

Academic Research and Advanced Training: Building up Research Universities in Brazil

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Abstract:

This paper provides an account of the processes that supported growth and differentiation inside Brazilian public sector, creating conditions for the development of group of universities that can be described as real research universities and evaluate the challenges faced by these institutions in the new environment created by changes in orientation of Brazilian higher education policies.

Key words: Brazil, research university, graduate education, science policy

Introduction

This paper intends to exam the special conditions that made possible for Brazil, a latecomer to higher education in Latin America, to build up an impressive and well established system of public universities marked for their strong orientation towards research and graduate teaching. While all public universities in Brazil share some features that could be taken as pre-conditions for developing a modern university, not all of them can be classified as real research universities. The analysis used information from the Brazilian Census of Higher Education, carried out by the Ministry of Education and data collected by the 2007 national survey of Brazilian academic profession, carried out under the framework of the research network “The Changing Academic Profession” (<http://www.uni-kassel.de/wz1/cap/international.ghk>).

As acknowledge by the international literature, the most important of these pre-condition is the coverage of full time contracts. The last data available for the

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national census of higher education in Brazil (2010) shows that 85% of all academics employed at public universities in Brazil hold full-time contracts. In the last survey on the Brazilian academic profession, from 2007, 83% of all respondents working in public universities that indicate to hold a full time contract also declared that this contract was his/her sole professional commitment (CAP, Brazil file).

Nevertheless, building up research universities is not just a matter of holding good terms of contract for the great majority of the academics or just providing for good infrastructure. Aside these more general conditions, research universities are also characterized by the dominance of an academic culture “grounded in individual competence and freedom to choose their own subjects of research, study and reflection” (Schwartzman and Balbachevsky, 1996, p. 270). As elaborated in another work (Balbachevsky, 2000), this culture subsumes the role of teaching to the role of research and knowledge production. It is an open culture in which the main source of prestige is the recognition gained from peers in the same field, which are – to a great extent – external to the institution’s control (Balbachevsky, 2000, p. 138).

While all public universities in Brazil offer good conditions for the academic work, just a small number of them can be described as real research universities in this sense. A major feature of these institutions is their commitment to the graduate education, especially doctoral education: in none of them less than 30% of their students are enrolled in graduate programs. In some, this proportion reaches 50%. Together, these institutions plus the small but active sector of the Federal Research Institutes answer for more than 85% of all doctoral degrees granted in the country (CGEE 2011). This article aims to present some of the most relevant features of these Brazilian research universities, to discuss the special conditions and internal dynamics supporting the emergence of public universities with this profile in Brazil, as well as to explore some challenges posed to the future evolution of these universities in Brazil.

Research and regional universities in Brazil: distinctive traits

Diversity is one of the essential characteristics of Brazilian higher education. In 2010 Brazil had more than 2.3 thousands of higher education institutions, to be found both in metropolitan areas and small towns around the country. While, by law, all these institutions are supposed to provide similar undergraduate instruction – all of them being entitled to grant bachelor degrees - the differences among them are immense. Private institutions represent more than 88% of all institutions and answer for 72.5% of all enrollments at undergraduate level.

In the private sector the most usual institutional format is the isolated professional school offering programs in a small number of professional tracks¹. Nevertheless, the last decade has witnessed a strong process of concentration inside this sector. In 2010, 89 private universities answer for more than 27.5 % of all undergraduate enrollments.

The most usual institutional format for the public sector is the comprehensive university. On the total, 87% of all undergraduate students attended by the public sector are enrolled in universities. Inside the public sector, the most relevant divide is the one created by the graduate education. In late 1960s, when graduate education was first recognized and received support from the federal government², only a few public institutions (both at federal, and state owned) were well positioned to take advantage of the existing incentives. These institutions created a large number of graduate programs, and hired academics with Ph.D. to staff them. With a great number of Ph.D. holders, these institutions were also able to capture the investments the Brazilian government was mobilizing for science and technology in the 1970s.

In spite of also holding the university status, the other public institution lack internal condition for high-level academic work. Inside them, graduate education is a

¹ Brazil, like all Latin-American countries adopt the continental model of higher education where undergraduate training is supposed to end up in a bachelor degree which certify the completion of the first cycle of higher education and, at the same time, accredit the holder as a full fledged professional, entitled to exercise his/her profession.

² For an overview of the Brazilian graduate education see Balbachevsky 2004, 2010, and CGEE 2011.

smaller enterprise and tends to be confined to the master level. Nonetheless, these institutions play a relevant role not only in undergraduate education, but also as a regional source of skills and knowledge. As thus, we propose to call them public regional universities, regardless if they are owned by the Federal government or some state government.

Public regional universities are marked by a much more diverse internal academic environment than. Diversity doesn't come from differences in contract and conditions of work. These dimensions are more or less homogeneous and derive from the terms of contract accessible to all academic staff. Heterogeneity is produced by contrasts in values, worldviews, and aspirations held by different parts of the academic staff (Balbachevsky, 2000). In fact, inside the Brazilian academic culture there is a strong subculture characterized by the dedication to undergraduate education and by the primacy it attributes to teaching (not implying a commitment to scholarship) over all other activities.

This is a self-referent culture. Inside it, "the professional identity is not defined by the individual's achievements as an independent scholar and researcher but by affiliation to an institution and a group with whom she/he shares the daily problems, achievements, and routines of academic life" (Schwartzman & Balbachevsky, 1996, pp. 271). For this group, autonomy is to be found in the intrinsic rewards created by the exchange with students inside the classroom. This strategy also implies renouncing the merit-based hierarchy that is one of the foundations of the academic profession. For the academics sharing this worldview, the only acceptable basis for differentiation are the ones coming from external conditions that could, in thesis, be extended to everyone, regardless considerations about performance, reputation, and so on. This perspective enables us to understand the roots and the centrality of the egalitarian demands inside Brazilian academic culture. As put in another paper (Schwartzman and Balbachevsky, 1996), it is among this group of academics that "one can find some of the central dilemmas that are common to all process of professionalization: the conflict between the ideals for collectivist trade unions and the individualistic liberal professions; the opposition between the values of personal achievements and those of the

professional community; and, consequently, the spaces that are open or closed for intellectual growth, the development of competence, and the strengthening of social responsibilities” (pp. 271).

Table 1, bellow, resumes some of the more relevant differences that characterize the quotidian of the academics employed in public research universities and public regional universities in Brazil:

Table 1. Differences in work conditions in different settings at the public sector in Brazil

Percentage of academics with:	Type of institution	
	Public research universities	Public regional Universities
Full time contract	91.1%	79.7%
Commitment to more than one academic institution	13.4%	19.9%
Work outside the academic market	13.8%	21.6%
Hold a Ph.D.	94.3%	64.2%
Teaching appointment in graduate education ¹	83.7%	45.3%
Teaching appointment in doctoral programs	47.8%	16.2%

¹ Teaching appointment in graduate education: teach in academic master programmes, doctoral programmes or professionally oriented graduate programmes.

Source: CAP Survey, Brazil

As one can see, conditions of commitment to academic life differ from research and regional universities. The proportion of academics with full time contract is higher and the proportion of those reporting working responsibilities outside their institution, either with another academic institution and/or outside the academic market is lower. On the other hand, academics in research universities tend to split their teaching commitments between graduate and undergraduate level, and teaching in doctoral programs is a fairly frequent experience. In regional universities, the majority of the academics are confined to undergraduate level, and

only a tiny percentage has experience of teaching (and advising) doctoral candidates.

Another dimension where one can find relevant differences is related with the degree of commitment to research. As it is well acknowledge by the literature, in order to be a full-fledged researcher, besides doing research with some regularity, an academic should be able to bring research findings to the attention of a wider audience, which, means usually to publish these findings (Fulton and Trow, 1975), and, following the new trends in internationalization, to sustain regular exchange with peers abroad. In Brazilian context, researchers should also have the skills and experience to compete for external support for their research activities, since it is not usual for universities, even public ones, to set aside their own resources for research. In the 2007 survey on the Brazilian academic profession, a number of questions were asked that provided information about all these dimensions. When combined, these dimensions allow for the construction of a scale measuring the level of the academic's commitment with the researcher role. This scale is shown in Table 2, bellow, which ranks the research activity of Brazilian academics from a non-active role through a fully professionalized researcher with active international connections (i.e., academics reporting success in securing external resources for their research, publishing results, and developing partnership with colleagues abroad or publishing in collaboration with peers from abroad).

Table 1 - Degree of commitment with research activity by type of institution (2007)

Degree of commitment with research	type of institution	
	Public research universities %	Public regional universities %
Full researcher with international connections	29.9	11.8
Full researcher with only domestic connections	24.4	15.5
Doing research and publishing without support	31.0	44.6
Doing research without support	8.6	11.1

and without publishing		
Not active as a researcher	6.1	16.9
Total (100%)	197	296

Scale's reproducibility index (for public institutions): .95

Source: CAP Survey, Brazil

As one can see, the majority of the academics in research universities are full-fledged researchers, doing research, publishing and counting with external support for their research projects. Inside regional universities, academics with this profile add up to only 27.3%, while others 28.0% are inactive as researchers; even if they reported some research in the last three years before the interview, they were not able to refer to any academic product derived from this activity. While 30% of the academics working in research universities reported some kind of international connection (doing research and/or publishing with peers abroad), this figure drops to only 12% inside regional universities.

Finally, another relevant dimension that is worthwhile to mention is the relationship between institutional career and research profile inside both kind of public universities in Brazil. As one can see in table 3, bellow, while inside research universities this relationship tend to follow a linear pattern, where academics in higher ranks are also research leaders, with more active and international research profile. Inside regional universities, the pattern runs contrary the expected association.

Table 3: Patterns of commitment to research, academic rank and institutional environment

type of institution		academic rank			total
		Full professor	Associate professor	Junior	
Public research universities	Full-fledged researcher with international connections	56,5%	28,9%	19,2%	29,6%
	Full-fledged researcher with only domestic connections	26,1%	25,6%	21,2%	24,5%

	Partially professionalized researcher	8,7%	40,5%	51,9%	39,8%
	Not active	8,7%	5,0%	7,7%	6,1%
	Total (100%)	23	121	52	196
Public regional universities	Full-fledged researcher with international connections	6,3%	18,2%	4,3%	11,9%
	Full-fledged researcher with only domestic connections	6,3%	22,1%	9,7%	15,6%
	Partially professionalized researcher	45,8%	55,2%	61,3%	55,6%
	Not active	41,7%	4,5%	24,7%	16,9%
	Total (100%)	48	154	93	295

Source: CAP Survey, Brazil

While only 6.3 per cent of the full professors in Regional Universities display a profile that could be described as mature and internationalized, this percentage grows up to 18.2 per cent among the associate professors, falling again to 4.3 per cent among the junior staff. So it seems that in regional universities commitment to research tends to be stronger among academics occupying intermediate positions in the academic rank.

The explanation for this unusual pattern is that in most public institutions, holding a doctor degree automatically grants access to the rank of associate professor, but not to full professorship. In the past, for most of the public sector, the lack of academics with the desired qualification induced special rules that bypassed the need of a doctorate for ascending the academic career (for in depth analysis of academic career in Brazilian institutions, see Balbachevsky, 2011). Only the most competitive institutions were able to preserve the requirement of a doctoral degree for candidates ascending to full-professorship. Thus, in regional institutions, many members of the older, less qualified generation are now full professors, while the new, better-qualified generation, holding enough academic credentials for competing for research funds, is stuck in the middle of the career rank.

Both institutional environment and academic degree are relevant for understanding the academic's commitment with research. In each type of institution, academics with doctorate tend to be more involved in research, while most of the academics without doctorate are not active in this dimension. Institutions where almost all faculty holds a doctorate degree (as in research universities and research institutes) tend to display a more dynamic research environment. But the inner institution's environment creates its own constraints for research. While 58.2% of the doctorate holders working in research universities reported success in securing external resources for their research, this proportion drops to 40.4% among academics with doctorate working in regional universities.

The birth of research universities in Brazil

Building up universities in Brazil is a quite recent experience. The country's first university law was enacted in 1931, and the first university, The University of Rio de Janeiro (afterward the University of Brazil, later re-named as Federal University of Rio de Janeiro – UFRJ), was founded in the same year. Between 1930s and 1950s higher education in Brazil experienced its first burst. In 1934 the state of São Paulo, the most dynamic regional economy in the country created its own university, the Universidade de São Paulo. In 1940 the first Catholic university was created, the Pontifícia Universidade Católica de Rio de Janeiro, and in the subsequent years other Catholic Universities were created in major cities and state capitals. After 1945, an actual network of federal universities was established, following the principle that each state were allowed to expect at least one federal university inside its territory.

In 1968 the Federal government, then under military rule, enacted a bill proposing reform university life. It replaced the old chair system with the department model, introduced the credit system for undergraduate studies, adopted full-time contracts for academics, split the old Faculties of science, philosophy and humanities,

allowing for specialized Institutes to be created and recognized and regulated the then incipient graduate education, and

Even if the reform faced some resistance from the old and prestigious professional schools, and mistrust from academics and students due to its authoritarian origins, it succeeded in implement major changes inside the public sector (for an overview of the 1968 Reform, see Klein, 1992 and Durhan, 1998). Between 1972 and 1986 spending with universities in the federal budget grew 5.4 folds. Most of this extra money was consumed by implementing full-time contracts for faculty and building up new campuses in the American style in the skirts of the cities for the federal universities ((Schwartzman, J. 1993, Velloso, 1987).

The 1960's reforms were implemented amid an explosive increase in the demand for higher education. In 1960, the total enrolment in higher education was of 93,000 students. In 1970 it was already jumped to 425,400 and by 1975 it was of 1.1 million. Nevertheless, contrary the experience of other countries in Latin America, the Federal government opted by divert pressures for access to the private sector, preserving the public universities from the most deleterious effect of massification. In the public sector, entrance examinations were (and still are) used to control the growth of enrollments and limit pressures over academic's teaching load.

The almost universal access to full-time contracts inside public universities composed with the effects of diverting the demands for access to the private sector were the first steps for building up real research oriented universities inside Brazil. The other steps were the institutionalization of graduate education, the adoption of a consistent set of policies aiming at assuring both growth and quality to this level of education, and the articulation of mechanisms for assuring resources to support academics' steady commitment to research.

The graduate foundations of research

The origins of graduate studies in Brazil can be traced to early experiences with the chair model in 1930s. At that time some universities in Brazil attracted a number of foreign scholars, some of them came in special missions organised by the Brazilian government, others as refugees from the European crisis of 1930's. In

these earlier experiences, graduate studies were conceived as kind of apprenticeship. Training was mostly informal and gravitated around the assistant's academic responsibilities and dissertation. These earlier experiences in graduate education had little impact on the higher education as a whole. It was a small enterprise only organized in some chairs in a small number of universities. The graduate degree had no currency outside the academy. In most cases, they were one pathway among others to access academic career.

Graduate education was legally recognized and regulated only in 1965. Its main organisational features were sketched by the Report 977, enacted by the Federal Council of Education (known in Brazil as *Parecer Sucupira*). This Report created a two level format for graduate studies, where students were supposed to successfully conclude a Master program prior to being accepted in a Doctorate program. The regulation of the graduate studies is indicative of the Government's awareness of the role of this level of education as a domestic alternative to qualify academics for the growing federal network of universities.

The quest for evaluation of graduate education:

The 1965 Report that regulated a graduate education also conferred on the Ministry of Education's Conselho Federal de Educação (Federal Council of Education) the responsibility for graduate programs' accreditation and evaluation. However, early attempts to fulfil this role failed, for the lack of appropriate mechanisms and procedures.

Despite the failure of first attempts, there were at least two stakeholders interested in developing good standards for graduate programs' evaluation. For the S&T agencies, the absence of general standards meant that they had few clues in choosing to support or dismiss applications for long term support for research teams. For the research groups linked to the programs, being recognized as having high quality meant independence from the agencies' internal struggles. Evaluation was also perceived as a key alternative for preserving legitimacy and prestige of graduate education. The solution was reached when CAPES - the Ministry of Education's agency originally in charge of providing scholarships for

faculty and graduate students - organized the first general evaluation of graduate programs in 1976. The procedure was supposed to serve as a guideline for allocating the students' scholarships (Castro and Soares, 1986) For this evaluation, CAPES proposed to focus on the collective academic outputs of the researchers formally linked as advisors of each program. In order to assure credibility for the entire process, the agency enlisted the help of prestigious scholars, who were brought in as consultants to work in committees, one for each discipline. The first round of evaluation was successfully carried out in the same year and its results were accepted by both the agencies and the community of scholars linked to graduate education.

Eventually, the CAPES evaluation was accepted by all stakeholders as a reference of quality for graduate programs. It successfully connected performance with reward: the better the program evaluation, the greater its chances for accrued support as expressed in students scholarships, and research infrastructure and funds. Most important, CAPES evaluation provided an important threshold of quality performance precluding graduate education, and mostly, doctoral programs, to spread inside all public universities. As such, it inadvertently produced the concentration of support and competencies necessary for establishing some ambitious research programs that were linked to the best graduate programs, and reinforced the visibility and institution wide effects of this level of education inside the few public (and some Catholic) universities where graduate education became fully institutionalized, mobilizing a significant institutional commitment (Balbachevsky and Schwartzman, 2010).

So, one could say that one of the factors explaining the success of Brazilian higher education in building up a strong research profile is hidden in its success in building a strong tier of graduate education, and, at the same time, the strong forces sustaining concentration of this endeavor in just a small number of public universities. Graduate education in Brazil emerged in the 1970s as a byproduct of the consensus built between political leaders, policy makers and the domestic science leaders around a project that puts science as a core policy for promoting the country's economic development and independence. And as it grew, it created

the necessary conditions for research to become institutionalized inside a small number of Brazilian universities that had succeeded in developing a robust tier of graduate education. Pivotal to this process was the institutionalization of the procedures related with programs' evaluation. The strong legitimacy of these procedures rested in the work done by the committees of peers that CAPES was able to mobilize for these evaluations. The work of these evaluation committees can be regarded as one the most effective instrument for expediting the institutionalization of all fields of knowledge and in building the foundations of the Brazilian scientific community (Schwartzman, 1991).

While the first committees were chosen in an ad-hoc procedure among the most influential scientific leaders in Brazil; as the CAPES evaluation became institutionalized, the composition of these committees became more stable, but, at the same time, the nomination process converted into an arena where different research traditions and groups struggled to be represented. This process presents few difficulties in areas where scientific consensus is broad, and the research agenda is more or less consensual. But in fields where these characteristics are not present, this struggle is fierce and the committees' decisions had major impacts over the odds of different research traditions (Coutinho, 1996). As quality tends to be defined in terms of what is done by the most powerful groups inside each field, the whole process is, by its nature, very conservative, and poses relevant obstacles for the growth of new research areas, especially when they are born in-between the rigid boundaries CAPES evaluation defines for different fields.

Building up funding mechanisms for research:

Another decisive step into building up research oriented universities was taken when graduate programs came to be defined as a privileged focus for policies adopted for Science and Technology (Schwartzman 1991) in the early 1970s. In those years Brazilian S&T policies experienced a major change: for the first time, the Brazilian government attempted to place science and technology as a tool for support economic development. This initiative is best understood if one takes into account the consensus then built between influential scientists (some of

them with well-known leftist orientations) and the nationalist sector in the Brazilian army, both supporting the idea of building an important sector of science and technology as an instrument for promoting the country's strategic interests.

Under the framework created by the nationalistic approach for science and technology policies; the main Brazilian investment bank – the government-owned Banco Nacional de Desenvolvimento Econômico (BNDES) – established a strong program to support technological development. The success of the Fund created pressures to its institutionalization into a new specialized agency, The Financiadora de Estudos e Projetos (FINEP), which was in charge of a National Fund for the Development of Science and Technology (FNDCT), entitled to a permanent share of the Federal Budget. In 1975 the small Conselho Nacional de Pesquisa (National Research Council) was reformed and transformed into a new and larger Conselho Nacional de Desenvolvimento Científico e Tecnológico (National Council for Scientific and Technological Development- CNPq), placed under control of the Ministry of Planning, then one important branch of the Brazilian government.

The 1970s were years of economic expansion, in which Brazilian economy grew up at annual rates of 7 to 10 per cent. These new agencies had funds to spend, and a flexible and modern bureaucracy, not constrained by the rigid controls one found in other governmental offices. Their first attempts were directed towards stimulating private and public firms to invest in technological development. But these initiatives were mostly doomed to fail due to the firms' lack of interest in investing in such a risky enterprise, being placed, as they were, in a highly protected environment created by the macro-economic import substitution policies. The agencies then turned their attention towards the informal research environments to be found in some of the most prestigious universities, where some scientific tradition was in place.

With such support, post-graduate education in Brazil grew at a great pace. In 1965, when the post-graduate studies were recognized, the National Education Council accredited 38 post-graduate programs: 27 as master's degrees and 11 as doctorate. Ten years later, in 1975, there were already 429, MA programs, and 149

doctoral programs. Since the beginning of 2000, the number of students attending a graduate program, either at master level or at doctoral level, increased 82%, going from 94.4 hundreds to 172 thousands of students. In the last decade, the country graduated more than 86 thousands of doctors and more than 338 thousands of masters.

The quest for financial autonomy

While the country's new Constitution of 1988 granted expanded autonomy for universities in Brazil, and the Education Law of 1997 reinforced the notion of University's autonomy in research and pedagogic realms, in reality, this autonomy is very limited. In the federal level, financial autonomy is non-existent. Universities' budget is covered by resources coming from the Ministry of Education that tend to reproduce the historical budget pattern. Any extra money needed for covering new initiatives or improving infra-structure should be negotiated with the Ministry of Education and the powerful Secretary for Higher Education. Staff salaries (including academic ones) are paid directly by the Federal Ministry of Planning. Under this picture, it came as no surprise that the de fact autonomy of federal universities is strongly restricted. Even when dealing with the more powerful and well established old universities that are more active in research and graduate education, the Ministry of Education have strong leverage to impose its own view. The only exception in this general picture comes from the State of São Paulo universities. In 1987 the state of São Paulo's public universities³ reached a comfortable situation of ample and unrestricted autonomy. From that year on, the three universities had guaranteed access to 8% of the major state revenue, a tax

³ In Brazil, the federative arrangement allows the states (provincial) governments to organize their own higher education systems that run parallel with the Federal system and the private system. State universities are sole responsibility of the state level government and are not subject to the Ministry of Education's regulations or evaluation (as is the case of federal and private universities). The state of São Paulo, the richest and most dynamic economy in Brazil, created three universities since 1932: The University of São Paulo (USP); the State University of São Paulo "Júlio de Mesquita" (UNESP) and the State University of Campinas (UNICAMP). These three universities are considered among the best universities in Brazil, with strong commitment to graduate education and research. Since 1960's, research and graduate education at these universities have been supported by contributions from Federal funds as well as the state level Science Foundation (FAPESP). By law, FAPESP is entitled to 1% of all state revenues, and also by law, the administrative costs of FAPESP cannot compromise more than 5% of its resources. Thus, most of its resources are used to support research projects, going directly to researchers and graduate students.

applied to all commercial or service transaction occurred inside the state⁴. The autonomy then granted to São Paulo state universities resulted from a long and aggressive strike that united the academic staff and employees' unions from the three universities, as well as the student movements. From the union's and university authorities' point of view, achieving financial autonomy represented the fulfillment of more than a decade of struggles for independency from political influence. From the point of view of the government, the agreement was a price to pay in order to stop the increasing political costs created by the constant attritions between universities and government, usually escalated by the intense coverage they received by the media.

Since then, these resources have been automatically transferred to the Universities' administration, without any kind of restriction. At that time, the proportional share each university was entitled were defined in a meeting between the three universities rectors and the governor. The agreement then reached was that the proportional commitment of state revenues to the universities should replicate the proportion observed in previous year (including investments then made in infrastructure). This pact is still in effect.

Financial autonomy had strong impact over the dynamics of State of São Paulo universities and represented a push for consolidating their leadership among elite research universities in Brazil. Internally, it reinforced budgetary responsibility and allowed for long term planning which improved academic career, research infrastructure and support for research and graduate training, which, in turn, created a very satisfactory condition, attracting the more dynamic and research oriented academics in Brazil. Since the beginning of 1990s, holding a PhD is an exigency for any candidate that apply for being accept as part of the academic staff in these universities.

Financial autonomy is the differential explaining the relative success of the São Paulo universities in the international ranks of Universities world wide. University of São Paulo is the only Brazilian university classified among the top 150th by the rank

⁴ This proportion raised to 9,6 % in 1994, after other strong strike inside the Universities. It is frozen since then, but since the State revenues have been increased in real terms all these years, the universities never lack support for their expenses.

elaborated by magazine Times Higher Education (THE) and the University of Campinas (UNICAMP) is among the top 200th, and is classified among the top 20th in the 2012 THE's rank of new universities. All three state owned universities are also well positioned in the well known Shanghai's rank.

Present and future challenges:

Taken in perspective, the experience of building up research universities in Brazil was relatively successful. Nevertheless, the whole process faces some hindrances that became more visible in the last decade with the change in international higher education landscape.

Some of the problems arise from the very success of Graduate evaluation, as it is carried out by CAPES. In spite of its positive aspects, CAPES evaluation had some hindrances that became more and more apparent as time went by. The small size of the Brazilian scientific community and the visibility of the peer-committees work created unavoidable parochial pressures. One consequence was grade inflation. (Castro and Soares 1986; CAPES 1998) . In 1996, four in every five programs were placed in the two highest ranks, A or B. It meant that CAPES evaluation were quickly losing any discriminating role.

Reacting to this situation, CAPES authorities established in 1998 a new model for program evaluation. This new model preserves the authority of the peer-committees, but adopts more formal rules for evaluation. It reinforced the adoption of some fixed parameters for all fields of knowledge stressing faculty academic background and research performance as measured by their publishing patterns; extended the periodicity of evaluation from two to three years; adopted a more comprehensive procedure, evaluating master's and doctoral programs together, instead of evaluating each program per se; and adopted a scale of seven points (instead of five), where the ranks of 6 and 7 is restricted to programs offering doctoral degrees that could be qualified as good or excellent by international standards, and establishing that 3 was the lowest acceptable rank for successfully accrediting a post-graduate program.

While the reform of CAPES procedures succeeded in imposing new and more stringent requirements to graduate education, it have done so by reducing the autonomy of peer evaluation and reinforcing the weight of formal procedures. The new uniform parameters applied to all fields opened a way for stronger political influence from the agency's bureaucracy in the whole procedure, while, at the same time, reduced its tolerance to new experimental or alternative models of graduate education. In the new model, evaluation have curbed some of the more dynamic experiences in graduate education (Silva and Proença, 2012), especially in those new emerging areas that could be characterized by transdisciplinarity and new dynamics of knowledge production (Gibons et all 1994, Bonaccorsi and Varga, 2007).

Another major challenge facing these universities is posed by the strong pressures coming from Brazilian society and government for an accelerate expansion of the share of public universities in the overall country's supply of places for undergraduate level. In the past, the standard description of the differences between the public and private institutions used to be as follows: public higher education in Brazil was free from tuition, most courses were provided during the day, and faculty members were civil servants with full-time contracts. To be admitted, students had to pass very competitive entrance examinations. Private institutions, on the other hand, charged tuition, most of the instruction was given in the evenings, and admission was easy. Most of the faculty worked part time, and had no career plans or job security. The new social pact that sustained transition to Democracy in Brazil, in the 1990s, reinforced the perception of the illegitimacy of this situation where the poor, because of the ailments of public primary and secondary education, is forced to pay, while the rich have access to higher education for free. This situation create strong pressures for opening access to public higher education and prompt the government to launch programs aiming to quickly expand enrollments at undergraduate level in the Federal Universities and impose quota programs for expand the presence of minorities in the universities'

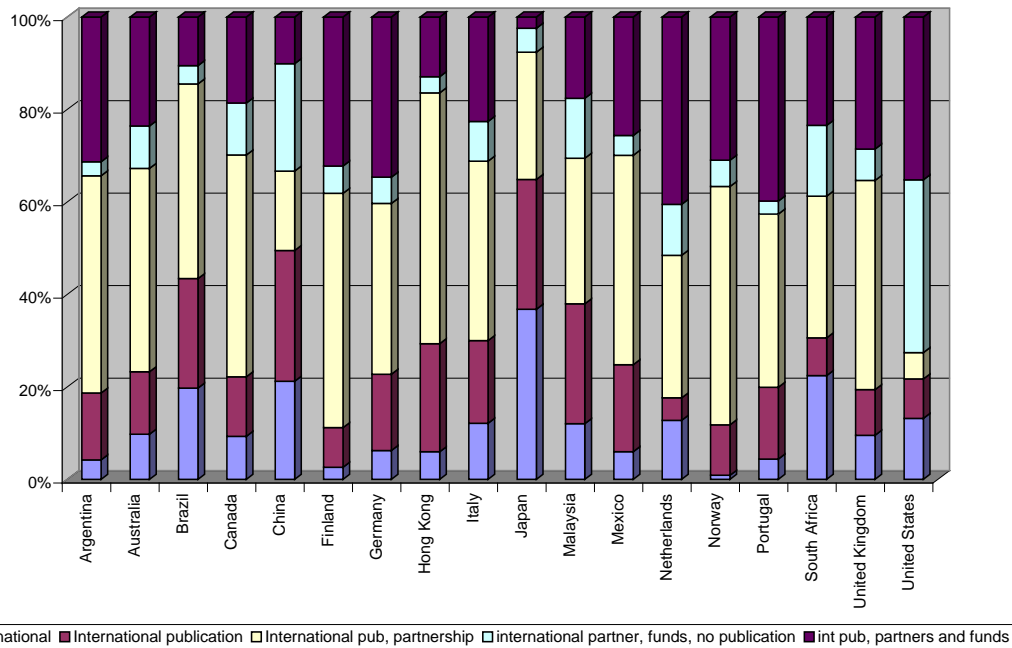
student body⁵. These programs created strong pressures for a rapid process of massification of the public sector, that may, in the long run, jeopardize the research profile of the best federal universities that have been under strong uniform pressure for quickly expand the new places opened at undergraduate level.

The second challenge comes from the very past success of the country in building a strong and large graduate layer inside higher education. Since mid 1980s, the growth of graduate education in all areas was stimulated following a reasoning that stressed the economy of scale of having all academics trained domestically instead of developing big programs for sending students abroad for their graduate studies. This decision created a very peculiar dynamic inside Brazilian graduate education that strongly reinforced its insulation from external influences. Thus, comparing the international involvement of Brazilian academics with teaching responsibilities at the doctoral level with academics with the same profile in other seventeen countries that were included in the CAP project (graph 1), one is surprised with the degree of insulation experienced by the elite of the Brazilian academics. While almost 20% of all academics with teaching responsibilities in Brazil have no relevant interaction with peers abroad, for another 20%, the interaction experienced is restricted to some publication abroad. At the other extreme, only a bit more than 10% of these academics reported a full portfolio of interaction with peers abroad, including research partnership, access to international funds for research and co-authoring publications with colleagues from abroad.

Graph 1: International activity of academics with teaching responsibilities at doctoral level in 18 countries.

⁵ In October 2012 the Federal Government enacted a Law approved by the congress, reserving 50% of the entries at Federal Universities to students coming from poor families, minorities and those who attended all primary and secondary education in public schools.

Research related activities: degree of internationalization



In July 2011, Brazilian government drastically changed this orientation, launching the program “science without frontier” (ciências sem fronteira), a multiyear initiative to send 75,000 fully funded Brazilian students abroad for training in the science, technology, engineering, and math (STEM) fields, with an additional 25,000 scholarships expected to be funded by the private sector. It is early for a full evaluation of the program’s impact over Brazilian HE landscape. First reports tend to stress problems in finding candidates with adequate profile (especially English proficiency) to fill all scholarships offered in the Program. Another issue raised is related with narrow coverage of the program in terms of fields. In fact, most social sciences, arts and humanities are left outside the Program, and critics point out that these are the areas where parochial tendencies are more pronounced, and where a program of such nature could have most relevant impact. Finally, some raise worries regarding the ability of the Agencies in charge of these programs to fully supervise the use of the fellowships in order to assure that the students really go to the best training alternatives. While the choice of only accepting applications for Universities listed in the top positions of the best known international ranks is an answer for the last problem, it may create artificial restrictions that can prevent

students to have access to best training options in some selected areas, where good training options are offered in specialized institutions.

Last but not least there is the challenge of public universities governance. One of the legacies of the country's struggle for Democracy in the 1980's is the almost unchallenged paradigm of "democratic governance" as the best model of governance for public universities. The term "democratic governance" refers to the arrangement where institutional authorities are chosen in open elections involving all perceived relevant forces inside the university: academics, students and employees.

While model seems to accommodate most of the internal tensions, it frequently gives rise of veto coalitions that strongly oppose change, experimentation and more competitive dynamics inside the university. At the same time, this governance model, in the absence of formal overseeing bodies representing external interest tend to close the university's decision making processes to all external influences and to magnify the relevance of the vested interests of internal stakeholders. In this framework, one of the main roles of institution's authorities is to serve as a buffer between the political exigencies posed by government and the interests sustained by the main internal forces.

Again, there are some differences in the way "democratic governance" works inside research universities and regional universities. As Balbachevsky and Schwartzman have shown in a previous work (2011), in the former settings, collegiate arrangements tend to be more active. At the later settings, collegiate arrangements are less prevalent and in many decision areas they are surpassed by more personal ways by which faculty as individuals express their interests, alongside other internal constituencies.

Conclusion remarks:

This paper gave an account of the processes that supported growth and differentiation inside Brazilian public sector, creating conditions for the development of group of universities that can be described as real research universities. As argued above, nurturing such institutions was an unintended consequence of the policies directed to building up and protecting graduate

education, and to support science adopted in the 70's, in order to answer the strategic goal of strengthening national research capabilities for national development. The institutional differentiation described here was never acknowledged by law, uses or policies in Brazil. In the past the fiction of an undifferentiated public sector, composed by universities equally dedicated to research, teaching and extension was beneficial to all public institutions. This is not true any more. The more unstable, and competitive international environment is knocking the door of Brazilian universities, thanks to the forced comparison brought by the visibility of international ranks and the experiences with another academic cultures brought by the new generation of students that are coming from their internship abroad. These new dynamics add new cross pressures over institutions that are already stressed by the changes in the demands posed by government. How Brazilian research universities will fare in the turbulences of the new environment is an open question.

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