Enrollment Levels In Institutions of Higher Education: Are State Lotteries Making A Difference In The American States

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Abstract
The academic literature on the impact of state lotteries on education has dealt primarily with issues of funding. Absent from the literature are studies measuring enrollment numbers before and after the adoption of a state lottery. This study attempts to fill a void in the literature regarding state operated lotteries and enrollments in institutions of higher education by answering the following question: are state operated lotteries increasing the number of higher education students in the American states? Pooled time series cross sectional regression analysis is the methodological technique employed to test the data in this research project. This study suggests that state operated lotteries have not had the impact on enrollments in institutions of higher education that many practitioners and scholars originally anticipated.
INTRODUCTION

The published literature available on legalized gambling explores various aspects of this highly debated issue. The utilization of legalized gambling for enhancing state revenues has been debated by researchers, scholars, legislators, and citizens. Gaming is less efficient than taxes on labor income (Rodgers and Stuart, 1998), and low income interest groups either bear more of the tax burden or they receive fewer benefits from its implementation than citizens in other income groups (Borg, Mason, and Shapiro, 1971; Livernois, 1997; Thomas and Webb, 1984; Clotfelter and Cook, 1989). Additionally, governments and citizens may experience unwanted problems and consequences including increased unemployment, decreased retail competition, increased public debt, and increased crime (Goodman, 1995; Pable, 1996; Gross, 1998). The literature on gambling points to both the desired revenues and the undesired consequences for state and local governments (French & Stanley, 2001b). Furthermore, scholars note its relationship with state wealth and federal spending for public education enhancement (French & Stanley, 2005; Stanley, 2005). Many contend that contributions from lotteries earmarked for social intervention programs, such as education, assist in eradicating the many disparities in the program funding that exists across these states (French & Stanley, 2004). Other studies have shown that proceeds from legalized gaming replace state monies previously dedicated to social programs such as education (Mikesell and Zorn, 1986; Spindler, 1995; Garrett, 2001; French & Stanley, 2001a; and Campbell, 2003). Allocations of these state funds are often related to the political pressures and cultures that exist within the states. Absent from the literature are studies measuring the consequences of lottery outcomes on institutions of higher education. One argument
suggests that institutions of higher education in lottery states are witnessing a dramatic increase in the number of students attending state universities. As a result, the infrastructures of state institutions of higher education may be ill prepared to handle the influx of students. This study attempts to fill a void in the literature regarding state operated lotteries and enrollments in institutions of higher education by answering the following question: *are state operated lotteries increasing the number of higher education students in the American States?*

The best decisions regarding the potential success of these policies should come from a thorough examination of the literature and research concerning the topic. The following section is a literature review of the recent expositions evaluating the relationships between state lotteries, education finance, and political culture.

**State Lotteries**

Lotteries have proven to be appealing mechanisms for producing supplemental government revenue because they are considered a voluntary tax: individuals pay the tax because they want to, instead of having to pay the tax because the government demands it (Mikesell, 2001). The voluntary aspects of lotteries are extremely appealing to governors and legislators because resources for social intervention programs are generated without unpopular tax increases. In other words, the intent of legalized gambling is to raise revenues without increasing the tax burdens of the lower class (Mikesell, 1989). The most popular gambling device today is by far the lottery (Mikesell and Zorn, 1986). The allure of lotteries and other forms of gambling as a source of revenue enhancement for state and local governments ascribes amply to the continued emergence of legalized gambling over the past two decades. Currently, thirty-eight states and the District of
Columbia operate lotteries. From 1982 to 1990, expenditures on legalized gaming increased at almost two times the rate of income; and 1992 revenues from state sanctioned gambling operations averaged approximately $30 billion a year (Gross, 1998).

While lotteries are touted by many as a means of increasing funds for needy state programs, opponents contend that lotteries are not the economic savior that policy makers and voters originally thought (Jones and Amalfitano, 1995). Miller and Pierce (1997) examined the financial aspects of education lottery’s short-term and long-term effects. They found that state-sponsored lotteries increased spending on education per capita during the early years of the lottery, but as time passed, these same states witnessed an overall decrease in spending for education.

The second major problem with lotteries and education funding is the idea of fungibility (Spindler, 1995; Garrett, 2001; Campbell, 2003; Mikesell and Zorn, 1986). Many residents can realize the benefits of using profits from lottery sales and lottery action as supplements to state funded programs. However, if these profits are utilized to replace original funding from the states, citizens may not reap any benefits, and their present circumstances may actually worsen. In many states, lottery profits are earmarked for education, economic development, distressed cities and towns, or senior citizen programs. In others, these profits fall into the general fund and may be directed to various programs as prescribed by the state legislature (Samuel, 2002; Campbell, 2003; Garrett, 2001; Erekson, Deshano, Platt, and Ziegert, 2002). Spindler attributes the issue of fungibility to the “politics of the budgetary process” because education expenditures are highly visible to the public, and are plagued with fiscal and political restraints (p. 60).
Legalized gambling, however, has provided benefits to state and local residents that may not have been realized through any other means. Lottery profits in Georgia, Florida, and Kentucky have been earmarked for education allowing younger residents in these states to attend state universities or colleges on full or partial scholarships (Barry, 1995; Florida Trend, 1997). Also, the educational systems of these states have utilized profits from lotteries to enhance the support network of computers, satellite dishes, and media technology in state schools. However, debate still arises as to whether or not legalized gambling is an appropriate answer for raising revenues for state and local governments.

A third major problem with lotteries occurs when the proceeds are used to finance a tax cut. Lotteries have proven to be appealing mechanisms for producing revenue because they are considered a voluntary tax. The voluntary aspects of lotteries are extremely appealing to governors and legislators because resources for social intervention programs are generated without unpopular tax increases; and, in some cases, tax cuts occur because a surplus of revenue exists from the lottery (Rubin, 1993; Ereckson, et.al. 1999). This is quite appealing to governors and legislators in their reelection bids for office. These individuals realize that increased state spending on programs that enhance the welfare of their constituents will greatly increase their political support. Rodgers and Stuart (1995) stipulate that “the revival of lotteries” despite immoral concerns and “negative distributional effects,” has occurred because of the belief that lotteries, instead of other tax instruments, raise additional revenue by generating smaller efficiency losses than other taxes; therefore, lotteries are less painful to voters (p. 244). In turn, political leaders will endorse tax cuts and replace the lost revenue with lottery dollars. Tax cuts
are highly favorable political platforms used by incumbents for being reelected. Unfortunately, social intervention programs, such as education, will be the first to suffer so politically ambitious individuals can maintain their tenure in politics (Jones and Amalfitano, 1994).

**Education Finance**

Education, according to the National Center for Education Statistics, accounts for the single largest cost in most state and local government operating budgets (U.S. Department of Education, 1998). Generally, the money comes from a combination of local and state taxes, federal grants-in-aid programs, and sales taxes, but the balance between these sources has shifted considerably over the years. Local tax revenues consist almost entirely of property taxes and sales taxes; and, despite their regressiveness, these taxes have maintained continued popularity as revenue generating devices (U.S. Department of Education, 1998). As a result of educational incongruity, however, local taxation for generating educational revenue began to receive immense criticism in the 1970’s and 1980’s. During this time period, state governments assumed a greater role in funding educational programs. The state share of total educational funding increased from 41 percent in 1968 to about 50 percent in 1986, while local funding decreased from about 50 percent to 43 percent during this same time period (Wong, 1989).

The characterization of school financing as a conflict between local control ideals and equal opportunity correctly summarizes the traditional discourse revolving around this issue (Robertson & Judd, 1889). A wide range of disparity between school districts exists within many states because of taxable wealth (gross state product) and tax rates. Some states possess capacious gross state products, while other states exhibit feeble
levels of wealth. Further exacerbation of wealth disparity between school districts exists because of imbalances in the distribution of commercial, industrial, utility, public, tax-free, and residential property, as well as, an uneven distribution of school-aged children. Consequently, those children living in poor neighborhoods receive a lower standard of education than children from wealthier communities (Peters, 1996). As a result, children from less affluent communities entering the job market or post-secondary educational institutions often find themselves deficient in the necessary skills to adequately compete. Thus, more affluent individuals receive better jobs and educations as compared to individuals who originate from less affluent households (Grissmer, Flanagan, and Williamson, 1997).

Statistical evidence provided by the Department of Education (2004) certifies numerous accounts of educational disparity across the American states. In most states, the average spending disparity between affluent and less affluent school districts ranges from two and five times more. Numerous court challenges to the constitutionality of property based education finance have occurred in almost every state over the last ten years, and the supreme courts in seventeen states have declared the current systems of education finance in these states unconstitutional (Dee, 2004).

Proponents of education funding claim that gross inadequacies exist between wealthy school districts and poor school districts as a result of the outdated funding mechanisms employed by states and localities for decades (Picas, 1995). Others contend that we currently spend more than we ever have as a nation on education, and the achievement score are stagnant and in some cases have even declined (Hanushek, 1994). Despite pious efforts toward eradicating these financial disparities, the fact remains that
within virtually every state, funding levels for some children’s education are several times greater than those of other children (Renchler, 1992).

The perennial social problem of educational expenditure disparity is often attributed to the failure of elected officials to adopt legislation to confront this issue. Historically, reports demonstrate that Republican governors tend to support less spending on education compared to Democratic governors. However, many Republican governors are witnessing the desperate need to enhance America’s educational system, especially since the U.S. is aggressively competing in a global economy (Beyle, 1996). Governors recognize that raising taxes in an effort to cover the educational expense of states is politically counter productive. Therefore, governors representing both parties are searching for ways to increase revenue allotments for public education without increasing taxes (Picas, 1995). One of the mechanisms often explored by governors to cover these social expenses is the use of a lottery. Governors, especially during election years, find the lottery quite appealing because it allows them to spend more on social programs, such as education, without embracing a tax increase for these expenditures. In theory, this demonstrates to the public that their particular chief political functionary possesses the characteristics of a thrifty, egalitarian leader. Often, the success of the gubernatorial reelection campaign depends on the populace’s perception of the governor (Beyle, 1996).

**Political Culture**

Despite the appeal of state operated lotteries as a supplemental revenue source for social programs, some states have repeatedly rejected legislation that would have brought gaming to their respective state. For instance, in 1999 the state of Alabama, in a referendum brought to the people, rejected lottery gaming almost 2 to 1. Why do some
states choose to operate state lotteries while others consistently oppose any legislation that supports state supported gaming? One reason for this discrepancy in regards to gaming policy is a state’s political culture.

Other research concerning political culture and policy adoption has focused on social class, regional diffusion, and economic disparity. Black and Black (1987) note that even when power and influence within the South shifted as the population of a new middle class Southerners composed of professional, technical, managerial, clerical workers began to outnumber the agrarian middle class, the political agenda of these states remained virtually unchanged because most members of this new middle class shared the same agrarian beliefs, values, and interests. Both the traditionalistic and entrepreneurial individualistic cultures that emerged placed great importance on financial self-reliance and minimal government intervention (Black and Black, 1987, p.60).

Virginia Gray (1973) points out that the differences exhibited in state policy innovations in education, welfare, and civil rights are often explained by political differences and economic disparities. Innovative states tend to be wealthier and exhibit greater political party competitiveness than the less innovative states (Gray, 1973, p. 1182). Also, states with higher mean percentages of Progressive party strength (prior to 1913) are more innovative in adopting particular legislation examined by Gray (Gray, 1973, p. 1183).

Regional diffusion and political, economic, and social characteristics also serve as plausible explanations of state government policy innovations including the adoption of legalized gambling (Berry and Berry, 1990; Erickson, Platt, Whistler, and Ziegert, 1999; Davis, Filer, and Moak, 1992; Furlong, 1998). Previous adoption of the lottery by
neighboring states is directly related to the utilization of this innovation. Also, states with declining fiscal health exhibit a higher probability of adopting the lottery. Lottery adoption is most likely to occur during an election year and least likely to occur in the years immediately following the election (Berry and Berry, 1990). In addition, states with lower per capita incomes and states with higher percentages of religious fundamentalists are least likely to adopt lotteries. With this in mind, the literature on political culture suggests that the southern region of the United States is distinct from the rest of the country in funding education. This distinction is measured by this study because the unit of analysis found in the study is state data from the southern region of the United States. Since the lottery is a fairly new policy issue for the south, a study is needed to measure the utility of this revenue generating device, as well as the consequences it has imposed on institutions of higher education.

According to Pierce and Miller (1999), education and general fund politics are the issues being used to sell lottery adoption in the states. They found that states adopting lotteries for curing the education “crisis” in America, instead of generating revenue for general fund “needs,” met less opposition from fundamentalists because the symbol that their children’s education was at stake is a symbol they were not willing to risk (Pierce and Miller, 1999, p.698). Therefore, somewhere between dedicating lottery proceeds for education instead of the general fund, state operated lotteries have become less sinful. Pierce and Miller indicate that measuring the amount of fundamentalism in morality policy issues such as gaming will assist scholars in understanding policy adoption trends in America, especially in the conservative south (Ellison and Nybroten, 1999).
Rationale For this Lottery Study

Employed from the literature are several concepts relating to the explanation of the lotteries’ impact on public education expenditures. For instance, the National Center for Educational Statistics claims that education accounts for the single largest cost in most state and local government budgets. Wong (1989) postulates that the wealth disparity among state governments resulting in educational achievement disparities between citizens of more affluent states and citizens of less affluent states. Lewis and Maruna (1996) posit that the federal government, in its attempts to eradicate educational disparity, returns large amounts of revenue to states for educational enhancement, despite the inconsistency of these actions. Beyle (1996) contends that Democratic governors have historically placed educational issues at the forefront of their political agendas; while Republican governors, as a whole, fail to grasp the need for enhanced education. Both Barry (1996), and Fields (1996) argue that Georgia and Florida represent success stories in revenue generation from the lottery, and that in turn, their educational systems have benefited tremendously from these added revenues. Finally, governors in their bids for reelection, tend to spend more on social programs than their previous years in office, hoping that these increased expenses will translate into votes. The hypotheses generated from the literature review for empirical analysis are as follows:
Hypothesis:

H₁: States operating lotteries tend to have similar enrollments of higher education students compared to states that do not operate lotteries.
H₂: States with larger numbers of higher education students tend to spend similar resources for higher education compared to states with fewer students.
H₃: States with higher gross state products tend to have similar numbers of higher education students compared to states with lower gross state products.
H₄: States with higher populations tend to have similar enrollments in institutions of higher education compared to states with fewer students.
H₅: States with larger enrollment levels in institutions of higher education tend to receive similar amounts of federal funding compared to states with lower enrollment levels.
H₆: States with higher levels of unemployment tend to have similar enrollments in institutions of higher education compared to states with lower unemployment levels.
H₇: States with Democratic governors tend to have similar enrollment levels in institutions of higher education compared to states with Republican governors.
H₈: States with higher levels of poverty tend to have similar enrollment levels students in institutions of higher education compared to states with lower levels of poverty.
H₉: Traditionalistic states tend to have similar enrollment levels of students in institutions of higher education compared to moralistic states.
H₁₀: Traditionalistic states tend to have similar enrollment levels of students in institutions of higher education compared to individualistic states.
H₁₁: The enrollment levels of institutions of higher education tend to be similar under Democratic presidents compared to republican presidents.
Unit of Analysis
The unit of analysis in the study is state level data from 1970 to the year 2000 (Thirty-year time period). As a result of this time period, the states of Tennessee and South Carolina were categorized as non-lottery states due to their recent adoption of the lottery. A thirty-year time period was chosen due to the empirical method used to test the data. For time series studies, thirty-years is the suggested time necessary to get a reliable analysis of the data (Babbie, 2004).

DATA & METHODOLOGY

DATA

Conceptual and Operational Definitions
TOTALHIGH – (Dependent Variable) The total number of college and university students by state. The data was collected from the Digest of Education Statistics published by the Federal Department of Education.

FEDSPEDU – The total amount of federal spending for education received by the states. The data was collected from the Digest of Education Statistics published by the Federal Department of Education.

GSP – The Gross State Product of each state adjusted for inflationary factors. The data was collected from the Bureau of Economic analysis, which is a branch of the Department of the Census.

LOTTERY – The amount of revenue each state receives from the lottery for higher education. The data was collected from the Statistical Abstracts of the United States published by the Department of the Census.

LOTTERY PRESENCE – A dummy variable coded 0 = lottery states and 1 = non-lottery states. This variable is utilized to explain some of the unexplained variance in the regression model. The amount of revenue each state receives from the lottery for education. The data was collect from the Statistical Abstracts of the United States published by the Department of the Census.

POPULATION – The number of residence in a particular state. The data was collect from the Statistical Abstracts of the United States published by the Department of the Census.

GOVPARTY - The political party affiliation of the governor of each state coded as a dummy variable where 0 = Democrat and 1 = Republican. The data was collect from the Statistical Abstracts of the United States published by the Department of the Census.

UNEMPLOYMENT – The percentage of individuals unemployed in each state. The data was collect from the Statistical Abstracts of the United States published by the Department of the Census.

SPHIGHEDU – Total spending on higher education by each state. The data was collected from the Digest of Education Statistics published by the Federal Department of Education.

INDIVIDUALISTIC, MORALISTIC, TRADITIONALISTIC - Daniel Elazar’s classifications of the American states. Three distinct dummy variables were generated categorizing each state according to Elazar’s political culture ranking.
**PRESIDENT’S PARTY AFFILIATION** – The presidential party of the president coded as a dummy variable (0 = Democrat; 1 = Republican). The data was collect from the Statistical Abstracts of the United States published by the Department of the Census.

**POVERTY** – The percentage of individuals at or below the poverty line for each state. The data was collect from the Statistical Abstracts of the United States published by the Department of the Census.

The estimated regression equation is written as follows:

\[ Y_{TOTALHIGH,t-1} = a + (B_1)GSP_1 + (B_2)FEDSPEDU_2 + (B_3)LOTTERY_3 + (B_4)LOTTERY PRESENCE_4 + (B_5)GOVPARTY_5 + (B_6)POVERTY_6 + (B_7)POPULATION_7 + (B_8)UNEMPLOYMENT_8 + (B_9)SPHIGHEDU_9 + (B_{10})INDIVIDUALISTIC_{10} + (B_{11})MORALISTIC_{11} + (B_{12})TRADITIONALISTIC_{12} + (B_{13})PRESIDENTIAL ID_{13} + E \]

**METHODOLOGY**

This research project uses pooled time series cross-sectional data analysis as the measuring device for the previously stated hypotheses. One of the most promising advantages of using pooled time series cross sectional analysis is its usefulness in offering explanations of the past while simultaneously predicting the future behavior of exogenous variables in relation to endogenous variables (Beck and Katz, 1996). Pooled time series cross sectional analysis allows the researcher to focus on more than one case in predicting social phenomenon; whereas simple time series analysis deals strictly with specific cases at different time points, causing data management complications, and compromises the generalizability of the project. Potential threats to data dependability arise with autocorrelation and heteroskedasticity (Beck and Katz, 1996). However, appropriate measures were taken to check and correct for these potential threats to data reliability. Also, VIF statistics were consulted to ensure that multicollinearity was absent from the data as well (Fox, 1991).¹

¹ Multicollinearity was checked by using the VIF and tolerance levels displayed by the SPSS program. Multicollinearity was not a problem in the five models presented in the manuscript (Fox, 1991) because all the variables displayed VIF statistics of less than 5.6. In addition, autocorrelation and Heteroskedasticity (using White’s test) were not a problems in the data set.
FINDINGS & DISCUSSION

Exhibit I: All Students

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>t-test</th>
<th>p.&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSP</td>
<td>0.0105</td>
<td>3.457</td>
<td>.001***</td>
</tr>
<tr>
<td>FEDSPEDU</td>
<td>-.101</td>
<td>-1.836</td>
<td>.063</td>
</tr>
<tr>
<td>LOTTERY</td>
<td>-58.460</td>
<td>-1.191</td>
<td>.089</td>
</tr>
<tr>
<td>LOTTERY PRES.</td>
<td>-15321.0</td>
<td>-1.591</td>
<td>.112</td>
</tr>
<tr>
<td>GOVPARTY</td>
<td>1384.1</td>
<td>.207</td>
<td>.836</td>
</tr>
<tr>
<td>POPULATION</td>
<td>54.92</td>
<td>64.77</td>
<td>.001***</td>
</tr>
<tr>
<td>UNEMPLOYMENT</td>
<td>4280.6</td>
<td>2.312</td>
<td>.021**</td>
</tr>
<tr>
<td>SPHIGHEDU</td>
<td>2.768</td>
<td>.954</td>
<td>.340</td>
</tr>
<tr>
<td>INDIVIDUALISTIC</td>
<td>11556.8</td>
<td>.997</td>
<td>.319</td>
</tr>
<tr>
<td>MORALISTIC</td>
<td>1800.9</td>
<td>1.935</td>
<td>.053**</td>
</tr>
<tr>
<td>PRESIDENTIAL ID</td>
<td>-19482.5</td>
<td>-2.131</td>
<td>.033**</td>
</tr>
<tr>
<td>POVERTY LEVEL</td>
<td>-1001.5</td>
<td>-1.047</td>
<td>.295</td>
</tr>
<tr>
<td>Constant</td>
<td>27502.6</td>
<td>.997</td>
<td>.319</td>
</tr>
</tbody>
</table>

R       .895
R2      .802
AdjR2   .800
Df      14
F       456.462
F(sig)  .001
N       1594

Note: *** significance at .001; **significance at .05

Exhibit I displays results of the first pooled time series cross-sectional regression equation that measures the lotteries impact on the number of students in institutions of higher education. The unit of analysis in the model includes both four-year and two-year institutions of higher education. The .800 adjusted $R^2$ value shows that 80 percent of the variance is being explained in model one. The data suggests that for every unit increase in population, an increase of 54.92 will occur in the total number of students enrolled in institutions of higher education. The significance of the t-test in the regression model (64.77; p<.001) allows for the rejection of the null hypothesis between the variables of population and number of students enrolled in institutions of higher education.
Additionally, gross state product (GSP) displays a p<.001 suggesting that for every unit increase in GSP, an increase of 54.92 will occur in the total number of students enrolled in institutions of higher education. The significance of the t-test in the regression model (3.457; p<.001) allows for the rejection of the null hypothesis between the variables GSP and number of students enrolled in institutions of higher education.

The unemployment variable is also statistically significant suggesting that for every unit increase in unemployment, an increase of 4280.6 will occur in the total number of students enrolled in institutions of higher education. The significance of the t-test in the regression model (2.312; p<.05) allows for the rejection of the null hypothesis between the variables unemployment and number of students enrolled in institutions of higher education.

In reference to Elazar’s political culture variables, the moralistic variable accounts for a statistically significant coefficient in the model. Moralistic culture displays a p<.05 suggesting that for every unit increase in moralistic culture an increase of 18003.9 will occur in the total number of students enrolled in institutions of higher education. The significance of the t-test in the regression model (1.935; p<.05) allows for the rejection of the null hypothesis between the variables moralistic culture and number of students enrolled in institutions of higher education.

Presidential party also demonstrates a statistical significance relationship with enrollment number in the regression model. Presidential party displays a p<.05 suggesting that for every unit increase in presidential party a decrease of -19482.5 will occur in the total number of students enrolled in institutions of higher education. The significance of the t-test in the regression model (-2.131; p<.05) allows for the rejection
of the null hypothesis between the variables presidential party and number of students enrolled in institutions of higher education.

In the second regression model, four-year institutions of higher education students become the dependent variable in an effort to distinguish differences between community colleges and regular four year institutions of higher education. The following table displays those results.

<table>
<thead>
<tr>
<th>Student Enrolled in Four-Year Institutions</th>
<th>B</th>
<th>t-test</th>
<th>p.&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSP</td>
<td>0.0093</td>
<td>1.605</td>
<td>.109</td>
</tr>
<tr>
<td>FEDSPEDU</td>
<td>0.0217</td>
<td>1.735</td>
<td>.083</td>
</tr>
<tr>
<td>LOTTERY</td>
<td>2.680</td>
<td>1.182</td>
<td>.237</td>
</tr>
<tr>
<td>LOTTERY PRES.</td>
<td>-3661.9</td>
<td>-1.597</td>
<td>.110</td>
</tr>
<tr>
<td>GOVPARTY</td>
<td>295.903</td>
<td>.186</td>
<td>.852</td>
</tr>
<tr>
<td>POPULATION</td>
<td>17.443</td>
<td>81.936</td>
<td>.001***</td>
</tr>
<tr>
<td>UNEMPLOYMENT</td>
<td>994.795</td>
<td>2.260</td>
<td>.024**</td>
</tr>
<tr>
<td>SPHIGHEDU</td>
<td>-.668</td>
<td>-.958</td>
<td>.338</td>
</tr>
<tr>
<td>INDEPENDENTALISTIC</td>
<td>2389.093</td>
<td>1.078</td>
<td>.281</td>
</tr>
<tr>
<td>MORALISTIC</td>
<td>1502.130</td>
<td>6.482</td>
<td>.001***</td>
</tr>
<tr>
<td>PRESIDENTIAL ID</td>
<td>-445.737</td>
<td>-.205</td>
<td>.838</td>
</tr>
<tr>
<td>POVERTY LEVEL</td>
<td>-389.107</td>
<td>-1.707</td>
<td>.088</td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R  .940  
R2  .883  
AdjR2 .882  
Df  14  
F  855.075  
F(sig)  .001  
N = 1594  
Note: *** significance at .001; **significance at .05

The .882 adjusted R\(^2\) value shows that 82 percent of the variance is being explained in model one. Once again, population is the first significant variable in the model. The data suggests that for every unit increase in population, an increase of 17.443 will occur in the total number of students enrolled in institutions of higher education. The
significance of the t-test in the regression model (81.936; p<.001) allows for the rejection of the null hypothesis between the variables population and number of students enrolled in institutions of higher education.

The unemployment variable is also considered statistically significant in the model. The data suggests that for every unit increase in unemployment, an increase of 994.795 will occur in the total number of students enrolled in institutions of higher education. The significance of the t-test in the regression model (2.260; p<.05) allows for the rejection of the null hypothesis between the variables unemployment and number of students enrolled in institutions of higher education.

In reference to Elazar’s political culture variables, the moralistic variable accounts for a statistically significant coefficient in the model. Moralistic culture displays a p<.05 suggesting that for every unit increase in moralistic culture an increase of 1502.130 will occur in the total number of students enrolled in institutions of higher education. The significance of the t-test in the regression model (6.482; p<.05) allows for the rejection of the null hypothesis between the moralistic culture variable and number of students enrolled in institutions of higher education.

| Exhibit III: Students Enrolled In Two-Year Institutions |
|----------------|----------------|----------------|
|                | B              | t-test         | p.<           |
| GSP            | .103           | 6.723          | .001          |
| FEDSPEDU       | -1.0890        | -1.298         | .107          |
| LOTTERY        | -23.116        | -1.871         | .121          |
| LOTTERY PRES.  | -1004.053      | -.166          | .868          |
| GOVPARTY       | -3.871         | .999           | .318          |
| POPULATION     | 26.142         | 48.560         | .001***       |
| UNEMPLOYMENT   | 2.681.2        | 2.281          | .023          |
| SPHIGHEDU      | -3.229         | -1.752         | .080          |
| INDIVIDUALISTIC| 18990.6        | .574           | .566          |
| MORALISTIC     | 24836.4        | 4.206          | .001***       |
| PRESIDENTIAL ID| -8412.1        | -.027          | .147          |
Exhibit III is the final pooled time series cross-sectional regression equation that measures the lotteries impact on the number of students in two-year institutions of higher education. The .677 adjusted $R^2$ value shows that 68 percent of the variance is being explained in model one. Again, the population variable is found to be statistically significant suggesting that for every unit increase in population, an increase of 26.142 will occur in the total number of students enrolled in institutions of higher education. The significance of the t-test in the regression model (48.56; $p<.001$) allows for the rejection of the null hypothesis between the variables population and number of students enrolled in institutions of higher education.

Additionally, gross state product (GSP) displays a $p<.001$ suggesting that for every unit increase in GSP, an increase of .103 will occur in the total number of students enrolled in institutions of higher education. The t-test for GSP of 6.723, with a $p<.001$ allows for the rejection of the null hypothesis between gross state product and total number of students enrolled in institutions of higher education.

The unemployment variable displays a statistically significant finding that suggests that for every unit increase in unemployment, an increase of 2.681 will occur in the total number of students enrolled in institutions of higher education. The significance
of the t-test in the regression model (2.281; p<.05) allows for the rejection of the null hypothesis between the variables unemployment and number of students enrolled in institutions of higher education.

Again, Elazar’s political culture variable moralistic accounts for a statistically significant coefficient in the model. Moralistic culture displays a p<.001 suggesting that for every unit increase in moralistic culture an increase of 24836.4 will occur in the total number of students enrolled in institutions of higher education. The significance of the t-test in the regression model (4.206; p<.05) allows for the rejection of the null hypothesis between the moralistic culture variable and number of students enrolled in institutions of higher education.

In addition to the previously discussed models measuring the impact of lotteries on enrollment figures of students in institutions of higher education among the states, the authors employed an analysis of the impact of lotteries on SAT scores. One argument suggests that some lottery states, are witnessing an increase in SAT scores among freshmen entering state universities. This notion suggests that the quality of students entering institutions of higher education in lottery states may have increased with the adoption of a state lottery. In an effort to measure this assumption, two regression models were conducted on the math and verbal sections of the SAT.\(^2\)

\(^2\) Due to the absence of SAT scores prior to 1974, the data for the models measuring SAT scores begin in the year 1974 and run through 2000.
Exhibit IV displays the results of the regression model with verbal SAT scores as the dependent variable. The .816 adjusted $R^2$ value shows that 82 percent of the variance is being explained in model one. The first variable, gross state product (GSP) displays a $p<.05$ suggesting that for every unit increase in GSP, an increase of .0516 will occur in the SAT scores of college students. The t-test score of 2.382 allows for the rejection of the null hypothesis between the variables GSP and SAT scores of college students.

Presidential party is another variable recording a statistical significance in the regression model. Presidential party displays a $p<.001$ suggesting that for every unit increase in presidential party an increase of 31.353 will occur in the SAT scores of
college students. The significance of the t-test in the regression model (4.246) allows for the rejection of the null hypothesis between the variables presidential party and SAT scores of college students.

Finally, the third statistically significant variable unemployment, suggests that for every unit increase in poverty, a decrease of -1.387 will occur in the verbal SAT score for students who have taken the exam. The significance of the t-test in the regression model (-3.039; p<.001) allows for the rejection of the null hypothesis between the variables poverty and SAT scores of college students.

**Exhibit V:**

**Math SAT Scores of Students Enrolled In Institutions of Higher Education**

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>t-test</th>
<th>p.&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSP</td>
<td>.04959</td>
<td>2.339</td>
<td>.019**</td>
</tr>
<tr>
<td>FEDSPEDU</td>
<td>.0554</td>
<td>1.745</td>
<td>.081</td>
</tr>
<tr>
<td>LOTTERY</td>
<td>.0440</td>
<td>.821</td>
<td>.412</td>
</tr>
<tr>
<td>LOTTERY PRES.</td>
<td>.944</td>
<td>.171</td>
<td>.865</td>
</tr>
<tr>
<td>GOVPARTY</td>
<td>-3.817</td>
<td>-1.001</td>
<td>.317</td>
</tr>
<tr>
<td>POPULATION</td>
<td>-.0938</td>
<td>-1.008</td>
<td>.314</td>
</tr>
<tr>
<td>INDIVIDUALISTIC</td>
<td>-1.865</td>
<td>-.213</td>
<td>.832</td>
</tr>
<tr>
<td>MORALISTIC</td>
<td>-3.559</td>
<td>-.433</td>
<td>.665</td>
</tr>
<tr>
<td>PRESIDENTIAL ID</td>
<td>29.819</td>
<td>4.005</td>
<td>.001***</td>
</tr>
<tr>
<td>UNEMPLOYMENT</td>
<td>.225</td>
<td>.222</td>
<td>.824</td>
</tr>
<tr>
<td>SPHIGHEDU</td>
<td>.0113</td>
<td>.651</td>
<td>.515</td>
</tr>
<tr>
<td>POVERTY</td>
<td>-1.232</td>
<td>-2.480</td>
<td>.013**</td>
</tr>
<tr>
<td>Constant</td>
<td>87.799</td>
<td>6.241</td>
<td>.001</td>
</tr>
</tbody>
</table>

R  .904  
R²  .817  
AdjR²  .816  
Df  9  
F  644.275  
F(sig)  .001  
N = 415  

Note: *** significance at .001; ** .05.
Exhibit V lists the results of the regression model with SAT math scores as the dependent variable. The .86 adjusted $R^2$ value shows that 83 percent of the variance is being explained in model one. Again, the gross state product (GSP) variable displays a $p<.05$ suggesting that for every unit increase in GSP, an increase of .04959 will occur in the SAT scores of college students. The t-test score of 2.339 allows for the rejection of the null hypothesis between the variables GSP and SAT scores of college students.

Presidential party also demonstrates statistical significance in the regression model. Presidential party displays a $p<.001$ suggesting that for every unit increase in presidential party an increase of 29.819 will occur in the SAT scores of college students. The significance of the t-test in the regression model (4.005) allows for the rejection of the null hypothesis between the variables presidential party and SAT scores of college students.

Furthermore, the data suggests that for every unit increase in poverty, a decrease of -3.595 will occur in the verbal SAT score for students who have taken the exam. The significance of the t-test in the regression model (-4.419; $p<.001$) allows for the rejection of the null hypothesis between the variables poverty and SAT scores of college students. Therefore, the null hypothesis for poverty rate and SAT scores was rejected.

The models found in exhibits IV & V fail to demonstrate that the SAT test scores of students have improved as a result of the adoption of a state lottery. However, both models do suggest that states with higher levels of GSP tend to have higher SAT scores. Also, the models indicate that states with SAT scores tend to have lower poverty levels compared to states with lower SAT scores. This suggests that increased levels of spending for education may correlate into higher SAT scores. Additionally, presidential
party demonstrates statistically significant variables in both models further supporting the
notion that Democratic presidents tend to spend more on education and as a result SAT
scores are higher during the tenure of presidential candidates who are Democrats.

POLICY IMPLICATIONS AND LIMITATIONS

Concern expressed by the academic literature about state institutions of higher
education experiencing unprecedented levels of increased enrollment as a result of the
lottery has failed to be supported by this study. This study suggests that the driving
factor for increasing enrollment in institutions of higher education is simply the
population of the state. States with higher populations tend to have higher enrollments in
institutions of higher education, compared to states with smaller population. The data
suggest that the lottery has had no significant impact on enrollment levels in institutions
of higher education.

One limitation of this study results from grouping all the states into one lottery
study. For example, the disbursement of lottery funds is different from state to state.
One state like Georgia may spend a majority of its funds on programs such as the Hope
Scholarship for higher education, whereas other states like Florida may spend some on
higher education and other proceeds on public safety and transportation. Specific studies
measuring the impact of lotteries on a state-by-state basis may create a better picture of
the impact that lotteries have on enrollments in institutions of higher education.

Future studies should focus on specific numbers of students receiving lottery
scholarships in higher education. For instance, once the administrative costs of higher
education lotteries are deducted, is there a significant difference between the number of
students receiving lottery scholarships and those who are not receiving money from the
lottery to attend school? Additionally, are the number of professors and their salaries increasing as a result of the lottery? These are future studies that would fill a research gap and lend credibility to the literature currently available on state operated lotteries.

REFERENCES


