tuition rate will not adversely affect tuition revenue. This finding extends the existing knowledge regarding the price elasticity of demand for colleges and universities by examining the lower-cost tuition rates associated with community colleges. While earlier studies suggest that there is a price-elastic relationship between tuition rate and enrollment in universities (Crouse, 2015; Langelett et al., 2015; Farhan, 2016), the findings of the present study suggested that the lower price point of community colleges may exhibit relatively inelastic price-demand behavior with modest increases in tuition rate.

Age Demographics

The age demographic categories were split into two groups for this study. The first variable represented the number of people in the county from age 15 to 17 years old. The 15 to 17 year old population was found to have a statistically significant relationship with tuition revenue for both the coincident and lagged model. Likewise, the standardized beta coefficient for the 15 to 17 year old population indicated that this independent variable had the strongest relationship with tuition revenue compared to the other variables in both models used this study. The findings showed that tuition revenue increases as the number of people between the ages of 15 and 17 within the service

county increases. These findings coincide with the works of Coca et al. (2017) as well as Lee and Lubienski (2017). Both studies showed an interdependence between regional high school enrollment and community college operational performance.

The second age demographic category of this study was the 18 to 24 year old age group. The results showed that this age group did not have a statistically significant relationship with tuition revenue in the coincident model. However, in the lagged model, this variable met the conditions of statistical significance with a p -value of .045, which is slightly less than the .05 threshold. However, the relationship with tuition revenue is directionally opposite of the 15 to 17 year old age group. The findings of the lagged model suggested that tuition revenue decreases as the number of people in the 18 to 24 year old age group increases. One possible explanation for this phenomenon could be that rural 18 to 24-year-old people are more likely to seek employment opportunities when they are available in lieu of attending college. Future research is recommended to confirm the reasons for the change in direction for the relationship between tuition revenue and the population of the age group from 18 to 24 years old.

Instructional Spending

The findings of this study showed that the percentage of the budget allocated to instructional activity has a statistically significant relationship with tuition revenue. The p -values in both the coincident model and lagged model were very near zero, indicating a high level of statistical significance. However, the unstandardized beta for the instructional spending variable in both models showed that it is a relatively weak predictor of tuition revenue. Based on the lack of strength in the relationship between

instructional spending and tuition revenue, I would interpret the findings to show that instructional spending is not an important factor in predicting tuition revenue in this model.

Model Interpretation

The ANOVA results for both the coincident and the lagged models showed that there is a high level of significance in the model. The adjusted R^2 values indicated that the coincident and lagged models explain 52% and 54% of the variability in tuition revenue, respectively. Based on the improved adjusted R^2 value, the lagged model is a more accurate predictor of tuition revenue within the sample of this study. Likewise, the strength of the relationship for all independent variables improved when the county population in the age group from 15-17 and unemployment were lagged by 1 year.

Limitations of the Study

This study was subject to limitations based on the period chosen for examination. The 7 year period from 2011 to 2017 was a period of generally steady economic growth across the Midwest United States as well as a period of enrollment decline for community colleges in that region. The findings and interpretations related to unemployment may be limited in generalizability based on the employment conditions that existed during the period of this study. Likewise, the findings related to the price elasticity of demand for community college may be limited to periods of economic growth, where household disposable income is generally stronger compared to times of economic recession.

Other limitations to the generalizability of the findings include the scope of the study as it relates to the size and geographic region of the participating institutions. The

community colleges in this study all fell within the state government jurisdiction of Michigan. Other state governments may have varying levels of control over the operations of community colleges and therefore may have different outcomes in a similar regression analysis. Likewise, the scope of the participants was limited to small rural community colleges of comparable size. Larger and more urban community colleges could face different levels of competition, population migration, and economic shifts that could limit the findings of the model used in this study.

Recommendations

Many of the limitations of this study could be overcome in future studies by expanding the years of focus to include multiple business cycles. In a study spanning a longer period, an inflation-adjusted approach to revenue would help ensure that changes in tuition rate are measured consistently throughout the data. The relationship between unemployment and tuition revenue that was found in this study could be confirmed in a study that spanned a full business cycle of both steadily increasing and steadily declining unemployment rates. If confirmed, the relationship between rising unemployment and rising tuition revenue would mirror the findings of this study, which are that tuition revenue declines as a result of unemployment when all other variables are held constant.

Additional research could eliminate further limitations regarding the scope of the study by focusing on larger arrays of community colleges that are composed of various sizes of institutions. Incorporating small, medium, and large institutions in a future study would expand the knowledge of the relationships found in this study and test if these findings hold true for larger community colleges in more urban areas. It would also be

useful to include a rurality score as a cofactor in the model to account for variations in urban conditions. While urban colleges may have a greater population density of the critical age demographics, these urban community colleges are also more likely to face higher levels of competition with more densely distributed educational and job opportunities for potential college students. Understanding the effects of these factors would tend to overcome the limitations regarding the limited scope in institutional size.

A broader study into additional community college spending strategies would also provide additional insight into the findings of this study. In this study, I focused primarily on the direct costs of instruction at community colleges as a primary indicator of budgeting strategy. It is possible that the slightly negative relationship between tuition revenue and instructional spending found in this study is because the salary ranges for faculty across the small rural community colleges are relatively similar. In that case, it is possible that any additional tuition revenue generated would be allocated to other spending categories rather than an increase in instructional salaries or instructional costs. This strategy would cause the percent of the budget spent on instructional activity to decrease slightly while the total tuition revenue increases. Additional research focusing on the relationship between faculty salary level and tuition revenue would clarify whether or not this phenomenon is the reason for the results found in this study.

Future research could also expand into specific instructional areas or could explore the impact of capital expenditure patterns. Investments in infrastructure, staff development spending, administrative costs, and educational equipment expenditures are all possible factors that could relate to the long-term financial success of community

colleges and are yet to be explored. Likewise, future research could focus on spending and growth in a specific instructional category such as health and human services, technology, manufacturing, or general studies. This type of future research could yield a greater understanding of the stability and long-term financial success associated with funding and developing specific programs while considering the effects of unemployment. All of these areas of future research would help expand the knowledge of financial strategies that have proven effective for the long-term financial success of community colleges.

Implications

The findings from this study promote positive social change by providing insight for the decision-making process used by leaders to improve the financial strength of community colleges so that they may continue to offer and expand the technical, vocational, certificate, and degree-bearing educational needs of the local communities they serve. Community colleges have traditionally served populations that may not otherwise have access to higher education. They have offered a low-price alternative for the educational development of individuals who may face financial or geographical barriers that would prevent them from receiving a college education in other forms (Crouse, 2015).

The findings of this study support that moderate and consistent tuition rate increases are positively correlated to increasing total tuition revenue and that the affordability of community colleges is not substantially affected by moderate and controlled tuition rate increases. This supports positive social implications for

maintaining a financial strategy that keeps education reasonably affordable while maintaining a fiscally responsible budget that focuses on sound financial planning that takes into consideration external factors such as unemployment and age demographic populations. Through this sound planning process, community college financial managers will have greater accuracy when forecasting expected revenue for the upcoming year. This will allow for proper spending allocations upfront so that these colleges remain financially viable and sustainable.

The viability and sustainability of community colleges also have implications for the economic and social conditions within their communities. Communities, cultures, and societies thrive and advance through the benefits of higher education. The areas surrounding higher education institutions benefit from positive spillover effects that impact regional economic performance, production, and entrepreneurship (Drucker, 2016). The findings of this study provide greater insight into the symbiotic relationship of the local economic conditions and the services provided by the community college. In periods of economic decline, community colleges stand ready to provide the training and credentials needed to update workers' skills to support the next wave of economic growth. The findings of this study also show that financial managers should pay close attention to local economic and employment statistics when establishing a budget. The quantified significance between unemployment and tuition revenue provides practical implications for financial managers in forecasting revenue and preparing an accurate fiscal budget.

The findings related to age population data and migration trends are another indicator of the connection between local conditions and the financial success of rural community colleges. Community colleges have a positive cultural value focused on individual advancement resulting in societal gain through higher education (Heather et al., 2015). The financial viability for community colleges is an important factor in ensuring that these positive social impacts will continue to grow. Furthermore, the findings from this study provide a greater understanding of the effects of various influences on tuition revenue. This broader understanding has practical implications in helping leaders to accurately predict changes in tuition revenue and adjust the operational priorities of community colleges in order to support and promote these positive social changes in the communities they serve.

Conclusions

The findings of this study reinforce the work of earlier research in showing the strong connection between the conditions of the local community and the financial success of community colleges. The local unemployment rate proves to be a key indicator to predict tuition revenue and seems to have a particularly significant influence when the unemployment rate follows a consistent trend over time. Likewise, the financial managers of community colleges should focus on the population trends for those students who are currently enrolled in high school in order to gauge short term tuition revenue. Tuition rate setting strategy has the strongest relationship with tuition revenue among the variables in this study. According to the findings of this study, moderate and consistent increases in tuition rate will result in increased tuition revenue, which indicates that the

current price points and demand patterns for rural community colleges in Michigan exhibit relatively inelastic behavior. Community college financial managers must weigh the complexities of spending allocation and the resulting tuition revenue in a way that maximizes the effectiveness of the institution to fulfill its mission and sustain financial viability. This study provides a practical approach to unraveling the intricate and complex process of accurately forecasting tuition revenue.

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Appendix A: Test for Linearity and Outlier Identification

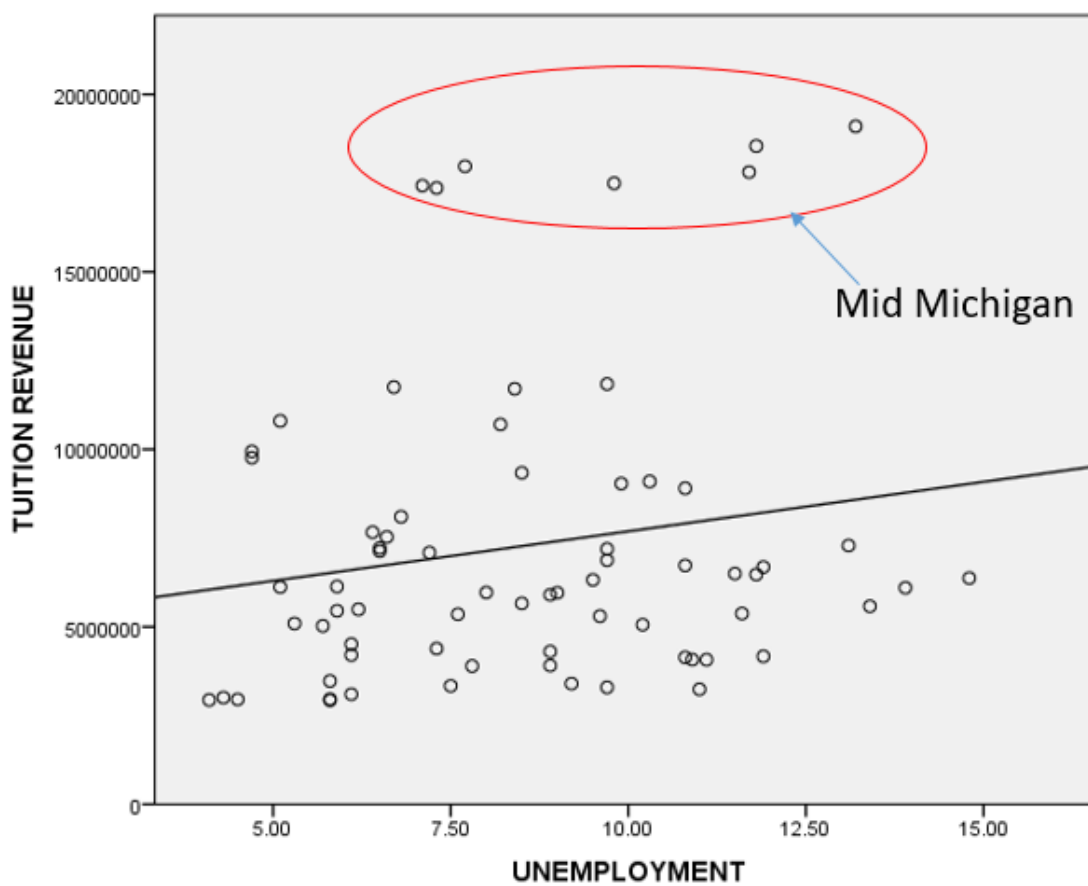


Figure A1. Scatterplot of tuition revenue and unemployment rate for group 1 Michigan community colleges

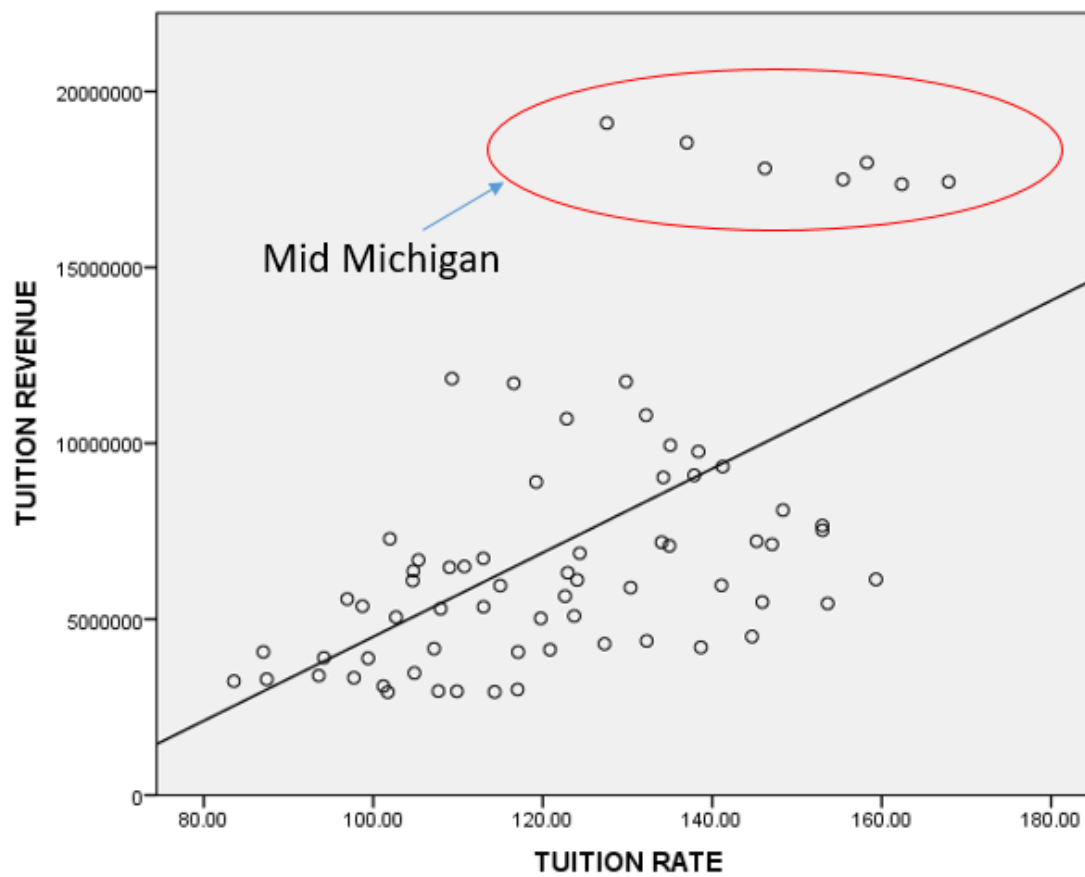


Figure A2. Scatterplot of tuition revenue and tuition rate for group 1 Michigan community colleges

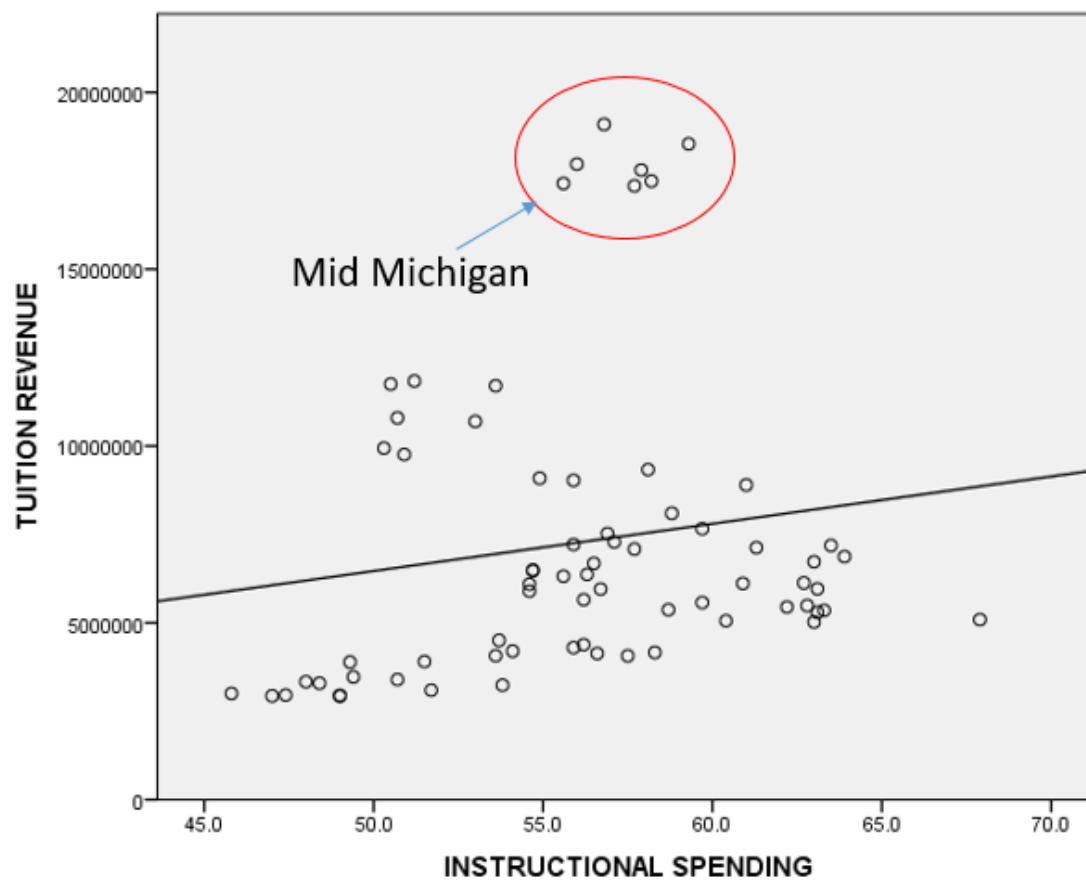


Figure A3. Scatterplot of tuition revenue and instructional spending for group 1 Michigan community colleges

Appendix B: SPSS Output from Original Multiple Linear Regression Model

Table B1

Model Summary

| <i>R</i> | <i>R</i> ² | Adjusted <i>R</i> ² | Std. Error of the Estimate | Durbin-Watson |
|-------------------|-----------------------|--------------------------------|----------------------------|---------------|
| .749 ^a | 0.561 | 0.522 | 1,665,983 | 1.653 |

Note. Predictors: (Constant), Instructional Spending, Age 15-17, Age 18-24, Unemployment, Tuition Rate; Dependent Variable: Tuition Revenue

Table B2

ANOVA

| | Sum of Squares | <i>df</i> | Mean Square | <i>F</i> | Sig. |
|------------|----------------|-----------|-------------|----------|-------------------|
| Regression | 2.019E+14 | 5 | 4.038E+13 | 14.548 | .000 ^b |
| Residual | 1.582E+14 | 57 | 2.775E+12 | | |
| Total | 3.601E+14 | 62 | | | |

Note. Dependent Variable is Tuition Revenue; Predictors: (Constant), Instructional Spending, Age 15-17, Age 18-24, Unemployment, Tuition Rate

Table B3

Coefficients

| Variable | Unstandardized Coefficients | | Standardized Coefficients | <i>T</i> | Sig. |
|------------------------|-----------------------------|------------|---------------------------|----------|------|
| | <i>B</i> | Std. Error | β | | |
| (Constant) | -9,454,655 | 2,897,379 | | -3.26 | 0.00 |
| Age 15-17 | 5,909 | 2,522 | 1.87 | 2.34 | 0.02 |
| Age 18-24 | -2,246 | 1,399 | -1.31 | -1.61 | 0.11 |
| Unemployment | 712,957 | 129,213 | 0.78 | 5.52 | 0.00 |
| Tuition Rate | 139,794 | 17,829 | 1.09 | 7.84 | 0.00 |
| Instructional Spending | -169,329 | 52,620 | -0.36 | -3.22 | 0.00 |

Note. Dependent Variable: Tuition Revenue

Table B4

Residual Statistics

| Statistic | Minimum | Maximum | Mean | Std. Deviation | N |
|----------------------|------------|-----------|-----------|----------------|-------|
| Predicted Value | 2,003,689 | 9,570,468 | 6,092,226 | 1,804,495 | 63.00 |
| Residual | -3,503,209 | 3,981,633 | 0 | 1,597,394 | 63.00 |
| Std. Predicted Value | -2.27 | 1.93 | 0.00 | 1.00 | 63.00 |
| Std. Residual | -2.10 | 2.39 | 0.00 | 0.96 | 63.00 |

Note. Dependent Variable: Tuition Revenue

Appendix C: SPSS Output from Lagged Multiple Linear Regression Model

Table C1

Model Summary – Lagged Model

| <i>R</i> | <i>R</i> ² | Adjusted <i>R</i> ² | Std. Error of the Estimate | Durbin-Watson |
|----------|-----------------------|--------------------------------|----------------------------|---------------|
| 0.761 | 0.580 | 0.543 | 1,629,397 | 1.796 |

Note. Predictors: (Constant), Lagged Unemployment, Instructional Spending, Lagged Age 15-17, Tuition Rate, Age 18-24; Dependent Variable: Tuition Revenue

Table C2

ANOVA – Lagged Model

| | Sum of Squares | <i>df</i> | Mean Square | <i>F</i> | Sig. |
|------------|----------------|-----------|-------------|----------|-------|
| Regression | 2.088E+14 | 5 | 4.175E+13 | 15.726 | 0.000 |
| Residual | 1.513E+14 | 57 | 2.655E+12 | | |
| Total | 3.601E+14 | 62 | | | |

Note. Dependent Variable: Tuition Revenue; Predictors: (Constant), Lagged Unemployment, Instructional Spending, Lagged Age 15-17, Tuition Rate, Age 18-24

Table C3

Coefficients – Lagged Model

| | Unstandardized Coefficients | | Standardized Coefficients | <i>T</i> | Sig. |
|------------------------|-----------------------------|------------|---------------------------|----------|-------|
| | <i>B</i> | Std. Error | β | | |
| (Constant) | -9,414,578 | 2,809,487 | | -3.351 | 0.001 |
| Age 18-24 | -2,764 | 1,350 | -1.606 | -2.047 | 0.045 |
| Tuition Rate | 147,902 | 18,043 | 1.149 | 8.197 | 0.000 |
| Instructional Spending | -184,947 | 52,573 | -0.392 | -3.518 | 0.001 |
| Lagged Age 15-17 | 6,681 | 2,421 | 2.139 | 2.760 | 0.008 |
| Lagged Unemployment | 639,297 | 115,294 | 0.777 | 5.545 | 0.000 |

Note. Dependent Variable: Tuition Revenue

Table C4

Residuals – Lagged Model

| | Minimum | Maximum | Mean | Std. Deviation | N |
|----------------------|------------|-----------|-----------|----------------|----|
| Predicted Value | 2,060,171 | 9,118,984 | 6,092,226 | 1,834,951 | 63 |
| Residual | -3,256,311 | 3,246,704 | 0.000 | 1,562,314 | 63 |
| Std. Predicted Value | -2.197 | 1.650 | 0.000 | 1.000 | 63 |
| Std. Residual | -1.998 | 1.993 | 0.000 | 0.959 | 63 |

Note. Dependent Variable: Tuition Revenue