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A Well-Behaved Population: The Chilean Scientific Researchers of the XXI Century and the International Regulation

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Abstract

In Chile, since the beginning of the twenty-first century, the State's scientific and higher education institutions (CONICYT, Fondecyt, National Quality Assurance System) and universities have established criteria and procedures for evaluating the scientific production that have consolidated an orientation of research activities towards the international mainstream, expressed mainly in journals indexed as WoS and Scopus, and also, for the social sciences, in those indexed as SciELO, although with less force. This configuration of national criteria and procedures articulated with international indexations can be considered a device for regulating the conduct of the scientific researchers population in the country. After a couple of decades in operation, the results show significant increases in scientific productivity, measured with such criteria of the global mainstream, which are notoriously superior to other Latin American countries. These data and a study on Chilean researchers, based on a probabilistic survey, show an internationalized population, fundamentally connected with the central countries, of Europe and the U.S.A., and only secondarily with others in the region. This is a population that self-regulates, with increasing effectiveness, its scientific activity according to the orientations of that regulation device: it is a "well behaved" population.

Keywords: Internationalization; Scientific Mainstream; Self-Regulation; Scientific Institutionality; Governmentality.

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1 Introduction

In the early 1980s, under the dictatorship of Augusto Pinochet, Chile experienced a radical change in its institutional structure. The university system, which in the country has always concentrated most of the scientific research, incorporated a market logic in its operations. The foundation of new private universities was facilitated, and public funding was reduced, forcing the new self-financing practices of entities that previously depended fundamentally on the State (Brunner, 2009). Thus, soon the higher education institutions multiplied and from the eight universities that had existed for decades, we arrived at 60 today. Also, in 1982, Fondecyt, a public fund to promote scientific and technological research, begins to operate through competitions in which the quality of the projects and the productivity of the contending scientists are evaluated. In the following decades, the funds provided by this way increased significantly and diversified (for initiation, postdoctoral or associative projects, among others) and became the main source of research funding in the country. It is a highly competitive program in which both to participate with prospects for success and get the final report's approval it is essential to demonstrate scientific productivity in mainstream indexed publications — in Web of Science, first, and Scopus, after this last indexing appeared, in 2004.[1]

In 2006, a national system for the Quality Assurance of Higher Education was established, one of whose functions has been the accreditation of universities and their programs, which has various practical effects relevant to their existence: it enables them to receive State funds and scholarships for their students, and increases their academic prestige (Zapata & Tejeda, 2016). In this system, as in Fondecyt contests, mainstream scientific productivity is an indicator of first relevance.

These institutional transformations promoting competition and that in Chile occurred earlier and more consistently than in other Latin American countries, have significantly transformed the dynamics of scientific research and the balance between its local and international orientation. The result is that today, at the beginning of the third decade of the 21st century, Chilean scientists constitute a population well adapted to internationalization and to a regulation expressed in the indexation system of the global mainstream. It is a population that exhibits a "good behavior" in the matter, pressured or motivated by an institutional system that goes from the State scientific agencies to the universities; it has shown a significant degree of conformity or practical adjustment to this logic.

The objectives of this article are: (1) To explore some institutional processes that have contributed to making operative, in the country, a device for regulating scientific activity that guides its production towards the international mainstream. (2) Check the results attributable to such a device, which, as I propose, would account for a population that behaves well, that adjusts and self-regulates according to the orientations of this device. (3) Characterize the researchers of this population, especially regarding their internationalization, which would help explain or understand their propensity to adjust the management of their scientific activity responding to the mainstream indexation parameters, thus adapting to the international regulatory mechanism.

I begin, in the first section, by presenting the population of Chilean scientific researchers,

1. At the end of 2018, the Ministry of Science, Technology, Knowledge and Innovation was created, which would reinforce the country's scientific activity. CONICYT (National Commission for Scientific and Technological Research), meanwhile, has been replaced by a National Agency for Research and Development (ANID), which entered into operations in 2020, as part of this new ministry (formerly of the Ministry of Education). Until the end of 2020, however, the new ministry has not had any significant effects.

highlighting some of its characteristics and recent evolution. In the next section, I explain some institutional factors that have played a crucial role in promoting international mainstream orientation. Based on secondary data, I present results referred to productivity and international connection. These results are manifestations of the international "good behavior" of Chilean scholars. For the following sections, I rely on an empirical investigation based on a survey to a representative sample of researchers. In the third section, I explain the investigation procedure and analyze some characteristics of the sample. In the fourth section, I describe the international activity of the researchers studied, paying attention to their international publications. I close the text with a section of conclusions.

2 The Population of Scientific Researchers in Chile

According to the OECD definition, by scientific researcher we will understand a professional involved in the conception or creation of new knowledge, products, processes, methods, systems, and in the management of the respective projects. The population of researchers constitutes a fundamental component of the scientific development of a country and therefore it is relevant to study its characteristics, development and international insertion (Comisión Presidencial Ciencia para el Desarrollo de Chile, 2015). In what follows, I expose some characteristics of the Chilean scientific population as a whole, according to the secondary information available.

The determination of the total number of those who make up the population of scientists in the country has some difficulties. There is no data base or directory that allows unambiguously elucidate the figures. However, the most reliable estimates make it possible to state that the figure is higher than 14,000 researchers. The Research Network in Science and Technology (RICYT, 2018) registers 14,200 researchers by 2016. CONICYT (2015) estimates the "scientific talent pool" or authors of the country's scientific production at around 13,000 researchers, for 2013, based on analysis of publications (p. 20).[2]

As for the number of researchers, Chile appears in fourth place in Latin America, after Brazil, Argentina, and Mexico. This, however, does not consider the different population sizes between countries. Calculating their proportion with respect to the economically active population (EAP), 1.62 scientific researchers (natural persons) result per 1,000 members of the workforce (RICYT, 2018). This proportion of researchers is well below that shown by the Nordic countries with more than 12 researchers per 1,000 workers or from the U.S.A. or other European countries, such as Austria, Belgium, and Great Britain, where it is greater than nine (UNESCO, 2019). On the other hand, it surpasses many Latin American countries, including Mexico, Colombia, Cuba, Peru and Uruguay (RICYT, 2018).

National expenditure on Investment and Development as a proportion of gross domestic product (GDP), which in the case of Chile is 0.36% in 2016, provides a measure of the national effort in the advancement of science.[3] Combining this rate and the number of researchers (NP)

2. Those are the numbers corresponding to "natural persons." The figures fall sharply if one considers what in these statistics is called "equivalent full-time researchers" (EFT). With its calculation, for RICYT (2018) the number of researchers is 8,993, for 2016. A report from CINDA/Universia (Santelices, 2010), however, delivers higher figures for Chile: 18,000 NP researchers and 13,400 EFT. On the other hand, a survey reported by the Comisión Presidencial Ciencia para el Desarrollo de Chile (2015) delivers a lower figure: 5,943 EFT for 2013.

3. For the entire period 1982–2011, natural and exact sciences received 43% of funding from Fondecyt, Technology 38% and social sciences and humanities 19% (CONICYT, 2014b).

per 1,000 members of the EAP, Chile's position is obtained among the countries of the Ibero-American area, which is recorded in the following table.

Table 1. Number of researchers per 1,000 members of the EAP in relation to spending on science and technology activities, as a percentage of GDP (2016).
Source: Own elaboration with RICYT (2018) data.

Researchers (NP) per 1,000 members of the EAP	**% of science and technology spending relative to GDP**			
	Less than 0.1%	**0.1 a 0.3%**	**0.3 a 0.7%**	**More than 0.7%**
0 to 1	Guatemala, Honduras, Nicaragua, Paraguay, Salvador	Bolivia, Colombia, Panama, Peru		Mexico
1 to 4			**Chile**, Ecuador, Uruguay	Brazil, Costa Rica, Cuba
More than 4			Argentina	Spain, Portugal

Regarding the distribution by gender, Chile has a very low proportion of women in the population of scientists, which is among the lowest in Latin American countries. Only 33% are women, in 2016, while in Argentina they are 53%, in Uruguay 50%, in Portugal 44%, and in Colombia 37% (RICYT, 2018).

2.1 Academic Staff in University Institutions

The scientific activity in Chile takes place mainly in universities. At present, there are 60 universities in the country, and in at least 24 of them a research work of a certain significance is carried out, considering the productivity achieved.

For studying the academy and scientific work in Chile, it is unavoidable to attend a grouping and classification that distinguishes between "traditional" universities (founded before 1981), dependent on state funding, and new and independent of such funding. The traditional ones are part of the Council of Rectors of the Chilean Universities (Cruch). The Cruch is an institutional entity that has existed since 1954 and that brings together State and private universities created before 1981.[4] These universities receive direct funding from State and have established a single admission system through a standardized test of national application, the PSU. In 1981, a change in legislation allowed and stimulated the foundation of new private universities. As a result, there are currently 33 non-traditional private universities, without public financing. Today, the traditional universities are 27, eighteen of them public and nine privates. Among them are the best positioned in the national and international

4. In 2018, for the first time, two independent private or new universities were accepted to be part of the Cruch.

rankings, but there are also several others that are surpassed by new and independent private universities. Some of these have been consolidated and accredited by the State in the area of research.

Researchers in traditional universities concentrate about 85% of CONICYT (today ANID) projects approved. According to Scopus data, between 2008 and 2012, 87.8% of Chilean scientific production came from universities, increasing this proportion with respect to the previous period, 2003–2007, in which was 84.1% (SCImago, 2014). Initially, the participation of new universities in scientific research progressed slowly; but since 2006 it has experienced a marked increase reaching 17% of the total Regular Fondecyt Research projects in 2018. On the other side, non-university institutions doing research work contribute around 4% of the projects' total. They are relevant in some specific areas, but their quantitative participation in the population of scientists is scarce.

Some independent private universities have had significant growth in the number of their researchers and their productivity. Despite its shorter trajectories, several of them have managed to be among the 15 most outstanding Chilean universities in research.

2.2 The Doctors

The doctor's degree expresses the management of the most advanced knowledge in the respective discipline or field of knowledge and a training focused on the research work. Typically and usually, doctors are researchers, although not all researchers are doctors. The number of doctors has increased in all Chilean universities, changing their academic profile, with a growing proportion of academics with a doctorate. The following table presents a summary of the quantities of university professors and those with a doctorate. If in traditional universities the growth of full-time professors (FT) with a doctor's degree has increased 140%, in new universities has been even greater: 290%. The result has been that, by 2015, 47.1% of FT academics in traditional universities are doctors, growing this figure by 15.3 percentage points, and in new private ones it is 31.0%, having reached the proportion that the traditional universities had ten years ago.

Table 2. Totals of FT academics, FT academics and doctors in 2015 and variation compared to 2005. in traditional (public and private) and new private universities.
(*) Note: Data regarding new private universities are based on the ten of them which have the greatest relevance in research.

	Total academics 2015	Increase in academics 2005–2015	Full-time (FT) academics 2015	Increase FT 2005–2015	FT doctors 2015	Increase FT doctors 2005–2015	% FT Doctors over FT total 2005	% FT doctors over FT total 2015
Traditional universities	25,450	1.2	11,775	1.4	5,548	2.0	31.8	47.1
New private universities *	15,933	1.8	3,113	2.9	964	3.4	25.9	31.0
Totals	**41,383**		**14,888**		**6,512**			

According to a study by CONICYT (2014a), there would be 11,468 doctors residing in Chile. 11% (1,304) of them foreigners, mainly from South America (42%), Europe (34%), Central America (12%), and U.S.A./Canada (7%). According to gender, the proportion is similar to what we have noted concerning to researchers in general, with a low female proportion: 30% women and 70% men. The average age at which these doctors graduated as such is 36 years. The average age, in 2014, was 49 years. At that time, less than 800 doctors were under 35 years of age (7% of the total). However, the aggressive scholarship policy of recent years is rejuvenating the age pyramid.

The total number of doctors in universities, including both full-time and part-time staff, is close to 8,000; we already saw that, of them, the full-time doctors are more than 6,500. That would mean that approximately 3,000 doctors are out of universities, in other centers, or in no institution. In addition to those 11,468 doctors in Chile, there are another 357 who, being Chilean, reside abroad. 52% of them are in North America, 40% in Europe, and 4% in Latin America (CONICYT, 2014a).

Since the early 2000s, CONICYT (National Commission for Scientific and Technological Research) significantly increased its Ph.D. scholarships and multiplied those who carry out these studies, both abroad and in the country. In eleven years, between 2004 and 2014, students graduating as doctors in the country, in traditional universities, double. From these universities, 4,102 new doctors graduate during this period. Some areas, such as agriculture and marine sciences, and social sciences, in which previously very few doctors were being trained, have tremendous growth; the graduates of the first area are multiplied by 15, those of the second by 7.

The growth of doctors is directly related to the financing policy deployed by CONICYT. Its national scholarship program began in 1988, assigning scholarships to a reduced number of applicants in an initial period. Significant growth began to occur since 2002, under the presidency of Ricardo Lagos. Thus, if under the previous government, of Eduardo Frei Ruiz-Tagle, 437 scholarships were granted, in Lagos they were 1,058, in the first government of Michele Bachelet, 3,032, in that of Sebastián Piñera, 3,894 and in the second Bachelet government, 4,287. Since 2005, in addition, CONICYT has begun granting scholarships for foreigners to carry out doctoral studies in the country. Thus, since 2000 CONICYT has awarded more than 13,000 scholarships (see Table 3). Of these, more than 4,000 have been to study abroad.[5]

5. Between 2008 and 2017, more than 2,000 doctoral scholarships have been to study in English-speaking countries (CONICYT, 2018).

Table 3. CONICYT's doctoral scholarships: Number of fellows per year of the beginning of the scholarship.
Source: CONICYT (2014c, 2018) and CONICYT data, own elaboration.

Government	Year	National doctoral programs	International doctoral programs	"Becas Chile" (international doctoral programs)	Doctoral programs for foreigners	Total	Total per period
Augusto Pinochet	1988	30				30	60
	1989	30				30	
Patricio Aylwin	1990	30				30	150
	1991	35				35	
	1992	47				47	
	1993	38				38	
Eduardo Frei Ruiz-Tagle	1994	50				50	437
	1995	66				66	
	1996	69				69	
	1997	70				70	
	1998	83				83	
	1999	96	3			99	
Ricardo Lagos	2000	64	4			68	1.058
	2001	114	21			135	
	2002	181	19			200	
	2003	138	26			164	
	2004	198	34			232	
	2005	213	43		3	259	
Michele Bachelet	2006	310	101		28	439	3,032
	2007	425	148			573	
	2008	448	321		64	833	
	2009	547	261	344	35	1,187	

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Government	Year	National doctoral programs	International doctoral programs	"Becas Chile" (international doctoral programs)	Doctoral programs for foreigners	Total	Total per period
Sebastián Piñera	2010	500		346	73	919	3,894
	2011	563		500		1,063	
	2012	581		392		973	
	2013	505		364	70	939	
Michele Bachelet	2014	596		351		947	4,287
	2015	740		362		1,102	
	2016	735		360		1,095	
	2017	743		400		1,143	
		8,245	981	3,419	273	12,918	

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3 Institutional Regulation of Scientific Production and Its Results

In the Chilean case, a very central way of regulating scientific activity operates, indirectly, through competitive public grants that finance research. They evaluate what counts as "scientific productivity." What is defined as such is what project evaluators will consider and what researchers will target to achieve. Any definition of productivity is a contingent and always questionable construction; nevertheless, in the last couple of decades, a particular version of productivity has been stabilized in the country and has been generalized through scientific and university institutions, acquiring for the participants the character of a unique, evident and inescapable reality.

In its 40 years, Fondecyt has funded more than 20,000 projects. In its beginnings, until 1988, it did not finance more than 100 projects annually, while currently there are more than one thousand by year.

In the main Fondecyt research projects competition, the so-called "regular", 40% of the evaluation of each project corresponds to the score assigned by productivity, registering each researcher up to ten publications made during the last five years. The weighting of these publications responds to the criteria determined by the different scientific committees, integrated each one by seven to fourteen academics of the different universities of the country, appointed through a process of self-selection (the members propose new members) considering their academic trajectories, that rotate every three years.[6]

These committees or "Study Groups" are 27 at present. In 59.3% of them, exclusively publications indexed as Web of Science are taken into account. Only in 33.3% (9 groups), articles of the regional, Ibero-American, platform, SciELO, are considered, and when this is done the assigned score is, on average, 0.38, less than half of what is assigned to a WoS publication, which in general is 1 and on average 0.85.[7]

Of the 16 Study Groups of natural, physical and applied sciences (biology, earth sciences, chemistry, astronomy, medicine, engineering, etc.), 15 exclusively consider Web of Science publications, as recorded in the Journal Citation Report published by Clarivate Analytics, also including the impact factor, although with different forms of weighting and calculation according to committee. Agronomy is the only one of these groups that also considers Scopus and SciELO publications, although giving them a very low score (0.15), which is marginal. No one could win in these disciplines by having only articles with these indexations.

In the 11 social science groups (anthropology & archeology, legal and political sciences, sociology, geography & urbanism, economics & administration, psychology, history, education, philosophy, etc.), the two types of publications with greater weighting are books and WoS articles. Nine groups give books the highest score, that is, 1; a group assigns them 0.75 points, and only the economy & administration group does not consider them. Scopus publications are considered by all, except economics & administration, with an average of 0.72. The articles SciELO are considered by all except two groups (economics & administration and arts & architecture), and with an average of 0.38 points. Six groups also consider the ERIH indexing, European base focused on the humanities, which now also includes social sciences.[8] Only three groups include publications of the Latin American base Latindex (Catalog), assigning them

6. In 2019, the average per Study Group was 9.9 members.

7. I have taken the evaluation criteria applied during the year 2019, according to the information of each committee, as a reference for the analysis; there are no major substantive differences with respect to previous years.

8. ERIH corresponds to the European Reference Index for the Humanities; since 2014 it is managed by Norwegian Social Science Data Services.

0.32 points on average; some other groups accept publications of this indexation in the category "others", giving them low scores, on average 0.20.[9] In concordance with the assessment given to the books, ten social science groups also assign scores to book chapters, on average 0.47 points.

Given that way of assigning scores, the signals regarding which publications are most valued are clear. Consequently, the main effort of Chilean researchers is focused on WoS and Scopus publications. For academics of the natural, physical, and applied sciences, with only WoS available to compete, they should concentrate on the ones with the greatest impact factor, which, with exceptions, are not those located on local territory and are mostly written in English. In the case of the social sciences, the researchers' effort is oriented towards WoS and Scopus journals, and to the publication of books. The SciELO articles, as I have noted, receive a low average score (0.38), which in history and philosophy drops to 0.25 and 0.20, respectively, not showing the committees of these disciplines a higher value for a regional platform. For its part, the only group that gives SciELO high marks is education, with 0.7. It would be necessary to follow an investigative procedure of an interpretative kind, similar to the one used by Lamont (2009), within the committees, to explain decisions such as that of the history committee that devalues publications in Latin America or the education committee that values them more than the other groups.

Regarding the social sciences, considering together all the publications that are accounted for in these evaluations — books, book chapters (both mainly locally oriented), and articles indexed in Latin American or Ibero-American bases —, they achieve a certain balance with those of international orientation from the mainstream. A contestant with pure WoS and Scopus publications will be more likely to win; however, another with a combination of books, SciELO publications and book chapters could also be successful, especially if he also includes some mainstream publication.[10]

3.1 Results of the Regulation: (1) Increased Mainstream Productivity

The following two tables provide a synthetic overview of mainstream productivity in Chile and Latin America, with some global benchmarks. You can see that in the ten years from 2007 to 2016, the WoS and Scopus publications grew around 40% worldwide, while in Latin America and the Caribbean, they had an increase of over 80%. One effect of this is that the region's participation in world scientific production went from 3.5% in 2007 to 4.5% in 2016, in WoS, with very similar increases in Scopus. As for Chile, its rise is even greater than the growth of Latin American productivity: more than 140%, in both indexations (see Table 4). This figure is above the countries with the highest scientific productivity in the region (Brazil, Mexico, and Argentina). This increase is even more remarkable compared to the previous decade: between 1996 and 2005, the proportion of Chilean articles to the total articles in the WoS base was 0.18%; between 2006 and 2015, it rose to 0.34% (Koch & Vanderstraeten, 2019). In parallel, although with a slower growth rate, the percentage of articles that cite Chilean articles in WoS rises from 0.15% to 0.24%.

9. SciELO includes just over 1,000 journals; Latindex Catalog, more than 5,200.

10. In an investigation referring only to the social sciences (in Chile), thoroughly analyzing their publications, I found a remarkable balance between local and international orientation of the references (Ramos Zincke, 2014). They are two vectors that operate together and that, to some extent, complement each other.

Table 4. Publications in Science Citation Index (WoS) and Scopus, 2007–2016, % increase in the period, and % with respect to the total publications of Latin America and the Caribbean on each platform, for selected countries.
Source: Author's elaboration, with RICYT (2018) data.

	SCI (WoS)					**SCOPUS**				
	2007	**2011**	**2016**	**% increase 2007–16**	**% of total Lat. Am. 2016**	**2007**	**2011**	**2016**	**% increase 2007–16**	**% of total Lat. Am. 2016**
Brazil	28,944	42,407	53,819	85.9	53.8	36,687	54,865	72,380	97.3	53.1
Mexico	10,119	12,164	17,434	72.3	17.4	12,749	17,116	22,345	75.3	16.4
Argentina	7,101	9,638	11,205	57.8	11.2	8,058	11,627	13,519	67.8	9.9
Chile	4,369	6,635	10,495	140.2	10.5	5,340	7,824	12,976	143	9.5
Total Lat. Am.	**55,235**	**76,853**	**99,971**	**81**	**100**	**70,864**	**102,706**	**136,423**	**92.5**	**100**
Spain	46,628	63,736	75,677	62.3	-	57,760	78,853	90,139	56.1	-
USA	474,322	531,969	614,923	29.6	-	517,265	612,163	641,969	24.1	-
World total	1,570,272	1,853,967	2,209,102	40.7	-	2,113,678	2,604,830	2,885,008	36.5	-
% 4 countries over Lat. Am.	91.5	92.2	93	-	-	88.7	89.0	88.9	-	-
% Lat. Am. of world total	3.5	4.1	4.5	-	-	3.4	3.9	4.7	-	-

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This table also allows appreciating the high concentration of regional scientific production. Around 90% of Latin American publications in journals of the world scientific mainstream are made in only four countries and, in addition, there is a tendency to increase such concentration. Brazil is the great power and regional center: by itself it brings together more than half of Latin American mainstream production.

The following table considers the different sizes of the countries' total population, registering WoS and Scopus productivity per one hundred thousand inhabitants. Chile, with 57.7 publications per one hundred thousand inhabitants in WoS and 71.3 in Scopus, during 2016, has the highest regional rate, well above the average, and it is also the Latin American country that has experienced the most significant increase between 2007 and 2016: 117.7% in WoS and 120.1% in Scopus.[11]

Table 5. Publications in Science Citation Index (WoS) and Scopus per hundred thousand inhabitants, 2007–2016 and % increase in the period, in Chile and selected countries.
Source: Author's elaboration, with RICYT (2018) data.

	SCI (WoS)				SCOPUS			
	2007	**2011**	**2016**	**% increase 2007–2016**	**2007**	**2011**	**2016**	**% increase 2007–2016**
Brazil	15.3	21.5	26.1	70.6	19.4	27.8	35.1	80.9
Mexico	9.6	10.5	14.3	49.0	12.1	14.8	18.3	51.2
Argentina	18.3	23.8	25.7	40.4	20.8	28.7	31	49.0
Chile	26.5	38.5	57.7	117.7	32.4	45.3	71.3	120.1
Total Latin America	9.8	12.9	15.9	62.2	12.6	17.3	21.7	72.2
Spain	103.2	135.1	162.5	57.5	127.8	167.1	193.6	51.5
U.S.A.	157.5	170.7	190.1	20.7	171.7	196.4	198.5	15.6

About the impact of the publications, considering the H-index, which expresses the amount *H* of documents that have received *H* citations, Brazil, Mexico, Argentina, and Chile, are among the 40 countries in the world, which, in the period 1996–2018, have an H-index greater than 300: Brazil, 530; Mexico, 411; Argentina, 393 and Chile, 349. As a point of comparison, Spain has an H-index of 830, Portugal of 457, France of 1,094 and U.S.A. of 2,222, the highest globally. No other country in Latin America and the Caribbean, out of the four indicated, has a score above 300 in this index, and the average in the region is 108.6.[12]

11. An analysis regarding the rise in productivity in social sciences by country can be seen in Gibert (2013).

12. Data from Scimago for 2019 was found in https://www.scimagojr.com/countryrank.php. That Chile has an H-index = 349 means that, for the period considered, the country has at least 349 publications that have received at least 349 citations each.

3.2 Results of the Regulation: (2) International Collaboration

One factor that makes it easier to publish in journals of the global scientific mainstream is international collaboration. CONICYT, through specific research competitions and financing for international collaboration included in all its contests, has decidedly promoted this strategy (Kaluf, 2014). The result has been that Chile has effectively achieved a high degree of collaboration. In the period from 2009 to 2013, 49.5% of its Scopus publications were made in collaboration. This rate places the country in third place in the world, among the 34 most scientifically productive countries. The highest percentages of collaboration occur in Hong Kong, Switzerland and Chile, well above the OECD average, which is 20.4%, and the world average, 15.1% (CONICYT, 2015).

In WoS, meanwhile, for the period 2008–2014, Chile's international collaboration rate is 61.3%. In comparison, the rate of Argentina is 46.1%; Brazil, 28.4%, and Mexico, 44.9%. The main countries with which Chile collaborates are the U.S.A. (7,850 articles), Spain (4,475), Germany (3,879), France (3,562), and U.K. (3,443). Unlike Chile, which prioritizes ties with central countries, the other countries of Latin America and the Caribbean have in their first places the collaboration with countries in the region: Brazil, Mexico and Argentina, in that order (UNESCO, 2015).

International scientific collaboration is a strategy that allows access to knowledge, equipment and laboratories, and that enhances the researchers' training. At the same time, when carried out with the central countries, in conditions of asymmetry, it involves dependency risks, by reducing the ability to define the research agenda according to the more dependent country's own priorities (Alatas, 2014; Kreimer, 2014). Although this negative effect can be conjectured, there are no studies or information in Chile that identify and weigh this type of impact.

In summary, the results observed, in terms of productivity and scientific collaboration, show the effectiveness of institutional regulation. The state and university institutions operate as transmission chains of the international regulation exercised through the mainstream indexing system, making only some adjustments for the social sciences and practically without modifications for the other disciplines. This device, which effectively guide researchers' conduct in the direction sought, corresponds to the type of regulatory mechanisms that operate remotely described by Foucault (2006) when studying governmentality. Through them, the population's behavior is conducted and, moreover, the individuals themselves self-regulate their behavior in the desired direction.[13]

That device creates a space of equivalence and calculation that facilitates comparisons of scientific productivity among entities at different levels, and among them over time. With its visibility, comparability and calculability, this representation guides all actors: to governments, authorities of universities and research centers, and to the researchers themselves. The operation of the device generates patterns in the scientific publications that are self-reinforcing and self-consolidating.

Beyond the purposes of the national scientific institutionality, such space of commensurability has its own operating dynamics, its own constituent logic, marked by its foundational imprinting, its trajectory, and the networks in which it is held. Its initial focus was the science of the central countries, and its operation continually reinforces the central science. The foundational asymmetry has been maintained. The corporations that have taken over these global indexing systems had not been interested nor concerned in transforming such an order (Beigel,

13. See theoretical discussion about these devices and their action in the educational system in Ramos Zincke (2018).

2014; Santin, 2019; Vessuri, 2014) and the asymmetries have been maintained, although some of them are now less marked, new countries have gained relevance in international competition (such as China) and peripheral centers (such as Brazil) have emerged or strengthened.

4 An Empirical Study on Chilean Researchers

4.1 Population and Sample

There is no general researchers' sampling frame in the country that can be appealed to. The most valid and reliable registry of the national population of researchers is the list of researchers who have won a Fondecyt contest, which, as we have indicated, is the broader and more extensive source for funding research in the country. For any researcher in the country, this is the grant that will allow one to carry out his or her research properly. Virtually every scientist who performs systematic research work will compete. Those who are selected are those who pass the peer evaluation test and have been recognized with sufficient skills and academic trajectory to deserve their research proposal to be approved and financed. At least, it can be said that all those who are in the CONICYT bases, selected in these competitions, are qualified as researchers and constitute the fundamental nucleus of the population of scientists in the country.

Certainly, there are also other persons who conduct research and have never won these competitions. Some of them have been valued and recognized by the scientific community, despite that. Others, probably the vast majority, even though having done some research work, are not properly recognized as researchers. In any case, there are no national registries to identify all of them in the same database.

From the beginning of these Fondecyt competitions, in 1982, until 2014, 17,751 research projects were approved, in various categories. Each project has a Main Researcher (MR) in charge, to which one or more co-investigators can be added. The participation of co-researchers varies greatly, both in hours and in responsibility for the investigation; given that, when I used the projects to form a researcher's database, I considered only the MRs. These are who can unquestionably qualify as authors and directors of the research, while it is uncertain to whom of the co-investigators such a qualification can be extended. With this restriction, for the period 1982–2014, there is a total of 7,496 investigators (MR), as differentiated individuals, that is, discounting the repetitions; in fact, with respect to the latter, there is an average of 2.37 projects per researcher. This is an irrefutable number of researchers, assessed and recognized as such.

4.2 Information Gathering Procedure

The final study population is made up of researchers from all scientific disciplines who have developed Fondecyt projects in the period from 2000 to 2014. I decided to narrow the population to this period since these were the most recent years available and it is highly probable that these researchers are currently active. They constitute 72.4% of the total population of Fondecyt researchers, counted since the beginning of the program.

From this population, consisting of 5,429 scientists, we took a random sample of 1,085 researchers. We obtained the email of 919 of them and sent to each one a letter explaining the survey's objectives and included the connection to a web page containing the questions. The first message was sent on May 29, 2017. Between June and August, the survey was re-sent nine times. The answers were coming gradually until they were 269 at the time of closing. There was thus a 29.3% answer rate that, for this kind of surveys, is somewhat above the usual rate

(which is around 20%). The sample obtained is probabilistic, statistically representative of the study population, with a 95.5% confidence level and a 5.8% margin of error.[14]

4.3 Descriptive Data of the Sample Compared to the Study Population

The distribution of cases in the sample in terms of discipline is detailed in the following table, comparing it with the reference population. There is great correspondence between sample and population.

Table 6. Main researchers for Fondecyt projects, in the population and in the sample, by discipline. Source: CONICYT databases and own survey

DISCIPLINE	STUDY POPULATION 2000–2014 (%)	SAMPLE 2000–2014 (%)
Exact and Natural Sciences (mathematics, physics, biology,etc.)	42.2	40.9
Social Sciences	16.4	20.4
Technology and Engineering Sciences	13.1	10.6
Technology and Medical Sciences	9.4	5.5
Technology and Agronomic Sciences	7.8	6.4
Humanities (history, archeology, literature, philosophy, etc.)	8.9	13.2
Legal, Economic and Administrative Sciences	2.3	3.0
Total	**100.0 (5,429)**	**100.0 (269)**

The distribution in the sample according to the institution of belonging also coincides with the distribution of the population. In the population, 61.0% of the researchers are concentrated in the five main universities; in the sample, 58.4%. Also, the distribution according to the type of institution is very similar. Geographically, 55.9% of the sample is concentrated in the Metropolitan Region. This is consistent with the distribution in the study population, in which such proportion is 59.7%.

4.4 Researchers Characterization

Of the researchers surveyed, 33.8% were women and 66.2% men. These figures fully match the data on the distribution of researchers in Chile that RICYT (2018) provides for 2016: 33.1% are women and 66.9% are men.

14. There is no reason to think of any systematic bias in the resulting sample, despite the low response rate. In fact, its distribution is remarkably similar to that of the study universe in all the variables checked, as specified below.

40.5% of the researchers had completed their studies in paid private schools; these establishments serve no more than 10% of the respective school population of the country and are attended by children of families of higher socioeconomic status. At the other extreme, 36.1% went to municipal establishments, which usually are attended by the lowest socioeconomic levels. The rest were educated in private subsidized establishments, which are at an intermediate level. 95% of all the establishments in which the researchers studied were scientific-humanist. Very few came from technical-professional education.

Considering the educational levels of fathers and mothers, in 24.1% of cases, both parents have a full university education. In 49.6%, at least one of the two parents completed that level. If parents with incomplete university studies are also considered, the figure rises to 58.9%. Besides, of the total number of respondents, in 16.2% at least one of the parents had completed graduate studies. These are subsets of the researchers' population that have a good cultural capital, which has facilitated their displacement in the academic career. At the other extreme, there are 27.7% of researchers whose parents have not gone through higher education, but who, in the same way, although probably with more effort, managed to develop their education, advance their studies and then progress in their careers as scholars and researchers.

85.1% of the surveyed researchers have the degree of doctor. Of those who do not have it, 2.3% obtained a master's degree. Only 12.6% have not any of such degrees. On the other hand, 31.2% have both.

Regarding academic work, 90.3% of respondents have full-time jobs at the institution where they work. Virtually everybody combines research with teaching work. 82.5% teach classes to undergraduate students. 12.6% of researchers teach classes for both undergraduate and graduate (master's and doctoral) students. 11.9% conduct classes only for doctoral students and 2.6% only for master's students. Just 2.2% do not teach at any level.

5 International Scientific Activity of Researchers

The researchers studied exhibit varied international activities, ranging from graduate training to various academic and research work abroad, as well as collaboration in international projects. 64.3% of researchers have completed graduate studies abroad, 71.0% have carried out research internships in international centers, 47.2% have had stays as a guest professor at a foreign university. Stays abroad and international connections for research are quite widespread in Chilean scientists. In addition, 72.9% have made presentations at international congresses in the last five years; if we asked about a more extended period, almost all of them would likely have indicated doing so. Table 7 shows the countries in which such activities have been carried out. Of all the international activities carried out, 52.3% have taken place in Europe and 23% in North America. The interest in the connection with the central countries is marked. Only 17.2% of the activities have taken place in Latin American countries other than Chile.

Table 7. Foreign countries in which researchers have carried out different types of activities (multiple mentions), in % of the number of mentions

COUNTRY	Graduate studies (%)	Research stay (%)	Guest professor (%)	International research team (%)	Total (%)
U.S.A.	29,9	24.1	12.3	15.3	20.0
Spain	20.7	14.1	14.4	11.9	14.6
France	9.8	10.8	7.4	9.5	9.5
Germany	7.1	10.5	7.4	9.5	9.0
U.K.	7.6	7.2	4.5	6.7	6.6
Brazil	1.6	4.1	7.8	7.0	5.3
Mexico	1.6	3.1	7.4	5.8	4.5
Argentina	1.6	2.8	5.8	3.7	3.5
Canada	2.2	3.3	3.3	2.8	3.0
Colombia	0.0	1.0	6.6	3.1	2.6
Belgium	2.7	2.1	0.8	0.0	1.3
Other Latin American countries	1.6	1.3	9.5	4.3	3.9
Other European countries	10.3	11.5	7.4	14.4	11.3
Other Asian countries	3.3	4.1	5.3	6.1	4.8
	100.0 (184)	100.0 (390)	100.0 (243)	100.0 (327)	100.0 (1,144)

As for research collaboration, 61.1% have been in at least one international project, either as main researcher or as co-investigator; 43.7% have led at least one and 30.8% have led more than one. In addition, 33.0% of those who have had international collaboration have participated in three or more different teams.

The following table records the average amounts of projects in which respondents have participated, both nationally and internationally. A higher level of internationalization is observed in technology and applied sciences.

Research Projects in which they have participated (Average and Median)

	Fondecyt Projects		International Projects	
Discipline Area	**Main researcher**	**Co-researcher**	**Main researcher**	**Co-researcher**
Exact and natural sciences	3,2	3,6	1,7	1,5
	2,5	2,0	0	0,5
Technology and applied sciences	3,4	2,6	3,1	2,3
	2,0	2,0	0,5	1,0
Social legal and economic sciences	3,0	2,8	1,4	1,7
	3,0	2,0	0	1,0
Humanities	2,5	1,7	1,4	0,8
	2,0	1,0	0	0
Total	3,1	3,0	1,9	1,6
	2,0	2,0	0	1,0
	(235)	(211)	(214)	(204)

Table 8. Average and median Fondecyt and international projects carried out by researchers, in a main or secondary role, during their career, according to disciplinary area

To carry out international activities, researchers have received support from both their institutions and CONICYT. 54.3% of respondents said they had "broad support" from their institution, and just 5.8% said they had not received any support. On the other hand, 50.5% declare to be very satisfied with the support of CONICYT, while a reduced 16.5% say they have a low degree of satisfaction. The highest percentage of "broad support" responses is observed in the exact and natural sciences (62.1%), and the lowest in the humanities (44.4%). There are no differences in the support that men and women receive.[15]

These Chilean researchers not only have a significant participation in international activities, but also have the predisposition already incorporated to continue participating. Regarding future projections, 89.9% declare that they have a "high interest" in carrying out collaborative work with foreign researchers and 76.0% in carrying out research stays in other countries. Those who claim to have low interest in these activities are a net minority: 1.9% in collaborative work and 7.7% in international stays.

15. A study using focus groups, in which 262 scientists from all disciplines participated, reaffirms the positive appreciation regarding the work of CONICYT towards them (Asesorías para el Desarrollo, 2012).

5.1 Internationalization of publications

90.3% of the researchers surveyed have published abroad in the last five years. 84.1% of the total has made at least one publication in English. 42.9% have published at least one abroad in Spanish. 5.8% have done it in French, 2.4% in German, and 8.7% in other languages. The largest proportion is concentrated in English publications: the researchers published abroad an average of 9 texts in this language and 2.4 in Spanish (see Table 9). About half of the researchers publishing abroad have not done so in Spanish.

Comparatively, the youngest (under 40) production equals, at least in quantity, the older groups with the most accumulated experience. They are more internationalized researchers than previous generations. The youngest are those who publish the least in Chilean journals. Regarding gender, scientific production abroad by men is significantly higher than women, both in English and Spanish (11.6 vs. 7.1 publications abroad, in total).

Table 9. Average and median of publications abroad, in the last five years, according to disciplinary area.

Discipline area	**Publications abroad (average and median)**		
	Total	**In English**	**In Spanish**
Exact and natural sciences	15.0	13.8	1.2
	9,5	10.0	0
Technology and applied sciences	10.5	9.6	1.8
	7.0	7.0	0
Social, legal and economic sciences	7.8	3.7	3.4
	6.0	2.0	2.5
Humanities	6.8	1.2	5.9
	5.0	1.0	5.0
Total	**10.1**	**9.0**	**2.4**
	8.0	**6.0**	**0**
	(207)		

The number of publications abroad is markedly greater in natural sciences and technology, compared to social sciences and humanities, especially in English (13.8 publications in English in natural sciences vs. 3.7 in social sciences and 1.2 in humanities, in the last five years.

Much of the publications abroad occur in WoS and Scopus journals. In the exact, natural, and applied sciences, the pattern of publishing outside of Latin America is very clear: more than 80% occurs outside the region. In social sciences, on the other hand, there is a certain balance, while in the humanities, the regional-local orientation prevails, that is, they have more publications in Latin America and Chile (see Table 10).

Table 10. Average and median WoS or Scopus publications, by researcher, according to disciplinary area[16]

Discipline area	WoS or Scopus publications (average and median)				Proportion of publications outside Latin America (%)
	Total	**In Chilean publications**	**In Latin American publications**	**In publications from other regions**	
Exact and natural sciences	15.4 12.0	1.2 0	0.4 0	13.8 11.0	89.6
Technology and applied sciences	13.0 10.0	1.9 0	1.0 0	10.7 9.0	82.3
Social, legal and economic sciences	6.8 5.5	2.2 2.0	1.9 1.5	3.9 2.5	57.3
Humanities	6.1 4.5	2.3 2.0	3.7 2.0	2.2 2.0	36.1
Total	**11.8** **8.5** **(208)**	**1.8** **1.0** **(179)**	**1.2** **0** **(154)**	**9.8** **7.0** **(187)**	

5.2 Linguistic Knowledge

The international language of science is English, and this is manifested strongly in WoS and Scopus publications. In WoS, during the period 2021–2014, 87.6% of the publications were written in English (Santin, 2019). In the survey, 99% of respondents declare to know English and many of them make daily use of this language. Thus, 80.0% read texts in English several times a week, which has differences between disciplines. The highest frequency of reading occurs in natural sciences and technology. While in these disciplinary areas about 90% of researchers (97.8% and 86.7%, respectively) read English texts daily or several times a week, in the social sciences and humanities the figure is less than 60% (51.1% and 57.7%, respectively).

Table 11 summarizes the levels of English language proficiency that Chilean researchers have, according to their own statement. The "intermediate" level of knowledge is excluded from the table. There is a high percentage (80.5%) that has a good command of reading in English. However, in the most active skills, required for conversation and writing in English, the percentages are lower, around 40%.[17]

16. The totals in Tables 9 and 10 do not match because: (1) Table 9 includes only publication abroad and Table 10 includes, together with WoS publications abroad, those in Chile. (2) Table 9 includes publications abroad corresponding to different indexations, while Table 10 only includes those indexed as WoS and Scopus.

17. In addition, 42.4% have passed international proficiency exams in English.

Table 11. Level of competency in English (academic use), according to disciplinary areas
Note: The "intermediate" level of mastery, in each competence, is the remaining proportion to complete 100%. In oral expression and written production, some researchers, within the social sciences and humanities, declare the total absence of capability in these matters, which almost does not occur in the other disciplines.

Competencies	Level	Discipline areas				Total
		Exact and natural sciences (%)	Technology and applied sciences (%)	Social Sciences (%)	Humanities (%)	
Reading comprehension	Advanced	88,8	80.0	66.7	76.9	80.5
	Basic	1.1	2.2	6.7	0	2.4
Auditive comprehension	Advanced	48.3	51.1	42.2	42.3	46.8
	Basic	14.6	13.3	28.9	11.5	17.1
Oral expression	Advanced	47.2	40.0	33.3	19.2	39.0
	Basic	13.5	11.1	37.8	23.1	19.5
Written production	Advanced	60.7	53.3	22.2	15.4	44.9
	Basic	3.4	6.7	35.5	34.6	15.1
Total		**100.0 (89)**	**100.0 (45)**	**100.0 (45)**	**100.0 (26)**	**100.0 (205)**

The percentage of exact, natural, and applied sciences researchers who have advanced language proficiency is significantly higher compared to social sciences and humanities. This is consistent with the previously noted data from publishing in English (Table 9). The former have cultivated to a greater extent their language skills.[18] On the other hand, in the youngest (under 40), English proficiency is comparatively greater than in the other age groups.

Family training and early education are relevant elements mentioned by about half of the respondents as means to achieve proficiency in English. Therefore, and as expected, the highest language proficiency levels are found in those researchers whose parents have a college-level education. However, about one third of researchers whose parents have an education that does not exceed the secondary level also achieve an advanced level of proficiency and about 80% of them attain at least intermediate level competencies. Family constraints are not destiny. The university trajectory makes it possible to compensate for the lack of cultural capital of the family of origin.

6 Conclusions

Although Chile's investment in science and technology is low and has practically not increased in recent years, the country has achieved a significant rise in its scientific productivity in the in-

18. The imperative of publishing in English is, in any case, stimulating the development of support services. 13.2% of respondents say that their publications in English are written first in Spanish and then send them for translation. 48.8% say they send their manuscripts written in English for language review. Projects submitted to Fondecyt contests, in turn, increasingly include translation budgets.

ternational mainstream, significantly higher than in the rest of the the region's countries. What explains this fact?

According to what I have shown, a device for regulating the conduct of researchers has been established. It is based on the system of research project competitions, the incentives offered by universities to their academics, and the accreditation system for universities and programs, all of which consider indexed publications such as WoS and Scopus and, secondarily, only for the social sciences, the SciELO index, as fundamental indicators of scientific productivity. Such indexing mechanisms are thus the core of the device and become guides and attractors for the publishing decisions of Chilean researchers. This adherence to international indexations, which spreads in national institutions and affects the researchers' practice, shapes how scientific production is valued and influences what is conceived as the quality of scientific production.

This form of regulation is part of a significant process of internationalization of Chilean scientific activity. The State's policies of the last two decades have contributed to this (Kaluf, 2014). The most prominent of them is the scholarship program for graduate studies abroad. This policy has increased and reinforced the national pool of researchers and contributed to the establishment of international networks. It has facilitated the acquisition of an "international habitus": the management of the tacit criteria that allow an effective performance in the international space, in the activities of collaboration, presentation of results and publishing (Weidemann, 2010). It has also contributed to the students' mastery of foreign languages, especially English. This scholarship policy, as well as the various ways of financing for international collaboration included in the research project competitions, have encouraged and helped Chilean researchers to adapt to the international scientific field and to understand its rules, incorporating this international perspective in their scientific habitus.

This valorization and support for internationalization, on the part of the State, has been increasing during the last couple of decades and has translated directly into university institutions. It accompanies the consolidation of research work as a central component of the mission of many universities (Bernasconi, 2010). In these institutions, at present, the evaluation of academic performance and scientific productivity has as its central factor the international indexing — WoS, Scopus, and SciELO. It has also been increasingly generalized the delivery of economic incentives that reward publications with such indexations, and that can reach the equivalent to half monthly salary or more, acquiring, therefore, clear guiding and driving capacity. Monetary incentives contribute to stabilizing the mainstream international publishing pattern. This accounts for the rapid growth of the indexed productivity of the universities that have applied these measures.[19]

In this framework, national scientific journals, in turn, seek to "ascend" in their indexations: at least to Latindex, from there to SciELO and, if possible, Scopus, with the aspiration to one day reach WoS.[20] The indexation achieved increases the value of the journal in the local circuit. Those that do not reach at least the level of SciELO lose appeal to many authors. There are displacements of researchers, from one to another journal, depending on their indexations. Non-indexed journals tend to disappear and those that are only Latindex lose academic relevance. In Chile, the "structural heterogeneity", which Beigel (2014) notes in the case of Argentina, is not configured. In Argentina, there is a local second circuit, institutionally supported, absent

19. The logic of "social mechanisms" (Manzo, 2014) could be used to investigate the respective individual action to explain the resulting aggregated pattern, considering "desires", "opportunities" and "beliefs", however this was not this study's perspective.

20. 55 Chilean journals have already acquired WoS indexing (Santin, 2019).

in Chile. In the regulation prevailing in Chile, evaluation criteria of productivity are consistently aligned among CONICYT (ANID), the higher education's system of accreditation and the universities. The result in this matter is "structural homogeneity". This is a manifestation of the high state centralization that the Chilean university system has had since its origins.

Consequently, the current national scientific activity has a preponderant orientation towards the central countries. There is a strong projection and dedication to positioning the country in the competition of the big leagues rather than to integrating research regionally. Although in the 1960s Chile was a prominent "peripheral center" of the social sciences in Latin America (Beigel, 2013), nowadays, instead of attending the regional circuit, researchers in these disciplines place their interest primarily in central countries, like the other scientific disciplines.

Faced with this reorientation of scientific activity, Chilean researchers have responded in a very adaptive way, in a "well behaved" manner.[21] Until 2018 there had only been criticism and resistance of some importance in the social sciences, from which some adjustments in the evaluation criteria have been derived. In these disciplines, some researchers declare that publishing in such journals, in a significant part of the cases, separates them from local concerns and discussions, reducing researchers' attention to problems of national relevance and weakening the response of science to local needs. However, this could be a false dilemma. Working to publish in international journals does not necessarily imply paying reduced attention to local problems. Moreover, there is no a priori reason to suppose that local problems cannot be illuminated by international literature. This is undoubtedly a subject that would require further debate and empirical investigation on such effects, positive and negative. Nevertheless, the main component of the transaction formula considering this criticism, which has been negotiated in the Fondecyt committees, has been incorporating books in the evaluation of productivity. The book is a type of product that reaches a more varied audience, especially local. The other negotiated element has been the additional inclusion of the SciELO and Latindex indexations, although they have been left with significantly lower weights. The result in the social sciences is a double and simultaneous international and local orientation. It is a formula in which, despite the changes, in the international perspective, WoS and Scopus indexing prevail, making it difficult to avoid publishing in English.

Thus, although there is a certain critical discourse that questions the weight of these indexations, they have slowly become a core part of the regulation mechanism of Chilean scientific production. The space of commensurability created by international indexations, along with reproducing asymmetries, has also been beneficial to the Chilean academy. It has pushed scholars to higher quality standards of production, to explore new scientific literature and to update their discussions, with a wider perspective. The resulting papers, in turn, have a greater capacity to be understood by other scientific audiences. Participating in international networks pays off when the quality of local science is improved.

The positive effects that this regulation has had on the country's positioning in the global competition have given arguments to the national authorities to preserve it. From the side of the critical voices, on the other hand, the articulation of a discourse, an organized action, or well-defined alternative proposals has not occurred so far. However, after the social outbreak of October 2019, as part of the meetings and cabildos with the participation of scientists, which were carried out along the country, the questioning of the predominance of the international

21. Although in different countries there is some degree of scientists' conformity with the international regulation, what is corroborated in this case is an especially high level of adaptation to it, which is manifested in the high growth of mainstream productivity, notoriously above other Latin American countries.

orientation of science and the centrality of its evaluation by way of WoS and Scopus indexed publications has become more intense and visible.

At present, the new accreditation criteria to be applied by the national agency in charge are being agreed upon. This agency is discussing changes in the evaluation procedures of the projects, and a new constitutional order for the country will be decided in 2022. Will all this result in changes in the regulatory rules and a reduction in the adaptive behavior of the scientific population with respect to international regulation? Some heated debates suggest that this will be the case. However, the entanglement and effectiveness of the institutional assembly that supports the current regulatory mechanism makes permanence more likely. The future direction, whatever it may be, will be defined in the next coming years.

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