

Educational and Socioeconomic Background of Undergraduates and Academic Performance: Consequences for Affirmative Action Programs at a Brazilian Research University

by

Renato H. L. Pedrosa, J. Norberto W. Dachs, Rafael P. Maia and Cibele Y. Andrade
State University of Campinas (Unicamp), Brazil

Benilton S. Carvalho
Johns Hopkins University, USA

This paper describes the results of a detailed study relating the performance of undergraduate students admitted to the State University of Campinas (Unicamp) from 1994 through 1997 and their socioeconomic and educational background. The study is based on a hierarchical model for the relevant variables involved. The main result is that students coming from disadvantaged backgrounds, in both educational and socioeconomic aspects, have a higher relative performance than their complementary group (we propose to call that phenomenon “educational resilience”). We report on an affirmative action program established at Unicamp (for undergraduate admissions), partially motivated by those findings, and present evidence from initial evaluation studies showing its positive impact. Finally, we comment on this study’s and Unicamp’s program’s impact on the present debate about affirmative action access policies in Brazilian HEIs.

Introduction

In Brazil, broadening the participation of graduates from the public secondary school system in higher education, in particular in public universities, is at the center of the debate on educational inclusion, since most of them also belong to low income families, and both groups are heavily underrepresented in the student bodies of those institutions. Recently, the ethnicity of students also became a central issue, since the same is true for blacks, “pardos” and native Brazilians (Martins (2003). “Pardo” may be translated as “grey” or “brown” and is used in self-assessing questions about color/race/ethnicity in official census forms, along with “white”, “black”, “yellow” and native Brazilians¹. We will use the Portuguese word in this paper, since there is no clear equivalent in English.

Besides the equity and formal equality issues of the debate, one issue that is frequently raised against affirmative action policies addressing such inequities – such as quotas for selected groups – is that they

1. “Pardo” is the Portuguese word appearing in official census and university questionnaires, referring to (non-black) people of mixed ancestry involving blacks. The word “pardo” is difficult to translate into English. It relates to color of skin, and has been translated as “brown”, but it also has a generic mixed-race connotation. For a description and discussion about the way race and ethnicity are classified in Brazil, see Travassos and Williams (2004).

may end up lowering the academic standards of the student body of higher education institutions (HEIs), in particular in the most selective ones. We use the expression affirmative action in a broad sense: affirmative action “occurs when people go out of their way (take positive action) to increase the likelihood of true equality for individuals of differing categories” (Crosby and Cordova, 1996). For a discussion of many aspects of affirmative action in the United States, see articles in Crosby and VanDeVeer (2000). An exposition of the situation in Brazil is in Martins (2003).

The main objective of this study was to investigate if there is quantitative evidence in support of policies enlarging the participation of educationally and socioeconomic disadvantaged youngsters, while preserving the academic principle of merit, when recruiting the students at a research university.

We chose the State University of Campinas (Unicamp), part of the State of São Paulo’s public higher education system and one of the top research universities in Brazil, as an institution appropriate for such a study. Unicamp is responsible for about 15% of all scientific output and 10% of all master/doctor degrees conferred in the country. Brazil is in the group of countries, together with Argentina, Mexico and South Korea, which contribute up to 2% of all indexed scientific articles of the world total output. Brazilian HEIs confer more than 7 000 doctor degrees every year (FAPESP, 2005). Unicamp is highly selective, with an average of over 16 candidates *per* undergraduate position offered each year (COMVEST, 2005). Academic, as well as socioeconomic data of 6 701 students admitted to Unicamp from 1994 through 1997 formed the study database.

The focus of the study was the investigation of how a student’s educational background, in particular if he/she had graduated from either public or private secondary schools, relates to his/her scholarly performance as undergraduates. We did not consider the race/ethnicity of students, another relevant and much debated issue, since that information is available only for those admitted to Unicamp from 2003 onwards. A future study will take that into account. Other variables were also considered, like gender, family educational and income status, etc., as we will report below.

The results of this study indicate that students coming from a disadvantaged environment, in socioeconomic and educational terms, perform relatively better than those coming from higher socioeconomic and educational strata. We call this phenomenon *educational resilience*, adapted from the resilience concept used in infant mortality studies (Wolfson and Rowe, 2001, p. 558). More interestingly, from an educational public policy viewpoint, is that students who came from public schools had a better relative performance than those who had studied at private schools. Methodologically, we used a hierarchical scheme (Victora, *et al.*, 1997) to build both linear and logistic regression models.

These results motivated the establishment of affirmative action programs (benefiting candidates who graduated from public high schools) at Unicamp which, as recent evidence shows, do not result in lower recruiting academic standards. In fact, the opposite seems to be true, as these early studies indicate (see *Comments* section at the end). The policies were implemented for those applying for admission to Unicamp in 2005. We will present the program and discuss the impact of the adopted policies in terms of enlarging the group of students coming from public high schools. We also report on a preliminary evaluation study of performance by that group.

We observe that the debate about the predictive validity of selection criteria of College academic performance has been in evidence in the US in recent years. As examples, we refer to the studies by Leonard and Jiang (1999) and by Rothstein (2004), as well as the references one may find in those papers.

Technical details related to the present paper, including development and analysis of the statistical model used for this research, as well as further information contained in the available databases, may be found in Dachs, *et al.* (2006).

Background

Brazil is a medium income developing country in South America, with per capita GDP (PPP²) of USD 7 460 in 2004 (World Bank, 2004). It has a population of over 180 million and a territory of about 8.5 million square kilometers. The State of São Paulo has the largest population among the 27 Brazilian states, with about 40 million, almost 22% of the Brazilian population. It is also the richest state, generating 33.4% of the GDP, with per capita GDP (PPP) of USD 11 190 in 2004. Campinas, where Unicamp is located, has a population of about 1 million and is a center of high technology development, in particular in the telecommunications sector. Unicamp was founded in 1966 and has been one of the main reasons for the city's technological vocation.

Regarding the Brazilian educational system, it is organized into two main segments. "Basic education" comprises the first eight years of "fundamental education", for children aged 7 to 14, and three years of "secondary education", known in Brazil as "middle education", for youngsters aged 15 to 17. The other segment is higher education. For a discussion of the whole system, see Schwartzman (2004). Accordingly, and following international usage, secondary education will always refer to the Brazilian three-year system of "middle education", high school to institutions at that educational level. Higher education will refer to post-secondary education in general.

In 2003, the last year for which complete data is available, only approximately 10% of those 18 to 24 years of age were attending Brazilian HEIs. Even though this percentage is low by international standards, they were much lower 15 years ago, with fast growth in enrollment in recent years (from 1.54 million in 1990 to 4.35 million in 2003). Growth occurred mainly in the private sector. In 2003, enrollment in private colleges and universities represented 70% of the total. Private sector participation in the State of São Paulo is even higher (85% of total enrollment). This is a sharp contrast with the situation in basic education, where only 12.5% of the students attend private schools. For details, see Chapter 3 of FAPESP (2005) and its references, as well as Schwartzman (2004).

Quality at fundamental and secondary levels is still a major problem. Brazil ranked in the 37th position for performance on the reading scale among 40 countries that participated in the OECD's Programme for International Student Assessment in 2000 (PISA (2000) and ranked last in the mathematics performance in 2003 (PISA, 2003). National assessment programs indicate that the situation is even worse for public schools (Ministry of Education, 2003). In contrast, in higher education the majority of the best universities are publicly funded and have no tuition or fees (FAPESP, 2005).

Access to higher education is, in great part, a consequence of the circumstances of a young person's life during his/her basic education years. Family income situation, educational and ethnic/racial background, and disparities in quality between the public and private systems of basic education are relevant issues. The percentage of young Brazilians attending college who are in the lower income brackets is much lower than their representation in the general population. The situation is even worse for the black and "pardo" population.

In the group of young people of 18 to 24 years of age, in the lowest quintile of per capita income, only 0.83% ever reached third level education, whereas in the upper quintile this figure is 43.7%. For youngsters who declared themselves as "white" or "yellow", the percentage is 20.4%, but for those assessing themselves as "black", "pardo" or "native Brazilians", it is only 5.3%. Moreover, both characteristics have independent effects on the probability of reaching upper education. In the lowest quintile the percentages are 1.9% for whites and yellows and 0.4% for blacks, "pardos" and native

2. PPP – Purchase Power Parity. Developed by the World Bank and the United Nations Development Program to make it possible to make meaningful comparisons of income and expenses among countries.

Brazilians. In the upper quintile of income per capita these percentages are, respectively, 47.6% and 30.6% (PNAD, 2003).

In particular, the percentage of students in public universities who attended public high schools is in general quite low. In São Paulo, close to 83% of graduates from high schools studied in the public system, but only about 30% of those enrolled in public universities are from that group.

The figures for Unicamp are quite similar. Before 2005, about 29% of its student body was formed by graduates from the public secondary system. And less than 12% declared themselves as either black or “pardo”, in contrast to about 30% who did so in the general State population. We will see how this situation changed after the introduction of an affirmative action admission program, described next.

Admission criteria to higher education in Brazil and at Unicamp

The admission of students to colleges and universities in Brazil is usually based exclusively on results of entrance examinations organized by each institution. In some instances the criteria also include the performance in a national exam (ENEM), offered once a year by the Ministry of Education. Unicamp has its own examination and uses the ENEM grade as part of the candidate’s admission grade.

With very few modifications, the entrance examination used by Unicamp today is the same as when the students participating in this study were admitted. ENEM did not exist at the time. In 2003, after a preliminary version of this study was completed, a Committee was formed by the Academic Senate to develop an affirmative action program to address the imbalance in favor of private school graduates that existed in the student body. It should also address the relatively low participation of blacks, “pardos” and native Brazilians among students. Upon recommendation of the Committee, the Academic Senate decided, beginning with the class admitted in 2005, to establish a set of actions aimed at these groups of candidates (CONSU, 2004).

Firstly, an existent waiver program of entrance examination fees³ was expanded to benefit more than 6 000 low income applicants (of a total of about 50 000). More importantly, applicants who had done their secondary studies in public high schools would have extra points added to their entrance examinations grade. The program established that 30 points would be added to the final grade, which is standardized with the average at 500 points and each standard mean deviation corresponding to 100 points. If (and this still applies to graduates from public schools) the applicant assessed him/herself as black, “pardo” or native Brazilian, 10 more points were added to his/her grade. We will see later how these figures relate to the findings of this study.

Materials

There were a total of 7 093 students admitted to Unicamp in the years 1994-1997. Of those, 6 702 were enrolled in 4-year (or longer) courses and 391 were enrolled in technological courses. The authors decided not to include this last group in the study, since those courses have quite distinct academic characteristics, which would require a separate treatment. There was one student who was removed from the database, since his records were corrupted, leaving 6 701 students in the group studied. This was considered as of no statistical consequence, since the student was enrolled in a course with a large class, including students of all relevant categories considered (see relevant variables in the next section and also tables in Dachs, *et al.* (2006).

3. Entrance examination fees for the class starting in 2006 were around USD 40, about 30% of the officially established monthly minimum wage.

When the candidates applied for admission, they had to respond to a questionnaire of close to 120 items, which is the main database for this study. All entrance examination and undergraduate grades of the group are also part of the data used in the research.

Besides the variables that were taken directly from the database, a composite family socioeconomic-educational index was created from the original variables, for the following reason: it is known that information about income is not reliable, especially as the answer to a simple and direct question and, moreover, given by a young person who seldom participates in the economic life of the family. After some prospective investigation, we decided to create a composite family socioeconomic-educational index, using the following variables: participation in the family economic arrangements, education of the parents, occupation type and job status of the parents, living arrangements of the candidate, ownership of a microcomputer. The method used was principal components (Filmer and Pritchett, 1998). The need to use those variables to construct the index explains why later in the model they are not independently relevant. This index was then re-scaled to vary between zero (low) and one (high). For the details and *rationale* behind the choice of variables used in the composition of this index, see Dachs, *et al.* (2006). We will see that this index proved quite relevant to our investigations.

The set of variables selected as relevant was the same throughout the four-year period:

1. Economic and social situation of the family group of the candidate:
 1. Monthly family income
 2. Microcomputer at home
 3. A family socioeconomic-educational index (see above)
2. Characteristics of the parents:
 1. Occupation of the father
 2. Occupation of the mother
 3. Status of the father in his job
 4. Status of the mother in her job
 5. Formal education of the father
 6. Formal education of the mother
3. Personal characteristics of the candidate:
 1. Studied in a public or private high school
 2. Period in which studied during secondary education (morning, afternoon, full-time, evening)
 3. Marital situation
 4. Type of course in secondary education (common, technical, etc.)
 5. Approval of all series in secondary education

6. Reading habits
7. Foreign languages spoken
8. Attendance of preparatory course for entrance examination
9. Extra-curricular activities in secondary education
10. If he/she works
11. Participation in the economic family arrangements
4. Variables related to the choice of institution, course and area:
 1. Main reason to chose Unicamp
 2. Main reason to chose course
 3. Proposed area of study
 4. Planned living arrangements when arriving at Unicamp
 5. Period of study chosen (full-time, evening)
5. Relevant covariates:
 1. Sex
 2. Age at entrance
6. Academic variables:
 1. Grades in the eight entrance exams (Portuguese, foreign language, biology, physics, chemistry, mathematics and geography)
 2. Final standardized average grade for the entrance exam
 3. Final grade point average at exit
 4. Condition at exit (graduated, expelled, dropout, still active)
 5. Period of exit (length of stay at University)
 6. Average grade point average for all students in the course who entered in a given year

The socioeconomic database and profile of students

The socioeconomic database contains a wealthy body of information about the pre-university life of the candidates. We will present here an overview of the data related to questions relevant to the purposes of this study, selecting from the variables described in the previous section those which were not only statistically significant in the model developed (see next section), but also relevant for the purposes of public policies regarding higher education in Brazil. Thus, apart from the items that are not significant, we

will not discuss here the type of degree of high school diploma, preparatory courses attendance, parents' characteristics, age at admission and sex. In this last case, about half were male and half female, with a slight preponderance of the former (Dachs and Maia, 2006).

We also refer to that paper for a detailed discussion about the database questions, but one comment is necessary. Some of the questions were not based on internationally accepted formulations. This is particularly true about income, which used brackets related to the national minimum wage, officially established each year. As a reference, in the period considered it varied in the range USD 60-USD 100.

Regarding graduation, of the 6 701 students considered, 4 837 (72.2%) had graduated, 1 713 (25.6%) had left the University without a degree and only 151 (2.2%) were still active when this study was developed (early 2005). They were treated as a single group, since the grade point average already included information about academic performance, independently of their degree status. Also, the socioeconomic profile of the students who left without a degree was quite similar to that of the whole group (Dachs and Maia, 2006). Accordingly, the data presented below concern all 6 701 students.

Of these, 26.8% had attended public and 63.4% had attended private high schools during all three years of study. 0.9% did not answer and the rest attended both private and public schools. We remark that those numbers were typical of Unicamp both before and after the period considered. As an example, in 2004, before the affirmative action program started, 28% of admitted students had attended public high schools exclusively.

Regarding family income distribution, of the 6 470 students that answered this question (96.6% of the total), 9.8% declared a monthly income of up to 5 minimum wage units, 48.3% an income in the bracket 5-20 minimum wage units and 41.9% an income above that. The higher income students are, as expected, more present in the most competitive careers. These courses are associated with higher professional status and salaries, examples being Medicine and most Engineering courses. Students in the lower income brackets are more frequently in the Teaching License courses and in some of the Sciences (Dachs and Maia, 2006). The above distribution was in great contrast to the one for the general population at the time, which had a much higher percentage of people in the lower income brackets.

The items related to the students' working status show that the great majority did not work at the time they were admitted. Even though this variable appeared as significant in some cases, we do not discuss it further, since their effects are somewhat mixed (see the next sections).

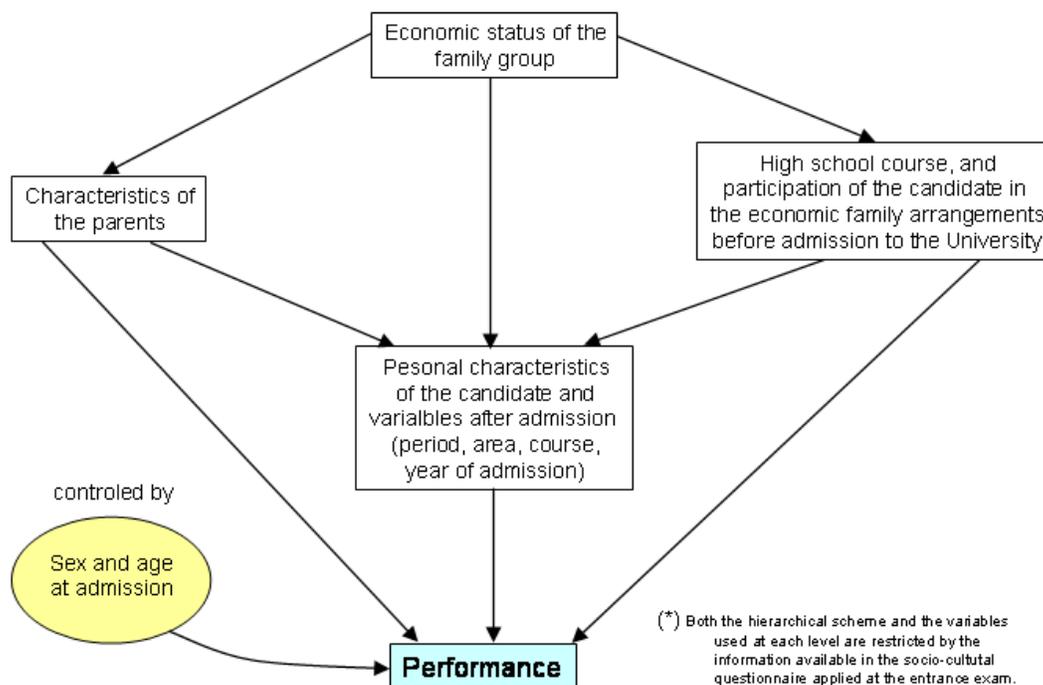
As mentioned before, we will omit the data regarding the parents' characteristics, since none of them persisted in the model which we will present in the next section. We only mention that the parents of students at Unicamp in the period are in the higher levels in both occupational and educational strata when compared to the general population. For example, more than 50% of fathers and 40% of mothers had higher education degrees, in great contrast to the situation for the general population, for which the figure is, even at the present time, less than 10% (PNAD, 2003).

Methods

Based on the availability of variables, and after a preliminary analysis, the authors decided that the chain of determinations of performance at the University could be well represented by the hierarchical framework presented in Figure 1. For a detailed technical discussion of all that will be presented in this section, see Dachs, *et al.* (2006). The upstream determinants are the economic conditions of the family of the student, which are then mediated by the characteristics of the parents and the student himself, and then by the choices made in terms of course and arrangements when arriving at the university. Two important

covariates that have to be considered are the sex and age of the student. As mentioned in the Introduction, the variable race/color could not be included in this study.

Figure 1. Hierarchical web of determinants of performance at the University (*)



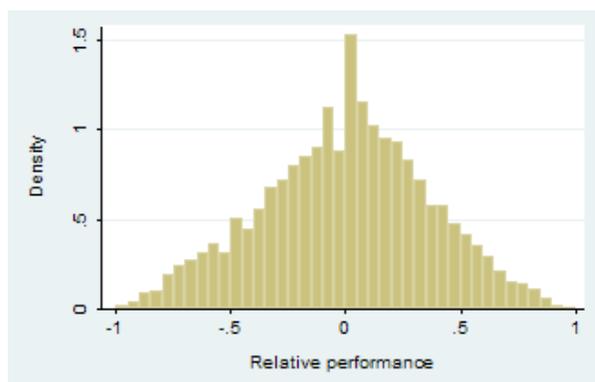
To be able to compare the performance of students admitted to different courses in the four years, we introduced a “relative performance” variable, essentially the difference of normalized ranks (at entrance and exit) within the student’s course (class). The reasons for normalization and for avoiding using grades were: a) grades for admission and during the course vary substantially from one course to another, and b) the number of students in each course also varies from over one hundred to less than ten in the four years covered. We describe this variable in detail next.

First, each student was assigned two ranks: an *entrance rank* that was 1 for the student with the lowest grade in the entrance examination in a given course (for each year) and so on (using increasing integers), until the student ranked first, and a similar *exit rank* using the grade point average of the student at exit from the university. So these ranks vary between 1 and the number of students in each course (and year).

In order to compare ranks for courses with different number of students, we normalized the computed ranks: the *relative ranks (entrance or exit)* are the student’s ranks divided by the number of students in the respective course for the given year. The relative ranks for a course in one year vary from $1/n_c$ to 1, where n_c is the number of students in that course in that year. 1 is highest in both cases.

The *relative performance* of a student is then the difference between the exit relative rank and the entrance relative rank. Therefore, the values of relative performance vary in the range $1/n_c-1$ and $1-1/n_c$, essentially between -1 and +1.

Figure 2. The distribution of relative performance for all the students in all courses in the four years of study



The distribution of relative performance is seen in Figure 2.

The smallest value is -0.979, the largest is 0.978, both the mean and the median are zero, the 25% percentile is -0.244 and the 75% percentile is 0.246.

The distribution is very close to normal in the middle but has shorter tails than a normal distribution, since by construction this variable has its values limited to a closed interval.

A linear model was then fitted to relative performance using the variables listed before. All categorical variables were transformed to dummy variables and the model was built in four stages starting with the upper level in the hierarchical scheme shown in Figure 1. This made it possible to discover the paths through which the upstream determinants reach the outcome and to find if the upper variables are still relevant even when the ones in lower levels are introduced in the model.

After fitting the complete model (with all the variables included), a process of backward elimination was performed, this time starting from the lower level of determination. No variables representing the characteristics of the parents (Level 2) remained in the final model. Also, no variables representing situation after admission (Level 3), like area of study, period of study, etc., remained. The surviving variables and the respective coefficients are presented in Table 1. Comments are in the next section.

The results of the linear model were, in general, corroborated by a logistic model applied to the same set of data. In particular, the association between public high school attendance and higher relative performance remained. For details, see Dachs, *et al.* (2006).

Table 1. Final linear model after the backward elimination process

Levels and variables		Coefficient	Significance ^(a)
1. Socioeconomic characteristics			
	Socio-economic index	-0.1846	***
2. Characteristics of the student before admittance			
Type of secondary school			
	Private	0.0000	
	Public	0.0370	***
Type of secondary course			
	Common	0.0000	
	Technical	0.0491	***
	Teaching credential school	0.1142	***
	Common, humanities	-0.0234	

	Common, biological sciences	-0.0194	
	Common, exact sciences	-0.0002	
	Supplemental education	0.0538	
	Other	0.0640	
Attended preparatory course			
	No	0.0000	
	Yes	-0.0265	***
Worked before admittance			
	No	0.0000	
	Part time / eventually	-0,0445	**
	Full time	0.0135	
Economic participation in family group			
	Does not work / family pays expenses	0.0000	
	Works and family helps financially	0,0562	**
	Works and family does not help	0.0357	
	Works and helps family financially	0,0786	**
	Is economically responsible for family	0.0712	
Academic and extra-curricular characteristics			
Speaks a second language			
	No	0.0000	
	Yes	-0.0248	**
Period of studies in high school			
	Full time	0.0000	
	Night	-0.0285	**
Relevant covariates			
Sex			
	Male	0.0000	
	Female	0.0903	***
	Age	-0.0274	***
Constant			
		0.6167	***

^(a) One * represents significance at the 5% level, two at 1% and three at 0.1% or less

Educational resilience in higher education

We will comment now on the results presented in the Table 1, above. The results show, basically, that some of the variables are clearly associated to higher relative performance. It should be noted that, among all variables considered, those remaining in the final stage are the ones through which relative performance is filtered. Further comments about this point are in Dachs *et al.* (2006). But it is important to mention that the family socioeconomic-educational index variable, which is in the highest level (Level 1) of the hierarchical model (Figure 1), even though having a lower direct impact on relative performance in the final model when compared to its effect in the first stage of the process (only Level 1 variables involved), still remains as a quite relevant factor associated to higher relative performance.

We make the following general observation regarding the hierarchical linear model: the coefficient of each significant variable is to be taken independently. Thus, if a female student graduated from a public teaching credential high school, she would be in the group with a coefficient of 0.241, meaning that her relative performance was quite higher than the reference group of male students graduating from common private high schools. Looking back at the relative performance distribution (Figure 2), this means that she would be in the 75 percentile cut-off point, relative to her male colleagues in the reference group.

Explicitly, the following characteristics of candidates for admission are significantly associated to higher relative performance:

1. Belonging in the lower tiers of the family socioeconomic-educational index.
2. Having graduated from the public secondary system.
3. Having studied at technical or teaching credential schools.
4. Not having attended preparatory courses.
5. Not speaking a second language.
6. Having studied full-time in high school.
7. Being a female.
8. Being younger.

Items 1, 2, 3 and 4 are characteristics which, together or separately, indicate some type of *educational resilience* developed by students belonging in those categories. The expression educational resilience is used in the sense that disadvantages in earlier periods of life were, somehow, translated into later higher educational performance. Further analytical studies will be necessary to fully develop and justify such a concept (which, as mentioned in the Introduction, we borrowed from health equity studies on infant mortality).

Concerning those who had studied at technical schools, they had already had to compete for admittance at those schools, the majority of them public. They are quite selective and are of better quality overall (including higher teachers' salaries, better infrastructure and better trained staff personnel) than the common public high schools. Recent results from the national high-school exit examination (ENEM) confirm these positive structural quality indicators.

We should remember that effects are cumulative, *e.g.*, if someone had graduated from a public technical school, the effects of each category (public and technical) should be combined to get the effect of having graduated from a technical public school.

Items 5 and 6 are difficult to explain without further analysis. The result indicated by item 7 is not completely unexpected: there are studies showing that women perform below their (academic) abilities in competitive examinations (like SAT) (Leonard and Jiang, 1999).

Being younger (item 8) is the sole individual characteristic that may be seen as somewhat independent of social, educational or economic background, possibly associated with the period of life most appropriate to developing certain abilities and participating in academic life, and also deserving further analysis and study.

The affirmative action program at Unicamp and public policy consequences

We comment now on the affirmative action program adopted by Unicamp, both about its formulation in relation to the findings of this study and about its impact on the selection process and on some preliminary findings regarding performance by those who benefited from the program. We also comment on its relevance regarding public policies conceived with the purpose of making higher education more accessible for disadvantaged youngsters.

The aforementioned Unicamp's Academic Senate Committee, which had the mission of proposing affirmative action measures, issued, in early 2004, a report where the findings reported in this study were

taken into account, in the following way. It observed that, since public school candidates had a higher relative performance than those coming from private schools, then the selection process might act backwards and, by attributing some advantage to that group, compensate for that difference in performance. That was the idea behind the 30 extra points in the final grade. The adopted figure of 30 points takes into account two aspects: intrinsic imprecision of the entrance exam grade, estimated at 15 points, and the relative positive performance by the group of public high school graduates assessed by this study. The extra 10 points for blacks, “pardos” and native Brazilians were added since those groups are also historically disadvantaged, so the Academic Senate considered that a similar rationale would apply to them (even though that group had not been considered in the study because of lack of data regarding their participation in the student group studied).

In terms of its selection impact, in 2005, the first year of implementation of the program, admission of candidates who had graduated from the public system increased by 15.4 % over the average of the previous 5 years, from 29.6% of the total admitted to 34.1%, with most of that increase occurring in the most selective courses. As an example, 34 out of 110 students admitted to the most selective course (80 candidates per place), Medicine, were from that group. This was a threefold increase from the average of the previous 10 years. The largest previous figure for that course had been 13 students coming from public high schools. The admission of blacks, “pardos” and native Brazilians also increased by 44.4% over the previous 2 years; from 10.9% to 15.7% of the whole class. This is still below the estimated figure of 23% of high school graduates that belong in those groups in the State of São Paulo, but is larger than in the other *campi* of the state system and shows clear progress in the direction of enlarging the participation of that group.

Concerning the fee waiver program, there was a sharp increase of 76% in the admissions in that group, totaling almost 8% of the whole class admitted in 2005. It should also be mentioned that, among candidates, all targeted groups also increased in participation, a clear indication that the program had the expected effect of reducing what is known as “self-exclusion”, *i.e.*, youngsters that are from disadvantaged groups do not even apply for admission. This phenomenon is common to selective HEIs everywhere, as the conclusions of a recent study about admission of low-income applicants to Harvard show (Avery, *et al.*, 2006). The complete results about the program at Unicamp are in the report by the Admissions Committee to the Academic Senate (COMVEST, 2005).

A more recent study, still in development, indicates that the findings of the research reported in this paper are in accordance with the performance of the class admitted in 2005. In fact, a preliminary result is that, even though in only 4 of the 55 undergraduate courses, students coming from the public system had a higher average entrance examination grade than those coming from private high schools, after only one university year, in 31 of them the grade point average of students who had graduated from public high schools was, in mean, higher than that of the other group of students. And that occurred throughout the spectrum of selective admission levels of courses. Another indication of academic progress by those students after admission is that the relative performance (same definition as used in this study) was higher for those who had graduated from public high schools in 48 of the 55 courses. An updated and broader study about these findings will be available by late 2006.

Now we comment on the public policy impact of this study and of Unicamp’s program in a larger sense. There are other three important public universities that have adopted similar programs since Unicamp did so: the largest public university in the country, São Paulo University (USP), a state university that has more than 40 thousand undergraduate students enrolled, is responsible for about 25% of all Brazilian indexed published research and confers more than 2 000 doctor degrees per year, and which is also very selective, has just approved a program where students coming from the public system will have 3% of the entrance examination grade added (to that grade), starting next year. The federal universities of Pernambuco and Rio Grande do Norte, two northeastern states, have also adopted similar programs. The

whole system of Technological Colleges (Fatecs) in São Paulo, comprising 26 *campi*, has adopted exactly the same program as Unicamp since last year.

Other federal universities have called on Unicamp officials to participate in seminars regarding prospective affirmative action programs, with very positive reaction to the program presented above and the results of this study.

Unicamp officials have also been participating in legislative hearings at the national Congress, which is debating the adoption of a law that will impose a quota system on the federal HEIs, always pointing out that there are alternatives (such as Unicamp's system) that avoid quotas, are effective, respect institutional autonomy and also maintain merit as an important feature of the selection process.

Conclusions

There is clear indication, based on the results presented above, that youngsters who come from a general disadvantaged background and are admitted to Unicamp undergraduate courses have a higher (untapped) academic potential, when compared to those belonging in higher pre-university social and educational strata. This is likely associated to the admission's criteria used by Unicamp until 2004 (and also by most Brazilian HEIs), which are based, solely, on examination grades. Also, these findings point to alternatives to those criteria, one of which was developed at Unicamp with positive initial results.

From a public policy point-of-view, the approach to affirmative action access programs suggested by this study and adopted by Unicamp (and already by other major public HEIs in Brazil) is a clear alternative to the quota systems being adopted by some universities in Brazil, in some cases mandated by legislative measures, for the following reasons: it *respects the academic autonomy of universities*, since each institution would have to develop its own studies and policies; it *develops a new and broader concept of merit*, which includes some of the candidate's background, *preserving the academic standards of the student body*; and, last but not least, it *effectively broadens the diversity of the student body* to include many candidates with clear academic potential, most of whom would be left out in the traditional recruiting system used in Brazil.

Finally, we believe that this study raises relevant issues, from both scientific and public policy viewpoints. Such issues might, in Brazil as well as elsewhere, interest those involved in programs and processes that propose to make access to higher education more democratic, in the sense of increasing the chance that talented individuals coming from disadvantaged backgrounds be admitted to HEIs, especially to the more selective ones.

Acknowledgements

We thank the following people: C. H. de Brito Cruz, Rector of the State University of Campinas - Unicamp (2002-2005), for his early support of this project. J. Tadeu Jorge, General Coordinator of Unicamp and Head of the Academic Senate Committee for Social Inclusion (2002-2005), and J. L. Boldrini, Dean for Undergraduate Studies at Unicamp (2002-2005) . J. Tadeu Jorge, for his support since May, 2005, when he became Rector of the University. E. De Decca, the present Dean for Undergraduate Studies at Unicamp. For their direct support regarding databases used for this study: Leandro R. Tessler, Coordinator of the Admissions Committee (COMVEST) at Unicamp, Antonio Faggiani, Coordinator of the Academic Records Division (DAC) at Unicamp, R. Hirata, database specialist, and C. A. F. Anselmo, statistician, both at COMVEST, and S. de Souza, database specialist at DAC. As usual, the authors are solely responsible for the content of this paper.

The second and third authors were supported by FAPESP. The second and fourth authors thank the support from the Center for Public Policies Studies (NEPP), Unicamp.

References

- Avery, C., et al. (2006), *Cost Should Be No Barrier: An Evaluation of the First Year of Harvard's Financial Aid Initiative*, Working paper 12029, National Bureau of Economic Research, Cambridge, USA.
- COMVEST (2005), *Programa de Ação Afirmativa e Inclusão Social – Relatório do Vestibular 2005*, COMVEST, Unicamp. [Program of Affirmative Action and Social Inclusion – Report on Entrance Examination 2005.]
- CONSU (2004), *Deliberação CONSU A12-04, 25/05/2004*, Unicamp, Campinas, Brazil.
- Crosby, Faye J. and Diana I. Cordova (1996), “Words Worth of Wisdom: Toward an Understanding of Affirmative Action”, *Journal of Social Issues*, Vol. 52, No. 4, Winter, pp. 33-49.
- Crosby, Faye J. and Cheryl VanDeVeer (eds.) (2000), *Sex, Race and Merit: Debating Affirmative Action in Education and Employment*, The University of Michigan Press, Ann Arbor, USA.
- Dachs, J., W. Norberto and Rafael P. Maia (2006), *Subsídios quantitativos para repensar as políticas de acesso à Universidade: Aumentando a equidade racial e econômica no ensino de terceiro grau no Brasil e no Estado de São Paulo, Parte 1*, NEPP preprint, Unicamp. [Quantitative Subsidies for Re-Thinking the Policies of Access in Higher Education: Increasing Racial and Economic Equity in Tertiary Education in Brazil and in the State of São Paulo.]
- Dachs, J., et al. (2006), “Merit and Access in Higher Education: Quantitative Subsidies for Policies of Affirmative Action at a Brazilian Research University”, in preparation, availability: June, 2006.
- FAPESP (2005), *Science, Technology and Innovation Indicators in São Paulo, 2004*, FAPESP, Brazil.
- Filmer, D. and L. Pritchett (1998), *Estimating Wealth Effects without Expenditure Data – or Tears*, Policy Research Working Paper 1994, World Bank, Washington, D.C.
- Leonard, David K. and Jiming Jiang (1999), “Gender Bias and the College Predictions of the SATs: A Cry of Despair,” *Research in Higher Education*, Vol. 40, No. 4, August, pp. 375-407.
- Martins, Roberto B. (2003), *Desigualdades raciais e políticas de inclusão social: Um sumário da experiência brasileira recente*, Report to the United Nations Economic Commission for Latin America and the Caribbean (CEPAL/UN). [Racial inequities and social inclusion policies: A summary of the recent Brazilian experience.]
- Ministry of Education (2003), *Qualidade da Educação: uma nova leitura do desempenho dos estudantes de 4a. série do Ensino Fundamental*, MEC/INEP, Brasília.
- PISA (2000), *Messages from PISA 2000*, OECD, Paris.
- PISA (2003), *Learning for Tomorrow's World: First Results from PISA 2003*, OECD, Paris.
- PNAD (2003), *Pesquisa Nacional por Amostra de Domicílios - 2003*, IBGE, Brazil.

- Rothstein, Jesse M. (2004), "College Performance Prediction and the SAT", *Econometrics*, Vol. 121, Issue 1-2, July-August, pp. 297-317.
- Schwartzman, Simon (2004), "The Challenges of Education in Brazil", in Brock, C. and S. Schwartzman (eds.), *The Challenges of Education in Brazil*, Triangle Journal, Ltd., Oxford, UK.
- Travassos, Claudia and David R. Williams (2004), "The Concept and Measurement of Race and Their Relationship to Public Health: A Review Focused on Brazil and the United States", *Cad. Saúde Pública*, June 2004, Vol.20, No.3, pp.660-678.
- Victora, Cesar G., *et al.* (1997), "The Role of Conceptual Frameworks in Epidemiological Analysis: A Hierarchical Approach", *International Journal of Epidemiology*, Vol.26, pp. 224-227.
- Wolfson, Michael C. and Geoff Rowe (2001), "On Measuring Inequalities in Health", *Bulletin of the World Health Organization: the International Journal of Public Health*, Vol. 79, No. 6, pp. 553-560, 2001.
- World Bank (2004), *World Development Indicators Database*, Washington, D.C., September.