CRAFTING A CLASS: THE TRADE OFF BETWEEN MERIT
SCHOLARSHIPS AND ENROLLING LOWER-INCOME STUDENTS

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Crafting a Class: The Trade Off Between Merit Scholarships and Enrolling Lower-Income
Students
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ABSTRACT

Our paper uses institutional-level panel data to test whether an increase in the number of
institutionally funded National Merit Scholarship (NMS) winners at an institution is associated with
a reduction in the number of Pell Grant recipients at the institution. We find that, other factors held
constant, an increase in the share of institutionally funded NMS winners in an institution's first-year
class is associated with a reduction in the share of Pell Grant recipients among the institution's
undergraduate student body and that the magnitude of this relationship is larges at the institutions
that enroll the greatest number of NMS students.

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I.   Introduction

One of the strengths of the American higher education system is its competitive

nature. Colleges and universities compete for faculty, for students, for external research

funding and on the athletic fields. Given the wide publicity that the *U.S. News & World*

Reports annual rankings of colleges and universities receives and the importance of

student selectivity in these rankings, increasingly American colleges and universities are

using merit aid as a vehicle to attract higher test score students and to improve their

rankings.[1]

It is well-known that test scores are correlated with students' socio-economic

backgrounds. Hence to the extent that colleges are successful in "buying" higher test

score students, one should expect that their enrollment of students from families in the

lower tails of the family income distribution should decline. However, somewhat

surprisingly, there have been no efforts to test if this is occurring.

Our paper presents such a test. While institutional level data on the dollar amounts of

merit scholarships offered by colleges and universities are not available, data are

available on the number of *National Merit Scholarship* (henceforth *NMS*) winners

attending an institution on scholarships that have been funded by the institution itself,

rather than the *National Merit Scholarship Corporation* (henceforth *NMSC)*. These

institutional scholarships are awarded to high test score students only if they attend the

institution. Our research strategy is to estimate if an increase in the number of recipients

of these scholarships at an institution is associated with a decline in the number of

students from lower and lower middle income families attending the institution, other

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[1]See, for example, Michael S. McPherson and Morton O. Schapiro (1998, 2002), Elizabeth A. Duffy and
Idana Goldberg (1998) and Ronald G. Ehrenberg (forthcoming)

factors held constant. We measure the number of these students by the number of Pell Grant recipients attending the institution.

Section II of our paper briefly describes the *National Merit Scholarship* and the federal Pell Grant programs. In section III, we describe our analytical approach and section IV presents our empirical findings. Section V provides some brief concluding remarks.

II.   The *National Merit Scholarship* and Pell Grant Programs[2]

The *National Merit Scholarship* Program began in 1955. High school students qualify for awards based upon their scores on the PSAT examination, high school records, letters of recommendation, information about the students' activities and leadership, and personal essays.

Three types of *NMS* awards exist. The first is a set of scholarships awarded to top students independent of family financial circumstances by the *NMSC* itself; these awards currently are $2,500 scholarships for one year of college and winners are free to choose the institution that they wish to attend. The second is a set of scholarships awarded by corporations to top students who are employees of the corporations, children of employees, residents of a community in which the corporations have operations, or students pursuing college majors or careers in which the corporations have a special interest. These scholarships may be for one year of study or renewable for four years. Again there is no restriction on the college or university that the student may attend.

The final type, and the focus of our attention, is the *NMS* awards funded by colleges and universities. Finalists in the *NMS* competition notify the *NMSC* of their first choice college or university and the *NSMC* in turn notifies the institution. Each institution that

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[2] A more detailed discussion of the *NMS* program is found at www.nationalmerit.org .

offers this type of award makes awards to a subset of the finalists that have indicated that they wish to attend the institution. Crucially, an award is cancelled if the student decides not to attend the institution. Hence, these awards are contingent on attending the institution.

These college and university funded awards are renewable for up to four years of undergraduate study and provide stipends that range from $500 to $2,000 a year. Awards of this amount pale when compared to the $30,000 tuition and fee levels that are now common at the nation's most selective private colleges and universities. However, previous research has indicated that offering a top student a named scholarship enhances the likelihood that a student will attend an institution.[3] In addition, it is likely that institutions that offer *NMS* awards offer additional merit aid to students and hence that the dollar amount of the *NMS* awards likely understates the amount of merit aid that the recipients receive from the institution.

Table 1 provides information on the total number of *NMS* awards and the number of these awards funded by colleges and universities for selected academic years between 1983 and 2003.[4] The total number of *NMS* awards grew from 5,566 in 1983 to 8,244 in 2003. As the third column indicates the percentage of these awards funded by colleges and universities increased from 42.8% in 1983 to 56.5% in 1995 and has remained at about that percentage since then.

NMS awards are heavily concentrated among a small number of our nation's over 3,500 colleges and universities. Our econometric research will involve analyzing panel data for the 100 colleges and universities that had the most new *NMS* winners attending

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[3] Christopher Avery and Caroline Hoxby (2004)
[4] These data were provided to the authors by the *National Merit Scholarship Corporation*.

them in 2003. The names of the institutions and their number of *NMS* winners in 2003 appear in the appendix.[5]

These top 100 institutions enrolled about 84% of all of the *NMS* winners in 2003 with somewhat lower percentages in the earlier years.[6] Many of these institutions are among the small number of colleges and universities that still pursue need blind admissions and need-based financial aid policies and a number of them accordingly offer <u>no</u> college and university funded *NMS* awards. However, even in this group of 100 institutions, the percentage of *NMS* awards that were funded by the institutions themselves rose from 41.5% in 1983 to about 55.5% at the turn of the 21st century.

Table 2 provide information for each year during our sample period on the numbers of institution funded and non-institution funded *NMS* students at these institutions at the 25th percentile, 50th percentile (median), 75th percentile and mean institution in our top 100 sample. The total number of *NMS* students increases at each point in the distribution; this increase is at least partially due to the way the institutions were selected (top 100 in 2003). What stands out, however, is that virtually all of the growth in the number of *NMS* winners occurred in the institution funded category. For example, the mean number of institutional funded awards in the sample rose from 17 in 1983 to 37 in 2003. As late as 1995-96, the 25th percentile institution (in terms of total number of *NMS* awards in 2003) offered <u>no</u> institutional funded *NMS* awards. By 2003-2004, however, the 25th percentile institution in the group offered 12 institutionally funded *NMS* awards.

Our interest is in how the growth of merit scholarships has influenced the proportion of students from lower and lower middle income families attending selective institutions.

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[5] There actually are 103 institutions in the sample because of a tie for 100th place.
[6] The lower enrollment shares in earlier years are an artifact of the way the panel was constructed. This occurs because there is some variation in the institutions that appear in the top 100 list from year to year.

While institutional level data on the family income distribution of students are not collected by the U.S. Department of Education, data on the number of Pell Grant recipients at each institution are collected annually.

The Pell Grant program is the largest need-based financial aid program, in the United States; it provided about $12.6 billion dollars in funding to 5.1 million undergraduate students in 2003-2004.[7] Eligibility for Pell Grants for a dependent student is based upon a dependent student's family income and wealth, the number of siblings in college and the expected costs of attending the institution; for independent students eligibility is based upon the income of the student and his or her spouse.[8] Prior to 1993, awards were also constrained to be less than 60% of the costs of attending an institution; some students who attended low-cost institutions were excluded from participating in the Pell Grant program for this reason.

Data from the *2002-2003 Title IV/Federal Pell Grant Program End-of-Year Report* indicate that in that year 87% of all Pell Grant recipients at 4-year public institutions came from families with family incomes of $40,000 or less; the comparable figure at 4-year private institutions was 86.6%.[9] Hence the share of Pell Grant recipients among an institution's undergraduate student body is a good proxy for the share of its students coming from lower and lower middle income families.[10]

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[7] *Trends in Student Aid 2004* (2004), tables 1 and 3

[8] Seftor and Turner (2002) indicate that throughout the 1990s, over one-half of Pell Grant recipients were independent students, although this fraction is likely to be much lower in the selective institutions that are in our sample where most students are full-time students

[9] *2002-2003 Title IV/Federal Pell Grant Program End-of-Year Report,* Table 2A

[10] Tebbs and Turner (2004) caution that the Pell Grant recipient data refer to students attending an institution anytime during a year, while IPEDs enrollment data refer to a point of time in the fall. Hence, other factors held constant, if turnover of students is high at an institution during the year, this will artificially make the "share" of Pell Grant recipients at the institution appear to be high. We control for this in the empirical work that follows by including institutional fixed effects in our estimation methods.

Table 3 presents information, by year, on the mean ratio of the number of Pell Grant recipients at an institution to the number of full-time undergraduates attending the institution for the 100 institutions in our sample during the 1983 to 2000 period. The column headed "unweighted" presents information on the average percentage across institution, while the column headed "weighted" is a weighted average, with the enrollments used as weights. These data suggest that the percentage of Pell Grant recipients among the undergraduate students at these institutions fluctuated, but gradually increased during the period. [11]

This increase tells us little about the impact of the growth of institutionally funded *NMS* at these institutions on the number of Pell Grant recipients at the institutions during the period; the share of Pell Grant recipients at these institutions will vary over time as the income distribution of the populations changes, as eligibility rules change, as maximum award levels change and as tuition levels at the institutions change. Hence to analyze the impact of changes in the number of *NMS* recipients on the number of Pell Grant recipients, we must control for these other factors in our analyses

III.   Analytic Approach

Our goal is to see how the number of institutionally financed new *NMS* winners (M_t) at an institution influence the number of Pell Grant recipients (P_t) at the institution, other factors held constant). A problem that immediately presents itself is that the number of

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[11] We caution the reader that part-time students attending at least half-time are eligible for Pell Grants. However, the *2002-2003 Title IV/Federal Pell Grant Program End-of-Year Report* (table 13) indicates that 86.9% of the Pell Grant recipients attending public 4-year institutions and 87.8% of the Pell Grant recipients attending private 4-year institutions were full-time students that year For the institutions in our sample, part-time students represent only 12.6 percent of all students and using total undergraduate students in the denominator of our ratio does not change the trends reported above or any of the econometric results that follow. We also should caution that only U.S. Citizens and permanent residents are eligible for Pell Grants. Thus if an institution enrolls a high fraction of foreign students, its Pell Grant ratio will, other factors held constant, appear to be low.

NMS winners refers to entering first-year students, while the number of Pell Grant recipients refers to all enrolled undergraduates. If we had data on the number of Pell Grant recipients that were first-year students at an institution, we would use this information and information on the number of new first-year students at the institution to construct the fraction of first-year students that were Pell Grant recipients at the institution and then estimate how changes in the number of *NMS* winners affects that ratio. However, Pell Grant data is not available at the institutional level by the year that the student is enrolled in college.

A solution to this problem is possible if we make some very strong and admittedly unrealistic assumptions. Specifically, if one is willing to assume for simplicity that all students at the institution enter as first-year students, that no students drop out before graduation, that students' Pell Grant eligibility does not change during the years that they are enrolled in college and that all students who graduate do so in four years, then the following relationship holds

(1) $P_{it} = p_{it} + p_{it-1} + p_{it-2} + p_{it-3}.$

Here p_{it} is the number of new first-year Pell Grant recipients that enroll at the institution in year t. Put simply, the total number of Pell Grant recipients at the institution in year t is the sum of the number of new first-year Pell grant recipients that enrolled at the institution in year t and in each of the three preceding years. If one writes down the equivalent expression for P_{it-1} and then subtracts this from P_{it}, one finds that

(2) $P_{it} - P_{it-1} = p_{it} - p_{it-4}.$

Given the assumptions that we have made, the difference between the number of Pell Grant recipients at an institution in year t and year t-1 is the difference between the

numbers of first-year Pell Grant recipients in year t and year t-4. Hence if we want to estimate how changes in the number of *NMS* influence changes in the number of Pell Grant recipients at the institution between years t and t-1, the correct change in the number of *NMS* winners to use is the difference between M_t and M_{t-4}. So the dependent variable in our econometric analyses will be based upon one year changes in the numbers of Pell Grant recipients, while our explanatory variable will be based upon four year changes in the number of institutionally funded *NMS* winners.

Our empirical approach is to use our institutional level panel data to estimate equations in which the one year change in the ratio of the number of Pell Grant recipients to the number of full-time undergraduate students at an institutions is specified to be a linear function of the four year change in the share of first-year full-time undergraduate students that receive institutionally financed *NMS* awards at the institution, institutional fixed effects, year fixed effects, and a random error term.

(3) $(P_{it}/F_{it}) - (P_{it-1}/F_{it-1}) = a_0 + a_1 ((M_{it}/N_{it}) - (M_{it-4}/N_{it-4})) + u_i + v_t + e_{it}$

Here F_{it} is the number of full-time enrolled undergraduates at institution i in year t, N_{it} is the number of full-time first-year students enrolled at institution i in year t, the a_j are parameters, the u_i are the institutional fixed effects, the v_t are the year fixed effects and the e_{it} is a random error term. The institutional fixed effects are included in the model to control for institution specific factors other than changes in the number of *NMS* award winners that might affect the change in the share of Pell Grant recipients at an institution. The year fixed effects are included to control for changes in national factors that might affect the share of Pell Grant recipients over time; these factors include changes in the

distribution of family income of college-age students, changes in Pell Grant eligibility and generosity rules, and changes in Pell Grant funding levels.

The Pell Grant and *NMS* variables have each been deflated by a relevant size variable (total full-time undergraduate students or total full-time first year students) to control for changes in the size of each institution over time. Because part-time students enrolled for at least one-half of a normal full-time load are eligible to receive Pell Grants, in the empirical work in the next section, we also experiment with deflating the Pell grant and *NMS* variables by the total number of undergraduate students and the total number of first-year students at the institution.

Finally, we should note that our use of the one year change in the number of Pell Grant recipients at institution to measure the four year change in the number of freshman Pell Grant recipients at an institution is likely to be subject to substantial measurement error because of the set of strict assumptions that we had to make to derive this equivalence. However, if the measurement error is random, it will serve only to increase the imprecision of our estimates; it will not bias the coefficient of the *NMS* variable.

IV. Empirical Findings

Table 4 summarizes our initial estimates of equation (3). The coefficients in the table are estimates of the parameter a_1 that come from four different model specifications. The first is based upon the total number of new *NMS* recipients at an institution, regardless of the source of funding. The second is based upon the number of institutionally funded *NMS* recipients. The third is based upon the number of *NMS* recipients at the institution that are not funded by the institution. The final specification includes both the number of institutionally funded *NMS* and the number of *NMS* recipients funded in other ways as

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explanatory variables. For each specification, we present estimated coefficients for models that excluded and included year fixed effects; the estimates are not very sensitive to these variables. The panel used in this estimation makes use of four years of *NMS* recipient data – 1983, 1987, 1991 and 1995, so we have three change observations for each institution in the sample.[12]

The coefficients in row 1 suggest that increasing the ratio of new *NMS* award winners, irrespective of source of funding, at an institution to the size of the institution's first-year full-time student body reduces the ratio of the institution's number of Pell Grant recipients to its full-time undergraduate enrollments. If the sizes of the institution's first-year full-time student body and its full-time undergraduate enrollments remain constant, the interpretation of the coefficients are that an increase in NMS awards of ten at an institution is associated with a reduction in the number of Pell Grant recipients at the institution of about two.

When we restrict our attention to the number of institutional funded *NMS*, the magnitude of the reduction is doubled to a reduction of four Pell Grant recipients for every ten additional institutionally funded *NMS* award winners, again holding constant full-time freshman and full-time total undergraduate enrollment levels. Indeed, when we restrict our attention to *NMS* winners not funded by the institution in row 3, an increase in the number of these winners at an institution has <u>no</u> statistically significant effect on the number of Pell Grant recipients at the institution. This finding is confirmed in the coefficients from the last model (row 4); when both the number of institutionally

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[12] The 2003 data could not be used because IPEDs data are not yet available for full-time first year students and total full time undergraduate enrollment for 2002 or 2003. We exclude the 1999 data because IPED enrollment data were not collected for that year. However, we report below our efforts to include data for 1999 by using the average of the institution's enrollment in 1998 and 2000 as a proxy for its 1999 enrollment level.

financed and other *NMS* award recipients are included as explanatory variables only increases in the former have a negative effect on the number of Pell Grant recipients at the institution. Put simply, in our sample of institutions, other factors held constant including the total full-time undergraduate and first-year enrollment levels, offering more institutionally funded *NMS* awards is associated with fewer Pell Grant recipients attending the institution and the magnitude of the reduction is roughly four less Pell Grant recipients for each ten additional institutional NMS recipients enrolled at the institution.

Table 5 presents estimates of coefficients from the models in table 4 that included year fixed effects, in which the models were estimated for various subgroups of our sample. In particular, we present estimates for the entire sample (the same as in table 4), for the top 80 institutions in terms of the number of Pell Grant recipients in 2003, for the top 60 institutions, for the top 40 institutions, for the top 20 institutions and for the top 10 institutions. These analyses confirm that only the institutionally financed and awarded *NMS* adversely influence the number of Pell Grant recipients at an institution. However, the magnitude of this displacement effect varies across institution. In particular, the magnitude of the displacement effect increases as we move from the top 100 institutions, to the top 80, down to the top 10 (in terms of total number of Pell Grant recipients in 2003). It is at the institutions with the largest number of Pell Grant recipients that the displacement of Pell Grant recipients by institutionally funded *NMS* recipients is the largest. Indeed, we cannot reject the hypothesis that, other factors held constant, at the top 10 institutions, every additional institutionally financed *NMS* recipient that attends the

institution is associated with a reduction of one Pell Grant recipient attending the institution.[13]

Several extensions of our analyses warrant brief mention. First, we replicated the analyses found in table 5 separately for public and private institutions. The pattern of displacement effects for the privates was very similar to those for the entire sample; the coefficients of the institutional *NMS* variable were indistinguishable for each subgroup between private institutions and for the overall sample (reported in table 5). In contrast, the displacement effects of increasing institutional *NMS* awards at public institutions were not significantly different from zero when we used the top 80 and top 100 samples. This says that at those public institutions which lie below number 60 in terms of total *NMS* recipients in 2003, we find no evidence of a displacement of Pell Grant recipients by institutionally funded *NMS* recipients.

Second, we replicated the analyses found in table 5, adding data for 1999 to the sample. Because 1999 enrollment data was not collected by IPEDs, this required us to estimate the 1999 number of full-time first year students for each institution by the average of the 1998 and 2000 values of this variable for each institution. We found that even with the measurement error that is induced by doing this, our estimates of the displacement effects of increasing the number of institutionally sponsored *NMS* recipients at an institution on the number of Pell Grant recipients at the institution were roughly of the same order of magnitude as those found in table 5.

Third, part-time students attending an institution at least half-time are eligible to receive Pell Grants. While we do not know the number of part-time students at each

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[13] Four of the top 10 institutions are selective private universities that have no institutionally financed *NMS* recipients. Four of the other six are flagship public universities (appendix table A)

institution each year that meet this criteria, we experimented with either including part-time students in the total enrollment figures that are in the denominator of the dependent variable in equation (3), including part-time first-year students in the total first-year enrollment figure that is in the denominator of the explanatory variables in equation (3), or doing both simultaneously. None of these changes substantially affected the findings that we have reported so far.

Finally, we divided our sample into institutions that experienced increases in total full-time enrollments during both the 1987-1991 and 1991-1995 periods and all other institutions. We estimated variants of the models that underlie table 4 for both groups. We found that a strong statistically significant negative relationship exists between the change in the ratio of institutionally funded *NMS* to the number of full-time first-year students and the change in the ratio of the number of Pell Grant recipients to the total full-time undergraduates enrolled at the institution existed only at the "growing" institutions. Thus, the displacement of Pell Grant recipients by institutionally awarded *NMS* recipients in our sample appears to occur only at institutions with growing enrollments and largely reflects a change in the share of Pell Grant recipients in the student body, not always an absolute decline in the number of Pell grant recipients.

V.   Concluding Remarks

Our study has provided the evidence that, other factors held constant, an increase in the share of institutionally funded *NMS* students in a college or university's first-year class is associated with a reduction in the share of Pell Grant recipients among the undergraduate student body at the institution. The magnitude of this displacement effect is largest at the institutions in our sample that enroll the greatest number of *NMS* students

and it occurs primarily in institutions whose enrollment is growing. We stress that we have observed this displacement effect, as we expected, only for institutionally sponsored *NMS;* we do not observe any displacement of Pell Grant recipients if an institution is able to increase the number of *NMSC* or company sponsored recipients that it enrolls. Those *NMS* winners, who receive their awards regardless of at which institution they choose to enroll, do not appear to displace any student from lower-income families when they enroll at an institution.

While our research has focused only on *NMS* awards, it highlights the tradeoff that may exist more broadly between using institutional grant aid to craft a more selective student body than would otherwise occur and using institutional grant aid to attract more students from families from the lower tail of the family income distribution. If selective institutions, especially public ones, are committed to serving students from all socioeconomic backgrounds, these institutions must track the share of their students that receive Pell grants and focus on socioeconomic diversity as well as on student selectivity as goals. Absent concerted efforts by these institutions to increase the representation of students from lower and lower middle income families in their student ranks, current inequalities in the distribution of students attending these institutions by family income class are likely to persist or worsen over time.[14]

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[14] William G. Bowen, Martin A Kurzweil and Eugene M. Pichler (2005)

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http:///www.ed.gov/finaid/prof/resources/data/pell0203/ope.html)

Table 1
Number of Total and Institution-Funded *National Merit Scholarship*
Students[a]

year	All Institutions				Top 100 Institutions[b]		
	Total	Institution Funded	Percent Institution Funded		Total	Institution Funded	Percent Institution Funded
1983	5566	2,382	42.8		4330	1796	41.5
1987	6127	2,976	48.6		4844	2214	45.7
1991	6552	3,463	52.9		4982	2489	50.0
1995	7030	3,975	56.5		5496	2951	53.7
1999	8081	4,582	56.7		6594	3660	55.5
2003	8254	4,670	56.6		6965	3856	55.4

[a] Data on the number of *National Merit Scholarship* students by institution are provided by the *National Merit Scholarship* Corporation. A complete list of these institutions was made available to us for 1983, 1984, 1985, 1986, 1987, 1991, 1995, 1999, and 2003. The *Chronicle of Higher Education* publishes the top X institutions (where X varies across years from 30 to 100) that enroll the most *National Merit Scholarship* students in many years. Because of the changing coverage, we have not used the *Chronicle's* data.

[b] The top 100 institutions are determined by the total number of merit *NMS* students in an institution in 2003; these institutions are not necessarily the top 100 in earlier years. These institutions enroll about 80% of all *NMS* (ranging from 78% in 1983 to 84% in 2003).

Table 2
Distribution of *National Merit Scholarship* Students at the Top 100
Institutions: By Source of Sponsorship

year	All				Institution Funded				Non-Institution Funded			
	25th	50th	75th	mean	25th	50th	75th	mean	25th	50th	75th	mean
198384	12	24	47	42	0	5	20	17	5	10	29	25
198788	20	30	52	47	0	14	26	21	5	9	29	26
199192	20	32	55	48	0	16	34	24	6	12	24	24
199596	23	36	57	53	0	20	36	29	5	12	23	25
199900	28	41	85	64	6	25	41	36	6	15	31	28
200304	29	44	77	68	12	26	40	37	7	14	33	30

Table 3
Percentage of Full-Time Undergraduate Students
That are Pell Grant Recipients at the Top 100 Institutions[a]
(as defined in table 1)

year	Unweighted	Weighted
1983	18.60	21.16
1984	18.32	21.02
1985	18.23	21.12
1986	15.94	18.67
1987	16.58	19.77
1988	19.50	23.14
1989	19.75	23.42
1990	19.34	23.21
1991	21.30	25.56
1992	22.64	27.32
1993	21.98	25.89
1994	22.05	26.01
1995	21.71	25.60
1996	21.72	25.75
1997	21.72	25.79
1998	21.95	26.24
1999[b]	20.05	23.97
2000	19.22	23.19

[a] The Pell Grant data are from the Federal Pell Grant Program administrated by the Department of Education. We received data from the Department of Education for academic years 1983-84 to 2003-04 on the number of students receiving Pell Grants and total amount of Pell Grants received at each Title IV institution each year during the period. Data on the number of full-time undergraduates enrolled at each institution and the number of full-time first-time freshman at each institution are from Webcaspar (http://caspar.nsf.gov). The percentage of Pell Grant recipients at an institution in a year is 100 times the number of Pell Grant recipients at the institution in the year divided by the number of full-time undergraduates enrolled at the institution in a year.

[b] Enrollment data were not provided by Webcaspar for 1999, so we used the average of the 1998 and 1999 figures for that year.

Table 4
Estimates of the Impact of a Change in the Share of Freshman at an Institution that are National Merit Scholarship Winners on the Change in the Share of Undergraduates at the Institution that Receive Pell Grants: Fixed Effects Models (t statistics)

	Share of Pell Grant Recipients $Pell_t - Pell_{t-1}$	
(1)Share of Total $Merit_t - Merit_{t-4}$	-0.200 (-2.35)	-0.171 (-2.16)
(2)Share of Inst. $Merit_t - Merit_{t-4}$	-0.415 (-3.16)	-0.409 (-3.38)
(3)Share of Non-inst. $Merit_t - Merit_{t-4}$	-0.070 (-0.52)	-0.004 (-0.03)
(4)Share of Inst. $Merit_t - Merit_{t-4}$	-0.418 (-3.12)	-0.427 (-3.44)
Share of Non-inst. $Merit_t - Merit_{t-4}$	0.018 (0.14)	0.086 (0.69)
Year Fixed Effects Included	No	Yes

Table 5
Estimates of the Impact of a Change in the Share of Freshman at an Institution that are National Merit Scholarship Winners on the Change in the Share of Undergraduates at the Institution that Receive Pell Grants: Fixed Effects Models Estimated Separately For Different Samples[a]
(t statistics)

	Share of Pell Grant Recipients $Pell_t - Pell_{t-1}$		
	Top 100	Top 80	Top 60
(1)Share of Total $Merit_t - Merit_{t-4}$	-0.171 (-2.16)	-0.176 (-1.91)	-0.172 (-1.63)
(2)Share of Inst. $Merit_t - Merit_{t-4}$	-0.409 (-3.38)	-0.420 (-3.00)	-0.436 (-2.69)
(3)Share of Non-inst. $Merit_t - Merit_{t-4}$	-0.004 (-0.03)	-0.001 (-0.01)	0.012 (0.07)
(4)Share of Inst. $Merit_t - Merit_{t-4}$	-0.427 (-3.44)	-0.442 (-3.08)	-0.465 (-2.78)
Share of Non-inst. $Merit_t - Merit_{t-4}$	0.086 (0.69)	0.102 (0.69)	0.122 (0.73)
Year Fixed Effects	Yes	Yes	Yes

	Share of Pell Grant Recipients: $Pell_t - Pell_{t-1}$		
	Top 40	Top 20	Top 10
(1)Share of Total $Merit_t - Merit_{t-4}$	-0.288 (-2.50)	-0.397 (-2.14)	-0.699 (-2.74)
(2)Share of Inst. $Merit_t - Merit_{t-4}$	-0.551 (-3.25)	-0.824 (-2.93)	-1.471 (-4.06)
(3)Share of Non-inst. $Merit_t - Merit_{t-4}$	-0.130 (-0.65)	-0.209 (-0.62)	-0.392 (-0.85)
(4)Share of Inst. $Merit_t - Merit_{t-4}$	-0.558 (-3.16)	-0.867 (-2.84)	-1.465 (-3.77)
Share of Non-inst. $Merit_t - Merit_{t-4}$	0.031 (0.16)	0.129 (0.39)	-0.020 (-0.06)
Year Fixed Effects	Yes	Yes	Yes

[a] Using panel data for 1983, 1987, 1991 and 1995

Appendix
Colleges and Universities with the Most Freshman *NMS* in 2003

Rank	Institution	Total *NMS*	Sponsored by Institution
1	Harvard University	378	0
2	University of Texas at Austin	258	201
3	Yale University	228	0
4	University of Florida	224	185
5	Stanford University	217	0
6	University of Chicago	182	148
7	Arizona State University	176	153
8	Rice University	173	102
9	University of Oklahoma	170	146
10	Princeton University	165	0
11	Washington University in St. Louis	162	125
12	University of Southern California	161	132
13	Massachusetts Inst. of Technology	151	0
14	University of North Carolina at Chapel Hill	143	117
14	Vanderbilt University	143	103
16	Brigham Young University	140	97
17	Texas A&M University	137	103
18	New York University	136	115
19	University of California at Los Angeles	125	94
20	Duke University	103	0
21	University of Pennsylvania	101	0
22	Northwestern University	96	53
23	Ohio State University	93	77
23	Purdue University	93	75
25	Carleton College	79	62
26	Georgia Institute of Technology	77	62
27	University of Georgia	75	59
28	Iowa State University	69	55
29	University of California at Berkeley	67	0
30	Michigan State University	60	46
31	University of Arizona	59	47
31	University of Michigan at Ann Arbor	59	0
33	University of California at San Diego	56	38
34	Boston University	54	39
35	Case Western Reserve University	53	28
36	University of Nebraska at Lincoln	52	40
37	Macalaster College	51	48
38	California Institute of Technology	50	0
38	University of Kansas	50	40
40	Johns Hopkins University	49	32
40	University of Tulsa	49	38
40	University of Maryland at College Park	49	34
43	Brown University	47	0

43	Columbia University	47	0
45	Oberlin College	46	38
45	Tulane University	46	36
47	Dartmouth College	45	0
47	University of Kentucky	45	33
47	University of South Carolina at Columbia	45	34
47	Wheaton College (Ill.)	45	40
51	University of Notre Dame	44	0
51	University of Washington	44	26
53	Harvey Mudd College	43	32
54	Kenyon College	41	33
54	Tufts University	41	37
56	Baylor University	40	31
56	Grinnell College	40	35
56	University of Arkansas at Fayetteville	40	33
56	University of Minnesota-Twin Cities	40	26
60	Cornell University	38	0
60	Emory University	38	27
62	George Washington University	37	32
62	Georgetown University	37	0
62	St. Olaf College	37	31
65	University of Alabama at Tuscaloosa	35	28
66	Rose-Hulman Institute of Technology	34	24
67	Clemson University	33	26
67	Miami University (Ohio)	33	26
67	University of Central Florida	33	28
67	University of Illinois at Urbana-Champaign	33	0
67	University of Virginia	33	0
72	Louisiana State University at Baton Rouge	32	25
72	University of Mississippi	32	24
74	Brandeis University	31	24
74	Furman University	31	29
74	University of Miami	31	22
74	University of Texas at Dallas	31	28
78	Carnegie Mellon University	29	0
78	North Carolina State University	29	21
80	Auburn University	28	20
80	University of Wisconsin at Madison	28	4
82	University of Houston	27	25
83	Williams College	26	0
84	Amherst College	25	0
84	University of California at Irvine	25	20
86	Mississippi State University	24	21
86	University of Tennessee at Knoxville	24	20
88	Bowdoin College	23	21
88	Pomona College	23	6
88	University of Iowa	23	19
88	University of Utah	23	17
88	Washington and Lee University	23	13
93	Swarthmore College	21	0

93	University of Rochester	21	18
93	University of South Florida	21	17
93	Virginia Tech	21	15
97	Bowling Green State University	20	18
97	Calvin College	20	17
97	Kansas State University	20	12
97	Pennsylvania State University at University Park	20	5
97	Trinity University (Tex.)	20	17
97	University of Richmond	20	12
97	Whitman College	20	16