

Who benefits from a lottery-funded college subsidy?
Evidence from the New Mexico Success Scholarship

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Abstract:

This paper investigates the enrollment, retention and academic performance effects of NM Success, a merit-based lottery-funded scholarship established in 1997, using student-level data from the University of New Mexico. While we find a staggering 56 per cent increase in University enrollments, the program pays out four subsidies for every new student attracted to college. Less academically able, higher income students have the greatest enrollment response. The program has not improved retention, and students have responded to its performance requirements by reducing their credit hours. Held to overall enrollment objectives, the program is truly a Success, but it fares less well when held to the standards of economic efficiency and distributional equity.

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1. Introduction

Public subsidies to higher education from both Federal and State governments in the United States take many and varied forms (McPherson and Schapiro, 1998). Traditionally, the Federal government subsidizes individual students and their families directly through grants, loans and tax credits, whereas State governments subsidize students and families indirectly by providing places in public colleges and universities at tuition rates below actual cost. State governments also offer merit- and means-based financial aid awards to students, but these have been smaller in number and value than the Federal programs.

Recently, some States have augmented the menu of higher education subsidies with scholarship programs funded by State Lotteries. Georgia's HOPE scholarship program is perhaps the most noteworthy, since it started in 1993, and has spent over \$658 million on 358,000 students (Bugler, Henry and Rubenstein, 1999). Cornwell *et al.* (2000) and Dynarski (2000) have studied enrollment effects of this program. Florida adopted a similar program in 1997, the same year that students attending state institutions in New Mexico began receiving lottery funds under the New Mexico Lottery Success Scholarship (NM Success) program. To the middle of 2000, the New Mexico program had made 35,637 awards totaling \$25.1 million (Montoya-Real 2000).¹ The federal government has also introduced its own HOPE program, in the form of tax credits and tax-deferred savings. These more recent programs have yet to be evaluated empirically.

Dynarski (2000) finds a large enrollment response to Georgia's HOPE program, particularly among middle- and upper-income recipients of the scholarship who would not otherwise have been shut

1. Montoya-Rael, NM CHE, 2000. The number of awards overstates the number of recipients as the figure provided

out of college by inability to pay. She also finds that HOPE's high school GPA requirement is one element that shuts out low-income students. Unlike other lottery-funded college scholarship programs, the NM Success program demands no minimum high school performance and requires a lower college GPA to retain the award. Moreover, New Mexico is a substantially poorer state, with a correspondingly lower ability to fund public subsidies for education: New Mexico ranks 48th in 1998 per capita income whereas Florida ranks 19th and Georgia ranks 23rd.² Thus, in addition to supplying another "data point" to better understand the impact of lottery funded subsidies, our study looks at how these subsidies work with lower academic requirements and when the eligible population is, as a whole, poorer.

We offer two human capital models to predict enrollment effects of the scholarship program. The key characteristics of students in these models are academic ability and capacity to finance educational investments. We model the decision to attend college and the decision to stay in the home state to attend college. From these models we derive testable hypotheses about the gross impacts and distribution of impacts on enrollment. In particular, we hypothesize that less academically able students, regardless of income, will be drawn into college, and that rich, more able students will be diverted back to New Mexico from out-of-state institutions. We also consider how the particular requirements of the NM Success program should affect college grades and persistence in college.

Using detailed administrative student data from the University of New Mexico (UNM), the largest post-secondary institution in the state, we conduct a "differences" analysis of student cohorts who began as freshmen at UNM before and after the implementation of the Success program. We find

is the simple sum of the number of awardees per semester.

2. According to The Statistical Abstract of the United States:1999, per capita income for Florida was \$22,939 in 1998, in Georgia it was \$25,020, and \$19,936 for New Mexico.

that the program had significant impacts on enrollments at UNM and elsewhere in the state. UNM enrollments as a proportion of high school graduates rose more than fifty per cent in response to the program. However, we estimate that close to one-half of the enrollment response came from students who were diverted from attending out-of-state or other in-state colleges. Four students received scholarships for every one new enrollee, a ratio similar to that estimated for Georgia's HOPE scholarship (Dynarski 2000). As with the HOPE scholarship, NM Success disproportionately attracted middle-class students. Because the program imposes a low academic requirement, these new students were also less academically capable, compared with pre-program students. Nevertheless, there is some evidence that students attracted to UNM through the Success program had higher college grades than pre-program students, in part, apparently, because they registered and completed fewer credit hours.

2. The New Mexico Lottery Success Scholarship

The rhetoric surrounding the promotion and writing of the legislation for the Success program emphasized the need to develop and retain educated workers in the relatively poor state of New Mexico. The legislature obtained popular support for the lottery because revenues after paying administrative costs were to fund education in the state, divided between capital improvements at state-run educational institutions and the Success scholarship program. The legislation establishing the Lottery Tuition Fund and the related scholarship program clearly states the intention to provide a level of financial support to New Mexico high school graduates (or equivalent) to defray the costs of tuition at public postsecondary institutions in New Mexico, thereby keeping New Mexicans "at home" and to

encourage students to complete a four year degree in a timely manner.³

NM Success is a broad based scholarship program with very minimal criteria for eligibility and is intended to supplement other forms of financial aid awarded to students. In contrast to the HOPE program, and Florida's Bright Futures program, the NM Success program is not awarded for high school performance. The award is given automatically to any enrolling New Mexico resident who has graduated from a New Mexico high school (or obtained the equivalent diploma) in the semester prior to enrolling for at least 12 credit hours (full time) in college and has a minimum 2.5 GPA in the first semester of college. It covers the cost of tuition at the chosen New Mexico post-secondary institution but no other costs (i.e., student fees are not covered). State programs in place before NM Success already awarded grants exceeding tuition to the most needy students. Given that students may not receive more than one full tuition award from state agencies, for the poorest students the NM Success offers no additional aid.⁴ Since the students only become eligible in their second semester of the first year of college, most institutions provide a "bridging" scholarship, using the same criteria for eligibility as the Success scholarship but in UNM's case also requiring a minimum high school GPA. UNM provides these funds through its internally funded "Bridge to Success Scholarship" (Bridge).

The NM Success scholarship requires students to maintain minimum academic standards while enrolling continuously as a full-time student, however, as mentioned before, the standards are lower than other programs—a 2.5 GPA compared to HOPE's 3.0. The award is renewed each semester to a maximum of eight semesters. There are provisions for postponing the award, for transferring institutions and maintaining the award, and for receiving an award after becoming ineligible for other aid as well as a

3. New Mexico Administrative Code (NMAC) 5.7.20 describes the Success Scholarship Program.

4. Financial aid information obtained from UNM's financial aid office. In practice, this institutional set-up is similar to the Georgia HOPE program's provision that students receive an award only for tuition that is not defrayed by a

probationary period during which the recipient can re-establish eligibility. The program imposes a higher academic standard for students to continue receiving the awards than are imposed on students at the same institutions not receiving the Success scholarship. For example, at UNM, freshmen must maintain only a 1.7 GPA, and more advanced students must maintain a 2.0 GPA.

3. Program Response: Magnitude and Distribution

To predict enrollment effects of NM Success we use the basic human capital model of investment in education (Schultz, 1963; Becker, 1964, Mincer, 1974). An individual chooses an educational investment—a combination of institution, degree, study program and financing sources—to maximize the expected net benefit accruing from the investment. The first order conditions of this optimization problem require that expected marginal benefits of schooling (**MB**) be set equal to the expected marginal costs (**MC**).⁵ Most simply, let the **MB** of educational investments as represented by discounted future earnings be a function of perceived academic ability. Let the **MC** of the investment depend on the direct and indirect costs of attaining that education, and on the capacity of the individual to finance those expenditures.

Using a similar strategy to Dynarski (2000), we can better specify these relationships using the following equations.⁶ Expected benefits, as measured by the discounted present value of future earnings, are a function of educational investments, **S**, according to the function

federal Pell Grant (Cornwell, *et al.* 2000, Dynarski 2000).

5. Marginal benefits of schooling are more uncertain than marginal costs. Costs are immediate and highly predictable, whereas benefits depend on many uncertain interdependent factors (such as major, completion, labor market conditions, individual career goals, etc.) and lay some distance in the future. In addition, low-income students may have limited information about professional salaries, and thus have lower expected benefits from school (Betts 1996).

6. Our model differs from Dynarski's in that we treat ability as a schooling multiplier on the benefit side. In addition, we assume that the student is the decision-maker. This assumption gives a natural interpretation to the proposition that students from wealthier families face lower interest rates: they do so because a larger portion of their schooling

$$(1) \quad \mathbf{B}(\mathbf{S}) = \alpha + a[\beta\mathbf{S} - \mathbf{S}^2],$$

where the coefficients α and β are normalized to make the coefficient on \mathbf{S}^2 unity. Schooling investments in terms of years are augmented by individual ability, a . As a is a multiplier, those with a higher ability measure benefit more from a given schooling investment than those with a lower value. Ex ante, though, students form their expectations of benefits based on their perceived ability, a^* . For simplicity at this stage, we assume a and a^* are highly correlated. We do consider the possibility of an imperfect correlation, however, since through the cohort effect, for example, average students in low-quality schools may over-estimate their ability. Differentiating with respect to \mathbf{S} to obtain \mathbf{MB} yields:

$$(2) \quad \mathbf{MB} = \mathbf{B}'(\mathbf{S}) = a\beta - 2a\mathbf{S}.$$

Marginal costs of education are calculated as net tuition, $\mathbf{C} - \mathbf{A}$, where \mathbf{A} is financial aid and \mathbf{C} is the full cost of education, plus the costs of financing the expense at interest rate r . It is proposed that r is a function of parental and student income, \mathbf{Y} , such that $r'(\mathbf{Y}) < 0$. We sign this derivative negative since the opportunity cost of borrowed funds increases as the amount borrowed increases, and higher income students borrow less, especially if transfers from their parents increase with family income. So

$$(3) \quad \mathbf{MC} = (\mathbf{C} - \mathbf{A})(1 + r(\mathbf{Y}))$$

Setting $\mathbf{MB} = \mathbf{MC}$ describes the first order conditions of the optimal educational investment, \mathbf{S}^* .

$$(4) \quad \mathbf{S}^* = \frac{b}{2} - \frac{1+r(\mathbf{Y})}{2a}(\mathbf{C} - \mathbf{A})$$

Since enrolling in a college represents a significant step to increase \mathbf{S} this equation can be used to predict the effect of the variables and parameters on the probability of attending college. For example, increases in perceived academic ability, financial aid and income unambiguously raise the probability of

expenses are paid by their parents.

attending college. Since the Success program lowers $(C - A)$ in equation (4), our first, and most obvious, hypothesis emerges.

H1: The NM Success scholarship should increase enrollments of New Mexico high school graduates at state schools.

Since theory cannot tell us how large the response will be, determining the size of the enrollment response is of primary interest in testing this hypothesis.

Looking at selected partials of the optimal solution, we also obtain:

$$(5) \quad \frac{\partial^2 \mathbf{S}^*}{\partial a \partial \mathbf{Y}} = \frac{1+r(\mathbf{Y})}{2a^2} (C - A) \cdot r'(\mathbf{Y}) < 0$$

$$(6) \quad \frac{\partial^2 \mathbf{S}^*}{\partial A \partial a} = -\frac{1+r(\mathbf{Y})}{2a^2} < 0$$

$$(7) \quad \frac{\partial^2 \mathbf{S}^*}{\partial A \partial \mathbf{Y}} = \frac{r'(\mathbf{Y})}{2a} < 0$$

Equation (5) tells us that higher ability increases the probability of attending college more for low-income students. Thus we would expect the marginal low-income student enrolling in college to have more (perceived) academic ability.⁷ Equations (6) and (7) indicate that the marginal effect of the scholarship on enrollment will decrease with ability and family income. This means that more able students, who already enjoy a high net benefit from a college education are less likely to be induced to attend college based on direct costs. Similarly, those with richer parents already enjoy relatively low marginal costs, so that direct costs are less binding. The model predicts that the largest enrollment

7. Dynarski (2000; pp. 10-11) also discusses the likelihood that the marginal poor student will be more academically able than the marginal non-poor student and provides some evidence of its validity, although it does not emerge directly from her model. In our data, freshmen whose parents' income was \$40,000 or less were more likely to have high school GPAs over 3.5 and less likely to have high school GPAs under 3.0 than students with higher parental income. They were also, however, statistically more likely to have ACT scores under 20 and less likely to have ACT scores greater than 24. Since our model predicts that enrollment is based on perceived ability, and students who sit for an entrance exam are already seriously considering college, these data are consistent with our model.

response should come from low-income students and those with weak academic backgrounds. Under the plausible assumption that students with low academic ability are disproportionately from low-income families, due to lower previous human capital investments, the model suggests a disproportionate response from low-income, low-ability students (Ganderton, 1992).⁸ But because this particular group of high school graduates were already eligible for existing full tuition scholarships, as mentioned earlier, the NM Success offers no additional reduction in marginal costs for them. The response from this group, therefore, should be small, and due only to the greater publicity surrounding the Success program, compared with other state financial aid programs. With this consideration in mind, we must amend the hypothesis that emerges from directly from the model, and predict that the poorest of low ability students will not react strongly to the incentives provided by NM Success. Our second set of (less intuitive) hypotheses therefore emerges:

H1a: College enrollment of low ability students, regardless of wealth, should increase, but the response should be relatively smaller among poor students.

H1b: College enrollment of high-ability students should not increase.

One of the objectives of the New Mexico program, as is the case in Georgia and Florida, is to provide an incentive for high school students to remain in-state to receive the scholarship funds. Thus in addition to the new enrollment response predicted by the model, we also expect a diversion effect. This occurs because the marginal net benefit of attending in-state institutions rises relative to attending out-of-state institutions. Assuming that students are initially drawn to out-of-state colleges because they offer a higher quality program or a better institution-student match that raises the net marginal benefit, the decision to leave the state requires that

8. Thus in our model $a'(Y) > 0$. Incorporating this relationship in equation (2) and assuming that $a'(Y)$ is small, yields

$$(8) \quad \mathbf{R} = (\Delta\mathbf{q})\mathbf{a}(\beta\mathbf{S}^* - \mathbf{S}^{*2}) - (\Delta\mathbf{C})[1+r(\mathbf{Y})]\mathbf{S}^* > 0$$

where \mathbf{R} is the rate of return to attending college out of state, $\Delta\mathbf{q}$ is the in-state/out-of-state difference in quality of instruction or match and $\Delta\mathbf{C}$ represents the difference in total costs between in-state and out-of-state institutions. It follows that

$$(9) \quad \frac{\partial\mathbf{R}}{\partial\Delta\mathbf{q}} = \mathbf{a}(b\mathbf{S}^* - \mathbf{S}^{*2}) > 0^9 \text{ and}$$

$$(10) \quad \frac{\partial\mathbf{R}}{\partial\Delta\mathbf{C}} = -[1+r(\mathbf{Y})]\mathbf{S}^*$$

This suggests that higher ability (high \mathbf{a}) and high-income (low r) students are more likely to attend out-of-state institutions.¹⁰ An increase in the cost differential due to a state scholarship program will divert some of these students back to in-state institutions. Thus:

H1c: Enrollment of New Mexico students out of state should fall.

H1d: Diversion of students back to New Mexico from out of state should increase the enrollment of richer, more able students in New Mexico.

Hypotheses **H1a**, **H1b** and **H1d** concern the distribution of the public higher education subsidy implicit in the Success program and the relative size of these responses is of particular interest.

Aside from the predicted enrollment effects, the legislated requirements of the Success scholarship should also induce changes in attendance and academic performance. In particular, most students forfeit the scholarship if they delay entry into college, or if they do not enroll continuously. It

the same sign predictions in equations (5) and (7).

9. Recall that the parameter associated with \mathbf{S}^{*2} was normalized to one. Since this parameter is typically very small, β will be very large and the quadratic in \mathbf{S}^* is assumed to be positive.

10. As we discuss in section 5, students who take the SAT are more likely to be considering out-of-state colleges. Those that took both the SAT and ACT had higher high school GPAs (half a standard deviation higher) and ACT scores (2/3 of a standard deviation higher) than those only taking the ACT. They were also less likely to report parental income of \$40,000 or less (by six percentage points). All of these differences are statistically significant. Although students taking the SAT do not capture all of those planning to attend college out of state, this does

follows that

H2a: The NM Success scholarship should induce more students considering college to enroll directly after their high school graduation.

Since more needy students have recourse to state financial aid programs that do not penalize students for stopping out, we expect that retention should improve most for the non-poor. Thus:

H2b: The scholarship should also reduce drop-out rates, especially for wealthier students.¹¹

The Success program also requires that students maintain a 2.5 grade point average. As mentioned earlier, this level of performance exceeds the 1.7 GPA required for good academic standing for freshmen at UNM. Students may therefore study harder to assure they meet the higher standards (Betts 1997). Alternatively, the performance criteria may lead to grade inflation (Dynarski, 2000, p.32; Bugler, Henry and Rubenstein, 1999, p.4). Insufficient time has elapsed to investigate this issue in the New Mexico case, even if the two effect could be separately identified. Nevertheless, the hypotheses to emerge from these considerations are:

H3a: The NM Success scholarship should increase college GPAs.

H3b: The program may induce perverse effects, such as grade inflation, or strategies on the part of students in their choice of courses and hours.

4. Overview of enrollment response and program costs

The New Mexico Success Scholarships were created in 1997. The University of New Mexico and other institutions announced their “bridging” scholarships soon after upon realizing that new students would not receive the Success money until their second semester. The first eligible students graduating

provide some evidence that those who seriously consider leaving are more academically able and disproportionately non-poor.

11. Dee and Jackson (1999) investigate the related, but distinct, topic of what determines scholarship retention for HOPE recipients.

high school in May of 1997 received Bridge scholarships in Fall of 1997 and Success scholarships in the spring semester of 1998. The timing of the scholarship announcements late in the academic year, however, meant that many students had already made plans to attend out-of-state institutions and many others had not taken the entrance exams required by UNM. We therefore treat 1997 as a transition year in our analyses of UNM data. Freshman cohorts for academic years 1994, 1995 and 1996 make up the pre-program reference group. Freshman cohorts for the years 1997, 1998 and 1999 are program cohorts.¹²

We begin with calculations of the state-wide college enrollment rate for public high school graduates in the fall following their graduation using the Integrated Postsecondary Education Data System (IPEDS) for first-time college enrollments and state departments of education for numbers of public high school graduates.¹³ Cornwell et al. (2000) use a similar methodology for their study of Georgia HOPE. Table 1 shows these rates for New Mexico and the neighboring states of Arizona and Colorado for program and pre-program years. In the pre-program period, New Mexico had the lowest enrollment rate of the three states at both public and private institutions. In the first three years of NM Success, however, this rate rose by more than 10 percentage points, or 23 per cent.¹⁴ In contrast, enrollment rates in Arizona and Colorado declined in the program period.

The last column of table 1 gives the freshman enrollment rate of New Mexican residents in out-of-state colleges for the years in which IPEDS provides this information. The out-of-state college enrollment rates rose from 12 to 15 per cent between 1994 and 1996, and fell to 10 percent in 1998.

12. Academic years consist of the fall semester in the calendar year used to identify the cohort, and the following spring semester in the next calendar year.

13. Numbers of private school graduates were not available in Colorado and Arizona.

14. In percentage terms, this increase is much higher than the 11-13 per cent increase reported by Cornwell *et al.* (2000), but similar to that reported by Dynarski (2000).

Under the conservative assumption that in the absence of NM Success the out-of-state enrollment rate would have been at the pre-program average of 13 per cent, the program retained in New Mexican institutions three per cent of high school graduates who would otherwise have attended college elsewhere. Alternatively assuming that out-of-state enrollment would have continued to rise by three percentage points a year (following the pre-program trend), the 1998 out-of-state enrollment rate would have been about 18 per cent in the absence of the program, indicating a diversion from out-of-state colleges of about eight per cent of high school graduates. These calculations suggest that between 30 and 80 per cent of the increase in the New Mexican enrollment rate was due to diverting students who would otherwise have attended college in some other state.

Clearly there has been a significant increase in enrollments at New Mexico post-secondary institutions since the introduction of the Success scholarships, which supports hypothesis **H1**. There has also been a significant diversion of students away from out-of-state alternatives, supporting hypothesis **H1c**. Both these findings confirm that the scholarship program achieved both its stated objectives of lowering the access costs to higher education and encouraging New Mexicans to stay in their home state to obtain that education.

As the largest institution in the state, UNM has enrolled approximately one third of all students receiving a Success scholarship each semester. Table 2 reveals a surge of enrollments of recent high school graduates at UNM coinciding with the inception of the scholarship program: the enrollment rate of recent public and private high school graduates rose 2.0 percentage points in the first program year and 4.4 percentage points in the subsequent two years, relative to the pre-program average.¹⁵ UNM

15. These percentage increases are remarkably similar to those reported for four-year institutions by Cornwell et al. (2000). Normalized to a percentage point increase per \$1000 subsidy, the estimated responses range between 2.3 and 5.0 points for the second two program years, depending on whether students responded to the guaranteed one-

appears to have benefited more than other state institutions: slightly more than 40 per cent of the total increase in the enrollment rate at public institutions accrued to UNM, even though UNM comprised only one-quarter of total state enrollments in the pre-program period. These gains translate into enrollment increases of 26 per cent in the first program year and 56 per cent in the subsequent two program years, relative to the pre-program average. As discussed earlier, students in the first program year had probably already committed to attending college, with or without the Success scholarship. Thus, the difference in enrollment response in the first and later years of the program suggests a diversion from other in- and out-of-state institutions of at least 46 per cent of the total response in the later program years.

Table 2 also shows the enormous reach of UNM's Bridge to Success scholarship. Between 72 and 87 per cent of recent NM high school graduates who entered UNM under the program received a Bridge scholarship, and many of the remaining students received some other form of university scholarship thereby preventing them from also taking up the Bridge. In the first program year, 3.5 scholarships were paid for every "extra" student enticed to UNM. It is quite likely that many of these students would have attended college without the Success incentive. In subsequent years this ratio drops to slightly less than 2.5 scholarship for each "extra" student. But if we assume that at most 54 per cent of the extra students would not have attended college without the program, the "leakage ratio" then rises to about 4.3. By comparison, Dynarski's (2000, p. 4) findings suggest a leakage ratio of 4 for HOPE.

The data show that retention rates fall after the inception of the lottery program. UNM

semester subsidy, or the hoped-for two-semester subsidy. These increases encompass the 3.7 to 4.2 point range reported by Dynarski (2000). Leslie and Brinkman (1987) review enrollment responses per \$100 subsidy in studies undertaken in the 1970s. Given the earlier time period, we do not attempt to compare our results with theirs.

experienced a large 28 per cent dropout rate between successive fall semesters in pre-program years, which then rises to 32 per cent by the second year of the lottery program. As we will see later, this is a statistically significant difference. Note also that the coverage of the scholarship declines steadily. Compared to the near-universal coverage rates of the first semester Bridge to Success scholarship, only 46 per cent of those enrolling in their third semester received a Success scholarship. This lowers the cost of the program per extra retained student. After making the adjustment for diverted students, the cost in both 1997 and 1998 is about 2.5 scholarships per extra student.

In the data we observe a relatively large enrollment response, but about half of it appears to be diversion. The program pays out about four scholarships for every new college entrant. Given that tuition is relatively low in New Mexico—it averaged \$1911 during the program period to date—this may be an acceptable program cost.¹⁶ But with UNM tuition, for example, rising at an average annual rate of about ten per cent over the same period, program costs will undoubtedly continue to rise. Exactly who responds to the subsidy is an important issue in assessing the policy. In the next section we consider specific distributional outcomes of the program by looking at student-level data.

5. Student-level Data and Empirical Models

UNM provided us with data for students who first enrolled between the fall 1994 and fall 1999 semesters. The data were extracted from the University's "Freshman tracking system" created and maintained by the Office of Institutional Research and include information on high school academic performance, entrance exam test scores, race, Hispanic origin, sex, age, credit hours and GPA by

16. IPEDS data indicates a mean full-time in-state tuition and fees for all 4-year public colleges in 1997 of \$3042 compared to UNM's tuition and fees of \$2164. In 1997 NM Success covered a full year tuition of \$1688.

semester at UNM and financial aid information, including parent income. We estimate differences between cohorts of students first enrolling at UNM during the Success program period with those who first enrolled before the program began. Since the first year of the program was transitional, and data are not yet available for third semester freshman who entered in 1999, many of the analyses concern differences in two individual years. It is necessary to distinguish between program-induced differences and random differences. We therefore estimate both program and pre-program differences in any given year relative to the freshman class that entered one year prior to the inception of the lottery program. Although averaging over several years will reduce measurement error, the year-by-year differences provide a more robust test of true program-induced differences.¹⁷

We estimate equations of the form:

$$(11) \mathbf{y}_i = \alpha + \beta_1 \mathbf{PRE}(94, 95) + \beta_2 \mathbf{TRANS}(97) + \beta_3 \mathbf{PROG}(98, 99) + \varepsilon_i$$

for New Mexico high school graduates enrolled at UNM. \mathbf{y}_i is an entering characteristic or college outcome for student i , ε_i is an error term, and β_1 , β_2 and β_3 are coefficient vectors corresponding to pre-program, transitional, and program years, respectively. These coefficients estimate total differences from the pre-program year of 1996. A β_1 coefficient statistically different from zero indicates a significant difference between 1996 and the specific pre-program year and, depending on its magnitude and sign, casts doubt on the program effect of any other significant coefficient. A true program effect occurs only when both β_3 coefficients are significant and when neither β_1 coefficient is significant. We use equation (11) to estimate the timing of high school-to-college transitions (**H2a**), total changes in the income and academic ability distribution (**H1a**, **H1b** and **H1d**), diversion from out-of-state colleges

17. Meyer (1995) emphasizes the importance of considering whether the control group in these types of “natural experiment” analyses also exhibits differences. Differences among control sub-groups will cast doubt on the validity of pre- and post-treatment differences.

(H1d), college retention (H2b) and grades and college credit hours (H3a and H3b) induced by the program.

Program differences in retention, grades and credit hours will be mediated by changes in the income and academic composition of the student body. We therefore estimate models of the form:

$$(12) C_i = \alpha + \beta_1 \text{PRE}(94, 95) + \beta_2 \text{TRANS}(97) + \beta_3 \text{PROG}(98, 99) + \lambda X + \varepsilon_i$$

where C_i is a college outcome measures, X is a vector of student characteristics when they enter college, λ is a vector of parameters, and the remaining elements are as defined in (11).¹⁸ We use equation (12) to test whether the program induces the hypothesized changes in college outcomes, controlling for changes in student composition. Thus for example, if less able students tend to have lower college GPAs and are also disproportionately attracted by the Success program, then program differences in GPAs estimated with equation (11) will be negative. Program differences estimated with equation (12), however, may well be positive if these low-ability students perform better than expected, due to program incentives.

In addition to estimating equations (11) and (12) for all students, we also repeat the exercise for students who enroll continuously through their third semester. Differences among continuing students give the longer range effects of the program, and provide information about students who are attracted by the program, but drop out quickly.

5. Distributional and incentive effects

Table 3 shows differences in the timing of high school-to-college transitions, the propensity to

18. Betts and Morell (1999) find that high school and family background are important determining factors of college GPAs.

attend out-of-state college (proxied by whether the student took the SAT), pre-college academic ability measures and parent income, relative to the 1996 reference year, for all entering (in-state) students.

The Success program induced an increase in the percentage of students enrolling at UNM immediately upon their high school graduation by about three percentage points in the first program year, and four percentage points in the subsequent two years (see column (I)), supporting hypothesis **H2a**.

Column (II) provides estimates for differences in the proportion of students who took the SAT. Although UNM accepts both the ACT and the SAT, more than 90 per cent of pre-Success incoming freshmen at UNM took the ACT and only 19 per cent took the SAT. Since the ACT has traditionally been the choice for students in New Mexico (see Kaplan Info Center 2000), we assume that students taking the SAT were more likely to be considering out-of-state colleges.¹⁹ The estimates show that the proportion taking the SAT was lower in every year—both program and pre-program years—compared to 1996. The most significant difference occurred in the program year of 1998. But the differences in 1999 and 1994 were nearly identical. Thus there is not strong evidence that students were less likely to consider going out of state in the program years.

High school GPA (column III) is consistently lower in all three program years, compared to 1996. Nevertheless, the lowest GPA in any of the years occurred in 1994, a pre-program year. ACT scores (column V) are, however, clearly lower in the program years: whereas pre-program ACT scores are statistically the same as the 1996 scores, they are about one-half of a point lower in the second two years of the Success program. Taken together, columns III and V suggest that Success disproportionately attracted lower ability students.

19. According to Kaplan Info Center (2000), colleges in states in the interior of the United States have traditionally preferred the ACT. Thus students who take the SAT may be considering prestigious colleges on the West and East coast, and are therefore probably not representative of all students interested in leaving the state. Nevertheless, this

The last two columns of table 3 report differences in the proportion of students who report parent incomes of \$20,000 or less and \$40,000 or less, respectively. Parent income information comes from forms filled out by students and their families in order to receive federal financial aid (FAFSA-Free Application for Federal Student Aid). Although some high income families file this application, poorer students and families are the most likely to do so. We therefore take the count of students who report parent income of \$40,000 or under (in constant 1998 dollars) to be complete. Success cohorts clearly have smaller proportions of low income students by two to three percentage points. The fact that the pre-program cohorts cannot be distinguished in terms of low-income proportions suggests that this is a true program-induced change. Note, however, that these changes did not occur in the first, transitional program year.

In sum, table 3 shows that the Success program shifted student composition in favor of the less able and more wealthy. Table 4 tests changes in the distribution of ability and income directly, using two ability measures—high school GPA and ACT score—and three income groups—very low-income (parent income \$20,000 or less), all low-income (parent income \$40,000 or less) and higher income (parent income greater than \$40,000). Significant negative estimates show that the share of a particular income-ability group fell, indicating a relatively low enrollment response to the Success program. Significant positive estimates show an increase in share, indicating a high enrollment response to the program. Small and insignificant estimates show that a group maintained its share, suggesting a moderate enrollment response. In the first program year, the only (marginally) significant effect was an increase in the share of higher income, high-ability students. This provides only weak support for hypothesis **H1d**. The story changes quite drastically, however, in the next two program years. In these

group *is* more likely to represent the most academically able, a group we are particularly interested in.

years, and across all income groups, high-ability students became less prevalent—by two to five percentage points. This indicates a relatively low enrollment response from the strongest students and supports hypothesis **H1b**. Higher income students with weak academic records became more prevalent, by three to seven percentage points, a relatively large enrollment response. By comparison, average and weak students among low-income groups maintained their student body shares, suggesting a moderate enrollment response. The data thus confirm hypothesis **H1a**, which predicted a large response from low-ability students, and more so for those with higher incomes. Compared to other groups, the diversion of richer, high-ability students from out-of-state does not appear to have been a large factor, especially after the first program year. Overall, the data lead us to reject hypothesis **H1d**.

We also estimated the models shown in table 4 for the sub-sample of students who enrolled continuously through their third semester. Results of these models (not shown) were nearly identical for the low-income groups. For the higher income group, the program effects were attenuated, with high-ability students losing a smaller share and low-ability students gaining a smaller share, compared with all students enrolled in the first semester. These patterns suggest that attrition was highest among the wealthier low-ability students, the group with the highest enrollment response.

Table 5 addresses the issue of retention directly. Models alternately provide total estimates and estimates which control for student characteristics.²⁰ Although we expected that the program would reduce dropouts (**H2b**), retention between the first two semesters falls significantly in the second

20. See note 3 in Table 5 for a list of control variables. For retention between semesters 1 and 2, students with a one point higher high school GPA and students who filed FAFSA increased their probabilities by eight and seven percentage points respectively. The positive effect for filing FAFSA was reduced to four percentage points if parents' income was \$40,000 or less, but greater than \$20,000. Latino students had slightly higher retention probabilities. For retention between the second and third semesters, no income variables were significant. Each point of the high school GPA raised the probability of retention by 17 percentage points. Native American students had lower retention rates by ten percentage points.

program year, even when controlling for the weaker academic ability of this cohort. Note however, that the first program cohort is not affected, and that retention rates revert to their pre-program rates for later semesters. Over all, the program has not induced a positive retention response, and we therefore reject **H2b**.

Table 6 considers the response to the GPA requirement of the Success program by providing estimates of differences in registered and completed credit hours, and semester GPA for the first two semesters of enrollment. The first panel presents total differences, and the results are mixed. Program cohorts appear to take fewer credit hours and earn lower grades, although similar differences occur for the pre-program entering 1994 class. The second panel, which controls student characteristics,²¹ eliminates most of the differences for the pre-program cohorts. The pre-program differences that remain, however, are mostly opposite to the expected results of the program. For example, second semester grades become significantly lower for the 1995 entering class when student characteristics are controlled. By contrast, grades appear to be not as low (for the first program year) and higher (for the second program year), once we include controls, although the differences are not statistically significant. The hours response, although slightly attenuated in comparison with the first panel, clearly becomes a phenomenon of the second program year. These students registered for, and completed, fewer credit hours than would have been predicted based on their academic ability and other characteristics.

The third panel of table 6 shows differences for students who enrolled continuously in the first three semesters. Under this criterion, students in the pre-program years become much more

21. In general, entrance exam scores, high school GPA and age at matriculation tended to raise hours and grades. Students filing FAFSA also had higher hours and grades, although these effects were muted, and sometimes reversed for those with parental incomes of \$40,000 or less, but more than \$20,000. Women had higher grades in both semesters, fewer hours the first semester, and more hours the second semester, relative to men. Minority students tended to have lower grades, especially in the second semester.

homogeneous, and students in the second program year become more distinct. Strikingly, first semester GPA for these students is now higher than in pre-program years and the difference is statistically significant. Credit hours attempted and completed are significantly lower.

Thus there is some evidence that the program led to higher than predicted GPAs, as hypothesized (**H3a**). We cannot, however, identify if this was a consequence of grade inflation or an actual improvement in academic performance by a group of students responding to the incentives provided by a program requiring higher grades to ensure continued financial support. Moreover, the GPA effect does not persist in the second semester, and does not appear at all for the first program year. The data provide stronger evidence in support of hypothesis **H3b**: students apparently lower their academic workload in order to improve their chances of attaining the academic standards required by the program.

To summarize, we have been able to test all our hypotheses. Regarding the distributional impact of the subsidy, the program appears to attract relatively more low-ability higher income students and relatively fewer high-ability students from all income groups. The program has not had the intended effect of improving retention. It does appear that in response to the GPA requirements of the program, students who entered UNM in the second program year (1998) received higher than predicted grades in their first semester and registered for fewer credit hours. None of the incentive effects appears for students who entered UNM in the first program year (1997), suggesting that students who would not attend college without the lottery program behave differently from students who planned to attend college anyway.

7. Conclusions

The stated objectives of the NM Success program are relatively modest, and have been quickly and conclusively achieved: enrollments at state institutions of higher education are up and fewer high school graduates are leaving the state to attend college. The program subsidizes about two-and-a-half students for every new student attracted to UNM. In the best case scenario, students diverted from out-of-state institutions will complete college and use their increased productivity to enrich New Mexico. In the worst case scenario, New Mexico will have subsidized students who leave the state anyway and who would have paid their own way through college without the program.

Although the statute says nothing about distributional objectives, promotional advertisements for the state lottery emphasize the idea of access. In one television commercial, for example, a gowned graduate tells us that she is the first in her family to attend college, and that she could not have done it without the Lottery Success scholarship. Our analysis suggests that she is not typical of Success recipients, especially those at UNM. We find that the program disproportionately attracts wealthier and less able students. It is not clear that this is a group to whom educational subsidies should be directed. This concern grows when we consider other, more pressing problems in the state's educational system. For example, compared with other states, New Mexico has the fourth highest high school dropout rate and the third highest concentration of minorities among dropouts.²² The federal HOPE tax incentives are likely to produce similar results. By design, the program excludes low-income families who pay little tax and have low savings rates. Moreover, the lack of academic requirements suggests that less capable students among the middle and upper-classes will comprise the bulk of new enrollments.

Any public policy intended to subsidize some activity should be assessed against the economic criteria of relative efficiency and distributional equity. Our analysis provides evidence that on these

grounds the NM Success program is poorly named. The program pays the tuition for two-and-a-half students to attract one new student to college. This ratio rises to about four when recognizing that nearly half the “new” enrollments were enticed away from leaving the state for their college educations. Efficient public policy sends each program dollar to the highest valued activity consistent with the program objectives. Very often, unseen consequences of programs only emerge after their implementation, or once program data are analyzed. It is difficult not to conclude that the NM Success fails to spend program funds in the most efficient way. When the source of the program funds is considered—lottery ticket purchases—the regressivity of the program is undeniable. Moreover, the primary beneficiaries of the program appear to be middle-class. New Mexico is a poor state with a significant minority population suffering from many social maladies caused by poor educational outcomes. It seems inconsistent for public policy to spend a tax that falls disproportionately on lower income members of society to subsidize the largely private benefits created by higher education going to the better-off members of that same society.

22. NCES Digest of Education Statistics, 1999, Table 7.

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Table 1. Freshman entering classes as proportion of public high school graduates in preceding academic year, by state and year of entry¹

	Full-time Freshmen						NM Resident Freshmen attending out-of-state colleges ³
	New Mexico		Arizona ²		Colorado		
	Public	Private	Public	Private	Public	Private	
Pre-Program							
1994	.508	.032			.621	.074	.117
1995	.457	.032	.481	.061	.646	.069	
1996	.444	.028	.491	.057	.637	.066	.149
<i>Pre-program average</i>	<i>.470</i>	<i>.031</i>	<i>.486</i>	<i>.059</i>	<i>.635</i>	<i>.070</i>	<i>.133</i>
Program							
1997	.563	.030	.444	.048	.619	.062	
1998	.588	.032	.435	.050	.617	.061	.103
1999	.577	.026	.351	.045	.613	.059	
<i>Program average</i>	<i>.576</i>	<i>.029</i>	<i>.410</i>	<i>.048</i>	<i>.616</i>	<i>.061</i>	<i>.103</i>

Source: IPEDS and information provided by the State Departments of Education from New Mexico, Arizona and Colorado.

Notes:

¹Enrollments include accredited institutions offering at least a two-year program that report data in every survey year.

²The Arizona State Department of Education provided a more recent series than is available from NCES, but figures for the 1993-1994 graduating high school class were unavailable. Figures for years available from both Arizona and NCES were not identical: we therefore chose to use the later series provided by Arizona.

³Who graduated high school within last 12 months. This information is available only in even-numbered years.

Table 2. In-State Enrollments of Recent High School Graduates

	Pre-Program Average	Success program years		
		1997	1998	1999
First semester				
Enrollment rate as percent of number of public and private high school graduates	7.9	9.9	12.3	12.3
Actual enrollment (1)	1286	1695	2236	2317
Predicted enrollment based on pre_program average enrollment rate (2)		1348	1431	1483
Difference (1-2)		347	805	834
Per cent "extra" enrollments		25.8	56.3	56.2
Number receiving Bridge scholarship		1222	1951	1882
Per cent receiving Bridge scholarship		72.1	87.3	81.2
Tuition (= value of scholarship)		\$844	\$877	\$971
Cost of program per "extra" student		\$2,968	\$2,125	\$2,192
Number of scholarships per "extra" student		3.5	2.4	2.3
Second semester				
Per cent who registered for 2nd semester	89.8	88.4	85.7	
Actual 2nd semester enrollment (3)	1155	1499	1916	
Predicted 2nd semester enrollment based on 1st semester prediction and pre_program retention (4)		1210	1285	
Difference (3-4)		289	631	
Per cent "extra" enrollments		23.9	49.1	
Number receiving Success scholarship		859	1229	
Per cent receiving Success scholarship		57.3	64.1	
Cost of program per "extra" student		\$2,509	\$1,707	
Number of scholarships per "extra" student		3.0	1.9	
Third semester				
Per cent of entering class continuing through 3rd semester	72.2	70.1	68.2	
Actual 3rd semester enrollment (5)	929	1189	1524	
Predicted 3rd semester enrollment based on 1st semester prediction and pre_program retention (6)		973	1033	
Difference (5-6)		216	491	
Per cent "extra" enrollments		22.2	47.5	
Number receiving Success scholarship		541	717	
Per cent receiving Success scholarship		45.5	47.0	
Cost of program per "extra" student ¹		\$2,196	\$1,418	
Number of scholarships per "extra" student		2.5	1.5	

Notes:

¹Scholarship in third semester is equal to tuition in the year following the entering year.

Table 3. Differences in characteristics of all entering in-state freshmen by year of entry, compared with 1996 (a pre-program year), OLS models (Standard errors in parentheses)

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)
	Recent High School graduate	Took SAT	High School GPA	Took ACT	ACT score	Parent Income	
						\$20,000 or less	\$40,000 or less
PRE-PROGRAM							
1994	-.020** (.008)	-.024* (.015)	-.111** (.019)	.009 (.010)	-.172 (.154)	-.004 (.013)	-.012 (.017)
1995	.000 (.008)	-.022 (.014)	.010 (.019)	.011 (.010)	.051 (.153)	.012 (.012)	.017 (.017)
<i>1996 Mean</i>	<i>.930</i>	<i>.202</i>	<i>3.33</i>	<i>.908</i>	<i>22.41</i>	<i>.134</i>	<i>.273</i>
PROGRAM							
1997	.026** (.008)	-.023 (.014)	-.045** (.018)	-.010 (.009)	.075 (.146)	-.013 (.012)	-.023 (.016)
1998	.039** (.007)	-.041** (.013)	-.089** (.017)	.031** (.009)	-.489** (.138)	-.027** (.011)	-.034** (.015)
1999	.044** (.007)	-.024* (.013)	-.063** (.017)	.050** (.009)	-.556** (.136)	-.022** (.011)	-.012 (.015)

**Significant at the 5% level.

*Significant at the 10% level.

Table 4. Differences in income and academic ability distributions of recent New Mexico high school graduates by year of entry, compared with 1996 (a pre-program year), OLS models: Dependent variable for each column/model equals one for indicated income and ability and zero otherwise (Standard errors in parentheses)

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)
	Parent income# \$20,000			Parent income # \$40,000			Parent income > \$40,000		
Ability:	High	Medium	Low	High	Medium	Low	High	Medium	Low
PRE-PROGRAM	<i>Ability measured by high school GPA</i>								
1994	.005 (.008)	-.007 (.008)	.000 (.007)	.006 (.012)	-.006 (.011)	.003 (.010)	-.012 (.018)	-.005 (.017)	.015 (.016)
1995	.012 (.008)	-.000 (.008)	-.006 (.007)	.032** (.012)	-.001 (.011)	-.011 (.010)	-.012 (.018)	.010 (.017)	-.019 (.016)
1996 Mean	.052	.050	.035	.110	.093	.069	.312	.225	.191
PROGRAM									
1997	-.006 (.008)	-.008 (.007)	-.003 (.007)	-.015 (.011)	-.006 (.011)	-.001 (.010)	-.015 (.017)	.014 (.016)	.024 (.015)
1998	-.018** (.007)	-.013* (.007)	-.000 (.006)	-.030** (.011)	-.009 (.010)	.006 (.009)	-.047** (.016)	.023 (.015)	.057** (.014)
1999	-.014* (.007)	-.014** (.007)	.002 (.006)	-.019* (.011)	.001 (.010)	.006 (.009)	-.053** (.016)	.035** (.015)	.030** (.014)
PRE-PROGRAM	<i>Ability measured by ACT Score</i>								
1994	-.006 (.007)	.006 (.008)	-.001 (.009)	-.006 (.011)	.003 (.012)	.005 (.012)	-.021 (.018)	-.003 (.018)	.022 (.015)
1995	.002 (.007)	.010 (.008)	-.006 (.008)	.008 (.010)	.014 (.011)	-.002 (.011)	-.009 (.018)	-.026 (.018)	.015 (.015)
1996 Mean	.043	.038	.056	.086	.093	.093	.296	.280	.151
PROGRAM									
1997	-.010 (.007)	.005 (.007)	-.013 (.008)	-.008 (.010)	-.005 (.011)	-.010 (.011)	.028* (.017)	-.006 (.017)	.001 (.014)

**Significant at the 5% level. *Significant at the 10% level.

Ability categories by high school GPA are: High >3.5, Medium 3.0-3.5 and Low <3.0. Ability categories by ACT are: High > 24, Medium 20-24 and Low <20.

Table 4 (cont.)

Ability:	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VIII)	(IX)
	Parent income# \$20,000			Parent income # \$40,000			Parent income > \$40,000		
	High	Medium	Low	High	Medium	Low	High	Medium	Low
PROGRAM									
1998	-.018** (.006)	-.002 (.007)	-.011 (.008)	-.024** (.009)	-.009 (.010)	-.001 (.010)	-.029* (.016)	.005 (.016)	.057** (.014)
1999	-.017** (.006)	.002 (.007)	-.011 (.007)	-.020** (.009)	-.001 (.010)	.010 (.010)	-.061** (.016)	.006 (.016)	.067** (.014)

**Significant at the 5% level. *Significant at the 10% level.

Ability categories by high school GPA are: High >3.5, Medium 3.0-3.5 and Low <3.0. Ability categories by ACT are: High > 24, Medium 20-24 and Low <20.

Table 5. Differences in retention rates, compared with 1996 (a pre-program year):¹ Linear probability models² with and without controls for entering-student characteristics; dependent variables indicate whether or not student registered continuously between indicated semesters (Standard errors in parentheses)

	(I)	(II)	(III)	(IV)	(V)	(VI)
	Retention as proportion of all students who enrolled for semester 1			Retention as proportion of all students who enrolled for semester 2		
	Semesters 1 & 2		Semesters 1, 2 & 3		Semesters 2 & 3	
PRE-PROGRAM						
1994	-.005 (.013)	.011 (.013)	-.022 (.018)	.002 (.018)	-.020 (.016)	-.009 (.017)
1995	-.008 (.012)	.002 (.013)	-.012 (.017)	-.010 (.018)	-.007 (.016)	-.013 (.017)
<i>1996 Mean</i>	.894		.718		.804	
PROGRAM						
1997	-.014 (.012)	-.007 (.012)	-.026 (.017)	-.020 (.017)	-.017 (.016)	-.017 (.016)
1998	-.038** (.011)	-.027** (.011)	-.040** (.016)	-.024 (.016)	-.012 (.015)	-.004 (.015)
CONTROLS ³	NO	YES	NO	YES	NO	YES

**Significant at the 5% level.

*Significant at the 10% level.

Notes:

¹Models estimated for in-state students who entered UNM within a year of their high school graduation.

²All results were the same when models were estimated as probits.

³The following variables were included as controls: high school GPA; ACT score; an indicator variable which takes the value of one if student sat for the SAT exam and is otherwise zero; an interaction between the SAT indicator variable and the SAT score; age at matriculation; indicator variables that take the value of one if the student has any of the following characteristics and is otherwise zero: female, Native American, Latino, African American, student filed a FAFSA parents' income \$20,000 or less in and parents' income \$40,000 or less, in constant 1998 dollars.

Table 6. Differences in credit hours and grades,¹ compared with 1996 (a pre-program year): OLS models with and without controls for entering-student characteristics (Standard errors in parentheses)

	(I)	(II)	(III)	(IV)	(V)	(VI)
	FIRST SEMESTER			SECOND SEMESTER		
	Credit hours		Semester GPA	Credit hours		Semester GPA
	Registered	Completed		Registered	Completed	
PRE-PROGRAM						
1994	.040 (.073)	-.170 (.149)	-.105** (.039)	-.210** (.010)	-.332** (.137)	-.099** (.040)
1995	.022 (.072)	-.279* (.147)	-.016 (.039)	-.055 (.098)	.023 (.135)	-.073* (.040)
<i>1996</i>						
<i>Mean</i>	<i>14.0</i>	<i>12.0</i>	<i>2.61</i>	<i>14.7</i>	<i>13.0</i>	<i>2.65</i>
PROGRAM						
1997	.060 (.069)	-.294** (.140)	-.063*** (.037)	-.082 (.093)	-.065 (.128)	-.055 (.038)
1998	-.240** (.065)	-.906** (.132)	-.032 (.035)	-.432** (.089)	-.591** (.122)	-.064* (.036)
1999	-.147** (.065)	-	-	-	-	-
WITH CONTROLS FOR ENTERING-STUDENT CHARACTERISTICS ²						
PRE-PROGRAM						
1994	.155** (.074)	.096 (.127)	-.003 (.037)	-.088 (.101)	-.109 (.131)	.004 (.037)
1995	.023 (.073)	-.388** (.125)	-.053 (.036)	-.051 (.099)	-.038 (.129)	-.088** (.037)
PROGRAM						
1997	.103 (.069)	-.274** (.118)	-.022 (.034)	-.043 (.094)	-.013 (.012)	-.011 (.034)
1998	-.120* (.065)	-.586** (.110)	.043 (.032)	-.276** (.089)	-.380** (.115)	.013 (.033)
1999	-.060 (.064)	-	-	-	-	-

Table 6, continued

	FIRST SEMESTER			SECOND SEMESTER		
	Credit hours		Semester GPA	Credit hours		Semester GPA
	Registered	Completed		Registered	Completed	
STUDENTS PERSISTING THROUGH THEIR 3 RD SEMESTER, WITH CONTROLS						
PRE-PROGRAM						
1994	.110 (.085)	.123 (.137)	-.019 (.032)	-.130 (.102)	-.068 (.123)	-.009 (.032)
1995	-.071 (.083)	-.342** (.134)	-.042 (.031)	-.014 (.100)	-.089 (.121)	-.076 (.031)
PROGRAM						
1997	.045 (.079)	-.208* (.127)	.006 (.029)	-.055 (.095)	-.007 (.114)	.006 (.030)
1998	-.193** (.074)	-.569** (.120)	.109** (.028)	-.240** (.089)	-.350** (.108)	.022 (.028)

**Significant at the 5% level.

*Significant at the 10% level.

Notes:

¹Models estimated for in-state students who entered UNM within a year of their high school graduation.

²See notes to table 5 for a list of controls.