

PROGRAM ASSESSMENT

FAPESP IMPACTS SERIES

FAPESP SCHOLARSHIP PROGRAMS - MAIN RESULTS

Program's General Information

- Assessment period: 1995 – 2009.
- Completed in 07/2012.
- Undergraduate Research, Master, PhD and Direct PhD projects were assessed.
- A total of 8,682 questionnaires were answered.

This document is part of a set of summaries presenting the results of impact assessments performed for the FAPESP programs. The full document with the assessment can be obtained at www.fapesp.br/avaliacao/relatorios/bolsas.pdf

FAPESP Scholarship Programs started in 1962 with the main purposes of developing scientific or technological research and the formation of new frameworks for the research system in the state of São Paulo. The assessment design for these Programs was a quasi experiment based on the possibility of comparing former FAPESP scholarship receivers between 1995 and 2009 (treatment group) and the group of individuals who had their FAPESP scholarship requests denied in that same period, but who had scholarships from other agencies (control group). The assessment measured the impacts of scholarships of different levels Scientific Initiation for undergraduate students (IC), master (MS), and PhD (DR) in the professional trajectory and in the scientific and technological production of the groups, based on their social-economic profile.

The total initial population for those scholarship categories was of 69,776 individuals (related to 88,583 denied or granted but totally completed submissions) in the period from 1995 - 2009. A total of 39,765 emails were sent inviting former scholarship students to answer the online questionnaire, obtaining a **31%** response rate. The questionnaires sent were previously partially completed with information from respondents' CVs of the Brazilian database "Lattes". The three scholarship levels (IC, MS, DR) determined three quasi-experiments.

Chart 1 presents the frequency and percentage of responses for each of the experiments. The weighed percentage is derived from the analysis using the propensity score, a technique used to reproduce the probability structure that generated the characterization of groups and reduce the analysis biases.

Chart 1: Description of *quasi-experiments*

Level of Scholarship	Scholarship from:	Number of respondents	% of initial sample	weighted by PS
IC (Scientific Initiation for undergraduate students)	FAPESP	3,467	55.3	51.1
	Other Funding Agencies	2,806	44.7	48.9
MS (Master Students)	FAPESP	3,326	47.9	50.1
	Other Funding Agencies	3,617	52.1	49.9
DR (PhD Students)	FAPESP	2,014	57.3	51.5
	Other Funding Agencies	1,500	42.7	48.5

The results of the assessment are presented below. It is important to emphasize that the volume of data obtained allows to further develop each of the aspects listed herein, showing a rich agenda.

Where do the former scholarship students come from? Social-economic profile and geographic origin

There is little difference when comparing ex scholarship holders from FAPESP and from other Funding Agencies (OFA) in terms of family income at the beginning of their academic trajectory. However, when other variables in the social-economic profile of those individuals are analyzed, it is possible to distinguish a predominance of ex-FAPESP scholarship holders as belonging to classes A and B (higher income social-economic classes) when compared to OFA ex-scholarship holders. In terms of geographical origin, there is no significant difference between treatment and control groups.

Where do the former scholarship students go? Geographic destination and professional trajectory

Still under the geographic perspective, most of the former FAPESP scholarship students continue in the state of São Paulo after completing their studies. However, the percentage of students established in São Paulo decreases as the degree increases, meaning PhDs are moving to other states in Brazil and other countries more than other levels.

The establishment in São Paulo reflects the origin of the former scholarship students. However, the lower relative establishment of PhD students might show the growth of the demand for faculties and researchers in other states, which, if proven, would imply that Fapesp would have a role in forming high level professionals to work elsewhere in this country.

Regarding the type of professional occupation of ex-scholarship holders, there is a predominance (just over 30%) of teaching positions at public universities, particularly for master and PhD levels. Regarding undergraduates evidences showed predominance of jobs not associated to research activities. They go mainly for companies. This difference is more remarkable in recent years and also for those who completed their trajectory in undergraduate studies, it is observed that only 12% of the former IC scholarship students go on to take position in higher education institutions.

For all levels of scholarships approximately 8% of individuals were found in research activities in companies and in public or private research institutions. Chart 2 shows details on this matter.

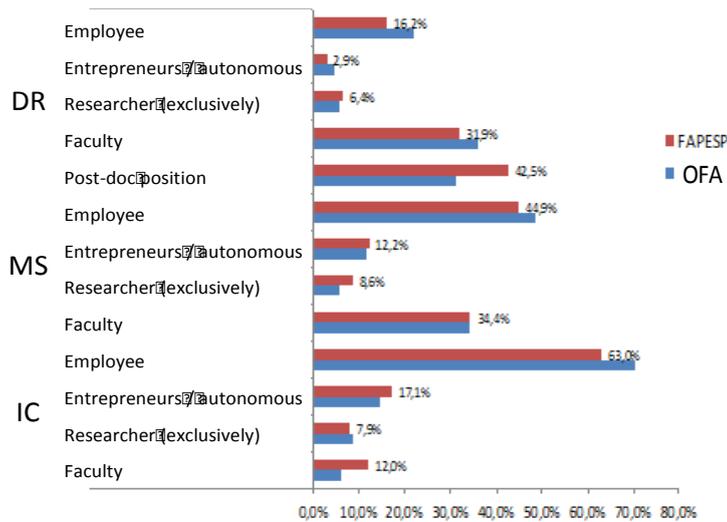


Chart 2: Percentage distribution of job/employment categories according to the scholarship level (IC, MS, DR).

***There are no significant differences regarding dedication to teaching and research activities as the professional activity when comparing former FAPESP scholarship students with former scholarship students from other agencies. However, the number of individuals in post-graduate courses (who continue holding research activities) is higher among former FAPESP scholarship students (60% higher than former scholarship students from other agencies). Chart 2 explores such differences.

In the case of entrepreneurial activity, there is a difference between former FAPESP scholarship students and those from other agencies. Former FAPESP scholarship students whose last academic stage was undergraduate course (with IC) have shown to be more entrepreneurs than former scholarship students from other agencies. However, this trend is inverted for PhD students. Such effect can be observed in the following Chart.

Chart 3: Effect of FAPESP scholarship to be "Entrepreneur/Self-Employed" according to the formation stage

	Effect	p(value)	IC 95%	
Undergraduate Research	1.55	0.05	1.01	2.38
Master Degree	0.95	0.70	0.71	1.26
PhD	0.79	0.30	0.51	1.23

The hypothesis that former FAPESP scholarship students find professional employment more quickly and have a more favorable income evolution over time than those with no FAPESP scholarship is not confirmed, since it can be noted that, in general, only for master degree students the time until professional employment is 10% less for former FAPESP scholarship students when compared to the other former scholarship students ; for PhD students, this effect was not observed.

Some evidence on the differences by large knowledge area can be observed in Chart 4.

Chart 4: Average time and corresponding standard deviation for the completion of stage (MS or DR) until the first employment/occupation per large area (in years).

Média Desvio Padrão	Mestrado		Doutorado	
	Outras Bolsas	FAPESP	Outras Bolsas	FAPESP
Exatas e da Terra	4,2 0,1	3,1 0,1	5,5 0,1	5,1 0,1
Biológicas	4,4 0,1	3,7 0,1	5,7 0,1	5,1 0,1
Engenharias	4,9 0,1	4,2 0,1	5,9 0,1	6,1 0,1
Saúde	4,9 0,0	4,5 0,1	5,6 0,1	6,3 0,1
Agrárias	4,2 0,1	4,2 0,1	5,2 0,1	5,1 0,1
Sociais Aplicadas	5,0 0,1	5,1 0,1	7,9 0,1	7,3 0,1
Humanas	4,8 0,0	4,4 0,1	6,8 0,1	7,3 0,1
Linguística, Letras, Arte	5,6 0,1	5,0 0,1	7,0 0,1	7,1 0,1
Multidisciplinar	4,2 0,1	3,3 0,2	5,6 0,2	4,5 0,3
Geral	4,7 0,02	4,2 0,03	5,9 0,3	5,9 0,3

The initial income of former FAPESP scholarship students for master degree courses was higher than that of other former scholarship students, but such difference was not significant regarding the PhD students. However, the difference in income evolution was greater for former FAPESP scholarship students both for master degree courses and for PhD courses. Charts 3 and 4 show these points below.

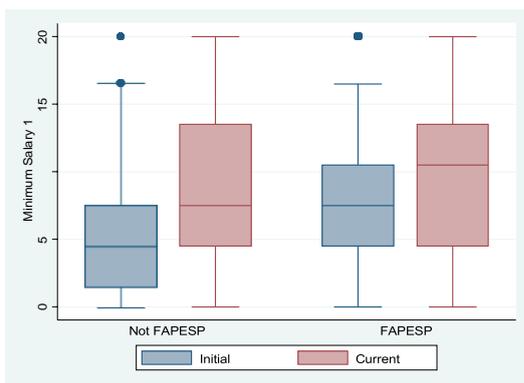


Chart 3: Salary and income evolution – master degree students

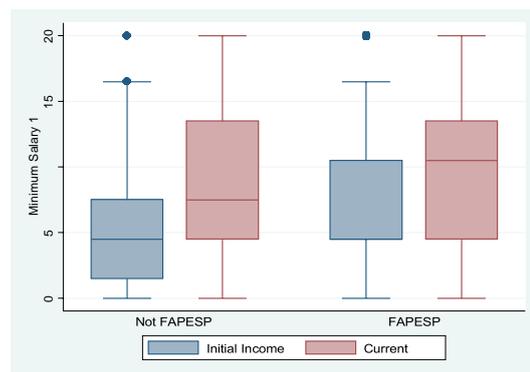


Chart 4: Salary and income evolution – PhD students

What is the academic trajectory of former scholarship students? Collaboration, projects and scientific production.

Former FAPESP scholarship students develop an academic trajectory from IC to DR, going through master degree courses, almost 50% greater than those with no FAPESP scholarship. On the other hand, former FAPESP scholarship students

with only IC not following academic trajectory is almost 3-fold higher than the other scholarship students. However, for those only taking master degree courses, the frequency of non-FAPESP scholarship students is much higher, showing that in general, a FAPESP scholarship student taking a master degree course usually follow an academic career with a much higher frequency than the other such students.

Therefore, there are two interesting characteristics in the trajectories of former FAPESP scholarship students: most students at undergraduate research go straight into the labor market, including as entrepreneurs. However, those taking a master degree with FAPESP scholarship usually go to a PhD course, thus completing their academic formation. Please check Chart 5 below

Chart 5: Academic trajectory of former FAPESP and non-FAPESP scholarship students (%)

Frequência %	Não FAPESP	FAPESP
IC/ MS/ DR	408 20,69%	1981 29,62%
MS/ DR	350 17,75%	855 12,78%
IC/ DD	35 1,77%	437 6,53%
DD	12 0,61%	56 0,84%
IC/ MS	612 31,03%	1861 27,82%
IC	116 5,88%	1134 16,95%
MS	439 22,26%	365 5,46%
Total	1972 100%	6689 100%

There is no effect of the FAPESP scholarship in the time for completing the master degree or PhD courses when analyzed in general terms (for all knowledge areas). However, there is a slight decrease in the time for presenting the study among those that had IC, regardless of the scholarship (FAPESP or other), albeit very modest (of approximately 7 to 9% less for master degrees and 2% less in PhD). There is also a tendency of decreasing the time to presentation in MS and DR throughout the analyzed period.

In the case of international collaborations, resources for research projects and publications, the FAPESP scholarship shows a positive effect when compared to other agencies. Former FAPESP scholarship students establish further collaborations and have more internships abroad than those with no FAPESP scholarships. Although the number of research projects coordinated by former scholarship students is similar between both groups in terms of project value, there is a significant difference (the values are 50% higher, on average).

However, for publications, it can be stated that former FAPESP scholarship students publish more and in journals of greater impact (Qualis A1), even if there are differences among the great knowledge areas and among the formation stage (at the master degree level, there is no significant difference for the number of publications). These figures are presented in Chart 6.

Chart 6: Effects of FAPESP scholarship on the total number of papers and number of QUALIS A1 papers

BOLSA	INDICADOR	EFEITO SOBRE GRUPO DE CONTROLE	P VALUE
IC	NUMERO PUBLICAÇÕES	0,99	0,88
	QUALIS A1	1,22	0,001
MS	NUMERO PUBLICAÇÕES	1,04	0,31
	QUALIS A1	1,13	0,001
DR	NUMERO PUBLICAÇÕES	1,37	0,001
	QUALIS A1	1,07	0,022

A discontinuity analysis was held to note the evolution of the rhythm of publications among FAPESP and non-FAPESP scholarship students before and after completing their PhD studies. .

Chart 5 shows that the distance between the groups presents a trend to decrease after the completion of the PhD studies.

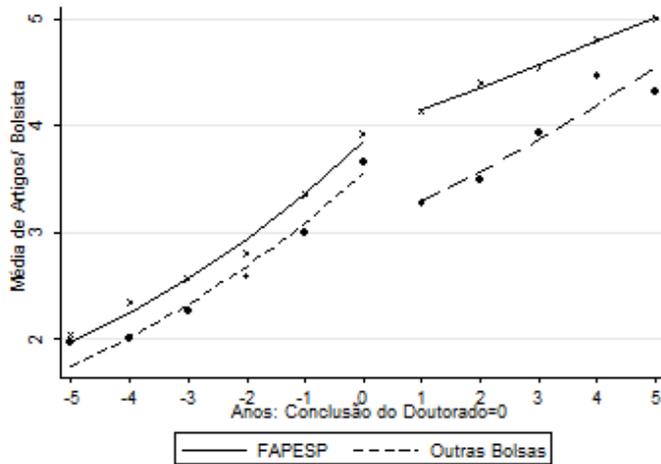


Chart 5 -- Discontinuity of publications after the completion of PhD studies (Observed means and Trends adjusted by the models – means of all published papers before and after the PhD studies).

Conclusion

Data obtained in the assessment of scholarship modes, comparing FAPESP and non-FAPESP scholarships, shows positive effects for the treatment groups, most likely due to the processes employed by such as peer-review and analysis of partial and final scientific reports. Such procedures are not employed in the agencies supporting other scholarship students. However, the effects of the selection bias cannot be discarded, since the control group was obtained from proposals submitted to and denied by FAPESP.