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Evaluating the Effects of the Arkansas Scholarship Lottery on College Participation

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by

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Abstract

In recent years, lottery scholarship programs have become a popular policy program for states that wish to help students afford higher education without having to raise new taxes. Through a statewide lottery, profits from the program are passed onto college students in the form of merit-based scholarships. Even with strong opposition from opponents who questioned how much a lottery would benefit the entire population of the state, the Arkansas Scholarship Lottery was created via voter referendum in 2008.

A key goal of the Arkansas Scholarship Lottery was to increase college participation, especially among underrepresented students. The study therefore sought to examine whether or not there has been a significant increase in college participation since the implementation of the program, both statewide and among a sample of high poverty counties. At the same time, human and social capital variables were examined through weighted least squares regression to see which community variables, if any, helped explain the rate at which high school graduates from an Arkansas county earn lottery scholarships.

The results of the study indicated that although there has been a significant increase in college participation across the state, the sample of high poverty counties did not witness a significant increase. The study also found certain human and social capital variables help to explain variation in lottery scholarship success across Arkansas counties, including education attainment, median income, population migration, and number of school activities offered. Although a clear model for predicting lottery scholarship success was not reached, recommendations were made to help the Arkansas Scholarship Lottery address some of its issues, namely the effect it has on college participation rate in high poverty counties.

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Dedication

This dissertation is dedicated to the people that made a college education possible for me: my parents, Chuck and Melody Pittman; my paternal grandparents, Ralph and Edythe Pittman; and my maternal grandparents, John and Helen Lauer. Their hard work and sacrifices through the years made it possible for me to receive a world-class education, and for that, I am forever grateful.

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Chapter I

Introduction

Context of the Problem

In 2008, the citizens of Arkansas passed an amendment to the state's constitution that allowed the legislature to create a lottery system that would use its revenues to fund college scholarships for high school graduates attending an in-state higher education institution. Two years later, the Arkansas Scholarship Lottery was fully implemented and the first class of students to receive the lottery scholarships entered college. Millions of dollars have been spent on the program and 98,279 students have already received funds from the lottery to attend college (Arkansas Scholarship Lottery, 2014).

Although a number of states have implemented their own lottery scholarship programs, the stakes are particularly high for Arkansas. The state has a relatively low college participation rate, particularly when it comes to low-income students (Pathways to College Network, 2012). One of the primary goals of the lottery program was to expand higher education opportunities for low-income students by making a college education more affordable. For the state to increase its human capital and improve its economic development, a key policy initiative for the governor's office, the Arkansas Scholarship Lottery needs to create meaningful gains in college participation among all demographics of the state's population.

Even though the Arkansas Scholarship Lottery is relatively new, there is now enough data available to measure the program's early successes in improving college participation rates across the state and among low-income students. The study also examined what effects, if any, human and social capital has on lottery scholarship application success in Arkansas counties. The study concluded with a discussion of policy implications along with recommendations for improving the program's performance in the future. As Arkansas continues its quest to further improve its education system, the Arkansas Scholarship Lottery will undoubtedly play a key role in how successful those efforts will be over the coming years.

Statement of Purpose

The purpose for conducting this study was to evaluate if the Arkansas Scholarship Lottery is reaching one of its most important goals: increasing college participation across Arkansas, particularly among traditionally underrepresented groups. The opening paragraph of the rules and regulations for the lottery scholarship program included:

> The Arkansas Academic Challenge Scholarship Program has been expanded to provide opportunities for higher education to previously underserved Arkansans (traditional students, currently enrolled college students and nontraditional students) due to the additional funding made possible by the Arkansas Scholarship Lottery (Arkansas Secretary of State, 2012).

Compared to other states, Arkansas has a relatively low college participation rate. In 2009, Arkansas was 38th in the country in college participation with 14.9% of adults ages 25-39 with a high school degree enrolled in postsecondary education (Pathways to College Network, 2012). Among low-income residents between the ages of 18-24 in the state, Arkansas has witnessed a slight increase in college participation from 16% in 1993 to 25% in 2009, the 30th best rate in the nation (Pathways to College Network, 2012). Even with this upward trend of low-income student participation over the past two decades, there remains room for significant growth.

Aside from college participation, another major concern for Arkansas policymakers is the state's higher education attainment rate. According to the United States Census Bureau (2014), 19.8% of Arkansans over the age of 25 have at least a bachelor's degree, much lower than the national average of 28.5%. State policymakers have taken notice of these figures in recent years, with many beginning to argue that improving the attainment rate is a major imperative for the state if it wishes to experience economic development over the next decade (Arkansas Economic Development Commission, 2012). Arkansas's four-year institutions need to become more accessible to students who qualify for admission, regardless of their family's income status. Among other programs, the Arkansas Scholarship Lottery seems to be the centerpiece of the state's initiative to not only increase college participation, but to also, over time, graduate more of these students from four-year institutions (Arkansas Economic Development Commission, 2012).

The study also examined what effect an area's social capital has on the rate at which its public high school graduates earn a lottery scholarship. A significant amount of the literature on lottery scholarship programs has focused on the socioeconomic distribution effects of lottery scholarships, specifically whether or not the programs are effectively a regressive tax, a type of system where people with low-incomes pay higher percentages of their earnings than those with higher incomes. To test this hypothesis, researchers often use measures of human capital, such as educational attainment. The study examined human capital measures to explain variation in lottery scholarship success among Arkansas counties. Using the same sample, the study also explored what effects social capital may have on lottery scholarship success. Social capital has been studied in the past to see how it affects college-going expectation in various communities. The idea in this study was to see if social capital is also having an effect on lottery scholarships.

Statement of Research Questions

1. What is the profile of Arkansas residents who purchase lottery tickets, and is it similar to the profile of lottery scholarship recipients?

2. Have there been significant changes in college participation rates for the state of Arkansas since the implementation of the Arkansas Scholarship Lottery?
3. Have there been significant changes in college participation rates among Arkansas's poorest counties since the implementation of the Arkansas Scholarship Lottery?
4. Are there significant differences in human capital that explain variations in the success of high school graduates receiving a lottery scholarship?
5. Are there significant differences in social capital that explain variations in the success of high school graduates receiving a lottery scholarship?
6. Based on the findings, what are the policy considerations for institutional and state leaders?

Limitations of the Study

1. Although Putnam (2000) provided an extensive list of examples of social capital variables, there is not a universally accepted list of variables within the research community. This research study used a variety of different social capital variables that have been used in previous works. There is no precise method to measure the actual social capital in a community, however, meaning that some variables may have been overlooked in the study, which undoubtedly impacted the results.
2. At the moment, the Arkansas Department of Higher Education (ADHE) reports the percentage of graduating seniors from public high schools who received a lottery scholarship in each county. Although the data are helpful, there are certain limitations that should be recognized. ADHE, for example, does not report how many graduating seniors from a county decided to attend an out-of-state institution. A common belief among higher education administrations is that, on average, students attending an out-of-

state institution come from more affluent families, both in terms of education and wealth (Hoover & Keller, 2011). Realizing this, it is safe to assume that a sizeable percentage of these students attending out-of-state colleges would have received a lottery scholarship if they had decided to attend an institution in Arkansas. Out-of-state enrollment figures would be important because it would allow future researchers to estimate the percentage of high school graduates who were eligible to receive a lottery scholarship based upon their college choice (i.e. remaining in the state of Arkansas).

3. Another limitation was the study's reliance on county-level data. At the moment, ADHE data on who buys lottery tickets and who benefits from the program are presented on the county-level. Although this information can be very beneficial, it caused the researcher to overlook economic disparities that could exist within a single Arkansas county. For example, some of the state's most populous counties, including Pulaski and Benton, are considered to have high levels of income inequality (Shelnut & Yao, 2005). This created a significant issue because, for example, the percentage of students receiving a lottery scholarship may not accurately reflect certain communities within the county. The same is true for other variables that were considered, including those related to both human and social capital. The study would have likely been able to reach more conclusive results to the research questions posed if the lottery data were presented by zip codes, which likely have more homogenous populations when it comes to socioeconomics. Regrettably, though, the county-level data continues to be used by ADHE, forcing all of the variables in the study to be considered on the county-level.
4. Although researchers continue to learn more about college choice theory, there are innumerable variables that can affect a student's decision to attend college. Even if a

student comes from a community with high levels of human and social capital, there is always a chance he/she could decide to not attend college, even with the added financial incentive of a lottery scholarship. The unpredictably of college choice therefore served as a limitation to the study.

Assumptions of the Study

1. Previous research has demonstrated a strong correlation between a community's human capital and its students' success at obtaining lottery scholarships (Rubenstein & Scafidi, 2002; Price & Novak, 1999, 2000). The accepted assumption, therefore, is that Arkansas counties with higher levels of human capital would also produce higher percentages of students who receive a lottery scholarship.
2. Although researchers have yet to consider the correlation between a community's social capital and lottery scholarship success, the study assumed that there is a connection between community social capital and student success at obtaining lottery scholarships. Previous researchers, such as Coleman (1988) and Putnam (2000), have found connections between social capital and education success. Considering the education requirements necessary to receive a lottery scholarship and eventually attend college in the state of Arkansas, it was reasonable to believe that there was a connection between community social capital and lottery scholarship attainment.
3. A significant percentage of students, particularly those coming from the lower and middle class, often use cost-benefit analysis when deciding whether or not to attend college (Mullen, 2010). Although many students believe that a college degree will lead to a better life, those coming from less affluent families are often concerned that the costs will not outweigh the intended benefits in the end. When used effectively, programs such

as the Arkansas Scholarship Lottery can provide enough funding to lower the cost of higher education to a level that convinces a student that it is in his/her best interest to go to college.

Operational Definitions

1. Arkansas Scholarship Lottery: The lottery program that is currently in place to fund scholarships for high school graduates who decide to attend an in-state higher education institution. To qualify, a student must complete high school with a 2.5 GPA or score at least a 19 on the ACT. Up until 2013, students who qualified received either $4,500 to attend a four-year institution in the state of Arkansas or $2,250 to attend a two-year institution. The program follows a similar model from lottery scholarships that were implemented in other southern states, including Tennessee and Georgia.
2. College Participation: The college participation rate is the percentage of college-eligible students (i.e. recipients of a high school diploma or equivalent) who decide to attend a postsecondary institution. For the purpose of the study, college participation will only be analyzed for students who attend either a two-year or four-year institution. In the state of Arkansas, a county's college participation rate is calculated by dividing the number of first-time college enrollees from the county by the public high school graduates in a given year. College participation rate can also be referred to as college-going rate.
3. Higher Education Attainment: The percentage of citizens within a state or a county who have received a degree from a higher education institution. In most cases, this includes anyone over the age of 25 who has received an associate's degree and/or bachelor's degree; for the purpose of the study, bachelor's degree attainment rate is only considered.

4. Human Capital: Human capital is the sum total of knowledge and skills within a community (Green & Haines, 2012). In recent decades, human capital has become an important element of community economic development (Shaffer, Deller, & Marcouiller, 2004). This study primarily focused on three important variables that are used to measure human capital: educational attainment, income, and the employment rate. Other variables that can be used include workforce development initiatives and community health.
5. Social Capital: Social capital is the accumulation of trust and relationships that exist throughout a community (Putnam, 2000; Murray, 2012). Like human capital, economists have begun to argue in recent years that high levels of social capital are needed to help spur community economic development (Shaffer, Deller & Marcouiller, 2004). A variety of social capital variables were used for the purpose of this study, ranging from population migration to the percentage of single-parent homes in a community.

Theoretical Framework

Numerous research studies have shown that the cost of higher education plays a significant role in a student's decision to attend college (Leslie & Brinkman, 1987; St. John, 1990; Kane, 1995; Heller, 1997, 1999). The primacy of higher education cost becomes more pronounced for students who come from a lower-income background. According to Mullen (2010), students who come from low-income backgrounds or are first-generation college students often view higher education using cost-benefit analysis. In order for college to be an attractive option, the long-term benefits must outweigh the initial costs of attending an institution. Educating the public about the long-term benefits of a college degree is indeed important, but so is seeking ways to make higher education more affordable. The Arkansas Scholarship Lottery was intended to make college more affordable for students to make it more likely that they will attend college and eventually graduate. For students who come from more affluent backgrounds, a lottery scholarship could make attending an in-state institution more attractive. Previous studies have shown the effect that lottery scholarship programs have had on affluent students, with data showing states being able to better retain their most academically gifted high school graduates (Zhang & Ness, 2010). The focus of this study, though, was to see what effect, if any, the Arkansas Scholarship Lottery has had on college participation for students coming from poorer backgrounds. With more financial aid awards in the system, college participation in Arkansas should increase. The study, though, wished to see if those increases are being seen across socioeconomic groups, particularly those coming form impoverished counties.

The framework of the study also considered the factors that would affect a student's ability to secure a lottery scholarship. Previous studies have shown that students coming from areas with low levels of human capital often struggle to earn lottery scholarships at rates similar to more affluent students (Rubenstein & Scafidi, 2002; Price & Novak, 1999, 2000). As is the case with previous research focusing on the socioeconomic distribution of lottery scholarships, the study considered what role human capital variables play in explaining variations in lottery scholarship success. A new set of variables, though, was incorporated to see what effect, if any, a community's social capital can have on students successfully applying for lottery scholarships in the state of Arkansas. Previous research has found some correlation between social capital and educational outcomes (Coleman, 1988; Putnam, 2000). Considering the previous research, there was a strong possibility that high levels of social capital within an Arkansas county would have a positive effect on its percentage of high school graduates who receive a lottery scholarship and decide to enroll in college.

Significance of the Study

This study was significant because it provided insight into whether or not the Arkansas Scholarship Lottery is meeting one of its primary goals: increasing college participation among underrepresented groups, particularly lower-income high school graduates (Arkansas Secretary of State, 2012). After three years of having a lottery scholarship program, the state should logically see modest to significant gains in college participation across the state. With such a significant infusion of millions of dollars into the system to help pay for college, failure to see any gain in college participation in Arkansas would make the lottery program an abject failure. The question, though, was whether or not counties with high poverty rates were also witnessing significant gains in college participation among their students. The first three research questions of the study are therefore a traditional policy analysis, meaning that the research will analyze whether or not the policy program is meeting its predetermined goals. Not only is this valuable information for Arkansas policymakers, but also for the voters who approved Constitution Amendment No. 3 in 2008.

Once the study completes its analysis of the lottery's effect on college participation, it went one step further in examining the variation that exists among counties in Arkansas when it comes to the success of high school graduates receiving a lottery scholarship. As the lottery continues to mature over the next decade, Arkansas policymakers will need to gain an understanding of how best to allocate promotional resources for the lottery scholarship program, ranging from advertisements to actual counseling of students. The state could simply choose a couple of dozen counties with high poverty rates and dedicate their resources to promote the program to those students and get them interested in the prospect of college. Even with their economic similarity, there are other variables that could affect student success in securing lottery scholarships. Community measurements of human capital, for example, can help predict the likelihood that qualifying students will have the motivation, and the knowledge, to submit a strong lottery scholarship application. By identifying significant human capital variables, state policymakers will have a better sense of where they can more efficiently dedicate resources that will not only teach qualified students about the program, but also provide them the counseling necessary to help create a successful application. By doing this, it will become much more likely that the Arkansas Scholarship Lottery will accomplish its goal of increasing college participation among underrepresented groups.

Finally, the study went a step further than previous lottery scholarship research and will also consider social capital variables. In the past, research studies have focused on human capital measures, such as the correlation between a county's higher education attainment rate and the percentage of high school graduates who receive a lottery scholarship. Although this information is important to understanding lottery scholarship programs, this study examined what role, if any, social capital can have on lottery scholarship success within an Arkansas county. To accomplish this, a number of different measures of social capital were used, ranging from civic participation to the percentage of homes with access to broadband internet. Through this research, policymakers should be able to learn if high levels of social capital are able to outweigh low measures of human capital, such as a low median income. If social capital turned out to be an important variable, policymakers could begin to explore cost-effective methods for increasing social capital within certain counties, which could in turn have a net positive effect on both lottery scholarship success and overall college participation rates in these areas. Although further research will needed to confirm that social capital can play a role, this study should be a step in the right direction when it comes to researchers' basic understanding of how lottery scholarship programs can be used to increase college participation rates, particularly for students from impoverished areas.

Chapter II

Review of the Relevant Literature

Introduction

For the purpose of the literature review, this chapter was divided into three primary sections. The first section detailed the history of the Arkansas Scholarship Lottery, which the people of Arkansas voted to create in 2008 (Nelson & Mason, 2007; Nelson, 2008). This section also included details about the current status of the program, including current requirements for students interested in receiving a lottery scholarship (Arkansas Department of Higher Education, 2012; Arkansas Scholarship Lottery, 2014). The second section focused on the research behind college-going and college choice decisions (Chapman, 1981; Jackson, 1986; Hossler & Gallagher, 1987; Hossler, Schmit, & Vesper, 1999; Mullen, 2010). Particular attention is paid to the economics of college choice, including research on how the price of higher education affects college choice (Leslie & Brinkman, 1987; St. John, 1990; Kane, 1995; Heller, 1997, 1999). Finally, the third section looked at the two primary capitals that are considered in the study, both human (Becker, 1962, 1971; Kiker, 1971; Hansen, 1971; Schultz, 1971) and social capital (Brehm & Rahn, 1997; Putnam, 2000; Murray, 2012; Green & Haines, 2012). The discussion in this section focused on how each connects to education.

Section I: History of the Arkansas Scholarship Lottery

When considering the agenda setting literature in relation to the successful passage of the Arkansas Scholarship Lottery in 2008, Kingdon's (2011) description of the role of policy entrepreneurs should be discussed. Kingdon (2011) explained the importance of policy entrepreneurs during the agenda setting process when he wrote:

> These entrepreneurs are not necessarily found in any one location in the policy community. They could be in or out of government, in elected or appointed positions, in interest groups or research organizations. But their defining characteristic, much as in the case of a business entrepreneur, is their willingness to invest their resources—time, energy, reputation, and sometimes money—in the hope of a future return. That return (p. 122) might come to them in the form of policies of which they approve, satisfaction from participation, or even personal aggrandizement in the form of job security or career promotion (p. 123).

According to Nelson (2008), the policy entrepreneur for the program was Bill Halter, who served as the lieutenant governor of Arkansas during the 2008 campaign to amend the state constitution so that it would allow a lottery system. It is difficult to ascertain the true reason that a policy entrepreneur decides to become the champion for a specific policy issue. Regardless, Lt. Governor Halter's decision to become the policy entrepreneur for a state-wide lottery scholarship was similar to a strategy that other politicians had used to gain higher political offices, including Zell Miller in Georgia and Steve Cohen in Tennessee (Nelson & Mason, 2007). In states throughout the South, statewide lottery scholarship programs, even when faced with initial opposition, had become very popular because they were contributing money to what were deemed worthy high school students, many of whom were the children of middle-class voters (Cornwell, Mustand & Sridhar, 2006). Although Lt. Governor Halter never came out and stated that his goal was to attain higher office, there are previous examples of southern politicians receiving the "return" that Kingdon (2011, p. 123) describes in the form of higher office.

Although Lt. Governor Halter's name has become synonymous with the Arkansas Scholarship Lottery, it is important to note that he was not the first individual to advocate for a statewide lottery. The lottery had actually been debated in Arkansas since the 1980s, but there was always some issue that would prevent the creation of the program. For example, Governor Bill Clinton was a staunch opponent of a lottery during the 1980s (Nelson & Mason, 2007). After Clinton softened his stance against the lottery, state legislators in 1990 pushed for a constitutional amendment that would allow a lottery to get on the ballot, but it quickly lost support once it became clear that the initiative's organizer forged signatures on the ballot petition (Nelson & Mason, 2007). During the 1990s and early 2000s, though, states bordering Arkansas began to adopt their own lottery systems, including Tennessee and Louisiana. As these lottery programs in rival states were implemented, a common refrain among lottery supporters in Arkansas was that the state was losing potential revenue to rivals as citizens in border communities crossed state lines to buy lottery tickets (Nelson & Mason, 2007).

During the 2006 race to replace the deceased Winthrop Rockefeller as lieutenant governor, Halter began to publicly advocate for the creation of a statewide lottery system that would fund college scholarships for students attending an in-state institution (Clinton School, 2006). Halter defeated his 2006 opponent, Republican State Senator Jim Holt, by a margin of 57.55% to 42.55% of the popular vote (Green Papers, 2013). Soon after assuming office, Lt. Governor Halter continued his advocacy for the new program. Even though previous proposals had failed to pass, public polling consistently showed that a majority of Arkansans favored the creation of a lottery, provided that the revenue from the program would be used to fund education (Weist, 2008). As has been the case in other southern states that had passed lottery amendments, Halter faced strong opposition, such as the Arkansas Faith and Ethics Council (AFEC), a faith-based organization known for its staunch opposition to moral issues such as alcohol, pornography, and gambling. In an essay concerning the possible adoption of a lottery, the executive director of AFEC, Larry Page, stated:

> The lottery can be described as the most insidious form of gambling [. . .] The regressivity of the lottery as a tax is such an established fact that even the most clever economists hired by the lottery proponents cannot convincingly refute it. Second, since the state, not a private sector entity, operates the lottery with the knowledge of the toll it takes on the economically disadvantaged, it is a case of the state acting as an economic predator of its weakest citizens (Warren, 2007, n.p.).

Page's argument was one similar to what many anti-lottery groups have argued in the past: the lottery serves as a de facto regressive tax with poorer individuals buying tickets with what little disposable income they have (Rubenstein & Scafidi, 2002). Led by Page's group, other faith-based organizations, most of which came from conservative Christian denominations such as the Southern Baptists and Assemblies of God, joined the battle against the lottery. Supporters of the lottery created a campaign organization entitled Hope for Arkansas, and hired Marvin Schwartz to serve as the official campaign manager (Randall, 2008). Although the Hope for Arkansas campaign initially held a major fundraising advantage (Associated Press, 2008), lottery opponents coalesced together to create almost a 2-1 advantage cash advantage by October 2008 (Log Cabin Democrat, 2008). Even with the campaign cash disadvantage, Hope for Arkansas advertisements once again focused on two key areas: making college affordable and ending the practice of Arkansans buying lottery tickets in border states. Even with strong opposition from AFEC and other religious organizations that opposed the lottery, Proposed Constitutional Amendment No. 3 passed with 62.8% of the popular vote.

Following Hope for Arkansas's victory in the 2008 election, the Arkansas General Assembly passed Act 606 of 2009, which is often referred to as the Arkansas Scholarship Lottery Act. The General Assembly decreed that all students graduating from an Arkansas high school must have at least a 2.5 high school GPA or a 19 ACT score to qualify for a lottery scholarship (Arkansas Department of Higher Education, 2012). Eligible students must submit an application to the Department of Higher Education along with a FAFSA to the federal government. As of the 2012-2013 academic year, successful applicants received either a $4,500 a year scholarship to attend an Arkansas four-year institution or $2,250 for a two-year institution. To retain the scholarship, recipients must maintain at least a 2.5 college GPA and stay on pace toward graduation, which means completing at least 27 credit hours the first year of college and 30 credit hours each subsequent year (Arkansas Department of Higher Education, 2012). By the end of 2013, 98,279 lottery scholarships had been awarded in Arkansas (Arkansas Scholarship Lottery, 2014).

Although the study focused on only the first three years of the program, it is important to note that the Arkansas Scholarship Lottery underwent a significant change in spring 2013. As the lottery faced potential budget shortfalls, the Arkansas state legislature debated a number of measures to make-up for the declining revenue. As had been in the case in other southern states, lottery revenues had been unable to keep pace with the increasing demand for the awards (Lyon, 2012). After considering a number of proposals to either cut the lottery or increase the eligibility requirements to receive the award, the General Assembly voted to decrease the initial award to $2,000 for all lottery recipients, a policy change that Senator Johnny Key of Mountain Home first proposed (DeMillo, 2013). For each year a student persists through college, the award will increase $1,000 annually, reaching a maximum of $5,000 for a student’s senior year of college (Brantley, 2013). Although it will take three or more years of data to determine what effect, if any, the changes will have on college participation in Arkansas, former Lt. Governor Bill Halter has already denounced the changes to the program (DeMillo, 2013). Once again, this study focused on the success of the lottery program before the new award system is fully implemented. Future research should focus on what effect the new law has on college participation across the state, particularly among students from low-income areas.

Section II: Research on College-Going Decisions

General College Choice Theories

For most of the 20th century, college administrators did not have to spend a significant amount of time and resources on recruitment activities (Chapman, 1981). During the 1980s, however, administrators began to notice a sharp decline in the number of applications they were receiving, making college recruitment much more important if they wished to enroll enough students to justify the size of their campus communities (Chapman, 1981). Not surprisingly, with this new demand, there was an increase of research concerning the factors that play a role in a high school student's college decision. Within the field, most of the early theories include some type of stages model that focused upon the psychology of college choice. For example, Chapman (1981) argued that students go through a two-stage process when choosing a college: search and choice. Through his work, Chapman proposed strategies for colleges and universities to not only identify prospective students, but also reach out to them and communicate why their school was the best possible institution.

Since Chapman's study, a number of researchers have developed their own variation of the stages model. For example, Jackson (1986) proposed a three-stage model that included the preference, exclusion, and evaluation stages. The model that has arguably gained the most acceptance within the admissions community, however, has been Hossler an Gallagher's (1987) three-stage model. On the surface, Hossler and Gallagher's (1987) model is quite similar to Chapman's model, except that it adds a new stage, the predisposition stage. According to Hossler and Gallagher (1987), the predisposition stage is often overlooked because it occurs so early in one's high school career. This stage is incredibly important because during this period, not only do students determine whether or not they want to go to college, but they also begin to consider potential institutional types. Next is the search stage, where students actively consider different institutions, reading about their many attributes and in some cases, actually visiting potential campuses. The final stage, the choice stage, is when students choose which schools to apply to and ultimately, what school they should attend. Since its initial publication, colleges and universities have used the three-stage model for developing communication strategies for prospective students.

With higher education becoming viewed as a vital investment in human capital, researchers have focused on the predisposition stage of college choice, where potential college students often decide whether or not higher education is a viable option. Hossler, Schmit, and Vesper (1999) examined this issue to see what areas of a student's background could affect his/her decision to attend college. Among other findings, they found that parental education attainment high school achievement, and extracurricular participation were all important variables in determining a student's propensity to attend college. The most important variable, though, was the amount of parental support a student receives from parents. Even in instances where parents did not attend college, their persistence that a student will attend college can outweigh their own lack of education attainment.

Over the previous decade, some researchers have attempted to explore differences in college choice decisions between students from different socioeconomic groups. Using a qualitative design, Mullen (2010) conducted a series of interviews with students from two different institutions: Yale University and Southern Connecticut State University. As Mullen (2010) pointed out, although the two schools were only seven miles apart, they each serve two very different types of students. Although Yale has gotten more diverse in recent years, a significant percentage of their students still come from very affluent families. Southern

Connecticut State, on the other hand, has more students come from a working-class background. Mullen (2010) conducted a series of interviews with students from both schools to analyze differences in both college choice and the higher education experience. Mullen (2010) found that students at Yale viewed college as “the next step” (p. 74), and few had reflected on what they should get out of a college education. Southern Connecticut State students, on the other hand, tended to use cost-benefit analysis to decide whether higher education was right for them. Simply, the potential benefits of a college degree (i.e. higher salaries) had to outweigh the costs; only then would a college education make sense. Although Mullen’s (2010) study was limited to only two institutions, it did show that socioeconomic backgrounds could affect how a student views the college choice process, particularly when making the decision whether or not to enroll at a higher education institution.

Researchers have also attempted to explore variations among college choice among students coming from different racial backgrounds. Perna (2000) used an econometrics model to explore variations in college enrollment among three groups: African American, Hispanic, and white high school graduates. Using data from the National Education Longitudinal Study (NELS), Perna (2000) found that white high school graduates attend four-year colleges at much higher rates than the other two groups, which is likely due to the higher educational attainment rates and median incomes for white families in the United States. When Perna (2000) controlled for less commonly researched variables that deal with social and cultural capital, however, she found that Hispanics were just as likely to enroll in a four-year college as white students. Controlling for social and cultural capital variables also showed that African American students were more likely to enroll than white students. Perna (2000) concluded that although finances can explain some of the variation in college choice decisions among racial groups, more analysis is needed to look at other potential variables, including social and cultural capital.

Economics and College Choice

College choice theorists have attempted to explain the relationship between a school's tuition rate and the probability a student would enroll at the institution. Although the stages models address tuition and financial aid in some way, their models lack the predictive power necessary to scientifically estimate how exactly cost affects college choice. Leslie and Brinkman (1987) conducted a literature review of previous studies with similar research questions concerning the relationship between tuition and college choice. Through their analysis, they created the Student Price Response Coefficient (SPRC), which measures changes in a single student's participation rate with every $100 increase in tuition. Leslie and Brinkman (1987) found that for every $100 increase in tuition, the likelihood that a student would enroll at a given institution decreases approximately 0.7 percent. With this study, the SPRC became an important model for researchers interested in the relationship between tuition and a student's decision to enroll at a specific college.

Since the publication of Leslie and Brinkman's article, subsequent researchers have applied the concepts of the SPRC to their own studies. Using data from the federal IPEDS database, Kane (1995) found that a $1,000 tuition increase at a community college led to an SPRC of -3.5, a significant indicator of the negative effect that tuition increases can have on enrollment. Other researchers have studied whether or not SPRC varies for different socioeconomic groups. St. John (1990), for example, found that tuition decreases had a stronger positive effect on lower income students than those whose family have an income level in the upper quartile of American families. SPRC has even been applied to financial aid offers, with researchers such as St. John and Noell (1989) concluding that the higher an aid offer, the more likely a student will attend the institution.

Ten years after the publication of Leslie and Brinkman's (1987) study, Heller (1997) conducted his own literature review of the subsequent tests of their SPRC. Using over 20 articles, Heller (1997) found evidence to support Leslie and Brinkman's original assertion, writing, "Increases in tuition lead to decline in enrollment. The consensus among the studies reviewed is that every $100 increase in tuition results in a drop of enrollments of 0.5 to 1.0 percentage points across all types of institutions" (p. 650). Heller (1997) also found evidence to support the hypothesis that students from lower socioeconomic groups are more price sensitive than students from higher groups. Heller (1997) did mention, however, that future research into SPRC needs to take into better account the role that financial aid packages can have on a student's decision to enroll. With more institutions pursuing a policy of tuition discounting (Kiley, 2013), fewer students are being asked to pay the exact list price for tuition, making it essential that researchers begin to consider what the average student is actually paying for school.

Soon after his literature review, Heller (1999) would make yet another important contribution to the literature with his study on the effects of tuition and financial aid at public institutions. Using a fixed-effects model, Heller (1999) found evidence of increased tuition rates at public universities having a negative effect on enrollment. He also determined that decreases in state spending on merit and need based grants for in-state students has also led to a decline in enrollment decisions. Heller (1999) also recommended states stop allowing institutional boards to set tuition rates since they often ignore societal goals, like affordability and access. Instead, tuition setting authority should be given to a coordinating board or state legislature, a governing body that is more beholden to voters.

Researchers have also attempted to apply a financial nexus model that connects college choice to persistence decisions (St. John, Paulsen, & Starkey, 1996; Paulsen & St. John, 1997). Paulsen and St. John (2002) described how the model intersects between family finances and college choice when they wrote:

> Initially, students are assumed to compare the costs and benefits of attendance based on their prematriculation perceptions or expectations about financial factors; a favorable judgment results in enrollment, which establishes an "implicit contract between the student and the college (p. 194).

Using logistic regression analysis, Paulsen and St. John (2002) found that although lower and middle-income students were more likely to receive "A" grades in high school, they were less likely to enroll in four-year institutions, particularly elite private colleges that offer high-tuition, high-aid admissions programs. Paulsen and St. John (2002) concluded that tuition rates had a significant effect on these students perception of a four-year college education, and argued that without a change in the current system, higher education will resemble a vehicle for reproducing social class structure rather than allowing potential college students to better their lives.

Considering the research on the economics of college choice, the price of higher education and the financial aid available to students would have an enormous effect on students from the state of Arkansas. According to the United States Census Bureau (2014), the median household income in Arkansas is $40,531, which is below the national median income of $53,046. Likewise, Arkansas has a poverty rate of 18.7%, which is almost 4 percentage points higher than the national rate of 14.9% (United States Census Bureau, 2014). Considering its current levels of poverty, the state of Arkansas faces enormous challenges in in convincing students to attend a four-year institution and to eventually graduate. Even though there is certainly evidence of high returns on investment for college graduates (National Center for Education Statistics, 2012), the prospect of having to finance a four-year college education can be overwhelming to many students, particularly those that come from a low-income background.

Section III: Research on Human and Social Capital, and their Effects on Education

Human Capital

Over the past century, a community's human capital has played a key role in both sociological and economic research. According to Becker (1962), human capital can be measured in a number of different ways, including education, workforce training, and even the quality of health care. The primary theory is that through investments in human capital, an individual is able to raise income earning potential (Becker, 1962, 1971; Kiker, 1971; Schultz, 1971). For most studies, education and workforce development opportunities play a key role in measuring human capital. In particular, measuring human capital within a community has in recent years served as an important indicator in determining the success of economic development efforts (Shaffer, Deller, & Marcouiller, 2004).

Although human capital has been discussed for centuries, researchers have started to place more emphasis on the study of the concept, particularly in relation to education. Since World War II, the United States has dramatically increased its investments in education. Near the end of the war, the federal government instituted the G.I. Bill in 1944, which opened up higher education to returning soldiers (Thelin, 2004). Following Sputnik in 1957, the United States poured money into math and science education out of fear that American students had fallen behind the Soviets (Cohen & Kisker, 2010). Federal spending on education continued in to the 1960s and 1970s, with the government creating programs such as the Pell Grant to address economic inequalities among American students who desired to attend college (Thelin, 2004).

Although each of these policies addressed different areas of concern, they each represented an earnest attempt on the federal government's part to improve the country's human capital through investments in higher education.

As the United States continued to increase its investments in higher education, some researchers began to look at what effect increased levels of schooling had on income. Hansen (1971), for example, found a positive correlation between years of schooling and individual income, although he cautioned that more research would be needed to take into account the effects of other variables, such as work talent and family background. Schultz (1971) also began to study what effect the increased participation had on income inequality in the United States. Schultz (1971) argued that increased participation in higher education actually decreased income inequality because it weakened the stranglehold that property income had on the economy. According to Schultz (1971) property income tends to stay within certain upper-class families, and the citizens who desire property often lack the means to acquire it over the course of their lives. Through the spread of higher education, individuals investing in their human capital opened up new ways for obtaining income, therefore decreasing income inequality over time. Schultz (1971) therefore argued that students should be provided as much information as possible that would allow them to make the best choice concerning whether the benefits of investing in human capital through higher education outweigh the costs. Although Schultz's (1971) idea was more theoretical than empirically based, De Gregorio and Lee (2002) would find evidence years later to support the idea that increased access to higher education can lead to decreases in income inequality.

The connection between higher education and human capital gains can be complicated by a number of factors, including a student's background. A key element of the research on human capital is the connection between young people and their parents (Coleman, 1988; Becker, 1993). Becker (1993), for example, wrote: “No discussion of human capital can omit the influence of families on the knowledge, skills, values, and habits of their children” (p. 21). Coleman (1988) also argued that “children are strongly affected by the human capital possessed by their parents” (p. S110). The idea is that whether it is through genetics or parenting decisions, children whose parents have high levels of human capital have the potential to also eventually attain similar levels in the future, including educational attainment. Coleman (1988) was quick to point out, though, that there are no guarantees that the children will inherit their parent’s human capital, particularly if the parent spends many days away from his/her family due to job requirements. Regardless, a number of education and policy researchers tend to use human capital as a variable to predict the likelihood that a student will be able to attain a certain level of education (Rowan-Kenyon, Bell, & Perna, 2007).

Human capital does not only include the hard skills and pieces of knowledge that are attained through education. Human capital also includes soft skills that are gained through experience, such as a knowing how to navigate a difficult application process or how to prepare for a job interview. Rowan-Kenyon, Bell, and Perna (2007) conducted a study of parental involvement in college decisions, paying particular attention to how socioeconomic class affects the way they approach the process. Through their research, Rowan-Kenyon, Bell, and Perna (2007) found evidence that low-income parents, particularly those that lacked a college education, often struggle advising their students on how to approach applying to college, including filling out financial aid applications and searching for affordable institutions. The researchers concluded that state-level lawmakers should consider policies that provide more practical information for parents throughout the state so that they can feel empowered to help assist their children with their college and financial aid applications.

Human Capital and Lottery Scholarship Programs

Human capital variables have also played a prominent role in the literature on lottery scholarship programs. Along with measuring effects on college participation, many lottery scholarship researchers tend to study the distributional effects of these programs. More precisely, these researchers often wish to learn whether or not lottery scholarship programs are forms of regressive taxation, meaning that low-income, low-educated citizens are buying lottery tickets to fund scholarships for the children of affluent parents. In their study of the Georgia HOPE Scholarship Program, for example, Rubenstein and Scafidi (2002) found evidence of a regressive system where low-income, low-educated individuals buying lottery tickets at higher than average rates. In the case of Georgia, the lottery revenue goes on to disproportionately benefit middle and upper-income students receiving the lottery scholarships. Hansen, Miyazaki, and Sprott (2000) found similar results in their study of five different lottery scholarship programs, as did Price and Novak (1999; 2000) with their research on the Texas lottery system. Although research studies on lottery programs are relatively new, there does seem to be some indication that human capital plays a role not only on who buys lottery tickets, but also which type of students eventually benefit from the program with money to help support a college education.

Social Capital

The idea of social capital has been applied to research studies in a number of different fields, ranging from sociology to economics. According to Putnam (2000), Lyda Judson Hanifan, a school administrator from West Virginia, is often credited with developing the term, which she viewed as:

> [T]hose tangible substances [that] count for most in the daily lives of people: namely good will, fellowship, sympathy, and social intercourse among the individuals and families that make up a social unit (Putnam, 2000, p. 19).

Although social capital has gone through a number of different changes since the Progressive Era (Putnam, 2000), the central concept still remains: the relationships developed between members of a community can, over time, lead to significant improvements for a specified community.

Putnam (2000) brought social capital into the mainstream with his books *Bowling Alone.* In the book, he argued that the United States has witnessed a significant decline in its social capital over the past half-century. Putnam (2000) cited evidence in a number of different key measures of social capital, including civic participation, community service, and even informal social connections within a community. He correlated this decline with concurrent issues in American society, such as childhood education and neighborhood safety. Although Putnam offered very few recommendations for how to improve social capital, his point was clear: according to almost every traditional measurement, there has been a significant decline in social capital across the United States since the 1950s.

Murray (2012) also acknowledged the steady decline in social capital in his book, *Coming Apart: The State of White America, 1960-2010.* Murray (2012) argued that there has been an increasing separation between the upper and lower classes in almost every way imaginable, including wealth, social connections, and even the likelihood that an individual will be the victim of the crime. Murray (2012) correlated these issues to the decline in social capital, particularly among the lower classes that need the capital the most. With lower levels of social capital and trust, members of the lower class are far less likely to improve their socioeconomic status, and over time, the gap between the upper and lower classes will only continue to grow.

Measuring Social Capital

Although Putnam (2000) and Murray (2012) both presented strong arguments, one of the biggest problems with studying social capital is the variety of variables that can be used to measure a community's actual level of the capital. Green and Haines (2012) wrote that the "most frequently used indicators of social capital are voter turnout, newspaper readership, participation in voluntary organizations, and attendance at meetings in local organizations" (p. 144-145). Other indicators of social capital with a community have emerged, ranging from the percentage of single-parent homes (Coleman, 1988) to the percentage of community members with access to high-speed internet (Hampton & Wellman, 2003; Wellman, Haase, Witte & Hampton, 2001). With so many variables, researchers have struggled to build a comprehensive social capital model. One of the more prominent examples of social capital models is Brehm and Rahn's (1997) structural model of social capital, causes, and consequences. With the model, Brehm and Rahn (1997) argued that social capital is dependent upon the amount of trust that exists within a community, both political and social. The model therefore includes three prominent areas that are connected through reciprocal relationships: confidence in government, civic engagement, and interpersonal trust. Brehm and Rahn (1997) supported their model by specifying the three areas into multiple variables that are tested through survey research. Once again, trust and social connectedness throughout a community seem to be important indicators for measuring social capital.

Other research studies examined social capital variables that dealt more with the economic realities of a community. For example, Glaeser, Laibson, and Sacerdote (2002) argued that a key component of social capital is social mobility. The idea is that when families in a community are unlikely to leave, social capital is developed over time. A key indicator of this is a community's homeownership rate since homeowners are less likely to move away than renters or other individuals who do not own property. Not surprisingly, they found that higher levels of homeownership serve as indicators of high levels of social capital within a community. Glaeser, Laibson, and Sacerdote (2002) also found other important indicators of social capital within a community, including the breakdown of different age groups and the percentage of workers who use social skills to become successful at their jobs (i.e. service industry employees as opposed to manual laborers).

For the purpose of the study, one of the most important works that must be mentioned is Coleman's (1988) analysis of how social capital leads to the creation of human capital. To test this, Coleman (1988) looked at two important areas of social capital: capital inside a family unit and capital outside a family unit. Within the family, Coleman (1988) found that parental expectations concerning whether or not a student attends college play a key role in a youth deciding whether to pursue a college education. Outside of the family, important social capital indicators, such as mobility and type of high school attended, also played a key role in explaining whether or not students decided to further their education. Although Coleman (1988) questioned how many citizens will decide to pursue improving social capital within a community, he did find instances of social capital helping to explain a student's pursuit of improving his human capital.

Growing Social Capital in Underdeveloped Communities

Even with the growing research on social capital, a key argument that remains among researchers is whether or not social capital can actually grow within a community. Even if there is a strong correlation between social capital and student success in receiving lottery scholarships in Arkansas, there needs to be evidence that social capital can be manipulated in positive ways for a community. Using Pakistani rural villages as a case study, Khan, Rifaqat, and Kazmi (2007) analyzed the argument. Khan, Rifaqat, and Kazmi (2007) looked at a number of different areas that related to social capital, including social mobilization, health, and education. Through their study, the researchers found that when some level of social capital exists within a community, nongovernmental organizations that have an understanding of the people in these areas are able to better develop social capital. These organizations are especially important in poor and rural areas. Social capital, therefore, has the ability to grow in some areas, provided there is some organization in place to help with the efforts.

Using historical studies on poor communities in Appalachia, Duncan (2001) also addressed whether or not underdeveloped communities are able to grow social capital. Duncan (2001) acknowledged that although nongovernmental and community organizations can make a difference, the middle class of a community often thwarts meaningful change. Duncan (2001) argued that members of this group often try to identify with members of the upper class, who are fearful of changes that could occur if social capital grows, particularly among the lower classes. In order for meaningful change to occur, the middle class has to better identify with the lower classes, arguing in favor of their rights as individuals. When this unofficial coalition forms, nongovernmental and community organizations are better able to develop social capital bonds among the people of an area.

Another important element of social capital that Putnam (2000) wrote about, membership in associations, has been often directly related to socioeconomic status. Herreros (2004) considered this idea on a global perspective, comparing association membership across the developed world. Herreros (2004) found that the United States, even with its significant economic stratification and relatively small welfare state, has a relatively high percentage of citizens who join associations. When looking closer at the data, though, Herreros (2004) found that those coming from the capitalist class were 10% more likely to join an association than a member of the working class. This can be due to a number of reasons, including less flexibility with personal time and stresses that come from jobs that require large amount of physical exertion. Not surprisingly, poorer communities in the United States tend to have lower levels of social capital according to Herreros (2004). In order to improve this situation, Herreros (2004) recommended that that governmental organizations look to find ways to incentivize association membership, which in turn builds trust among members of a community.

Summary of the Chapter

The literature review served three purposes. The first purpose was to provide a historical context for the Arkansas Scholarship Lottery. Even though the lottery amendment to the Arkansas constitution passed in 2008, efforts to create a lottery system in the state had begun decades before. Even with public support, there was always some barrier to the creation of a lottery. This changed after 2006 with the election of Lt. Governor Bill Halter, who became the policy entrepreneur for a lottery system that would use its revenues to fund college scholarships for students who decide to attend an Arkansas institution of higher education. Even though the lottery had difficult opposition from evangelical Christian interest groups, Halter and his supporters were able to win at the polls in 2008. Since then, tens of thousands of Arkansas high school graduates have used the money to attend college.

The second purpose of the literature review was to analyze previous research on college choice in the United States. Hossler and Gallagher's (1987) three-stage model, predisposition, search, and choice, has been the most recognized college choice model. Although the model was often used to describe the process a student goes through when deciding whether or not to attend college, research since Hossler and Gallagher (1987) has shown that students from different backgrounds often progress through each stage differently. Mullen (2010), for example, found that students from low-income backgrounds often approach the college decision using a cost-benefit analysis, meaning that they needed proof that the long-term benefits of a college education would outweigh the short-term costs. Upper-income students, on the other hand, rarely questioned the idea of whether or not to go to college. Further research has shown how increases in the cost of higher education affect a student's choice to attend an institution, particularly if he/she comes from a family of meager resources. The research therefore shows the potential a lottery scholarship can have in encouraging students from the state of Arkansas to attend a four-year institution, especially if they come from low-income areas. Considering Arkansas's current levels of both poverty and educational attainment, the lottery scholarship should have a positive effect on college participation, particularly among students with low-income backgrounds.

The final purpose of the literature review was to analyze the concepts of human and social capital, and connect each to education policy. Over the past half-century, the United States had made extraordinary investments in human capital, often with the goal of economic development. Indeed, researchers have shown proven links between human capital and economic development. There also appeared to be a connection between levels of human capital in a community and the student success in receiving lottery scholarships to help fund a college education. With most of the previous lottery research focusing on human capital, this study intends to see if social capital can also help explain why some counties receive larger shares of the benefits of the Arkansas Scholarship Lottery than others. The hope is that the injection of social capital analysis will provide a significant contribution to the lottery scholarship literature.

The theoretical framework of the study focused on the idea that financial aid can play a significant role in a student deciding to attend a four-year college, especially if the student comes from a low-income background. Although it has a number of goals, the Arkansas Scholarship Lottery's primary objective is to increase higher education participation in a state that has relatively low levels of educational attainment.

Chapter III

Methodology

Introduction

This chapter outlines the methodology that was used to answer each of the research questions posed in the study. The chapter begins with a section on the different samples that were used in the study. The second section details the different types of data that were collected for the purpose of analysis, including the sources of each data set. The next section explains the different measures that were used in the study, along with providing operational definitions for each of the independent studies. The fourth section offers the research design and analysis. For the study, there were a variety of designs used, including one-way ANOVA and weighted least squares (WLS) regression. An ANOVA is a statistical method that compares two or more means. Through this analysis, an *F*-statistic is produced that can help explain whether an independent variable has a significant effect on a dependent variable (Kirk, 1995). WLS regression, on the other hand, is an alternative to ordinary least squares (OLS) regression that can be used when there is a fear that heteroscedasticity exists within the data (Wetherill, 1986). Finally, the methodology chapter concludes with a discussion of the different advantages and limitations of the overall research methodology. Through this chapter, researchers are able to gain an understanding of how each research question was answered, allowing them to determine what can be done to improve the methodology for future studies on the topic of lottery scholarships and what effect they have on college participation.

The following research questions were addressed through this study:

1. What is the profile of Arkansas residents who purchase lottery tickets, and is it similar to the profile of lottery scholarship recipients?
2. Have there been significant changes in college participation rates for the state of Arkansas since the implementation of the Arkansas Scholarship Lottery?
3. Have there been significant changes in college participation rates among Arkansas's poorest counties since the implementation of the Arkansas Scholarship Lottery?
4. Are there significant differences in human capital that explain variations in the success of high school graduates receiving a lottery scholarship?
5. Are there significant differences in social capital that explain variations in the success of high school graduates receiving a lottery scholarship?
6. Based on the findings, what are the policy considerations for institutional and state leaders?

Sample

Dolma (2010) described the "unit of analysis" as "the entity that is being analyzed in a scientific research" (p. 169). The unit of analysis for the study was the community. For the purpose of the study, a community was defined as an Arkansas county. For the first research question, the sample included each county in Arkansas, 75 in total. The first research question was meant to profile two key areas of a lottery scholarship program: the individuals who purchase lottery tickets and the high school graduates who receive a lottery scholarship. Many previous studies have asked similar questions to determine the distributional effects of a lottery scholarship program (Price & Novak, 1999, 2000; Rubenstein & Scafidi, 2002; Hansen, Miyazaki, & Sprott, 2000). The question that is often posed is whether or not a lottery program is a form of regressive taxation. Even though this study looked to profile both the consumers and the beneficiaries of the program, it does not intend to provide analysis concerning the distributional effects of the Arkansas Scholarship Lottery. Rather, it wished to provide important background information for those unfamiliar with the program. The second, fourth, and fifth research questions also used the same sample, including each Arkansas county for the purpose of analysis.

The second sample that is used is intended for Research Question Three. According to the United States Census Bureau (2014), the state as a whole has an estimated poverty rate (2008-2012) of 18.7%, but it includes a wide range of counties, from Grant County's 8.4% to Chicot County's 32.5%. Research Question Three used a sample of all counties with a poverty rate of 21.9% or above, which is 7 percentage points higher than poverty rate in the United States, 14.9%. Currently, there are 31 counties in Arkansas that have a poverty rate of 21.9% or above, and this group of counties served as the second sample. This sample can provide an idea of what effect, if any, the Arkansas Scholarship Lottery is having on the college participation rates for low-income students. Previous researchers have discovered multiple barriers to college for low-income students, including lack of parental savvy when it comes to navigating the application process for both college and financial aid (Rowan-Kenyon, Bell, & Perna, 2007).

One concern of conducting a policy evaluation for a single state is its generalizability for other lottery scholarship programs. Crowne (2010) described generalizability as "the extent to which the results of the study apply to individuals and circumstances beyond those studied" (p. 335). Although the sample should be large enough to generalize for the state of Arkansas, a common issue with state-level program evaluation is the difficulty of generalizing the results to other states. Indeed, Arkansas has a unique set of demographic circumstances that cannot be replicated in other states. Regardless, the goal of the research was to provide methods for evaluating the effects a lottery scholarship program has on college participation, particularly among students coming from poor backgrounds.

Procedures of Data Collection

The vast majority of the data collected came from existing databases and reports for the Arkansas Department of Higher Education (ADHE), the Arkansas Division of Legislative Audit, and the United States Census Bureau. This type of data collection is often described as the collection of factual information through web-based databases, a type of data collection that has become more common with the continuous expansion of internet access in the United States (Pachnowski, Newman, & Jurczyk, 1997). Before the data was collected, however, a proposal was submitted to the University of Arkansas Institutional Review Board (IRB) for approval. Individual higher education institutions regulate research activities on college campuses through the IRB process, which protects the rights of participants (Howe & Dougherty, 1993). Even though this particular study primarily used secondary data that is already available to the public, the IRB protocol was still followed, which is required for dissertations submitted through the University of Arkansas's Public Policy Ph.D. Program. The data collected for each of the research questions were as follows:

Research Question One: What is the profile of Arkansas residents who purchase lottery tickets, and is it similar to the profile of lottery scholarship recipients? Data was collected from two different years of legislative audits (FY2011 and FY2013) for the Arkansas Scholarship Lottery. Among other pieces of information, these audits contained three valuable pieces of county-level data for the research: the rate of total lottery sales, the rate of lottery scholarship awards, and in the case of FY2013, the rate of lottery scholarship money earned.

Research Question Two: Have there been significant changes in college participation rates for the state of Arkansas since the implementation of the Arkansas Scholarship Lottery? College participation data from the three years prior to the lottery (2007-2009) were used to find a pre-lottery grand mean for each county, which served as the first level of the factor. This data were made available by an online request to Ms. Sharon Butler, who works in the Research & Planning Division for ADHE. The post-lottery level was a grand mean for each county that was determined using college participation data from the first three years of the Arkansas Scholarship Lottery (2010-2012). Data for 2010-2012 were compiled using previous annual comprehensive reports for the ADHE, which are available for public access on the department's website.

Research Question Three: Have there been significant changes in college participation rates among Arkansas's poorest counties since the implementation of the Arkansas Scholarship Lottery? Once again using ADHE data, Arkansas college participation data were used for both the pre-lottery (2007-2009) and the post-lottery (2010-2012) levels. The important difference, though, was the sample. Rather than use data from all of the Arkansas counties, this research question only examined data from the counties that have a poverty rate of 21.9% or above.

Research Question Four: Are there differences in human capital that explain variations in the success of high school graduates receiving a lottery scholarship? There were multiple independent variables for each Arkansas county, including:

1. High school attainment (for county residents over the age of 25): The United States Census Bureau (2014) provides data concerning high school attainment for those residents above the age of 25, which is commonly viewed as the working age in the United States

2. Bachelor's degree attainment (for county residents over the age of 25): Data for bachelor's degree attainment were also obtained through the United States Census Bureau (2014).
3. Median income (for each household in a county): The data were made available through the United States Census Bureau (2014).
4. Poverty rate (2008-2012 figures for each county). The data were made available through the United States Census Bureau (2014).
5. Employment rate (for each county): The employment rate for each county in Arkansas (overall 2012 rate) was secured through the United States Bureau of Labor Statistics (2014).
6. Median value of owner-occupied housing units: The data were made available through the United States Census Bureau (2014).

Research Question Five: Are there differences in social capital that explain variations in the success of high school graduates receiving a lottery scholarship? The methodology used to answer this question was very similar to the fourth research question. Instead of representations of human capital, the independent variables for fifth research question were intended to serve as measurements of social capital. They include:

1. Number of school informal associations: The Arkansas Activities Association (2014) maintains an online database that details the student organizations and varsity sports teams available at each high school in the state. Each county was assigned a number based upon the average number of declared activities (maximum of 27) that each public high school in the county offered to students.

2. Religious adherents: The Association of Religion Data Archives (2014) tracks religious adherence throughout the United States. For the purpose of this study, the Religious Congregations and Membership Study, 2000 (Counties File) was downloaded as a spreadsheet. From the file, Row Four (All Denominations--Rates of adherence per 1000 population (2000)) of the spreadsheet was used for each county in Arkansas.
3. Population migration: Data for population migration were obtained through the United States Census Bureau (2013). The value that was used for the study was the absolute value of migration between 2000-2010 for each Arkansas county.
4. Home ownership rate (for each county): Once again, this data was obtained through the United States Census Bureau (2014).
5. Voter turnout: Clarity Elections (2012) tracks voter turnout for each county in the state of Arkansas. Voter turnout figures for the 2012 General Election were used for the purpose of this study.
6. Single-parent homes: The Annie E. Casey Foundation (2014) uses United States Census and American Community Survey data to maintain records about the percentage of single-parent homes in each Arkansas county. The data used in the study were the 2011 percentages of single-parent households in each Arkansas county.

Research Question Six: Based on the findings, what are the policy considerations for institutional and state leaders? The final research question called for a qualitative analysis to see what implications the findings of the study had for institutional and state leaders. To accomplish this, a policy outcome evaluation was used to see whether or not the primary goals of the Arkansas Scholarship Lottery had been met during its first three years of existence.

Explanation of the Independent Variables

In the study, Research Questions Four and Five each used WLS regression to answer the questions posed. Before explaining the different measures that are used to answer each question, it was first important to understand the operational definitions of both human capital and social capital. Creswell (2008) described the concept of operational definitions when he wrote: “An operational definition is the specification of how you will define and measure the variable in your study. You can find definition in published research studies on your topic” (p. 160). Realizing the importance of operational definitions, the following section provides these definitions, which have been established through previous research on both human capital and social capital:

1. Human Capital: Human capital is the sum total of knowledge and skills within a community (Green & Haines, 2012). In recent decades, human capital has become an important element of community economic development (Shaffer, Deller, & Marcouiller, 2004). This study will primarily focus on three important variables that are used to measure human capital: educational attainment, income, and the employment rate. Other variables that can be used include workforce development initiatives and community health.
2. Social Capital: Social capital is the accumulation of trust and relationships that exist throughout a community (Putnam, 2000; Murray, 2012). Like human capital, economists have begun to argue in recent years that high levels of social capital are needed to help spur community economic development (Shaffer, Deller, & Marcouiller, 2004). A variety of social capital variables are used for the purpose of this study, ranging from homeownership rate to access to high-speed internet.

For any research study, validity is an important concept that must be considered. For the purpose of this research, content validity was a serious concern, especially since both human and social capital each has a number of different possible variables for measurement. To address this concern of content validity, one method is to use previous research from experts in the field to see if the measurements “are representative of the area of interest” (Creswell, 2008, p. 172). Research explanations for each of set of independent variables in Research Questions Four and Five are therefore presented below.

Human Capital (Research Question Four)

1. High school attainment (for county residents over the age of 25) and Bachelor’s degree attainment (for county residents over the age of 25): Although many researchers have made the connection through the years, Becker (1962) was one of the first researchers to write about education as one of the most important indicators of a community’s human capital. Through educational attainment, citizens are given the skills they need to succeed both in the workplace and in the community.
2. Median income, poverty rate, employment rate, and median value of owner-occupied housing units: As Shaffer, Deller, and Marcouiller (2004) mentioned, human capital is increasingly being connected to a community’s economic development strategies. Many communities do this because they believe there is a strong connection between accumulations in human capital and the skills of their workforce. Logically, high levels of both income, employment, and home values would serve as indicators of significant human capital within a community.

Social Capital (Research Question Five)

1. Number of school informal associations: Both Putnam (2000) and Murray (2012) argued that group formation is an important component of building social capital within a community. This particular variable focuses on the social capital that is created at a high school through registered students organizations.
2. Religious adherents: Putnam (2000) noted that religious involvement is one of the strongest forms of civic engagement for many individuals and is also a strong predictor of service involvement in the community.
3. Population migration: Glaeser, Laibson, and Sacerdote (2002) argued that population migration is a key indicator of social capital. According to the researchers, residents of a county who own a home are much less likely to leave, allowing them to state and develop relationships over time. Not surprisingly, low levels of population migration allow these relationships to flourish and create trust in the community, an important public good.
4. Home ownership rate: Similar to population migration, high levels of home ownership in a region can predict high amounts of social capital (DiPasquale & Glaeser, 1999; Glaeser, Laibson, & Sacerdote, 2002). The logic is that homeowners will be more established members of a community and are far less likely to leave for other communities. Homeownership, therefore, can serve as an important indicator of social capital in a community.
5. Voter turnout: Scholars such as Fiorina (1990) have noted that social capital plays a positive role in increasing political communication among community members, which in turn can lead to increases in voter participation. Above average voter turnout is therefore believed to be an indicator of higher levels of social capital within a community.

6. Single-parent homes: Coleman (1988) argued that single-parent homes could negatively affect social capital in a number of ways. To begin with, children in these homes are less likely to interact with adults because of the parent's work schedule. At the same time, single parents often have less time to interact with other adults, affecting the community's overall social capital. High percentages of single-parent homes should therefore have a negative effect on a community's social capital.

Although reliability can also be a concern for most research studies, this particular study does not intend to administer a survey instrument or interview participants, either of which would require reliability testing. The testing does, however, look at multiple years of data for each county to ensure that an outlier year does not skew the data in one particular direction.

Analysis & Design

The study used a mixed methods approach to answer the research questions posed in the study. IBM's SPSS Statistics Software, v. 22 helped provide data analysis for the first five research questions. The first research question used descriptive statistics to profile what types of Arkansans buy lottery tickets and which high school students are benefiting the most from the scholarship program. The next two research questions each used within-subjects, one-way ANOVA. The goal of an ANOVA, also known as analysis of variance, is to measure effect size through the production of an *F*-statistic, the level of which indicates whether or not a null hypothesis should be rejected. In cases where the null hypothesis is rejected within an ANOVA, a researcher is able to conclude that the independent, or treatment, variable had a significant effect on the dependent variable (Kirk, 1995).

Weighted least squares regression (WLS) was used for Research Questions Four and Five. Regression analysis is designed to help researchers predict the value of a dependent variable based on the effect of an independent variable (Meyers, Gamst, & Guarino, 2013). Once the regression model is found to have some type of effect size (*F*-statistic) through an ANOVA, each independent variable is observed to determine a) the direction of its effect on the dependent variable and b) whether or not that effect is significant (Simon, 2004). Regression analysis uses the same assumptions as ANOVA, with the addition of linearity of the data. To address the potential threat of heteroscedasticity with the county-level data (Rubenstein & Scafidi, 2002), WLS regression can be used as an alternative to OLS regression (Montgomery & Peck, 1992). Considering the threat of nonconstant error variance when using data from individual Arkansas counties, WLS regression was the best option to address Research Questions Four and Five.

The final research question used a simple program evaluation model to analyze whether or not the Arkansas Scholarship Lottery is indeed expanding college participation in Arkansas. Although there are numerous stages in the policy cycle, Vedung (1997) argued "evaluation is not concerned with the entire policy cycle, but only with the back end of it" (p. 4). The primary focus of this research question, therefore, was to evaluate the outcomes of the program, namely the expansion of college participation among students from poor communities in Arkansas. Although the evaluation may lead to recommendations and suggestions for agenda setting, the goal was analyzing the outcomes of the program and if its intended goals have been met.

Research Question One: What is the profile of Arkansas residents who purchase lottery tickets, and is it similar to the profile of lottery scholarship recipients? Data were collected from three years (2010-2012) of county-level data on the Arkansas Scholarship Lottery. For this research questions, only descriptive statistics were reported, including means and standard deviations.

Research Question Two: Have there been significant changes in college participation rates for the state of Arkansas since the implementation of the Arkansas Scholarship Lottery? Using college participation rates for each county in the state of Arkansas, one-way, within-subjects ANOVA. The factor was time with two levels: pre-lottery and post-lottery. College participation data from the three years prior to the lottery (2007-2009) were used to find a pre-lottery grand mean for each county, which served as the first level of the factor. The post-lottery level was a grand mean for each county that was determined using college participation data from the first three years of the Arkansas Scholarship Lottery (2010-2012).

Research Question Three: Have there been significant changes in college participation rates among Arkansas's poorest counties since the implementation of the Arkansas Scholarship Lottery? Once again, a one-way, within-subjects ANOVA was used with the factor being time and the two levels being pre-lottery and post-lottery. Arkansas college participations data were used for both the pre-lottery (2007-2009) and the post-lottery (2010-2012) levels. The important difference, though, was the sample. Rather than use data from all of the Arkansas counties, this research question only examined data from the sample of 31 Arkansas counties with a poverty rate of 21.9% or above.

Research Question Four: Are there differences in human capital that explain variations in the success of high school graduates receiving a lottery scholarship? WLS regression was used to answer this research question, with the number of public high school graduates in each county used as the weight for the regression model. The dependent variable was the percentage of high school graduates receiving a lottery scholarship within an Arkansas county. There were multiple independent variables for each county, including: high school attainment (for county residents over the age of 25), poverty rate, bachelor's degree attainment (for county residents over the age of 25), median income (for each household in a county), employment rate (for each county), and median value of owner-occupied housing units (for each county).

Research Question Five: Are there differences in social capital that explain variations in the success of high school graduates receiving a lottery scholarship? Once again, WLS regression was used with number of public high school graduates used as the weight. The percentage of high school graduates receiving a lottery scholarship was also used as the dependent variable. The important difference, though, was the list independent variables. They include: number of school informal associations, religious adherents, population migration, home ownership rate (for each county), voter turnout, and single-parent homes.

Research Question Six: Based on the findings, what are the policy considerations for institutional and state leaders? The final research question called for a qualitative analysis to see what implications the findings of the study had for institutional and state leaders. To accomplish this, a program evaluation was considered with recommendations made for various higher education leaders throughout the state of Arkansas. Essentially, this question will be addressed through an impact analysis of the Arkansas Scholarship Lottery, "to determine whether the program is reaching its intended audience" (Sylvia & Sylvia, 2004, p. 113).

Summary of the Chapter

The chapter described in detail the different methodological tools that were used to answer the research questions posed in the study. Along with these tools, a number of independent variables representing either human or social capital were described. Although the primary objective of the study was to see what effect, if any, the Arkansas Scholarship Lottery had on college participation, the research also intended to find any potential causes in lottery scholarship variation among impoverished communities. Human and social capital variables were therefore used to see what effect each had on the variation.

After using descriptive statistics to answer the first research question, a one-way, within-subjects ANOVA was used for the second and third research questions. The first research question focused on the expansion of college participation in the state of Arkansas, while the third research question analyzed the growth, or lack thereof, in the poorest counties of the state. The fourth and fifth research questions, on the other hand, used WLS regression to determine what capital variables help explain the variation in lottery scholarship success among the most impoverished Arkansas counties. Finally, the sixth research question explored the policy implications of the findings using a program evaluation. Through these research questions, the goal was to learn more about the outcomes of the Arkansas Scholarship Lottery, particularly as they related to college participation.

Chapter IV

Data Presentation & Analysis

Introduction

The study was designed to learn more about the Arkansas Scholarship Lottery and to discover areas that can make the program more effective in reaching prospective college students, particularly those that come from underrepresented backgrounds. The research questions used in the study can be divided into two groups. The first three research questions primarily focused on the program's effect on college participation in the state. Research Question One examined which Arkansas counties buy lottery tickets at high rates, and compared them to the counties that benefit the most for the program (i.e. receiving lottery scholarships at the highest rates). Realizing that the price of higher education can play a significant role in college choice (Leslie & Brinkman, 1987; St. John, 1990; Kane, 1995; Heller, 1997, 1999), Research Question Two analyzed whether or not the state has witnessed a significant increase in college participation since the implementation of the Arkansas Scholarship Lottery. Using a similar methodological design, Research Question Three essentially asked the same question, but only looked at a sample of the most impoverished counties in Arkansas. The research has shown that although the cost of higher education can have a very significant effect on a low-income student's decision to enroll (Mullen, 2010; Heller, 1999; St. John, 1990), previous lottery programs have not always evenly distributed the costs and benefits of lottery programs across different socioeconomic groups (Price & Novak, 1999; 2000; Rubenstein & Scafidi, 2002; Hansen, Miyazaki, & Sprott, 2000).

The second set of research questions sought to learn more about the different community variables that can affect the rate at which high school students secure lottery scholarships to fund a college education. Previous research has shown that both human (Becker, 1971; Schultz, 1971; Rowan-Kenyon, Bell, & Perna, 2007) and social capital (Putnam, 2000; Murray, 2012) within a community can have an effect on educational outcomes. Realizing this, regression models were created to see how different human and social capital variables can predict the rate at which students from an Arkansas county earn lottery scholarships. Finally, with the quantitative results of the study, a policy outcome evaluation was conducted to see whether or not the Arkansas Scholarship Lottery had two of its most important goals: making college more affordable for Arkansans and increasing college participation among traditionally underrepresented groups.

To answer the research questions, the study primarily relied on secondary data collected from a variety of sources, including the Arkansas Department of Higher Education (ADHE), the Arkansas Division of Legislative Audit, and the United States Census Bureau. A number of other online databases provided the quantitative data for the independent variables in Research Questions Four and Five, including those belonging to the United State Bureau of Labor Statistics, the Arkansas Activities Association, the Association of Religion Data Archives, Clarity Elections, and the Annie E. Casey Foundation. Once the data was collected, an Excel spreadsheet that included all relevant data was created for each of the research questions. IBM's SPSS Statistics Software, v. 22 was used to answer each of the first five research questions, and the generated output was used for the purpose of data analysis.

This study was significant because it provided insight into whether or not the Arkansas Scholarship Lottery increased college participation across the state, particularly among underrepresented populations. In order for the state to have a chance to increase both its college participation and attainment rates, it is imperative that a program as vast as the Arkansas Scholarship Lottery is able to infuse enough financial aid into the system to encourage students from underrepresented populations to participate in higher education. The study is also significant because it examines different variables that affect the percentage of high graduates receive a lottery scholarships from an Arkansas county. With this information, policymakers will be able to better identify counties that are underperforming when it comes to securing lottery scholarships.

Once the study completed its analysis of the lottery's effect on college participation, it went one step further in examining the variation that exists among counties in Arkansas when it comes to the success of high school graduates receiving a lottery scholarship. As the lottery continues to mature over the next decade, Arkansas policymakers will need to gain an understanding of how best to allocate promotional resources for the lottery scholarship program, ranging from advertisements to actual counseling of students. The state could simply choose a couple of dozen counties with high poverty rates and dedicate their resources to promote the program to those students and get them interested in the prospect of college. Even with their economic similarity, there are other variables that could affect student success in securing lottery scholarships. Community measurements of human capital, for example, can help predict the likelihood that qualifying students will have the motivation, and the knowledge, to submit a strong lottery scholarship application. By identifying significant human capital variables, state policymakers will have a better sense of where they can more efficiently dedicate resources that will not only teach qualified students about the program, but also provide them the counseling necessary to help create a successful application. If these proposals are implemented, it will become much more likely that the Arkansas Scholarship Lottery will accomplish its goal of increasing college participation among underrepresented groups.

This chapter outlines the results of the study. The chapter begins with an explanation of the factors that were used for the one-way, within-subject ANOVA that was used in Research Questions Two and Three. The chapter continues with a description of the dependent variable for the regression models, along with the different set of independent variables that were used to answer Research Questions Four and Five. The next section of the chapter outlines the procedures of data analysis used for each research question. The chapter ends with a summary of the results for each research question, including a policy outcome evaluation. Although the results of the study did not lead to a complete model of what causes one county to be more successful at receiving lottery scholarships than another, it was clear that policy changes are needed if the Arkansas Scholarship Lottery wishes to become more effective at increasing college accessibility for students form underrepresented populations.

Preliminary Data Analysis Considerations

Summary of the Levels of the ANOVA Factor

Research Questions Two and Three each used a within-subjects, one-way ANOVA to determine if there had been significant gains in college participation since the Arkansas Scholarship Lottery. Research Question Two used a sample of all of Arkansas counties (n = 75), while Research Question Three used a sample of each Arkansas county with a poverty rate of 21.9% or higher (n = 31). For each research question, the ANOVA had one factor, time, with two levels: pre-lottery (2007-2009) and post-lottery (2010-2012). The post-lottery level was obtained through the comprehensive higher education annual reports that are available on the ADHE website. Each of these reports has a section that looks at annual college-going rates for each of the counties in Arkansas. Finding data for the pre-lottery level, however, proved to be much more problematic. Although there were sections on college participation in the ADHE reports prior to 2010, only one report had the actual figures for each county. The other reports provided a map of the state with a color code for each county that was based upon a range of college participation rates. Realizing this, the researcher contacted Ms. Sharon Butler, who works in the Research & Planning division within ADHE. Over email correspondence, Ms. Butler provided a spreadsheet with different table detailing county-level college participation for each year from 2007-2009. With this data, a spreadsheet was created with college participation data for each Arkansas county from 2007-2012. Using an Excel algorithm (number of first-time college students / number of public high school graduates), a college participation grand mean for 2007-2009 was made for each county in Arkansas. The grand mean for 2007-2009 served as the pre-lottery level. Using the same spreadsheet, the same Excel algorithm was created using the 2010-2012 data. The grand mean that was produced using this algorithm for each county served as the post-lottery level. Although a more extensive description of the data can be found in Appendix A, a statistical summary of each of the levels can be found below in Table 1.

Table 1

Summary of College Participation Rates for Arkansas Counties (*n* = 75)

	Pre-Lottery Participation[a]	Post-Lottery Participation[b]
Range	0.201 to 0.778	0.258 to 0.631
Mean	0.495	0.522
SD	0.083	0.067

Note. 2007-2009 College Participation in Arkansas Counties (07-09 Participation[a]). Unpublished raw data prepared by Ms. Sharon Butler, Arkansas Department of Higher Education. Retrieved February 3, 2014 via email request to Ms. Butler. 2010-2012 College Participation in Arkansas Counties. (10-12 Participation[b]) from, Arkansas Department of Higher Education. (2014). Annual comprehensive reports. Retrieved January 15, 2014 from http://www.adhe.edu/institutions/Pages/institutions.aspx

Once the two levels were developed for Research Question Two, a second spreadsheet was created. The data from the first spreadsheet was copied and pasted onto the second spreadsheet. In this case, however, all counties that did not meet the poverty threshold of 21.9% or higher were erased, leaving a sample of 31 counties. A statistical summary of two levels for Research Question Three can be found in Table 2.

Table 2

Summary of College Participation Rates for Sample of High Poverty Arkansas Counties (*n* = 31)

	Pre-Lottery Participation[a]	Post-Lottery Participation[b]
Range	0.31 to 0.778	0.365 to 0.63
Mean	0.503	0.516
SD	0.089	0.063

Note. 2007-2009 College Participation in Arkansas Counties (07-09 Participation[a]). Unpublished raw data prepared by Ms. Sharon Butler, Arkansas Department of Higher Education. Retrieved February 3, 2014 via email request to Ms. Butler. 2010-2012 College Participation in Arkansas Counties. (10-12 Participation[b]) from, Arkansas Department of Higher Education. (2014). Annual comprehensive reports. Retrieved January 15, 2014 from http://www.adhe.edu/institutions/Pages/institutions.aspx

Summary of the Dependent Variable for WLS Regression Analysis

WLS regression was used for Research Questions Four and Five. Research Question Four was designed to see to what extent human capital variables played a role in explaining the variation of the success of high school graduates applying for lottery scholarships. Research Question Five asked a similar question, but with social capital variables instead of human capital. Each research question, therefore, used the same dependent variable: the rate of lottery scholarships per high school graduates. To determine this figure for each county in Arkansas, two data sources were needed: the number of lottery scholarships awarded to citizens from each county and the total number of public high school graduates during the same time period (2010-2012). The first piece of data, number of lottery scholarship awarded to citizens from each county, is available on the Arkansas Scholarship Lottery's website and is broken down by each year of the program's existence. The second piece of data, total number of public high school graduates, was secured through the annual higher education comprehensive reports that are posted on the ADHE website. It is important to note that since 2010, ADHE only reports the number of public high school graduates from each county in the state, meaning that the data excludes both home school students and private high school graduates. Once the figures were obtained, a spreadsheet was created to help produce the rate of lottery scholarships per high school graduates, the dependent variable. A simple Excel algorithm (number of lottery scholarships / number of public high school graduates) was created to produce the rate for each county in the state. A summary of this data is listed below in Table 3, with a more comprehensive data breakdown in Appendix B. It is important to note that some counties have a rate higher than 1. Once again, this is due to the fact that ADHE only reports the total number of public high school graduates for each county. The Arkansas Scholarship Lottery, on the other hand, reports all lottery scholarship winners for each county, regardless of the type of high school they attended.

Table 3

Summary of the Dependent Variables for Arkansas Counties (*n* = 75)

	Lottery Scholarships Per Public HS Grads
Range	0.505 to 1.727
Mean	1.041
SD	0.244

Note. Data for the dependent variable came from two sources. The number of lottery scholarships per county (2010-2012) came from the Arkansas Scholarship Lottery website. Retrieved February 4, 2014 from http://myarkansaslottery.com/about/scholarships. The data for the number of public high school graduates per county (2010-2012) came from the annual comprehensive ADHE reports. Retrieved February 4, 2014 from http://www.adhe.edu/institutions/Pages/institutions.aspx

Summary of the Independent Variables for WLS Regression Analysis

The independent variables that were used for the study were divided into two categories: human and social capital. For each category, six independent variables were used to answer the fourth and fifth research questions. Data collection took over two weeks, but data were found for each of the variables that were originally proposed in Chapter Three of the study. The collection ended up taking multiple weeks because of updates that were made in various areas, particularly the figures that came from the United States Census Bureau. Considering the large amount of secondary data that were collected, all of the variables and their corresponding figures were entered into an Excel spreadsheet workbook, with a different tab for each research question. Once the data collection was completed, each of the tabs was copied and pasted into SPSS data tables, with a different file created for each research question. To better understand the different variables that were used in the study, the list of SPSS codes of each independent variable can be found in Table 4.

Table 4

SPSS Coding for Independent Variables

Code	Description
Poverty	Persons below poverty level, percent, 2008-2012
HS	High school attainment, percent of persons age 25+, 2008-2012
Bachelor	Bachelor’s degree, attainment, percent of persons age 25+, 2008-2012
MedIncome	Median household income, 2008-2012
Employ	Unemployment rates by county, not seasonally adjusted, Arkansas Annual 2012
MedHouse	Median value of owner-occupied housing units, 2008-2012
Assoc	Average number of AAA declared activities for each public high school in an Arkansas county, 2013
Religion	All Denominations--Rates of adherence per 1000 population, 2000
Migration	Absolute value of migration to/from a county, 2000-2010
HomeOwn	Homeownership rate, 2008-2012
Voter	Voter turnout for the general election, 2012
Single	Percentage of single-parent homes, 2011

Human Capital Variables

For the purpose of analysis, most of the human capital variables came from the United States Census Bureau. As was previously mentioned, the United State Census Bureau updated many of its county-level figures in December 2013, which extended the time it took to collect the human capital variables data. Also, due to updates in areas such as the poverty rate, the sample of impoverished Arkansas counties changed to reflect overall increases in both the state and national poverty rate. Regardless, each of the human capital variables used in the study from the Census Bureau are the updated 2008-2012 figures.

The only human capital variable that did not come from the United States Census Bureau was the unemployment rate variable, which came from the United States Bureau of Labor Statistics. The original inclination was to use the most up-to-date monthly unemployment figures from each Arkansas county. Realizing the highly cyclical nature of monthly unemployment figures, though, it was decided that the unemployment rate variable would use annual, unadjusted data. The most recent year available was 2012, which was the data used for this study.

Even with a variety of human capital variables, the initial fear was there could be multicollinearity in the final WLS regression model. Although this will be addressed later in the section, the decision was made to still include each variable for the original model. Once the model was run, collinear variables would be addressed using a variety of techniques. Regardless of the potential issues, Table 5 provides a descriptive statistical summary of the human capital variables that were incorporated into the study. A more comprehensive presentation of the data behind the human capital variables can be found in Appendix C.

Table 5

Human Capital Variables

	Poverty[a]	*HS*[b]	*Bachelor*[c]
Range	0.084 to 0.325	0.663 to 0.891	0.064 to 0.316
Mean	0.209	0.803	0.142
SD	0.501	0.047	0.0496

	MedIncome[d]	*Employ*[e]	*MedHouse*[f]
Range	25,188 to 53,817	0.053 to 0.125	51,600 to 150,700
Mean	35,855.267	0.082	84,900
SD	5,983.473	0.017	23,954.963

Note. Persons below poverty level, percent, 2008-2012. (Poverty[a]), High school attainment, percent of persons age 25+, 2008-2012. (HS[b]), Bachelor's degree, attainment, percent of persons age 25+, 2008-2012. (Bachelor[c]), Median household income, 2008-2012. (MedIncome[d]), and Median value of owner-occupied housing units, 2008-2012. (MedHouse[f]) from, United States Census Bureau. (2014). Arkansas state & county quick facts. Retrieved January 20, 2014 from http://quickfacts.census.gov/qfd/states/05000.html. Unemployment rates by county, not seasonally adjusted, Arkansas Annual 2012. (Employ[e]) from, United States Bureau of Labor Statistics. (2014). Local area unemployment statistics map: Unemployment rates by county, not seasonally adjusted, Arkansas Annual 2012. Retrieved January 25, 2014 from http://data.bls.gov/map/MapToolServlet

Social Capital Variables

Unlike the human capital variables, each of the social capital variables came from a different source. The first variables, *Assoc*, was intended to measure the number of different organizations offered at a public high school. The Arkansas Activities Association (AAA) is the official governance body for high school athletics and activities in the state of Arkansas. The

AAA maintains an online database of different activities offered at each high school in the state. Each profiled school is annually required to provide a list of “declared” activities offered at the high school. The list, which includes 27 activities ranging from football to speech, is far from exhaustive, but is a good indicator of the quantity of activities offered at a given high school. To calculate this variable, each public high school in the state was placed in an Excel spreadsheet. The second column was the high school’s county, while the third column was the number of declared activities at the high school. One each high school was entered, the data was sorted using the county column. Following the sort, an average of declared activities at the public high schools was calculated for each county. Although the process was very time-consuming, it provided important insight into the number of different high school activities that are available at different high schools across the state of Arkansas.

The second social capital variable, *Religion*, was designed to measure the amount of religious participation within each Arkansas county. The Association of Religion Data Archives maintains an online database that demonstrates religious participation in a number of different areas across the United States. Although there have been surveys completed in the past few years, the most recent county-level data that were available were from 2000. Although there could be some changes in religious participation across Arkansas since 2000, it was decided that the data could still provide valuable insight into the *Religion* variables. With that in mind, a spreadsheet was download that included data for each county in the United States. Once the Arkansas section was identified, it was determined that the exact figures would come from the “All Denominations—rates of adherence per 1000 population” row of the spreadsheet.

Similar to most of the human capital variables, the *Migration* variable came from United States Census Bureau data. For this variable, a simple calculation was made subtracting each

Arkansas county's 2010 population from its 2000 population. Regardless of whether there was a net gain or subtraction, an absolute value was used to show the change in population figures. The fourth social capital variable, *HomeOwn*, measured the percentage of home ownership within an Arkansas county. For this variable, though, the data were simply copied from each county profile the Census Bureau has created for Arkansas counties, with no calculations necessary.

The fifth social capital variable, *Voter*, provided data on voter turnout for each Arkansas county from the most recent general election year, 2012. The original online search for voter turnout in the state led to the Arkansas Secretary of State's website. As part of the website, there are links to Clarity Elections, an online web service that tracks election results in municipalities across the United States, including county-level voter turnout data. As is the case with most voter turnout data, it is important to note that turnout is a measure of the percentage of registered voters participated in an election. Any Arkansas citizen who is not registered to vote was excluded from the voter turnout data.

Finally, the sixth social capital variable, *Single*, provided insight into the number of children who are growing up in single-parent homes. For this variable, data were secured through the Annie E. Casey Foundation, which maintains an online database tracking at-risk children across the United States. As part of the database, the foundation tracks single parent homes for each county in the United States. The most recent data for Arkansas counties came from 2011, and were used for the purpose of this study.

Although a comprehensive list of all of the data associated with the social capital variables can found in Appendix D, a statistical summary for each variable is included in Table 6.

Table 6

Social Capital Variables

	Assoc[a]	*Religion*[b]	*Migration*[c]	*HomeOwn*[d]
Range	5.5 to 20.33	240.125 to 852.986	12 to 67,933	0.556 to 0.834
Mean	12.393	567.137	4,682.373	0.706
SD	3.559	112.977	10,322.504	0.07
	Voter[e]	*Single*[f]		
Range	0.564 to 0.773	0.196 to 0.649		
Mean	0.675	0.365		
SD	0.045	0.088		

Note. Average number of AAA declared activities for each high school in an Arkansas county, 2013 (Assoc[a]) from, Arkansas Activities Association. (2014). Directory of member schools. Retrieved January 31, 2014 from http://www.ahsaa.org/schools. All Denominations--Rates of adherence per 1000 population, 2000 (Religion[b]) from, Association of Religion Data Archives. (2014) Retrieved January 31, 2014 http://www.thearda.com/Archive/Files/Downloads/RCMSCY_DL2.asp. Absolute value of migration to/from a county, 2000-2010 (Migration[c]) from, United States Census Bureau. (2013). American fact finder - Community facts. Retrieved December 18, 2013 from http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml. Homeownership rate, 2008-2012 (HomeOwn[d]) from, United States Census Bureau. (2014). Arkansas state & county quick facts. Retrieved January 31, 2014 from http://quickfacts.census.gov/qfd/states/05000.html. Voter turnout for the general election, 2012 (Voter[e]) from, Clarity Elections. (2012). Official results – Arkansas statewide general election on November 6, 2012. Retrieved January 20, 2014 from http://results.enr.clarityelections.com/AR/42843/113233/en/vt_data.html. Percentage of single parent homes, 2011 (Single[f]) from, Annie E. Casey Foundation. (2014). Children in single-parent families: Arkansas. Retrieved January 20, 2014 from http://datacenter.kidscount.org/data/tables/4051-children-in-single-parent-families?loc=5&loct=5#detailed/5/213-287/false/867,133,38,35,18/any/9775,9774

Data Analysis and Procedures

Descriptive Statistics for Research Question One

The goal of Research Question One was to learn more about the profiles of Arkansas residents who benefit from the lottery (i.e. receive scholarships) compared to the citizens who purchase lottery tickets. Using county-level data, descriptive statistics were produced to create two rankings: county spending per resident on lottery tickets and number of lottery scholarships per resident. As the rankings were produced, though, it became obvious that there was a potential correlation between *Poverty* and the individual variables. Considering this possibility, a series of five *Pearson's r* two-tailed correlations were produced between a county's poverty rate and the following:

1. Lottery Sales Per Resident (FY2011)
2. Lottery Sales Per Resident (FY2013)
3. Lottery Scholarship Awards Per Resident (FY2011)
4. Lottery Scholarship Awards Per Resident (FY2013)
5. Lottery Scholarship Amount Per Resident (FY2013)

It should be noted that lottery scholarship amount per resident could only be calculated with the latest Arkansas Scholarship Lottery Legislative Audit from FY2013, the first time the report included the actual amount of money students from each county in the state received from the Arkansas Scholarship Lottery.

ANOVA Models for Research Questions Two and Three

A one-way, within-subjects ANOVA was used to answer Research Questions Two and Three. For each research question, the factor was time and there were two levels: pre-lottery and post-lottery. The first level, pre-lottery, was a calculated grand mean for the 2007-2009 college participation rate for each county in Arkansas. The second level, post-lottery, was a calculated grand mean for the 2010-2012 college participation rate for each county in Arkansas. It is important to note, though, the samples were different for each research question. Research Question Two used a sample of all Arkansas counties (*n* = 75). Through this research question, it was determined whether or not the state as a whole had witnessed significant increases in college participation since the creation of the Arkansas Scholarship Lottery program. Research Question Three, on the other hand, used a sample of all Arkansas counties with a poverty rate of 21.9% or above (*n* = 31). This particular research question analyzed whether or not the residents of the poorest counties in the state were also experiencing significant gains in college participation. Even with the influx of financial aid money into the system, a common argument against lottery scholarships for years has been that the programs provide the most significant benefits for both the middle and upper class citizens of a state (Rubenstein & Scafidi, 2002).

WLS Regression Analysis for Research Questions Four and Five

WLS regression was used to address Research Question Four and Five. For each research question, the dependent variable was the rate of lottery scholarships per public high school graduates in an Arkansas county. Both research questions also used county population as the weight in an effort to prevent heteroscedasticity. The independent variables were different for each research question, however. Research Question Four used a set of six human capital variables. Research Question Five, on the other hand, incorporated six variables relating to social capital.

Each variable was included in the main effects regression models for both research questions, but there was a concern for multicollinearity for each set of variables. To address this issue, SPSS produced variance inflation factor (VIF) tests and tolerance tests. In regard to VIF, any variable with a level of 5 or higher was considered potentially collinear (Rogerson, 2001). At the same time, any tolerance test that produced a value of 0.20 or below was considered potentially collinear as well (Menard, 1995). The main effects regression model for Research Question Five did not produce any variables with a VIF of 5 or higher, or a tolerance level of 0.20 or below, allowing the research to use the model for analysis. The main effects regression model for Research Question Four, however, indicated that within the model, four of the variables were potentially problematic (i.e. VIF of 5 or higher and/or tolerance test of 0.20 or below): *Poverty*, *Bachelor*, *MedHouse*, and *MedIncome*. Further examination of a correlations matrix indicated that *MedHouse* was especially problematic for the model, leading to its removal. Alternate regression models were conducted, focusing on the *HS* and Bachelor, which were also found to be collinear variables. The alternate regression models were as follows:

1. *HS* and *Bachelor* were removed from the model
2. *HS* was removed from the model
3. *Bachelor* was removed from the model
4. Both *HS* and *Bachelor* were removed from the model and replaced with the interaction term *HS+Bachelor*

Once the alternate models were produced, the research analyzed each of the models to see what would be the best model to use to answer Research Question Four. The goal was to find a model that decreased potential multicollinearity without sacrificing the adjusted R^2 in the process. Once the models were run, it was determined that the best model to answer Research Question Four was the fourth alternate model, which included the *HS+Bachelor* interaction term. It is important to note that the interaction term was created by adding the two variables rather than through multiplication. Even though *MedIncome* still had a VIF over 5 and a tolerance below 0.20, the fourth alternate model did the best job of decreasing multicollinearity without making a significant sacrifice to the adjusted R^2.

Policy Evaluation for Research Question Six

The final research question used a policy outcome evaluation (Sylvia & Sylvia, 2004) to learn more about the impact, or lack thereof, the Arkansas Scholarship Lottery has had on different populations within Arkansas. In order to conduct any outcome evaluation, it is important to first consider the goals of the program. Goals can come in a number of forms, from explicit statements to the understanding of the program's intent (Sylvia & Sylvia, 2004). Going through documents concerning the Arkansas Scholarship Lottery, including statement's made during the campaign to change the Arkansas constitution in 2008, there seemed to be three goals relating to the program:

1. Make college more affordable for Arkansans
2. Increase the number of college enrollees from underrepresented communities
3. Discourage Arkansans, especially those from areas near border states, from spending their money on out-of-state lottery tickets

Although the third intended goal of the Arkansas Scholarship Lottery is important, this study did not address what effect the program has had on Arkansan spending on out-of-state lottery tickets. Future research should examine this issue, especially since it was one of the key arguments the Hope for Arkansas campaign made it support of the lottery program. The first two goals, though, were examined for Research Question Six. As part of this evaluation, an impact analysis was used to see whether or not the program was reaching its intended audience. In order to judge the success of the program, it is important to understand in which ways it is affecting the populations of individuals it was designed to help.

Results

Research Question One

What is the profile of Arkansas residents who purchase lottery tickets, and is it similar to the profile of lottery scholarship recipients?

To answer Research Question One, a set of descriptive statistics was created to learn more about how the costs and benefits of the Arkansas Scholarship Lottery are distributed across the state. Using data from previous audit reports, Table 7 first explains the range of lottery costs and benefits across different counties in the state.

Table 7

Summary of County Sales and Scholarship Awards in Arkansas for FY2011 & FY2013 (*n* = 75)

	SalesPer_11[a]	SalesPer_13[b]
Range	37.68 to 391.73	39.97 to 345.79
Mean	161.82	153.54
SD	71.95	64.26
	AwardsPer_11[c]	AwardsPer_13[d]
Range	0.004 to 0.017	0.005 to 0.015
Mean	0.011	0.011
SD	0.002	0.002
	AmountPer_13[e]	
Range	18.74 to 62.03	
Mean	42.69	
SD	9.55	

Note. The data necessary to create the calculations for: Sales per Arkansas county resident (SalesPer_11[a]) and Lottery scholarship awards per Arkansas county resident (AwardsPer_11[c]) from, Arkansas Division of Legislative Audit. (2011). SALC08511, Arkansas Lottery Commission audit report, FY2011. Retrieved January 20, 2014 from http://arklegaudit.gov/#search. Please note that there was an obvious error in the report of lottery scholarships offered from Saline to St. Francis counties (p. 47) that was likely due to a data sorting issue. The researchers corrected this error in the data tables he created for this study. The data necessary to create the calculations for: Sales per Arkansas county resident (SalesPer_13[b]), Lottery scholarship awards per Arkansas county resident (AwardsPer_13[d]), and Amount of lottery scholarship dollars per Arkansas county resident (AmountPer_13[e]) from, Arkansas Division of Legislative Audit. (2013). SALC08513, Arkansas Lottery Commission audit report, FY2013. Retrieved January 20, 2014 from http://arklegaudit.gov/#search.

Table 7 shows that when it comes to the Arkansas Scholarship Lottery, there are sizeable differences among counties when it comes to lottery sales per resident. In 2011, for example, Nevada County had the highest sales per resident with $391.73, while Montgomery County had the lowest sales per resident with $37.68. Two years later, Arkansas County had the highest sales per resident with $345.79, while Montgomery County once again had the lowest sales per resident at $39.97. Similar gaps were found in the awarding of lottery scholarships, especially when it came to the gap in amount of funding per resident in 2013. That year, Miller County had the lowest amount per resident with $18.74, while Franklin County had the highest with $62.03. Using these descriptive statistics, there is evidence that the costs and benefits of the Arkansas Lottery Scholarship are not evenly distributed across the state.

One of the common criticisms of lottery scholarship programs is that counties with high poverty and other socioeconomic concerns often buy lottery tickets at disproportionate rates (Price & Novak, 1999; 2000). Considering this, rankings of the counties with the highest sales per resident were created. The top five counties for total sales per resident, along with their respective poverty rates, are listed in Table 8.

Table 8

Arkansas Counties with Highest Lottery Sales Per Resident (FY2011 & FY2013)

	FY2011	SalesPer	*Poverty*	FY2013	SalesPer	*Poverty*
1	Nevada	391.73	0.272	Arkansas	345.79	0.17
2	Arkansas	347.85	0.17	Nevada	335.98	0.272
3	Dallas	331.13	0.18	Chicot	289.48	0.325
4	Woodruff	312.59	0.246	Prairie	263.56	0.188
5	Poinsett	286.32	0.268	Jackson	262.14	0.256

Table 8 shows that among the counties with the highest sales per resident, there appeared to be a possible correlation with a county's poverty rate. Although there is a certain degree of variation in the poverty rate among the counties listed in Table 8, each of these counties had a poverty rate well above the national rate.

At the same time, lottery scholarships have also been found to disproportionately benefit students from affluent families, particularly those coming from middle and upper-income areas. Realizing this, Tables 9 and 10 list the top five counties that have received the most benefits (i.e. lottery scholarships per resident) from the Arkansas Scholarship Lottery. A comprehensive listing of all lottery sales and scholarships by county can be found in Appendix E.

Table 9

Arkansas Counties with Highest Lottery Scholarship Awards Per Resident (FY2011 & FY2013)

	FY2011	AwardsPer	*Poverty*	FY2013	AwardsPer	*Poverty*
1	Faulkner	0.017	0.146	Faulkner	0.015	0.146
2	Clark	0.015	0.237	Franklin	0.0144	0.187
3	Pope	0.0149	0.185	Lonoke	0.0141	0.131
4	Arkansas	0.0147	0.17	Pope	0.0140	0.185
5	Conway	0.0146	0.234	Scott	0.01398	0.2

Table 10

Arkansas Counties with Highest Lottery Scholarship Amount Per Resident (FY2013)

	FY2013	AmountPer	*Poverty*
1	Franklin	62.03	0.187
2	Faulkner	61.71	0.146
3	Pope	60.65	0.185
4	Crawford	60.20	0.193
5	Logan	59.83	0.158

Although the counties receiving lottery scholarships at higher rates had fairly high poverty rates, they remained relatively lower than the counties that have the highest sales per resident. Realizing that descriptive statistics would not be able to give a clear picture of correlation, it was decided that a set of Pearson's r correlations would provide a better understanding of the connection between poverty and the costs and benefits distributions of the Arkansas Scholarship Lottery. Unlike descriptive statistics, a Pearson's *r* correlation is able to provide an idea of the statistical strength and direction of the relationship between two variables (Onwuegbuzie, Daniel, & Leech, 2007) With this in mind a set of Pearson's *r* correlations were created to learn more. Table 11 summarizes the correlations that were conducted.

Table 11

Pearson's *r* Correlation Coefficients (n = 75)

		Poverty
SalesPerResident_11	Pearson Correlation	0.195
	Sig. (2-tailed)	0.093
AwardsPerResident_11	Pearson Correlation	-0.334**
	Sig. (2-tailed)	0.003
SalesPerResident_13	Pearson Correlation	0.252*
	Sig. (2-tailed)	0.029
AwardsPerResident_13	Pearson Correlation	-0.339**
	Sig. (2-tailed)	0.003
AmountPerResident_13	Pearson Correlation	-0.358**
	Sig. (2-tailed)	0.002

Note. *$p \le 0.05$, two-tailed. **$p \le 0.01$, two-tailed

First looking at the FY2011 figures, lottery tickets sales had a weak positive relationship (r = 0.195) with poverty, which indicated that lottery ticket sales increase in counties as their poverty rates increase. It is important to note, though, that this relationship was not statistically significant. The rate of lottery scholarship awards, however, had a moderately negative relationship (*r* = -0.334) with poverty, which meant that the awarding of lottery scholarships decreased as the poverty rate increased in a county.

In regard to the FY2013 figures, lottery tickets sales had a slightly moderate positive relationship (*r* = 0.252) with poverty, a slight increase from FY2011. The rate of scholarship awards once again had a moderately negative relationship (*r* = -0.339) with poverty, consistent with the 2010 figures. As was mentioned earlier, the FY2013 figures, also provided the actual amount of money each Arkansas county received from the lottery scholarship program. Consistent with the findings of the awards, the rate of scholarship dollars that were awarded to each county had a moderately negative relationship (*r* = -0.358) with poverty.

Although the findings from the Pearson's *r* correlations were consistent with the previous literature on lottery scholarships, it is important to note that the strength of the relationships between the lottery program and poverty rates in Arkansas counties were, at best, moderately strong. In the case of the FY2011 figures, the relationship between lottery sales per resident and poverty was not even statistically significant, a surprising finding in the study. Considering the results, there appears to be evidence that Arkansas residents who buy lottery tickets at high rates seem to come from some of the most impoverished counties within the state. At the same time, there also appears to be even stronger evidence that Arkansas residents who come from counties with less poverty seem to secure lottery scholarships at higher rates. The correlation coefficients therefore indicate a connection between poverty and the Arkansas Scholarship Lottery, particularly when it comes to the costs and benefits of the program.

Research Question Two

Have there been significant changes in college participation rates for the state of Arkansas since the implementation of the Arkansas Scholarship Lottery?

According to the descriptive statistics in Table 1, there was an increase in state's overall college participation rate from 0.495 in the pre-lottery years (2007-2009) to 0.522 in the post-lottery years (2010-2012). Even with this information, an ANOVA was needed to determine whether or not the increase had been statistically significant. A one-way, within-subjects ANOVA was therefore conducted to answer Research Question Two. The factor was time and there were two levels used: pre-lottery and post-lottery. The results of the ANOVA can be found in Table 12.

Table 12

Test of Within-Subjects Effect for Research Question Two

Factor[a]	*df*	Mean Square	*F*	Sig
Time	1	0.028	8.561	0.005*

Note. Factor[a] - Sphericity assumed. *$p \leq 0.01$, two-tailed.

For this ANOVA, $F(1, 74) = 8.56$, meaning that the model was statistically significant at $p \leq 0.01$. The results indicated that the state of Arkansas has experienced a statistically significant increase in college participation since the creation of the Arkansas Scholarship Lottery. Considering the influx of the new scholarships into the system, the state should have indeed experienced an increase in college participation. Previous research has shown that the price of higher education can have a significant effect on a student's decision to enroll, especially if he/she comes from a low-income background (Mullen, 2010; Heller, 1999; St. John, 1990).

Although the test does not prove that the Arkansas Scholarship Lottery is the primary cause of the increase, it does indicate that an increase in college participation has occurred in Arkansas since the program's implementation.

Research Question Three

Have there been significant changes in college participation rates among Arkansas's poorest counties since the implementation of the Arkansas Scholarship Lottery?

To answer Research Question Three, a sample of 31 Arkansas counties with a poverty rate of 21.9% or above was created to see whether or not the poorest counties in the state had also witnessed a significant increase in college participation. According to the descriptive statistics in Table 2, there was an increase in the overall college participation rate for this sample of high poverty Arkansas counties from 0.504 in the pre-lottery years (2007-2009) to 0.516 in the post-lottery years (2010-2012). Similar to Research Question Two, the third research question use one-way, within-subjects ANVOA with one factor (time) and two levels (pre-lottery and post-lottery) to determine if this increase was indeed statistically significant. The results of the ANOVA are found in Table 13.

Table 13

Test of Within-Subjects Effect for Research Question Three

Factor[a]	*df*	Mean Square	*F*	Sig
Time	1	0.002	0.429	0.517

Note. Factor[a] - Sphericity assumed.

For this ANOVA, $F(1, 30) = 0.429$, meaning that the model was not statistically significant at $p \leq 0.05$. The results indicated that unlike the state as a whole, the sample of the most impoverished counties in Arkansas did not have a significant increase in college participation after the implementation of the Arkansas Scholarship Lottery. It is important to note that the pre-lottery college participation mean for the sample of 31 counties (0.495) was actually higher than the state as a whole (0.504). Regardless, according to the ANOVA, the sample of 31 impoverished counties did not witness the same significant gain in college participation. This finding has important implications for the program, especially as the state of Arkansas seeks to expand its higher education attainment rates in the future.

Research Question Four

Are there significant differences in human capital that explain variations in the success of high school graduates receiving a lottery scholarship?

Research Question Four examined whether or not significant differences in human capital explained the variation in students receiving lottery scholarships across the state of Arkansas. WLS regression analysis found that high school attainment, percent of persons age 25+, 2008-2012 (*HS*) and bachelor's degree, attainment, percent of persons age 25+, 2008-2012 (*Bachelor*) were significant variables. The complete main effects model, which included six human capital independent variables and the rate of lottery scholarships per public high school graduates in an Arkansas county (2010-2012) served as the dependent variable. The findings of the main effects models were listed in Table 14.

Table 14

Summary of Regression Analysis for Human Capital Variables Predicting Lottery Scholarship Success: Main Effects Significant Results

IV	Unstandardized Estimate (*B*)	Std. Error	Standardized Beta	*t*
(Constant)	-1.530	1.203		-1.271
Poverty	-0.798	1.432	-0.121	-0.557
HS	4.112**	1.145	0.601	3.591
Bachelor	2.178*	1.050	0.522	2.074
MedIncome	-0.00001233	0.000	-0.283	-1.217
Employ	-1.596	2.822	-0.082	-0.566
MedHouse	-0.000003541	0.000	-0.349	-1.311

Note. Adj. R^2 = 0.439; *df* = 68. ** $p \leq 0.01$, two-tailed.* $p \leq 0.05$, two-tailed.

The adjusted R^2 suggested that, given the number of independent variables, this model explained 43.9% of the variance in the dependent variable. For the model, $F(6, 68) = 10.669$, which showed that the model was statistically significant at $p \leq 0.05$. Within the model, the variables *Poverty*, *MedIncome*, *Employ*, and *MedHouse* were not found to be statistically significant at $p \leq 0.05$. The unstandardized estimates (*B*) and *t* tests for each significant variable were as follows:

- On average, given an increase of one percentage point in the high school attainment rate for citizens the age of 25 or over in an Arkansas county, the rate of lottery scholarships per public high school graduates could be expected to increase by 4.112 percentage points, holding everything else in the model constant. The *t* test was 3.591 ($p \leq 0.01$).

- On average, given an increase of one percentage point in the bachelor's degree attainment rate for citizens the age of 25 or over in an Arkansas county, the rate of lottery scholarships per public high school graduates could be expected to increase by 2.178 percentage points, holding everything else in the model constant. The *t* test was 2.074 ($p \leq 0.05$).

Given the number of social capital variables used in the model, there was a fear of multicollinearity. Realizing this, VIF and tolerance tests were used to determine if any of the variables were collinear. The results of the test can be found in Table 15.

Table 15

Summary of Collinearity Statistics for the Regression Analysis: Main Effects

IV	Tolerance	VIF
(Constant)		
*Poverty**	0.161	6.224
HS	0.271	3.697
*Bachelor**	0.120	8.355
*MedIncome**	0.140	7.119
Employ	0.358	2.795
*MedHouse**	0.107	9.342

Note. *Potentially collinear because Tolerance $\leq$ 0.20 and/or VIF $\geq$ 5.00

A closer look at the data revealed that *MedHouse,* which had a VIF of 9.342, was especially problematic and was therefore removed from the model. The collinearity diagnostics revealed that *MedHouse* and *MedIncome* were especially collinear, which is due to the connection between income and one's ability to afford homes at a certain price range. Taking *MedHouse* out of the model therefore had little or no effect on the human capital theory that was applied to the independent variables in Research Question Four. The diagnostics also revealed that *Bachelor* and *HS* were also collinear. To address this, a series of alternate regression models were created. The goal was to find a model that decreased multicollinearity without sacrificed the adjusted R^2. Analyzing the results of the four models, it was determined that the best alternate included the interaction term *HS*+*Bachelor*, a combined educational attainment variable that was created by adding the rates for *HS* and *Bachelor* together for each model. The SPSS output for all of the alternate models can be found in Appendix F. It is important to note that Alternate Model #3 in Appendix F had a slightly larger adjusted R^2 (0.421) and the model did not have any variables that demonstrated multicollinearity. With that said, the differences between Alternate Model #3 and Alternate Model #4 were considered miniscule. For the sake of the human capital theory, it was determined that the importance of including *Bachelor* in some form outweighed the threat of multicollinearity. A good portion of the college choice and lottery scholarship literature emphasizes the importance of educational attainment in a community, especially bachelor's degree attainment (Rubenstein & Scafidi, 2002; Rowan-Kenyon, Bell & Perna, 2007). Realizing this, the final alternate model, which included *HS*+*Bachelor*, was used for the purpose of analysis, and its output is listed in Table 16.

Table 16

Summary of Regression Analysis for Human Capital Variables Predicting Lottery Scholarship Success: Alternate Model

IV	Unstandardized Estimate (*B*)	Std. Error	Standardized Beta	*t*
(Constant)	-0.216	0.596		-0.362
Poverty	-1.962	1.147	-0.297	-1.710
MedIncome	-0.00001997*	0.000	-0.453	-2.064
Employ	1.548	2.401	0.080	0.644
HS+Bachelor	2.369**	0.397	0.857	5.964

Note. Adj. $R^2 = 0.419$; $df = 70$. ** $p \leq 0.01$, two-tailed.* $p \leq 0.05$, two-tailed.

The adjusted R^2 suggested that, given the number of independent variables, this model explained 41.9% of the variance in the dependent variable. For the model, $F(4, 70) = 14.328$, which showed that the model was statistically significant at $p \leq 0.05$. Within the model, the variables *Poverty*, *MedIncome* and *Employ* were not found to be statistically significant at $p \leq 0.05$. The unstandardized estimates (*B*) and *t* tests for each significant variable were as follows:

- On average, given an increase of one percentage point in the combined education attainment rate (*HS+Bachelor*) for citizens the age of 25 or over in an Arkansas county, the rate of lottery scholarships per public high school graduates could be expected to increase by 2.369 percentage points, holding everything else in the model constant. The *t* test was 5.964 ($p \leq 0.01$).
- On average, given an increase of $1,000 in median income (*MedIncome*) for an Arkansas county, the rate of lottery scholarships per public high school graduates could be

expected to decrease by 0.02 percentage points, holding everything else in the model constant. The *t* test was -2.064 ($p \leq 0.05$).

The finding that educational attainment (*HS+Bachelor*) had a positive effect on the rate at which high school graduates from an Arkansas county received lottery scholarships is consistent with previous research. There is a distinct advantage for high school students whose families have high levels of educational attainment, especially those with parents that have obtained a bachelor's degree (Rowan-Kenyon, Bell, & Perna, 2007). The *MedIncome* finding was a little more surprising, although this will be addressed further in Chapter Five.

Research Question Five

Are there significant differences in social capital that explain variations in the success of high school graduates receiving a lottery scholarship?

Research Question Five examined whether or not significant differences in social capital explained the variation in students receiving lottery scholarships across the state of Arkansas. WLS regression analysis found that the average number of AAA declared activities for each high school in an Arkansas county, 2013 (*Assoc*) and the absolute value of migration to/from a county, 2000-2010 (*Migration*) were significant variables. The complete model, which included six social capital independent variables and the rate of lottery scholarships per public high school graduates in an Arkansas county (2010-2012) served as the dependent variable. A summary of the findings is listed in Table 17.

Table 17

Summary of Regression Analysis for Social Capital Variables Predicting Lottery Scholarship Success: Main Effects

IV	Unstandardized Estimate (*B*)	Std. Error	Standardized Beta	*t*
(Constant)	0.434	0.695		0.625
Assoc	0.074*	0.013	0.834	5.592
Migration	-0.000006344*	0.000	-0.403	-2.483
Voter	-1.320	0.809	-0.182	-1.631
Single	0.967	0.528	0.258	1.830
HomeOwn	0.776	0.667	0.174	1.164
Religion	0.000	0.000	-0.130	-1.194

Note. Adj. $R^2 = 0.278$; $df = 68$. $^*p \leq 0.05$, two-tailed.

The adjusted R^2 suggested that, given the number of independent variables, this model explained 27.8% of the variance in the dependent variable. For the model, $F(6, 68) = 5.756$, which showed that the model was statistically significant at $p \leq 0.05$. Within the model, the variables *Voter*, *Single*, *HomeOwn*, and *Religion* were not found to be statistically significant at $p \leq 0.05$. The unstandardized estimates (*B*) and *t* tests for each significant variable were as follows:

- On average, given an increase of one AAA declared activity for the average public high school in an Arkansas county (*Assoc*), the rate of lottery scholarships per public high school graduates could be expected to increase by 0.074 percentage points, holding everything else in the model constant. The *t* test was 5.592 ($p \leq 0.05$).

- On average, given an increase of 1,000 in the absolute value of population migration for an Arkansas county (*Migration*), the rate of lottery scholarships per public high school graduates could be expected to decrease by 0.006 percentage points, holding everything else in the model constant. The t test was -2.483 ($p \leq 0.05$).

Given the number of social capital variables used in the model, there was a fear of multicollinearity. Realizing this, VIF and tolerance tests were used to determine if any of the variables were collinear. The results of the test can be found in Table 18.

Table 18

Summary of Collinearity Statistics for the Regression Analysis: Main Effects

IV	Tolerance	VIF
(Constant)		
Assoc	0.438	2.283
Migration	0.371	2.698
Voter	0.785	1.274
Single	0.492	2.031
HomeOwn	0.436	2.293
Religion	0.826	1.211

Note. *Potentially collinear because Tolerance ≤ 0.20 and/or VIF ≥ 5.00

According to the results of the tests, none of the variables appear to be collinear (Tolerance ≤ 0.20 and/or VIF ≥ 5.00). The main effects WLS regression model was therefore appropriate to answer Research Question Five.

Research Question Six

Based on the findings, what are the policy considerations for institutional and state leaders?

To answer this question, an outcome evaluation was created to see examine if the Arkansas Scholarship Lottery has met its stated and implied goals. For the purpose of this study, two program goals were analyzed:

1. Make college more affordable for Arkansans
2. Increase the number of college enrollees from underrepresented communities

As part of this evaluation, an impact analysis was conducted to see how the Arkansas Scholarship Lottery has impacted specific populations it was designed to help. The results were as follows:

Goal One: Make college more affordable for Arkansans

Theoretically, any influx of financial aid into a higher education system is a positive for students deciding whether or not to attend college. Numerous researchers have found a strong correlation between college costs and a student's desire to attend a higher education institution (Leslie & Brinkman, 1987; St. John, 1990; Kane, 1995; Heller, 1997, 1999). Through a lottery scholarship offer, students who may have found the cost of higher education too daunting could become more inclined to enroll in college. The easiest way to measure this phenomenon would be to see whether or not the state of Arkansas had experienced a significant increase in college participation since the implementation of the program. To answer this, a one-way, within-subjects ANOVA was conducted for Research Question Two. The results of the ANOVA indicated that the state as a whole has experienced a significant increase in college participation since the implementation of the program.

Although the model did indicate a significant increase in college participation, further research is needed to learn more about how the lottery scholarship program is affecting affordability for students across the state. For example, future researchers should look at whether or not institutions in the state decided to raise tuition at significant rates since the implementation of the Arkansas Scholarship Lottery. If significantly high tuition increases have occurred, they would be consistent with the Bennett (1987) hypothesis, which argued that the introduction of new financial aid into a system will only encourage higher education institutions to raise tuition rates, meaning that the new money would not really make college more affordable for students. If higher than usual tuition rate increases have occurred, this should be considered in whether or not the program has actually made higher education affordable. Another interesting angle would be to look at the average debt load for students who enroll in Arkansas colleges, and compare it to the debt loads prior to the Arkansas Scholarship Lottery. After controlling for inflation, any significant increases could signal that the program has not really made higher education more affordable for Arkansas students.

As was mentioned earlier, the increases in college participation across the state of Arkansas is a positive sign that the lottery has had a positive effect on higher education affordability in the state. More research will be necessary, though, to measure the level of the impact, and whether or not subsequent changes on the institution level have negatively affected any gains made in college affordability.

Goal Two: Increase the number of college enrollees from underrepresented communities

Looking at the results of the study, it is difficult to ascertain whether or not the Arkansas Scholarship Lottery has succeeded in the goal of increasing college participation for students coming from underrepresented communities. Research Question Three, for example, found that the sample of the 31 impoverished Arkansas counties did not experience a significant gain in college participation since the implementation of the Arkansas Scholarship. Although a gain did occur, the lack of significance is important, especially when compared to Research Question Three. Another concern was the results of the Research Question One, which indicated a slightly moderate negative relationship between poverty and the rate of lottery scholarship recipients from a county. The evaluation for this goal becomes difficult, however, when other results from the study are considered. For example, the results of Research Question Four showed that *Poverty* was not found to be a significant human capital variable that explained lottery scholarship to public high school graduates ratio. Regardless, the fact that the sample of the most impoverished counties in Arkansas has not witnessed a significant increase in college participation indicates that the lottery scholarship program should begin considering new outreach strategies for these communities.

Future research on the Arkansas Scholarship Lottery should look to analyze other elements of underrepresented populations. For the purpose of this study, most of the focus was on students coming from communities with high rates of poverty. One of the most obvious variables that can be considered is race, specifically what effect the Arkansas Scholarship Lottery has had on underrepresented minorities, including African-Americans and Hispanics. Another variable of interest could be first-generation college students. According to the results of Research Question Four, the educational attainment variable (*HS+Bachelor*) proved to have a significant positive impact on the ratio of lottery scholarships to public high school graduates ratio for a county. Essentially, counties with higher rates of educational attainment are more likely to have higher rates of lottery scholarship recipients. Realizing this, researchers should find ways to isolate first-generation college students to learn what impact, if any, the lottery has had on their higher education aspirations. Realizing that there are numerous barriers to both college access and success for first-generation students, any data on the program's effect on this population can give policymakers a better idea of whether or not the Arkansas Scholarship Lottery is truly meeting its goal of expanding access for students coming from underrepresented backgrounds.

Policy Considerations

Although there will be a more detailed set of policy recommendations in Chapter Five, the following are a collection of policy considerations for state and institutional leaders who wish to make sure that both of the stated goals from this section are being met:

1. Policymakers should closely analyze data in the next two to three years to see what impact, if any, the recent changes in the funding formula have had on college participation gains across the state.
2. A thorough analysis of the marketing strategy for the Arkansas Scholarship Lottery should be conducted, specifically in areas that have high poverty and low educational attainment. Any outreach strategy should include training for school counselors who are charged with getting students interested in the program and its benefits.
3. Even with recent funding issues, new formulas should be considered to further incentivize students from underrepresented populations to participate. For example, the state of Tennessee offers a supplemental award to students whose families below a specific economic threshold. Arkansas should consider similar changes to the funding formula to make college more affordable for impoverished students.

4. The state should also closely track annual tuition increases at state institutions to ensure that the Arkansas Scholarship Lottery is having a positive effect on college affordability, especially for students coming from underrepresented populations.

These policy considerations, along with further recommendations, will be analyzed more closely in Chapter Five.

Summary of the Chapter

The chapter began with a discussion of the models that were used to answer the research questions posed in the study. Research Question One used a series of descriptive statistics plus Pearson's *r* correlations to learn the profiles of Arkansas counties that receive lottery scholarships at high rates to the counties that purchase lottery tickets at high rates. Next, one-way, within-subject ANOVA models were introduced to answer Research Questions Two and Three. Research Question Two explored whether or not the state of Arkansas had experienced a significant increase in college participation since the beginning of the Arkansas Scholarship Lottery. Research Question Three asked a similar question, but applied the model to a sample of Arkansas counties with high poverty rates. The WLS regression models were then introduced for Research Questions Four and Five. Research Question Four used a set of six human capital variables to see if they could predict the percentage of high school graduates that receive a lottery scholarship in a given year. Research Question Five asked a similar question, only in this specific case, a set of six social capital variables were used. Finally, Research Question Six outlined an outcome evaluation for the Arkansas Scholarship Lottery, which focused on whether or not the program was reaching its most important goals.

The chapter continued with the results for each research question posed in the study. Research Question One found a slightly moderate negative relationship between *Poverty* and the rate at which a county receives lottery scholarship. At the same, time although there was a positive relationship between *Poverty* and the rate at which a county purchases lottery tickets, the relationship was very slight, at best. Continuing to Research Question Two, the study found that the state of Arkansas has witnessed a significant increase in its college participation rate across the state since the implementation of the Arkansas Scholarship Lottery. Research Question Three, though, indicated that the poorest counties in the state had not witnessed a statistically significant increase in college participation since the implementation of the Arkansas Scholarship Lottery, a particularly important finding in the study.

The study continued with Research Question Four. The first main effects model indicated issues with multicollinearity, leading to the production of alternate models to address the issue. After identifying an alternate model for the purpose of analysis, *MedIncome* and *HS+Bachelor* were found to be significant social capital variables in explaining the success at which high school graduates from an Arkansas county have at attaining lottery scholarships. Research Question Five, on the other hand, did not indicate issues with multicollinearity, and *Assoc* and *Migration* were found to be significant social capital variables. Finally, Research Question Six evaluated whether or not the Arkansas Scholarship Lottery was meeting three of its most important goals: college affordability for all Arkansans, college access for Arkansans from underrepresented groups, and discouraging Arkansans from buying lottery tickets from border states. Although more research is necessary for the first and third goals, early indications are that the program could do a better job of increasing access to higher education for students coming from underrepresented backgrounds.

Chapter V

Conclusions, Recommendations, and Discussion

Introduction

Compared to the rest of the United States, Arkansas has one of the lowest higher education attainment rates. To help address this issue, the Arkansas Scholarship Lottery was created as a way to provide direct financial aid to high school graduates who decide to attend a higher education institution in the state. With the infusion of millions of dollars of financial aid into the system, the hope was that college participation would increase in the state of Arkansas, particularly among students coming from underrepresented backgrounds (Arkansas Secretary of State, 2012). With this in mind, the study was designed to see what gains, if any, the state had experienced in college participation. Once those changes in college participation were examined, the study then examined a variety of human and social capital variables to see if they could explain the variation in lottery scholarships offered across the state of Arkansas.

This chapter provides a summary of the conclusions that were reached in the study, along with recommendations for future practice, both in terms of policymaking and academic research. The chapter begins with a brief summary of the study along with the findings that were developed for each of the research questions. The chapter continues with a list of conclusions about the Arkansas Scholarship Lottery, and provides recommendations for future research, along with recommendations for future policymakers to put into practice. The chapter ends with a discussion of the future of the Arkansas Scholarship Lottery and what can be done to ensure that the program is increasing access to college education across the state, particularly among students from underrepresented backgrounds.

Summary of the Study

Considering Arkansas's struggles to improve its higher education attainment rate to a level on par with the rest of the country, the purpose of this study was to see what effect, if any, the Arkansas Scholarship Lottery has had on college participation in the state. The literature showed that although a number of variables can affect college choice, one of the most important remains the cost of attending a specific college or university (Leslie & Brinkman, 1987; St. John, 1990; Kane, 1995; Heller, 1997, 1999). Although the cost of higher education can play a role in almost any student's college choice, the literature has shown that students coming from low socioeconomic backgrounds are often primarily concerned about price, causing many to use a simple cost-benefit analysis to determine whether or not to enroll in a postsecondary program (Mullen, 2010; Heller, 1999; St. John, 1990). In theory, the creation of a lottery scholarship program should be a significant enticement for students interested in enrolling in higher education, especially if they come from an underrepresented background. In practice, though, lottery scholarship programs often primarily benefit students coming from middle and upper-income backgrounds (Rubenstein & Scafidi, 2002; Hansen, Miyazaki, & Sprott, 2000). Realizing this previous research on the distribution of lottery scholarship costs and benefits, the study examined college participation gains from the Arkansas Scholarship Lottery, particularly among the most impoverished counties in the state.

Another area of interest was learning what role, if any, human and social capital variables play in explaining the rate at which high school graduates earn lottery scholarships in different Arkansas counties. Previous research has connected both human (Becker, 1962, 1971; Kiker, 1971; Hansen, 1971; Schultz, 1971) and social capital (Brehm & Rahn, 1997; Putnam, 2000; Murray, 2012; Green & Haines, 2012) to societal changes, including educational outcomes. Most of the previous research on statewide lotteries has connected the programs to human capital variables, especially those that relate to income and educational attainment (Price & Novak, 1999; 2000; Rubenstein & Scafidi, 2002; Hansen, Miyazaki, & Sprott, 2000). Considering this, the study hoped to contribute to the literature by also looking at the connection between social capital variables and lottery scholarship success.

Research Question One was intended to establish a profile of who buys lottery tickets and what type of students receive lottery scholarships. Using county-level data (FY2011 and FY2013 figures) made available through the Arkansas Division of Legislative Audit, rates of lottery sales and lottery scholarships awarded were determined for each county. Using a short list of rankings, it was determined that there was a possible connection between a county's poverty rate and its involvement with the Arkansas Scholarship Lottery. Using a set of Pearson's *r* correlations for both FY2011 and FY2013, it was determined that there is a relationship between poverty and the Arkansas Scholarship Lottery, both in terms of rate of lottery tickets sold and scholarships awarded to high school students. Even though a relationship exists, further research will be needed to establish whether or not Arkansas has some of the same socioeconomic distribution issues that have been found in other statewide lottery scholarship programs.

Research Questions Two and Three looked at changes in college participation rate since the implementation of the Arkansas Scholarship Lottery. Research Question Two analyzed all 75 Arkansas counties to see if there had been a significant change in college participation from pre-lottery (2007-2009) to post-lottery (2010-2012). Using a one-way, within-subjects ANOVA, it was determined that there had been a significant increase in college participation across the state since the implementation of the Arkansas Scholarship Lottery. Hoping to determine what gains had been made in college participation for the poorest counties in the state, Research Question

Three used a sample of 31 Arkansas counties that were defined as high poverty (poverty rate ≥ 21.9%). Using a one-way, within-subjects ANOVA, the study found that there had not been a significant increase in college participation among the high poverty counties, which called into question whether or not the program was creating gains in college participation among students from traditionally underrepresented backgrounds.

Research Questions Four and Five both used WLS regression to learn determine how human and social capital variables explained variations in the rate at which high school graduates from a particular Arkansas county received lottery scholarships. The model of human capital variables in Research Question Four needed adjustment due to issues with multicollinearity, but the adjusted model determined that *MedIncome* (median income in an Arkansas county) and *HS+Bachelor* (high school attainment rate plus bachelor's degree attainment rate) were significant human capital variables. The results of Research Question Five, on the other hand, indicated that the social capital variables *Assoc* (average number of Arkansas Activities Association declared activities for each public high school in an Arkansas county) and *Migration* (absolute value of migration to/from a county) were significant social capital variables. With these results, policymakers can have a better idea of the different variables that best predict the rate at which high school graduates from an Arkansas county earn lottery scholarships.

The final research question, Research Question Six, was designed to serve as an outcome evaluation for the program. Among the many goals for the Arkansas Scholarship Lottery, two were analyzed: making college more affordable for Arkansans and increasing college participation for traditionally underrepresented populations. Although the first goal was theoretically the simple addition of financial aid money that comes from the Arkansas Scholarship Lottery, future research is needed to see whether or not colleges are raising their tuition at higher rates, which over time could diminish the benefits of college affordability. The second goal, increasing representation among underrepresented students, still needs work in order to be attained, especially after seeing the results of Research Question Three. Regardless, further research will be needed to see how the effects of the Arkansas Scholarship Lottery on other underrepresented groups, such as racial minorities and first-generation college students.

Conclusions

The following conclusions relating to the Arkansas Scholarship Lottery were drawn from the study:

1. Although the Pearson's *r* correlations from Research Question One were not strong, there was some initial evidence that there were distributional concerns with the Arkansas Scholarship Lottery, particularly when it came to the correlation between poverty rates and the rate at which lottery scholarships were awarded to a particular county. Future research will be needed to address the level of these socioeconomic distributional concerns.
2. The Arkansas Scholarship Lottery has had a significant effect on the college participation rate for the state of Arkansas. Considering the state government's focus on growing the educational attainment rate in the state of the Arkansas (Arkansas Economic Development Commission, 2012), this is an important step in the right direction for long-term economic development.
3. Even with the growth in the state's college participation rate, the sample of 31 counties with high poverty rates in Arkansas did not witness significant growth in college participation during the same period following the implementation of the Arkansas Scholarship Lottery. This finding should be a significant concern for the leaders of the

Arkansas Scholarship Lottery, especially since one of the primary goals of the program is growing the percentage of high school graduates from underrepresented backgrounds who decide to attend college (Arkansas Secretary of State, 2012).

4. Within the alternate model for the human capital variables, the educational attainment variable (*HS+Bachelor*) and *MedIncome* were both found to be significant variables in explaining the rate at which public high school graduates from a county earned lottery scholarships. The *HS+Bachelor* variable showed that for each percentage point in educational attainment, the rate of lottery scholarships per public high school graduates could be expected to increase by 2.369 percentage points, holding everything else in the model constant. This finding was consistent with previous research on lottery scholarship programs (Rubenstein & Scafidi, 2002; Hansen, Miyazaki, & Sprott, 2000). The *MedIncome* variable, on the other hand, indicated that given an increase of $1,000 in the median income for an Arkansas county, the rate of lottery scholarships per public high school graduates could be expected to decrease 0.02 percentage points. Although the *MedIncome* finding was surprising, the actual decrease in the rate was very subtle.
5. Within the model for social capital variables, the *Assoc* and *Migration* variables were both found to be significant. On average, given an increase of one AAA declared activity for the average public high school in an Arkansas county, the rate of lottery scholarships per public high school graduate could be expected to increase by 0.074 of a percentage point, holding everything else in the model constant. With a greater number of groups available at a high school, students have more opportunities to build both a college resume and social capital with fellow students and staff members. In regard to the *Migration* variable, on average, given an increase of 1,000 in the absolute value of

population migration for an Arkansas county, the rate of lottery scholarships per public high school graduate could be expected to decrease by 0.006 percentage points, holding everything else in the model constant. Once again, as the absolute value of population migration increases for a county, it becomes more difficult to build social capital across the community, and it therefore logical to conclude that an increase in overall population migration could have an effect on lottery scholarship success.

6. The Arkansas Scholarship Lottery was intended to reach two important goals: make college more affordable for Arkansans and increase college enrollment of students from underrepresented populations. The results of the study seemed to support the notion that the Arkansas Scholarship Lottery has made college more affordable, although long-term studies should be conducted in the future to see if the program has affected tuition pricing strategies among higher education institutions. It is much clearer, though, that the program has struggled to increase college participation among students from poor communities in the state.

Recommendations for Future Research

Even with the study's examination of the Arkansas Scholarship Lottery, there are still multiple issues that need to be analyzed in future research projects on the subject. The first recommendation is that future researchers should consider potential distributional issues with the Arkansas Scholarship Lottery. One of the most common arguments against the program during the 2008 campaign was that it would serve as a regressive tax, with poor, undereducated Arkansans purchasing lottery tickets, the revenue of which would overwhelmingly benefit the children of middle and upper-income families. Admittedly, this study was more interested in analyzing whether or not the Arkansas Scholarship Lottery was reaching its intended goals that related to college participation. Considering the original arguments made against the program, it would be interesting to see if there was indeed evidence of socioeconomic distributional issues that have been found in other states that have a lottery scholarship program.

Staying on the topic of socioeconomic distributional issues, another research area could be learning more about why these problems exist through both survey and qualitative research. The regressive tax argument is well established, but why are poor, uneducated individuals more likely to buy tickets? Are they simply unaware of the significantly low odds of winning a substantial prize? Are the tickets just to easy to buy when checking out at a gas station? At the same time, why are the children less likely to receive these awards? Are they even aware of the steps necessary to file an application? Are there adults available to help with the process? All of these questions are important to ask if researchers want to gain a better understanding of the distributional issues. A first step would be to create a survey to explore these questions, followed by structured interviews of individuals across the state of Arkansas. Through phenomenological methods such as these, researchers could gain a better understanding of these issues, and could begin to create new policy proposals that would adequately address what is often the primary argument against lottery scholarship programs.

Another recommendation for future researchers is to develop new tools that can lead to more understanding about the effect the Arkansas Scholarship has on college participation. The study examined whether or not there has been an increase in college participation for two different groups: 1) all 75 counties in Arkansas and 2) 31 high poverty (poverty rate $\geq$ 21.9%) counties in Arkansas. Although the one-way, within-subjects ANOVA was the appropriate methodological tool for answering Research Questions Two and Three, further research will be needed to explain the actual effect the Arkansas Scholarship Lottery has had on college participation. Could the increase in college participation across the state be attributed to other possible factors, such as federal policy initiatives during President Barack Obama's administration to increase college participation? Further research will be needed to see the true impact the Arkansas Scholarship Lottery has had on college participation. One possible method for answering this question would be to compare the college participation changes to states with similar demographics that do not have a lottery scholarship program. If the state without the lottery scholarship program has seen similar gains in college participation, there may be nationwide trends or policies that are having a significant effect on the participation rate in Arkansas. More research will be needed to draw a stronger connection between the Arkansas Scholarship Lottery and college participation.

Future researchers should also consider analyzing variables other than poverty rates to measure college participation changes among different underrepresented communities. For example, the same methods could be used to compare counties with low educational attainment rates to the rest of the state. Considering the study determined that educational attainment was a statistically significant human capital variable in explaining the rate at which public high school graduates received lottery scholarships, it is plausible that counties with low educational attainment rates are experiencing the same gains in college participation. This would be a critical topic to examine, especially since researchers are likely to find high levels of potential first-generation college students in counties with low educational attainment. The other variable that could be considered is race, specifically looking at growth in college participation among counties with high minority populations. Although unfavorable findings relating to race could hurt the Arkansas Scholarship Lottery's credibility, Arkansas voters have a right to know whether or not the program is actually increasing college participation among underrepresented communities within the state.

In regard to the human and social capital variables, one conclusion that should be explored further is the connection between number of sponsored activities and the rate at which high school graduates receive lottery scholarships in Arkansas. Even though some researchers have found a connection between extracurricular involvement and the probability a student will enroll in higher education (Mahoney, Cairns, & Farmer, 2003), more research, particularly as it relates to lottery scholarships, is needed on the subject. First and foremost, could the number of activities simply be an example of community affluence at a high school? One could assume that if this were the case, students are really more successful at securing lottery scholarships because of the relative wealth of their families, not because the school is able to offer a breadth of extracurricular activities. At the same time, are there certain activities that could help create more of a college-going culture than others? Is it more valuable to join certain clubs that are traditionally considered to be more intellectual, such as band or debate? Or is it simply important that a student is involved, regardless of the type of activity? With the conclusions reached in the study, answers to these questions could prove to be useful not only to lottery scholarship researchers, but also to college choice theorists in general.

Although much was learned about college participation changes during the first three years of the Arkansas Scholarship Lottery, future researchers should also start to take into account the significant changes in the funding formula that were implemented for incoming college students in Fall 2013. Due to issues with lottery revenue, the Arkansas Scholarship now uses a system where students receive $2,000 for their first year of college, followed by annual $1,000 increases in the award, maxing out at $5,000 for the fourth year of college. This is a significant change from the old formula, particularly for students who attend four-year institutions. Prior to the change, a student attending a four-year college received $4,500 annually from the Arkansas Scholarship Lottery. A concern moving forward for the program is what effect this will have on students coming from impoverished backgrounds. Previous research has shown that these students view college using cost-benefit analysis, with many opting not to attend if the initial costs are simply too much (Mullen, 2010). With the decrease in the first-year award, a common fear is that students will decide not to attend college simply because they cannot afford the first year. Even if they persist and get higher awards each year, the first year cost could possibly dissuade them from attending. Knowing that this is a possibility, it will be important for future researchers to track how changes in the funding formula for the Arkansas Scholarship Lottery have affected college participation, particularly among students coming from impoverished backgrounds.

Future researchers should also consider seeking new sources of data that demonstrate college participation in the state of Arkansas. Although the Arkansas Department of Higher Education (ADHE) is a reliable resource, there are two significant flaws to its college participation data. To begin with, the college participation only measures public high school graduates for each county. Although this is beneficial, it has to be noted that some counties in the state have relatively high private school populations; that due to their socioeconomic status, students who could afford to attend private school would more than likely have higher college participation rates than their public school peers. By only using college participation data for public high school graduates, wealthier counties in the state may have an actual college participation rate that is higher than what ADHE reports. At the same time, ADHE only reports college participation for students who attend college at an Arkansas institution of higher education. Due to this reporting method, students who attend an out-of-state institution are not included. As Hoover and Keller (2011) reported, students who attend an out-of-state institution were overwhelmingly affluent and often have parents with at least bachelor's degrees. Once again, the decision not to include students who attend out-of-state institutions can decrease the actual college participation in affluent counties in the state. With more accurate college-going data, the differences between affluent and poor counties in the state could be more glaring.

Another important source of data will be comparing the Arkansas Scholarship Lottery's effect on both two-year and four-year college participation rates. At the moment, ADHE only publishes the overall college participation rate for a county, regardless of whether a student attended a two-year or four-year institution. Access to this data could allow researchers to look at a multitude of new perspectives. For example, are students from impoverished counties simply enrolling in community colleges at higher rates? Or does a lottery scholarship give poor students the means to continue to a four-year institution? At the same time, are some high schools funneling students into community colleges at high rates? If so, is this a community's strategic move to keep these institutions viable or just its inability to properly prepare students for a four-year university? These are just a few examples of research questions that could be posed with access to college participation data for both two-year and four-year higher education institutions.

In the long-term, a key indicator of the Arkansas Scholarship Lottery's success will be to learn how it supports economic development in Arkansas. More specifically, will the lottery produce more college graduates in the state of Arkansas? At the moment, the Arkansas Scholarship Lottery is being touted as a significant part of Governor Mike Beebe's plan for statewide economic development (Arkansas Economic Development Commission, 2012). Indeed, researchers in the past have drawn a connection between gains in educational attainment and economic development. Although the program has its stated goals, the true measure of success for most voters will simply be whether or not the money spent on the lottery has led to economic gains for the state of Arkansas. Researchers should certainly follow what, if any, gains are made in higher education attainment across Arkansas in the years to come.

Recommendations for Practice

One of the primary goals of this study was to provide recommendations for improving the Arkansas Scholarship Lottery, especially when it comes to college participation among students from traditionally underrepresented populations. The following recommendations are divided into two categories: recommendations for state leaders and recommendations for higher education institutional leaders.

Recommendations for State Leaders

The most significant concern for the Arkansas Scholarship Lottery moving forward should be the fact that counties with high poverty rates have not experienced a significant increase in college participation. A concerted effort should be made to analyze the awareness high school students in these counties have of the program. A simple answer would be to spend more money advertising the Arkansas Scholarship Lottery through traditional media, such as television, newspapers, and radio. What really needs to be examined, though, is the quality and quantity of college counselors who are available in these areas. Hurwitz and Howell (2013) found that the addition of one high school counselor to a school can lead to a significant increase in college enrollment. In many impoverished schools, though, high school counselors are often understaffed and are asked to cover a number of different student issues that do not relate to college preparation, including mental health, family, and disciplinary issues (Hurwitz & Howell, 2013). If the state of Arkansas is serious about improving college participation, state leaders should look into ways to improve the college preparation training of counselors and should look for ways to hire more counselors at schools, particularly those in impoverished communities.

Although improved college counseling could be a significant help, another proposal should be to change the funding formula for the Arkansas Scholarship Lottery. At the moment, each qualifying student receives the same scholarship award, regardless of family income. Realizing this, the state legislature should examine the feasibility of creating a funding formula similar to the Tennessee Education Lottery Scholarship. The state of Tennessee offers a base HOPE Scholarship award for any qualifying student (21 ACT or 3.0 GPA). As part of the program, though, qualifying students who have a family income that falls below a certain threshold will receive an Aspire Award, which is a $1,500 supplement to the HOPE Scholarship. Replicating the Tennessee example could be beneficial for Arkansas, especially since previous research has shown that students from underrepresented populations, including African Americans and low-income students, saw significant gains in college participation following the implementation of the Tennessee HOPE Scholarship (Ness & Tucker, 2008). Realizing the success of the Tennessee model, Arkansas state officials should consider altering the formula to create a supplemental award for low-income students to help them pay for a college education.

Another area that state leaders should look to improve is the number of extracurricular activities that are offered at a high school, particularly small high schools in impoverished areas. The results of Research Question Five indicated that the *Assoc* variable was significant in predicting the rate at which public high school graduates received lottery scholarship awards. Obviously, there is no extracurricular requirement for receiving a lottery scholarship. Research has shown, though, that involvement in extracurricular activities is associated with a student's decision to attend college (Mahoney, Cairns, & Farmer, 2003). Through extracurricular involvement, students learn a number of valuable soft skills, including leadership, teamwork, time management, and in many cases, communication skills. Additionally, extracurricular involvement can be beneficial for students who need a résumé to apply for merit-based scholarships. With this in mind, the state legislature should look to develop grants to help struggling high schools expand both the quantity and quality of their extracurricular programs. Even with the increasing emphasis on standardized test scores as the primary measure of academic excellence for public high schools, a renewed focus on expanding extracurricular activities can help strengthen the college-going culture across the state.

Once there is enough data available, ADHE needs to begin to report on the retention and educational attainment of students receiving lottery scholarships. The tendency is to compare higher education institutions to examine the success of their students who receive the lottery scholarship. Some institutions may indeed have better student retention programs in place than others, which could explain differences in overall lottery scholarship retention. Since Act 1203 in 2011, Arkansas has used a performance-based model for higher education funding that tracks, among other metrics, student retention (Arkansas Department of Higher Education, 2011). In the future, the state legislature should consider adding lottery scholarship retention to the model. Not only would the change hold colleges more accountable for their retention of lottery scholarship recipients, but it will also make the public aware of which institutions struggle to keep these students enrolled.

If the state of Arkansas is serious about improving lottery scholarship retention, though, it should also consider easing requirements for first-year students who are receiving the award. At the moment, students are required to maintain a cumulative 2.5 college GPA in order to keep a lottery scholarship. Even though the state only requires students to complete 27 credit hours during their freshman year (30 credit hours each year after), many students struggle with their first year of college, especially if they do not yet have the appropriate support or strategies needed to be successful (Schlossberg, Waters, & Goodman, 1995). Realizing that low-income students may not have the necessary tools for a successful transition, the state should ease GPA requirements for the first year of college, while still maintaining the 2.5 cumulative GPA requirement for each academic year that follows. By doing this, students from underrepresented populations will have a better opportunity to transition into a successful college student.

Another significant goal of the Arkansas Scholarship Lottery was to make college more affordable for students attending in-state institutions. With the creation of any public financial aid program, there is often a fear that colleges will use the money in the system to justify tuition increases. Bennett (1987) argued that there is a connection between increased funding for financial aid programs and the price of higher education. Initial evidence has shown that there was a slight increase in rate of tuition increases in the two years following the implementation of the Arkansas Scholarship Lottery (Hill, 2012). Although these numbers are difficult compare to pre-lottery years, when the economy was coming out of the recession and state institutions like the University of Arkansas-Fayetteville used tuition freezes to help attract new students. Even thought the connection between the lottery scholarship and tuition increases will likely be inconclusive for a few years, the state should begin to track individual institution tuition increases in its legislative audits for the Arkansas Scholarship Lottery. By doing this, both voters and state leaders should be able to see if there is any correlation between the Arkansas Scholarship Lottery and significant tuition increases. As part of the audit, though, institutions should be given space to justify their tuition increases, such as increased utilities, documented need for new staff and/or faculty members, increased costs for employee benefits, and significant declines in state support.

Recommendations for Higher Education Institution Leaders

As mentioned in the recommendations for state leaders, an important component of any strategic plan for improving impoverished student participation in the Arkansas Scholarship Lottery program would be to improve the counseling that is offered to these students. Although this is an important goal for the state, colleges should also consider ways to integrate their recruitment strategy with expanding the pool of Arkansas Scholarship Lottery recipients. A common practice in public university recruitment offices is to create recruitment regions for admissions counselors. For example, an admissions counselor at an Arkansas public university may be assigned to cover the northwest section of the state, while another would be assigned to work with students from the southeast region. Looking at the most impoverished areas of the state, a significant percentage of these students are either in the Delta region (near the borders of Tennessee and Mississippi) or in the southern region of the state. Realizing where these areas are, enrollment management leaders should train their admissions counselors for regions like these to better advise students on the nuances of applying for a lottery scholarship. For example, these admissions counselors could work with local leaders to develop workshops and presentations about the lottery scholarship and how to apply. Higher education institutions could also solicit accounting students and recent graduates to help families fill out the FAFSA, a potential barrier to apply for some families. By using these simple strategies, colleges could be able to not only reach out to these students, but also help them apply for financial aid that could help make it possible for those students attend their institution.

Once students with the Arkansas Scholarship Lottery have decided to attend college, the next step for institutional leaders is to develop strategic programs to help retain those students. Singell (2004) found students who lose a scholarship due to grades or some other reason often leave the institution at a significant rate. This finding comes as no surprise, especially since the loss of a scholarship can become a significant financial burden for many families, especially those on a limited income. Realizing that this could be an issue, universities should consider creating mandatory intervention programs on their campus. In such a scenario, a student with a scholarship would have to meet with a counselor if grades fall to an "at-risk" level of losing the scholarship. During their session, the counselor would come up with strategies for improving performance, ranging from tutoring sessions to visits to the school mental health counseling center. Martindale (2009) found that mandatory intervention programs can be an effective way of helping students retain their scholarships and maintain their enrollment at the institution. Although programs like these could be expensive to implement, the long-term benefits of retaining lottery scholarship recipients at higher rates could potentially outweigh initial costs.

Discussion

One of the key arguments against the Arkansas Scholarship Lottery was that the program would effectively serve as a regressive tax, with low-income individuals buying tickets at high rates that would primarily help middle and upper-income students finance their college education (Warren, 2007). Although this was a popular talking point, the argument was grounded in previous academic research (Price & Novak, 1999; 2000; Rubenstein & Scafidi, 2002; Hansen, Miyazaki, & Sprott, 2000) and it is important to note that this study did not attempt to fully address the distributional consequences of the Arkansas Scholarship Lottery. Using Pearson's *r* correlations, a slight positive correlation was found between poverty and ticket purchases. At the same time, however, there was a moderate negative correlation between poverty and lottery scholarship recipients, implying that counties with high levels of poverty are often receiving lottery scholarships at lower rates. Although this was consistent with the previous literature on the distributional effects of lottery scholarship programs, it is important to point out that a more thorough examination is needed in order to make the argument that the Arkansas Scholarship Lottery is indeed a regressive tax. Other variables, such as educational attainment and race, will need to be tested to learn more about the distributional effects. Until this research is conducted, all that can be said is that there is only some evidence of distributional issues with the Arkansas Scholarship Lottery.

Although distributional effects are important, this study in particular was more interested in learning whether or not there have been significant gains in college participation since the implementation of the Arkansas Scholarship Lottery. As has been mentioned throughout the study, one of the primary goals to of the Arkansas Scholarship Lottery was to increase college participation among traditionally underrepresented groups. According to the results, across the state there has been a significant increase in college participation since the implementation of the Arkansas Scholarship Lottery. During this same period, however, the most impoverished counties in the state have not seen a significant gain in college participation. This finding was important because it indicated that the program was not meeting one of its most important goals: providing increased access to students from underrepresented groups. Considering the previous research on lottery scholarship programs, this finding was not surprising. Even though it can be a struggle to market merit-based scholarship programs to students from underrepresented communities, it is imperative for the state to improve its outreach in the years to come. Until that happens, the Arkansas Scholarship Lottery is simply not reaching one of its goals of increasing access to higher education.

The recommendations for practice section of Chapter V provided a number of ideas that could potentially increase the impact of the Arkansas Lottery Scholarship on underrepresented populations. Among these ideas, an important focus needs to be on the level of college counseling a student receives, particularly if the student comes from a low-income area that has a large percentage of prospective first-generation college students. A common issue in these low-income areas is that high school counselors often juggle a number of other responsibilities that do not directly deal with college, and few counselors exist for the simple fact they are some of the first employees to lose their jobs when a district faces budget issues (Hurwitz & Howell, 2013). Both the state governments and higher education institutions have a responsibility to provide better college counseling support to these students, especially when it comes to applying for financial aid programs like the Arkansas Scholarship Lottery. At the same time, state officials should take the lead of the Tennessee HOPE Scholarship and create a new funding formula that lowers the base lottery scholarship, and provides a significant supplement to students who fall below a specific income threshold. By doing this, Arkansas could potentially see the same significant college participation increases among underrepresented students that the state of Tennessee witnessed after the implementation of the HOPE Scholarship (Ness & Tucker, 2008). The adoption of the Tennessee HOPE funding formula would be a form of policy diffusion, a common practice among state governments looking to implement new policies. Berry and Berry (2007) argued that many states favor policy diffusion because it allows them to implement policies that have proven to be successful in the past rather than creating an entirely brand new program. In this case, with the current issues the Arkansas Scholarship Lottery faces, policy diffusion is an approach that should be pursued.

The focus should not just be on enrolling these students as freshmen, though. Institutions should also create new mandatory scholarship monitoring programs that can help them address academic issues that arise for lottery scholarship recipients before they reach a point that they will not be able to keep their financial aid. Through these efforts, not only can the state of Arkansas experience a significant increase in college participation among underrepresented students, but it can also provide a strong support system that will help them progress through college and graduate.

Following the section on college participation, the study continued with an exploration of what role, if any, human and social capital variables played in explaining difference in the rate of lottery scholarship awards offered across Arkansas counties. After altering the model due to potential issues with multicollinearity, the results of Research Question Four indicated that the educational attainment rate (*HS+Bachelor*) and median income (*MedIncome)* were both significant human capital variables in explaining a county's lottery scholarship success. The educational attainment rate finding indicated that the rate of lottery scholarships per public high school graduates could be expected to increase by 2.369 percentage points. Median income, on the other hand, actually indicated that an increase of $1,000 in the variable led to a decrease in lottery scholarships per public high school graduates, although it was important to note that the decrease was only 0.02. Although the median income finding was surprising, arguably the most important finding related to educational attainment. For the Arkansas Scholarship Lottery to improve its performance, officials should target areas with low educational attainment to help students learn about the program and its benefits. As Rowan-Kenyon, Bell, and Perna (2007) found in previous research, prospective first-generation college students have numerous barriers to enrollment, including a lack of parental savvy when it comes to seeking potential financial aid programs. With proper counseling, though, these families will more than likely be able to navigate the system, including the requirements necessary to secure a lottery scholarship.

In regard to the social capital variables that were examined in Research Question Five, two were found to be significant: number of AAA declared activities for the average public high school in an Arkansas count (*Assoc*) and the absolute value of population migration from 2000-2010 (*Migration*). The finding on population migration was important because it indicated that a stable population over time can help build social capital and even improve educational outcomes. There is very little, though, a state can do to manage population migration in individual counties. Even when favorable economic development policies and programs are granted to individual counties, they will inevitably attract outside residents to the area, thus increasing migration. Due to the inherent difficulties of controlling population migration, the most important finding was the connection of the number of school clubs and organizations to lottery scholarship success. This finding was consistent with previous research that has found a connection between high school extracurricular involvement and a student's propensity to want to attend college (Mahoney, Cairns, & Farmer, 2003). By expanding the offering of extracurricular activities, students are introduced to both new ideas and potential passions in life. At the same time, extracurricular involvement will help students prepare for competitive scholarships applications that request a list of high school activities. Realizing the importance of extracurricular involvement, the state of Arkansas must seek new ways to expand the offerings of extracurricular activities, particularly in poor and underdeveloped communities in the state.

Throughout this research study, one potential question has loomed: Is it possible for the Arkansas Scholarship Lottery to reach its goal of expanding college access to traditionally underrepresented groups? At the moment, there is evidence to indicate the Arkansas Scholarship Lottery has yet to make significant gains in access, particularly among impoverished communities. The finding does not mean that the program is fatally flawed, however. With coordinated efforts from both state and institutional leaders, there is certainly the possibility that the program will be able to reach its important goal. To create a college-going culture with the Arkansas Scholarship Lottery at the center of the plan, state and institutional leaders will need to improve the dissemination of information to students and their families, both through traditional advertising and improved college counseling. At the same time, this culture can improve by expanding opportunities for extracurricular involvement, which was found to be a connection to lottery scholarship success in an Arkansas county. Finally, a change in the funding formula that puts Arkansas more in line with the Tennessee HOPE model could ensure that impoverished students, along with high-achieving students, will receive a greater share of the funds from the program that are designated for scholarships. Although it may take years for these changes to be fully implemented, the totality of these recommendations could potentially put the Arkansas Scholarship Lottery on the path of reaching its goal of improving college participation for students coming from underrepresented populations.

Although increasing college participation is important for the state of Arkansas, voters will ultimately judge the success of the program based upon its ability to create higher rates of college graduates in the state. Although it is too early to analyze if the program is creating a significant gain in graduates, both state and institutional leaders will need to coordinate efforts to ensure that lottery scholarship recipients are completing their academic programs. As the state begins to adopt more forms of performance-based funding, it should hold colleges and universities accountable for the retention and graduation of lottery scholarship recipients, particularly those that come from underrepresented backgrounds. At the same time, the state should closely monitor tuition increases to make sure that institutions are not raising rates simply because of the lottery program. Institutions also need to implement, if they have not already, scholarship retention programs that allow administrators to monitor student achievement and provide counseling to students who are at-risk of losing a lottery scholarship due to substandard academic performance. Through a proactive program, at-risk students can be more quickly identified so that administrators can give the students guidance on what can be done to improve their academic performance.

In order for the state to Arkansas to improve its higher education attainment ranking, it will take many years of coordinated efforts. State leaders will need to identify non-traditional students with some college credit and successfully convince this group to return to school to complete a degree. Institutions will need to improve their academic success programs to ensure that students are getting a high-quality education that leads to both a college degree and a meaningful career down the road. Public high schools, particularly those in high poverty counties, will need to look for ways to create a college-going culture. Although numerous programs will need to be created, the Arkansas Scholarship Lottery, with a few proposed modifications, has the potential to become one of the key policy programs that helps the state increase its percentage of college graduates.

Summary of the Chapter

The chapter began with a list of conclusions relating to the research questions posed in the study. The study found that although the state of Arkansas has experienced a significant increase in college participation since the implementation of the Arkansas Scholarship Lottery, a sample of high poverty counties did not witness a significant increase during the same period of time. At the same time, WLS regression models identified different human and social capital variables that served as significant predictors of a county's lottery scholarship success, including educational attainment rates, median income, number of AAA declared activities for the average public high school, and population migration.

The chapter continued with a discussion of recommendations for future research. Although the study was able to produce a set of interesting findings relating to the Arkansas Scholarship Lottery, more research will be needed to learn more about the program's effect on the state, especially whether or not it is indeed the driving force behind the increases in college participation. Following this section, recommendations for future practice were presented. These recommendations were presented to two groups: state leader and higher education institutional leaders. If both groups are able to implement these recommendations, the Arkansas Scholarship Lottery could become a better performing public policy program in the future. Finally, the chapter ended with a discussion of the findings presented throughout the study.

Even though the Arkansas Scholarship Lottery is less than five years old, it is important to start the process of evaluating whether or not the program is reaching its goals, which was the purpose of this study. Although the program could see improvements when it came to underrepresented student participation, the study presented reasonable recommendations that could be implemented in the coming years.

References

Annie E. Casey Foundation. (2014). Children in single-parent families: Arkansas. Retrieved from http://datacenter.kidscount.org/data/tables/4051-children-in-single-parent-families?loc=5&loct=5#detailed/5/213-287/false/867,133,38,35,18/any/9775,9774

Arkansas Activities Association. (2014). Directory of member schools. Retrieved from http://www.ahsaa.org/schools

Arkansas Department of Higher Education. (2011). Arkansas 2025: Leading in the global economy by investing in education and enhancing accountability. Retrieved from http://www.adhe.edu/SiteCollectionDocuments/Institutional%20Finance%20Division/Publications/Performance%20Funding%20Report%20Final%2011232011%20AHECB%20(2).pdf

Arkansas Department of Higher Education. (2012). Academic challenge scholarship overview. *Arkansas.gov.* Retrieved from http://www.adhe.edu/divisions/financialaid/Pages/fa_acs.aspx

Arkansas Department of Higher Education. (2014). Institutions. Retrieved from http://www.adhe.edu/institutions/Pages/institutions.aspx

Arkansas Division of Legislative Audit. (2011). SALC08511, Arkansas Lottery Commission audit report, FY2011. Retrieved from http://arklegaudit.gov/#search

Arkansas Division of Legislative Audit. (2013). SALC08513, Arkansas Lottery Commission audit report, FY2013. Retrieved from http://arklegaudit.gov/#search

Arkansas Economic Development Commission. (2012). Governor Mike Beebe's strategic plan for economic development. Retrieved from http://arkansasedc.com/media/139886/aedc%202012%20revised%20strategic%20plan%20low%20res.pdf

Arkansas Scholarship Lottery. (2014). Your lottery dollars. *MyArkansasLottery.com.* Retrieved from http://myarkansaslottery.com/about/scholarships

Arkansas Secretary of State. (2012). Arkansas academic challenge scholarship rules and regulations. Retrieved from http://www.sos.arkansas.gov/rulesRegs/Arkansas%20Register/2012/Jan12Reg/008.10.11-002.pdf

Associated Press. (2008, July 15). Arkansas lottery supporters raise more than $470,000. *Arkansas Online.* Retrieved from http://www.arkansasonline.com/news/2008/jul/15/arkansas-lottery-supporters-raise-more-470000/?print

Association of Religion Data Archives. (2014). Religious congregations and membership study, 2000 (Counties File). Retrieved from http://www.thearda.com/Archive/Files/Downloads/RCMSCY_DL2.asp

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy, 70*(5), 9-49.

Becker, G. S. (1971). Optimal investment in human capital. In B.F. Kiker (ed.). *Investment in human capital*. (pp. 40-50). Columbia, SC: University of South Carolina Press.

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis with special reference to education* (3rd ed.). Chicago: University of Chicago Press.

Bennett, W. J. (1987, February 18). Our greedy colleges. *New York Times.* Retrieved from http://www.nytimes.com/1987/02/18/opinion/our-greedy-colleges.html

Berry, F. S., & Berry, W. D. (2007). Innovation and diffusion models in policy research. In Sabatier, P.A. (Ed.). *Theories of the policy process* (2nd Ed.). (pp. 223-260). Cambridge, MA: Westview Press.

Brantley, M. (2013, February 14). Halter slams lottery scholarship bill. *Arkansas Times.* Retrieved from http://www.arktimes.com/ArkansasBlog/archives/2013/02/14/halter-slams-lottery-scholarship-bill

Brehm, J., & Rahn, W. (1997). Individual level evidence for the causes and consequences of social capital. *American Journal of Political Science*, 41, 888-1023.

Chapman, D. W. (1981). A model of student choice. *Journal of Higher Education, 52*(5), 490-505.

Clarity Elections. (2012). Official results – Arkansas statewide general election on November 6, 2012. Retrieved from http://results.enr.clarityelections.com/AR/42843/113233/en/vt_data.html

Clinton School. (2006). Lt. governor debate. *University of Arkansas Clinton School of Public Service Speakers Series.* Retrieved from http://clintonschoolspeakers.com/lecture/view/bill-halter-and-jim-holt

Cohen, A. M., & Kisker, C. B. (2010). *The shaping of American higher education: Emergence and growth of the contemporary system* (2nd ed.). San Francisco, CA: Jossey-Bass.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 94,* S95-S120.

Cornwell, C., Mustard, D. B., & Sridhar, D. J. (2006). The enrollment effects of merit-based financial aid: Evidence from Georgia's HOPE program. *Journal of Labor Economics, 24*(4), 761-786.

Creswell, J. W. (2008). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (3rd ed.). Upper Saddle River, NJ: Pearson.

Crowne, S. S. (2010). Research and statistics: generalizability and how it relates to validity. *Pediatrics in Review, 31*(8), 335-336.

De Gregorio, J., & Lee, J. (2002). Education and income inequality: New evidence from cross-country data. *Review of Income and Wealth, 48*(3), 395-416.

DeMillo, A. (2013, February 25). Arkansas lawmakers approve lottery scholarship changes. *Arkansas Business.* Retrieved from http://www.arkansasbusiness.com/article/91044/arkansas-lawmakers-approve-lottery-scholarship-changes?page=all

DiPasquale, D., & Glaeser, E. (1999). Incentives and social capital: Are homeowners better citizens? *Journal of Urban Economics, 45*(2), 354-384.

Dolma, S. (2010). The central role of the unit of analysis concept in research design. *Istanbul University Journal of the School of Business, 39*(1), 169-174.

Duncan, C. M. (2001). Social capital in America's poor rural communities. In S. Saegert, J.P. Thompson, & M.R. Warren (eds.), *Social capital and poor communities.* (pp. 60-86). New York: Russell Sage Foundation.

Fiorina, M. P. (1990). Information and rationality in elections. In J. Ferejohn and J. Kuklinski (eds.), *Information and Democratic Processes*. (pp. 329-342) Urbana: University of Illinois Press.

Glaeser, E. L., Laibson, D., & Sacerdote, B. (2002). An economic approach to social capital. *The Economics Journal, 112,* F437-F458.

Green, G. P., & Haines, A. (2012). *Asset building & community development* (3rd ed.). Los Angeles: SAGE.

Green Papers. (2013). Arkansas 2006 midterm elections. *The Green Papers.* Retrieved from http://www.thegreenpapers.com/G06/AR.phtml

Hampton, K., & Wellman, B. (2003). Neighboring in Netville: How the internet supports community and social capital in a wired neighborhood. *City & Community, 2*(4), 277-311.

Hansen, W. L. (1971). Total and private rates of return to investment in schooling. In B. F. Kiker (ed.). *Investment in human capital*. (pp. 211-227). Columbia, SC: University of South Carolina Press.

Hansen, A., Miyazaki, A. D., & Sprott, D. E. (2000). The tax incidence of lotteries: Evidence from five states. *Journal of Consumer Affairs, 34*(2), 182-203.

Heller, D. E. (1997). Student price response in higher education: An update to Leslie and Brinkman. *Journal of Higher Education, 68*(6), 624-659.

Heller, D. E. (1999). The effects of tuition and state financial aid on public college enrollment. *Review of Higher Education, 23*(1), 65-89.

Herreros, F. (2004). *The problem of forming social capital: Why trust?* New York: Palgrave Macmillan.

Hill, P. (2012, July 30). The higher education reports: The lottery effect. *The City Wire.* Retrieved from http://www.thecitywire.com/node/23090#.UymhoyiIujI

Hoover, E., & Keller, J. (2011). More students migrate away from home: Public universities expand recruitment efforts in quest for out-of-state money. *Chronicle of Higher Education.* Retrieved from http://chronicle.com/article/The-Cross-Country-Recruitment/129577/

Hossler, D., & Gallagher, K. S. (1987). Studying student college choice: A three-phase model and the implications for policymakers. *College and University, 62*(3), 207-221.

Hossler, D., Schmit, J. L., & Vesper, N. (1999). Going to college: How social, economic, and educational factors influence the decisions students make. Baltimore, MD: Johns Hopkins University Press.

Howe, K. R., & Dougherty, K. C. (1993). Ethics, institutional review boards, and the changing face of educational research. *Educational Researcher, 22*(9), 16- 21.

Hurwitz, M., & Howell, J. (2013, February). Measuring the impact of high school counselors on college enrollment. *College Board Advocacy & Policy Center.* Retrieved from http://media.collegeboard.com/digitalServices/pdf/advocacy/policycenter/research-brief-measuring-impact-high-school-counselors-college-enrollment.pdf

Jackson, G. A. (1986). *Workable, comprehensive models of college choice: Final and technical report*. Cambridge, MA: Harvard University Press.

Kane, T. J. (1995). Rising public college tuition and college entry: How well do public subsidies promote access to college? Cambridge, MA: National Bureau of Economic Research Working Paper Series No. 5164.

Khan, S. R., Rifaqat, Z., & Kazmi, S. (2007). *Harnessing and guiding social capital for rural development.* New York: Palgrave Macmillan.

Kiker, B. F. (1971). The historical roots of the concept of human capital. In B.F. Kiker (ed.). *Investment in human capital*. (pp. 51-77). Columbia, SC: University of South Carolina Press.

Kiley, K. (2013, May 7). Price of a bad economy. *Inside Higher Ed.* Retrieved from http://www.insidehighered.com/news/2013/05/07/nacubo-survey-reports-sixth-consecutive-year-discount-rate-increases

Kingdon, J. W. (2011). *Agendas alternatives, and public polices* (2nd ed.). Boston, MA: Longman.

Kirk, R. E. (1995). *Experimental design: Procedures for the behavioral sciences.* Pacific Grove, CA: Brooks/Cole.

Leslie, L. L, & Brinkman, P. T. (1987). Student price response in higher education. *Journal of Higher Education, 58*(2)*,* 181-204.

Log Cabin Democrat. (2008, October 16). Ark. lottery opponents have nearly 2-1 cash edge. *The Log Cabin Democrat.* Retrieved from http://thecabin.net/stories/101608/loc_1016080015.shtml

Lyon, J. (2012, December 23). Changes ahead for lottery scholarship program. *Arkansas News.* Retrieved from http://arkansasnews.com/sections/news/arkansas/changes-ahead-lottery-scholarship-program.html

Mahoney, J. L., Cairns, B. D., & Farmer, T. W. (2003). Promoting interpersonal competence and educational success through extracurricular activity participation. *Journal of Educational Psychology, 95*(2), 409-418.

Martindale, A. L. (2009). Assessment of a program to improve the success of merit-based scholarship recipients. (Doctoral dissertation). Retrieved from University of Arkansas, ProQuest, UMI Dissertations Publishing, 2009. 3361720.

Menard, S. (1995). *Applied logistic regression analysis: Sage University series on quantitative applications in the social sciences*. Thousand Oaks, CA: Sage.

Meyers, L. S., Gamst, G. C., & Guarino, A. J. (2013). *Performing data analysis using IBM SPSS.* Hoboken, NJ: Wiley.

Montgomery, D. C., & Peck, E. A. (1992). *Introduction to linear regression analysis* (2nd ed.). New York: John Wiley & Sons.

Mullen, A. L. (2010). *Degrees of inequality: Culture, class, and gender in American higher education.* Baltimore, MD: Johns Hopkins University Press.

Murray, C. (2012). *Coming apart: The state of white America 1960-2010.* New York: Cox and Murray.

National Center for Education Statistics. (2012). Fast facts: Income of young adults. Retrieved from http://nces.ed.gov/fastfacts/display.asp?id=77

Nelson, M. (2008, July 30). Why the wanna-be next governor of Arkansas hates me. *Chronicle of Higher Education.* Retrieved from http://chronicle.com/blogs/brainstorm/why-the-wannabe-next-governor-of-arkansas-hates-me/6169

Nelson, M., & Mason, J. L. (2007). *How the South joined the gambling nation: The Politics of State Policy Innovation.* Baton Rouge, LA: Louisiana State University Press.

Ness, E. C., & Tucker, R. (2008). Eligibility effects on college access: Under-represented student perceptions of Tennessee's merit aid program. *Research in Higher Education, 49,* 569-588.

Onwuegbuzie, A. J., Daniel, L., & Leech, N. L. (2007). Pearson product-moment correlation coefficient. In Salkind, N. J., & Rasmussen, K. *Encyclopedia of Measurement and Statistics.* DOI: http://dx.doi.org/10.4135/9781412952644. Retrieved from http://srmo.sagepub.com/view/encyclopedia-of-measurement-and-statistics/n338.xml

Pachnowski, L. M., Newman, I., Jurczyk, J. P. (1997). *Immediate data: The World Wide Web as a resource for teaching research methods.* (ERIC Document Reproduction Service No. ED 409361)

Pathways to College Network. (2012). College access and success data. Retrieved from http://www.pathwaystocollege.net/statelibraries/ListArticlesByCategory.aspx?cat=AK&keyword=Access%20and%20Participation

Paulsen, M. B., & St. John, E. P. (2002). Social class and college costs: Examining the financial nexus between college choice and persistence. *Journal of Higher Education, 73*(2), 189-236.

Paulsen, M. B., & St. John, E. P. (1997). The financial nexus between college choice and persistence. In R. Voorhees (Ed.), Researching student financial aid (pp. 65–82). *New Directions for Institutional Research* No. 95. San Francisco: Jossey-Bass.

Perna, L. W. (2000). Differences in the decision to enroll in college among African Americans, Hispanics, and whites. *Journal of Higher Education, 71,* 117-140.

Price, D. I., & Novak, E. S. (1999). The tax incidence of three Texas lottery games: Regressivity, race, and education. *National Tax Journal, 52*(4), 741-751.

Price, D. I., & Novak, E. S. (2000). The income redistribution effects of Texas state lottery games. *Public Finance Review, 28*(1), 82-92.

Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community.* New York: Simon & Schuster.

Randall, M. (2008, September 10). Hope for Arkansas makes case for education lottery. *Poinsett County Democrat Tribune.* Retrieved from http://www.democrattribune.com/story/1459993.html

Rogerson, P. A. (2001). *Statistical methods for geography*. London: Sage.

Rowan-Kenyon, H. T., Bell, A. D., & Perna, L. W. (2007). Contextual influences on parental involvement in college going: Variations by socioeconomic class. *Journal of Higher Education, 79*(5), 564-586. New York: Simon & Schuster.

Rubenstein, R., & Scafidi, B. (2002). Who pays and who benefits? Examining the distributional consequences of the Georgia Lottery for education. *National Tax Journal, 55*(2), 223-238.

Schlossberg, N. K., Waters, E. B., & Goodman, J. (1995) *Counseling adults in transition* (2nd ed.). New York: Springer.

Schultz, T. W. (1971). *Investment in human capital: The role of education and of research.* New York: The Free Press.

Shaffer, R., Deller, S., & Marcouiller, D. (2004). *Community economics: Linking theory and practices* (2nd ed.). Oxford: Blackwell Publishing.

Shelnut, J. P., & Yao, V. W. (2005). A spatial analysis of income inequality in Arkansas at the county level: Evidence from tax and commuting data. *Federal Reserve Bank of St. Louis: Regional Economic Development, 1*(1), 52-65.

Simon, L. J. (2004). Lesson #1: Simple linear regression. *Penn State University Department of Statistics.* Retrieved from http://sites.stat.psu.edu/~lsimon/stat501wc/sp05/01simple/06simple_conclude.html

Singell, L. D. (2004). Come and stay awhile: Does financial aid reflect retention conditioned on enrollment at a large public university. *Economics of Education Review, 23*(5), 459-471.

St. John, E. P. (1990). Price response in enrollment decisions: An analysis of the high school and beyond sophomore cohort. *Research in Higher Education, 31*(2), 161- 176.

St. John, E. P., & Noell, J. (1989). The effects of student financial aid on access to higher education: An analysis of progress with special consideration of minority enrollment. *Research in Higher Education, 30*(6), 563-581.

St. John, E. P., Paulsen, E. P., & Starkey, J. B. (1996). The nexus between college choice and persistence. *Research in Higher Education, 37,* 175-220.

Sylvia, R. D., & Sylvia, K. M. (2004). *Program planning and evaluation for the public manager* (3rd ed.) Long Grove, IL: Waveland.

Thelin, J. R. (2004). *A history of American higher education.* Baltimore, MD: The Johns Hopkins University Press.

United States Bureau of Labor Statistics. (2014). Local area unemployment statistics map: Unemployment rates by county, not seasonally adjusted, Arkansas Annual 2012 Retrieved from http://data.bls.gov/map/MapToolServlet

United States Census Bureau. (2013). American fact finder – Community facts. Retrieved from http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml

United States Census Bureau. (2014). Arkansas state & county quick facts. Retrieved from http://quickfacts.census.gov/qfd/states/05000.html

Vedung, E. (1997). *Public policy and program evaluation.* New Brunswick, NJ: Transaction Publishers.

Warren, C. (2007, April 2). Arkansas faces lottery battle, other moral, ethical issues. *The Ethics and Religious Liberty Commission of the Southern Baptist Convention.* Retrieved from http://erlc.com/article/arkansas-faces-lottery-battle-other-moral-ethical-issues

Wellman, B., Haase, A. Q., Witte, J., & Hampton, K. (2001). Does the internet increase, decrease, or supplement social capital? Social networks, participation, and community commitment. *American Behavioral Scientist, 45*(3), 436-455.

Wetherill, G. B. (1986). *Regression analysis with applications*. New York, NY: Chapman and Hall.

Weist, J. (2008, March 12). Poll shows support for severance tax increase, lottery. *Arkansas News.* Retrieved from http://archives.arkansasnews.com/2008/03/12/poll-shows-support-for-severance-tax-increase-lottery/

Zhang, L., & Ness, E. C. (2010). Does state merit-based aid stem brain drain? *Educational Evaluation and Policy Analysis, 32*(2), 143-165.

Appendix A

College Participation Rates in Arkansas

Pre-Lottery (2007-2009) and Post-Lottery (2010-2012)

Table A

College Participation Rates for Pre-Lottery (2007-2009) and Post-Lottery (2010-2012)

	Pre-Lottery			Post-Lottery		
County	PHS[a]	First[b]	Rate[c]	PHS[d]	First[e]	Rate[f]
Arkansas	698	360	0.516	624	367	0.588
Ashley	705	351	0.498	711	368	0.518
Baxter	953	452	0.474	979	547	0.559
Benton	5,315	2,172	0.409	6,647	2,836	0.427
Boone	1,149	656	0.571	1,183	685	0.579
Bradley*	402	212	0.527	419	153	0.365
Calhoun	161	77	0.478	148	77	0.520
Carroll	693	269	0.388	661	244	0.369
Chicot*	338	140	0.414	342	150	0.439
Clark*	593	308	0.519	593	374	0.631
Clay	544	244	0.449	526	219	0.416
Cleburne	728	375	0.515	640	370	0.578
Cleveland	295	164	0.556	316	167	0.528
Columbia*	732	446	0.609	760	386	0.508
Conway*	626	389	0.621	646	382	0.591
Craighead	2,778	1,440	0.518	2,910	1,557	0.535
Crawford	2,091	969	0.463	2,202	1,158	0.526

Table A (continued)

	Pre-Lottery			Post-Lottery		
County	PHS[a]	First[b]	Rate[c]	PHS[d]	First[e]	Rate[f]
Crittenden*	1,850	882	0.477	1,953	1,049	0.537
Cross	792	341	0.431	750	360	0.480
Dallas	247	113	0.457	237	110	0.464
Desha*	594	294	0.495	553	297	0.537
Drew*	656	349	0.532	671	299	0.446
Faulkner	2,966	1,857	0.626	3,271	1,981	0.606
Franklin	719	389	0.541	717	409	0.570
Fulton	341	188	0.551	370	171	0.462
Garland	2,365	1,270	0.537	2,672	1,494	0.559
Grant	870	403	0.463	829	446	0.538
Greene	1,223	591	0.483	1,242	650	0.523
Hempstead*	729	300	0.412	731	343	0.469
Hot Spring	1,042	506	0.486	1,037	586	0.565
Howard*	641	310	0.484	606	357	0.589
Independence*	1,128	505	0.448	1,051	590	0.561
Izard	333	168	0.505	356	194	0.545
Jackson*	440	213	0.484	439	245	0.558
Jefferson*	2,263	1,205	0.532	2,321	1,346	0.580

Table A (continued)

	Pre-Lottery			Post-Lottery		
County	PHS[a]	First[b]	Rate[c]	PHS[d]	First[e]	Rate[f]
Johnson	751	342	0.455	743	468	0.630
Lafayette*	258	80	0.310	264	121	0.458
Lawrence*	574	299	0.521	641	307	0.479
Lee*	230	179	0.778	252	133	0.528
Lincoln*	320	171	0.534	335	157	0.469
Little River	433	116	0.268	391	181	0.463
Logan	679	362	0.533	751	421	0.561
Lonoke	2,161	1,150	0.532	2,487	1,370	0.551
Madison*	501	199	0.397	502	222	0.442
Marion	352	157	0.446	374	178	0.476
Miller	1,075	216	0.201	1,053	272	0.258
Mississippi*	1,448	707	0.488	1,472	803	0.546
Monroe*	317	170	0.536	281	137	0.488
Montgomery*	234	114	0.487	216	122	0.565
Nevada*	299	156	0.522	335	207	0.618
Newton*	316	153	0.484	276	152	0.551
Ouachita	1,106	586	0.530	982	530	0.540
Perry	334	161	0.482	391	219	0.560

Table A (continued)

	Pre-Lottery			Post-Lottery		
County	PHS[a]	First[b]	Rate[c]	PHS[d]	First[e]	Rate[f]
Phillips*	721	421	0.584	800	457	0.571
Pike	454	223	0.491	411	196	0.477
Poinsett*	865	390	0.451	814	383	0.471
Polk	788	390	0.495	744	421	0.566
Pope	1,890	1,037	0.549	1,901	1,106	0.582
Prairie	266	152	0.571	260	145	0.558
Pulaski	7,496	5,118	0.683	7,952	4,514	0.568
Randolph	488	265	0.543	522	288	0.552
Saline	2,246	1,268	0.565	2,705	1,594	0.589
Scott	320	151	0.472	377	237	0.629
Searcy*	390	254	0.651	301	119	0.395
Sebastian	3,644	1,826	0.501	3,652	1,949	0.534
Sevier*	502	247	0.492	627	327	0.522
Sharp*	660	249	0.377	591	313	0.530
St. Francis*	796	441	0.554	829	431	0.520
Stone	314	119	0.379	315	185	0.587
Union	1,564	776	0.496	1,593	869	0.546
Van Buren*	476	226	0.475	466	247	0.530

Table A (continued)

	Pre-Lottery			Post-Lottery		
County	PHS[a]	First[b]	Rate[c]	PHS[d]	First[e]	Rate[f]
Washington	5,629	2,454	0.436	6,679	2,922	0.437
White	2,173	1,096	0.504	2,306	1,275	0.553
Woodruff*	237	98	0.414	236	116	0.492
Yell	755	336	0.445	784	404	0.515

Note. * - County included in Research Question Three sample because of having *Poverty* ≥ 21.9. 2007-2009 College Participation in Arkansas Counties, including public high school graduates annual figures, first-time entering college students annual figures, and annual college-going rate (PHS[a], First[b], Rate[c]). Unpublished raw data prepared by Ms. Sharon Butler, Arkansas Department of Higher Education. Retrieved February 3, 2014 via email request to Ms. Butler. 2010-2012 College Participation in Arkansas Counties, including public high school graduates annual figures, first-time entering college students annual figures, and annual college-going rate. (PHS[d], First[e], Rate[f]) from, Arkansas Department of Higher Education. (2014). Annual comprehensive reports (2010-2012). Retrieved January 15, 2014 from http://www.adhe.edu/institutions/Pages/institutions.aspx

Appendix B

Dependent Variable

Table B

Dependent Variable (Lottery Scholarships Per Public High School Graduates, 2010-2012)

County	Awards[a]	PublicHSGrads[b]	ScholarshipsPer[c]
Arkansas	749	624	1.200
Ashley	551	711	0.775
Baxter	1,193	979	1.219
Benton	5,992	6,647	0.901
Boone	1,310	1,183	1.107
Bradley	297	419	0.709
Calhoun	164	148	1.108
Carroll	461	661	0.697
Chicot	279	342	0.816
Clark	1024	593	1.727
Clay	440	526	0.837
Cleburne	833	640	1.302
Cleveland	344	316	1.089
Columbia	717	760	0.943
Conway	843	646	1.305
Craighead	3,651	2,910	1.255
Crawford	2,361	2,202	1.072
Crittenden	1,412	1,953	0.723

Table B (continued)

County	Awards[a]	PublicHSGrads[b]	ScholarshipsPer[c]
Cross	647	750	0.863
Dallas	237	237	1.000
Desha	404	553	0.731
Drew	638	671	0.951
Faulkner	5,462	3,271	1.670
Franklin	706	717	0.985
Fulton	421	370	1.138
Garland	3,095	2,672	1.158
Grant	638	829	0.770
Greene	1,573	1,242	1.267
Hempstead	595	731	0.814
Hot Spring	1129	1037	1.089
Howard	579	606	0.955
Independence	1249	1051	1.188
Izard	479	356	1.346
Jackson	460	439	1.048
Jefferson	2,514	2,321	1.083
Johnson	866	743	1.166
Lafayette	187	264	0.708
Lawrence	676	641	1.055

Table B (continued)

County	Awards[a]	PublicHSGrads[b]	ScholarshipsPer[c]
Lee	196	252	0.778
Lincoln	354	335	1.057
Little River	320	391	0.818
Logan	844	751	1.124
Lonoke	2,795	2,487	1.124
Madison	484	502	0.964
Marion	427	374	1.142
Miller	532	1053	0.505
Mississippi	1,088	1,472	0.739
Monroe	242	281	0.861
Montgomery	287	216	1.329
Nevada	260	335	0.776
Newton	296	276	1.072
Ouachita	895	982	0.911
Perry	419	391	1.072
Phillips	575	800	0.719
Pike	422	411	1.027
Poinsett	720	814	0.885
Polk	761	744	1.023
Pope	2,692	1,901	1.416

Table B (continued)

County	Awards[a]	PublicHSGrads[b]	ScholarshipsPer[c]
Prairie	311	260	1.196
Pulaski	13,111	7,952	1.649
Randolph	658	522	1.261
Saline	4,363	2,705	1.613
Scott	444	377	1.178
Searcy	294	301	0.977
Sebastian	4,610	3,652	1.262
Sevier	551	627	0.879
Sharp	659	591	1.115
St. Francis	559	829	0.674
Stone	404	315	1.283
Union	1,376	1,593	0.864
Van Buren	447	466	0.959
Washington	6,935	6,679	1.038
White	2,785	2,306	1.208
Woodruff	218	236	0.924
Yell	700	784	0.893
No Response	69		

Note. Number of lottery scholarships distributed, 2010-2012 (Awards[a]) from, Arkansas Scholarship Lottery. (2014). Scholarships. Retrieved January 15, 2014 from http://myarkansaslottery.com/about/scholarships. Number of public high school graduates, 2010-2012 (PHS[b]) from, Arkansas Department of High Education. Comprehensive Higher Education

Annual Reports, 2010-2012. Retrieved January 15, 2014 from http://www.adhe.edu/institutions/Pages/institutions.aspx. The rate of lottery scholarships per public high school graduates, 2010-2012 (ScholarshipsPer[c]), calculated statistic that was made using (Awards[a] / PHS[b]) for each Arkansas county.

Appendix C

Human Capital Variables

Table C

Human Capital Variables for Research Question Five

County	*Poverty*[a]	*HS*[b]	*Bachelor*[c]	*MedIncome*[d]	*Employ*[e]	*MedHouse*[f]
Arkansas	0.17	0.824	0.13	39,883	0.077	76,700
Ashley	0.172	0.828	0.131	38,069	0.125	63,600
Baxter	0.172	0.868	0.155	35,209	0.077	119,700
Benton	0.121	0.857	0.281	53,515	0.057	150,700
Boone	0.158	0.854	0.154	38,364	0.071	105,300
Bradley	0.254	0.745	0.113	32,321	0.101	63,900
Calhoun	0.105	0.789	0.068	31,425	0.09	57,600
Carroll	0.177	0.812	0.165	35,558	0.055	117,200
Chicot	0.325	0.725	0.142	25,188	0.104	55,600
Clark	0.237	0.852	0.216	32,393	0.093	86,700
Clay	0.187	0.766	0.099	32,695	0.124	61,200
Cleburne	0.166	0.835	0.169	39,410	0.072	118,800
Cleveland	0.183	0.851	0.143	38,060	0.07	67,800
Columbia	0.247	0.845	0.191	34,895	0.085	78,200
Conway	0.234	0.83	0.144	32,625	0.076	84,500
Craighead	0.204	0.847	0.237	41,054	0.067	116,500
Crawford	0.193	0.812	0.133	39,981	0.074	101,100
Crittenden	0.248	0.787	0.146	36,521	0.112	100,200
Cross	0.162	0.8	0.119	39,665	0.082	75,900

Table C (continued)

County	*Poverty*[a]	*HS*[b]	*Bachelor*[c]	*MedIncome*[d]	*Employ*[e]	*MedHouse*[f]
Dallas	0.18	0.808	0.102	30,309	0.103	54,500
Desha	0.284	0.757	0.128	29,504	0.105	59,300
Drew	0.242	0.827	0.208	32,087	0.108	80,700
Faulkner	0.146	0.888	0.262	49,008	0.066	135,300
Franklin	0.187	0.832	0.125	35,918	0.067	92,500
Fulton	0.196	0.83	0.103	35,059	0.068	89,700
Garland	0.19	0.86	0.204	38,680	0.075	131,500
Grant	0.084	0.842	0.17	49,063	0.065	100,200
Greene	0.173	0.822	0.125	38,481	0.088	95,200
Hempstead	0.268	0.792	0.149	31,193	0.072	71,800
Hot Spring	0.142	0.829	0.128	39,652	0.065	81,600
Howard	0.237	0.76	0.113	35,236	0.071	72,900
Independence	0.236	0.816	0.133	34,374	0.087	85,900
Izard	0.188	0.804	0.114	31,011	0.082	75,800
Jackson	0.256	0.753	0.095	31,692	0.096	57,600
Jefferson	0.233	0.828	0.176	37,561	0.094	81,100
Johnson	0.191	0.774	0.157	32,198	0.068	85,000
Lafayette	0.229	0.76	0.12	28,633	0.099	51,600
Lawrence	0.254	0.764	0.091	32,205	0.09	57,400
Lee	0.309	0.708	0.064	26,098	0.113	52,100

Table C (continued)

County	*Poverty*[a]	*HS*[b]	*Bachelor*[c]	*MedIncome*[d]	*Employ*[e]	*MedHouse*[f]
Lincoln	0.287	0.718	0.092	34,107	0.091	64,100
Little River	0.149	0.841	0.109	39,042	0.069	78,600
Logan	0.158	0.801	0.117	37,237	0.076	82,400
Lonoke	0.131	0.862	0.179	51,499	0.061	119,100
Madison	0.239	0.748	0.108	33,481	0.053	95,000
Marion	0.182	0.838	0.132	33,497	0.081	91,600
Miller	0.201	0.84	0.129	40,314	0.067	89,400
Mississippi	0.242	0.766	0.12	35,651	0.1	75,600
Monroe	0.266	0.734	0.129	28,075	0.084	52,500
Montgomery	0.227	0.811	0.11	33,240	0.077	75,500
Nevada	0.272	0.812	0.111	35,578	0.069	64,700
Newton	0.261	0.806	0.125	27,790	0.075	74,900
Ouachita	0.203	0.851	0.152	32,032	0.095	68,600
Perry	0.139	0.82	0.097	42,738	0.08	78,400
Phillips	0.323	0.73	0.132	27,219	0.109	59,200
Pike	0.208	0.783	0.124	32,087	0.087	74,200
Poinsett	0.268	0.729	0.089	31,743	0.078	67,200
Polk	0.215	0.827	0.117	33,479	0.077	84,100
Pope	0.185	0.82	0.2	40,948	0.071	107,700
Prairie	0.188	0.766	0.101	35,806	0.073	74,900

Table C (continued)

County	*Poverty*[a]	*HS*[b]	*Bachelor*[c]	*MedIncome*[d]	*Employ*[e]	*MedHouse*[f]
Pulaski	0.172	0.891	0.316	46,102	0.066	140,600
Randolph	0.206	0.801	0.11	32,539	0.099	68,100
Saline	0.086	0.889	0.231	53,817	0.06	137,700
Scott	0.2	0.75	0.103	38,130	0.066	79,100
Searcy	0.25	0.744	0.11	30,301	0.077	85,200
Sebastian	0.205	0.824	0.187	40,247	0.073	113,100
Sevier	0.263	0.663	0.086	32,081	0.078	70,000
Sharp	0.232	0.844	0.112	30,240	0.099	75,700
St. Francis	0.278	0.764	0.112	30,104	0.11	67,800
Stone	0.204	0.804	0.13	32,834	0.097	90,400
Union	0.209	0.82	0.161	39,349	0.086	74,200
Van Buren	0.244	0.82	0.136	33,900	0.089	83,500
Washington	0.195	0.824	0.28	41,429	0.054	150,000
White	0.177	0.826	0.179	41,410	0.08	98,600
Woodruff	0.246	0.745	0.107	28,061	0.107	58,600
Yell	0.209	0.722	0.097	38,245	0.06	84,300

Note. Persons below poverty level, percent, 2008-2012. (Poverty[a]), High school attainment, percent of persons age 25+, 2008-2012. (HS[b]), Bachelor's degree, attainment, percent of persons age 25+, 2008-2012. (Bachelor[c]), Median household income, 2008-2012. (MedIncome[d]), and Median value of owner-occupied housing units, 2008-2012. (MedHouse[f]) from, United States Census Bureau. (2014). Arkansas state & county quick facts. Retrieved January 20, 2014 from http://quickfacts.census.gov/qfd/states/05000.html. Unemployment rates by county, not seasonally adjusted, Arkansas Annual 2012. (Employ[e]) from, United States Bureau of Labor Statistics. (2014). Local area unemployment statistics map: Unemployment rates by county, not

seasonally adjusted, Arkansas Annual 2012. Retrieved January 25, 2014 from
http://data.bls.gov/map/MapToolServlet

Appendix D

Social Capital Variables

Table D

Social Capital Variables for Research Question Five

County	*Assoc*[a]	*Religion*[b]	*Migration*[c]	*HomeOwn*[d]	*Voter*[e]	*Single*[f]
Arkansas	15	698.877	1,730	0.681	0.699	0.416
Ashley	15.5	799	2,356	0.753	0.727	0.342
Baxter	16	514.328	3,127	0.773	0.706	0.341
Benton	19.88	537.795	67,933	0.688	0.687	0.25
Boone	11.33	547.249	2,955	0.73	0.734	0.273
Bradley	11	698.095	1,092	0.694	0.707	0.365
Calhoun	8	594.011	376	0.802	0.604	0.488
Carroll	15.33	436.487	2,089	0.716	0.745	0.306
Chicot	6	455.479	2,317	0.677	0.658	0.562
Clark	19	684.193	551	0.66	0.730	0.36
Clay	10.33	549.151	1,526	0.738	0.564	0.328
Cleburne	12.5	441.404	1,924	0.768	0.692	0.285
Cleveland	8.5	616.147	118	0.785	0.705	0.352
Columbia	9.67	641.565	1,051	0.712	0.723	0.448
Conway	10	569.434	937	0.738	0.707	0.382
Craighead	17.38	646.553	14,295	0.596	0.570	0.361
Crawford	16	529.326	8,701	0.726	0.664	0.326
Crittenden	11.67	416.722	36	0.578	0.635	0.326
Cross	17.5	810.304	1,656	0.677	0.669	0.33

Table D (continued)

County	*Assoc*[a]	*Religion*[b]	*Migration*[c]	*HomeOwn*[d]	*Voter*[e]	*Single*[f]
Dallas	9	852.986	1,094	0.69	0.690	0.357
Desha	14	622.254	2,333	0.566	0.618	0.438
Drew	15.5	646.317	214	0.636	0.711	0.42
Faulkner	16.5	565.303	27,223	0.652	0.618	0.318
Franklin	11.33	485.623	354	0.748	0.709	0.332
Fulton	9.67	460.831	603	0.781	0.657	0.289
Garland	17.43	597.039	7,956	0.699	0.655	0.39
Grant	16	788.265	1,389	0.8	0.735	0.196
Greene	16.67	614.69	4,759	0.64	0.710	0.292
Hempstead	12	507.907	978	0.677	0.689	0.403
Hot Spring	13.6	584.786	2,570	0.726	0.644	0.327
Howard	8.75	659.231	511	0.652	0.687	0.4
Independence	15.25	643.619	2,414	0.711	0.647	0.335
Izard	11.67	554.683	447	0.771	0.773	0.34
Jackson	9	566.511	421	0.697	0.626	0.448
Jefferson	12	478.061	6,843	0.64	0.690	0.539
Johnson	13.5	479.566	2,759	0.684	0.701	0.343
Lafayette	6.5	546.91	914	0.734	0.689	0.409
Lawrence	8.4	607.629	359	0.712	0.656	0.288
Lee	7	344.277	2,156	0.607	0.664	0.55

Table D (continued)

County	*Assoc*[a]	*Religion*[b]	*Migration*[c]	*HomeOwn*[d]	*Voter*[e]	*Single*[f]
Lincoln	13	396.15	358	0.708	0.666	0.386
Little River	13	532.507	457	0.803	0.732	0.341
Logan	12.25	741.795	133	0.771	0.693	0.315
Lonoke	16.5	570.701	15,528	0.739	0.683	0.318
Madison	8.33	349.856	1,474	.754	0.755	0.223
Marion	9.5	360.595	513	0.815	0.685	0.25
Miller	13.67	640.853	3,019	0.662	0.721	0.41
Mississippi	11.17	633.487	5,499	0.589	0.645	0.484
Monroe	9	559.782	2,105	0.628	0.700	0.562
Montgomery	9	528.61	242	0.802	0.640	0.247
Nevada	10.5	603.717	958	0.729	0.687	0.36
Newton	6	240.125	278	0.834	0.648	0.282
Ouachita	10.33	626.433	2,670	0.682	0.648	0.457
Perry	12	506.514	236	0.826	0.686	0.304
Phillips	7.25	433.541	4,698	0.559	0.585	0.649
Pike	8.67	597.717	12	0.728	0.682	0.377
Poinsett	13	682.283	1,031	0.633	0.635	0.432
Polk	14.67	589.945	433	0.776	0.716	0.36
Pope	13.8	507.353	7,285	0.692	0.612	0.315
Prairie	10.5	673.236	824	0.73	0.707	0.296

Table D (continued)

County	*Assoc*[a]	*Religion*[b]	*Migration*[c]	*HomeOwn*[d]	*Voter*[e]	*Single*[f]
Pulaski	17.67	591.417	21,274	0.603	0.675	0.454
Randolph	11.5	577.631	226	0.764	0.616	0.305
Saline	20.33	498.174	23,589	0.779	0.713	0.305
Scott	14	574.118	237	0.739	0.597	0.364
Searcy	5.5	356.615	66	0.749	0.695	0.333
Sebastian	17	688.471	10,673	0.639	0.638	0.348
Sevier	13	655.962	1,301	0.708	0.682	0.311
Sharp	13	647	145	0.83	0.661	0.349
St. Francis	10.67	450.783	1,071	0.556	0.612	0.609
Stone	8	507.609	895	0.774	0.716	0.265
Union	11.57	674.44	3,990	0.699	0.708	0.441
Van Buren	12.33	543.664	1,103	0.769	0.744	0.35
Washington	18	501.271	45,350	0.566	0.662	0.329
White	13.38	625.162	9,911	0.693	0.568	0.291
Woodruff	7	590.321	1,481	0.599	0.661	0.423
Yell	13.25	484.791	1,046	0.681	0.642	0.287

Note. Average number of AAA declared activities for each high school in an Arkansas county, 2013 (Assoc[a]) from, Arkansas Activities Association. (2014). Directory of member schools. Retrieved January 31, 2014 from http://www.ahsaa.org/schools. All Denominations--Rates of adherence per 1000 population, 2000 (Religion[b]) from, Association of Religion Data Archives. (2014) Retrieved January 31, 2014 http://www.thearda.com/Archive/Files/Downloads/RCMSCY_DL2.asp. Absolute value of migration to/from a county, 2000-2010 (Migration[c]) from, United States Census Bureau. (2013). American fact finder - Community facts. Retrieved December 18, 2013 from http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml. Homeownership rate, 2008-2012 (HomeOwn[d]) from, United States Census Bureau. (2014). Arkansas state & county quick facts. Retrieved January 31, 2014 from http://quickfacts.census.gov/qfd/states/05000.html. Voter turnout for the general election, 2012 (Voter[e]) from, Clarity Elections. (2012). Official results – Arkansas statewide general election on November 6, 2012. Retrieved January 20, 2014 from http://results.enr.clarityelections.com/AR/42843/113233/en/vt_data.html. Percentage of single-parent homes, 2011 (Single[f]) from, Annie E. Casey Foundation. (2014). Children in single-parent families: Arkansas. Retrieved January 20, 2014 from http://datacenter.kidscount.org/data/tables/4051-children-in-single-parent-families?loc=5&loct=5#detailed/5/213-287/false/867,133,38,35,18/any/9775,9774

Appendix E

Lottery Sales & Scholarship Awards

FY2011 & FY2013

Table E1

Arkansas Scholarship Lottery Sales for FY2011

County	Population_10[a]	TotalSales[b]	SalesPer[c]
Arkansas	19,019	6,615,709	347.85
Ashley	21,853	1,759,562	80.52
Baxter	41,513	4,532,999	109.19
Benton	221,339	11,446,517	51.71
Boone	36,903	4,391,864	119.01
Bradley	11,508	1,156,516	100.50
Calhoun	5,368	747,454	139.24
Carroll	27,446	3,189,981	116.23
Chicot	11,800	2,532,607	214.63
Clark	22,995	5,923,590	257.60
Clay	16,083	1,163,545	72.35
Cleburne	25,970	4,541,986	174.89
Cleveland	8,689	1,345,869	154.89
Columbia	24,552	2,545,912	103.69
Conway	21,273	5,793,989	272.36
Craighead	96,443	15,514,464	160.87
Crawford	61,948	5,808,838	93.77
Crittenden	50,902	7,678,814	150.85
Cross	17,870	3,011,514	168.52

Table E1 (continued)

County	Population_10[a]	TotalSales[b]	SalesPer[c]
Dallas	8,116	2,687,460	331.13
Desha	13,008	2,584,460	198.68
Drew	18,509	2,498,318	134.98
Faulkner	113,237	16,435,906	145.15
Franklin	18,125	2,975,476	164.16
Fulton	12,245	748,994	61.17
Garland	96,024	13,369,563	139.23
Grant	17,853	2,323,060	130.12
Greene	42,090	6,757,461	160.55
Hempstead	22,609	5,171,441	228.73
Hot Spring	32,923	4,641,994	141.00
Howard	13,789	2,206,037	159.99
Independence	36,647	8,231,833	224.63
Izard	13,696	1,077,648	78.68
Jackson	17,997	4,575,383	254.23
Jefferson	77,435	21,379,944	276.10
Johnson	25,540	3,491,283	136.70
Lafayette	7,645	1,027,651	134.42
Lawrence	17,415	3,599,324	206.68
Lee	10,424	1,580,848	151.65

Table E1 (continued)

County	Population_10[a]	TotalSales[b]	SalesPer[c]
Lincoln	14,134	1,747,124	123.61
Little River	13,171	1,023,352	77.70
Logan	22,353	3,604,432	161.25
Lonoke	68,356	15,283,664	223.59
Madison	15,717	1,277,701	81.29
Marion	16,653	2,372,532	142.47
Miller	43,462	4,683,658	107.76
Mississippi	46,480	8,041,151	173.00
Monroe	8,149	2,099,791	257.67
Montgomery	9,487	357,423	37.68
Nevada	8,997	3,524,388	391.73
Newton	8,330	723,314	86.83
Ouachita	26,120	6,293,673	240.95
Perry	10,445	1,374,182	131.56
Phillips	21,757	3,030,668	139.30
Pike	11,291	1,546,123	136.93
Poinsett	24,583	7,038,485	286.32
Polk	20,662	2,174,873	105.26
Pope	61,754	11,719,275	189.77
Prairie	8,715	2,014,492	231.15

Table E1 (continued)

County	Population_10[a]	TotalSales[b]	SalesPer[c]
Pulaski	382,748	93,769,313	244.99
Randolph	17,969	1,959,097	109.03
Saline	111,845	18,396,990	164.49
Scott	11,010	1,596,679	145.02
Searcy	8,007	1,395,647	174.30
Sebastian	127,304	11,814,340	92.80
Sevier	17,177	1,690,133	98.40
Sharp	17,054	2,253,280	132.13
St. Francis	27,858	3,591,566	128.92
Stone	12,663	1,410,991	111.43
Union	41,639	8,569,519	205.81
Van Buren	17,295	2,523,466	145.91
Washington	203,065	19,050,038	93.81
White	77,076	15,019,898	194.87
Woodruff	7,260	2,269,425	312.59
Yell	22,185	2,434,928	109.76

Note. Population estimate, 2010 (Population_10[a]) and Lottery total sales, FY 2011 (TotalSales[b]) from, Arkansas Division of Legislative Audit. (2011). SALC08511, Arkansas Lottery Commission audit report, FY2011. Retrieved January 20, 2014 from http://arklegaudit.gov/#search. The rate of lottery scholarship sales per county resident, FY2011 (SalesPer[d]), calculated statistic that was made using (TotalSales[b] / Population[a]) for each Arkansas county.

Table E2

Arkansas Scholarship Lottery Awards for FY2011

County	Population_10[a]	Awards[b]	AwardsPer[c]
Arkansas	19,019	280	0.015
Ashley	21,853	181	0.008
Baxter	41,513	435	0.010
Benton	221,339	1,948	0.009
Boone	36,903	475	0.013
Bradley	11,508	95	0.008
Calhoun	5,368	62	0.012
Carroll	27,446	160	0.006
Chicot	11,800	86	0.007
Clark	22,995	353	0.015
Clay	16,083	150	0.009
Cleburne	25,970	285	0.011
Cleveland	8,689	125	0.014
Columbia	24,552	237	0.010
Conway	21,273	312	0.015
Craighead	96,443	1,212	0.013
Crawford	61,948	718	0.012
Crittenden	50,902	472	0.009
Cross	17,870	229	0.013

Table E2 (continued)

County	Population_10[a]	Awards[b]	AwardsPer[c]
Dallas	8,116	89	0.011
Desha	13,008	133	0.010
Drew	18,509	218	0.012
Faulkner	113,237	1,894	0.017
Franklin	18,125	227	0.013
Fulton	12,245	143	0.012
Garland	96,024	1,055	0.011
Grant	17,853	242	0.014
Greene	42,090	518	0.012
Hempstead	22,609	205	0.009
Hot Spring	32,923	403	0.012
Howard	13,789	198	0.014
Independence	36,647	469	0.013
Izard	13,696	177	0.013
Jackson	17,997	177	0.010
Jefferson	77,435	915	0.012
Johnson	25,540	310	0.012
Lafayette	7,645	62	0.008
Lawrence	17,415	222	0.013
Lee	10,424	69	0.007

Table E2 (continued)

County	Population_10[a]	Awards[b]	AwardsPer[c]
Lincoln	14,134	118	0.008
Little River	13,171	90	0.007
Logan	22,353	258	0.012
Lonoke	68,356	896	0.013
Madison	15,717	168	0.011
Marion	16,653	160	0.010
Miller	43,462	152	0.003
Mississippi	46,480	324	0.007
Monroe	8,149	87	0.011
Montgomery	9,487	122	0.013
Nevada	8,997	86	0.010
Newton	8,330	120	0.014
Ouachita	26,120	281	0.011
Perry	10,445	132	0.013
Phillips	21,757	180	0.008
Pike	11,291	144	0.013
Poinsett	24,583	245	0.010
Polk	20,662	294	0.014
Pope	61,754	921	0.015
Prairie	8,715	113	0.013

Table E2 (continued)

County	Population_10[a]	Awards[b]	AwardsPer[c]
Pulaski	382,748	4,754	0.012
Randolph	17,969	246	0.014
Saline	111,845	1,379	0.012
Scott	11,010	153	0.014
Searcy	8,007	109	0.014
Sebastian	127,304	1,507	0.012
Sevier	17,177	172	0.010
Sharp	17,054	194	0.011
St. Francis	27,858	202	0.007
Stone	12,663	146	0.012
Union	41,639	441	0.011
Van Buren	17,295	159	0.009
Washington	203,065	2,304	0.011
White	77,076	946	0.012
Woodruff	7,260	71	0.010
Yell	22,185	219	0.010
Not Reported		6	

Note. Population estimate, 2010 (Population_10[a]), Lottery scholarship awards, FY2011 (Awards[b]) from, Arkansas Division of Legislative Audit. (2011). SALC08511, Arkansas Lottery Commission audit report, FY2011. Retrieved January 20, 2014 from http://arklegaudit.gov/#search. The rate of lottery scholarship awards per county resident, FY20101(AwardsPer[d]), calculated statistic that was made using (Awards[b] / Population[a]) for each Arkansas county.

Table E3

Arkansas Scholarship Lottery Sales for FY2013

County	Population_12[a]	TotalSales[b]	SalesPer[c]
Arkansas	18,892	6,532,746	345.79
Ashley	21,524	2,105,901	97.84
Baxter	41,048	4,959,526	120.82
Benton	232,268	12,373,285	53.27
Boone	37,327	5,213,765	139.68
Bradley	11,397	1,927,021	169.08
Calhoun	5,307	623,269	117.44
Carroll	27,610	3,273,071	118.55
Chicot	11,433	3,309,676	289.48
Clark	22,936	4,105,809	179.01
Clay	15,684	1,185,095	75.56
Cleburne	25,808	4,420,023	171.27
Cleveland	8,627	712,020	82.53
Columbia	24,473	3,362,417	137.39
Conway	21,287	5,376,203	252.56
Craighead	99,735	15,958,000	160.00
Crawford	61,946	5,332,229	86.08
Crittenden	50,021	8,153,504	163.00
Cross	17,683	2,866,513	162.11

Table E3 (continued)

County	Population_12[a]	TotalSales[b]	SalesPer[c]
Dallas	7,987	1,852,404	231.93
Desha	12,545	2,264,411	180.50
Drew	18,743	2,458,507	131.17
Faulkner	118,704	16,212,309	136.58
Franklin	18,045	2,275,620	126.11
Fulton	12,318	757,627	61.51
Garland	96,903	13,021,686	134.38
Grant	17,986	2,177,493	121.07
Greene	43,163	7,216,379	167.19
Hempstead	22,373	5,004,304	223.68
Hot Spring	33,394	4,147,774	124.21
Howard	13,735	2,362,637	172.02
Independence	37,025	8,672,349	234.23
Izard	13,474	1,122,946	83.34
Jackson	17,600	4,613,599	262.14
Jefferson	74,723	17,935,170	240.02
Johnson	25,901	2,977,672	114.96
Lafayette	7,447	915,763	122.97
Lawrence	17,012	2,888,442	169.79
Lee	10,216	1,352,522	132.39

Table E3 (continued)

County	Population_12[a]	TotalSales[b]	SalesPer[c]
Lincoln	14,101	1,196,053	84.82
Little River	12,919	1,277,993	98.92
Logan	21,983	3,100,413	141.04
Lonoke	69,839	13,755,945	196.97
Madison	15,645	768,964	49.15
Marion	16,568	2,185,250	131.90
Miller	43,634	6,115,219	140.15
Mississippi	45,562	7,450,643	163.53
Monroe	7,828	1,953,979	249.61
Montgomery	9,340	373,294	39.97
Nevada	8,925	2,998,615	335.98
Newton	8,086	730,026	90.28
Ouachita	25,396	6,175,621	243.17
Perry	10,339	1,121,298	108.45
Phillips	20,784	3,185,545	153.27
Pike	11,247	1,203,193	106.98
Poinsett	24,307	5,467,684	224.94
Polk	20,471	1,877,636	91.72
Pope	62,765	11,181,174	178.14
Prairie	8,458	2,229,217	263.56

Table E3 (continued)

County	Population_12[a]	TotalSales[b]	SalesPer[c]
Pulaski	388,953	81,424,220	209.34
Randolph	17,930	2,101,074	117.18
Saline	111,845	16,060,074	143.59
Scott	11,010	1,492,506	135.56
Searcy	8,007	1,402,118	175.11
Sebastian	127,304	11,758,643	92.37
Sevier	17,177	1,716,144	99.91
Sharp	17,054	2,705,646	158.65
St. Francis	27,858	3,494,482	125.44
Stone	12,663	1,291,092	101.96
Union	40,867	9,007,406	220.41
Van Buren	17,030	2,154,744	126.53
Washington	211,411	19,923,627	94.24
White	78,493	14,968,578	190.70
Woodruff	7,100	1,621,832	228.43
Yell	21,932	2,448,988	111.66

Note. Population estimate, 2012 (Population_12[a]), and Lottery total sales, FY2013 (TotalSales[b]) from, Arkansas Division of Legislative Audit. (2013). SALC08512, Arkansas Lottery Commission audit report, FY2013. Retrieved January 20, 2014 from http://arklegaudit.gov/#search. The rate of lottery sales per county resident, FY2013 (SalesPer[d]), calculated statistic that was made using (TotalSales[b] / Population[a]) for each Arkansas county.

Table E4

Arkansas Scholarship Lottery Awards for FY2013

County	Population_12[a]	Awards[b]	Amount[c]	AwardsPer[d]	AmountPer[e]
Arkansas	18,892	243	958,209	0.013	50.72
Ashley	21,524	206	858,628	0.010	39.89
Baxter	41,048	378	1,391,251	0.009	33.89
Benton	232,268	2,110	8,591,430	0.009	36.99
Boone	37,327	411	1,483,469	0.011	39.74
Bradley	11,397	102	411,909	0.009	36.14
Calhoun	5,307	54	222,001	0.010	41.83
Carroll	27,610	153	582,913	0.006	21.11
Chicot	11,433	99	431,239	0.009	37.72
Clark	22,936	313	1,320,044	0.014	57.55
Clay	15,684	140	557,816	0.009	35.57
Cleburne	25,808	280	1,023,997	0.011	39.68
Cleveland	8,627	101	431,544	0.012	50.02
Columbia	24,473	255	1,094,040	0.010	44.70
Conway	21,287	263	1,043,430	0.012	49.02
Craighead	99,735	1247	5,278,858	0.013	52.93
Crawford	61,946	848	3,729,038	0.014	60.20
Crittenden	50,021	499	1,962,211	0.010	39.23
Cross	17,683	209	832,189	0.012	47.06

Table E4 (continued)

County	Population_12[a]	Awards[b]	Amount[c]	AwardsPer[d]	AmountPer[e]
Dallas	7,987	68	281,690	0.009	35.27
Desha	12,545	118	506,193	0.009	40.35
Drew	18,743	211	921,208	0.011	49.15
Faulkner	118,704	1,774	7,325,651	0.015	61.71
Franklin	18,045	261	1,119,359	0.014	62.03
Fulton	12,318	136	488,931	0.011	39.69
Garland	96,903	1,054	4,107,970	0.011	42.39
Grant	17,986	206	856,019	0.011	47.59
Greene	43,163	507	2,086,805	0.012	48.35
Hempstead	22,373	202	755,722	0.009	33.78
Hot Spring	33,394	351	1,400,481	0.011	41.94
Howard	13,735	190	752,539	0.014	54.79
Independence	37,025	381	1,420,989	0.010	38.38
Izard	13,474	149	535,413	0.011	39.74
Jackson	17,600	148	513,244	0.008	29.16
Jefferson	74,723	786	3,195,008	0.011	42.76
Johnson	25,901	297	1,268,846	0.011	48.99
Lafayette	7,447	68	267,568	0.009	35.93
Lawrence	17,012	225	826,047	0.013	48.56
Lee	10,216	60	238,907	0.006	23.39

Table E4 (continued)

County	Population_12[a]	Awards[b]	Amount[c]	AwardsPer[d]	AmountPer[e]
Lincoln	14,101	126	508,159	0.009	36.04
Little River	12,919	124	492,313	0.010	38.11
Logan	21,983	305	1,315,333	0.014	59.83
Lonoke	69,839	991	3,854,739	0.014	55.19
Madison	15,645	164	612,306	0.010	39.14
Marion	16,568	126	462,038	0.008	27.89
Miller	43,634	211	817,707	0.005	18.74
Mississippi	45,562	416	1,503,819	0.009	33.01
Monroe	7,828	75	309,876	0.010	39.59
Montgomery	9,340	77	271,741	0.008	29.09
Nevada	8,925	96	355,502	0.011	39.83
Newton	8,086	86	300,982	0.011	37.22
Ouachita	25,396	326	1,276,766	0.013	50.27
Perry	10,339	138	535,950	0.013	51.84
Phillips	20,784	200	768,122	0.010	36.96
Pike	11,247	146	521,761	0.013	46.39
Poinsett	24,307	244	987,436	0.010	40.62
Polk	20,471	219	822,221	0.011	40.17
Pope	62,765	881	3,806,627	0.014	60.65
Prairie	8,458	96	358,876	0.011	42.43

Table E4 (continued)

County	Population_12[a]	Awards[b]	Amount[c]	AwardsPer[d]	AmountPer[e]
Pulaski	388,953	4,164	17,289,983	0.011	44.45
Randolph	17,930	191	721,989	0.011	40.27
Saline	111,845	1,536	6,343,546	0.014	56.72
Scott	11,010	154	612,910	0.014	55.67
Searcy	8,007	92	320,164	0.011	39.99
Sebastian	127,304	1,587	7,066,922	0.012	55.51
Sevier	17,177	199	695,470	0.012	40.49
Sharp	17,054	235	826,721	0.014	48.48
St. Francis	27,858	173	658,089	0.006	23.62
Stone	12,663	131	483,626	0.010	38.19
Union	40,867	500	2,039,759	0.012	49.91
Van Buren	17,030	143	533,941	0.008	31.35
Washington	211,411	2,332	9,616,615	0.011	45.49
White	78,493	934	3,538,009	0.012	45.07
Woodruff	7,100	71	272,250	0.010	38.35
Yell	21,932	252	1,042,529	0.011	47.53
Not Reported		37	150,045		

Note. Population estimate, 2012 (Population_12[a]), Lottery scholarship awards, FY2013 (Awards[b]), and Lottery scholarship amount, FY2013 (Amount[c]) from, Arkansas Division of Legislative Audit. (2013). SALC08513, Arkansas Lottery Commission audit report, FY2013. Retrieved January 20, 2014 from http://arklegaudit.gov/#search. The rate of lottery scholarship awards per county resident, FY2013 (AwardsPer[d]), calculated statistic that was made using (Awards[b] / Population[a]) for each Arkansas county. The rate of lottery scholarship dollar amount per county resident, FY2013 (AmountPer[e]), calculated statistic that was made using (Amount[c] / Population[a]).

Appendix F

Alternate Regression Models for

Research Question Four

Table F1

Summary of Regression Analysis for Human Capital Variables Predicting Lottery Scholarship Success: Alternate Model #1 (Minus HS *and* Bachelor*)*

IV	Unstandardized Estimate (*B*)	Std. Error	Standardized Beta	*t*
(Constant)	0.905	0.690		1.311
Poverty	-0.672	1.374	-0.102	-0.489
MedIncome	1.190E-5	0.000	-0.273	1.224
Employ	-1.324	2.869	-0.068	-0.461

Note. Adj. $R^2 = 0.136$; $df = 71$. $^{**}p \leq 0.01$, two-tailed.$^{*}p \leq 0.05$, two-tailed.

Table F2

Summary of Collinearity Statistics for the Regression Analysis: Alternate Model #1

IV	Tolerance	VIF
(Constant)		
Poverty	0.269	3.716
MedIncome	0.235	4.255
Employ	0.534	1.873

Note. *Potentially collinear because Tolerance ≤ 0.20 and/or VIF ≥ 5.00

Table F3

Summary of Regression Analysis for Human Capital Variables Predicting Lottery Scholarship Success: Alternate Model #2 (Minus HS*)*

IV	Unstandardized Estimate (*B*)	Std. Error	Standardized Beta	*t*
(Constant)	1.779	0.634		2.807
Poverty	-3.196*	1.320	-0.485	-2.422
Bachelor	3.046**	0.647	0.730	4.709
MedIncome	-1.958E-5	0.000	-0.449	-1.806
Employ	2.458	2.643	0.127	0.930

Note. Adj. $R^2 = 0.334$; $df = 70$. $^{**}p \leq 0.01$, two-tailed.$^{*}p \leq 0.05$, two-tailed.

Table F4

Summary of Collinearity Statistics for the Regression Analysis: Alternate Model #2

IV	Tolerance	VIF
(Constant)		
Poverty	0.225	4.450
Bachelor	0.375	2.668
*MedIncome**	0.146	6.866
Employ	0.484	2.064

Note. *Potentially collinear because Tolerance $\leq$ 0.20 and/or VIF $\geq$ 5.00

Table F5

Summary of Regression Analysis for Human Capital Variables Predicting Lottery Scholarship Success: Alternate Model #3 (Minus Bachelor*)*

IV	Unstandardized Estimate (*B*)	Std. Error	Standardized Beta	*t*
(Constant)	-3.173	0.884		-3.589
Poverty	0.852	1.153	0.129	0.739
HS	5.366**	0.895	0.784	5.997
MedIncome	-4.378E-6	0.000	-0.100	-0.521
Employ	-1.483	2.348	-0.076	-0.632

Note. Adj. R^2 = 0.421; *df* = 70. ** $p \leq 0.01$, two-tailed.* $p \leq 0.05$, two-tailed.

Table F6

Summary of Collinearity Statistics for the Regression Analysis: Alternate Model #3

IV	Tolerance	VIF
(Constant)		
Poverty	0.256	3.906
HS	0.458	2.185
MedIncome	0.211	4.750
Employ	0.534	1.874

Note. *Potentially collinear because Tolerance $\leq$ 0.20 and/or VIF $\geq$ 5.00

Table F7

Summary of Regression Analysis for Human Capital Variables Predicting Lottery Scholarship Success: Alternate Model #4 (Include HS+Bachelor*)*

IV	Unstandardized Estimate (*B*)	Std. Error	Standardized Beta	*t*
(Constant)	-0.216	0.596		-0.362
Poverty	-1.962	1.147	-0.297	-1.710
MedIncome	-1.997E-5*	0.000	-0.453	-2.064
Employ	1.548	2.401	0.080	0.644
HS+Bachelor	2.369**	0.397	0.857	5.964

Note. Adj. R^2 = 0.419; *df* = 70. ***p* $\leq$ 0.05, two-tailed.**p* $\leq$ 0.05, two-tailed.

Table F8

Summary of Collinearity Statistics for the Regression Analysis: Alternate Model #4

IV	Tolerance	VIF
(Constant)		
Poverty	0.260	3.853
MedIncome	0.163	6.142
Employ	0.512	1.952
HS+Bachelor	0.380	2.629

Note. *Potentially collinear because Tolerance $\leq$ 0.20 and/or VIF $\geq$ 5.00

Appendix G

IRB Approval Letter

UNIVERSITY OF ARKANSAS

Office of Research Compliance
Institutional Review Board

February 12, 2014

MEMORANDUM

TO:	Noah Pittman Michael Miller
FROM:	Ro Windwalker IRB Coordinator
RE:	New Protocol Approval
IRB Protocol #:	14-01-444
Protocol Title:	*Evaluating the Effects of the Arkansas Scholarship Lottery on College Participation*
Review Type:	☒ EXEMPT ☐ EXPEDITED ☐ FULL IRB
Approved Project Period:	Start Date: 02/12/2014 Expiration Date: 02/11/2015

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (http://vpred.uark.edu/210.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval. Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

If you wish to make *any* modifications in the approved protocol, you must seek approval *prior to* implementing those changes. All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu.

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