Educational and socioeconomic background of undergraduates and academic performance: consequences for affirmative action programs at a Brazilian research university

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Study Proposal

To determine associations between undergraduate students’ characteristics, including:

- Family’s socioeconomic/job situation
- Family’s educational background
- Student’s gender and age

and

- Student’s undergraduate academic performance compared to his/her performance at admission - relative performance
State University of Campinas – Unicamp
State of São Paulo - Brazil

- One of only four Brazilian HEIs included in the world top 500 (Chinese study)
- About 15,000 undergraduate and 10,000 graduate students enrolled
- Confers about 700 PhDs every year
- Responsible for 15% of all indexed research produced in Brazil, the source of 2% of all indexed research worldwide
- Strong technological and scientific profile
- Highly selective: average of 16 candidates per undergraduate position
- Selection based exclusively on an admission exam
# Background data (2003/4)

<table>
<thead>
<tr>
<th></th>
<th>Brazil</th>
<th>São Paulo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>185 million</td>
<td>40 million</td>
</tr>
<tr>
<td>Per capita GDP (PPP)</td>
<td>U$ 7,460</td>
<td>U$ 11,190</td>
</tr>
<tr>
<td>Tertiary enrolment</td>
<td>4,35 million</td>
<td>1,10 million</td>
</tr>
<tr>
<td>Net tertiary enrolment (age group: 18-24)</td>
<td>11%</td>
<td>13%</td>
</tr>
<tr>
<td>Public sector participation</td>
<td>28%</td>
<td>15%</td>
</tr>
<tr>
<td>Black / &quot;Pardo&quot; population</td>
<td>47%</td>
<td>28%</td>
</tr>
</tbody>
</table>
Student population in the study

- 6,701 undergraduate students (all students enrolled in 4+ year courses)
- Admitted in the years 1994-1997
- Students’ status in January/2005:

<table>
<thead>
<tr>
<th>Graduated</th>
<th>Dropped-out or expelled</th>
<th>Active</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,837</td>
<td>1,713</td>
<td>151</td>
<td>6,701</td>
</tr>
<tr>
<td>72%</td>
<td>26%</td>
<td>2%</td>
<td>100%</td>
</tr>
</tbody>
</table>

- Educational and socio-economic information

<table>
<thead>
<tr>
<th></th>
<th>Public secondary schooling</th>
<th>Low-income</th>
<th>Father with tertiary degree</th>
<th>Mother with tertiary degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unicamp#</td>
<td>27%</td>
<td>10%</td>
<td>53%</td>
<td>41%</td>
</tr>
<tr>
<td>São Paulo</td>
<td>84%*</td>
<td>57%*</td>
<td>11%**</td>
<td>12%***</td>
</tr>
<tr>
<td>Brazil</td>
<td>83%*</td>
<td>69%*</td>
<td>8%**</td>
<td>9%***</td>
</tr>
</tbody>
</table>

* Secondary graduates, 2004
** Adult male pop., 2004
*** Adult female pop., 2004

Source: Comvest and PNAD/IBGE
Relevant variables in the study

Hierarchical model

• Highest level (3th) – General family characteristics
  – Family income, consumer goods at home, composite socioeconomic-educational index

• Middle level (2nd) – Special family and student characteristics prior to admission
  – Characteristics of the parents: occupation, job status, formal education
  – Characteristics of student before admission: secondary education (regular/technical-professional/teacher’s credential, public/private), reading habits, attendance of preparatory courses, worker/not worker

• Lower level (1st) – Student characteristics after admission
  – Characteristics of student after admission: area of studies, course, year of admission

• Controlling variables
  – Sex
  – Age at admission

• Academic performance variables
  – Grades at admission
  – Grades during undergraduate studies
  – Length of stay as student
  – Exit status
Relative performance

- **Course at given year** has initially $n$ enrolled students

- **Relative admission rank** in year-course: $R_a = r_a / n$
  - $r_a$: absolute admission rank  
  - lowest = 1, highest = $n$

- **Relative exit rank** in year-course: $R_e = r_e / n$
  - $r_e$: absolute exit rank  
  - lowest = 1, highest = $n$

- **Relative performance**:

  $$P = R_e - R_a$$

  ($P$ varies between $1/n - 1$ and $1 - 1/n$)
Variables associated to positive relative performance

- Low composite socioeconomic index level
- Public secondary schooling
- Technical or teaching credential secondary schooling
- Not speaking a foreign language
- Being female
- Being younger
Affirmative action program at Unicamp

• Admission grade: average of **500 points**

• Extra points in final admission grade for candidates who:
  
  – Had graduated from public secondary system + 30 pts
  
  – If so + declared ethnicity/color as Black/Pardo/Native Brazilian + 40 pts

• Admission fee waiver program:
  
  – For low-income candidates from public secondary system
## Affirmative action program at Unicamp

### Socioeconomic and educational profile
(2005/6 over 2003/4)

<table>
<thead>
<tr>
<th>Category</th>
<th>Increase (Change in % of total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public secondary schooling:</td>
<td>+ 18% (29% to 33%)</td>
</tr>
<tr>
<td>Blacks/Pardos/Native Brazilians (B-P-NB):</td>
<td>+ 42% (11% to 15%)</td>
</tr>
<tr>
<td>Low-income public secondary schooling:</td>
<td>+ 19% (20% to 23%)</td>
</tr>
<tr>
<td>Low-income B-P-NB:</td>
<td>+ 61% (6.4% to 10%)</td>
</tr>
<tr>
<td>Low-income total:</td>
<td>+ 10% (43% to 47%)</td>
</tr>
</tbody>
</table>
Affirmative action program at Unicamp

Academic results for class admitted in 2005
(after completing first year of studies)

• Public secondary schooling
  – In 53 courses, out of 56, relative performance was positive (in 31 of them within 5% significance)
  – In 31 courses, out of 56, absolute academic performance was higher

• Ethnicity/race/color
  – No significative difference between this group and the complementary one
Conclusions of the study

- At Unicamp students of lower social status perform better along their undergrad studies than those of higher

- Public secondary schooling is one relevant aspect to be taken into account

- Women also perform better than men
It is possible to accommodate affirmative action programs and merit criteria when recruiting undergraduate students to a highly selective (research) university
Research project members

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