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AUTHOR Summers, Susan Robinson
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ABSTRACT

One of the more pervasive fiscal trends of the past three decades is the use of state-sponsored lotteries to raise revenue, often earmarked for such publicly supported institutions as public colleges. Evidence exists, however, that lottery revenues, which are unstable in nature, tend to supplant stable general revenue funds. Moreover, lottery ticket purchases can suppress other state tax sources, thus causing a further redistribution of a state's general fund expenditures. To examine the fiscal results over time of earmarking lottery funds to a public community college system, a study of changes in available resources and actual expenditures was conducted in the Florida Community College System (FCCS) since the inception of the state's Education Lotteries in 1987. Study findings, based on a review of revenue and expenditure trends for 23 fiscal years, included the following: (1) the implementation of lottery funding was associated with a decrease in community college expenditures, and with a decline in general revenue allocations to the FCCS; (2) there was no statistically significant evidence that lottery funds supplanted general revenue funds in Florida, since allocations represented a small percentage of total allocations; (3) the FCCS was shown, however, to be increasingly dependent on non-state sources of revenue since the inception of the lottery; and (4) when lottery funds were distributed without categorical restrictions on their use, the overall level of state support was found to be lower than when funds were allocated with categorical restrictions. Contains 84 references. (BCY)

AN EXAMINATION OF SUPPLANTATION AND REDISTRIBUTION EFFECTS OF LOTTERY ALLOCATIONS TO A COMMUNITY COLLEGE SYSTEM

SUSAN ROBINSON SUMMERS
Chairperson of Extended Studies
Lake City Community College

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American Education Finance Association
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ABSTRACT

The purpose of this study was to determine whether a public institution benefitted financially from being a designated recipient of a portion of the profits from a state-operated lottery. A state system of public community colleges was used for the analysis. The method was to determine whether there was any change since the inception of the Florida Education Lotteries in the state fund allocations and actual expenditures of the 28 state-supported community colleges in Florida. The study was divided into four basic questions:

1. Did the start of the Lottery coincide with a change in expenditure trends of the Florida community colleges? The results provided evidence of an inverse relationship between lottery dollars and total community college expenditures; also, general revenue allocations to the community college system declined.

2. Did Florida Lottery funds supplant or enhance state general revenue funds expended in support of community college education? There was no statistically significant evidence of supplantation. Within the context of 22 fiscal years, the lottery allocations were too small to have exerted a significant effect on the state total allocation to community colleges, indicating that the supplantation effect was influenced by redistribution.

3. Did the addition of the lottery as a revenue source result in a redistribution in the proportion of community college expenditures funded through state sources? The community colleges were shown to have been increasingly dependent on nonstate sources of revenue since the inception of the Florida Lottery in FY 1987.

4. The fourth question concerned the proportion of lottery dollars that were released to community colleges in the form of a categorical allocation versus lottery dollars that were awarded without spending restrictions. There was evidence that the extent to which the lottery allocation was a categorical award was positively correlated with the amount of the total state allocation. The issue of categorical awards was linked to redistribution and supplantation.

INTRODUCTION

The last decades of the 20th century were years when governments experimented with the use of alternative, nontax methods to generate funds for social programs. One of the more pervasive fiscal trends of the past three decades is the implementation of state-sponsored lotteries to serve as supplemental government revenue sources. While some state lotteries generate funds for the state treasury, state lottery revenues are often earmarked for a publicly-supported institution such as education, parks and recreation, or economic development.

The purpose of this study was to examine over time the fiscal results of earmarking lottery revenues for a public community college system. In the final analysis, did the colleges benefit from being designated recipients of a portion of the profits from a state-operated lottery? The method used to address this question was to determine whether there had been any change since the inception of the Florida Education Lotteries in the available resources and actual expenditures of the 28 state-supported community colleges in Florida. The trend analysis involved 23 fiscal years of data.

REVIEW OF THE LITERATURE

An extensive body of literature exists on the subject of American lotteries, mainly from the fields of economics and political science. While research has focussed on the use of lottery funds for K-12 education, there was an apparent void concerning the use of a state lottery to fund higher education.

Between 1965 and 1993, voters in 35 states and the District of Columbia approved referenda to implement a state-government-operated lottery for the explicit purpose of creating a new state revenue source, reflecting a resurgence of lotteries worldwide. In 1986, 140 different countries permitted some form of legalized gambling; 100 of these countries had legalized lotteries (Clotfelter & Cook, 1989).

Twentieth century lotteries revive a time-honored way to raise funds for worthy activities (Clotfelter & Cook, 1990a), a phenomenon that began in New Hampshire in 1964 and spread rapidly across the continental United States. The rebirth of the Florida Lottery in 1986 coincided with the adoption of four other state lotteries, in Idaho, Kansas, Montana, and South Dakota (Mikesell & Zorn, 1987). State lotteries in the 20th century were presented to voters as an expedient way to raise new revenues for a state treasury by providing a consumer entertainment commodity through a government-held monopoly (Brinner & Clotfelter, 1975; Clotfelter & Cook, 1987, 1990b). The passage of a state lottery was politically more popular than the passage of additional taxes

(Allen, 1991; Borg & Mason, 1988, 1990; Clotfelter & Cook, 1989; Wyett, 1991).

The wide acceptance of the lottery is reflected in the 65% approval rate averaged by 20th century state lottery referenda (Clotfelter & Cook, 1989). Ironically, lotteries were outlawed by constitutional amendment in a number of states during the 18th century, beginning in Massachusetts in 1719. At the start of the Civil War, lotteries were banned in all states except for Delaware, Missouri, and Kentucky (Thomas & Webb, 1984). The revocations occurred, in part, because the promotion of lottery sales invoked concerns about the state governments' encouragement of public immorality, and the proportional return to the beneficiaries had greatly declined.

An extensive body of literature suggests that government-operated lotteries are regressive in nature, unstable as a resource base, and used by expedient politicians as a quick fix to generate new monies while raising taxes (Allen, 1991; Brinner & Clotfelter, 1975; Karcher, 1989). Lotteries were voted into states where other forms of gambling were illegal, sometimes under the guise of being a deterrent to illegal gambling. However, lotteries have been found to have no impact on the prevalence of illegal gambling (Thomas & Webb, 1984). At the same time, lotteries have been shown to suppress parimutuel wagering (Summers, 1993; Vasche, 1990), thereby suppressing tax revenues from commercial gambling. Figure 1 shows that, after 23 consecutive years of annual growth, parimutuel revenues in

Florida declined by 19% from the lottery's inception in FY 1987 through FY 1991, the most recent fiscal year for which figures were available at the time of this study (State of Florida Governor's Office of Planning and Budgeting, 1993). The 19% decline constituted a revenue loss of $24.9 million to the State of Florida treasury.

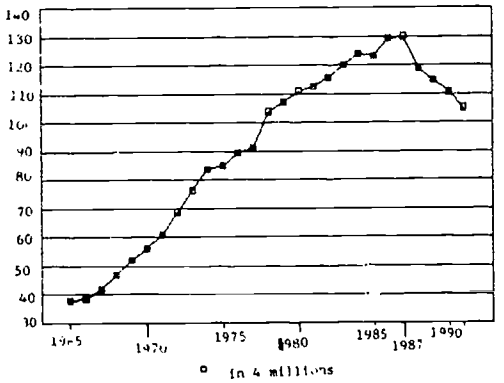

Figure 1. Parimutuel tax revenues rose from FY 1965 until the inception of the Florida Lottery, FY 1987 (Source: State of Florida Governor's Office of Planning and Budgeting, 1993).

The lottery as a share of total state revenues

Nationwide, state lotteries are reported to generate an average ranging from 2% (Mikesell & Zorn, 1988) to 4% (Clotfelter & Cook, 1991) of state-earned revenue. Year-to-year and state-to-state variations are considerable. For FY 1985, the range extended from a low of only 0.09% of own-source state revenues in Vermont, to a high of 3.72% of state revenues in Maryland (Mikesell & Zorn, 1988). The expansion of the state lottery as a revenue source has coincided with a national trend for state lottery revenues to plateau or decline. Calkins (1992), DeBoer (1986, 1990), and Mikesell (1987) established that the rapid growth of state lotteries in the early 1980s was not present in the early 1990s.

While 23 state lotteries are earmarked for education, there is evidence that higher education is not better funded in lottery states during the early 1990s, when there was an inverse relationship between the existence of a state lottery and the size of the state allocation to higher education. Summers (1993) compared state lottery data with Hines' (1992) analysis of state funding for higher education in FY 1993 relative to FY 1991. The higher education systems with the greatest gains in funding were found among the group of 15 states without a state lottery. The highest-grossing state lotteries were operated in states which allocated budget reductions to higher education.

Supplantation

The tendency of lottery dollars to supplant general revenue funds was recognized by Weinstein and Deitch (1974) 2 decades ago; they concluded that the supplantation of general revenue funds with lottery dollars was a more probable outcome than the enhancement of available resources for any given beneficiary. Wyett (1991) found that earmarking lottery proceeds for a specific beneficiary led to the supplantation of general revenue dollars. Wyett viewed supplantation as being particularly problematic with lottery funds, because a state lottery is an elastic, unstable, and unpredictable source of revenue. When lottery revenues decline, the supplanted general revenue funds are not readily restored to the lottery beneficiaries.

Clotfelter and Cook (1989) argued that supplantation is inevitable, despite measures like earmarking which are intended

to control the use of revenues, because of the fungible nature of the budget process. Borg and Mason (1988) found that Illinois Lottery profits, earmarked for public education, supplanted general revenue funds that would have been allocated to education. Stark, Honeyman, and Wood (1991) found that Florida Lottery funds supplanted a portion of general revenue funds in support of elementary and secondary education in FY 1989. MacManus and Spindler (1989) predicted that the true beneficiaries of the Florida Lottery were city and county governments, because the supplanted state education funds would be redistributed to transportation, criminal justice, and other services that often burdened city and county governments.

Redistribution

In redistribution, one revenue source may supplant, or suppress, another. Borg, Mason, and Shapiro (1993) extended the work of Clotfelter and Cook (1989) in modeling the extent to which lottery ticket purchases suppress revenues from other state tax sources. Borg et al. determined that for every dollar of state lottery revenue generated, from 15¢ to 23¢ of other tax revenue was lost. Further, when a state had earmarked the lottery proceeds for a designated beneficiary, redistribution occurred among the state-supported agencies as a consequence of the rising or falling tides of the lottery fortunes. They found the strongest suppression effect in states without a state income tax, with a relatively great reliance on sales and excise tax revenues, and with a high-revenue state lottery. These findings

suggested a strong suppression effect by Florida's lottery profits on own-source revenues, and a redistribution of expenditures from the general revenue fund. The suppression of Florida parimutuel taxes that corresponded with the Florida Lottery years of operation was shown in Figure 1.

Earmarking Lottery Proceeds

The issue of earmarking should be examined in light of the actual benefits that accrued to the beneficiary. Borg and Mason (1990) found that earmarking actually led to a decline in fiscal support for the beneficiaries, accompanied by a rise in the erroneous perception by the general public that these agencies were being well funded. They reported that earmarking lottery proceeds led to demonstrated supplanting in all states studied since 1968. They concluded that the lottery itself did not hurt educational funding; rather, "What can be inferred is that the downward trends in the states' total revenues are the culprits," (p.297). Earmarking was shown by Clotfelter and Cook (1989) to have had the greatest fiscal impact where the lottery funds constituted a large portion of an agency's total budget; otherwise, because of the inherent fungibility of the budgeting process, earmarking had little real effect on the beneficiary's financial status.

The Florida Education Lotteries

The Florida Lottery was earmarked to serve as a revenue stream to fund public education: the K-12 school districts, 28-

Table I. Per-student funding history of Florida's community colleges, FY 1981-1993, expressed in current dollars.

FY	GRF	LOTTERY	STU FEES	TOTAL	LOT AS % OF TOTAL
1981	2,027	0	632	2,659	
1982	2,036	0	650	2,685	
1983	2,348	0	662	3,010	
1984	2,572	0	708	3,280	
1985	2,678	0	721	3,398	
1986	2,826	0	761	3,587	
1987	2,893	137	798	3,829	3.6
1988	2,936	242	807	3,984	8.2
1989	2,816	448	807	4,071	11.0
1990	2,640	468	847	3,956	17.7
1991	2,262	667	994	3,924	17.0
1992	2,249	638	1,084	3,971	16.1
1993	2,302	620	1,124	4,046	15.3

Source: State of Florida Board of Community Colleges, 1993, p. 17.

Notes: All sums expressed per FTE. FY 1981-1991 represents actual data. FY 1992 represents estimated data based on appropriations and the most current reductions to General Revenue at time of press. FY 1993 represents estimated data based on Legislative Appropriations as of 7/01/93, and estimated student fee revenues.

member community college system, and 9-member state university system. Florida is one of only 7 states without a state income tax; the others are Texas, South Dakota, and Washington, which like Florida are lottery-operating states; Alaska and Wyoming, where revenue is earned from taxes on the extraction of natural

resources; and Nevada, where the bulk of state general revenue is generated through excise taxes on casinos and other forms of parimutuel gambling (Fisher, 1988). In Florida, the state sales, tourism, and corporate taxes and user fees are the primary sources of general revenue (Wood & Honeyman, 1992). Florida voters, like those in other states, had routinely rejected referenda that attempted to instigate new forms of state revenue, or new taxes. Floridians were protected through their state constitution from both a personal income tax and a lottery. Floridians voted to amend the constitution to permit a lottery but continued to resist the concept of a state income tax (Karcher, 1989).

According to the advertising campaign used to lobby for passage of the amendment, and written into the enabling legislation, the citizens were told that the Florida lottery would generate enhancement funds for improvements in education (Clotfelter & Cook, 1989; FL St. §24.102.1). The enabling legislation stated, further, that the lottery would not be used to substitute, or replace, general revenue funds (§24.102.2.a). The Florida lottery was required to retain at least 38% of the gross revenue from the sale of lottery tickets and other earned revenue for deposit in the Educational Enhancement Trust Fund, as specified in §24.121.2. Since FY 1991, Florida lottery profits have been allocated so that 70% flow to the school districts, and the community college system and the SUS each receive a 15% share. Table 1 shows the funding history of the Florida community

colleges since FY 1981, reflecting the erosion of the general revenue allocation as the lottery gained momentum, and the overall decline in the funding per FTE despite the increasing size of the lottery allocations. Despite the additional support of lottery funds since FY 1987, Jones and Brinkman (1990) reported that the Florida community colleges were under-funded and over-stressed.

Florida's lottery profits may be expected to fall in the mid-1990s based on two different factors: the maturity of the Florida lottery and the implementation of the Georgia lottery Prior to 1993, none of the states contiguous to Florida operated a lottery. The presence of contiguous co-lottery states was found to be negatively correlated with lottery revenues (Mikesell & Zorn, 1987). In the first sales week, the Georgia Lottery broke a six-year-old national record for first-week lottery sales, which was set by the Florida Lottery in 1987. Further, any suppression from the Georgia Lottery should be exacerbated by the impending maturity of the Florida Lottery. Mikesell (1987) predicted a revenue decline after a lottery age of 10 years, which the Florida Lottery will attain in 1997.

During the first 3 years of lottery funding, the Florida general revenue allocation to education dropped by 5% (Karl, 1991). Meanwhile, as a proportional source, lottery revenues at first rose, then declined, and finally reached a plateau. The proportion of total state educational support comprised of lottery dollars more than doubled from FY 1988 to FY 1989;

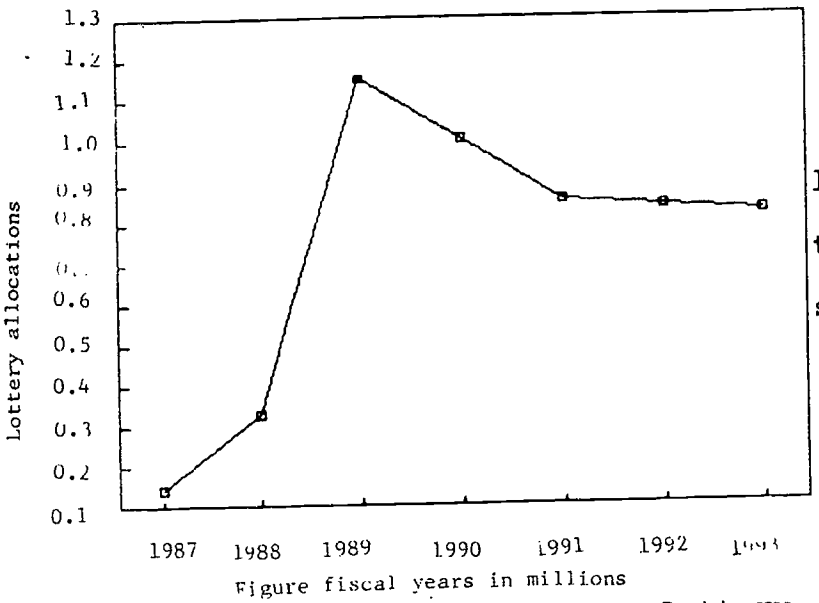

Figure 2 Florida Lottery allocations to education, FY 1987 - FY 1993, shown in current dollars (Source: State of Florida Department of Education, 1992, 1993).

lottery dollars comprised less than 4% of the total FY 1988 state allocation to education (Allen, 1991) and comprised 9.5% of the total educational allocation in FY 1989 (State of Florida Department of Education, 1990b). In FY 1992, about 8% of the state's total allocation for education at all levels was comprised of lottery dollars (State of Florida Department of Education, 1992, 1993). The fluctuations in the size of the Florida Lottery allocations to all systems of education are shown in Figure 2.

The lottery allocations in Florida shifted rapidly from entirely categorical to, at the community colleges, entirely unrestricted. Lottery dollars were used in FY 1990 for subsistence at the community colleges during the three mid-year reductions in the state allocation. The community college system had initially used lottery dollars for such tangible enhancement projects as system-wide library automation and expanded library collections at the individual colleges, but in FY 1990 the college presidents lobbied for removing categorical restrictions on lottery funds in order to meet the crisis caused by budget cuts (Maxwell, 1990). In FY 1991, the Florida legislature

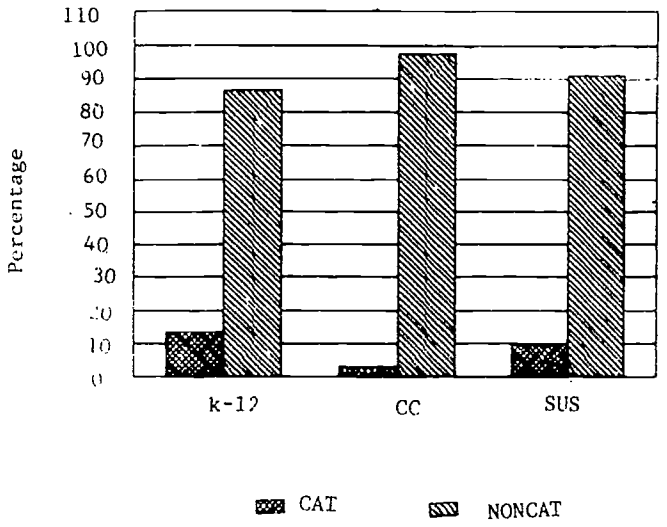

Figure 3. Percentages of FY 1992 lottery allocations, categorical & noncategorical (Source: State of Florida Department of Education, 1993, p. 4).

implemented a policy to permit the governing bodies of the K-12 school districts, community colleges, and state university system (SUS) to decide internally the method with which most of the lottery allocation would be awarded (State of Florida Department of Education, 1992). In FY 1992, the Florida legislature placed categorical spending restrictions on about 14% of the K-12 lottery allocation, about 10% of the SUS lottery allocation, and less than 3% of the community college allocation. In FY 1993, the lottery allocation to community colleges was entirely noncategorical. Figure 3 graphically depicts the proportional differences between the K-12, community college (CC), and SUS educational systems in the lottery allocations for FY 1992 that were categorical awards.

DATA SOURCE AND METHODOLOGY

The purpose of this study was to determine whether a state-supported agency benefitted fiscally from being a designated recipient of a portion of the profits from a state-operated lottery. The Florida Lottery and the Florida system of 28 community colleges were used to address four separate questions.

Regression models were constructed to examine each of the four questions proposed.

Impact. The first question was whether the start of the Florida Lottery coincided with a change in the expenditure trends of the Florida community colleges.

Supplantation. The second question was whether Florida Lottery funds either supplanted or enhanced state general revenue funds expended in support of community college education.

Redistribution. The third question was whether the addition of the lottery as a revenue source resulted in a change, or redistribution, in the proportion of community college expenditures funded through state sources.

Categorical/noncategorical. The fourth question concerned the proportion of lottery dollars that were released to community colleges in the form of a categorical allocation versus lottery dollars that flowed without spending restrictions into the Community College Program Fund (CCPF). The goal was to determine whether the percentage of categorical restriction correlated with the total amount of state funds allocated to the community colleges.

Data

This archival study used fiscal expenditure and enrollment data for each of the 28 Florida community colleges, and general revenue and lottery allocation data from the State of Florida Department of Education (State of Florida Department of Education 1990a, pp. 3, 6; 1990b, pp. 3-4, 25; 1991, pp. 3-4, 7; 1992, pp.

3-5, 8; 1993, p. 1; State of Florida Department of Education Division of Community Colleges 1974, pp. 48, 70-74; 1975, pp. 32, 61-65; 1976, pp. 30, 56, 58-61; 1977, pp. 34, 63, 65-72; 1978, pp. 34, 62, 64-71; 1979, pp. 32, 60, 62-69; 1980, pp. 33, 63, 65-74; 1981, pp. 11, 42, 44-53; 1982, pp. 11, 42, 44-53; 1983, pp. 44-53; 1984, pp. 11, 42, 44-48; 1985, pp. 11, 39, 41-45; 1986, pp. 14, 52, 54-58; 1987, pp. 13, 73, 75-79; 1988a, 1988b, pp. 15, 75, 77-81; 1989, pp. 15, 77, 79-83; 1990a, 1990b, pp. 13, 79, 81-85; 1991a, 1991b, 1991c; 1992a, pp. 28-29, 76-77; 1992b; 1993a, 1993b).

The data consisted of State of Florida lottery and nonlottery allocations to the community colleges, TOTAL E&G, and weighted FTE for each of the 28 Florida community colleges for every fiscal year under study. Expenditure data was shown by Harrell and others to be appropriate to the study of community college finance (Harrell, 1992; Harrell, Honeyman, Wattenbarger, & Wood, 1993). Data for each institution, rather than the system as a whole, was used to increase the total number of data points, and, therefore, the power of the statistics (Mason & Bramble, 1989).

Fiscal Years (FY) 1972 through 1993 were selected for all calculations except those involving community college year-end expenditures. For community college expenditure data, FYs 1972 through 1991 were used, because data from subsequent years were unavailable at the time of this study. FY 1972 was chosen as the starting year for the data used in this study, because FY 1972

was the first full year of completion of the State of Florida Master Plan, which implemented the full system of 28 community colleges (State of Florida Department of Education, 1990).

Method

This archival study analyzed three conditions using regression over time (Chatterjee & Price, 1991; Cook & Campbell, 1979). The first condition was the expenditure trends of the 28 state-supported community colleges in Florida. The second condition was the allocation of State of Florida general revenue and lottery funds to community colleges. The third condition was the percentage of each year's lottery allocation that was categorical, rather than noncategorical.

Linear regression models examined the four central questions concerning the effect of the Florida lottery on community college finance. Forward-selection stepwise regression was used to isolate the variables which were correlated with the fiscal effect that lottery dollars have had on the Florida community college system.

Tolerance and the variance inflation factor (VIF) were used to detect data redundancy, or collinearity of the independent variables (Chatterjee & Price, 1991). A Type I error probability level (α) of less than or equal to .05 was selected to support each decision to reject or fail to reject the null hypothesis (Blalock, 1972). Nondirectional hypotheses were used because the goal was to detect any change in trend, whether positive or negative. The squared multiple correlation coefficient (R^2) was

used to further assess the adequacy of fit of the regression models. To interpret the magnitude of effect size, the following parameters were used:

1. A large effect was an R^2 greater than or equal to .15.
2. A medium effect was an R^2 greater than or equal to .06.
3. A small effect was an R^2 greater than or equal to .01.
4. An R^2 less than .01 was not significant (Cohen, 1977, pp. 284-288).

Variables

Following is a listing of the abbreviations and definitions of each of the variables included in this study.

CAT - the percentage of the lottery allocation that was a categorical, or restricted, award.

CC - community college - a categorical variable ranging from 1 to 28, corresponding to the alphabetical listing of the community colleges.

FTE - full time equivalent, a continuous variable referring to the weighted unit of measure used to describe community college enrollment.

FTEX12 - all-source Funds I and II (Total E&G) expenditures per FTE, including state and nonstate sources of revenue.

GRF - general revenue fund allocation.

GRFFTE - general revenue fund dollars per FTE.

LOT - the college's annual lottery allocation.

LOTFTE - lottery dollars per FTE.

LT - a nominal, dummy variable coded 0 for nonlottery years, 1 for lottery years.

STATFTE - the sum of general revenue fund and lottery dollars, expressed per FTE.

TOTAL E&G - all-source Education and General (Funds I and II) expenditures.

TOTSTATE - the sum of state general revenue fund and lottery dollars.

YR - fiscal year, a continuous variable ranging from 72 (FY 1972-73) to 93 (FY 1993-94).

Impact

The first question addressed in this study was whether there was a relationship between the fiscal status of the Florida community colleges and the use of the Florida Lottery as a revenue source. The variables used in this model controlled for differences in FTE, because of fluctuating enrollments within each community college over the 22 years of this study, as well as the major differences in annual FTE across the 28 community colleges. The model used to detect the impact of lottery dollars on community college expenditures:

$$FTEX12 = \beta_0 + \beta_1 GRFFTE + \beta_2 STATFTE + \upsilon$$

$$H_o: \beta_2 = 0 \qquad H_a: \beta_2 \neq 0$$

The null hypothesis stated that there was no difference between nonlottery and lottery years in community college Funds I and II (E&G) expenditures per weighted FTE (McDowall, McCleary, Medinger, & Hay, 1980).

Supplantation

State of Florida nonlottery, general revenue allocations to each community college (GRF) for FY 1972 through FY 1993 were regressed against two independent variables, and an interaction term: the continuous variable fiscal year (YR); the dummy variable LT, denoting whether or not lottery funds were a community college revenue source for that year; and an interaction term, YR*LT, which was used to measure whether the relationship between YR and GRF was different at different levels of LT (Kleinbaum, Kupper, & Muller, 1988). The model:

$$GRF = \beta_0 + \beta_1 YR + \beta_2 LT + \beta_3 YR*LT + \upsilon$$

$$H_o: \ \beta_3 = 0; \qquad H_a: \ \beta_3 \neq 0$$

The null hypothesis stated that the existence of the Florida Lottery had no effect on GRF allocations to the community colleges. The alternative hypothesis stated that the lottery corresponded with a change in GRF. If GRF dollars were supplanted, β_3 would be less than 0; if GRF dollars were enhanced, β_3 would be greater than 0.

A second analysis of supplantation used forward-selection stepwise linear regression. The purpose was to learn which variables were predictive of State of Florida all-source allocations to community colleges (TOTSTATE). Predictor variables used for this analysis were LOT, GRF, CAT, and LT.

Redistribution

A forward-selection stepwise linear regression approach was used to examine the question of the redistribution of funding

sources for the community colleges. The dependent variable was FTEX12. The predictor variables were GRFFTE, LOTFTE, and STATFTE.

The Effect of Categorical Lottery Allocations

The final question concerned whether the proportion of the lottery allocation that was a categorical award was correlated with a change in the all-source state allocation to the community colleges. The annual state allocations from both lottery and nonlottery funds (TOTSTATE) per community college were regressed against the percentage of each year's lottery allocation that was categorical (CAT), and the dummy variable LT, denoting whether or not lottery funds were a community college revenue source for that year. The model:

$$TOTSTATE = \beta_0 + \beta_1 CAT + \beta_2 LT + \beta_3 CAT*LT + \upsilon$$

$$H_0: \beta_3 = 0; \qquad H_a: \beta_3 \neq 0$$

The null hypothesis (H_0) stated that CAT was not predictive of TOTSTATE. If H_0 were rejected, a positive β_3 would indicate a positive correlation between CAT and TOTSTATE; higher values of CAT were associated with more state funds. Likewise, a negative β_3 would indicate a negative correlation between TOTSTATE and CAT; higher values of CAT were associated with lower state allocations.

ANALYSIS OF THE DATA

The data were examined for outliers, or data points which were overly influential, using Cook's Distance, DFITS, and standardized residual statistical methods, and scatter and

residual plots (Chatterjee & Price, 1991). No outlying data points were found that were excessively influential; therefore, none were removed. The scatter and residual plots supported the five assumptions of linearity of each of the regression models; hence, no higher-order terms were used.

Table II. Descriptive statistics of all variables.

VARIABLE	COUNT	MEAN	MINIMUM VALUE	MAXIMUM VALUE	STAND DEV
CC	616	n/a	1	28	n/a
YR	616	n/a	72	93	n/a
FTE	616	5720	391	35828	6042
LT	616	n/a	0	1	n/a
LOT	616	968761	0	22241388	2426117
LOTFTE	616	150	0	786	246
CAT	616	0	0	94%	22%
GRF	616	10816104	395244	87941772	12464390
GRFFTE	616	2029	784	4787	924
TOTSTATE	616	11784866	395244	103538111	14139740
STATFTE	616	2179	784	5177	1057
FTEX12	560	3160	966	7410	1410
TOTAL E&G	560	16969650	527304	164546530	20711470

Descriptive statistics for all variables are shown in Table 2. The smallest variance, as reflected in the standard deviation scores, was found for the variables which controlled for differences in FTE: LOTFTE, GRFFTE, STATFTE, and FTEX12. There was a considerable range in the values for FTE, TOTSTATE, and

TOTAL E&G, a fact which reflected the considerable variation in the size and relative wealth of the 28 community colleges. In general, the smallest colleges tended to have the highest expenditures per FTE (FTEX12), while the largest colleges had the lowest FTEX12 values. This reflected the economies of scale that were present in large, urban institutions, and the greater operating costs per student served for the smallest, rural colleges.

Impact

Table 3. ANOVA table and parameter estimates for the relationship between the lottery and the fiscal status of the Florida community colleges.

$$FTEX12 = \beta_0 + \beta_1 GRFFTE + \beta_2 STATFTE + \upsilon$$

$$H_o: \beta_2 = 0; \quad H_a: \beta_2 \neq 0$$

Analysis of Variance

Source	Degrees of freedom	Sum of squares	Mean square	F Value
Model	2	800781497	400390749	302.04
Error	608	805968428	1325606	
Total	610	1606749925		

Parameter Estimates

Parameter	Estimate	Standard error	F	P>F
Intercept	380.90	114.53	11.06	.0009
β_1	3.46	.24	205.12	.0001
β_2	-2.08	.21	96.73	.0001

$R^2 = .42$

The first question addressed in this study was whether a correlation existed between the fiscal status of the community

colleges and the use of a state lottery as a revenue source. The results indicated that the addition of lottery funds as a revenue source correlated with a change in community college expenditures. The sign of β_2 was negative, meaning that community college expenditures were negatively correlated with lottery dollars; larger lottery allocations were associated with lower community college expenditures. The addition of the Florida Lottery as a revenue source coincided with a downturn in the expenditures of the Florida community colleges. The model multiple correlation coefficient (R^2) was .42, a large effect size. The ANOVA source table and parameter estimates are shown in Table 3.

Supplantation

The second question concerned whether the existence of the Florida Lottery correlated with either supplantation or enhancement of general revenue fund allocations to community colleges. The results supported the decision to not reject H_0; there was no evidence of an interaction effect. The supplantation ANOVA source table and parameter estimates contained in Table 4.

A decision was made to test the data with an alternative version of the model, without the interaction term (Chatterjee & Price, 1991; Kerlinger & Pedhazur, 1973). An additive model was developed:

$$GRF = \beta_0 + \beta_1 YR + \beta_2 LT + \upsilon$$

$$H_o: \beta_2 = 0; \quad H_a: \beta_2 \neq 0$$

Table 4. ANOVA table and parameter estimates for the supplantation model $GRF = \beta_0 + \beta_1 YR + \beta_2 LT + \beta_3 YR*LT$.

$$GRF = \beta_0 + \beta_1 YR + \beta_2 LT + \beta_3 YR*LT + \upsilon$$

$$H_o: \beta_3 = 0; \quad H_a: \beta_3 \neq 0$$

Analysis of Variance

Source	Degrees of freedom	Sum of squares	Mean square	F Value
Model	3	1.26	4.20	31.00
Error	612	8.29	1.36	
Total	615	9.55		

Parameter Estimates

Parameter	Estimate	Standard error	T for H_0: Parameter=0	P>|T|
Intercept	-48456339	10402320	-4.66	.0001
β_1	718059	131478	5.46	.0001
β_2	56166165	38847308	1.45	.1487
β_3	-622930	436064	-1.43	.1537

$R^2 = .13$

The hypotheses tested for a change in the Y intercept over the two conditions of LT, which would provide an indication that GRF was either supplanted or enhanced. Again, the data supported the decision to not reject the null hypothesis. Thus, this study did not find evidence that either supplantation or enhancement of general revenue dollars had occurred to a statistically significant extent. The results are shown in the supplantation ANOVA source table and parameter estimates contained in Table 5.

Over the period of the lottery years, FY 1987 through FY 1993, there was graphic evidence that supplantation had occurred

Table 5. ANOVA table and parameter estimates for the supplantation model $GRF = \beta_0+\beta_1 YR+\beta_2 LT$.

$$GRF = \beta_0 + \beta_1 YR + \beta_2 LT + \upsilon$$

$$H_o: \ \beta_2 = 0; \quad H_a: \ \beta_2 \neq 0$$

Analysis of Variance

Source	Degrees of freedom	Sum of squares	Mean square	F Value
Model	2	1.23	6.16	45.41
Error	613	8.32	1.36	
Total	615	9.55		

Parameter Estimates

Parameter	Estimate	Standard error	T for H_0: Parameter=0	P>|T|
Intercept	-43982570	9928119	-4.43	.0001
β_1	661429	125466	5.27	.0001
β_2	725410	1708982	.42	.6714

$R^2 = .13$

in the community college allocation, as shown in Figure 4. It was thus concluded that the issue of general revenue fund supplantation warranted further examination.

Stepwise regression involving additional variables was used to investigate supplantation, using the dependent variable TOTSTATE, and the independent variables LOT, GRF, CAT, and LT. At the $\alpha = .05$ level of significance selected for this study, three variables entered the model: GRF, LOT, and CAT; however, CAT contributed nothing to the R^2. The model selected:

$$TOTSTATE = \beta_0 + \beta_1 GRF + \beta_2 LOT + \beta_3 CAT + \upsilon$$

The partial R^2 for GRF was .98, a statistic that reflects the almost total reliance of the State of Florida on the general revenue fund to finance community colleges. When viewed against the 22 years of the completed Florida system of community colleges, the share of lottery profits that was awarded to community colleges accounted for,

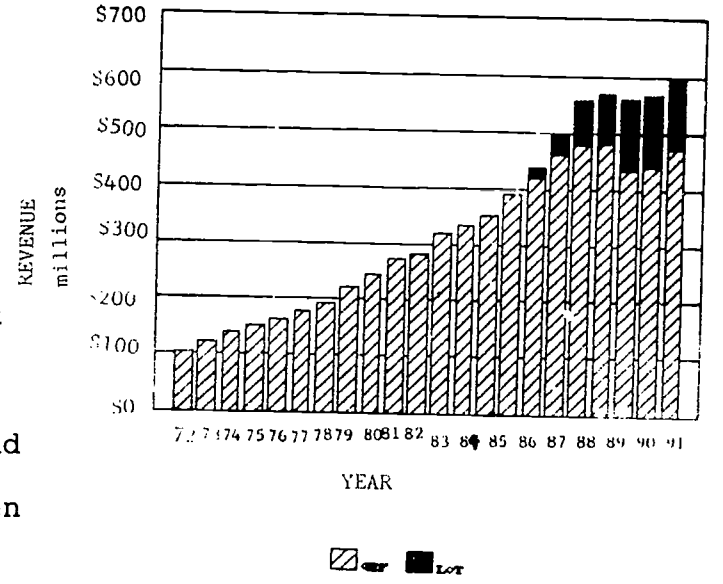

Figure 4. Supplantation of State of Florida general revenue dollars with Florida Lottery dollars allocated to the community college system.

Table 6. Stepwise analysis of supplantation.

Summary of Forward Selection Procedure for Y = TOTSTATE, X = LOT, GRF, CAT and LT

Step	1	2	3
Variable entered	GRF	LOT	CAT
Number in	1	2	3
Partial R^2	.98	.02	.00
Model R^2	.98	1.00	1.00
F Value	34551		
P>|F|	.0001	.0001	

Model selected:
$TOTSTATE = \beta_0 + \beta_1 GRF + \beta_2 LOT + \beta_3 CAT + \upsilon$

at best, 2% of the variation in the total state allocation. General revenue dollars continued to comprise the greatest share of the state allocation; in comparison, the magnitude of the lottery allocation was essentially insignificant. The parameter estimates are shown in Table 6.

Redistribution

The third question concerned the varying proportions of total community college expenditures that were comprised of state general revenue funds. The goal was to determine whether the community colleges had been either better or less well funded by the State of Florida since the introduction of the Florida Lottery as a revenue source. A forward-selection stepwise regression was conducted using FTEX12 as the dependent variable. The independent variables were three variables that controlled for differences in FTE: GRFFTE, LOTFTE, and STATFTE. The model selected:

$$FTEX12 = \beta_0 + \beta_1 GRFFTE + \beta_2 STATFTE + \beta_3 LOTFTE + \upsilon$$

The R^2 was a large .50, of which .42 was explained by GRFFTE. The partial R^2 for STATFTE was .08, a medium effect size. The partial R^2 for LOTFTE was .005, which was not a statistically significant effect size. The results of the analysis are displayed in Table 7.

Figure 5 is a visual illustration of redistribution, using aggregate data for the community college system. Figure 5 shows that the difference between Total E&G funds expended by the community colleges, and state general revenue allocations, has

Table 7. Stepwise regression for the dependent variable FTEX12.

Summary of Forward Selection Procedure for Y = FTEX12, X = GRFFTE, LOTFTE and STATFTE.

Step	1	2	3
Variable entered	GRFFTE	STATFTE	LOTFTE
Number in	1	2	3
Partial R^2	.419	.080	.005
Model R^2	.419	.498	.504
F Value	438.4	96.7	6.6
P>|F|	.0001	.0001	.0103

Model selected:
$FTEX12 = \beta_0 + \beta_1 GRFFTE + \beta_2 STATFTE + \beta_3 LOTFTE + \upsilon$

increased over time. The gap widened as GRF reached a plateau and, later, declined after the introduction of the Florida Lottery in FY 1987, while Total E&G increased. The colleges thus are shown to have been increasingly reliant on nonstate sources of revenue from FY 1987 through FY 1991.

The Effect of Categorical Lottery Allocations

The final question was whether the extent to which lottery funds were allocated as categorical awards, with funding restrictions, was correlated with the total extent of state support for community colleges. The model for this equation:

$$TOTSTATE = \beta_0 + \beta_1 CAT + \beta_2 LT + \beta_3 CAT*LT + \upsilon$$

$H_0: \beta_3 = 0; \quad H_a: \beta_3 \neq 0$

The null hypothesis (H_0) stated that the percentage of the lottery allocation that was categorical (CAT), rather than

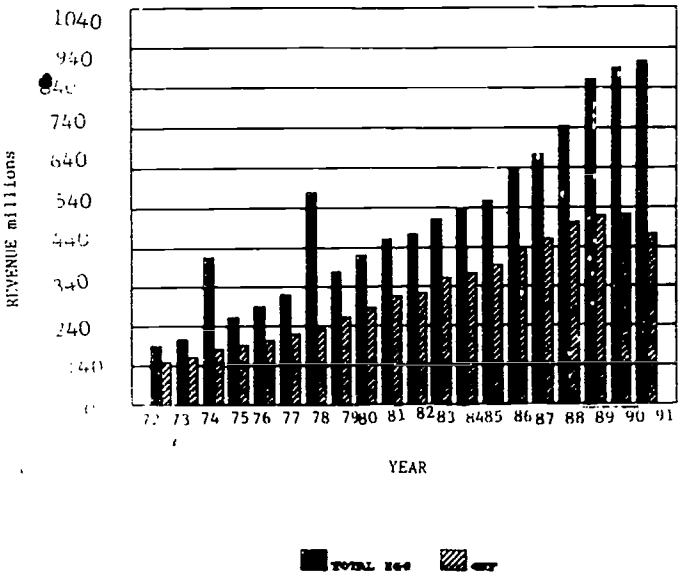

Figure 5. Redistribution of funding sources for Florida's community college system, FY 1972 - FY 1991.

noncategorical, was not predictive of state support. The alternative hypothesis (H_a) stated that CAT was predictive of TOTSTATE.

It was not possible to obtain a parameter estimate for β_3 because CAT and LT were confounded variables: if LT equaled 0, then

Table 8. The effect of categorical vs. noncategorical lottery allocations, the model TOTSTATE = $\beta_0 + \beta_1$CAT + β_2LT + β_3CAT*LT.

$$TOTSTATE = \beta_0 + \beta_1 CAT + \beta_2 LT + \beta_3 CAT*LT + \upsilon$$

$$H_0: \beta_3 = 0;\ H_a: \beta_3 \neq 0$$

Analysis of Variance

Source	Degrees of freedom	Sum of squares	Mean square	F Value
Model	2	1.65	8.23	47.13
Error	608	1.06	1.75	
Total	610	1.23		

Parameter Estimates

Parameter	Estimate	Standard error	T for H_0: Parameter=0	P>|T|
Intercept	8329775	648594	12.84	.0001
β_1	65424	44160	1.48	.14
β_2	8143599	2235030	3.64	.0003
β_3	0	*	*	*

R^2 = .13

CAT equaled 0 (Kleinbaum, Kupper, & Muller, 1988). The results of the analysis are shown in Table 8. The model was significant at the $\alpha = .05$ level. The F value was a large 47.13, and the R^2 was .13.

A decision was made to remove the interaction term and recalculate the statistics. The adjusted model and hypotheses were

$$TOTSTATE = \beta_0 + \beta_1 CAT + \beta_2 LT + \upsilon$$

$$H_0: \beta_2 = 0; \qquad H_a: \beta_2 \neq 0$$

Table 9. The effect of categorical vs. restricted lottery allocations, the model $TOTSTATE = \beta_1 CAT + \beta_2 LT$.

$$TOTSTATE = \beta_0 + \beta_1 CAT + \beta_2 LT + \upsilon$$

$$H_0: \beta_2 = 0; \; H_a: \beta_2 \neq 0$$

Analysis of Variance

Source	Degrees of freedom	Sum of squares	Mean square	F Value
Model	2	1.67	8.35	48.13
Error	613	1.06	1.73	
Total	615	1.23		

Parameter Estimates

Parameter	Estimate	Standard error	T for H_0: Parameter=0	P>|T|
Intercept	8370292	642559	12.87	.0001
β_1	65424	44011	1.49	.14
β_2	8203082	2226415	3.68	.0002

$R^2 = .14$

The data for this second analysis supported the decision to reject H_0 at the $\alpha = .05$ level of significance. The model using CAT and LT was found to be predictive of TOTSTATE. The sign of β_1 was positive; therefore, the greater the value of CAT, the greater the value of TOTSTATE. The R^2 was .14, a medium effect size. The ANOVA source table and parameter estimates are shown in Table 9.

Clearly, GRF was highly predictive of TOTSTATE; general revenue dollars were shown in the supplantation stepwise analysis to explain 98% of the total variance of TOTSTATE. For a more sensitive review of the other predictor variables, a stepwise analysis was conducted that did not include GRF as an independent variable. The model that was selected:

$$TOTSTATE = \beta_0 + \beta_1 LOT + \beta_2 CAT + \beta_3 LT \upsilon$$

The strength of the association between LOT and TOTSTATE became more pronounced, as shown in Table 10. The F value for the model containing only LOT as an independent variable was a huge 724.0. The full model R^2 was a large .59, of which the partial R^2 for LOT was .54. The partial R^2 for CAT was .04; and for LT, .01. These are both small, but significant, effect sizes. Thus, when used in conjunction with LOT, CAT was predictive of TOTSTATE.

DISCUSSION OF RESULTS AND CONCLUSIONS

The introduction of the Florida Lottery as a community college revenue source coincided with a downturn in the funds expended at the community colleges. Lottery funds supplanted

Table 10. Stepwise analysis of the effect of categorical versus noncategorical allocation of lottery funds.

Summary of Forward Selection Procedure for Y = TOTSTATE, X = LOT, CAT and LT

Step	1	2	3
Variable entered	LOT	CAT	LT
Number in	1	2	3
Partial R^2	.54	.04	.01
Model R^2	.54	.58	.59
F Value	724.0	54.7	17.9
P>|F|	.0001	.0001	.0001

Model selected:
$TOTSTATE = \beta_0 + \beta_1 LOT + \beta_2 CAT + \beta_3 LT + \upsilon$

general revenue dollars; however, lottery dollars comprised such a small percentage of the state allocation that their influence on community college funding was minimal. Over the 22 years of data in this study, the general revenue fund explained 98% of the variance in State of Florida support for the community colleges, while the lottery explained only 2%. There was evidence of redistribution in the funding sources of the Florida community colleges. There was an increasing gap between the per-FTE expenditures at the community colleges and the state allocation per FTE, despite the addition of a state-operated lottery as a revenue source. It was shown that the extent to which the lottery allocation was categorical correlated with the size of the state all-source allocation to the community colleges. The college

finances fared somewhat better in years when the categorical percentage of the lottery allocations was greatest.

Based on the results of this study, it was apparent that the addition of a state lottery as a revenue source had a definite, adverse effect on the fiscal status of one beneficiary. The Florida Lottery coincided with a downturn in community college finance, in three different ways. The first way involved supplantation of general revenue dollars. The second way involved redistribution of funding sources. The third way involved the extent to which categorical restrictions were placed on the lottery allocation. When the lottery allocation was made without categorical spending restrictions, the community colleges received a lower total allocation from all state revenue sources.

The findings of this study supported the conclusions of other researchers that high-grossing state lotteries that were earmarked for public education were found in states with an otherwise eroding financial support for public education (Hines, 1992). This study also supported the findings of others who found that being earmarked for lottery profits did not lead to better financial support for the beneficiary (Jones & Brinkman, 1990; Karl, 1991).

The Florida Lottery was proposed as a way to generate new funds for public education without implementing a new tax, which was the rationale adopted in other states as well (Allen, 1991; Borg & Mason, 1990; Clotfelter & Cook, 1989; Mikesell & Zorn, 1987; Wyett, 1991). This study found an actual deterioration in

the overall fiscal status of one lottery beneficiary after the lottery was added as a revenue source.

This study did not support the findings of Stark (1991) and Stark, Honeyman, and Wood (1991), who found statistically significant evidence of supplantation of general revenue dollars when lottery funds became a revenue source for Florida's K-12 system. This study provided evidence that lottery dollars supplanted general revenue dollars awarded to community colleges, but the results were not statistically significant. This study further showed that lottery and general revenue allocations, combined, comprised a decreasing share of community college support. Because the lottery funds to community colleges were so small relative to general revenue funds and other funding sources, no statistically significant evidence of supplantation was found. In FY 1992, lottery funds comprised about 8% of the total state allocation to education in Florida. This study found that, over the 22 fiscal years of this study, lottery dollars explained only about 2% of the variation in the state allocation to community colleges. In the year-to-year view, however, lottery dollars comprised as much as 17% of the state allocation to community colleges (Table 1).

Finally, the community colleges as a group are increasingly reliant on nonstate revenue sources. A state system of community colleges is designed for horizontal equity, so that citizens across the state may receive an equivalent education at any of the institutions. A question which needs to be addressed is

whether the horizonal equity of the Florida community college system has been eroded as a result of the search for nonstate revenue sources. The question must address the consequence of the redistribution of the state's contribution relative to other funding sources.

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