THE RELATIONSHIP BETWEEN PER PUPIL EXPENDITURE IN MARICOPA
COUNTY K-12 PUBLIC SCHOOL DISTRICTS AND STUDENT UNDER
PREPAREDNESS AT THE POST SECONDARY LEVEL

By Edmond Allen Lamperez, Jr.

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ABSTRACT

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Edmond Allen Lamperez, Jr.

Student under preparedness is one of the major challenges facing community
colleges in the United States. When students are not prepared for college level course
work, it decreases their chances of successfully meeting their goals, whether that is an
associate's degree, a certificate, or transfer to a university. When students do not meet
their academic goals in college, then they are unable to reach their full potential. A
contributing factor of student under preparedness at the postsecondary level is an
inequitable and inadequate distribution of resources at the K-12 level. Schools and school
districts are funded, in large part, with local property tax levies, which results in large
disparities in per pupil funding. Students residing in socio-economically disadvantaged
school districts that often expend less money per pupil are disproportionally under
prepared for college-level course work. This study examined the relationship between per
pupil expenditure in Maricopa County K-12 public school districts and student under
preparedness at the post-secondary level; specifically the Maricopa County Community
College District (MCCCD). Subsequently, this study advocates policy transformations
aimed at equalizing opportunity for Maricopa County students to make education an
avenue for social mobility.

The population of this study consists of Maricopa County Community College
District students who attended a Maricopa County public K-12 school district, and who
took placement testing at MCCCD for course placement during the fall 2013 semester.

Purposive sampling was used to identify students who currently attend MCCCD and took placement tests to enter MCCCD during fall 2013.

In order to assess the relationship between per pupil expenditure at the secondary level and student preparedness at the post-secondary level two logistic regression models were utilized. The first model uses per pupil expenditure quartiles as the independent variable and student preparedness as the dependent variable. The second model uses an interaction between Arizona Department of Education high school grade and per pupil expenditure (per pupil quartiles) as the independent variable and student preparedness as the dependent variable. The difference between the two models is stark—Model 1 (only per pupil quartiles) shows that the students in quartile four, where the most money is being spent, are the least likely to be prepared—that appears to be because the students in quartile four are largely made up of students that are socio-economically disadvantaged. The results of Model 2 are consistent with the notion that increased per pupil expenditure and more effective schools will result in a higher proportion of college ready students. The implications of the findings of this study are twofold. First, the issue of "ecological equity" must be addressed in Maricopa County. Second, the issue of equity and adequacy in per pupil expenditure must be addressed in Maricopa County (and perhaps the State of Arizona). Policy transformations are needed in these two areas of educational public policy. The issues of "ecological equity" and adequacy and equity in education funding must be addressed concurrently. Specific policies recommended include quality preschool education, extending school hours, providing health and social services in schools, and expending more money per pupil in school districts with concentrated poverty.

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A very special thanks to my loving wife Wendy, thank you so much for being so understanding and supportive through this long journey. This would not have been possible without you. Finally, thanks to my parents for teaching me the value of education and providing inspiration and love.

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DEDICATION

This is dedicated to my loving, understanding, and wonderful wife Wendy Lee. Thank you for being my partner and my best friend! I could not have made it through this program without your love, encouragement and support. You understood that this was important to me so you made the sacrifices necessary to help me achieve my goal—I am forever grateful. We have so much to look forward to in the years ahead—so much love and life to live together—and so much travel!

CHAPTER 1

INTRODUCTION

Student under preparedness is one of the major challenges facing community colleges in the United States. When students are not prepared for college level course work, it decreases their chances of successfully meeting their goals, whether that is an associate's degree, a certificate, or transfer to a university. When students do not meet their academic goals in college, then they are unable to reach their full potential. If students are unable to meet their full potential, then the individual sustains a personal loss, and society sustains an economic and social loss. Collegiate failures at the individual level add up to become systemic social and economic problems at the aggregate level (Putnam, 2015).

A contributing factor of student under preparedness at the postsecondary level is an inequitable and inadequate distribution of resources at the K-12 level. Schools and school districts are funded, in large part, with local property tax levies, which results in large disparities in per pupil funding. Students residing in socio-economically disadvantaged school districts that often expend less money per pupil are disproportionally under prepared for college-level course work. It is essential to enact policy transformations aimed at equalizing opportunity if Maricopa County (and the State of Arizona) desires to make education an avenue for social mobility. This study aims to examine the relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the post-secondary level; specifically the Maricopa County Community College District (MCCCD). Subsequently, this study

advocates policy transformations aimed at equalizing opportunity for Maricopa County students to make education an avenue for social mobility.

Purpose

The purpose of this study was to understand the relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the MCCCD. This relationship is vitally important if education is to be utilized as a conduit for social mobility. Additionally, this study advocates policy transformations aimed at equalizing opportunity for Maricopa County students to make education an avenue for social mobility. Policy transformations are necessary so that opportunity is equally distributed helping to insure optimal educational and social mobility outcomes for Maricopa County.

Statement of the Research Problem

Education has been viewed as a conduit for social mobility in the United States throughout its history. However, social mobility at the aggregate level has been stagnant in the United States for the past several decades (Olinsky & Post, 2013). More often than not, sub-optimal educational outcomes are seen as the culprit or problem in the explanation for why social mobility has stagnated in the United States. Educational reform efforts have sometimes focused on regional equitable educational (K-12) resource allocation to help remedy stagnant social mobility outcomes. Equitable resource allocation at the K-12 level may have the effect of "leveling the playing field" when it comes to student preparedness at the postsecondary level leading to better postsecondary outcomes.

It is imperative to understand the relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the MCCCD, if we seek to improve educational outcomes, and thus social mobility outcomes. This relationship is vitally important if education is to be utilized as a conduit for social mobility.

Research Question and Hypotheses

This study explores the relationship between per pupil funding at the secondary level in Maricopa County K-12 public schools and student preparedness at the postsecondary level, specifically the MCCCD, by answering the following research questions:

1. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the Maricopa County Community College District?

Ho1: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the Maricopa County Community College District.

H1: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the post- secondary level, specifically at the Maricopa County Community College District.

2. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the postsecondary level, specifically at the Maricopa County Community College District?

Ho2: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the postsecondary level, specifically at the Maricopa County Community College District.

H2: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the post- secondary level, specifically at the Maricopa County Community College District.

3. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by gender at the postsecondary level, specifically at the Maricopa County Community College District?

Ho3: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by gender at the postsecondary level, specifically at the Maricopa County Community College District.

H3: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness

by gender at the post- secondary level, specifically at the Maricopa County Community College District.

4. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the postsecondary level, specifically at the Maricopa County Community College District?

Ho4: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the postsecondary level, specifically at the Maricopa County Community College District.

H4: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the post- secondary level, specifically at the Maricopa County Community College District.

Definition of Terms

For the purpose of this study, the following terms are defined as follows:

*ACCUPLACER***:** a suite of tests used by the Maricopa County Community College District that determine a student's knowledge in math, reading, and writing in preparation for enrollment in college.

Developmental Education: collegiate level course work that is remedial and intended to develop the necessary academic skills to succeed in college.

Prepared Student: a student whose academic skills in the subject matters of English, Reading and/or Mathematics are at college level; as assessed by a basic skills assessment such as ACCUPLACER.

Social Mobility, Upward Mobility, and Intergenerational Mobility: a child's chance of moving up in the income distribution relative to his/her parents (Chetty, Hendren, Kline, Saez, Turner, 2014).

Under Prepared Student: a student whose academic skills in the subject matters of English, Reading and/or Mathematics are not at college level; as assessed by a basic skills assessment such as ACCUPLACER.

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Delimitations

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Several challenges exist with the application of this study's findings outside of Maricopa County and/or the students outside the Maricopa County Community College District. This study utilizes purposive sampling as the students analyzed for this study have all enrolled in the Maricopa County Community College District. This sampling method limits the sample to a specific population of college students in Maricopa County, and is not representative of all college students in Maricopa County or elsewhere.

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Limitations

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This study operationalizes student under preparedness as placement into developmental education. This study relies on the Maricopa County Community College District methodology for developmental education placement, which is the ACCUPLACER test. It is assumed that the ACCUPLACER test is a valid measure of student under preparedness at the post-secondary level.

Assumptions

There are major assumptions associated with this study. This study operationalizes student under preparedness as testing into developmental education at the post-secondary level; specifically the Maricopa County Community College District. The methodology utilized at Maricopa County Community College District for course placement is ACCUPLACER. This study assumes that ACCUPLACER accurately places students at Maricopa County Community College District. ACCUPLACER is used widely at Community Colleges in the United States for course placement, however the cut scores used to determine course placement vary.

Significance of the Study

Understanding the relationship between per pupil expenditure in Maricopa County K-12 school districts and student under preparedness at the postsecondary level, specifically at the Maricopa Community College District, may help to provide an explanation as to why social mobility has been stagnant nationally and regionally. Presumably, educators and policy makers in the Greater Phoenix region endeavor to increase social and economic opportunity for all people in the region. Moreover, as more people in the region experience upward social mobility, the region experiences an increase in overall economic prosperity. Understanding if a mal distribution of educational resources at the K-12 level in Maricopa County has impeded upward social mobility and overall economic development in the region can help policy makers choose an optimal educational public policy, which ultimately will benefit both the students and the region as a whole. Alternatively, if no relationship is found, then policy makers can

seek out alternative relationships to help elucidate as to why educational outcomes and social mobility are less than optimal in the region.

Summary

This chapter presented the research problem, which is to explore the relationship between per pupil funding at the secondary level in Maricopa County K-12 public schools and student preparedness at the postsecondary level, specifically the Maricopa County Community College District. Definitions of terms, delimitations, limitations, assumptions, and the significance of the study were also provided.

CHAPTER 2

LITERATURE REVIEW

Introduction

This review of the literature is intended to examine the issues associated with per pupil expenditure at the secondary level and student under preparedness and the post-secondary level. These include social mobility in the United States, meritocracy, higher education as a conduit for social mobility, declining role of higher education in promoting equal opportunity, developmental education, testing and racial bias, local control of education, K-12 financing in Arizona, educational policy stability, and educational policy transformation.

Social Mobility

The terms social mobility, upward mobility, and intergenerational income mobility are sometimes used interchangeably, and explain a child's chance of moving up in their income distribution relative to her or his parents (Chetty, Hendren, Kline, Saez, & Turner, 2014). This phenomenon takes its place as the core component of the "American Dream." Social mobility is an issue that receives frequent attention from the national press. For example, Fareed Zakaira asks in his November 2011 article for Time Magazine: "What Ever Happened To Upward Mobility?" Zakaria asserts that upward mobility has been declining in the United States, and he discusses upward mobility in the context of the Great Recession and income inequality; asserting that social mobility has declined and the great recession has exacerbated that trend. Even with frequent attention in the media, scholars continue to debate whether or not social mobility has declined in recent decades. The core question surrounding this debate is whether or not the United

States is a less economically mobile society than it once was. Studies have shown that social mobility is less likely across generations than popularly believed (Mazumder, 2005). Some researchers have found that social mobility has declined in recent decades. For instance, Aaronson and Mazumder (2007) use an intergenerational elasticity model to measure how economic differences between families persist over time. Their model shows that intergenerational mobility has fallen in recent decades. Others researchers have found that social mobility has remained relatively stable over the past forty years. Chetty et al., (2014) find that their ranked-based measures of intergenerational mobility have not changed significantly over time (the correlation between parent and child income percentile ranks, the probability that a child reaches the top fifth of the income distribution conditional on her parents' income quintile, and for children born after 1986, the correlation between parent income ranks and children's college attendance rates). They find that the probability that a child reaches the top fifth of the income distribution given parents in the bottom fifth of the income distribution is 8.4% for children born in 1971, compared with 9.0% for those born in 1986.

Although differing opinions exist on social mobility frequency, researchers do almost universally find that income inequality has increased over the past forty years (Mazumder, 2005; Aaronson & Mazumder, 2007; Corak, 2013; Chetty et al., 2014). A powerful analogy is one of visualizing income distribution as a ladder with every step as the next income percentile, the steps have grown further apart (increased inequality), but children's chances of climbing from lower to higher has not changed as social mobility has remained stable (Chetty et al., 2014). Alan Krueger (2012) has dubbed this the "Great Gatsby Curve," in which he uses the Gini Coefficient, a measure of inequality and

intergenerational elasticity of income to show that there is a positive relationship between inequality and social mobility. That is, the more inequality a country has, the less social mobility it will have. Moreover, the rise of inequality the past few decades likely is a precedent to less social mobility in the future in the United States. Educational attainment is one of the primary predictors of social mobility, and when the United States has had success in social mobility it is largely a consequence of individuals acquiring higher education credentials in excess of their parents.

Meritocracy

The idea that opportunity in the United States is a function of ones own merit, and that merit determines individual success is a core value of American ideology. Individual merit encompasses things like work ethic, integrity, moral character, perseverance, ability, and attitude. Hence, if one is willing and able then he or she can "get ahead". However, research indicates that that meritocracy is a myth.

> In *The Meritocracy Myth*, we do not suggest that "merit" is a myth. Rather, we argue that meritocracy the idea that societal resources are distributed exclusively or primarily on the basis of individual merit is a myth. It is a myth because of the combined effects of non-merit factors such as inheritance, social and cultural advantages, unequal educational opportunity, luck and the changing structure of job opportunities, the decline of self-employment, and discrimination in all of its forms (McNamee & Miller, 2009, 27).

Fundamentally, the assertion that resource distribution is a function of individual merit is a myth, and one of the basic reasons is unequal educational opportunity, among

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others. In the United States, education has been a conduit for social mobility, however, for a variety of reasons, education as a conduit for social mobility has had unequal success in the United States.

Higher Education as a Conduit for Social Mobility

The expansion of higher education throughout the twentieth century in the United States and the rest of the industrialized world resulted in opportunity for upward social mobility. Higher education is a force in practically every society, and academic institutions have met severe challenges with success (Altbach, 1999). Colleges and universities are at the center of today's knowledge-based economies, and the postsecondary system has provided access to unprecedented numbers of students (Altbach, 1999). With more than 100 million students enrolled worldwide, higher education has moved from an elite enterprise to a mass phenomenon (Altbach, 1999). Higher education in the United States and elsewhere can boast considerable accomplishments. These include massification and differentiation; the former expanded higher education to the masses rather than solely elites, the latter established a tiered university system to accommodate the expansion. Higher education produces research, which is the driver of innovation, modern advances, and technology. Higher education also allows for social mobility—students can become upwardly mobile and make life better for themselves and their families. Finally, higher education is now an international phenomenon with millions of students enrolled worldwide. Higher education has adapted to new circumstances. Differentiated academic systems have joined the elite universities, and the curriculum has been broadened (Altbach, 1999).

In particular, community colleges have a massive impact on the national economy and on the ability of individuals to become upwardly mobile. The impact of community colleges on the national economy, and the return on investment of the key stakeholder's (students, society, and tax payers) was the subject of research by Economic Modeling Specialists International in an economic impact analysis entitled, "Where Value Meets Values: The Economic Impact of Community Colleges." Key findings in their analysis released in February 2014 include:

- The total effect of America's community colleges on the U.S. economy in 2012 was 809 billion, equal to 5.4% of the nation's gross domestic product (GDP).

- Society as a whole in the U.S. will receive a present value of 1.1 trillion in added income over the course of the students' working careers. Society will also benefit from 46.4 billion in present value social savings related to reduced crime, lower welfare and unemployment, and increased health and well-being across the nation.

- For every dollar that federal, state, and local taxpayers spent on America's community colleges in 2012, society as a whole will receive a cumulative value of $25.90 in benefits, for as long as the colleges' 2012 students remain active in the U.S. workforce.

- Federal, state, and local taxpayers in the U.S. paid 44.9 billion to support the operations of America's community colleges during the analysis year. The present value of the added tax revenue stemming from the students' higher lifetime incomes and the increased output of businesses amounts to

285.7 billion in benefits to taxpayers. Savings to the public sector add

another 19.2 billion in benefits due to a reduced demand for government

funded social services in the U.S.

The Center for Analysis of Postsecondary Education and Employment in the 2014

report, "The Medium-Term Labor Market Returns to Community College Awards:

Evidence from North Carolina" examined labor market gains for first-time college

students who enrolled in the North Carolina Community College System in 2002-2003;

they also explore returns to credit accumulation, subject field, and transfer. The analysis

included medium term returns for graduates with returns for those who earned college

credit but did not graduate. "Our analysis shows that students' earnings grew rapidly in

the years immediately after college, and even nine years after initial enrollment, the

returns to associate degrees and bachelor's degrees were still increasing…From the

student perspective, the completion of an associate degree appears to be a very high-

yielding investment" (Belfield, Liu, & Trimble, 2014, p. 23). The return on investment

for community college students who matriculate is tremendous. Other benefits of

community college success include, but are not limited to, the reduction in risk of job loss

for the individual and lower social welfare spending for local, state, and the federal

government.

There is no question that a college degree yields a robust return on investment in

terms of economic benefit. However, some researchers assert that the economic benefits

of higher education are contingent upon placement within the higher education system

and socio-economic status. Differentiation has implications for the reproduction of

inequality to the extent that the individual placement in the higher education system—the

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type of college education received—depends on socio-economic origins and, in turn, shapes the economic outcomes of college graduates (Torche, 2011).

Challenges for Higher Education as a Conduit for Social Mobility

Even with all of the apparent successes of higher education many questions persist. Some scholars question whether the expansion of higher education will reduce class inequalities. Indeed some scholars expect existing class inequalities to be maintained or perhaps even exacerbated through higher education expansion (Jencks and Riesman, 1968). Researchers argue that massification and differentiation require additional examination as they may exacerbate inequality by expanding opportunities disproportionally for the privileged rather than reduce inequality by providing more opportunities for disadvantaged persons (Arum, Gamoran, & Shavit, 2007). Some researchers also argue that market based systems of higher education—like the United States—do not promote equal opportunity or additional opportunities for disadvantaged persons (Arum, Gamoran, & Shavit, 2007). A fundamental assertion of this narrative is that higher education stratification has adversely affected minority populations disproportionally. Minorities have traditionally been denied access and have underperformed in higher education as a result of societal, institutional, and cultural forces (Arum, Gamoran, & Shavit, 2007).

Differentiation and Stratification

A central question is whether higher education reduces inequality by providing more opportunities for disadvantaged persons, or does it exacerbate inequality by expanding opportunities disproportionally for the privileged? Social control theorists argue that a differentiated system of higher education preserves the elite status of those

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born into privilege (Arum, Gamoran, & Shavit, 2007). These arguments maintain that the expansion of higher education systems in the United States and other countries did not result in a reduction of educational inequalities.

Proponents of the inclusion theory point out that expansion of higher education in industrialized countries has resulted in enhanced opportunities that previously did not exist for millions of people. Conversely, many argue that differentiation in higher education results in diversion—a process in which the lower class is diverted to less prestigious higher education institutions and therefore are diverted to positions of lower status.

> From a theoretical point of view most important, the structure of higher education has been transformed as it has expanded. Particularly, in economically advanced countries, expansion has been accompanied by differentiation…Thus, at the same time that members of the working class found new opportunities to enroll in higher education, the system was being hierarchically differentiated so that these new opportunities may have had diminished value (Arum, Gamoran, & Shavit, 2007).

That is, the differentiated system of higher education in large part maintains existing class inequalities.

Role of Higher Education in Promoting Equal Opportunity

Some researchers argue that higher education has begun to play a lessor role in promoting equal opportunity in the United States. Starting in the 1980s several trends converged that made higher education less attainable to the poorest students. These

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include, but are not limited to, rising tuition, changes in federal student aid programs, and the decline of affirmative admissions.

But beginning in the 1980s and accelerating in the 1990s, college opportunities for low-income and disadvantaged people have declined. A combination of rising tuition, changes in the federal student aid programs, and new institutional admissions procedures have conspired to tighten access to public colleges. Looking to the future, these trends are poised to accelerate (Mumper, 2003, p.98).

The Federal Pell Grant program provides need-based grants to low-income undergraduate students. Initiated by the Higher Education Act of 1965, the Pell Grant does not have to be repaid. When it was introduced the Pell Grant purchased 78% of the annual cost of one year at an average priced public university. However, Pell Grant funding has lagged behind the pace of tuition inflation (Mumper, 2003). This has an adverse effect on the ability of low-income families to attain a college education. In the 1970s and 1980s federal student loan policy began to shift toward subsidized loans for the middle class, which thwarted efforts to increase Pell Grant funding for the poor (Mumper, 2003). The average Pell Grant per recipient has remained relatively steady since 1975, a figure just below $3000 (Retrieved from http://www.collegeboard.com). During the same time period, the average cost of a four-year public university has quadrupled (Retrieved from http://www.collegeboard.com).

In the 1960s and 1970s affirmative admission policies were enacted to promote higher education equal opportunity for minority groups. However, courts have ruled in the state of Texas that institutions of higher education cannot give any consideration to race or ethnicity for the purposes of achieving a diverse student body. The state

institutions of higher education have applied this ruling to all admission and scholarship applications. Additionally, the state of California passed Proposition 209, which prohibited granting preferential treatment on the basis of race, sex, color, ethnicity, or national origin. These states are an example of how admission and attendance to institutions of higher education has become much more difficult for minorities (Mumper, 2003). Generally, financial aid has been refocused toward increasing the level of funding for tax credits and merit scholarships. Students from low-income families will face higher tuition, no preferential admission standards, more loans, fewer grants, and increased competition for admission—federal and state policy makers have instituted these changes in the past few decades (Mumper, 2003).

Challenges at Community Colleges

Students from low-income families represent a large portion of the student body at community colleges, in large part from the aforementioned shift in financial aid and admissions policies at four-year colleges and universities. "The community college represents the only form of universal access to education, and is purported to be the gateway to low-income and minority students' realization of the "American Dream." But that dream is growing more and more elusive for a substantial number of people" (Keene, 2008, p. 3). Barriers to higher education are especially burdensome for the urban and rural poor because they impact these demographic groups at a significantly higher rate than wealthier suburbanites. Wellman & Soares (2011) discuss systemic problems in America's education system:

Our country's educational attainment problem is embedded in the leaky educational pipeline, beginning with the poor transition of students across

classrooms from kindergarten to 12th grade and then on to and through

postsecondary education to credentials, degrees, and jobs. In addition to that,

policymakers also need to focus on the root causes on the declining rates of

educational attainment among younger adults, including: equity gaps, or the

chronically lower performance at all levels of education for the rapidly growing

portions of the population who are low income or Latino; the decline in the

proportion of students who complete high school; low college-going rates among

many recent high school graduates; and the low success rates in technical-

vocational education and in community colleges (Wellman & Soares, 2011, p.3).

Additionally, barriers adversely impact adult students whose skills and training are an

integral part of social mobility and economic development. One of the major barriers to

successful outcomes for community college students is developmental education.

Developmental Education

One of the most difficult issues facing community colleges in the United States is

developmental education. Developmental education students are those who must take

remedial coursework upon the onset of their college career because they are under

prepared for college level coursework. Developmental education coursework occurs

primarily in the subject areas of Mathematics, English, Reading, and English as a Second

Language (ESL). Developmental education students are systemically different from

community college students who do not remediate in gender, ethnicity, first-generation

status, academic preparation, and experiences during high school and delayed college

entry (Crisp, 2014).

In a 2010 issue brief for the Community College Research Center, Thomas Bailey and Sung Woo Cho find that 60 percent of incoming community college students nationwide are referred to at least one developmental course (Bailey, T. & Woo Cho, S., 2010). Since the large majority of incoming community college students are high school graduates, this is indicative of a systemic problem with student under preparedness. Less than one quarter of community college students who enroll in developmental education complete a degree or certificate within eight years of enrollment in college (Bailey, T. & Woo Cho, S., 2010). In comparison, almost 40 percent of community college students who do not enroll in any developmental education course complete a degree or certificate in the same time period (Bailey, T. & Woo Cho, S., 2010). Developmental education is costly; states spend tens of millions of dollars on remediation, and rough national estimates suggest that well over $1 billion a year are spent on these services (Bailey, T. & Woo Cho, S., 2010). Hence, developmental education is costly and not very effective.

Testing and Racial Bias

The current reform movement in education that requires testing at virtually every level has been growing for thirty plus years. The testing movement has been and continues to be extremely controversial. There is a consistent performance gap at the aggregate level between minority students, particularly African American students, and their White counterparts. Education reformists call for educating all students to meet rigorous academic standards to provide equity and excellence in education. However, critical race theorists demonstrate that standardized testing became popular in the modern era as a response to the Supreme Court's landmark Brown versus Board of Education decision. "The high stakes tests that are used in growing numbers of elementary and

secondary schools are an extension of the tracking programs that were broadened after *Brown* and of the state competency tests that were first required in the south in the 1970's. By 1996, 18 states required students to pass a high stakes test to earn a diploma. Thirteen of these states required segregation before 1954 and four others—New York, New Jersey, Nevada, and Hawaii—have large African American populations" (Baker, 2001). In higher education, southern officials first required that applicants submit standardized tests after African American students sought access to professional schools. "Following what had become, by the 1950's a familiar pattern, educational authorities responded to court ordered desegregation by requiring-for the first time-that undergraduate applicants submit standardized test scores. After blacks applied for admission to the University of Georgia, the State Board of Regents amended admissions requirements to the university system and began requiring that all applicants to state colleges 'take appropriate intelligence and aptitude tests'" (Baker, 2001). Critical theorists point out that an increasing reliance on standardized testing will only widen the achievement gap and the associated distance between the advantaged and disadvantaged. Moreover, critical theorists assert that standardized testing is an insidious response to desegregation.

Local Control of Education (K-12 Emphasis)

Horace Mann, widely considered the father of American education, spearheaded the common school movement. "The new Secretary's first efforts were directed toward the education of the public, bringing home to the citizenry a desire for the development of a deeper interest in popular education" (Mudge, 1937). The common school movement insured that every child could receive a basic education, which would be funded through

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local taxes. Mann believed that the stability of society, both politically and socially, was contingent upon education: basic literacy and the inculcation of citizenship in terms of common public ideals. He declared: "Without undervaluing any other human agency, it may be safely affirmed that the common school may become the most effective and benignant of all forces of civilization" (Messerli, 1972). In the view of Mann, public education was the institution that would insure democratic participation and enhance society's well-being. He stated: "A republican form of government, without intelligence in the people, must be, on a vast scale, what a mad-house, without superintendent or keepers, would be on a small one" (Messerli, 1972). Mann's championing the common school was born out of his belief that an orderly, intelligent, democratic republic must have an educated citizenry. In a critical analysis of the common school ideal Joel Spring writes: "The official ideology of the common school might be considered essentially conservative because it did not call for any basic changes in the economic and political structure of society but placed its hope for social improvement on the education of the individual. In fact, the official ideology of the common school accepted the existing political and economic organization of society, and held that any problems were the result of individual deviance or failure" (Spring, 2011, p. 88).

As governor of Virginia, Thomas Jefferson proposed centralizing a system of funding for education that would have had the House of Burgesses pay for all common schools in Virginia (Hickrod, 2006). The revolutionary war interrupted Jefferson's education agenda, and when the State of Virginia implemented an educational finance system in the revolutionary era, funding occurred at the local not the state level. Jefferson said this would not work, the rich localities would have adequate resources and

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good schools, and the poor localities would not have adequate resources and poor schools (Hickrod, 2006).

Heinz-Dieter Meyer (2008) asserts that the institutions of localized education are "outmatched by a complex and, for all practical purposes, national system of public education that answers to a centralized bureaucracy rather than local democratic control and that produces and reproduces social inequality" (Meyer, 2008, p.831).

> Local control means local funding. While this was no serious problem in the rural
> and agricultural America where social inequalities were limited, today the
> resources that districts have available differ sharply. The reason for this
> inequality is that school funding is based on the property tax (real estate tax). The
> poorer a district, the less valuable its real estate, the lower the revenue generated
> by the property tax, the less money there is for schools, and the more a
> community depends on supplemental funding from state and federal government.
> The result is an education system that makes a student's place of residence a
> major factor in the quality of their education (Meyer, 2008, p.833).

Meyer's asserts that local control of education and related resource allocation engenders and reproduces inequality. That is, local control of education and related mal distribution of resources is a contributing factor to upward social mobility stagnation.

Matt Miller (2008) writing for the Center for American Progress asserted that local control of is "killing American education." First and foremost, Miller cites financial inequality as the primary problem with local control. Local control of education means local funding of education. Property tax, as the primary contributor to school funding, results in inequity among school districts as a result of variation in property

values. "As it turns out, spending gaps between states (as opposed to within states) actually account for the lion's share of financial inequity across the nation. Even after adjusting for regional cost differences and varying student needs, one study shows that the top 10 states ranked by per-pupil spending invest nearly 50 percent more per student than the lowest ranking 10, a difference of more than $2,500 per pupil" (Miller, 2008, p. 16). Inequity in school funding is a major public policy problem in the United States regarding its education system.

K-12 Financing in Arizona

The constitution of the state of Arizona Article 11, Section 2 requires a "general and uniform public school system, which system shall include: 1.Kindergarten schools, 2. Common schools, 3.High schools, 4.Normal schools, 5.Industrial schools, 6.Universities, which shall include an agricultural college, a school of mines, and such other technical schools as may be essential, until such time as it may be deemed advisable to establish separate state institutions of such character" (ARS, Article 11, Section 2). The words 'general' and 'uniform' provide no guarantee of an adequate or equitable school system. Indeed many states, as in Arizona, embrace local control to such a degree that there are wide disparities in adequacy and equity. This manifests itself in various ways, but seems accentuated with regard to funding. "The chronicle of the school funding cases in Arizona is not one of rapid steps towards this definition of the good society. It is a tale of legislative avoidance, lip service, passive resistance, outright antagonism, and inadequate funding" (First, 2007, p. 373).

An equalization formula comprises the foundation of Arizona's school finance system. This formula is referred to as the foundation system, which consists of school

district budget limits and a property tax called the qualifying tax rate (QTR) (Olson, 2009). The equalization base is the sum of the funding guaranteed to a school district based on the number of students enrolled. The equalization base consists of three components. The first component is the revenue control limit (RCL) or the district support level (DSL); the RCL is the largest of the three components. The RCL accounts for a school district's expenditure amount related to maintenance and operations (mainly employee salaries and benefits). A school district applies a convoluted weighted student count to apply the RCL formula. The next largest component is the capital outlay revenue limit (CORL). It is the second per pupil funding formula, which is financed by local property taxes, and all state taxpayers through equalization assistance. However, statutes allow school districts to transfer any portion of their CORL to the district's maintenance and operations fund. The final piece of the equalization base is the soft capital allocation, which is also funded through the legislature and the district's average daily membership (ADM). This soft capital cannot be transferred and is allocated toward short-term capital expenses such as computers, lab equipment, and library resources (Olson, 2009). In Arizona, the QTR and state aid make up the equalization formula designed to equalize per pupil funding. However, there are a myriad of exceptions that allow school districts to budget beyond the equalization base. These include desegregation, excess utilities, carry forward, small school adjustment, dropout prevention, debt service, performance incentive, and registered warrants. All of these provisions allow school districts to spend in excess of the equalization formula without voter approval. School districts can also seek voter approval to spend in excess of the equalization formula including maintenance and operations overrides, K-3 overrides,

capital outlay overrides, and bonds/debt service. "The equalization base has effectively

equalized spending in approximately half of Arizona's school districts. But nearly as

many districts need significantly greater amounts" (Olson, 2009, p. 31). Arizona's

equalization formula results in inequity in school district resource allocation.

In the 2015-2016 State of Arizona budget, K-12 education funding (district

additional assistance dollars) was reduced by over 113 million dollars. Moreover, it was

mandated that these cuts come from non-classroom spending. The budget declares that it

is the intent of the governor to increase the total percentage of classroom spending. The

2015-2016 state budget drastically reduces K-12 capital expenditure in the State of

Arizona (Retrieved from http://www.arizonaea.org).

Educational Policy Path Dependency

The concept of path dependency implies that events or occurrences at an early

point in time will affect the outcome of events occurring at a later point in time (Pierson,

2004). It is argued by path dependency theorists that the critical feature of a historical

process that generates path dependency is positive feedback or self-reinforcement.

Therefore, once a course of action is taken—a step in that direction—it is not easy to

reverse course. Paul Pierson (2004) explains path dependency and its relation to positive

feedback in *Politics in Time*. He states, "In the presence of positive feedback, the

probability of further steps along the same path increases with each move down that path.

This is because the relative benefits of the current activity compared with once possible

options increases over time. To put it a different way, the costs of switching to some

previously plausible alternative rise" (Pierson, 2004, p. 21). The theory of path

dependency helps us explain institutional and policy stability. According to path

dependency, once a direction or course of action is embarked upon redirection is very difficult. Positive feedback reinforces the path that is already underway. The theory of path dependency is relevant concerning local control of education in Arizona (and the United States) because once it was adopted as a policy it became a fixture of public policy—a thorn in the side of adequate and equitable resource allocation in public education.

Systems Approach to Educational Policy Transformation

Educational institutions in Arizona must undergo systemic operational reform to become successful and ensure desired outcomes. The patchwork of solutions being utilized nationwide and in Arizona are an inadequate response to the state's educational crisis. In *Implementing Change: Patterns, Principles, and Potholes*, Hall and Hord (2011) cite three major elements for systemic reform: "First was unifying the vision and goals of what schools should be like; second, establishing a coherent system of instructional guidance (knowledge, skills, capacities, curriculum, materials, professional development, accountability assessment) aligned with goals; and third, restructuring the governance system (state develops outcomes and accountability, schools determine means to achieve outcomes)" (Hall & Hord, 2011, p. 195). Analyzing a state or regional school system systemically is crucial, and ultimately will lead to necessary systemic change because the system view will help prevent parochial and arbitrary actions associated with ideologues and special interests.

Jenlink, Reigeluth, Carr, and Nelson offer a clear definition of system change when they state that it "recognizes the interrelationships and interdependencies among the parts of the educational system, with the consequence that desired changes in one part

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of the system are accompanied by changes in other parts that are necessary to reach an idealized vision of the whole" (Hall and Hord, 2011, p. 194). Problems in education must be viewed in the context of solving societal public policy problems and must be viewed in context with other public policies. A systemic approach in Arizona and/or Maricopa County coupled with the aforementioned education reform is a way to bring about holistic educational reform and beneficial outcomes for students, society and economy.

Systemic change theory also emphasizes the importance of all levels working systemically—at the state, district, school, and classroom level. Hall and Hord (2011) describe the levels as concentric circles that provide expectations and demands that influence student achievement. Often in school districts this is not the case particularly in the aforementioned patchwork of existing solutions wherein there are many types of schools with varied organizations and leadership reporting to various entities, as well as convoluted financing mechanisms. Finally, the theory emphasizes the systemic use of competencies to insure success. These include: creating coherence, collecting and using data, continuous professional learning, building relationships, and responding to changing conditions (Hall & Hord, 2011).

Summary

This review of the literature examined the issues associated with per pupil expenditure at the secondary level and student under preparedness and the post-secondary level. These include social mobility in the United States, meritocracy, higher education as a conduit for social mobility, declining role of higher education in promoting equal opportunity, developmental education, testing and racial bias, local control of education,

K-12 financing in Arizona, educational policy stability, and educational policy

transformation.

CHAPTER 3

METHODOLOGY

Introduction

The purpose of this chapter is to describe the methodology utilized to explore the research questions. In particular, this chapter presents a description of the research design, procedures, and methodology used in this study.

Restatement of the Research Problem

As stated in Chapter 1, it is imperative to understand the relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the Maricopa Community College District, if we seek to improve educational and thus social mobility outcomes. This relationship is vitally important if education is to be utilized as a conduit for social mobility.

Restatement of the Research Question and Hypotheses

This study explores the following research questions:

1. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the Maricopa County Community College District?

Ho1: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the Maricopa County Community College District.

H1: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the post- secondary level, specifically at the Maricopa County Community College District.

2. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the postsecondary level, specifically at the Maricopa County Community College District?

Ho2: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the postsecondary level, specifically at the Maricopa County Community College District.

H2: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the post- secondary level, specifically at the Maricopa County Community College District.

3. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by gender at the postsecondary level, specifically at the Maricopa County Community College District?

Ho3: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under

preparedness by gender at the postsecondary level, specifically at the Maricopa County Community College District.

H3: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by gender at the post- secondary level, specifically at the Maricopa County Community College District.

4. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the postsecondary level, specifically at the Maricopa County Community College District?

Ho4: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the postsecondary level, specifically at the Maricopa County Community College District.

H4: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the post- secondary level, specifically at the Maricopa County Community College District.

Research Design and Procedures

This study utilized a quasi-experimental design, which will allow the researcher to study the relationship of K-12 school district per pupil funding and student under preparedness at the Maricopa County Community Colleges, where the assignment of individuals to either a control or experimental group is impossible (Nachmias &

Nachmias, 1999). This study also utilized a correlational design as it explored the co-variation of variables of interest—per pupil funding at the K-12 level and student under preparedness at the postsecondary level.

Population and Sample

The population of this study consists of Maricopa County Community College District students who attended a Maricopa County public K-12 school district, and who took placement testing at MCCCD for course placement during the fall 2013 semester. Purposive sampling was used to identify students who currently attend MCCCD and took placement tests to enter MCCCD during fall 2013. Additionally, nine of the ten Maricopa County Community College institutions were chosen to provide variation in student socio-economic status, ethnicity, and gender. These include Chandler-Gilbert Community College, Estrella Mountain Community College, Gateway Community College, Glendale Community College, Mesa Community College, Paradise Valley Community College, Phoenix College, Scottsdale Community College, and South Mountain Community College. Rio Salado College was not included since it is exclusively an online institution.

The criteria included:

1) A public K-12 district in Maricopa County whose students graduated with a high school diploma and entered MCCCD and for which per pupil expenditure data was available.

2) Available student test scores (ACCUPLACER) in MCCCD Student Information System Data Warehouse.

3) Maricopa County K-12 public school district with available per pupil expenditure data.

4) Dual Enrollment/Concurrent high school students were excluded.

5) ESL (English as a Second Language) Students were excluded.

6) Students with disabilities were excluded.

The rationale for selecting Maricopa County public K-12 districts is to strategically choose a geographic location wherein the student data (placement testing) is available at the postsecondary level (MCCCD) and the K-12 per pupil expenditure district data is concurrently available. These criteria will enable the researcher to determine if a link exists between K-12 per pupil expenditure and student under preparedness at the postsecondary level.

Sources of Information

Information for this study was accessed from two existing sources. The first source is the "Arizona School District Spending (Classroom Dollars) Fiscal Year 2013" from the State of Arizona Office of the Auditor General. The report details expenditure of every public K-12 school district in the state of Arizona including disaggregating by instructional and non-instructional expenditure. The data contained in this report is an integral part of this study, as it allowed the researcher to know the funding level of every public school district. Additionally, this report contains a letter grade for every school, which will serve as a measure of institutional effectiveness. The letter grade was used as an interaction with per pupil funding to form one of two independent variables. The other independent variable was per pupil funding without the interaction with high school letter grade. The State Auditor utilizes quality control measures insuring reliability and validity

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of the data contained in this yearly report required by Arizona Revised Statutes (41-1279.03).

The second source of information is the Student Information System (SIS) at Maricopa County Community College District. MCCCD's data warehouse was utilized to access student scores on the ACCUPLACER placement tests to determine whether or not students tested into developmental education. These tests are required of new students in three subject areas—English, Mathematics, and Reading. The ACCUPLACER test is commonly utilized at colleges and universities across the nation for proficiency testing. Testing into developmental education was used as a proxy for student under preparedness at the postsecondary level. Student's Pell grant status was obtained from Maricopa County Community College District's data warehouse to serve as a proxy for socio-economic status.

Data Collection and Data Analysis Procedures

Student data will be accessed from the Maricopa County Community College SIS. This student data will include ACCUPLACER test scores to determine whether ort the student placed into developmental education. Additional data will include both the high school district attended as well as the high school attended, ethnicity, gender, and Pell status. The information will be coupled with per pupil expenditure by high school district from the Arizona Auditor's report as well as the Arizona Department of Education high school letter grade. Inferential statistical methods will be utilized for data analysis.

Two Models

This analysis utilized two separate independent variables in order to assess the relationship between per pupil expenditure at the secondary level and student

preparedness at the post-secondary level. The first model used per pupil quartiles (expenditure) as the independent variable and student preparedness as the dependent variable. The second model used an interaction between Arizona Department of Education high school letter grade and per pupil expenditure (per pupil quartiles) as the independent variable and student preparedness as the dependent variable. Two models were utilized because: a) Model 1 tests the research question in its purest form; that is it utilized per pupil quartiles (expenditure) as the independent variable and student preparedness as the dependent variable; and b) Model 2 sought to introduce institutional effectiveness as an interaction with per pupil funding as the independent variable. The Arizona Department of Education evaluates every school on a yearly basis and assigns every school a letter grade ranging from A to F. The importance of utilizing the interaction with Arizona Department of Education high school grade is driven by a desire to include both resource allocation *and* institutional effectiveness in the independent variable. This high school letter grade is used as an interaction with per pupil spending by district (transformed into quartiles) as the independent variable with the dependent variable being student preparedness at the post- secondary level.

Table A: Data Match Up Table

Hypothesis	Sources of Data	Data Analysis Procedures
H1: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 school districts and student under preparedness at the post-secondary level, specifically at the Maricopa Community College District.	Analysis of per pupil expenditure at Maricopa County public secondary schools on student preparedness at the postsecondary level, specifically the Maricopa County Community College District Maricopa Community College District Student Information	Inferential Statistics: Logistic (Binary) Regression Logistic regression is a form of regression, which is used when the dependent is a dichotomy and the independents are of any type. Logistic regression can be used to predict a dependent variable on the

	System; State of Arizona Public School District Expenditure Report; U.S. Census	basis of independents and to determine the percent of variance in the dependent variable explained by the independents; to rank the relative importance of independents; to assess interaction effects; and to understand the impact of covariate control variables.
Ho1: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 school districts and student under preparedness at the post- secondary level, specifically at the Maricopa Community College District.	<u>Analysis of per pupil expenditure at Maricopa County public secondary schools on student preparedness at the post-secondary level, specifically the Maricopa County Community College District</u> Maricopa Community College District Student Information System; State of Arizona Public School District Expenditure Report; U.S. Census	<u>Inferential Statistics: Logistic (Binary) Regression</u> Logistic regression is a form of regression, which is used when the dependent is a dichotomy and the independents are of any type. Logistic regression can be used to predict a dependent variable on the basis of independents and to determine the percent of variance in the dependent variable explained by the independents; to rank the relative importance of independents; to assess interaction effects; and to understand the impact of covariate control variables.
H2: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 school districts and student under preparedness by ethnicity at the post-secondary level, specifically at the Maricopa Community College District.	<u>Analysis of per pupil expenditure at Maricopa County public secondary schools on student preparedness at the postsecondary level, specifically the Maricopa County Community College District</u> Maricopa Community College District Student Information System; State of Arizona Public School District Expenditure Report; U.S. Census	<u>Inferential Statistics: Logistic (Binary) Regression</u> Logistic regression is a form of regression, which is used when the dependent is a dichotomy and the independents are of any type. Logistic regression can be used to predict a dependent variable on the basis of independents and to determine the percent of variance in the dependent variable explained by the

		independents; to rank the relative importance of independents; to assess interaction effects; and to understand the impact of covariate control variables.
Ho2: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 school districts and student under preparedness by ethnicity at the post-secondary level, specifically at the Maricopa Community College District.	Analysis of per pupil expenditure at Maricopa County public secondary schools on student preparedness at the post-secondary level, specifically the Maricopa County Community College District Maricopa Community College District Student Information System; State of Arizona Public School District Expenditure Report; U.S. Census	Inferential Statistics: Logistic (Binary) Regression Logistic regression is a form of regression, which is used when the dependent is a dichotomy and the independents are of any type. Logistic regression can be used to predict a dependent variable on the basis of independents and to determine the percent of variance in the dependent variable explained by the independents; to rank the relative importance of independents; to assess interaction effects; and to understand the impact of covariate control variables.
H3: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 school districts and student under preparedness by gender at the post-secondary level, specifically at the Maricopa Community College District.	Analysis of per pupil expenditure at Maricopa County public secondary schools on student preparedness at the postsecondary level, specifically the Maricopa County Community College District Maricopa Community College District Student Information System; State of Arizona Public School District Expenditure Report; U.S. Census	Inferential Statistics: Logistic (Binary) Regression Logistic regression is a form of regression, which is used when the dependent is a dichotomy and the independents are of any type. Logistic regression can be used to predict a dependent variable on the basis of independents and to determine the percent of variance in the dependent variable explained by the independents; to rank the relative importance of independents; to assess interaction effects; and to

		understand the impact of covariate control variables.
Ho3: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 school districts and student under preparedness by gender at the post-secondary level, specifically at the Maricopa Community College District.	Analysis of per pupil expenditure at Maricopa County public secondary schools on student preparedness at the post-secondary level, specifically the Maricopa County Community College District Maricopa Community College District Student Information System; State of Arizona Public School District Expenditure Report; U.S. Census	Inferential Statistics: Logistic (Binary) Regression Logistic regression is a form of regression, which is used when the dependent is a dichotomy and the independents are of any type. Logistic regression can be used to predict a dependent variable on the basis of independents and to determine the percent of variance in the dependent variable explained by the independents; to rank the relative importance of independents; to assess interaction effects; and to understand the impact of covariate control variables.
H4: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 school districts and student under preparedness by socio-economic status at the post-secondary level, specifically at the Maricopa Community College District.	Analysis of per pupil expenditure at Maricopa County public secondary schools on student preparedness at the postsecondary level, specifically the Maricopa County Community College District Maricopa Community College District Student Information System; State of Arizona Public School District Expenditure Report; U.S. Census	Inferential Statistics: Logistic (Binary) Regression Logistic regression is a form of regression, which is used when the dependent is a dichotomy and the independents are of any type. Logistic regression can be used to predict a dependent variable on the basis of independents and to determine the percent of variance in the dependent variable explained by the independents; to rank the relative importance of independents; to assess interaction effects; and to understand the impact of covariate control variables.
Ho4: There is not a statistically significant	Analysis of per pupil expenditure at Maricopa	Inferential Statistics: Logistic (Binary)

relationship between per pupil expenditure in Maricopa County K-12 school districts and student under preparedness by socio-economic status at the post-secondary level, specifically at the Maricopa Community College District.	County public secondary schools on student preparedness at the post-secondary level, specifically the Maricopa County Community College District Maricopa Community College District Student Information System; State of Arizona Public School District Expenditure Report; U.S. Census	Regression Logistic regression is a form of regression, which is used when the dependent is a dichotomy and the independents are of any type. Logistic regression can be used to predict a dependent variable on the basis of independents and to determine the percent of variance in the dependent variable explained by the independents; to rank the relative importance of independents; to assess interaction effects; and to understand the impact of covariate control variables.

Inferential Statistics

Logistic regression was utilized to determine if there is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the Maricopa County Community College District. Logistic regression is the optimal methodology for this research endeavor because of the nature of the outcome variable is dichotomous.

Many college outcomes are dichotomous in nature. There are no interval scales to describe such behaviors. Either an individual attends college or not, majors in hard sciences are not, stays or leaves the institution, or obtains a bachelor degree or not…Although several statistical techniques are available, only a few of them conform to the specific dichotomous nature of outcome measures such as enrollment, persistence, and degree attainment. These include structural modeling

for dichotomous dependent variables, log-linear analysis, discriminant analysis, probit regression, and logistic regression (Cabrera, 1994).

The predetermined type I alpha error rate is .05. There were two independent variables tested by utilizing two separate models. The first independent variable is per pupil expenditure in Maricopa County K-12 public school districts. The second independent variable was high school letter grade used as an interaction with per pupil funding. Covariates include socio-economic status, ethnicity, and gender. The dependent variable is student under preparedness at the postsecondary level (dichotomous). The operational definition of student under preparedness will be testing into developmental education at the postsecondary level—specifically the MCCCD. The operational definition of socio-economic status will be federal financial aid (Pell status). A chi-square test will be utilized to insure that the model fits the data as well as a Hosmer-Lemeshow goodness of fit test. The following charts, figures or tables will be included to comprehensively assess the results:

- An overall evaluation of the logistic model

- Goodness of Fit statistics

- Statistical tests of individual predictors

- An assessment of the predicted probabilities

- Classification tables

Assumptions and Limitations

In logistic regression no assumptions are made about the distributions of the independent variables. Moreover, the independent variables should not be highly correlated with one another, as this will cause problems with estimation.

Summary

This chapter sought to describe the methodology utilized to explore the research question. In particular, this chapter presented a description of the research problem, research design, procedures, and methodology used in this study.

CHAPTER 4

RESULTS AND FINDINGS

Introduction

This chapter presents the results and findings of a quasi-experimental and

correlational study exploring the relationship between per pupil funding at the secondary

level and student preparedness at the post-secondary level. The study utilizes data from

the Arizona State Auditor (per pupil expenditure by Maricopa County public high school

district in 2013 and high school grade), as well as student data from the Maricopa County

Community College District (placement tests results, Pell status, and demographics).

Purpose

The purpose of this study was to understand the relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student under

preparedness at the postsecondary level, specifically at the MCCCD. This relationship is

vitally important if education is to be utilized as a conduit for social mobility.

Additionally, this study advocates policy transformations aimed at equalizing opportunity

for Maricopa County students to make education an avenue for social mobility.

Sample

The sample is made up of a total of 9,534 students enrolled in fall 2013 from the

following Maricopa County Community College District institutions: Chandler-Gilbert

Community College, Estrella Mountain Community College, Gateway Community

College, Glendale Community College, Mesa Community College, Paradise Valley

Community College, Phoenix College, Scottsdale Community College, and South

Mountain Community College. Rio Salado College was not included since it is exclusively an online institution.

The criteria included:

1) A public K-12 district in Maricopa County whose students graduated with a high school diploma and entered MCCCD and for which per pupil expenditure data was available.

2) Available student test scores (ACCUPLACER) in MCCCD Student Information System Data Warehouse.

3) Maricopa County K-12 public school district with available per pupil expenditure data.

4) Dual Enrollment/concurrent high school students were excluded.

5) ESL (English as a Second Language) Students were excluded.

6) Students with disabilities were excluded.

Table 1 shows the nineteen public school districts in Maricopa County that make up the sample of students who subsequently enrolled at the Maricopa County Community College District in fall 2013 that met the aforementioned criteria and are included in this study; including per pupil expenditure, and the number and percent of students enrolled.

Table 1
High School Districts in the Study

	Per Pupil Expenditure 2013 (Dollars)	Total Students In Study	% Total Students In Study
Agua Fria Union High School District	6753	426	4%
Buckeye Union High School District	7356	149	2%
Cave Creek Unified School District	6901	83	1%
Chandler Unified School District	6644	627	7%
Deer Valley Unified School District	6597	636	7%
Dysart Unified District	6862	369	4%
Fountain Hills Unified District	7596	30	0%
Gilbert Unified District	6791	639	7%
Glendale Union High School District	7879	825	9%
Higley Unified School District	5965	152	2%
Mesa Unified School District	7705	1050	11%
Paradise Valley Unified District	7365	686	7%
Peoria Unified School District	6708	783	8%
Phoenix Union High School District	9578	1375	14%
Queen Creek Unified District	7353	83	1%
Scottsdale Unified District	7570	372	4%
Tempe Union High School District	7239	678	7%
Tolleson Union High School District	5990	543	6%
Wickenburg Unified District	7477	28	0%
		9534	100%

Table 2
District Per Pupil Expenditure (2013)

Descriptive Statistics	*(Dollars)*
Mean	7423
Median	7239
Mode	9578
Std. Deviation	1020
Range	3613
Minimum	5965
Maximum	9578

The minimum per pupil expenditure was 5,965 dollars in 2013, and the maximum

per pupil expenditure was 9,578 dollars in 2013 for a range of 3,613 dollars. The standard

deviation was 1,020 dollars, and the mean was 7,423 dollars for the districts included in this study in 2013 (see Table 2).

An analysis of demographic data shows that a plurality of students in the sample is Hispanic (39.4%), followed by White (38.6%). Additionally, 58.3% of the students in the sample were not college ready; college ready is defined as having placement into college level courses (100 level or above), and not college ready is defined a placement into developmental course work (less than 100 level). A majority of every ethnic group in the sample was not college ready with the exception of Hawaiian's and White's (see Table 3).

Demographic data also shows that a slight majority of students in the sample are male (51%), and a slight minority is female (49%). A majority of both males and females were not college ready (see Table 4).

Table 3
Ethnicity

			College Ready		Total
			No	Yes	
Ethnicity	Native Am	Count	136	51	187
		% of Total	1.4%	0.5%	2.0%
	Asian	Count	171	131	302
		% of Total	1.8%	1.4%	3.2%
	African Am	Count	478	168	646
		% of Total	5.0%	1.8%	6.8%
	Hawaiian	Count	21	22	43
		% of Total	0.2%	0.2%	0.5%
	Hispanic	Count	2505	1253	3758
		% of Total	26.3%	13.1%	39.4%
	Unknown	Count	498	414	912
		% of Total	5.2%	4.3%	9.6%
	Other	Count	5	1	6
		% of Total	0.1%	0.0%	0.1%
	White	Count	1741	1939	3680
		% of Total	18.3%	20.3%	38.6%
Total		Count	5555	3979	9534
		% of Total	58.3%	41.7%	100.0%

Table 4
Gender

| | | | College Ready | | Total |
			No	Yes	
Gender	Female	Count	2719	1963	4682
		% of Total	28.5%	20.6%	49.1%
	Male	Count	2836	2016	4850
		% of Total	29.7%	21.1%	50.9%
Total		Count	5555	3979	9534
		% of Total	58.3%	41.7%	100.0%

The overwhelming majority of students in the sample are between the ages of
eighteen and twenty (91.6%). All other age groups make up just 8.4% of the sample. The
majority of students in the sample in every age group were not college ready (see Table
5).

Table 5
Age

| | | | College Ready | | Total |
			No	Yes	
Age	18 - 20	Count	4902	3833	8735
		% of Total	51.4%	40.2%	91.6%
	21 - 25	Count	457	123	580
		% of Total	4.8%	1.3%	6.1%
	26 - 35	Count	141	19	160
		% of Total	1.5%	0.2%	1.7%
	36 - 45	Count	36	3	39
		% of Total	0.4%	0.0%	0.4%
	46 - 55	Count	15	1	16
		% of Total	0.2%	0.0%	0.2%
	56 - 65	Count	4	0	4
		% of Total	0.0%	0.0%	0.0%
Total		Count	5555	3979	9534
		% of Total	58.3%	41.7%	100.0%

Approximately 46% of the students in the sample received a Pell Grant, while 54% of students in the sample did not. A majority of both Pell Grant recipients and Pell Grant non-recipients were not college ready (see Table 6).

Table 6
Pell Recipient

			College Ready		Total
			No	Yes	
Pell Recipient	No	Count	2709	2431	5140
		% of Total	28.4%	25.5%	53.9%
	Yes	Count	2846	1548	4394
		% of Total	29.9%	16.2%	46.1%
Total		Count	5555	3979	9534
		% of Total	58.3%	41.7%	100.0%

Findings

This study utilized binary logistic regression, which is a statistical technique used to predict an outcome variable that is dichotomous. In this case, a student is either under prepared or prepared for college level course work contingent upon placement tests. The dependent variable is student preparedness at the postsecondary level (dichotomous). The operational definition of student under preparedness will be testing into developmental education at the postsecondary level. The independent variable is per pupil expenditure for specified (according to enrollments at MCCCD in fall 2013) Maricopa County public high school districts in 2013. Covariates include ethnicity, gender, and socio-economic status. The predetermined type I alpha error rate is .05.

Students in the sample were placed into quartiles contingent upon per pupil expenditure in 2013. The first quartile is made up of students from school districts that spent the least amount of money (lowest 25%) per pupil in 2013, and so on. The fourth

quartile is made of students from districts that spent the most money (highest 25%) per

pupil in 2013 (see Table 7).

Table 7
Per Pupil Expenditure Quartiles

Per Pupil Expenditure (Dollars)		College Ready		Total
		No	Yes	
Quartile 1 (5965-6708)	Count	1519	1222	2741
	% of Total	15.9%	12.8%	28.7%
Quartile 2 (6753-7239)	Count	1251	944	2195
	% of Total	13.1%	9.9%	23.0%
Quartile 3 (7353-7705)	Count	1233	1165	2398
	% of Total	12.9%	12.2%	25.2%
Quartile 4 (7879-9578)	Count	1552	648	2200
	% of Total	16.3%	6.8%	23.1%
	Total	5555	3979	9534
	% of Total	58.3%	41.7%	100.0%

Two Models

This analysis utilized two separate independent variables in order to assess the

relationship between per pupil expenditure at the secondary level and student

preparedness at the post-secondary level. The first model used per pupil quartiles

(expenditure) as the independent variable and student preparedness as the dependent

variable. The second model used an interaction between Arizona Department of

Education high school letter grade and per pupil expenditure (per pupil quartiles) as the

independent variable and student preparedness as the dependent variable. Two models

were utilized because: a) Model 1 tests the research question in its purest form; that is it

utilized per pupil quartiles (expenditure) as the independent variable and student

preparedness as the dependent variable; and b) Model 2 sought to introduce institutional effectiveness as an interaction with per pupil funding as the independent variable. The Arizona Department of Education evaluates every school on a yearly basis and assigns every school a letter grade ranging from A to F. The importance of utilizing the interaction with Arizona Department of Education high school grade is driven by a desire to include both resource allocation *and* institutional effectiveness in the independent variable. This high school letter grade is used as an interaction with per pupil spending by district (transformed into quartiles) as the new independent variable with the dependent variable being student preparedness at the post- secondary level.

Research Question 1 Findings

1. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the Maricopa County Community College District?

Ho1: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the Maricopa County Community College District.

H1: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the post- secondary level, specifically at the Maricopa County Community College District.

Model 1

To examine the relationship between per pupil funding at the secondary level and student preparedness at the post-secondary level logistic regression was utilized with the aforementioned per pupil quartiles as the independent variable and student preparedness as the dependent variable. The Hosmer and Lemeshow test, utilized to assess whether there was evidence for lack of fit, was not significant. Cox and Snell's and Nagelkerke's R-squared indicate significance and a good fit, as does the Omnibus LL Ratio Test (see Table 8).

Table 8
Model Fit Statistics: Research Question 1

			Hosmer & Lemeshow Test			Omnibus LL Ratio Test		
-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2	Chi-square	df	Sig.	Chi-square	df	Sig.
12756.986	.021	.028	0.000	2	1.000	198.228	3	<.001

The results of the logistic regression analysis are shown in Table 9. There were significant relationships between per pupil expenditure at the secondary level and student under preparedness at the post-secondary level for quartile three and quartile four. Results for students in quartile two were not significant. The results show that students in quartile four are .52 times less likely to be college prepared compared to students in quartile one (reference group). Additionally, students in quartile three are 1.17 times more likely to be college prepared compared to students in quartile one (reference group). These results are curious, as students in quartile four where the most money is being spent per pupil are *less* likely to be college prepared than students in quartile one where the least amount of money is being spent per pupil.

Table 9

Logistic Regression: Research Question 1

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.	
							Lower	Upper
PerPupilQuartile			189.41	3	0.000			
PerPupilQuartile(2)	-0.06	0.06	1.23	1	0.268	0.938	0.84	1.05
PerPupilQuartile(3)	0.16	0.06	8.22	1	0.004	1.174	1.05	1.31
PerPupilQuartile(4)	-0.66	0.06	117.39	1	0.000	0.519	0.46	0.58
Constant	-0.22	0.04	32.06	1	0.000	0.804		

Note. B = coefficients of the logistic regression; S.E. = standard error; Wald = Wald statistic; df = degrees of freedom; Sig. = significance; Exp(B) = exponentiation of the coefficient or odds ratio; CI = confidence interval. Results of binary logistic regression with the dichotomous outcome variable being student -preparedness.

Table 10 shows the classification table in accordance with this model. The model correctly predicts 58% of students, which is not an improvement over the expected agreement of 58%. Therefore, Cohen's Kappa (Improvement Measure) is 0%.

Table 10

Classification Table: Research Question 1

		Predicted Prepared		Correctly	Expected	Cohen's
		No	Yes	Classified	Agreement	Kappa
Observed	No	5555	0	100%	58%	
Prepared	Yes	3979	0	0%	0%	
Overall Percent Correct				58%	58%	0%

Research Question 1 Model 1 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

H1: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the post- secondary level, specifically at the Maricopa County Community College District.

Model 1 resulted in conflicting findings with students in quartile four less likely to be

college prepared than students in quartile one, and students in quartile three more likely

to be college prepared than students in quartile one.

Model 2

The Model Fit Statistics for Model 2 are shown in Table 11. The Hosmer and

Lemeshow test, utilized to assess whether there was evidence for lack of fit, was not

significant. Cox and Snell's and Nagelkerke's R-squared indicate significance and a good

fit, as does the Omnibus LL Ratio Test.

Table 11
Model Fit Statistics: Research Question 1 Model 2

-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2	Hosmer & Lemeshow Test			Omnibus LL Ratio Test		
			Chi-square	df	Sig.	Chi-square	df	Sig.
12838.778	.012	.016	0.000	2	1.000	116.435	3	<. 001

The results of the logistic regression analysis are shown in Table 12. There were

significant relationships between per pupil expenditure at the secondary level and student

under preparedness at the post-secondary level for quartile three and quartile two. Results

for students in quartile four were not significant. The results show that students in

quartile three are 1.72 times more likely to be college prepared compared to students in

quartile one (reference group). Additionally, students in quartile two are 1.32 times more

likely to be college prepared compared to students in quartile one (reference group). The

results from Model 2 are more consistent, as students in both quartile two and three

where more money is being spent per pupil are more likely to be college prepared than

students in quartile one where the least amount of money is being spent per pupil, when

an interaction with the Arizona Department of Education high school grade is utilized.

Table 12

Logistic Regression: Research Question 1 Model 2

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
GPerPupilExpend			116.10	3	0.000			
GPerPupilExpend(2)	0.27	0.06	24.69	1	0.000	1.315	1.18	1.47
GPerPupilExpend(3)	0.54	0.05	102.31	1	0.000	1.720	1.55	1.91
GPerPupilExpend(4)	0.01	0.07	0.04	1	0.838	0.986	0.86	1.13
Constant	0.51	0.03	269.08	1	0.000	0.599		

Note. B = coefficients of the logistic regression; S.E. = standard error; Wald = Wald statistic; df = degrees of freedom; Sig. = significance; Exp(B) = exponentiation of the coefficient or odds ratio; CI = confidence interval. Results of binary logistic regression with the dichotomous outcome variable being student -preparedness.

Table 13 shows the classification table in accordance with this model. The model

correctly predicts 59% of students, which is an improvement over the expected

agreement of 46%. Therefore, Cohen's Kappa (Improvement Measure) is 23%.

Table 13

Classification Table: Research Question 1 Model 2

		Predicted Prepared		Correctly	Expected	Cohen's
		No	Yes	Classified	Agreement	Kappa
Observed	No	4518	1037	81%	37%	
Prepared	Yes	2910	1069	27%	9%	
Overall Percent Correct				59%	46%	23%

Research Question 1 Model 2 Results

Since there was a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student preparedness at

the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is

valid:

H1: There is a statistically significant relationship between per pupil expenditure

in Maricopa County K-12 public school districts and student under preparedness

at the post- secondary level, specifically at the Maricopa County Community College District.

Research Question 2 Findings

> 2. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the postsecondary level, specifically at the Maricopa County Community College District?
>
> Ho2: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the postsecondary level, specifically at the Maricopa County Community College District.
>
> H2: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the post- secondary level, specifically at the Maricopa County Community College District.

In order to assess the relationship between per pupil expenditure at the secondary level and student preparedness at the post-secondary level two logistic regression models were utilized. The first model uses the aforementioned per pupil quartiles as the independent variable, ethnicity as a covariate, and student preparedness as the dependent variable. The second model uses an interaction between Arizona Department of Education high school grade and per pupil expenditure (per pupil quartiles) as the independent variable, ethnicity as a covariate, and student preparedness as the dependent variable.

Model 1

The first model uses the aforementioned per pupil quartiles as the independent

variable, ethnicity as a covariate, and student preparedness as the dependent variable. The

Hosmer and Lemeshow test, utilized to assess whether there was evidence for lack of fit,

was not significant. Cox and Snell's R-squared indicate significance and a good fit, as

does the Omnibus LL Ratio Test (see Table 14).

Table 14
Model Fit Statistics: Research Question 2

			Hosmer & Lemeshow Test			Omnibus LL Ratio Test		
-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2	Chi-square	df	Sig.	Chi-square	df	Sig.
12491.171	.048	.064	1.820	7	.969	464.042	9	< . 001

The results of the logistic regression analysis are shown in Table 15. There were

significant relationships between per pupil expenditure at the secondary level and student

preparedness at the post-secondary level for quartile three and quartile four. Results for

students in quartile two were not significant. The results show that students in quartile

four are .64 times less likely to be college prepared compared to students in quartile one

(reference group). Additionally, students in quartile three are 1.12 times more likely to be

college prepared compared to students in quartile one (reference group). Additionally,

every ethnic group is less likely to be college prepared in comparison to Whites

(reference group). Ethnicity 6 (Other) is .78 times less likely to be college prepared

compared to Whites. Ethnicity 5 (Hawaiians) is .88 times less likely to be college

prepared compared to Whites. Ethnicity 4 (Native Americans) is .35 times less likely to

be college prepared compared to Whites. Ethnicity 3 (Asians) is .75 times less likely to

be college prepared compared to Whites. Ethnicity 2 (African Americans) is .35 times

less likely to be college prepared compared to Whites. Ethnicity 1 (Hispanics) is .51

times less likely to be college prepared compared to Whites.

Table 15
Logistic Regression: Research Question 2

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Ethnicity			258.31	6	0.000			
Ethnicity(1)	-0.67	0.05	178.48	1	0.000	0.512	0.46	0.57
Ethnicity(2)	-1.05	0.10	117.91	1	0.000	0.350	0.29	0.42
Ethnicity(3)	-0.29	0.12	5.78	1	0.016	0.746	0.59	0.95
Ethnicity(4)	-1.04	0.17	37.91	1	0.000	0.352	0.25	0.49
Ethnicity(5)	-0.13	0.30	0.19	1	0.667	0.878	0.48	1.59
Ethnicity(6)	-0.25	0.08	11.17	1	0.001	0.779	0.67	0.90
PerPupilExpend			78.62	3	0.000			
PerPupilExpend(2)	-0.05	0.06	0.59	1	0.441	0.956	0.85	1.07
PerPupilExpend(3)	0.11	0.06	3.84	1	0.050	1.119	1.00	1.25
PerPupilExpend(4)	-0.44	0.06	49.83	1	0.000	0.641	0.57	0.73
Constant	0.12	0.05	6.86	1	0.009	1.128		

Note. B = coefficients of the logistic regression; S.E. = standard error; Wald = Wald statistic; df = degrees of freedom; Sig. = significance; Exp(B) = exponentiation of the coefficient or odds ratio; CI = confidence interval. Results of binary logistic regression with the dichotomous outcome variable being student -preparedness.

Table 16 shows the classification table in accordance with this model. The model

correctly predicts 61% of students, which is an improvement over the expected

agreement of 42%. Therefore, Cohen's Kappa (Improvement Measure) is 33%.

Table 16
Classification Table: Research Question 2

		Predicted Prepared		Correctly	Expected	Cohen's
		No	Yes	Classified	Agreement	Kappa
Observed	No	3981	1574	72%	27%	
Prepared	Yes	2171	1808	45%	15%	
Overall Percent Correct				61%	42%	33%

Research Question 2 Model 1 Results

Since there was a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student preparedness by

ethnicity at the post-secondary level the Null Hypothesis is rejected and the Alternative

Hypothesis is valid:

> H2: There is a statistically significant relationship between per pupil
>
> expenditure in Maricopa County K-12 public school districts and student
>
> under preparedness by ethnicity at the post- secondary level, specifically at the
>
> Maricopa County Community College District.

Model 2

The second model uses an interaction between Arizona Department of Education

high school grade and per pupil expenditure (per pupil quartiles) as the independent

variable, ethnicity as a covariate, and student preparedness as the dependent variable. The

Model Fit Statistics for Model 2 are shown in Table 17. The Hosmer and Lemeshow test,

utilized to assess whether there was evidence for lack of fit, was not significant. Cox and

Snell's R-squared indicate significance and a good fit, as does the Omnibus LL Ratio

Test.

Table 17
Model Fit Statistics: Research Question 2 Model 2

-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2	Hosmer & Lemeshow Test			Omnibus LL Ratio Test		
			Chi-square	df	Sig.	Chi-square	df	Sig.
12521.019	.045	.060	10.492	7	.162	434.194	9	<.001

The results of the logistic regression analysis are shown in Table 18. There were significant relationships between per pupil expenditure at the secondary level and student preparedness at the post-secondary level for quartile three and quartile two. Results for students in quartile four were not significant. The results show that students in quartile three are 1.46 times more likely to be college prepared compared to students in quartile one (reference group). Additionally, students in quartile two are 1.23 times more likely to be college prepared compared to students in quartile one (reference group). Additionally, every ethnic group is less likely to be college prepared in comparison to Whites (reference group) except Ethnicity 5 (Hawaiians). Ethnicity 6 (Other ethnicity) is .75 times less likely to be college prepared compared to Whites. Ethnicity 4 (Native Americans) is .34 times less likely to be college prepared compared to Whites. Ethnicity 3 (Asians) is .73 times less likely to be college prepared compared to Whites. Ethnicity 2 (African Americans) is .33 times less likely to be college prepared compared to Whites. Ethnicity 1 (Hispanics) is .48 times less likely to be college prepared compared to Whites.

Table 18
Logistic Regression: Research Question 2 Model 2

| | B | S.E. | Wald | df | Sig. | Exp(B) | 95% C.I.for EXP(B) | |
							Lower	Upper
Ethnicity			308.83	6	0.000			
Ethnicity(1)	-0.73	0.05	224.86	1	0.000	0.480	0.44	0.53
Ethnicity(2)	-1.10	0.10	130.21	1	0.000	0.333	0.28	0.40
Ethnicity(3)	-0.32	0.12	6.88	1	0.009	0.727	0.57	0.92
Ethnicity(4)	-1.08	0.17	41.03	1	0.000	0.338	0.24	0.47
Ethnicity(5)	-0.05	0.30	0.03	1	0.860	0.948	0.52	1.72
Ethnicity(6)	-0.29	0.07	15.12	1	0.000	0.749	0.65	0.87
GPerPupilExpend			50.44	3	0.000			
GPerPupilExpend(2)	0.21	0.06	13.69	1	0.000	1.232	1.10	1.38
GPerPupilExpend(3)	0.38	0.06	47.29	1	0.000	1.463	1.31	1.63
GPerPupilExpend(4)	0.07	0.07	0.95	1	0.331	1.072	0.93	1.23

| Constant | | -0.06 | 0.04 | 2.11 | 1 | 0.147 | 0.940 |

Table 19 shows the classification table in accordance with this model. The model

correctly predicts 60% of students, which is an improvement over the expected

agreement of 45%. Therefore, Cohen's Kappa (Improvement Measure) is 28%.

Table 19

Classification Table: Research Question 2 Model 2

		Predicted Prepared		Correctly	Expected	Cohen's
		No	Yes	Classified	Agreement	Kappa
Observed	No	4381	1174	79%	34%	
Prepared	Yes	2604	1375	35%	11%	
Overall Percent Correct				60%	45%	28%

Research Question 2 Model 2 Results

Since there was a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student preparedness by

ethnicity at the post-secondary level the Null Hypothesis is rejected and the Alternative

Hypothesis is valid:

> H2: There is a statistically significant relationship between per pupil
>
> expenditure in Maricopa County K-12 public school districts and student
>
> under preparedness by ethnicity at the post- secondary level, specifically at the
>
> Maricopa County Community College District.

Research Question 3 Findings

3. Is there a statistically significant relationship between per pupil expenditure in

Maricopa County K-12 public school districts and student under preparedness by

gender at the postsecondary level, specifically at the Maricopa County

Community College District?

Ho3: There is not a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student under

preparedness by gender at the postsecondary level, specifically at the Maricopa

County Community College District.

H3: There is a statistically significant relationship between per pupil expenditure

in Maricopa County K-12 public school districts and student under preparedness

by gender at the post- secondary level, specifically at the Maricopa County

Community College District.

In order to assess the relationship between per pupil expenditure at the secondary

level and student preparedness at the post-secondary level two logistic regression models

were utilized. The first model uses the aforementioned per pupil quartiles as the

independent variable, gender as a covariate, and student preparedness as the dependent

variable. The second model uses an interaction between Arizona Department of

Education high school grade and per pupil expenditure (per pupil quartiles) as the

independent variable, gender as a covariate, and student preparedness as the dependent

variable.

Model 1

The first model uses the aforementioned per pupil quartiles as the independent

variable, gender as a covariate, and student preparedness as the dependent variable. The

Hosmer and Lemeshow test, utilized to assess whether there was evidence for lack of fit,

was not significant. Cox and Snell's and Nagelkerke's R-squared indicate significance

and a good fit, as does the Omnibus LL Ratio Test (see Table 20).

Table 20
Model Fit Statistics: Research Question 3

-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2	Hosmer & Lemeshow Test			Omnibus LL Ratio Test		
			Chi-square	df	Sig.	Chi-square	df	Sig.
12756.366	.021	.028	10.559	6	.103	198.847	4	<.001

The results of the logistic regression analysis are shown in Table 21. There was

not a significant relationship between gender and student preparedness at the post-

secondary level. There were significant relationships between per pupil expenditure at the

secondary level and student preparedness at the post-secondary level for quartile three

and quartile four. Results for students in quartile two were not significant. The results

show that students in quartile four are .52 times less likely to be college prepared

compared to students in quartile one (reference group). Additionally, students in quartile

three are 1.76 times more likely to be college prepared compared to students in quartile

one (reference group).

Table 21
Logistic Regression: Research Question 3

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Gender	-0.03	0.04	0.62	1	0.431	0.967	0.89	1.05
PerPupilQuartile			189.88	3	0.000			
PerPupilQuartile(2)	-0.06	0.06	1.22	1	0.270	0.938	0.84	1.05
PerPupilQuartile(3)	0.16	0.06	8.25	1	0.004	1.175	1.05	1.31
PerPupilQuartile(4)	-0.66	0.06	117.73	1	0.000	0.518	0.46	0.58
Constant	-0.20	0.04	20.76	1	0.000	0.818		

Note. B = coefficients of the logistic regression; S.E. = standard error; Wald = Wald statistic; df = degrees of freedom; Sig. = significance; Exp(B) = exponentiation of the coefficient or odds ratio; CI = confidence interval. Results of binary logistic regression with the dichotomous outcome variable being student -preparedness.

Table 22 shows the classification table in accordance with this model. The model correctly predicts 58% of students, which is not an improvement over the expected agreement of 58%. Therefore, Cohen's Kappa (Improvement Measure) is 0%.

Table 22

Classification Table: Research Question 3

		Predicted Prepared		Correctly	Expected	Cohen's
		No	Yes	Classified	Agreement	Kappa
Observed	No	5555	0	100%	58%	
Prepared	Yes	3979	0	0%	0%	
Overall Percent Correct				58%	58%	0%

Research Question 3 Model 1 Results

Since there was not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness by gender at the post-secondary level the Null Hypothesis is retained:

Ho3: There is not a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student under

preparedness by gender at the postsecondary level, specifically at the Maricopa

County Community College District.

Model 2

The second model uses an interaction between Arizona Department of Education high school grade and per pupil expenditure (per pupil quartiles) as the independent variable, gender as a covariate, and student preparedness as the dependent variable. The Hosmer and Lemeshow test, utilized to assess whether there was evidence for lack of fit, was significant, indicating the model is not a good fit. Cox and Snell's and Nagelkerke's R-squared indicate significance and a good fit, as does the Omnibus LL Ratio Test (see Table 23).

Table 23
Model Fit Statistics: Research Question 3 Model 2

			Hosmer & Lemeshow Test			Omnibus LL Ratio Test		
-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2	Chi-square	df	Sig.	Chi-square	df	Sig.
12838.302	.012	.016	13.440	6	.037	116.991	4	<.001

The results of the logistic regression analysis are shown in Table 24. There was not a significant relationship between gender and student preparedness at the post-secondary level. There were significant relationships between per pupil expenditure at the secondary level and student preparedness at the post-secondary level for quartile three and quartile two. Results for students in quartile four were not significant. The results show that students in quartile three are 1.72 times more likely to be college prepared compared to students in quartile one (reference group). Additionally, students in quartile two are 1.32 times more likely to be college prepared compared to students in quartile one (reference group).

Table 24
Logistic Regression: Research Question 3 Model 2

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Gender	0.03	0.04	0.48	1	0.490	0.972	0.90	1.06
GPerPupilExpend			116.45	3	0.000			
GPerPupilExpend(2)	0.28	0.06	24.82	1	0.000	1.316	1.18	1.47
GPerPupilExpend(3)	0.54	0.05	102.57	1	0.000	1.721	1.55	1.91
GPerPupilExpend(4)	0.02	0.07	0.05	1	0.827	0.985	0.86	1.13
Constant	0.50	0.04	175.55	1	0.000	0.608		

Note. B = coefficients of the logistic regression; S.E. = standard error; Wald = Wald statistic; df = degrees of freedom; Sig. = significance; Exp(B) = exponentiation of the coefficient or odds ratio; CI = confidence interval. Results of binary logistic regression with the dichotomous outcome variable being student -preparedness.

Table 25 shows the classification table in accordance with this model. The model correctly predicts 59% of students, which is an improvement over the expected agreement of 46%. Therefore, Cohen's Kappa (Improvement Measure) is 23%.

Table 25
Classification Table: Research Question 3 Model 2

		Predicted Prepared		Correctly	Expected	Cohen's
		No	Yes	Classified	Agreement	Kappa
Observed	No	4518	1037	81%	37%	
Prepared	Yes	2910	1069	27%	9%	
Overall Percent Correct				59%	46%	23%

Research Question 3 Model 2 Results

Since there was not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness by gender at the post-secondary level the Null Hypothesis is retained:

Ho3: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by gender at the postsecondary level, specifically at the Maricopa County Community College District.

Research Question 4 Findings

4. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the postsecondary level, specifically at the Maricopa County Community College District?

Ho4: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under

preparedness by socio-economic status at the postsecondary level, specifically at the Maricopa County Community College District.

H4: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the post- secondary level, specifically at the Maricopa County Community College District.

In order to assess the relationship between per pupil expenditure at the secondary level and student preparedness at the post-secondary level two logistic regression models were utilized. The first model uses the aforementioned per pupil quartiles as the independent variable, socio-economic status (operationalized as receiving or not receiving a Pell grant) as a covariate, and student preparedness as the dependent variable. The second model uses an interaction between Arizona Department of Education high school grade and per pupil expenditure (per pupil quartiles) as the independent variable, socio-economic status (operationalized as receiving or not receiving a Pell grant) as a covariate, and student preparedness as the dependent variable.

Model 1

The first model uses the aforementioned per pupil quartiles as the independent variable, socio-economic status (operationalized as receiving or not receiving a Pell grant) as a covariate, and student preparedness as the dependent variable. The Hosmer and Lemeshow test, utilized to assess whether there was evidence for lack of fit, was not significant. Cox and Snell's and Nagelkerke's R-squared indicate significance and a good fit, as does the Omnibus LL Ratio Test (see Table 26).

Table 26
Model Fit Statistics: Research Question 4

			Hosmer & Lemeshow Test			Omnibus LL Ratio Test		
-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2	Chi-square	df	Sig.	Chi-square	df	Sig.
12658.771	.031	.041	2.733	6	.842	296.442	4	<.001

The results of the logistic regression analysis are shown in Table 27. There was a significant relationship between Pell status and student preparedness at the post-secondary level. Pell recipients were .65 times less likely to be college prepared than those who did not receive a Pell grant. There were significant relationships between per pupil expenditure at the secondary level and student preparedness at the post-secondary level for quartile three and quartile four. Results for students in quartile two were not significant. The results show that students in quartile four are .56 times less likely to be college prepared compared to students in quartile one (reference group). Additionally, students in quartile three are 1.18 times more likely to be college prepared compared to students in quartile one (reference group).

Table 27
Logistic Regression: Research Question 4

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Pell	-0.42	0.04	97.64	1	0.000	0.654	0.60	0.71
PerPupilQuartile			148.68	3	0.000			
PerPupilQuartile(2)	-0.07	0.06	1.33	1	0.249	0.935	0.84	1.05
PerPupilQuartile(3)	0.16	0.06	8.22	1	0.004	1.176	1.05	1.31
PerPupilQuartile(4)	-0.58	0.06	89.01	1	0.000	0.561	0.50	0.63
Constant	-0.04	0.04	1.05	1	0.306	0.958		

Note. B = coefficients of the logistic regression; S.E .= standard error; Wald = Wald statistic; df = degrees of freedom; Sig. = significance; Exp(B) = exponentiation of the coefficient or odds ratio; CI = confidence interval. Results of binary logistic regression with the dichotomous outcome variable being student -preparedness.

Table 28 shows the classification table in accordance with this model. The model correctly predicts 59% of students, which is an improvement over the expected agreement of 50%. Therefore, Cohen's Kappa (Improvement Measure) is 18%.

Table 28

Classification Table: Research Question 4

| | | Predicted Prepared | | Correctly | Expected | Cohen's |
		No	Yes	Classified	Agreement	Kappa
Observed	No	4887	668	88%	44%	
Prepared	Yes	3244	735	18%	6%	
Overall Percent Correct				59%	50%	18%

Research Question 4 Model 1 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness by socio-economic status at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

H4: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the post- secondary level, specifically at the Maricopa County Community College District.

Model 2

The second model uses an interaction between Arizona Department of Education high school grade and per pupil expenditure (per pupil quartiles) as the independent variable, socio-economic status (operationalized as receiving or not receiving a Pell grant) as a covariate, and student preparedness as the dependent variable. The Hosmer and Lemeshow test, utilized to assess whether there was evidence for lack of fit, was not significant, indicating the model is a good fit. Cox and Snell's and Nagelkerke's R-

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squared indicate significance and a good fit, as does the Omnibus LL Ratio Test (see

Table 29).

Table 29
Model Fit Statistics: Research Question 4 Model 2

			Hosmer & Lemeshow Test			Omnibus LL Ratio Test		
-2 Log likelihood	Cox & Snell R^2	Nagelkerke R^2	Chi-square	df	Sig.	Chi-square	df	Sig.
12718.257	.025	.033	6.349	5	.274	236.956	4	<.001

The results of the logistic regression analysis are shown in Table 30. There was a

significant relationship between Pell status and student preparedness at the post-

secondary level. Pell recipients were .63 times less likely to be college prepared than

those who did not receive a Pell grant. There were significant relationships between per

pupil expenditure at the secondary level and student preparedness at the post-secondary

level for quartile three and quartile two. Results for students in quartile four were not

significant. The results show that students in quartile three are 1.66 times more likely to

be college prepared compared to students in quartile one (reference group). Additionally,

students in quartile two are 1.26 times more likely to be college prepared compared to

students in quartile one (reference group).

Table 30
Logistic Regression: Research Question 4 Model 2

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Pell	0.47	0.04	119.52	1	0.000	0.628	0.58	0.68
GPerPupilExpend			94.34	3	0.000			
GPerPupilExpend(2)	0.23	0.06	17.64	1	0.000	1.263	1.13	1.41
GPerPupilExpend(3)	0.51	0.05	87.69	1	0.000	1.658	1.49	1.84
GPerPupilExpend(4)	0.03	0.07	0.15	1	0.696	1.028	0.90	1.18
Constant	0.29	0.04	61.33	1	0.000	0.748		

Note. B = coefficients of the logistic regression; S.E. = standard error; Wald = Wald statistic; df = degrees of freedom; Sig. = significance; Exp(B) = exponentiation of the coefficient or odds ratio; CI = confidence interval. Outcome is student-preparedness.

Table 31 shows the classification table in accordance with this model. The model correctly predicts 59% of students, which is an improvement over the expected agreement of 51%. Therefore, Cohen's Kappa (Improvement Measure) is 17%.

Table 31

Classification Table: Research Question 4 Model 2

		Predicted Prepared		Correctly	Expected	Cohen's
		No	Yes	Classified	Agreement	Kappa
Observed	No	4971	584	89%	45%	
Prepared	Yes	3295	684	17%	6%	
Overall Percent Correct				59%	51%	17%

Research Question 4 Model 2 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness by socio-economic status at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

> H4: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the post- secondary level, specifically at the Maricopa County Community College District.

Comparing the Two Models

The two models presented in this analysis utilize two separate independent variables in order to assess the relationship between per pupil expenditure at the secondary level and student preparedness at the post-secondary level. The first model uses per pupil quartiles (expenditure) as the independent variable and student preparedness as the dependent variable. The second model uses an interaction between Arizona Department of Education high school letter grade and per pupil expenditure (per

pupil quartiles) as the independent variable and student preparedness as the dependent variable. Though the first model has statistical validity, its results are conflicting as it showed that students from quartile four, where the most money is being spent per pupil, were least likely to be college prepared, and students from quartile three, where the second most money is being spent per pupil, were more likely to be college prepared than the reference group. This indicates that there are other factors influencing preparedness outside of per pupil funding for students in quartile four. Model 1 did not account for institutional effectiveness; which, when used as an interaction with per pupil funding provided a more robust predictor.

Summary

This chapter presented the results and findings of a quasi-experimental and correlational study exploring the relationship between per pupil funding at the secondary level and student preparedness at the post-secondary level. The study utilizes data from the Arizona State Auditor (per pupil expenditure by Maricopa County public high school district in 2013 and high school grade), as well as student data from the Maricopa County Community College District (placement tests results, Pell status, and demographics). This study utilized binary logistic regression, which is a statistical technique used to predict an outcome variable that is dichotomous. In this case, a student is either under prepared or prepared for college level course work contingent upon placement tests. The dependent variable was student preparedness at the postsecondary level (dichotomous). The two models presented in this analysis utilize two separate independent variables in order to assess the relationship between per pupil expenditure at the secondary level and student preparedness at the post-secondary level. The first model uses per pupil quartiles

(expenditure) as the independent variable and student preparedness as the dependent variable. The second model uses an interaction between Arizona Department of Education high school letter grade and per pupil expenditure (per pupil quartiles) as the independent variable and student preparedness as the dependent variable. Final results were as follows:

Research Question 1 Model 1 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

> H1: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the post- secondary level, specifically at the Maricopa County Community College District.

Research Question 1 Model 2 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

> H1: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the post- secondary level, specifically at the Maricopa County Community College District.

Research Question 2 Model 1 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness by ethnicity at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

> H2: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the post- secondary level, specifically at the Maricopa County Community College District.

Research Question 2 Model 2 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness by ethnicity at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

> H2: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the post- secondary level, specifically at the Maricopa County Community College District.

Research Question 3 Model 1 Results

Since there was not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness by gender at the post-secondary level the Null Hypothesis is retained:

Ho3: There is not a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student under

preparedness by gender at the postsecondary level, specifically at the Maricopa

County Community College District.

Research Question 3 Model 2 Results

Since there was not a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student preparedness by

gender at the post-secondary level the Null Hypothesis is retained:

Ho3: There is not a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student under

preparedness by gender at the postsecondary level, specifically at the Maricopa

County Community College District.

Research Question 4 Model 1 Results

Since there was a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student preparedness by

socio-economic status at the post-secondary level the Null Hypothesis is rejected and the

Alternative Hypothesis is valid:

H4: There is a statistically significant relationship between per pupil expenditure

in Maricopa County K-12 public school districts and student under preparedness

by socio-economic status at the post- secondary level, specifically at the Maricopa

County Community College District.

Research Question 4 Model 2 Results

Since there was a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student preparedness by

socio-economic status at the post-secondary level the Null Hypothesis is rejected and the

Alternative Hypothesis is valid:

H4: There is a statistically significant relationship between per pupil expenditure

in Maricopa County K-12 public school districts and student under preparedness

by socio-economic status at the post- secondary level, specifically at the Maricopa

County Community College District.

Table 32: Research Questions and Findings Summary

Research Question	Findings	
Research Question 1: Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level?	*Model 1:* There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the Maricopa County Community College District.	*Model 2:* There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the Maricopa County Community College District.
Research Question 2: Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the postsecondary level, specifically at the Maricopa County Community College District?	*Model 1:* There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the postsecondary level, specifically at the Maricopa County Community College District.	*Model 2:* There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the postsecondary level, specifically at the Maricopa County Community College District.
Research Question 3: Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by gender at the postsecondary level, specifically at the Maricopa County Community	*Model 1:* There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by gender at the postsecondary level, specifically at the Maricopa	*Model 2:* There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by gender at the postsecondary level, specifically at the Maricopa

College District?	County Community College District.	County Community College District.
Research Question 4: Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the postsecondary level, specifically at the Maricopa County Community College District?	*Model 1:* There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the postsecondary level, specifically at the Maricopa County Community College District.	*Model 2:* There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the postsecondary level, specifically at the Maricopa County Community College District.

CHAPTER 5

SUMMARY, DISCUSSION, AND IMPLICATIONS

Introduction

This chapter provides a summary of the study, restates the purpose, summarizes and discusses the findings, and discusses implications of a quasi-experimental and correlational study exploring the relationship between per pupil funding at the secondary level and student preparedness at the post-secondary level.

Summary of the Study

The purpose of this study was to understand the relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the MCCCD. This relationship is vitally important if education is to be utilized as a conduit for social mobility. Additionally, this study advocates policy transformations aimed at equalizing opportunity for Maricopa County students to make education an avenue for social mobility. Policy transformations are necessary so that educational resources are equally distributed helping to insure optimal educational and social mobility outcomes for Maricopa County. The sample is made up of a total of 9,534 students enrolled in fall 2013 from the following Maricopa County Community College District institutions: Chandler-Gilbert Community College, Estrella Mountain Community College, Gateway Community College, Glendale Community College, Mesa Community College, Paradise Valley Community College, Phoenix College, Scottsdale Community College, and South Mountain Community College.

This analysis utilized two separate independent variables in order to assess the relationship between per pupil expenditure at the secondary level and student preparedness at the post-secondary level. The first model used per pupil quartiles (expenditure) as the independent variable and student preparedness as the dependent variable. The second model used an interaction between Arizona Department of Education high school letter grade and per pupil expenditure (per pupil quartiles) as the independent variable and student preparedness as the dependent variable.

Summary of Findings

The study utilizes data from the Arizona State Auditor (per pupil expenditure by Maricopa County public high school district in 2013 and high school grade), as well as student data from the Maricopa County Community College District (placement tests results, Pell status, and demographics). This study utilized binary logistic regression, which is a statistical technique used to predict an outcome variable that is dichotomous. In this case, a student is either under prepared or prepared for college level course work contingent upon placement tests. The dependent variable was student preparedness at the postsecondary level (dichotomous). The two models presented in this analysis utilize two separate independent variables in order to assess the relationship between per pupil expenditure at the secondary level and student preparedness at the post-secondary level. The first model uses per pupil quartiles (expenditure) as the independent variable and student preparedness as the dependent variable. The second model uses an interaction between Arizona Department of Education high school letter grade and per pupil expenditure (per pupil quartiles) as the independent variable and student preparedness as the dependent variable. Final results were as follows:

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Research Question 1 Model 1 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

H1: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the post- secondary level, specifically at the Maricopa County Community College District.

Research Question 1 Model 2 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

H1: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the post- secondary level, specifically at the Maricopa County Community College District.

Research Question 2 Model 1 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness by ethnicity at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

H2: There is a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student

under preparedness by ethnicity at the post- secondary level, specifically at the

Maricopa County Community College District.

Research Question 2 Model 2 Results

Since there was a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student preparedness by

ethnicity at the post-secondary level the Null Hypothesis is rejected and the Alternative

Hypothesis is valid:

H2: There is a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student

under preparedness by ethnicity at the post- secondary level, specifically at the

Maricopa County Community College District.

Research Question 3 Model 1 Results

Since there was not a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student preparedness by

gender at the post-secondary level the Null Hypothesis is retained:

Ho3: There is not a statistically significant relationship between per pupil

expenditure in Maricopa County K-12 public school districts and student under

preparedness by gender at the postsecondary level, specifically at the Maricopa

County Community College District.

Research Question 3 Model 2 Results

Since there was not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness by gender at the post-secondary level the Null Hypothesis is retained:

Ho3: There is not a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by gender at the postsecondary level, specifically at the Maricopa County Community College District.

Research Question 4 Model 1 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness by socio-economic status at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

H4: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the post- secondary level, specifically at the Maricopa County Community College District.

Research Question 4 Model 2 Results

Since there was a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student preparedness by socio-economic status at the post-secondary level the Null Hypothesis is rejected and the Alternative Hypothesis is valid:

H4: There is a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness

by socio-economic status at the post- secondary level, specifically at the Maricopa County Community College District.

Discussion

This analysis utilized two separate independent variables in order to assess the relationship between per pupil expenditure at the secondary level and student preparedness at the post-secondary level. The first model used per pupil quartiles (expenditure) as the independent variable and student preparedness as the dependent variable. The second model used an interaction between Arizona Department of Education high school letter grade and per pupil expenditure (per pupil quartiles) as the independent variable and student preparedness as the dependent variable.

Research Question 1

1. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the Maricopa County Community College District?

Research Question 1 Model 1 Discussion

There were significant relationships between per pupil expenditure at the secondary level and student under preparedness at the post-secondary level for quartile three and quartile four. Results for students in quartile two were not significant. The results show that students in quartile four are .52 times less likely to be college prepared compared to students in quartile one (reference group). Additionally, students in quartile three are 1.17 times more likely to be college prepared compared to students in quartile one (reference group).

These results are curious, as students in quartile four where the most money is being spent per pupil are *less* likely to be college prepared than students in quartile one where the least amount of money is being spent per pupil. There are additional variables outside of per pupil expenditure affecting preparedness. The students that make up quartile four are overwhelmingly from Phoenix Union High School District. Phoenix Union High School District spent over $9,578 per pupil in 2013. However, Phoenix Union High District also has the highest poverty rate (36%) according to "Arizona School District Spending (Classroom Dollars) Fiscal Year 2013" from the State of Arizona Office of the Auditor General.

There is an abundance of research indicating that there is a relationship between academic achievement and socioeconomic status (White, 1982; Sirin, 2005). "Thus, even when the current school financing system achieves its goal of financial equity between poor and wealthy school districts, it does not necessarily achieve a comparable "ecological equity"—because students in poor and wealthy school districts do not enjoy comparable living circumstances outside school" (Sirin, 2005, p. 446). The term "ecological equity" refers to the environment that students from economically disadvantaged backgrounds endure in comparison to their wealthier counterparts. The plight of students from economically disadvantaged school districts includes poverty, homelessness, violence, illegal drug trafficking, and limited social services (Sirin, 2005). Therefore, educational finance inequity must also be solved concurrently with "ecological inequity" in order to achieve positive educational and societal outcomes. "Poor school districts have more than their equal share of challenges to deal with, and consequently they need adequate financial resources that may be more than equal to those

needed by wealthier schools" (Sirin, 2005, p. 446). This indicates that Maricopa County public school districts (particularly its largest urban district—Phoenix Union High School District) have a problem with equity as well as adequacy regarding per pupil expenditure.

In addition, it is important to note that although Phoenix Union High School District expended $9,578 per pupil in 2013 that is still considerably below the national average which was $11,864 in 2013 according to *Quality Counts 2014* an annual assessment of state school spending published in *Education Week* (Lloyd and Swanson, 2014). Also, a significant portion of that expenditure ($16,017,345 in 2013) comes from federal Title 1 funds according to the Arizona Department of Education. There is research indicating that state and local jurisdictions offset Title 1 revenue by lowering their own spending on services intended to help poor students (Liu, 2008). Other inequities exist within Title 1 allocations that result in less Title 1 funding for states that spend less per pupil but have high concentrations of poverty such as Arizona. "Since all four Title I formulas allocate money based on numbers of poor children, and since two formulas weight poor children according to poverty concentration…all four formulas include a state expenditure factor that makes each state's Title 1 allocation a function of its own per pupil spending. As a result, these states have low Title 1 aid per poor child even though they have high poverty" (Liu, 2008, p. 984).

Research Question 1 Model 2 Discussion

There were significant relationships between per pupil expenditure at the secondary level and student under preparedness at the post-secondary level for quartile three and quartile two. Results for students in quartile four were not significant. The results show that students in quartile three are 1.72 times more likely to be college

prepared compared to students in quartile one (reference group). Additionally, students in quartile two are 1.32 times more likely to be college prepared compared to students in quartile one (reference group). The results from Model 2 are more intuitive, as students in both quartile two and three where more money is being spent per pupil are more likely to be college prepared than students in quartile one where the least amount of money is being spent per pupil, when an interaction with the Arizona Department of Education high school grade is utilized. Model 2 provides the interaction with Arizona Department of Education high school grade along with per pupil expenditure in the independent variable, which accounts for the effectiveness of the school. The difference between the two models is stark—Model 1 (only per pupil quartiles) shows that the students in quartile four, where the most money is being spent, are the least likely to be prepared—that appears to be because the students in quartile four are largely made up of students that are socio-economically disadvantaged.

The results of Research Question 1 Model 2 are consistent with the notion that increased per pupil expenditure and more effective schools will result in a higher proportion of college ready students. The introduction of an interaction of per pupil expenditure and Arizona Department of Education high school grade as the independent variable provides more intuitive results. It is highly plausible that Arizona Department of Education high school grade has a relationship with poverty quotient. That is, the higher the poverty quotient of the high school district the lower the high school grade. In this case, the result would in effect reinforce the prior "ecological equity" discussion. Students from wealthier school districts have the inherent benefit of ecology and their educational outcomes further improve with increased per pupil funding. In Model 2, the

results do not show significance for quartile four where the most money is being spent per pupil.

Research Question 2

> 2. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by ethnicity at the postsecondary level, specifically at the Maricopa County Community College District?

Research Question 2 Model 1 Discussion

There were significant relationships between per pupil expenditure at the secondary level and student preparedness at the post-secondary level for quartile three and quartile four. Results for students in quartile two were not significant. The results show that students in quartile four are .64 times less likely to be college prepared compared to students in quartile one (reference group). Additionally, students in quartile three are 1.12 times more likely to be college prepared compared to students in quartile one (reference group). Additionally, every ethnic group is less likely to be college prepared in comparison to Whites (reference group). Ethnicity 6 (Other) is .78 times less likely to be college prepared compared to Whites. Ethnicity 5 (Hawaiians) is .88 times less likely to be college prepared compared to Whites. Ethnicity 4 (Native Americans) is .35 times less likely to be college prepared compared to Whites. Ethnicity 3 (Asians) is .75 times less likely to be college prepared compared to Whites. Ethnicity 2 (African Americans) is .35 times less likely to be college prepared compared to Whites. Ethnicity 1 (Hispanics) is .51 times less likely to be college prepared compared to Whites.

There is ample evidence that indicate certain socio-demographic groups are less likely to succeed in college such as minorities and those from lower socio-economic status (Allen Phelps, Porchea, 2010). There is also ample evidence that race and socio-economic status intersect (Sirin, 2005; Rowley & Wright, 2011). All of the ethnic groups were less likely to be college prepared in comparison to Whites according to the results of this study. The results indicate that non-White students are less likely to be prepared for college, which is consistent with other studies.

Research Question 2 Model 2 Discussion

There were significant relationships between per pupil expenditure at the secondary level and student preparedness at the post-secondary level for quartile three and quartile two. Results for students in quartile four were not significant. The results show that students in quartile three are 1.46 times more likely to be college prepared compared to students in quartile one (reference group). Additionally, students in quartile two are 1.23 times more likely to be college prepared compared to students in quartile one (reference group). Additionally, every ethnic group is less likely to be college prepared in comparison to Whites (reference group) except Ethnicity 5 (Hawaiians). Ethnicity 6 (Other ethnicity) is .75 times less likely to be college prepared compared to Whites. Ethnicity 4 (Native Americans) is .34 times less likely to be college prepared compared to Whites. Ethnicity 3 (Asians) is .73 times less likely to be college prepared compared to Whites. Ethnicity 2 (African Americans) is .33 times less likely to be college prepared compared to Whites. Ethnicity 1 (Hispanics) is .48 times less likely to be college prepared compared to Whites. The results of Research Question 2 Model 2 are consistent with the notion that increased per pupil expenditure and more effective schools

will result in a higher proportion of college ready students. The introduction of an interaction of per pupil expenditure and Arizona Department of Education high school grade as the independent variable provides more intuitive results regarding per pupil expenditure and maintains consistency regarding non-White students being less likely to be college prepared.

Research Question 3

> 3. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by gender at the postsecondary level, specifically at the Maricopa County Community College District?

Research Question 3 Model 1 Discussion

There was not a significant relationship between gender and student preparedness at the post-secondary level. There were significant relationships between per pupil expenditure at the secondary level and student preparedness at the post-secondary level for quartile three and quartile four. Results for students in quartile two were not significant. The results show that students in quartile four are .52 times less likely to be college prepared compared to students in quartile one (reference group). Additionally, students in quartile three are 1.76 times more likely to be college prepared compared to students in quartile one (reference group). These results are virtually identical to Research Question 1 Model 1 and, in addition, show that gender is not a significant predictor.

Research Question 3 Model 2 Discussion

There was not a significant relationship between gender and student preparedness at the post-secondary level. There were significant relationships between per pupil expenditure at the secondary level and student preparedness at the post-secondary level for quartile three and quartile two. Results for students in quartile four were not significant. The results show that students in quartile three are 1.72 times more likely to be college prepared compared to students in quartile one (reference group). Additionally, students in quartile two are 1.32 times more likely to be college prepared compared to students in quartile one (reference group). These results are virtually identical to Research Question 1 Model 2 and, in addition, show that gender is not a significant predictor.

Research Question 4

4. Is there a statistically significant relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness by socio-economic status at the postsecondary level, specifically at the Maricopa County Community College District?

Research Question 4 Model 1 Discussion

There was a significant relationship between Pell status and student preparedness at the post-secondary level. Pell recipients were .65 times less likely to be college prepared than those who did not receive a Pell grant. There were significant relationships between per pupil expenditure at the secondary level and student preparedness at the post-secondary level for quartile three and quartile four. Results for students in quartile two were not significant. The results show that students in quartile four are .56 times less

likely to be college prepared compared to students in quartile one (reference group). Additionally, students in quartile three are 1.18 times more likely to be college prepared compared to students in quartile one (reference group). These findings reinforce previous research on the relationship between socio-economic status and academic achievement/college readiness. Pell students were less likely to be college prepared. The other results are consistent with the results of the first research question.

Research Question 4 Model 2 Discussion

There was a significant relationship between Pell status and student preparedness at the post-secondary level. Pell recipients were .63 times less likely to be college prepared than those who did not receive a Pell grant. There were significant relationships between per pupil expenditure at the secondary level and student preparedness at the post-secondary level for quartile three and quartile two. Results for students in quartile four were not significant. The results show that students in quartile three are 1.66 times more likely to be college prepared compared to students in quartile one (reference group). Additionally, students in quartile two are 1.26 times more likely to be college prepared compared to students in quartile one (reference group). The results of Research Question 4 Model 2 are consistent with the notion that increased per pupil expenditure and more effective schools will result in a higher proportion of college ready students. These findings reinforce previous research on the relationship between socio-economic status and academic achievement/college readiness. Pell students were less likely to be college prepared. The other results are consistent with the results of the first research question.

Implications

The implications of the findings of this study are twofold. First, the issue of "ecological equity" must be addressed in Maricopa County. Second, the issue of equity and adequacy in per pupil expenditure must be addressed in Maricopa County (and perhaps the State of Arizona). Policy transformations are needed in these two areas of educational public policy. Most importantly, it must be noted that public policies intersect and do not occur or exist in a vacuum. A conversation about educational public policy is also about poverty, healthcare, criminal justice and other policy. It is not possible to solve a crisis in education without addressing public policy in a larger context. Students who are socio-economically disadvantaged will not succeed in school in aggregate by focusing solely on educational policies like funding, accountability, or standardized test scores. A larger conversation must occur that focuses on mitigating the adverse impacts of poverty outside the classroom and the school. These results show that students from socio-economically disadvantaged backgrounds remain at an academic disadvantage even when more money is spent on a per pupil basis. The adverse impacts of poverty must be addressed aside from school district spending in order to raise classroom achievement and life chances.

Addressing "Ecological Equity"

The plight of students from disadvantaged backgrounds who attend urban schools can be understood through an analysis of economic, political, and racial disparity. "The disparity which exists in the educational system can be explained primarily in racial, economic, and political terms. All of these dimensions are linked to resource relationships in political economy. That is, resource related disparity results from the

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misdistribution and misallocation of wealth in support of public education. The political

side of the matter involves public services and public choice. The economic factors are

tied to sources and uses of wealth. Coincidental to the joint issues of economics and

politics are those of class and race. The poor, the underclasses of society, simply do not

have access to the resources needed to provide an adequate and equitable educational

experience" (Spratlen, 1973, 287). The problem of urban education must be viewed in

the context of solving basic urban problems. Crisis in urban education is, in part, the

crisis of segregated housing, inadequate healthcare, and sub-par employment

opportunities. "Since race and socio-economic status intersect, one manner in which

government could provide a non-discriminatory education to all students, the cornerstone

of the NCLB would be to level the academic field among those students entering

kindergarten by fully funding Head Start, Even Start and other early childhood education

programs" (Rowley and Wright, 2011,p. 103). Early intervention programs must become

a cornerstone of public policy in Maricopa County if we desire to improve educational

and societal outcomes in the long term. In addition, Rowley and Wright advocate

fostering a culture of value for education and continued assistance for economically

disadvantaged students during high school years through programs such as AVID

(Advancement Via Individual Determination). AVID is a program designed to address

the possible negative effects of poor parental expectations for disadvantaged youth

(Rowley and Wright, 2011).

Robert Putnam (2015) advocates for several public policies intended to benefit the

socio-economically disadvantaged and halt the widening "opportunity gap". Mechanisms

to increase the income of the socio-economically disadvantaged include the expansion of

the Earned income Tax Credit (EITC), expand the existing child tax credit by making the credit fully refundable so that it can help the poorest kids, and the protection of antipoverty programs such as food stamps, housing vouchers, and child care support (Putnam, 2015).

Additionally (and specifically regarding education), Putnam (like Rowley and Wright) advocates quality preschool education as a mechanism to mitigate the adverse impacts of poverty on human development and scholastic success. "For example, the carefully studied, high-quality pre-K program offered in all public elementary schools in Boston has been proven highly effective, though expensive. Key ingredients of the Boston program, according to education specialists Greg Duncan and Richard Murnane include a high quality curriculum; well paid, well trained, well coached teachers; and provisions for accountability" (Putnam, 2015, p. 250). Putnam also advocates extending school hours to offer more extracurricular and enrichment activities as research shows positive results for socio-economically disadvantaged children (Putnam, 2015). Along the same lines, Putnam argues that putting health and social services in schools that serve socio-economically disadvantaged children helps to improve learning as well as providing other community benefits (Putnam, 2015).

Addressing Adequacy and Equity

In order to optimize social mobility outcomes, the issues of "ecological equity" and adequacy and equity must be addressed concurrently. These issues are not mutually exclusive; they more likely have an endogenous relationship. The issue of adequacy reflects the extent to which the State of Arizona invests in public education. According to "Arizona School District Spending (Classroom Dollars) Fiscal

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Year 2013" from the State of Arizona Office of the Auditor General, the State of Arizona expended an average of $7,496 per pupil in 2013 (the mean per pupil expenditure for students in this study was $7,423), which is 37% less than the national average of $11,864 in 2013 according to *Quality Counts 2014* an annual assessment of state school spending published in *Education Week* (Lloyd and Swanson, 2014). Moreover, the large urban school district in this study—Phoenix Union High School District—expended $9,578 per pupil in 2013; an amount heavily subsidized with Title 1 funds, which is still 19% below the national average. Putnam asserts that much more money must be expended in schools within impoverished areas in order to improve their quality. "Most fundamentally, school systems need to put higher quality teachers in poor schools under conditions in which they can actually teach and not just keep order. As our comparison of two Orange County high schools illustrated in frightening detail, schools in impoverished areas face much bigger challenges. If we care about the opportunity gap, our aim must be not merely to equalize funding, but to more nearly equalize results, and that will require massively more compensatory funding" (Putnam, 2015, p.252).

In its most basic form, equity in school funding reflects the extent to which there is fairness in the amount schools are funded (usually quantified by per pupil expenditure)—in this case within the sample of students in this study, or alternatively within Maricopa County, or the State of Arizona. The State of Arizona utilizes an equalization formula to address equity. However, as described in Chapter 2, there are multiple ways that districts can obtain additional funds (such as overrides and transfers). The result, is large differences in per pupil expenditure as shown in this study—the minimum per pupil expenditure was 5,965 dollars in 2013, and the maximum per pupil

expenditure was 9,578 dollars in 2013 for a range of 3,613 dollars. If we define adequacy as providing the minimum funding necessary for students to succeed and further define equity as *equality in outcomes* then education funding in Maricopa County and the State of Arizona is not adequate or equitable.

Benefits of Education Policy Transformations

The key to understanding the benefits of educational policy transformations is the realization that addressing adequacy and equity, and advancing towards "ecological equity" benefits not just the students who reside in disadvantaged areas, but also the entire region. The region will benefit from an overall increase in economic activity, more qualified workforce, more discretionary spending per capita, higher rate of entrepreneurship, bigger tax base, decrease in persons requiring government economic subsidy, lower crime rates, among other economic and social benefits. Educational policy changes ultimately pay for themselves by reducing expenditure on other economic subsidies in the long term and enhancing economic output. Putnam cites research by Clive Belfield et al. (2012) in which Belfield estimates the annual and lifetime costs imposed on taxpayers as well as society as a whole for "opportunity youth" who are people (16-24) neither in school nor at work. They estimate the lifetime taxpayer burden of 1.59 trillion and the societal lifetime burden of 4.75 trillion. Most of these costs are lost earnings, lower economic growth, and lower tax revenue—less than 5 percent reflect the cost of welfare programs (Putnam, 2015). In short, it costs us a lot more to *not* implement necessary changes to educational policies that address "ecological equity" and adequacy and equity.

Limitations

This study operationalizes student under preparedness as placement into developmental education. This study relies on the Maricopa County Community College District methodology for developmental education placement, which is the ACCUPLACER test. The population of this study consists of Maricopa County Community College District students who attended a Maricopa County public K-12 school district, and who took placement testing at MCCCD for course placement during the fall 2013 semester. Purposive sampling was used to identify students who currently attend MCCCD and took placement tests to enter MCCCD during fall 2013. Approximately, ten percent of the students in the sample did not graduate from high school in 2013, ideally all of them would have. The sample may not be representative of all students in Maricopa County or the State of Arizona.

Recommendations for Research

The purpose of this study was to understand the relationship between per pupil expenditure in Maricopa County K-12 public school districts and student under preparedness at the postsecondary level, specifically at the MCCCD. The population in this study was limited to students in Maricopa County public school districts who attended one of the Maricopa County Community College District institutions in Fall 2013. A future study may endeavor to expand the population sample to include students who attended other institutions of higher education. Also, this analysis utilized two separate independent variables in order to assess the relationship between per pupil expenditure at the secondary level and student preparedness at the post-secondary level. The first model used per pupil quartiles (expenditure) as the independent variable and

student preparedness as the dependent variable. The second model used an interaction between Arizona Department of Education high school letter grade and per pupil expenditure (per pupil quartiles) as the independent variable and student preparedness as the dependent variable. The logistic regression Model 2 results did not show significance for the fourth quartile where the most money was expended per pupil when the independent variable was an interaction between Arizona Department of Education high school letter grade and per pupil expenditure (per pupil quartiles). There may be a relationship between Arizona Department of Education high school grade and poverty quotient. That is, the higher the poverty quotient of the high school district the lower the high school grade. It would be beneficial to explore this relationship. Additionally, a longitudinal element could be added to this study that tracks social mobility outcomes over time for a cohort of students, essentially comparing social mobility outcomes for students grouped by educational expenditure levels and relevant covariates.

Conclusion

This analysis utilized two separate independent variables in order to assess the relationship between per pupil expenditure at the secondary level and student preparedness at the post-secondary level. The first model used per pupil quartiles (expenditure) as the independent variable and student preparedness as the dependent variable. The second model used an interaction between Arizona Department of Education high school letter grade and per pupil expenditure (per pupil quartiles) as the independent variable and student preparedness as the dependent variable. The difference between the two models is stark—Model 1 (only per pupil quartiles) shows that the students in quartile four, where the most money is being spent, are the least likely to be

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prepared—that appears to be because the students in quartile four are largely made up of students that are socio-economically disadvantaged. The results of Model 2 are consistent with the notion that increased per pupil expenditure and more effective schools will result in a higher proportion of college ready students.

This study shows that the issues of "ecological equity" as well as adequacy and equity in public school funding must be addressed concurrently to improve scholastic outcomes and related life chances for youth in Maricopa County, particularly for those that are socio-economically disadvantaged. Currently, investment in public education in Maricopa County and the State of Arizona is not adequate or equitable. Investment in public education and other related social investments should be viewed as a prerequisite to an economically and socially mobile citizenry where life chances are not contingent upon initial life circumstance—it is only when all of our children have democratic access to upwardly mobile outcomes that our democratic ideals are realized.

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APPENDIX A

STUDENTS BY ADE HIGH SCHOOL GRADE AND DISTRICT

Students by ADE High School Grade/District

District	ADE High School Grade			Total
	C	B	A	
Agua Fria Union High School District	0	426	0	426
Buckeye Union High School District	0	110	39	149
Cave Creek Unified School District	0	0	83	83
Chandler Unified School District	0	0	627	627
Deer Valley Unified School District	1	350	285	636
Dysart Unified District	197	172	0	369
Fountain Hills Unified District	0	30	0	30
Gilbert Unified District	1	309	329	639
Glendale Union High School District	0	107	718	825
Higley Unified School District	0	152	0	152
Mesa Unified School District	180	508	362	1050
Paradise Valley Unified District	9	381	296	686
Peoria Unified School District	102	463	218	783
Phoenix Union High School District	1123	244	8	1375
Queen Creek Unified District	0	83	0	83
Scottsdale Unified District	75	159	138	372
Tempe Union High School District	30	131	517	678
Tolleson Union High School District	543	0	0	543
Wickenburg Unified District	28	0	0	28
	2289	3625	3620	9534