

Institutional Expansion and Scientific Development in the Periphery: The Structural Heterogeneity of Argentina's Academic Field

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Abstract The relationship between “marginal” and “mainstream” science has, in recent decades, become a matter of discussion. Traditional perspectives must be reexamined in the wake of transformations in the international circulation of knowledge and the subsequent diversification of scientific “peripherality”. Argentina represents an interesting case with which to explore the structure of “peripheral centres” and new forms of scientific development. While it has recently experienced an expansion in terms of institutionalization, professionalization, and internationalization, that process has been coupled with entrenchment of existing institutional asymmetries and persistent intra-national inequalities; academic prestige is distributed according to opposite principles of legitimation (local/international). Our main task is to explore the current state of research capacities pursuant to that expansion in order to analyze the diverse styles in which knowledge is produced. In our analysis, we make critical use of Bourdieu's concept of field and the Latin

This paper discusses part of the studies on Argentina's academic field conducted within the Research Program on Academic Dependency in Latin America (PIDAAL), directed by Fernanda Beigel in the frame of CONICET and the National University of Cuyo, at Mendoza, Argentina.

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American category of “structural heterogeneity,” while also focusing on the question of circulation. The paper outlines how professionalization has developed locally over time, and the historical tension between the National Council for Scientific and Technical Research and the public universities. It describes the current structure of the scientific field in terms of researchers, institutes, publishing circuits, and institutional evaluative cultures. It focuses on geographical asymmetries in order to assess the distribution of new human and material resources throughout the country. Finally, it addresses the current situation under the new government, and raises concern over recent regressive actions.

Keywords Argentina · Scientific expansion · Structural heterogeneity · Styles of production · Circulation of knowledge

The relation between “marginal” and “mainstream” science has been a matter of discussion in the last decades (Vessuri 1987; Arvanitis and Gaillard 1992). New flows of collaborative research and publishing circuits have been profusely observed in order to assess the emergence of “semi-peripheries” and/or the changes in the predominance of the old powers of international science. In favour of a diagnosis leaned towards democratization that sees a more equitable redistribution of academic capital, new trends on “brain gain” mobility and transnational networks are highlighted (Didou and Gérard 2009; Gaillard et al. 2013). Against these tendencies, studies on academic publishing argue that research agendas are still strongly attached to the patterns of writing established by the Science Citation Index, English plays a hypercentral role, while very few oligopolies dominate scientific communication (Mosbah-Natanson and Gingras 2014; Heilbron 2008; Beigel 2014a, b; Larivière et al. 2015).

The transformations in the international circulation of knowledge have diversified scientific peripherality to an extent it is necessary to revise traditional perspectives that identified scientific development with the growth in terms of publications/impact in mainstream journals. The logics of production and circulation outside the “centres of excellence” led to the emergence of internationalized elites progressively disconnected from the local agenda, along with dynamical local circuits somewhat isolated from international debates. To understand this complex scenario, it is also relevant to offer a critical approach to the simplifications behind the concept of academic dependency that reduce scientific dominance to a simple import-export relation between centres and peripheries. In fact, several *peripheral centres* have recently lived through major changes that have allowed an expansion in terms of institutionalization, professionalization and international circulation of endogenous knowledge. But along with this expansion existing asymmetries between academic institutions have been reinforced, intra-national inequalities persist and the distribution of international prestige among scientists has been progressively differentiated.

For its part, the concept of academic dependency has been under scrutiny because it is attached to a simplifying perspective of a passive periphery reduced to the role of importer of foreign knowledge, subaltern to an active centre considered as the main exporter and producer of “original” knowledge. We have argued that it is necessary to move forward in understanding the international structure of academic hierarchies

beyond the stereotype that likens mainstream science with academic autonomy, and science in the periphery with academic dependency. This is precisely where the concept of structural heterogeneity is suitable to explain the complexity of asymmetries that are located within the structure of a field crossed by international, regional and local circuits of recognition (Beigel 2010, 2013).

Argentina represents an interesting case to explore the structure of a scientific field with diverse profiles of production and circulation embedded in endogenous and exogenous tensions. It is currently a dynamic and professionalized academic field, dominantly public, that has experienced an expansion of its research capacities during 2003–2015. Even if there are other institutions that develop research and teaching in the country, this work is focused on the public National Universities (NU) and the National Council for Scientific and Technical Research (CONICET) because these are the main pillars of scientific production. Table 1 shows the share of public and private agencies in R&D investment: within the agencies of science and technology CONICET has a prominent role (MINCyT 2016).

Even if sounding paradoxical, during the three “Kirchner” governments (2003–2015), an internationalist orientation was driven with similar force as nationalist actions. Academic mobility and international collaboration was financed by the State at the national universities and research public agencies, but external doctoral fellowships diminished gradually until they were cancelled in 2007. Currently, only 9% of the current total researchers at CONICET obtained their doctoral degree abroad. Many new doctoral schools were created and Argentina became an interesting destination for Latin American students – given the gratuity of pre-graduate studies and low costs of graduate programs. The NU also received great impulse for national and regional mobility, along with increasing budget for full-time positions. They preserved traditional autonomy and, thus, international standards were in a great deal refracted in evaluation and accreditation. At the same time, an important growth of papers produced by the researchers at CONICET informs on an inclination towards publishing in mainstream circuits: 4 of the 5 “best-career publications” by the researchers were in English and 83% of these papers were published in mainstream journals (Beigel 2016). From 2013 until 2016, CONICET has been in second position among the Latin American institutions included in the Scimago Institutions Ranking (SIR). The most prestigious university, the University of Buenos Aires, is highly positioned in international university rankings. This double-sided policy explains the differentiation observed in terms of the circulation of the output: the simultaneous increase of publications in mainstream journals, along with the dynamism of local circuits.

Considering its relevant position as a *peripheral centre*, however, Argentina’s publications in mainstream journals grew at a slower rate than other Latin American countries. During 2005–2015 publications by authors affiliated in Argentina increased 56% in the Science Citation Index Expanded (Web of Science, now Clarivate), a meagre performance compared with Brazil (118%) and Chile (114%) (UNESCO 2016).¹ A fact that could be explained, again, by the “nationalist” side of

¹ Counts in the UNESCO World Report (2016) are made on all publications. We made our own count in Web of Science, considering this time only published papers in journals indexed in the Science Citation Index Expanded and the general growth of papers by Argentinian authors in 2005–2015 is doubled (112%), while the growth of Brazil reaches 192%, and Chile 191%.

Table 1 Argentinian research institutions and R&D investment, year 2014. *Source:* Compiled by the authors from MINCyT (2016)

Sector	Agencies	R&D investment
Public agencies	National Science and Technology Ministry (MINCyT):	47.7%
	National Council for Scientific and Technical Research (CONICET)	
	National Agency for Science and Technology Promotion (ANPCyT)	
	National Energy and Mining Ministry:	
	National Commission for Atomic Energy (CNEA)	
	National Agroindustry Ministry:	
	National Institute for Agriculture Technology (INTA)	
	Other national agencies	
	Provincial state agencies	
	Public companies	
Private agencies	National Education Ministry	29.1%
	52 national universities	
	Non-profit organizations for scientific research	1.7%
	Private companies	20%
	Private universities	1.5%
Total		100%

public policies. But among other factors that will be amplified later let's present for now two elements that will make the reader aware of the complexity of this national case. 1) To publish in journals indexed in mainstream circuits is not a requirement for the national classification of researchers performed by the NU system, and 2) there is a scant quantity of national academic journals indexed in mainstream circuits, almost half of them are not indexed in any repository, they are still edited in paper, accordingly, distributed in small circles. By 2016, only 15 Argentinian journals were indexed in the WoS, a strategy broadly developed, for example, in Chile. Does this mean that Argentina's scientific production had expanded but has become disconnected from "international science"? As we will see, this is not the case: diverse orientations coexist because the international and the local circuits both received strong impulse, along with a process of regionalization (Latin-Americanization) observed especially in the SSH.

The main task of this paper is to analyse the current state of the research capacities resulting after the expansion of Argentina's academic field in order to explore its impact in the circulation of knowledge produced locally and the distribution of scientific prestige. In the first section, we briefly explore the category of *structural heterogeneity* in the Latin American tradition in order to propose its application to the case study, combined with a critical reading of Bourdieu's concept of field. Afterwards, we outline the historical path of professionalization of scientific research in Argentina and the structural nature of the hinge between the National Council for Scientific and Technical Research (CONICET) and the

National Universities. We describe the growth in terms of researchers and institutes, focusing on the relations between CONICET researchers and NU teacher-professors. We build a classification of eight academic regions in order to examine the results of the expansion in terms of geographical and institutional asymmetries. Finally, we address the policy implications emerging from this study in face of the particular situation of Argentina's science under the recently elected new government.

Structural Heterogeneity: Institutional Asymmetries and Circuits of Recognition

The idea of “structural heterogeneity” stands within the Latin American tradition of the historic-structural method based on a local approach that it was rooted in a century ago. It appeared in the 1920s in order to explain our typical economic structure, featured by the combination and overlapping of different forms of production and social relations, including servitude, feudalistic and capitalist working relations. It was developed by the research fields of Colonial Studies and Economic History but ultimately built as an analytical category between two milestones in the Latin American social sciences, *Estructuralismo Cepalino* and Dependency Analysis. They argued that both the centre and periphery were part of a single international process and constituted a structure of dependency. Development within the periphery was not resulting in the homogenization (modernization) of the structure but rather the contrary. Precursor, Furtado (1959) argued that the underdevelopment theory should be replaced by a theory of social and economic heterogeneity.

The concept of “structural heterogeneity” emerged to overcome the “dualist” analysis by which the Economic Commission for Latin America (ECLA) initially described the division between a traditional and a modern sector. Pinto (1965) observed the existence of economic units that belonged to different stages of historical evolution and wide-range technological difference (1965: 43). Foreign capital dominated the most technologically advanced industries, therefore, as a result, the more heterogeneous the structure was, the more dependent the economy. In the end, “structural heterogeneity” was formulated as the crystallization of styles of production, social relations and domination mechanisms corresponding to different phases of development but coexisting conflictingly within nation-state (Quijano 2014). Dependency was not merely the result of external and unilateral actions by powerful nations against weak countries, a link was established among dominant groups within peripheral countries.

Now, is the concept of *dependency* useful for the analysis of scientific peripherality in a context of an increasingly internationalized academic world? Most of the radical perspectives that adapted the *centre-periphery focus* to the study of the science have diagnosed academic underdevelopment as a consequence from economic development or the imitative mind existing in peripheral scientific communities (Alatas 2003). In previous works (Beigel 2013) we developed a critique to the notion of academic dependency, whenever understood as a mere

external imposition of evaluation criteria, research agendas or methodological patterns. Although theories and methods produced in the periphery have low possibilities for *exports* to mainstream circuits, this doesn't imply massive imports of central models. Academic periphery has become increasingly complex and diverse, while blind belief in bibliometric indicators typical in the centres is guiding these to particular forms of endogamy.

The concept of “structural heterogeneity” came to be understood as different styles of production coexisting conflictingly within a nation-state. Instead of imputing this to a sort of dualism between *modern* and *traditional* social relations, it explained them by the asymmetries of power embedded in the structure. A relational perspective is at the core of this Latin American tradition. If we now focus on the heterogeneities of peripheral scientific communities, one of the main facts to observe is the existence of highly internationalized scientists producing knowledge under “universal” evaluation criteria, living together with strong academic groups with local power and recognition. Accordingly, the first task is to build an approach that contemplates the force of the “international”, the regional, the “national” and the “local” –entanglements that can be explained by putting to work the concepts of field and circuit (Beigel 2014b). These opposite styles of circulation don't simply emerge from the disciplinal difference among social sciences and humanities (SSH) and natural and exact sciences (NES). On the contrary, they evolve across disciplines and are related to diverse evaluative cultures emerging within the institutional stake in-between the National Universities and CONICET.

Even if there are many intermediate profiles, it is useful to work on these two analytical opposite “illusions” (Bourdieu 1999) that are at stake and living conflictingly in order to understand the disputes in the field. On the one hand, a large group of full-time head professors-researchers with a style of production and circulation featured by the resistance to the imposition of international trends and “mainstream” styles of production, mostly entrenched in provincial public universities. Within these academic elites prevails an “institutionally recognized prestige”, closely linked to teaching competencies, the dominion of local agendas and university power. On the other hand, a “universalistic” orientation, more attached to international standards and global research agendas, broadly extended across all disciplines at CONICET. It is based on a belief in an “internationally recognized prestige” featured by pure scientific capital represented in papers published in mainstream journals – or the regional circuit in the case of the SSH.

The historical split between CONICET and national [public] universities is a structural determinant of this process, all of which could easily drive the reader to conclude that finally we are in front of two sub-fields, in Bourdieusean terms. However, against this simplistic separation in two “sectors” we argue that the struggle for an international/local academic legitimation operates throughout the structure of the field. Three relevant observations can serve as proof of the integrity of the field. Firstly, researchers at CONICET yearn for teaching posts at the university and teachers at the university aspire to be considered comparable to CONICET researchers. In fact, 75% of CONICET researchers hold a teaching post at a NU. Secondly, both professors at the universities and researchers at CONICET participate at the national classification performed by the Bureau of Education, and

an important part of each group proudly exhibit the highest *Category I*. Thirdly, the elite researchers holding the highest categories at CONICET and NU classification are concentrated in a unique university: Universidad de Buenos Aires (UBA). In other works (Beigel 2010, 2014a, b) we conducted studies on the professionalization of this academic elite. The most relevant conclusions of these studies are summarized in Table 2 and a brief historical account is provided in the next section.

Table 2 Historical-Structural Heterogeneities of Argentina’s scientific field

INSTITUTIONAL SETTING OF THE FIELD	<p>CONICET (1958) was born as an autonomous public agency with a full-time research career</p> <p>National (public) Universities have a strong tradition of institutional autonomy and autarchy. The first private (Catholic) university was created in 1956</p>
SPLIT BETWEEN THE NATIONAL UNIVERSITIES AND CONICET DURING THE LAST DICTATORSHIP (1976–1983)	<p>A major transference of C&T resources operated from the National Universities to CONICET, the latter experiencing a rapid institutional expansion</p> <p>With an external loan, more than 100 research institutes were created in the orbit of CONICET, disconnected from the National Universities</p> <p>Research was severely weakened at National Universities</p>
EXTERNAL EVALUATION	<p>The Higher Education Act (1995) introduced external evaluation to the National Universities</p> <p>Most National Universities resisted and particularly UBA never adjusted to the Law in force, via judicial support</p>
GEOGRAPHICAL AND INSTITUTIONAL ASYMMETRIES	<p>Highly unequal intra-national distribution of research capacities</p> <p>By 1999, 63% of the total researchers at CONICET had workplace at the Autonomous City of Buenos Aires or the province of Buenos Aires (2,254/3,579)</p>
DOUBLE PATH FOR PRESTIGE-BUILDING	<p>Diverse evaluative cultures emerged at National Universities, along with multiple regulations for tenure</p> <p>Non-metropolitan universities promoted teaching background and local prestige</p> <p>At CONICET research background and international prestige prevailed</p>
CIRCUITS OF RECOGNITION	<p>National Universities developed local publishing circuits</p> <p>Scientific prestige for CONICET researchers was built by publishing in mainstream circuits, adopting WoS standards</p> <p>Latin American journals prevailed for SSH at CONICET</p>

Professionalization of Scientific Research in Argentina: The Hinge between CONICET and the National Universities in a Historical Perspective

The unique features of Argentina's scientific field can be attributed to the country's historical path of professionalization and internationalization. It has a long history of distinguished scientists who have been integrated to prestigious networks/academies, publishing in mainstream journals and receiving important awards. This international circulation of relevant figures during the XXth century was also furthered by political exile, reinforcing an internationalization more based on individual trajectories than on stable institutional policies (Beigel 2014b). University autonomy is a long and strong tradition, granted by the National Constitution.

Argentina's university has had a dominant professional orientation, i.e., was conceived to train physicians and lawyers, as an environment for the reproduction of knowledge more than a space for scientific research (Prego 2010; Buchbinder 2005). Since 1945, the first institutes were created as a form of organization of research (Vasen 2013). The first battle around two models of science policy occurred during President Perón's government: a planning-based agency for coordination or one based on an independent scientific career within an agency for performing science. Perón began to design a "strategic" area of science and technology related to the public universities and between 1950 and 1951, a significant number of institutions and organizations related to science were created (Hurtado 2010).

The military coup of 1955 and the intervention of national universities promoted a major boost to the institutionalization of scientific research outside the universities. The main landmark in this direction was the creation in 1958 of the National Council of Scientific and Technical Research (CONICET), which was the result of an intense debate on the institutional reorganization of the activities of science and technology (Feld 2009). In the 1950s and 1960s a phase of modernization started at the national universities and some projects of departmentalization existed, but they were rarely implemented, due to the increasing rejection that this foreign model generated in the student movement. Interspersed with military coups and interventions in the universities, a process of fragmented professionalization occurred with the increase of full-time positions and the growth of enrolment in new careers such as education and social sciences.

Three different forms of symbolic capital evolved during these decades within the academic field in Argentina. The first type was an *institutionally* recognized prestige, more extended at provincial universities and linked to administrative positions at the research centres or Faculties and diverse forms of university power. The second type, an *internationally* recognized scientific prestige, attached to international prizes and publishing, was a kind of academic capital that developed progressively at CONICET and the bigger and ancient national universities, such as the universities of Buenos Aires, Córdoba and La Plata. During the radicalization of the 1960s, students and teachers got involved with a third type of prestige, the *militant capital* that was spread through all disciplines: in the massive quitting at the

UBA Faculty of Exact and Natural Sciences and the “National Chairs” [Cátedras Nacionales], created within the social sciences and humanities (Beigel 2013).

The last dictatorship (1976–1983) meant the most violent suppression of democratic guarantees known in the country and a turning point for the academic field, because hundreds of teachers and students were killed or imprisoned. The social sciences were deeply affected in terms of scholars imprisoned or exiled. They were also de-institutionalized via the closure of pre-graduate programs and research institutes of Sociology, Anthropology, Journalism and in some cases Social Work or Psychology. During these years there occurred a relevant expansion of material and human resources at CONICET, through the contraction of the budget for universities, given the need of the military cupola to dismantle the political activity in major national universities (Bekerman 2013). Scientific research in universities was severely diminished and concentrated at CONICET, where more than one hundred research institutes under its control were created. As a result of these dark years, there was a deep rift between the two institutions, and this aspect largely transcended the temporal boundaries of the dictatorship, becoming a structural feature of scientific and university system.

According to Albornoz and Gordon (2011), since the restoration of democracy in 1983, there was an attempt to reverse the rift between CONICET and the national universities and universities reprised its role in the research tasks. National programs were created and subsidies to promote research by university teachers were granted. CONICET also worked to reverse the rift. A key change was the abolition of the existing system that used to fund not the institutes or projects but the institute’s directors (which had led to misappropriation of funds through private foundations presided by the directors of the institutes themselves). A system of subsidies for projects was established through public calls. These actions were complemented by the creation of the Support System for University Researchers (SAPIU), which was proposed to give an economic incentive to the activity of full-time teachers in universities that were either members of the Career Investigator or that, without being part of CONICET, performed similar research. Leal et al. (2012) argue that, however, teaching remained the predominant activity at the universities until the 1990s. “In Argentina’s higher education system, teaching - and not research - constituted the core around which was structured academic activity” (357). By 1993, a Program for Teachers-Researchers was created, but its first attempt of application showed the weaknesses of the practice of research carried out in universities, the low portion of teachers with graduate degrees and scientific publications (Bekerman 2016).

Exogenous forces came to change the scenario in which scientific and university policy would unfold, since the approval of the Higher Education Act (1995), namely, the limitations of public funds for higher education, the establishment of external evaluations and the creation of numerous private universities. The fragmentation of actors and bureaucratic bodies placed the university system under high stress and conflict. Afterwards, the general social and economic crisis evolving between 1999 and 2002 affected the academic field through unprecedented budget cut-backs. The traditional annual application for tenure was reduced to a minimum amount of positions. By 2002 the demographic pyramid of CONICET was aged and

these researchers seemed like an elite in extinction. The social sciences were particularly affected by the priorities made by the neoliberal government and as a result, social research at CONICET began to be increasingly attached to the international evaluation criteria imposed by the natural sciences. Internationalization gained a general consensus in an environment of internal attacks and prejudice by public officers². The resistance of the SSH was expressed within the evaluation committees through defending books as a legitimate style of production and the regional (Latin American) journals as a valid form of international communication.

Since 2003, there was a period of strong recovery for science and public universities, based on the increase and diversification of the budget, the creation of research institutes and the multiplication of doctoral scholarships and full-time positions. The public universities were generously supported and 22 new public universities were created. But the major expansion of research capacities occurred in CONICET where new regional centres were created, even at the farthest geographical limits of the country. Between 2003–2015, researchers at CONICET were tripled from 3,579 to 9,236, reaching by 2013 a rate of 2.64 full-time researchers per thousand labour force (UNESCO 2016). This is low if compared with Belgium, Japan or Denmark, but is by far the highest in Latin America. Fellowships grew from 2,351 to 8,868, while technical and administrative personnel increased by 38% (MINCyT 2015; CONICET 2016).

Figure 1 shows the expansion in terms of total amount of researchers. This growth changed the historical predominance of the natural and exact sciences (NES) but increased the dominion of the biological and health sciences (BHS). By 2014 the social sciences and humanities (SSH) had improved their share along with engineering and agrarian sciences (EAS). The expansion also implied important inversions in infrastructure, along with the creation of institutes in different regions of the country. By 1983 CONICET had 112 institutes and by 2014 these reached 237.

The Recent Expansion of Research Capacities and the Asymmetries of Power Within the Academic Field

As we have seen, public expenses for science and technology have multiplied in the last decade in Argentina, with a marked increase of full-time positions. Currently, the public sector concentrates 77% of the overall inversion in scientific and technological activities and only the rest takes place at private universities and companies (MINCyT 2015). The state finances undergraduate programs at public universities: students do not pay tuition. There are 52 public universities and 50 private universities, but enrolment is much higher at public institutions (by 2014, 78.5% of undergraduate enrolment and 75.5% of graduate enrolment belonged to public institutions). Researchers at CONICET and public universities were

² Notorious momentum was the conflict between social scientist Susana Torrado and the minister of Economy, Domingo Cavallo, when he publicly sent Torrado to “wash the dishes”. This became a symbol for academic resistance and nowadays many “dish washing” public interventions were performed by the social movement against cutbacks.

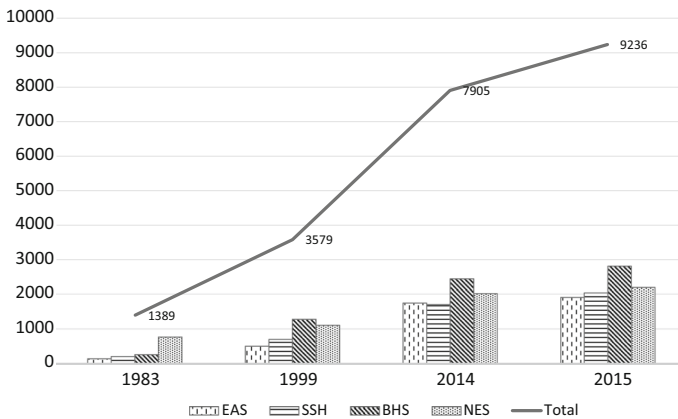


Fig. 1 Researchers at CONICET by scientific area, 1983–2015. References: *EAS* Engineering and Agricultural Sciences, *SSH* Social Sciences and Humanities, *BHS* Biological and Health Sciences, *NES* Natural and Exact Sciences. Source: PIDAAL historical database of researchers at CONICET (1983–2014)

responsible for 90% of all publications in 2000–2008 (Lugones et al. 2010:124), while private universities still have a weak tradition in research and development³. University accreditation is performed by a single public agency, the National Commission for University Evaluation and Accreditation (CONEAU, for its Spanish Acronym).

CONICET offers research positions, subsidies for scientific projects and fellowships for doctoral-postdoctoral studies. Graduate programs, particularly doctoral schools, have grown rapidly in the last decade, along with the growth in fellowships. All of this has resulted in a relevant increase of PhD holders in all scientific areas. The creation of the Science and Technology Ministry (MINCYT, for its Spanish acronym) in 2007 also gave a particular impulse to professionalization of research. The geometrical growth of human and material resources for scientific research, in a context of rapid internationalization, reinforced the structural heterogeneity of the field and entangled a complex set of asymmetries related to institutional power and scientific recognition. In previous works we have studied the institutional setting, the diverse evaluative cultures and the circulation of the scientific output, this latter featured by different circuits (Beigel 2014b, 2015; Beigel and Salatino 2015; Bekerman 2016). Table 3 shows the synthesis of these structural observations for Argentina's case. In what follows we will focus on the current intra-national distribution of research capacities with a particular insight on the relations between CONICET and the national universities.

There are relevant differences in terms of paths of career-building between CONICET and the national universities—and the latter, among themselves. The main working place for the increasing new PhD holders has been CONICET, even if only

³ In fact, professors based exclusively at private universities can't participate in the national program of universities research evaluation (Programa de Incentivos).

Table 3 Asymmetries of Argentina's scientific field after the expansion

INSTITUTIONAL SETTING OF THE FIELD	<p>Dominantly public scientific field</p> <p>A unique public National Agency for Evaluation and Accreditation of universities (CONEAU)</p> <p>52 autonomous National Universities with diverse regulations</p> <p>Specialized agencies for scientific research CONICET, CNEA, INTI, INTA</p> <p>50 private universities, with scarce research activities. Very few researchers at CONICET are based in a private university</p> <p>79% of higher education enrolment in public universities</p>
RELATIONS BETWEEN CONICET AND THE NATIONAL UNIVERSITIES	<p>Disconnection between public policies addressed to National Universities (Ministry of Education) and scientific policies addressed to CONICET and specialized agencies (Ministry of Science and Technology)</p> <p>By 2009, CONICET's share of the national C&T budget reached 26.5% while the national universities only participate in 5.1%</p> <p>70% of CONICET researchers also have a teaching post at a public university</p>
TENSIONS BETWEEN TEACHING AND RESEARCH	<p>Teaching at universities is not mandatory for CONICET researchers, although most desire a post at a public university</p> <p>Even if most institutes and research centres depending on CONICET have established relations with national universities, there are still significant difficulties to articulate research to teaching</p> <p>Research background is not mandatory for tenure at several non-metropolitan national universities</p>
INTRA-NATIONAL DISTRIBUTION OF RESEARCH CAPACITIES	<p>Concentration of CONICET researchers at 3 metropolitan universities</p> <p>The capital city and metropolitan area of Buenos Aires concentrates 60% of total researchers at CONICET, a meagre change comparing concentration by 1999 (See Table 2)</p> <p>Concentration of institutional power at CONICET by researchers formed and located at UBA</p>
EVALUATIVE CULTURES AND PRESTIGE-BUILDING	<p>PhD holders represent only 9.9% of the teaching staff at National Universities</p> <p>Tensions between international and nationally-oriented scientists</p> <p>Internationalized scientific evaluation at CONICET centred in published papers: identification between quality and international indexation</p> <p>Diverse evaluation cultures and regulations at national universities, partly centred in teaching background and endogamic recruitment</p>

Table 3 continued

CIRCUITS OF RECOGNITION	<p>Researchers with a “national/ist” style of production and circulation extended at non-metropolitan national universities in dynamical local circuits</p> <p>Researchers with an “international” (mainstream) orientation extended in the exact and natural sciences with seat at CONICET and metropolitan national universities</p> <p>Researchers with a regional circulation extended in the social sciences and humanities with seat at CONICET and metropolitan national universities</p>
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¼ fellows that applied for tenure were accepted until 2015⁴. Full-time positions at public universities had also grown during this period. However, the requirements are quite different and diverse with each institution because of their autonomous status. In general, at the universities, a doctoral degree is not a determinant credit to access a teaching post. Moreover, at many provincial universities, publications are not considered as important as one’s teaching background. Furthermore, publications and PhD degrees are not a determinant factor in the periodical evaluations at the universities by CONEAU nor do they have any impact on government funding for public universities –less than 10% of the teaching staff are PhD holders. Traditional chair system prevails in the bigger universities, thus “temporal” power of head professors and deans have an influence in the selection of the evaluation committees for tenure. However, it cannot be said that teaching posts are simply discretionally allocated because teaching background implies a set of competencies linked to the dominion of the local agenda, a valuable capital in these competitions. As a consequence of the expansion of the CONICET and its “meritocratic” culture, young doctors more likely aspire to become researchers but never abandon the aspiration of gaining a teaching post (Beigel 2015, 2016).

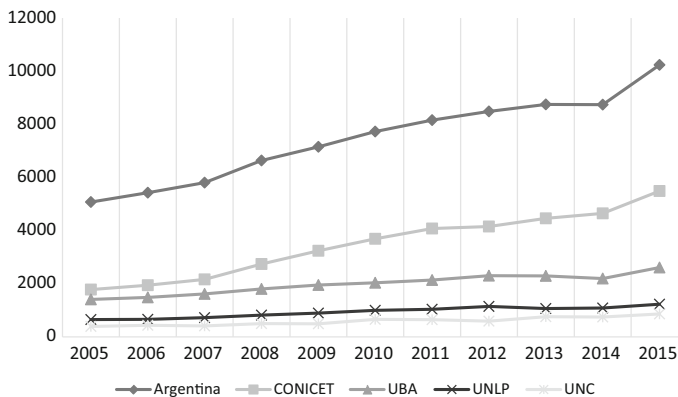
At CONICET, publishing in indexed journals is a prerequisite to apply for tenure. The natural and applied scientists have developed a long tradition of internationalization (adapting to writing in English and Web of Science or Scopus publishing rules) and progressively extended the practice of evaluating the indexation of the journals to all scientific areas. Bibliometric indicators show an important growth of Argentinian institutions in terms of research performance, headed by CONICET. Table 4 shows the asymmetries between CONICET, UBA and the rest of the national universities, a tendency that is also clear in the amount of papers included in Web of Science, as can be seen in Fig. 2. However, there is a relevant issue that is in itself proof of the remaining structural rift between CONICET and the NU. We refer to the fact that the universities, and particularly UBA, have claimed that researchers with workplace or teaching positions at the universities normally use the

⁴ In December 2016 the results of the annual announcement for tenure at CONICET were published and the research positions offered by the new government decreased in 50%, a severe cut that provoked a national movement of the scientific community and the seizure of the headquarters of the MINCYT and the CONICET buildings in several provinces.

Table 4 Argentinian institutions^a position on Scimago Institutions Ranking, years 2009–2016. *Source:* Compiled by the authors based on Scimago Institutions Ranking

Institution	2009	2010	2011	2012	2013	2014	2015	2016
CONICET	399	378	333	284	243	216	223	220
UBA	521	511	493	458	427	402	412	418
UNLP	713	695	658	618	575	543	549	572
UNR	722	712	690	658	611	588	586	578
UNMdP	703	696	685	658	629	605	607	580
INTA	721	720	704	667	626	599	582	584
UNC	712	709	692	656	613	593	592	592
UNRC	712	708	685	654	633	605	596	595

^aAcronyms: CONICET (National Council for Scientific and Technical Research), UBA (National University of Buenos Aires), UNLP (National University of La Plata), UNR (National University of Rosario), UNMdP (National University of Mar del Plata), INTA (National Institute for Agriculture Technology), UNC (National University of Córdoba), UNRC (National University of Río Cuarto)

**Fig. 2** Scientific articles (Web of Science) by selected Argentinian research institutions, years 2005–2015. *Source:* Compiled by the authors based on Web of Science

CONICET affiliation in their papers and not the university affiliation, accordingly, these are not counted in statistics.

The growth of the articles of Argentine authors included in Science Citation Index Expanded was driven mainly by researchers belonging to CONICET. The three institutions that follow it in importance - UBA (University of Buenos Aires), UNLP (National University of La Plata) and UNC (National University of Córdoba) - show a much more moderate growth trend. Thus, the articles of CONICET researchers (208%) grew more than those of UBA (85%), UNLP (88%) and UNC (120%) (see Fig. 2). In the case of the scientific articles indexed in Scopus there is also a significant yet not explosive global growth of 78% between 2005 and 2015. CONICET is the institution that most contributes to this expansion: articles signed

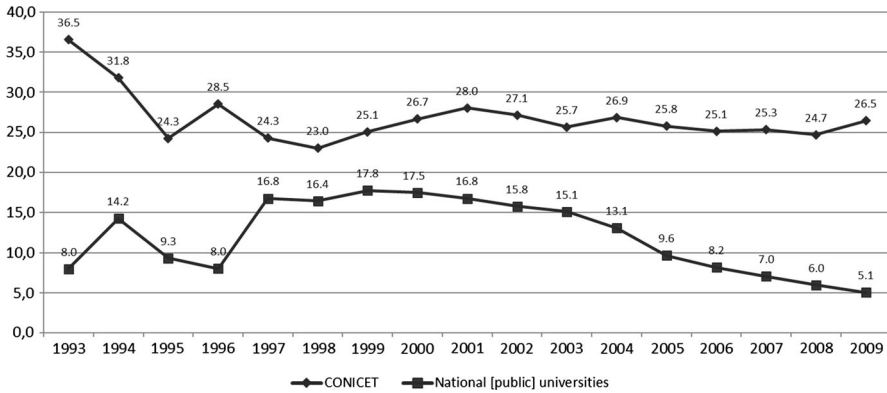


Fig. 3 Allocations for CONICET and national universities as a percentage of the public expenses for Science and Technology (S&T). *Source:* Elaborated by the authors based on Mosto (2011: 25–26)

by its researchers grew 126% in the period compared to 76% on average in the three major universities.

Aside from mainstream circuits, the regional circuit was strengthened in this period within the SSH and Spanish-Portuguese language scientific production at CONICET. Local circuits nourished by non-indexed journals are clearly left outside the play at CONICET, while they are valued at non-metropolitan universities, broadly in the SSH but also by researcher-teachers from other disciplines. This two-pronged path (local/international) observed for the academic field as a whole has been reinforced by the disconnection between public policies elaborated on one part by the Ministry of Education (SPU), and on the other part by the MINCyT, the former addressed to public universities and the latter directed at CONICET and specialized agencies for scientific research. Following up the evolution of the public expenses for science and technology [Finalidad Ciencia y Técnica, in the national budget], we can observe that CONICET received five times more than the universities, in the period 1993–2009. As we can see in Fig. 3, since 2002 the CONICET share was relatively stationary, while the national universities declined from 15.8% to 5.1%⁵. At the same time, public expenses on S&T for national universities were visibly concentrated for the period 2000–2007, during which an average of 35% was absorbed by three universities that are, for their part, the largest in terms of matriculation, the most ancient and prestigious: UBA, UNLP and UNC.

In order to understand the complex relations established within this heterogeneous field, it is necessary to observe the asymmetries between CONICET and the 52 NU in terms of distribution of research capacities. It is not easy to describe in quantity and quality the population of Argentinian scholars, firstly because the data is produced separately by the two national ministries (Education, and Science);

⁵ There are several limitations in the available data to analyze public investment by institution in Argentina. The flow of funds to the universities come from two main sources: the S&T public resources distributed through the national budget and the funds granted by PIDI and received by the researchers as a supplementary salary.

secondly, because there are two national classification systems that respond to different criteria. For the NU, the Incentive Program for Teachers-Researchers (IPTR), offering five categories for teachers-researchers (I-V). CONICET for its part offers five categories for its research career: Superior, Principal, Independent, Adjunct and Assistant. Other agencies, such as CNEA or INTA, have their own categories and criteria.

There is no public statistical data available in order to clearly distinguish the population of full-time researchers considering dual membership. A large majority of the university professors are not researchers at CONICET, but most researchers at CONICET are university professors, hence holding two legally compatible posts. According to the statistical yearbook published by the Ministry of Education, the total teachers-researchers classified in IPTR were 24,122 by 2013 (SPU 2013). Our own data indicates that by December 2014 the total CONICET researchers was 7,905, of whom 2,091 didn't have a teaching post nor, by consequence, a category in the IPTR system. If we add them to the researchers classified by IPTR we come to a population of 26,213 accredited researchers at the universities and CONICET.⁶ Inverse transferences, from NU to CONICET, are less likely found: professors who have built their career at the university are usually out of the age range or far from the publishing background required for tenure at CONICET.

Focusing now on professors⁷ with the highest categories in IPTR (categories I and II) and the universe of researchers at CONICET, we can observe the institutional concentration of this elite group. Table 5 shows that 3 universities (UBA, UNLP, UNC) concentrate 39.4% of total CONICET researchers, 42.4% of the professors with category I and 29.9% of professor's category II. In particular, the concentration is visible at UBA where 31.1% of total agents with category I and II are based. This highlights the strong institutional bond between CONICET and the most prestigious universities. The case of UBA is especially complex: because of its massiveness, it also includes numerous professors *ad-honorem* that are not allowed to apply for IPTR and numerous professors without a research background. But its dominant place within the internationalized elites is not just the result of its size: in that case the share of UBA's professors in all IPTR categories should have been relatively equal. On the contrary, the share of UBA decreases from higher to lowest positions, because the rest of the national universities professors occupy mostly inferior categories. If we isolate the 4,734 individuals with categories I–II that are not researchers at CONICET, the part of them who work at UBA diminish considerably (16%). All of which confirms that the dominant place of UBA occurs within the internationalized elite composed of researchers at CONICET that are, for their part, also classified in the highest IPTR categories.

The dominant place of UBA in the internationalized elite and particularly at CONICET has been a matter of our previous studies. Three facts were observed: 1)

⁶ We are not including doctoral or postdoctoral fellows without teaching posts in the analysis although they are a relevant universe of agents whose final expectation is to be a researcher at CONICET, but an analysis of this universe is outside the scope of this paper.

⁷ When we refer to professors we intend to distinguish researchers that have a teaching post at a national university but are not researchers at CONICET. In the Argentinian higher education system they are "teacher-researchers".

Table 5 CONICET researchers and Categories I–II (IPTR), by workplace. *Source:* PIDAAL database of researchers at CONICET (dec. 2014); List of IPTR available at: <http://incentivos-spu.me.gov.ar/banco2/>. In counting CONICET researchers for UBA, UNLP and UNCórdoba we have included researchers working at institutes with double institutional membership

Institution	CONICET (N=7,905)	IPTR I-II (N=6,633)	
	CONICET researchers	Category I	Category II
UBA	21.3%	18.5%	12.6%
UNLP	9.9%	12.8%	9.3%
UNC	8.2%	11.1%	8%
Subtotal	39.4%	42.4%	29.9%
Other 49 national universities	37.8%	50.5%	65.9%
CONICET's institutes	12.2%	3.8%	2.4%
Government Institutions	6.4%	2.4%	1.2%
Private universities	2.8%	0.6%	0.4%
Other private institutions	1.4%	0.3%	0.2%
Total	100%	100%	100%

The relevance of UBA as a workplace depends on the discipline, reaching its highest peak in the SSH where UBA's share is 29% of the total SSH researchers at CONICET. 2) The share of UBA in the PhD formation: 32.5% of the total researchers in this agency obtained their Bachelor's at UBA and 30.3% of the total obtained their doctoral degree at this university. The highest peak is in one of the most important areas of this agency, Biology and Health, where this percentage reaches 41.5%. 3) Our survey conducted on the composition of the evaluation committees (2005–2015) is also striking: 41% of all members are graduates from UBA and within the Qualification Board (the highest instance that evaluates the work of the disciplinary committees), 80% of its members during this period are graduates from this university (Beigel 2016). This incidence in the academic formation of the researchers and within CONICET structure is critical to explain the evolution of the evaluation criteria towards international standards.

The distribution of CONICET researchers by workplace shows a significant concentration at UBA that increases along with hierarchy. A third part of the “superior” researchers have their workplace at UBA, $\frac{1}{4}$ of the “Principal” and a fifth of the rest of the categories. Figure 4 shows that the rest of the national universities participate in the inferior categories, which in turn is one of the benefits of the federalization policies during the recent expansion. However, of the total 5,815 researchers at CONICET that have a teaching post, 25.7% are at UBA.

Now let's analyse the hierarchical distribution of the researchers by area in order to see if asymmetries are explained by a disciplinary hierarchy rather than structural field determinants. Of the total CONICET researchers, indeed “hard” sciences concentrate a greater part of the higher categories –particularly the exact and natural sciences accumulate in the superior category. The share of the social sciences and humanities currently decreases along with hierarchy, as can be seen in Fig. 5. But

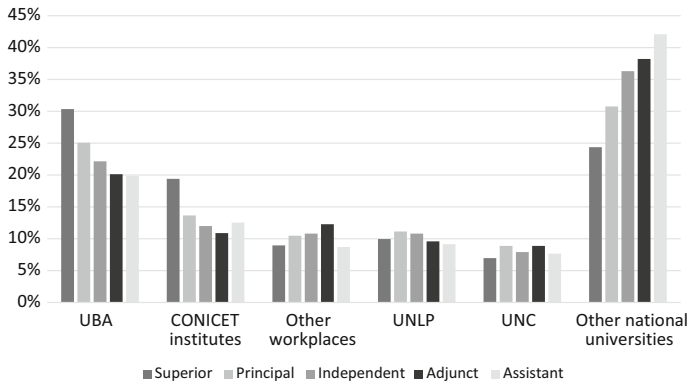


Fig. 4 CONICET researchers by workplace and category, 2014 (N=7,905). *Source:* PIDAAL database of researchers at CONICET, Dec. 2014

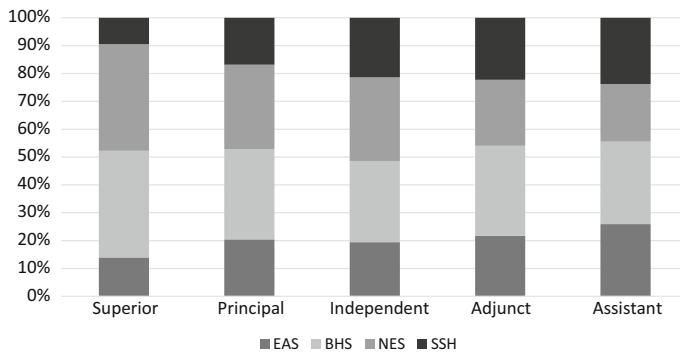


Fig. 5 CONICET researchers, by category and scientific area (N=7,905) [%]. References: *EAS* Engineering and Agricultural Sciences, *SSH* Social Sciences and Humanities, *BHS* Biological and Health Sciences, *NES* Natural and Exact Sciences. *Source:* PIDAAL database of researchers at CONICET, December 2014

this is not due to the dominance of hard sciences during the expansion. On the contrary, the SSH had a strong incidence in CONICET's governing board and its particular publishing styles (oriented to publishing in the regional circuit) have been accepted for tenure and promotion. This morphology is rooted in the historical process of de-institutionalization of these disciplines under the last dictatorship and the demographic starting point they had before the expansion. By 1983, 15% of the total researchers at CONICET were from the SSH, and in 2015 their percentage rose to 22% (See Fig. 1). In 1999, the SSH was an aged universe of researchers (only 29.6% were 30–45 years old) and by 2015 most of those former researchers in higher categories were already retired. The expansion coped with the disciplinal asymmetry and time will show if ascendant mobility will be equivalent for all areas.

Research at national universities is developed at institutes of all sizes, with diverse degrees of consolidation and also in traditional chairs, frequently led by

isolated individuals. At CONICET, research is developed at institutes articulated in a network of 14 regional centres located in different provinces. Many efforts have been made in the last decade to reconnect the old split between CONICET and the national universities. By 1999, 15% of total researchers had their workplace in an institute depending exclusively on CONICET; 22% at institutes of double dependency (National University+CONICET) and 44% at institutes belonging exclusively to national universities. In 2014, almost half of the total researchers work at double dependency institutes (47.3%), only 6.6% at institutes depending exclusively on CONICET, and 29.5% at institutes belonging exclusively to national universities. Currently, a great part of these researchers belong to the social sciences and humanities and mostly work at UBA, UNLP and UNC. Disconnection still prevails in many provinces.

We have collected primary data on 813 institutes depending exclusively on the national universities and 233 institutes depending on CONICET (or double dependency CONICET+ National Universities). As can be seen in Fig. 6, the exact and natural sciences are mostly based at CONICET: 54% of these institutes and 76.1% of the researchers. Biology and health are more equilibrated in terms of institutes: 53% belong to the national universities while 47% belong to CONICET. However, 75.8% of the total researchers from this area work in a CONICET institute. Engineering and Agricultural Sciences have more institutes in the orbit of the national universities (87%) but the bigger ones belong to CONICET and 65% of the total researchers work at these institutes. In an opposite situation are the social sciences and humanities, with a marked trend towards the universities: 91% of the institutes depend exclusively on a national university and 65% of the researchers work at an institute depending on a national university. However, as can be expected, most of these researchers work at one specific university: UBA.

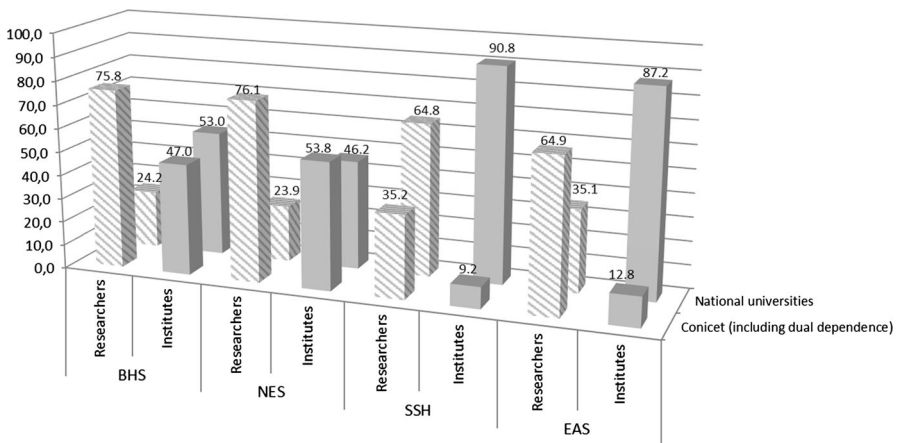


Fig. 6 CONICET Researchers (N=7,905) and Research Institutes (N=1,046) by area and institutional membership, 2014 [%]. References: *EAS* Engineering and Agricultural Sciences, *SSH* Social Sciences and Humanities, *BHS* Biological and Health Sciences, *NES* Natural and Exact Sciences. Source: PIDAAL database of CONICET researchers, Dec. 2014 and PIDAAL data base of institutes, Dec. 2014

The distribution of researchers by institution and the progressive connection of CONICET institutes with a national university does not necessarily inform on the link between research and teaching. To work in an institute located at a university or with double-dependency does not imply an obligation to participate in teaching activities. The researchers who effectively teach at the national universities are those holding a teaching post, currently the majority: 5,602/7,905. Only 261 CONICET researchers have a teaching post at a private university.

If we now analyse the geographical distribution of research capacities, the concentration is even higher than observed by institution, because many private institutes and associations have a seat in the area of Buenos Aires. It is critical to differentiate areas inside this vast Argentinian province that includes the capital of the country. Actually, 3 different regions can be distinguished within “Buenos Aires”: a) the Autonomous City of Buenos Aires (“CABA”, for its Spanish acronym), capital of the country, b) the metropolitan area of Buenos Aires (“Gran Buenos Aires”) and c) other zones of the province of Buenos Aires (the “Bonaerense” region) (see Fig. 7). In Gran Buenos Aires we find many universities tightly connected to CABA because of the migration of researchers formed at UBA. Many of these have institutes with headquarters located at CABA. The concentration of CONICET researchers in the first two regions is particularly visible, in spite of the efforts made to prioritize marginal regions.

For the whole country, we hereby classify 8 academic regions, considering demographic and academic indicators. Each region counts at least one important university created before 1960, that operates as a sort of a regional node. The exception is the Southern region. As can be seen in Table 6, even if only 7.2% of the Argentinian population resides at CABA, 33.9% of the new pre-graduates per year come from institutions located in the capital city. This share increases in PhD titles (41.6%) and CONICET researchers residing in CABA (31.5%). Together with the dominant role of UBA this region concentrates practically 1/3 of the national research capacities.

The four regions that follow in relevance are Gran Buenos Aires, Centre-West, Centre-East and Bonaerense, respectively. Each has a relevant research tradition, although the contribution to graduate and PhD holders is frankly minor. The North-West and North-East contribute far less to new pre-graduates and PhD holders even though they have universities with more than 50 years of existence and appreciable amount of IPTR professors. The South reveals as the more extensive region with less demographic density in Argentina. It has new but still few higher education institutions, although it has been benefited by the federalization policies at CONICET, recruiting more new researchers than North-West and North-East together (See Table 6).

Intra-national asymmetries are also visible in the distribution of the research institutes. Particularly the CONICET institutes, which are highly concentrated: 31% are located at CABA. Figure 8 shows a different picture for the institutes depending on national universities. 26% are located in Gran Buenos Aires (where Universidad Nacional de La Plata highlights); secondly, Centre-West with 23% (highlighting Universidad Nacional de Cordoba), while CABA participates only with 9.6%. However, this is due to the fact that we are comparing absolute number of institutes and not the amount of researchers.

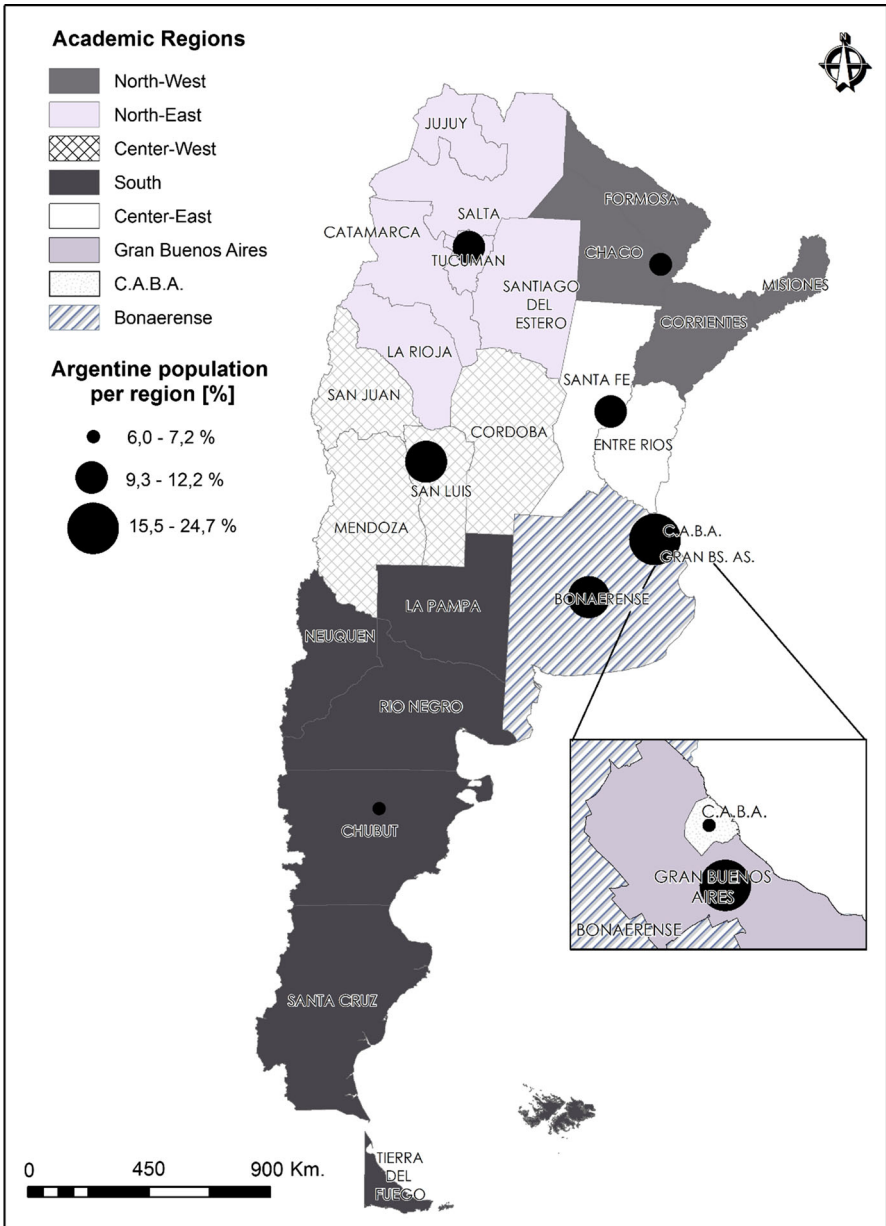


Fig. 7 Argentina's 8 academic regions

Table 6 Population, education and indicators, per academic region. *Sources:* Compiled by the authors from National Census 2010 (National Institute for Statistics and Census, INDEC). New pre-graduates, New Ph.D holders, and IPTR Professors in Sistema de consulta de estadísticas universitarias (accessed 13 February 2017). CONICET Researchers: PIDAAL database, Dec. 2014

Region	Population Absolute (%)	New pre- graduates, per year Absolute (%)	New Ph.D. holders, per year Absolute (%)	IPTR professors Absolute (%)	CONICET researchers Absolute (%)
CABA	2,890,151 (7.2%)	37,752 (33.9%)	758 (41.6%)	3,405 (15.1%)	2,489 (31.5%)
Gran Buenos Aires	9,916,715 (24.7%)	18,464 (16.6%)	249 (13.7%)	3,351 (14.8%)	1,353 (17.1%)
Bonaerense	5,708,369 (14.2%)	3,806 (3.4%)	110 (6%)	2,603 (11.5%)	887 (11.2%)
Center-West	6,161,170 (15.4%)	20,872 (18.7%)	370 (20.3%)	5,564 (24.6%)	1,321 (16.7%)
Center-East	4,430,531 (11%)	15,125 (13.6%)	170 (9.3%)	2,471 (10.9%)	729 (9.2%)
North-West	4,911,412 (12.2%)	7,896 (7.1%)	94 (5.2%)	2,765 (12.2%)	413 (5.2%)
North-East	3,679,609 (9.2%)	5,065 (4.5%)	34 (1.9%)	987 (4.4%)	143 (1.8%)
South	2,419,139 (6%)	2,381 (2.1%)	37 (2%)	1,429 (6.3%)	570 (7.2%)
TOTAL	40,117,096 (100%)	111,361 (100%)	1822 (100%)	22,575 (100%)	7,905 (100%)

References: New pre-graduates and New Ph.D. holders per year: average for 2010–2014 period. IPTR Professors: all categories (I–V), 2012

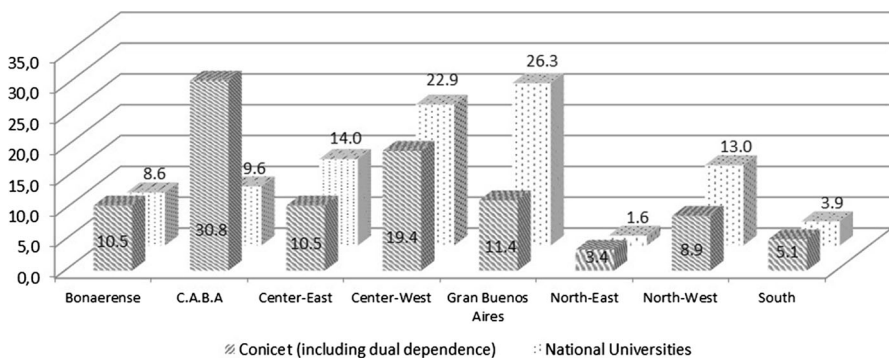


Fig. 8 CONICET and national universities research institutes, by region (N=1.050) [%]. *Source* PIDAAL data base of research institutes, Dec. 2014

Final Remarks and Policy Implications

Compared with the deteriorated structure of Argentina's academic field up to the 2001 crisis, the expansion that followed did indeed achieve relevant results in terms of institutionalization and professionalization. The full-time positions grew significantly in research and teaching, along with public investment in R&D. Several regional research centres and numerous new institutes were created in partnership between CONICET and the national universities. However, this expansion was fulfilled in a country with a history of military dictatorships and erratic scientific policies, evolving on par with a long established tradition of university autonomy. Accordingly, production and circulation of knowledge has been increasingly featured by different circuits of recognition and opposite evaluative cultures with three main orientations: one mostly attached to international standards, another one developed within the regional circuit, and the third one focused on the local realm.

To understand this process in a historical-structural perspective, we pointed out the rift between the CONICET and the national universities intensified during the last military dictatorship and established as a structural feature of the academic field. This rift is still visible in the lack of articulation between the planning areas directed at CONICET or other specialized agencies (Ministry of Science, Technology and Productive Innovation) and programs aimed at higher education (Ministry of Education). The division is reinforced by the fact that teaching is not mandatory for CONICET researchers and research background is not decisive for career-building at many universities. The national program created to stimulate research at the national universities (IPTR) is more a symbolic recognition than an economic "incentive". However, its classification is widely accepted and desired by university professors as much as by researchers at CONICET - besides, most of the latter are also professors at national universities where a more nationalized culture prevails. Far from living separately at different institutions or disciplines, these principles of legitimation are at the core of the disputes in everyday life at the universities.

In order to analyse this case, we used a conceptual framework capable of understanding a field that underwent a rapid growth, but is besieged by opposite endogenous trends and strong external pressures. Precisely born to surpass the developmentalist perspective, the concept of *structural heterogeneity* was used to explain the entangled processes that are at work in peripheral countries that experienced economic growth but deepening internal asymmetries. In the case of Argentina, diverse professionalization paths can be observed, while accounting for local, national and international circuits. Considering the structural features of this field, what balance shall we make of the results of the recent expansion? Measured by performance in Web of Science/SCImago, Argentina's growth is lower compared to the "productivity" of other Latin American countries. Publishing in mainstream circuits and indexed journals is a prevalent practice at CONICET and we saw that the publications by its researchers grew by 208% (WoS) and 126% (Scopus), a relevant figure considering the increase of human and institutional resources. Besides, and taking into account the fact that the morphology of this

agency is now very young, it is expectable to wait quite some time for increasing publishable results. Different styles of production and circulation were impulsed within the national universities and the SSH, where regional (Latin American) indexation systems - such as Scielo or Latindex - were rewarded. Therefore, to measure the impact of the expansion in terms of knowledge production it is critical to observe alternative circuits in open access.

International comparisons can no longer rely on mainstream databases as a “universal” pattern. As we have seen, their limitations for measuring “world science” have been discussed by qualitative and quantitative studies (Vessuri 1987; Arvanitis and Gaillard 1992; Archambault et al. 2009, among others). But a far more critical perspective is needed in order to sort out from “self-blaming minority”. Scientific development needs an urgent redefinition in terms of diverse paths of institutionalization, professionalization, considering adjustment of innovation to local needs and a non-dominant notion of circulation. We argued that Argentina developed a scientific policy with a democratizing orientation and a horizontal expansion, both stimulating internationalized and nationally-oriented elites. The co-existence of several evaluative cultures based on diverse regulations, largely possible due to a resistant tradition of university autonomy, made possible the endurance of strong local circuits with scarce international circulation. Accordingly, in order to boost innovation at the national universities, it is necessary to account for original knowledge published in local journals while developing actions to stimulate the dialogue with an international research agenda.

One critical issue in the balance of expansion is the geographical and institutional distribution of the increase in terms of researchers. Concentration at metropolitan universities was observed, particularly the dominant role of UBA in the composition of the academic elites and within CONICET. We created a regional classification because the official classifications of the higher education system are not suitable to analyse the vast Buenos Aires zone. As a result of the data elaborated, the capital city has been largely concentrating the expansion of researchers and PhD holders, as long as CONICET institutes, despite the efforts for settlement in relegated provinces. These federalization actions were successful mainly concerning the Southern region. Accordingly, a priority on disadvantaged areas is imperative in the competition for tenure at CONICET. Along with this the increase of geographical diversity in the composition of the evaluation committees is also advisable.

The above recommended policies are scarcely viable in the dismal present situation of Argentina. It is now particularly difficult to propose actions to amend the pervasive structural asymmetries. Under the new government headed by the right-wing President Mauricio Macri the expansion of the scientific national system was quickly slowed down. CONICET experienced a cut-off that affected its budget and the full-time positions annually offered – these diminished in 50% by 2016. The democratizing orientation of previous scientific policies concerned by equitable growth of all disciplines is today menaced, given the new rules announced in the competition for tenure at CONICET. Basic research is relegated while applied projects have been assigned with half of the available positions. This affects the process of accumulation of knowledge that was ongoing in the natural and exact sciences and directly harms the social sciences and humanities.

The new policies are not only aimed at a financial cut-off but to question the private/public composition of R&D investment and undermine the goals established by the Ministry of Science and Technology for 2020. These were planned, paradoxically, by the same minister now in functions – the unique bureau that continues under the new government supposedly having recognized the previous achievements made in this area. An orientation towards heteronomous internationalization is already at work in the proposal of creating salary incentives for productivity. For their part, the national universities have also experienced a diminishment in budget, due to inflation and selective distribution. They are being questioned by the government from different sides: by criticizing its free entrance (historically open to migrant students coming from other Latin American countries) and punishing the distance between matriculation and rate of graduation. It seems we are not part of an integral reform program of the higher education system nor a new perspective towards scientific development, but in front of a political decision to reduce the gravity of public science and public education in Argentina's near future.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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