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Does Student Aid Affect College Enrollment?

New Evidence on a Persistent Controversy

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ABSTRACT

Numerous econometric studies, based mostly on cross-section data, have found substantial effects of student aid on college enrollment. These effects have been hard to discern in historical data. We report here on an econometric analysis of a time-series of college enrollment and net cost data for white students disaggregated by income and sex. We find significant net cost effects on enrollments of low-income students. This raises serious doubts about the hypothesis that federal student aid has failed to affect enrollment patterns in U.S. higher education significantly over the past two decades.

Certainly no aspect of the evaluation of federal student aid has attracted more attention than the question of its impact on enrollment levels and patterns. Although it is important to note that affecting enrollment is not the whole justification for student aid, the aim of promoting the enrollment of less affluent students has been central to the case for federal student aid throughout its history.[1] Despite quite substantial empirical efforts, the issue of the size - and even the existence - of these enrollment effects remains unsettled. A major difficulty is that controlled econometric studies of student behavior, the best of which have relied on cross-section data on individuals, lead us to expect substantial effects of student aid, but these effects have been hard to discern in the historical time series.

Before the introduction of the Basic Educational Opportunity Grant program in 1974 (later renamed Pell), total federal spending on need-based grants to undergraduate students amounted to less than a third of a billion in 1982 dollars and accounted for less than three percent of total tuition revenue. By 1980, need-based federal grants were over 3.5 billion 1982 dollars, and the Pell program accounted for more than 80 percent of that total. These federal grants to students amounted to 29 percent of total tuition revenue of U.S. colleges and universities in 1980. Over the same period, federally subsidized loans for college grew from around $3 billion to over $5.5 billion 1982 dollars. Yet, despite this dramatic change in financing, enrollment rates in 1980 were, if anything, slightly below those earlier in the decade. After 1980, the grant programs experienced little real growth, subsidized loans continued to increase, and enrollment rates have remained fairly steady.[2] The relative stability of overall enrollment rates in the light of substantial fluctuations in federal spending on student aid is an empirical puzzle and a challenge for public policy.

This paper reports on a disaggregated econometric analysis of time series evidence on U.S. higher education enrollments and net costs over the 1974-1984 period. Section I contains a brief

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[1] A broader framework of goals for federal student aid is suggested in McPherson (1988).

[2] More detailed examination of the federal student aid programs and their changing funding levels is provided in McPherson and Schapiro (1990). Enrollment data are from the Bureau of Labor Statistics, Current Population Survey. Student aid data are from Gillespie and Carlson (1983) and Lewis (1988).

literature review. Section II presents our regression results and compares them to findings from cross-section studies. Section III contains a summary and conclusions.

I. The literature

A great many studies over the years have attempted to estimate the impact of price or net cost of education on students' postsecondary education decisions.[3] A minority of those studies have tried to measure specifically the effect of student aid on enrollment decisions, with the rest focusing on the impact of tuition price. Although the studies differ widely in data sources and estimation techniques, they tend to agree on two main points. First, student decisions to enroll in college respond positively, and non-trivially, to price cuts or aid increases. Second, decisions about where to attend school also respond non-trivially to changes in the relative prices of schooling alternatives.

Perhaps the best and most influential of these studies is Manski and Wise (1983). According to a simulation based on their estimates of college choices of a sample of 1972 high school graduates, the Pell grant program as it existed in 1979-80 should have left enrollments 21% higher than they would have been without Pell, with the increases heavily concentrated at two-year colleges and among students from lower income families. The predicted response by income group varies greatly: there is a 59% enrollment increase for low-income students, a 12% increase for middle-income students, and only a 3% increase for upper-income students.[4]

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[3] A number of able surveys of this literature exist. A recent one, which provides references to many of its predecessors, is Leslie and Brinkman (1987). See also Leslie and Brinkman (1988).

[4] Several key features of the Manski-Wise findings on the access effects of Pell grants are corroborated by other studies. Estimates developed by Leslie and Brinkman (1988) from their analysis of seven econometric studies (including Manski and Wise) suggest that the Pell program as it existed at the end of the 1970's should have raised lower income enrollment by between 20 and 40%, implying an increase in total enrollment of approximately 10 to 20 percent. They point out that these results indicate that roughly 500,000 to 1 million low-income students and approximately 400,000 middle-income students are enrolled in college because of grant aid. The mid-point of the total of these figures is slightly over 1 million students, approximately 16% of all full-time students. For more detailed discussion of the relevant literature, see McPherson and Schapiro (1990).

Further econometric support for the claim that financial aid influences enrollment is provided by the many studies that estimate the effect of tuition variations on enrollment behavior. Although changes in grant awards may have somewhat different effects on enrollments from tuition changes that have equivalent effects on net price, the size of those effects and their variation across income classes should be similar. It is therefore reassuring to note that most studies of enrollment demand find significant positive effects of tuition reductions on enrollment levels, and find that the enrollment effects (in percentage terms) are larger for lower-income students.[5] Leslie and Brinkman (1987) find that a consensus of the studies they survey puts the effects of a price cut of $100 (1982-83 academic year dollars) on national enrollment of 18-24 year-olds at about 1.8 percent. On the assumption that a price cut has equal effect with a grant increase of the same magnitude, the Pell program as it existed in 1979 should have boosted total enrollment by approximately 10 to 15 percent, compared to what enrollments would have been in that year without the program.[6] This is roughly comparable to the findings of studies like Manski and Wise that try to measure the effect of grant aid directly.

These econometric findings create an expectation that it should be possible to detect effects of changing student aid policy in the national time series data. However, a number of observers have noted the absence of any obvious change in national enrollment trends in response to changes in federal student aid policies and funding levels, for example Zemsky (1988) and Leslie and Brinkman (1988). Moreover, some of the most careful econometric studies (including Manski and Wise) rely on data collected before the introduction of the Pell program in 1974. Inferences from these estimates to behavior in the post-Pell period may be suspect if the

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[5]See Leslie and Brinkman (1987) for a comprehensive survey. For an analytically oriented survey that examines the relation between income levels and price responsiveness of enrollment, see McPherson (1978).

[6]This assumes an average Pell award of about $1000 1979 dollars per recipient and that about half of freshmen should have been eligible for Pell under 1979 rules. Actual enrollment rates of high school graduates grew by about 5 percent from 1973 to 1979. Thus these estimates imply that in the absence of the Pell program the enrollment rate would have fallen by between 5 and 10 percent over this time period. One potential explanation for such a decline is the sharp drop in the earnings differential between college and high school graduates over this period. See Katz and Murphy (1990).

introduction of a major new federal program changed the structure of the aid-enrollment relationship.

W. Lee Hansen (1983), in a highly influential study, has suggested that it is useful to look at relative enrollment rates of more and less affluent students in gauging the impact of federal student aid, on the grounds that changes over time in federal student aid are the most obvious factor that should affect time-series changes in the enrollment behavior of these two groups differentially. He used Current Population Survey (CPS) data in examining enrollment rates for students from families with dependents eighteen through twenty-four for two time periods - 197l/1972 and 1978/ 1979. He then calculated the ratio of the enrollment rates of below- to above-median-income families in the two periods and found that the ratios declined for whites, blacks, men and women. When a weighted average was taken for whites and blacks and for men and women, the ratios again fell between the two periods.

The conclusion from this study is well known among researchers and policy makers: "These data force one to conclude that the greater availability of student financial aid, targeted largely toward students from below-median-income families, did little, if anything, to increase access. The results certainly do not accord with expectations that access would increase for lower-income dependents relative to higher-income dependents." (Hansen, 1983, p. 93)

There are some obvious limitations in interpreting this kind of snap-shot comparison at two points in time. First, year-to-year fluctuations may obscure underlying trends, so that increasing the number of years in the comparison is helpful. Second, controlling for variation in other factors that affect the demand for enrollment is not possible with this method. Such factors as overall economic conditions, changes in rates of return to higher education, and changes in opportunity costs of college enrollment (as produced, for example, by changes in the draft law) may influence the comparison if these factors affect different income groups differently. Finally, this kind of comparison is not responsive to changes over time in the targeting of student aid. During the 1970's, the total amount of federal student aid not only increased substantially, but also changed significantly in its distribution. A larger fraction of available aid was targeted at middle and upper income students in the late 1970's, tending to obscure any effect on differential enrollment rates that might have occurred.

II. Analysis

Summarizing the above discussion, researchers have found significant econometric evidence of a rather large enrollment response to differences in student aid. However, despite substantial variation in aid over time, enrollment responses are not readily detected in national time-series data. Earlier analysts have, however, failed to subject time-series data from the post-Pell era to econometric analysis.[7]

Our analysis is based on enrollment, tuition and financial aid data for population subgroups over the 1974-1984 period. The enrollment data are from the Current Population Survey; the tuition and financial aid data are from an annual survey of college freshmen, The American Freshman survey.[8] The individual data points in our regressions are an enrollment rate and an average net cost for a particular population subgroup (e.g., white women, incomes below $10,000) in a particular year.[9] We employ three such data sets: one for public institutions, one for private institutions, and one that averages over public and private institutions. Investigations with the data suggest that small samples in the CPS data for blacks and other races preclude time series

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[7]Several time-series econometric studies of enrollment demand exist, but these pre-date the introduction of the Basic Grants program. See Hight (1975), Campbell and Siegel (1967) and Hoenack and Weiler (1975). Results from these studies are on the whole comparable to the findings of cross-section econometric studies.

[8]The data on tuition, student aid and income in the American Freshman Survey are self-reported by students. No doubt this self-reporting introduces measurement error in these variables. Nevertheless, we use these data for several reasons. First, they are the only consistently reported annual data on net costs and income. Second, there is no reason to expect the biases in student reporting of income and costs to vary systematically over time. Hence, while the data may be inaccurate as estimates of these values in any particular year, their variation over time should be more reliable. Finally, we know of no reason why any systematic biases in these variables should be correlated with variations in the dependent variable (the enrollment rate). Note that the dependent variable is obtained from a data set that is collected separately from these independent variables.

[9]We define “net cost” as the difference between tuition (the “sticker price”) and the subsidy value of student aid. Net cost is measured in thousands of 1978-79 dollars. The subsidy value is calculated on the assumption that subsidized loans obtained by students from the federal government provide a fifty percent subsidy. Several attempts to estimate the present value of student loan repayment streams put the implicit subsidy at approximately half the face value of the loan. See Bosworth et al (1987) and Hauptman (1985).

analysis at the level of disaggregation we employ. Therefore, the results we report here are limited to whites only. In the regressions that report on enrollments at public and private institutions separately, we are forced to exclude data for 1980 because mistakes made by the Bureau of the Census in coding the 1980 CPS make it impossible to distinguish public from private enrollment. Thus, regressions using the combined data set are based on 66 observations (three income groups, two genders, and 11 years). Regressions for public and for private institutions have 60 observations (three income groups, two genders, and 10 years). Table 1 contains descriptive statistics.

Table 2 presents regression results in which enrollment rates averaged across public and private institutions are explained by time-series changes in net cost and other variables. Given the nature of the data set, heteroskedasticity is a natural worry. Therefore, for all of the regression results that follow, estimated asymptotic covariance matrices were computed under the assumption of heteroskedasticity in order to calculate the standard errors.” These adjusted standard errors were used in all tests of significance. The regression equation includes a time trend along with a dummy variable for gender (1 for females and 0 for males) and dummy variables for the medium-income group (income between $10,000 and $30,000 in 1978 dollars) and for the high-income group (income over $30,000). In addition, the equation includes terms which interact income with the net cost variable, the gender dummy and the time trend. NETCSTHI interacts NETCOST with the dummy variable representing high income. NETCTMED interacts NETCOST with the medium-income dummy variable. TIMEHI and TIMEMED interact TIME with the income dummies, while FEMHI and FEMMED interact FEMALE with the income dummies.

We have the following expectations about the signs of the coefficients. The NETCOST coefficient, which measures the responsiveness of enrollment to net cost for the low-income group, should be negative. The coefficient on NETCTMED measures the difference between the responsiveness of low- and middle-income students’ enrollment to changes in net cost. Cross-

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[10] For the derivation of this technique, see White (1980). The correction of the standard errors does not produce major changes from the results obtained without the correction.

section studies generally indicate that higher income students are less responsive to price than lower income students. We therefore expect the coefficient on NETCTMED to be positive, muting the negative effect of net cost on enrollment relative to that of lower income students. For the same reason we expect the coefficient on NETCSTHI to be positive (and larger than that on NETCTMED).

As Table 2 shows, all the estimated coefficients on these net cost variables are significant with the expected sign.[11] Increases in net cost lead to lower enrollment for the low-income group, and the interaction effects are positive and significant, showing that this effect is smaller for middle-and upper-income students. In fact, the coefficients on the net cost-income interaction terms are larger in absolute value than the coefficient on net cost, implying that the predicted effect of net cost on enrollment in this equation is positive (and statistically significant, as the Chi-square tests show) for middle- and upper-income students.[12] It is possible that this unexpected result for more affluent students is explained by a supply rather than a demand effect: a positive relationship between enrollment and net cost may come about because (particularly in the 1980's) a strong demand among middle- and upper-income students for higher education has caused colleges and universities to raise their prices.[13]

The negative coefficient on net cost implies that for lower-income students a $100 net

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"In order to ensure that all predicted values lie within the unit interval, we ran regressions using a logistic transformation of the dependent variable. These results did not differ substantively from those reported below. Further, an examination of the residuals from the regressions we present below did not provide any evidence of autocorrelation within particular economic/demographic groups. (Note that standard tests for auto-correlation are inappropriate given the panel nature of the data set.)

12The values of the intercept, MED and HIGH dummies imply that for all three income groups the intercept terms are positive but are a declining function of income. This may seem surprising, since we expect enrollment rates to vary positively with income. However, the presence of a negative net cost effect for the low income group coupled with positive effects for the other income groups means that predicted levels of enrollment evaluated at means in fact increase with income.

13Because enrollment rates are substantially higher for middle- and high- income students than for low-income students, and because these students generally pay higher net costs than low-income students, it is more plausible to expect a supply response to the behavior of middle- and high-income students than to that of the low-income group. Ideally, we could test this conjecture about supply side effects by including demand-shift variables in a multi-equation analysis; this is, however, beyond the scope of the present study.

cost increase results in an enrollment decline of about .68 percentage points, which is about a 2.2 percent decline. We noted above that Leslie and Brinkman find a consensus in the literature that a $100 increase in net cost reduces enrollment rates by 1.8 percent. Converting our estimates in 1978-79 dollars to the 1982-83 equivalent relied on by Leslie and Brinkman, we find that a $100 cost increase results in a 1.6 percent enrollment decline for low-income students. The Leslie-Brinkman figure is in effect averaged over all income groups. As noted earlier, most studies find higher price responsiveness among lower income students. Manski and Wise's results, for example, suggest that a $100 net cost increase for low income students (1979 dollars) leads to a 4.9% decline in enrollment.[14] The result here, while lower than the Manski-Wise estimate, seems broadly consistent with typical cross-section findings. The important point is that our econometrically controlled time series analysis supports the view that changes in costs lead to changes in enrollment for low-income students.

We turn next to the coefficients relating to gender and to the time trend. The coefficient on the FEMALE variable indicates that over the 1974- 1984 period the enrollment rate for women tended to be about 5 percentage points higher than that for men. The fact that the variables interacting FEMALE with income are close to zero and statistically insignificant indicates that this gender effect is constant across income groups. (Chi-square values show that the net effect of the female variable on enrollment is positive and significant for all three income groups.) The time trend is negative and significant for the low income group, suggesting a tendency for the enrollment propensity for that group to fall over time, but the coefficient is quite small, with the estimated rate of decline being just .36 percentage points per year. There is no significant time trend for middle-income students, but there is a significant negative time trend of .66 percentage points per year for high-income students. The negative time trends noted here and below may indicate the presence of unmeasured variables tending to lower enrollment propensities over time.

Tables 3 and 4 examine private enrollment and public enrollment separately. This breakdown is particularly important because of a potential problem with the endogeneity of the

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[14] This coefficient is computed from information in Manski and Wise's Tables 7.2 and 7.4.

price variable in the equations that average over sectors: if, for example, the number of students choosing to attend private institutions (which are generally higher priced) rises, this choice will be reflected in higher average net cost. Distinguishing between sectors does not completely eliminate this problem, since there is price variation within each sector, but it reduces the problem substantially. The structure of the equations is similar to that in Table 2, which combines public and private enrollment, except that the net cost variable (NETCSTPU and NETCSTPR, respectively) and the net cost-income interaction terms (NTCSTMPU and NTCSTHPU for public middle- and high-incomes and NTCSTMPR and NTCSTHPR for private middle- and high-incomes) are specific to the sector whose enrollment is being explained. It would be natural to test for the significance of variables measuring cross-price effects. Unfortunately, a high correlation between the time series for public and private net costs (on the order of 90 percent) makes it impossible to include both variables in the same equation.

As in the combined equation, all the coefficients in the private and public equations which are significant have the expected sign.[15] For private enrollment, we estimate that a $100 increase in net cost lowers enrollment by about 6.0 percent for low-income students. In the private equation the net cost-middle income interaction is positive and significant, implying that the price responsiveness of students from middle-income families is significantly lower than that of students from low-income families. The overall net effect of cost on private enrollment for middle income families is negative and significant, indicating that, as for low-income students, rises in net cost reduce enrollment for middle-income students as well. The net cost-income interaction variable for students from high-income families is also positive and significant, indicating that they are less responsive to price. However, the overall net effect of cost increases on high-income private enrollment is not significantly different from zero.

Continuing with the results for private enrollment in Table 3, we find that low-income

[15] What about the relative size of the coefficients in the public and private equations? Even taking student aid into account, low-income students on average face higher prices in private institutions. If this implies that private higher education is viewed as a "luxury" by low-income families, then low-income students might be expected to be more sensitive to changes in the price at private than at public institutions. However, we do not find a statistically significant difference between the net cost coefficients for the two sectors in our sample.

women have a significantly higher enrollment propensity than low-income men. Moreover, chi-square values indicate that enrollment propensities in private colleges are also significantly higher for middle-income and high-income women than for men of the same income class. We find a .34 percentage point negative and significant time trend for high-income students. The time trends for the low- and middle-income groups are not significant.

Turning to the results for public enrollment in Table 4, we find that the coefficient on net cost for low-income students has the expected negative sign but is not statistically significant at conventional levels. (The point estimate would imply that a $100 increase in net cost reduces enrollment at public institutions by about 1.6 percent for low-income students.) As expected, the coefficients on the net cost-income interactions are both positive and significant. For both middle- and high-income groups, chi-square values indicate that the net effect of cost on enrollment is positive and statistically significant. Again, the FEMALE variable was positive and significant for each income group. The only significant time trend is a small negative one (-.36 percentage points per year) for low-income students.[16]

III. Summary and conclusions

Our most important and reliable finding is that increases in the net cost of attendance have a negative and statistically significant effect on enrollment for white students from low-income families. Moreover, the magnitude of this net cost effect is reasonable in light of that found in earlier econometric studies of enrollment demand. These results hold for a combined

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[16] In a further refinement of the analysis, we break down net cost into its two components - the published tuition (or sticker price) and the subsidy value of aid (AID). (These results are discussed in detail in McPherson and Schapiro (1990)). This step serves the purposes, first, of shedding light on the relative magnitudes of the aid and sticker price effects and, second, of pushing the data to see if anomalies or inconsistencies surface. When public and private institutions are combined, the two variables have the expected sign -- a higher "sticker price" lowers enrollment and more aid raises enrollment. The sticker price coefficient is significant, but the AID coefficient fails to be significant at the 10% level. As for the magnitudes, the absolute values of the two coefficients are not statistically different from each other. When public and private enrollment are considered separately, we find that for low income students at private institutions, AID has the expected positive sign and is significant; sticker price has the expected negative sign and is also significant; again, the coefficients do not differ significantly from each other. For low-income students at public institutions, the two signs are as expected but are not statistically significant.

sample of public and private institutions as well as for a subsample limited to private institutions.[17] (For the public sample, the sign was as expected but not significant.) It is not possible to use our data set to test for net cost effects for blacks or other racial-ethnic groups because of excessive sampling variation in the estimated enrollment rates for these students.

Our finding that the time-series and cross-section results for low-income white students are consistent is an important first step in resolving a longstanding controversy in the literature.[18] These results derive from the fact that we have systematically related changes in net cost to changes in enrollment, rather than simply looking at enrollment levels at two points in time. It is important to appreciate that these findings for low-income students would be obscured in an analysis that aggregated over income groups, since our evidence suggests (in line with the findings of cross-section studies) that the behavior of these income groups is quite different.

We found a very different picture when we looked at the behavior of more affluent students. We found no evidence in these data that increases in net cost inhibited enrollment in these income groups. In fact, for the upper-income group, there was a fairly consistent positive effect of net cost on enrollment, which may be interpreted as indicating a tendency for high enrollment demand among affluent students to lead to higher net costs for those students. For middle-income students, we found that net cost did not have a consistent effect on enrollment in our equations.

The above analysis indicates that changes in the net price facing lower-income students have significant effects on their enrollment behavior, An important policy issue, however, is

[17] When net cost is broken down into its two components, tuition and subsidy value of aid, the results generally continue to support the finding that the enrollment decisions of low-income students are sensitive to the costs they face.

[18] A referee raised the interesting point that the post-1980 behavior of several important variables influencing enrollment differed substantially from their behavior before 1981. In particular, tuition rose quite rapidly after 1980, and the growth of federal student aid slowed substantially. Might the difference between our results and Hansen's simply result from our inclusion of post-1980 data that did not exist at the time of Hansen's study? We examined this possibility by estimating our equations for the 1974- 1980 time period. The results were essentially quite similar to those for the full period, although some of the coefficients were less precisely estimated. An attempt to obtain estimates for the 1981-1984 period was unsuccessful, an outcome we attribute to the severe limitation on degrees of freedom.

whether changes in federal aid in fact wind up changing net cost. If, for example, increases in federal aid led to decreases in the amount of aid awarded by institutions or to increases in tuition, the effect of aid on net cost would be muted. This issue deserves more systematic treatment than we can give it here. However, preliminary findings from a study of the effects of student aid on institutions that the present authors have underway (McPherson, Schapiro and Winston (1988) and (1989)) suggest that these potential offsetting effects may not be empirically important. The time series evidence on net cost further suggests that periods when federal aid is generous coincide with periods when the net cost facing low-income students is lower. This supports the view that these potential offsets are not an important factor.

In sum, a more careful analysis of the historical data has raised serious doubts about the hypothesis that federal student aid has failed to affect enrollment patterns in U.S. higher education significantly over the past two decades, Our assessment indicates that time-series evidence on the enrollment behavior of low-income white students is quite consistent with the many cross-section estimates of aid effects in the literature. While further analysis seems warranted, it is nonetheless clear that policy makers must carefully consider potential enrollment effects when determining aid policy.

TABLE 1

DESCRIPTIVE STATISTICS

	N	mean	std. dev.	min.	max.
		All Institutions			
enrollment rate	66	0.427	0.117	0.246	0.672
netcost ($000)	66	3.056	0.693	1.974	4.623
		Private Institutions			
enrollment rate	60	0.111	0.05 1	0.037	0.228
netcstpr ($000)	60	4.126	0.949	2.622	6.336
		Public Institutions			
enrollment rate	60	0.318	0.070	0.194	0.46 1
netcstpu ($000)	60	2.460	0.433	1.657	3.197

TABLE 2

COMBINED SAMPLE

DEP VARIABLE: ENROLLMENT RATE

ROOT MSE	0.023	R-SQUARE	0.97
DEP MEAN	0.427	ADJ R-SQ	0.96
C.V.	5.3	N	66

PARAMETER ESTIMATES

VARIABLE	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0
INTERCEP	0.461	0.050	9.29[a]
NETCOST	-0.068	0.023	-2.95[a]
TIME($x10^{-3}$)	-3.645	1.755	-2.08b
FEMALE	0.049	0.009	5.56[a]
MED	-0.143	0.063	-2.25[b]
HIGH	-0.210	0.073	-2.86[a]
NETCSTHI	0.155	0.028	5.53[a]
NETCTMED	0.091	0.027	3.36[a]
TIMEHI($x10^{-3}$)	-3.005	2.773	-1.08
TIMEMED($x10^{-3}$)	2.917	2.096	1.39
FEMHI	-0.001	0.013	-0.09
FEMMED	-0.000	0.011	-0.02

TEST:	NETCOST+NETCSTHI=O	CHISQ VALUE:	32.57[a]
TEST:	NETCOST+NETCSTMED=O	CHISQ VALUE:	2.85'
TEST:	TIME+TIMEHI=O	CHISQ VALUE:	9.59[a]
TEST:	TIME+TIMEMED=O	CHISQ VALUE:	0.40
TEST:	FEMALE+FEMHI=O	CHISQ VALUE:	22.86[a]
TEST:	FEMALE+FEMMED=O	CHISQ VALUE:	53.02[a]

[a] significant at 0.01 level
[b] significant at 0.05 level
[c] significant at 0.10 level

TABLE 3

PRIVATE INSTITUTIONS

DEP VARIABLE: ENROLLMENT RATE

ROOT MSE	0.014	R-SQUARE	0.94
DEP MEAN	0.111	ADJ R-SQ	0.93
C.V.	12.4	N	60

PARAMETER ESTIMATES

VARIABLE	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0
INTERCEPT	0.165	0.019	8.47[a]
NETCSTPR	-0.036	0.006	-6.27[a]
TIME($x10^{-3}$)	0.487	0.551	0.88
FEMALE	0.016	0.004	3.80[a]
MED	-0.028	0.027	-1.02
HIGH	-0.069	0.054	-1.29
NTCSTHPR	0.052	0.012	4.23[a]
NTCSTMPR	0.023	0.008	2.95[a]
TIMEHI($x10^{-3}$)	-3.880	2.022	-1.92[c]
TIMEMED($x10^{-3}$)	0.156	0.802	0.20
FEMHI	0.012	0.009	1.28
FEMMED	0.005	0.005	0.99

TEST:	NETCSTPR+NTCSTHPR=O	CHISQ VALUE:	2.22
TEST:	NETCSTPR+NTCSTMPR=O	CHISQ VALUE:	6.65[a]
TEST:	TIME+TIMEHI=O	CHISQ VALUE:	3.04[c]
TEST:	TIME+TIMEMED=O	CHISQ VALUE:	1.22
TEST:	FEMALE+FEMHI=O	CHISQ VALUE:	11.46[a]
TEST:	FEMALE+FEMMED=O	CHISQ VALUE:	45.11[a]

[a] significant at 0.01 level
[b] significant at 0.05 level
[c] significant at 0.10 level

TABLE 4

PUBLIC INSTITUTIONS

DEP VARIABLE: ENROLLMENT RATE

ROOT MSE	0.021	R-SQUARE	0.93
DEP MEAN	0.318	ADJ R-SQ	0.91
C.V.	6.56	N	60

PARAMETER ESTIMATES

VARIABLE	PARAMETER ESTIMATE	STANDARD ERROR	T FOR HO: PARAMETER=0
INTERCEPT	0.327	0.059	5.50[a]
NETCSTPU	-0.038	0.034	-1.12
TIME(x10^{-3})	-3.646	1.960	-1.86[c]
FEMALE	0.029	0.009	3.19[a]
MED	-0.179	0.072	-2.47[b]
HIGH	-0.256	0.076	-3.37[a]
NTCSTHPU	0.149	0.038	3.91[a]
NTCSTMPU	0.098	0.038	2.59[b]
TIMEHI(x10^{-3})	3.209	2.350	1.37
TIMEMED(x10^{-3})	2.631	2.246	1.17
FEMHI	-0.007	0.013	-0.58
FEMMED	0.001	0.011	0.12

TEST:	NETCSTPU+NTCSTHPU=O	CHISQ VALUE:	43.17[a]
TEST:	NETCSTPU+NTCSTMPU=O	CHISQ VALUE:	13.84[a]
TEST:	TIME+TIMEHI=O	CHISQ VALUE:	0.11
TEST:	TIME+TIMEMED=O	CHISQ VALUE:	0.86
TEST:	FEMALE+FEMHI=O	CHISQ VALUE:	5.73[b]
TEST:	FEMALE+FEMMED=O	CHISQ VALUE:	21.63[a]

[a] significant at 0.01 level
[b] significant at 0.05 level
[c] significant at 0.10 level