



**IMHE/OECD General Conference**

**Values and Ethics in Higher Education  
Paris, September 11-13, 2006**

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

**Renato H. L. Pedrosa**

**State University of Campinas – Unicamp  
Brazil**

# 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 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)

	<b>Brazil</b>	<b>São Paulo</b>
<b>Population</b>	<b>185 million</b>	<b>40 million</b>
<b>Per capita GDP (PPP)</b>	<b>U\$ 7,460</b>	<b>U\$ 11,190</b>
<b>Tertiary enrolment</b>	<b>4,35 million</b>	<b>1,10 million</b>
<b>Net tertiary enrolment (age group: 18-24)</b>	<b>11%</b>	<b>13%</b>
<b>Public sector participation</b>	<b>28%</b>	<b>15%</b>
<b>Black / "Pardo" population</b>	<b>47%</b>	<b>28%</b>



# 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:

Graduated	Dropped-out or expelled	Active	Total
4,837	1,713	151	6,701
72%	26%	2%	100%

- Educational and socio-economic information

	Public secondary schooling	Low-income	Father with tertiary degree	Mother with tertiary degree
Unicamp#	27%	10%	53%	41%
São Paulo	84%*	57%*	11%**	12%***
Brazil	83%*	69%*	8%**	9%***

# 1994-1997

\* 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)

<b>Category</b>	<b>Increase</b>	<b>(Change in % of total)</b>
– Public secondary schooling:	<b>+ 18%</b>	<b>(29% to 33%)</b>
– Blacks/Pardos/Native Brazilians (B-P-NB):	<b>+ 42%</b>	<b>(11% to 15%)</b>
– Low-income public secondary schooling:	<b>+ 19%</b>	<b>(20% to 23%)</b>
– Low-income B-P-NB:	<b>+ 61%</b>	<b>(6.4% to 10%)</b>
– Low-income total:	<b>+ 10%</b>	<b>(43% to 47%)</b>



# 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 significant 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**



## Affirmative Action and Academic Merit

*It is possible to accommodate affirmative action programs and merit criteria when recruiting undergraduate students to a highly selective (research) university*



## Research project members

- **Renato H. L. Pedrosa**
- **J. Norberto W. Dachs**
- **Rafael P. Maia**
- **Cibele Y. Andrade**

**State University of Campinas - Unicamp, Brazil**

- **Benilton S. Carvalho**

**State University of Campinas - Unicamp, Brazil**  
**Now at Johns Hopkins University, USA**