Investigating the Causal Impacts of the Gates Millennium Scholars & Washington State Achievers Programs

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The Gates Millennium Scholarship (GMS) Program

• Established in 1999 by Bill & Melinda Gates Foundation
• Will Provide $1 Billion in Scholarships Over 20 Year Period
• Goals
  – Improve Access for High Achieving, Low-Income Students of Color
  – Create a Cadre of Future Leaders
The GMS Program (cont’d)

• Covers Full Tuition at Any Institution of Higher Learning in the U.S.
  – GMS is a “last dollar” award. On average, scholars get approximately $6,000 more than non-scholars in grants and scholarships

• NORC (at U of Chicago) Surveys and Tracks GMS Scholars & Non-Recipients
GMS Selection Criteria

- High school GPA (3.3 minimum)
- Pell eligible, citizens, must complete app
- Score on Non-Cognitive Test
  - Apps answer questions developed to measure non-cognitive abilities
  - Answers scored by trained raters score assigned to each applicant
GMS Selection Criteria (cont’d)

• Applicants unlikely to be aware of cut pts. because unaware of # apps at test time
• Raters unlikely to know the cut pts. as they are unaware of the # of qualified apps
• If raters aware of # of apps at review time many apps are later disqualified because don’t meet other criteria
• Of 3,000-4,000 apps in year about 1,000 are selected
The Surveys

• Prepared by RAC & NORC
• Admin. to all Scholars & Random Sample of Non-Recipients
• Very extensive surveys in spring of freshman (baseline) & junior years (F1), then 2 yrs. later (F2)
  – Track demographic, HS/college academics, enrollment/graduation, student/parent finance, family, extra-curricular, perceptions of school & self, racial issues, issues about GMS administration, post-collegiate occupation
Data

• Had Info on Colleges Attended So Merged to IPEDS to Get IHE Characteristics

• F2 Asked Info About Undergrad Degree, Post-Grad Study & Labor Market Experience

  – But these were only measured at 5 years after entry
Possible Impacts of Scholarship

• Increase Chances of Attendance/Completion

• Lower Debt Levels of Recipients
  – Increased debt may reduce likelihood of attending graduate school (Millett, 2003)

• Change Aspirations for Graduate School

• Change Parental Contributions

• Reduce Work Hours While Enrolled
  – May increase time for studying, taking more credits, leisure, extra-curricular activities
  – Work may increase dropout & time to degree (Ehrenberg and Sherman, 1987)
Determining Causal Effects of Program

• Difficult Because Classic Selection Problem
  – Students not randomly assigned to program
• Overcome by Employing Regression Discontinuity (RD) Method
  – Originally used to study effects of National Merit Scholarship award (Thistlethwaite & Campbell, 1960)
  – Also used to study effects of financial aid on college acceptance and enrollment (van der Klaauw, W., 2002; Kane, 2003)
Outcomes Analyzed

• Variety of Them by Race/Ethnicity
• Estimated Differences Among GMS & Non-Scholars at End of Frosh/Jr Years for:
  – Retention, debt levels, hours worked/earnings, parents’ contributions, community involvement
  – Time spent studying, leisure activities frosh year only
  – Differences in 4 yr graduation rates & grad school aspirations
• Will Only Report on Selected Results
GMS Sample

• Two Cohorts Used (2001 & 2002)
• 3,200 Undergrads Who Matriculated in Fall
• Evenly Split Between GMS & Non-GMS
  – 42% African American
  – 35% Latino
  – 23% Asian American

• Note: American Indians not included because score on non-cognitive tests not a factor in selection (they accepted all who met the other criteria)
Observable Differences

• Overall sample includes more (fewer) Latino/a (Asian American) students receiving (not receiving) scholarships than in the non-recipient group

• Parents of GMS recipients have lower incomes and lower levels of education compared to non-recipients

• SAT scores and % with < 4 yrs of HS math about equal

• Nearly all students still enrolled at F1
  – Recipients enrollment rate is 3 percentage points higher than for non-scholars (98% vs. 95%)
Loan Amount Differences

• Avg. loan in frosh yr. is $2,140 for full sample
  – Recipients $975; $3,200 for non-recipients

• Full sample cumulative loan thru junior year about $6,800
  – GMS recipients $3,300; non-recipients about $10,000
Hours Worked

- Avg. number hours worked in frosh yr smaller (=13.5) than national averages
- GMS participants work 11 hours during work-week, non-recipients 15 hours
- Avg. number in junior year is 16 hours with difference between recipients/non-recipients about 4 hours
Estimation Strategy

• Baseline Model: controls for race, cohort, test score & square, and all possible 2 and 3 way interactions between race and cohort and test score and its square

• Add. Controls Model: Include gender, mother/father ed., family size, HS type, yrs of HS math & science, SAT, parental income

• Also estimated models with linear, quadratic, & cubic polynomial test score specifications
  – Results reported are from the quadratic model
Results

• Net impact of GMS on total scholarship money received is positive & sign. for all waves

• Impact on college enrollment is small & not statistically significant in any wave
  – App pool consists of higher ability minority students who would probably attend anyway

• Yearly loans reduced by 69%, 61%, and 44% of the estimated increase in scholarship money in the baseline, F1, and F2
Accumulated Debt from Student Loans: Junior Year

Cohort III

African Americans

Estimated Impact of GMS

- $7,537

Cut point = 72

Source: Gates Millennium Scholar Surveys: Cohort III
Notes: 1. Estimates based on local linear regression using optimal bandwidths.
2. Non-cognitive essay score measured as deviation from cut point.
Results

• Overall, evidence parental support reduced, at least for jr. year (27%)

• GMS reduces hours worked/week & avg. weekly earnings for baseline and F1; F2 negative but not significant

• Probability of being Social Science, STEM, Humanities, Education, business or journalism major no different (at F1)
Parental Contribution: Junior Year
Cohort III

Latinos

Estimated Impact of GMS
-$2,012

Cut point = 69

Source: Gates Millennium Scholar Surveys: Cohort III
Notes: 1. Estimates based on local linear regression using optimal bandwidths.
2. Non-cognitive essay score measured as deviation from cut point.
Results

• Overall, evidence parental support reduced, at least for jr. year (27%)

• GMS reduces hours worked/week & avg. weekly earnings for baseline and F1; F2 negative but not significant

• Probability of being Social Science, STEM, Humanities, Education, business or journalism major no different (at F1)
Results

• No evidence of higher 4 yr. grad rates among GMS recipients
• Conditional on completing college by F2, no difference in grad school attendance
• Among F2 completers not already enrolled in grad school, GMS raised probability of applying to grad school
  – By about 30 percentage points or 150%
Results

• Prob. of working in Educational Services industry was positive and statistically significant
  – Finding similar to results by Rothstein and Rouse (2007) for when lower student debt

• Among employed non-ed grads, 10% of GMS & 6% of non-recipients were teaching
  – Suggests GMS may induce some non-education majors to become teachers
Additional Results

• Evidence that PhD Aspirations of Asian Americans & Latinos raised

• Have Measures of Time Spent Studying, Relaxing, in Extracurricular Activities for Freshman Year
  – No effect of GMS on any of these variables

• Some Evidence of Increases in Community Service for Some Racial/Ethnic Groups in Frosh & Junior Years
Participates in Community Service Often or Very Often: Junior Year

Cohort III

Latinos

Source: Gates Millennium Scholar Surveys: Cohort III
Notes: 1. Estimates based on local linear regression using optimal bandwidths.
2. Non-cognitive essay score measured as deviation from cut point.

Estimated Impact of GMS 0.11

Cut point = 69
Subgroup Differences

• Also Examined Outcomes Differences by Gender, Parental Education, Type of Institution Attended
  – No differences in retention/work/parent contributions
• Loan Debt Reduced More for Private College Attendees Than Public College Attendees
• Scholarship Amts Higher for Men Than Women
• Some Evidence That “Treatment” (scholarship amount) Larger for Private College Attendees
Conclusions & Policy Implications

• Scholarship Has Little Effect on Retention Through the Junior Year
  – Ceiling effects?

• Scholarship Substantially Reduces Debt Load of Recipients
  – Remains to be seen how this change affects behavior with respect to career choice

• GMS Scholarship Lowers Time Spent Working & Increases Involvement in Community Service
  – No evidence that they spend more time studying or more time relaxing though
Conclusions & Policy Implications

• GMS Reduces Amount Parents Contribute to College Education (esp. for Asian Americans).
  – If parents expected this scholarship would they reduce their savings behavior?
  – Does the scholarship increase parental support for other children in the family?

• Aspirations for PhD’s Increased for Recipients

• Bachelor’s Degree Attainment
  – Some students get GMS in 5th year, may change incentives about 4 yr completion, lengthening time to degree
Initial Results of Washington State Achievers Scholarship Program

• Established in Washington in 2001 by Bill and Melinda Gates Foundation
• Part of initiative is to support 16 high schools as they redesign themselves
• In addition to school support, scholarships given to some students from each HS
  – 500 low-income students per year at each school
• Goals: Increase academic achievement for students thereby promoting college attendance and success
The WSA Program (cont’d)

- 1st students selected in spring 2001 & matriculated to college that fall
- Subsequent cohorts have/will begin college each fall through 2010
- Holistic program that involves, among other things, high school reform
Program Selection

- Students chosen in junior year of HS
- Must graduate, have need, & apply for need-based aid
- Family income < 35% of WA state average
  - Assets must be below a specified threshold
- Scholarships also (partially) allocated on basis of the score on non-cognitive test
Scholarship Details

• Pay tuition/fees for set of IHEs in WA state for up to five years
• “Top up” program: Funds cover differences in COA after other aid taken into account
• Students also provided mentors in high school and for first two years of college
• NORC Tracks WSA Scholars & Non-Recipients
Outcomes Analyzed

• Estimate differences in outcomes of scholars/non-scholars during freshman year
  – College enrollment, loan amounts, credits taken, hours worked, and weekly earnings while enrolled in college
  – Also time spent in extra-curricular activities, relaxing, and sleeping

• In the interest of time we will only report on selected results
Evidence of Discontinuity

Local Polynomial Estimates of Probability of WSA Scholar

At score of 20, \( \text{pr(WSA)} = .18 \)

At score of 30, \( \text{pr(WSA)} = .94 \)
Regressions

- Controls include: Demographic & student characteristics, characteristics of HS, non-cognitive test score
- TSLS when outcome is continuous (credits, work); probit w/endogenous regressor when outcome is dichotomous (enrollment)
- “Treatment” dummy provides evidence of net effect of WSA on outcome of interest
- Conducted many robustness checks; results qualitatively similar
WSA Sample

- WSA scholarship average is $5,853 in frosh year of college
- Total aid received by WSA scholars is $11,369, avg. for non-WSA is $2,419
- However, WSA scholars attend colleges with tuition costs about $5,800 higher than non-scholars ($13,398 vs. $7,602)
WSA Sample

- Total sample with applicable cut point is 498; 231 received scholarships (“treated”)
- HS give 55-65% of apps scholarship, fractions not different across schools
- Scholars take more AP/IB courses, more likely to take Algebra II & physics
- Observable characteristics do not differ substantially just above/below cut point
Compared to Non-Scholars, Receipt of WSA Award…

• …increases college enrollment by as much as .42 (in probability points); large effect
• …lowers average loan amounts in freshman year by $4,500 compared to non-WSA
• …overall, no differences in hours worked or weekly earnings during freshman year
  – Does increase probability of working while in college, but decreases average hours worked among those who work
Subgroup Differences

- Asian & Blacks higher enrollment rates (14 and 13 pct. points) vs. Whites
- Asian American students work less and earn less than white students
- Students taking AP/IB courses in HS less likely to attend 2-year colleges
- Black, Asian, & Latinos get fewer hours of sleep/week than white students
- Males report more hours per week relaxing than females
Limitations

- Only Cohort IV could be used as no evidence of discontinuity in prob(scholarship) for Cohort III
  - Relatively small sample size results in more imprecise estimates than would otherwise be

- Effect of WSA on enrollment is probably picking up effect of other services scholars receive (mentoring while in high school, and for their first two years of college)
  - Nearly 70% stated that hometown mentor was helpful/very helpful during college choice process, so assistance also related to college outcomes (e.g., enrollment, credits taken, etc.) we examined
Conclusions

• Large positive impact on the probability of college enrollment in the year after high school

• Scholarship lowers student debt; sub-group differences in the effect of the program on multiple outcomes

• Increases chances that recipient will work while in college, but average hours worked per week < non-recipients who work
A Final Word…

DISCLAIMER: The Views Contained Herein are Not Necessarily Those of the Bill & Melinda Gates Foundation

• For More Information About the GMS Program visit: www.gatesfoundation.org/Education/ResearchAndEvaluation/

• Copy of our paper can be obtained at:
  – URL HERE
Background Material
Variables Used in Analysis

- Debt levels (totloans; loancury), hours worked (wkhrweek); earnings, parents’ contributions (parconstr), community involvement (ucommuni)
- Time spent studying, leisure activities frosh year only
Non-Cognitive Questionnaire

- Developed by William Sedlacek (U of Maryland)
- 29 questions, eight scales
  - Self-concept
  - Realistic Self Appraisal
  - Understanding Racism
  - Long Range Goals
  - Leadership
  - Strong Support Person
  - Community Involvement
  - Non-traditional Knowledge
Response Rates

- Survey response rates 69% for Cohort II & 81% for Cohort III
- Higher for recipients than for non-recipients in both cohorts
  - 83% versus 58% in Cohort II and 90% versus 75% in Cohort III
- Among non-recipient responders in II 25% were apps who were disqualified because of low score; 74% of non-scholars in Cohort III were disqualified because of score below cut
Financial Aid

• **Rationale for government intervention**
  
  – Credit market constraints faced by students.
    
    • Keane & Wolpin (2001): Credit constraints are “tight” but no impact on enrollment behavior.
  
  – Public good aspect of education (spillover effects)
    
    • Moretti (2004) using NLSY found higher wages among those without college education in cities with larger fraction of college graduates.
    
    • Milligan, Moretti & Oreopoulos (2003) found evidence in the U.S. that increased education increased the likelihood of becoming politically involved.
Tuition + Fees and Net Price for Low Income Students 2003-2004

Source: CollegeBoard Trends in College Pricing 2006
Notes: Net Price = Tuition + Fees – Grants – Education Tax Benefits.
Low income defined as family income less than $35,000.
### GMS Scholars by Ethnic Group: Cohorts II & III

**Sample (Population)**

<table>
<thead>
<tr>
<th>Ethnic Group</th>
<th>Non-scholar</th>
<th>GMS Scholar</th>
</tr>
</thead>
<tbody>
<tr>
<td>African Americans</td>
<td>699 (2,164)</td>
<td>625 (710)</td>
</tr>
<tr>
<td>American Indians</td>
<td>128 (237)</td>
<td>192 (258)</td>
</tr>
<tr>
<td>Asian Pacific Islander</td>
<td>453 (1,425)</td>
<td>289 (312)</td>
</tr>
<tr>
<td>Hispanic Americans</td>
<td>495 (1,241)</td>
<td>621 (718)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,775 (5,067)</td>
<td>1,727 (1,999)</td>
</tr>
</tbody>
</table>
### Table 1
Sample Means and Means Just Above and Below the "Cut Points" for Background Variables

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Full Sample</th>
<th>Cut Score + 1</th>
<th>Cut Score - 1 or Full</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT Composite Score</td>
<td>23.7</td>
<td>23.58</td>
<td>24.12</td>
<td>0.28</td>
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<tr>
<td>SAT Verbal + Math Score</td>
<td>1123.92</td>
<td>1110.76</td>
<td>1124.86</td>
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<tr>
<td>Attended Religious High School</td>
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<td>0.06</td>
<td>0.04</td>
<td>0.25</td>
</tr>
<tr>
<td>Attended Private High School</td>
<td>0.07</td>
<td>0.08</td>
<td>0.04</td>
<td>0.12</td>
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<tr>
<td>Years of High School Math</td>
<td>3.87</td>
<td>3.88</td>
<td>3.86</td>
<td>0.37</td>
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<tr>
<td>Years of High School Science</td>
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<td>3.63</td>
<td>3.69</td>
<td>0.22</td>
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<tr>
<td>Family Size</td>
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<td>3.65</td>
<td>3.66</td>
<td>0.96</td>
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<td>Born in U.S.</td>
<td>0.61</td>
<td>0.61</td>
<td>0.58</td>
<td>0.57</td>
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<td>Family Owns Home</td>
<td>0.51</td>
<td>0.47</td>
<td>0.50</td>
<td>0.47</td>
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<tr>
<td>Female</td>
<td>0.61</td>
<td>0.66</td>
<td>0.61</td>
<td>0.24</td>
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**Father's education**

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<td>0.20</td>
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<tr>
<td>High School</td>
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<tr>
<td>Some College</td>
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<tr>
<td>BA/BS Degree</td>
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<td>0.15</td>
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<td>Post BA/BS Degree</td>
<td>0.10</td>
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**Mother's education**

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<td>Less Than High school</td>
<td>0.19</td>
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<tr>
<td>High School</td>
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<tr>
<td>Some College</td>
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<td>Post BA/BS Degree</td>
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<td>Ethnic Group</td>
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<td>-----------</td>
<td>------------</td>
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<tr>
<td>African Americans</td>
<td>71</td>
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<tr>
<td>Asian Americans</td>
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<tr>
<td>Latinos</td>
<td>68</td>
<td>69</td>
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<td></td>
<td>Enrollment</td>
<td>Total Loans</td>
<td>Hours of Work</td>
<td>Weekly Earnings</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------</td>
<td>-------------</td>
<td>--------------</td>
<td>-----------------</td>
</tr>
<tr>
<td><strong>Combined</strong></td>
<td>0.013</td>
<td>-$2,201</td>
<td>-4.14</td>
<td>-$18</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.349)</td>
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<tr>
<td><strong>African Americans</strong></td>
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<td>(0.040)</td>
<td>(0.000)</td>
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<td>(0.256)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.279)</td>
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<td><strong>Latinos</strong></td>
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<td>(0.243)</td>
<td>(0.000)</td>
<td>(0.004)</td>
<td>(0.245)</td>
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Controls for total non-cognitive score using a quadratic function. Standard errors in parentheses.
<table>
<thead>
<tr>
<th></th>
<th>Enrollment</th>
<th>Total Loans</th>
<th>Hours of Work</th>
<th>Weekly Earnings</th>
<th>Parental Contribution</th>
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<td><strong>Combined</strong></td>
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<td>(0.416)</td>
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Controls for total non-cognitive score using a quadratic function. Standard errors in parentheses.
RD Estimated Impact of GMS on Outcome Variables at End of Freshman Year of College

Table 3(a) No Additional Controls

<table>
<thead>
<tr>
<th></th>
<th>Enrollment</th>
<th>Total Loans</th>
<th>Hours of Work</th>
<th>Weekly Earnings</th>
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<tr>
<td></td>
<td>(0.028)</td>
<td>($1,246)</td>
<td>(3.71)</td>
<td>($53)</td>
<td>($1,025)</td>
</tr>
<tr>
<td>Latinos</td>
<td>-0.005</td>
<td>-$2,839</td>
<td>-0.28</td>
<td>-$24</td>
<td>-$575</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>($1,379)</td>
<td>(2.89)</td>
<td>($28)</td>
<td>($495)</td>
</tr>
</tbody>
</table>

Controls for total non-cognitive score using a quadratic function. Standard errors in parentheses.
Table 3(b) Additional Controls: Parents’ Education, Family Size, SAT score, Parents’ Income, High School Type & Gender

<table>
<thead>
<tr>
<th>Estimated Impact of GMS on Outcome Variables at End of Freshman Year of College</th>
<th>Enrollment</th>
<th>Total Loans</th>
<th>Hours of Work</th>
<th>Weekly Earnings</th>
<th>Parental Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined</td>
<td>0.003</td>
<td>-$1,842</td>
<td>-5.28</td>
<td>-$71</td>
<td>-$653</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
<td>($648)</td>
<td>(1.90)</td>
<td>($30)</td>
<td>($383)</td>
</tr>
<tr>
<td>African Americans</td>
<td>-0.005</td>
<td>-$1,524</td>
<td>-5.10</td>
<td>-$83</td>
<td>-$796</td>
</tr>
<tr>
<td></td>
<td>(0.025)</td>
<td>($514)</td>
<td>(2.30)</td>
<td>($63)</td>
<td>($365)</td>
</tr>
<tr>
<td>Asian Americans</td>
<td>0.025</td>
<td>-$1,199</td>
<td>-11.44</td>
<td>-$171</td>
<td>-$2,179</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
<td>($1,279)</td>
<td>(3.48)</td>
<td>($63)</td>
<td>($1,191)</td>
</tr>
<tr>
<td>Latinos</td>
<td>0.000</td>
<td>-$2,766</td>
<td>-1.64</td>
<td>-$27</td>
<td>$377</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>($1,726)</td>
<td>(2.98)</td>
<td>($23)</td>
<td>($670)</td>
</tr>
</tbody>
</table>

Controls for total non-cognitive score using a quadratic function. Standard errors in parentheses.
controls for total non-cognitive score using a quadratic function. Standard errors in parentheses.

Table 4(a) No Additional Controls

<table>
<thead>
<tr>
<th></th>
<th>Enrollment</th>
<th>Total Loans</th>
<th>Hours of Work</th>
<th>Weekly Earnings</th>
<th>Parental Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined</td>
<td>0.006</td>
<td>-$6,915</td>
<td>-5.36</td>
<td>-$53</td>
<td>-$1,554</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>($994)</td>
<td>(1.52)</td>
<td>($20)</td>
<td>($356)</td>
</tr>
<tr>
<td>African Americans</td>
<td>0.000</td>
<td>-$6,231</td>
<td>-6.61</td>
<td>-$67</td>
<td>-$435</td>
</tr>
<tr>
<td></td>
<td>(0.029)</td>
<td>($1,466)</td>
<td>(2.49)</td>
<td>($30)</td>
<td>($292)</td>
</tr>
<tr>
<td>Asian Americans</td>
<td>0.083</td>
<td>-$7,270</td>
<td>-8.70</td>
<td>-$92</td>
<td>-$5,167</td>
</tr>
<tr>
<td></td>
<td>(0.043)</td>
<td>($2,710)</td>
<td>(3.56)</td>
<td>($40)</td>
<td>($1,356)</td>
</tr>
<tr>
<td>Latinos</td>
<td>-0.032</td>
<td>-$7,480</td>
<td>-1.79</td>
<td>-13</td>
<td>-$721</td>
</tr>
<tr>
<td></td>
<td>(0.017)</td>
<td>($1,299)</td>
<td>(2.76)</td>
<td>($35)</td>
<td>($448)</td>
</tr>
</tbody>
</table>
Table 4(b) Additional Controls: Parents’ Education, Family Size, SAT score, Parents’ Income, High School Type & Gender

<table>
<thead>
<tr>
<th></th>
<th>Enrollment</th>
<th>Total Loans</th>
<th>Hours of Work</th>
<th>Weekly Earnings</th>
<th>Parental Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Combined</strong></td>
<td>0.004</td>
<td>-$6,376</td>
<td>-5.18</td>
<td>-$47</td>
<td>-$1386</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>($1,218)</td>
<td>(1.82)</td>
<td>($23)</td>
<td>($411)</td>
</tr>
<tr>
<td><strong>African Americans</strong></td>
<td>0.015</td>
<td>-$5,606</td>
<td>-6.48</td>
<td>-51</td>
<td>117</td>
</tr>
<tr>
<td></td>
<td>(0.042)</td>
<td>($1,579)</td>
<td>(2.92)</td>
<td>($30)</td>
<td>($387)</td>
</tr>
<tr>
<td><strong>Asian Americans</strong></td>
<td>0.050</td>
<td>-$7,373</td>
<td>-7.56</td>
<td>-87</td>
<td>-$5,545</td>
</tr>
<tr>
<td></td>
<td>(0.037)</td>
<td>($2,751)</td>
<td>(3.92)</td>
<td>($43)</td>
<td>($1,602)</td>
</tr>
<tr>
<td><strong>Latinos</strong></td>
<td>-0.023</td>
<td>-$6,949</td>
<td>-3.12</td>
<td>-30</td>
<td>-$551</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>($1,899)</td>
<td>(3.16)</td>
<td>($45)</td>
<td>($438)</td>
</tr>
</tbody>
</table>

Controls for total non-cognitive score using a quadratic function. Standard errors in parentheses.
### RD Estimated Impact of GMS on Participation in Community Service

<table>
<thead>
<tr>
<th></th>
<th>End of Freshman Year</th>
<th>End of Junior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Controls (1)</td>
<td>Controls (2)</td>
</tr>
<tr>
<td>Combined</td>
<td>0.122 (0.041)</td>
<td>0.095 (0.040)</td>
</tr>
<tr>
<td></td>
<td>0.131 (0.045)</td>
<td>0.118 (0.048)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African Americans</td>
<td>0.146 (0.052)</td>
<td>0.126 (0.057)</td>
</tr>
<tr>
<td></td>
<td>0.103 (0.074)</td>
<td>0.070 (0.075)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian Americans</td>
<td>0.082 (0.095)</td>
<td>-0.010 (0.119)</td>
</tr>
<tr>
<td></td>
<td>0.207 (0.120)</td>
<td>0.169 (0.133)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latinos</td>
<td>0.117 (0.073)</td>
<td>0.093 (0.079)</td>
</tr>
<tr>
<td></td>
<td>0.128 (0.054)</td>
<td>0.142 (0.067)</td>
</tr>
</tbody>
</table>

Controls for total non-cognitive score using a quadratic function. Standard errors in parentheses. In columns (2) and (4) controls for Parent's Education, Family Size, SAT score, Parents Income, High School Type & Gender are added.
### Estimated Impact of GMS on Outcome Variables at End of Junior Year in College by Subgroup on Educational Aspirations

<table>
<thead>
<tr>
<th></th>
<th>Combined</th>
<th>African Americans</th>
<th>Asian Americans</th>
<th>Latinos</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MA/Professional Degree</strong></td>
<td>0.055</td>
<td>0.053</td>
<td>0.035</td>
<td>0.058</td>
</tr>
<tr>
<td></td>
<td>(0.046)</td>
<td>(0.068)</td>
<td>(0.11)</td>
<td>(0.084)</td>
</tr>
<tr>
<td><strong>PhD</strong></td>
<td>0.123</td>
<td>0.009</td>
<td>0.264</td>
<td>0.175</td>
</tr>
<tr>
<td></td>
<td>(0.039)</td>
<td>(0.06)</td>
<td>(0.088)</td>
<td>(0.045)</td>
</tr>
</tbody>
</table>
## End of Jr Yr Results by Sub Group

<table>
<thead>
<tr>
<th>Sub Group</th>
<th>Retention</th>
<th>Scholarship Support</th>
<th>Total Loans</th>
<th>Hours of Work</th>
<th>Earnings</th>
<th>Parental Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
<td>(6)</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>-0.014</td>
<td>$11,955</td>
<td>-$8,812</td>
<td>-3.88</td>
<td>-$45.71</td>
<td>-$1,254</td>
</tr>
<tr>
<td></td>
<td>(0.023)</td>
<td>(691)</td>
<td>(1866)</td>
<td>(2.78)</td>
<td>(19.53)</td>
<td>(691)</td>
</tr>
<tr>
<td>Women</td>
<td>0.015</td>
<td>$5,093</td>
<td>-$6,081</td>
<td>-5.65</td>
<td>-$54.12</td>
<td>-$1,632</td>
</tr>
<tr>
<td></td>
<td>(0.021)</td>
<td>(1082)</td>
<td>(1051)</td>
<td>(1.72)</td>
<td>(23.31)</td>
<td>(512)</td>
</tr>
<tr>
<td>College Degreed Parent</td>
<td>-0.007</td>
<td>$9,274</td>
<td>-$9,827</td>
<td>-4.16</td>
<td>-$29.47</td>
<td>-$3,451</td>
</tr>
<tr>
<td></td>
<td>(0.022)</td>
<td>(1930)</td>
<td>(1997)</td>
<td>(2.99)</td>
<td>(39.79)</td>
<td>(952)</td>
</tr>
<tr>
<td>No College Degreed Parent</td>
<td>0.020</td>
<td>$6,897</td>
<td>-$5,430</td>
<td>-6.22</td>
<td>-$63.48</td>
<td>-$722</td>
</tr>
<tr>
<td></td>
<td>0.021</td>
<td>(1083)</td>
<td>(1300)</td>
<td>(2.17)</td>
<td>(18.85)</td>
<td>(1959)</td>
</tr>
<tr>
<td>Public 4-year</td>
<td>0.004</td>
<td>$5,818</td>
<td>-$4,002</td>
<td>-4.64</td>
<td>-$34.13</td>
<td>-$794</td>
</tr>
<tr>
<td></td>
<td>(0.018)</td>
<td>(832)</td>
<td>(898)</td>
<td>(2.00)</td>
<td>(23.34)</td>
<td>(373)</td>
</tr>
<tr>
<td>Private 4-Year</td>
<td>0.043</td>
<td>$8,633</td>
<td>-$12,609</td>
<td>-6.08</td>
<td>-$68.04</td>
<td>-$2,749</td>
</tr>
<tr>
<td></td>
<td>(0.027)</td>
<td>(1794)</td>
<td>(2253)</td>
<td>(3.04)</td>
<td>36.18</td>
<td>(1169)</td>
</tr>
</tbody>
</table>
Predicted Probability of Enrollment by Total Non-cognitive Score

Figure 3
Predicted Probability of Enrollment in Follow-up Survey by Total Non-Cognitive Score
Cohort III

African Americans

Asian Americans

Latinos

Source: Gates Millennium Scholar Surveys; Cohort III.
Notes: The vertical lines indicate the respective cut points for each ethnic group for the Gates Millennium Scholarship program.
Predicted Total Loans by Total Non-Cognitive Score

Source: Gates Millennium Scholar Surveys: Cohort III.
Notes: The vertical lines indicate the respective cut points for each ethnic group for the Gates Millennium Scholarship program.
Predicted Hours of Work by Total Non Cognitive Score

Figure 5
Predicted Hours of Work in Follow-up Survey by Total Non-Cognitive Score
Cohort III

African Americans

Asian Americans

Latinos

Source: Gates Millennium Scholar Surveys Cohort III.
Notes: The vertical lines indicate the respective cut points for each ethnic group for the Gates Millennium Scholarship program.
Test for Manipulation of Test Score: Expect Jump if So

Figure 1
Distribution of Total Non-Cognitive Score by Race/Ethnicity: Cohort II

African Americans

Asian Americans

Latinos

Source: Gates Millennium Scholar Surveys: Cohort II
Test for Manipulation of Test Score: Expect Jump if So

Figure 2
Distribution of Total Non-Cognitive Score by Race/Ethnicity: Cohort III

African Americans

Asian Americans

Latinos

Source: Gates Millennium Scholar Surveys: Cohort III
Predicted Hours of Work by Total Non-Cognitive Score

Figure 5
Predicted Hours of Work in Follow-up Survey by Total Non-Cognitive Score
Cohort III

Source: Gates Millennium Scholar Surveys Cohort III.
Notes: The vertical lines indicate the respective cut points for each ethnic group for the Gates Millennium Scholarship program.
Figure 7
Fraction Enrolled in College: Fall 2004
Cohort III

Source: Gates Millennium Scholar Surveys: Cohort III
Notes: 1. Estimates based on local linear regression using optimal bandwidths.
2. Non-cognitive essay score measured as deviation from cut point.
Fraction of Gates Millennium Scholars

Source: Gates Millennium Scholar Surveys; Cohort III
Note: 1. Estimates based on local linear regression using optimal bandwidths.
   2. Non-cognitive essay score measured as deviation from cut point.
Accumulated Debt through Junior Year

Figure 9
Accumulated Debt from Student Loans: Junior Year
Cohort III

African Americans

Asian Americans

Latinos

Source: Gates Millennium Scholar Surveys: Cohort III
Notes: 1. Estimates based on local linear regression using optimal bandwidths.
2. Non-cognitive essay score measured as deviation from cut point.
Figure 10
Hours Worked per Week: Junior Year
Cohort III

Source: Gates Millennium Scholar Surveys: Cohort III
Notes: 1. Estimates based on local linear regression using optimal bandwidths.
   2. Non-cognitive essay score measured as deviation from cut point.
Figure 11
Parental Contribution: Junior Year
Cohort III

African Americans

Asian Americans

Latinos

Source: Gates Millennium Scholar Surveys: Cohort III
Notes: 1. Estimates based on local linear regression using optimal bandwidths.
2. Non-cognitive essay score measured as deviation from cut point.
Figure 12
Total Dollar Amount of Scholarships: Junior Year
Cohort III

Source: Gates Millennium Scholar Surveys: Cohort III
Notes: 1. Estimates based on local linear regression using optimal bandwidths.
2. Non-cognitive essay score measured as deviation from cut point.
Participates in Community Service Often or Very Often: Junior Year
Cohort III

African Americans

Asian Americans

Latinos

Source: Gates Millennium Scholar Surveys: Cohort III
Notes: 1. Estimates based on local linear regression using optimal bandwidths.
2. Non-cognitive essay score measured as deviation from cut point.