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Publishing Performance, Bibliodiversity and Bilingualism in a Complete Corpus of Scientific Publications * **

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Discussions on open access publishing, scientific information systems, and institutional repositories are continually renewed in Latin America and other latitudes. Initiatives that seek to compile everything produced by scientific researchers, and not only indexed publications, also take a central role. To this end, this article analyzes the complete publication corpus of all the researchers of the National Council for Scientific and Technical Research (CONICET, due to its acronym in Spanish) of Argentina. Publishing styles are examined (format, language, and place), in addition to differences between disciplines and specific gender asymmetries. The article also delves into the changes occurred in the last decade within the assessment cultures of CONICET and its recruitment policy. The results show that, while the paper format and the English language are dominant, they coexist with other forms of knowledge production and circulation. Publications in Argentina, written in Spanish and published in book format, are far from marginal in the population analyzed.

Keywords: bibliodiversity; CONICET; scientific publications; knowledge circulation

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Introduction

Several studies have argued that the academic community feels great pressure to publish and is not always aware of the distortions that this produces in the selection of their research topics or in the forms of writing (Giménez Toledo, 2016; Gingras, 2016). This pressure was stimulated by the increasing quantification of evaluations, as well as by the use and abuse of impact indicators (Ràfols, 2019; Sivertsen, 2019). In other words, this productivism is not reduced to accumulating any amount of published work, because the indexation of the journal prevails in its evaluation process. That famous phrase "publish or perish" derived, thus, into "publish in the mainstream or perish in the periphery". This state of affairs favored the replacement of the evaluation of the scientific quality of each published piece by a sophisticated bibliometrics of the journals (Beigel, 2014).

The University Rankings, for their part, consolidated the power of recognition for some indexing systems and became a sort of transnational coordination of evaluation policies (Kehm, 2020). In parallel, salary-incentive systems began to extend worldwide for publication in "high impact" journals, playing a rol in the devaluation of national journals. The hyper-centrality of English contributed to the gradual abandonment of local languages, with the cultural impoverishment that it entails and the negative effect it has on the linkage between society and the production of knowledge (De Swaan, 2001; Lillis & Curry, 2010; Gerhards, 2014). The abandonment of the book in favor of articles, a phenomenon that began in the exact and natural sciences and spread to most disciplines consolidated the prestige of the mainstream journal and its efficiency to provide academic recognition. Additionally, the researchers contributed with their *ad-honorem* evaluations and their ecumenical conviction to sustain an academic prestige industry that now burdens them with high-performance demands.

A key element that promoted the universalization of a hierarchy of journals and the homogenization of the English language as a global form of communication, is the exclusive use of databases such as Web of Science (hereinafter WoS, now owned by Clarivate) and Scopus (Elsevier) in scientific studies at an international level, in university rankings and in research assessment. These two companies produce a ranking of journals according to the number of citations they receive within the same database. Therefore, the Impact Factor does not measure the circulation of a certain article, neither its author, in the academic world, but the impact of a journal on this endogenous environment. The distortions produced by the impact factor and its harmful effects in the publishing industry are well-known: predatory journals that charge for publish without blind or external academic evaluation, research collaborations pushed by the search for greater "impact", the displacement of peer evaluation of scientific quality, among many others (Biagioli & Lippman Eds., 2020). The growing demand for open access in the academic community stimulated these commercial publishers to promote open access. But the economic losses generated by the end of the onerous subscriptions that were charged to institutions were transferred to the authors and, as a result, the commercial open access through the Article Processing Charges (APC) is expanding (Guédon, 2011; Debat & Babini, 2019). All this reinforces the global segmentation of the circulation of knowledge sepparating powerful institutions that can pay their entry to the mainstream circuit and poor universities that publish in non-commercial circuits.

The case of China is very interesting to analyze the effects of this dominant tendency in the development of a peripheral community. Quan *et al.* (2019) recall that China became the most important country in the production of scientific articles in hegemonic databases. This promoted not only basic science but also technological development and the increase in patents. However, Tao Tao (2020) attracts attention to a recent

"nationalizing" movement that points to a change in the local evaluative culture through redirecting research incentives. This turn is inspired by a critical look at how Chinese institutions shaped their practices to achieve greater impact and how they pressured their researchers for publishing performance. The new trend informs that papers will be used as the main evaluation only for basic research and not for technological development and applied research. And for basic researchers only a group of representative productions will be analyzed leaving aside the impact factor. At least a third of these representative works will be promoted to be published in Chinese journals with international circulation. Zhang & Sivertsen (2020) highlight that the purpose of the Chinese reform is to recover the local relevance of knowledge, although they point out the need to have new evaluation instruments according to the new trends -in particular comprehensive information systems for the complete national production.

Nobody doubts that the impact factor and the mainstream circuit have had a relevant incidence on the publishing styles in hegemonic countries and in the so-called "periphery". However, it is difficult to truly calibrate that incidence because those same commercial databases are used to build comparisons regarding "world science". Studies of complete universes of curriculum are scarce, for the simple reason that this kind of databases are not generally available or exhaustive.[1] An exception is Brazil with its LATTES system that offers publicly the list of the curriculum with all the publications of each agent of the scientific-technological system. A recent study by Mugnaini, Damaceno, Digiampietri & Mena-Chalco (2019), for example, made a survey on 260,663 individuals showing that Brazilian journals occupy a significant portion of the articles in all areas and that 60% of the total journals in which these articles are published correspond to journals not indexed in Scopus, WoS or SciELO. These studies can shed new light on the diversity of the production and circulation of knowledge, promoting informed scientific policies and eventually reorientations in the evaluation systems.

But these public platforms are not available or data exhaustive in the rest of the countries yet. In the case of Argentina, many efforts have been made to unify the information systems in the Science and Technology Information Portal, but it has not yet become an interoperable system with updated curriculums. The Argentinian institution that built an exhaustive database based on the management and evaluation system is the National Council for Scientific and Technical Research (CONICET-Argentina). This paper builds on this database, called SIGEVA, which includes updated curriculums for all its agents. CONICET is a public agency with a full-time research career (Carrera del Investigador Científico y Tecnológico - CIC) that may or may not be complemented by a teaching post at a university. Although the vast majority of CONICET researchers have a teaching position, public universities have their own research career with a specific classification: the Incentive Program for researchers-professors (PROINCE). The coexistence of these two research careers, added to the existence of a strong university autonomy tradition led to the existence of various curricular information systems. University repositories, for their part, progress unevenly, depending on the institution, despite the existence of National Law N° 26,899 for the Creation of Open Access Institutional Digital Repositories, promulgated on December 2013 and regulated in 2016. For its part, CONICET has a very important institutional repository, with a professional curatorship progressing sustainedly over time. So far, Digital CONICET has processed 109,552 titles that correspond to researchers, doctoral fellows or support staff of the

[1] Some recently created information systems aim to revalue publication in books, such as the Spanish Scholarly Publishers Indicators (Toledo, Mañana-Rodríguez & Sivertsen, 2017; Toledo *et al.*, 2019). There is also the "Norwegian model", which consists in a National Scientific Index that gathers and updates with each *curriculum vitae* or institutional presentation all the country's scientific production in all formats (Sivertsen, 2019).

organization. It is a very important repository that contains publications from active and retired agents.

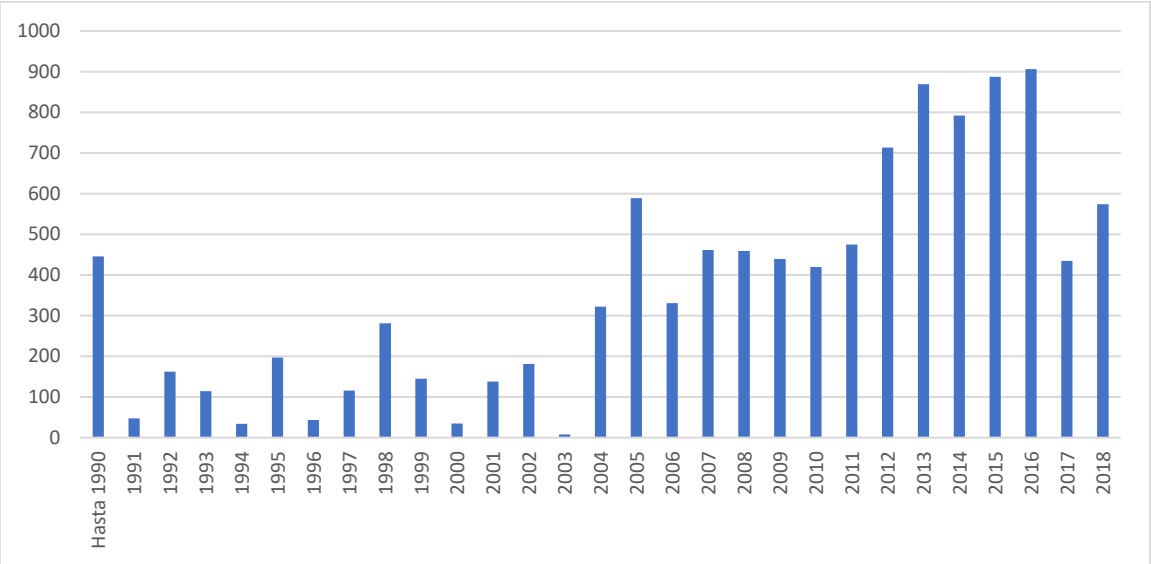
After our formal request to support this empirical study CONICET provided information for the total publications of active researchers in the organization by February 3, 2020. This corpus includes all the publications registered in SIGEVA by 10,619 agents in research careers at that date: a total of 422,209 documents and 19,958 technical reports.[2] In this paper, we begin by describing the demographic composition of CONICET and its historical evolution, amalgamating previous studies that allowed us to observe generational differences, discipline diversity and institutional inequalities. Afterwards we make a statistical description of the production observed by scientific area, research category and gender. Then we analyze the places of publication of this production, the weight of the local vector of circulation, the relationship between publication in books and articles, as well as linguistic diversity. Finally, we bring in the recent context of the cutbacks experienced at CONICET in order to explain the quantitative performance observed in the younger generation.

Expansion and contraction at CONICET: productivity and gender asymmetries

The evolution of CONICET must be framed in the context of a scientific system that experienced a period of expansion (2004-2014) and a recent contraction (2015-2019) that affected the full-time positions available. Together with the impact of the elimination of the age limits and the new requirements in "Strategic Topics" (since 2017) and "Regional Strengthening of Research, Development and Innovation (I+D+i)" (since 2018), the young generation is facing a highly competitive scheme. Later we will see the effect that all this had on increasing the number of publications required for a successful entry application, which gives the new cohorts of researchers a singularity compared to the rest. The cutback was clearly observed in the 2015 call (represented by the 2017 admitted candidates) and the next (2018 admitted candidates).[3] As a result of the scale of the immediately preceding expansion period, however, the demographic pyramid of CONICET is still predominantly young (64.4% are Assistants and Adjuncts, and 3/4 of the researchers in these categories have less than 45 years). **Figure 1** shows the quantitative changes that occurred in the active universe of CONICET researchers according to their year of admission, reflecting a constant growth since 2004 but marked between 2012 and 2016.

[2] We greatly appreciate the commitment and efforts made by Andrés Profeta (Human Resources Area, CONICET) and the support of the National Scientific and Technological Agency (PICT 2017-2647).
[3] The administrative term for the effective tenure of successful applicants during a call are usually over a year, in groups distributed over several months. **Figure 1** is organized by the time of tenure and not by the year of the call. Admitted candidates in 2019 and 2020 were left out of this study because they were not part of the active universe available in SIGEVA.

Figure 1. CONICET researchers in activity till February 2020, by year of admission 1990-2018 (n = 10,619)



Source: self-built based on SIGEVA-CONICET, 2020.

In previous works (Beigel, Gallardo & Bekerman, 2018) we analyzed the features of the expansion of the argentine academic field, a predominantly public institutional space, which tripled the number of full-time researchers between 2004 and 2015. Repatriation of 1300 Argentinians who had emigrated in times of crisis also had place, capitalizing on the networks that these built during their experiences abroad. Academic mobility was stimulated by national programs aimed at promoting postdoctoral and research visits, a mobility thought not only heading North but also within Latin America. Unlike the doctoral training policies applied in countries such as Brazil or Chile, Argentina reduced and finally closed its external doctoral program at CONICET in 2007. Scholarships were financed only for PhD programs in Argentina and funds were directed to support doctoral schools in national universities. There was a great investment in infrastructure, creating the Technological Scientific Pole in the capital city and several scientific-technological regional centers in the provinces. As a result, the balance of scientific expansion policies shows a combination of internationalizing actions with politics aimed at national development.

Let's now review the distribution of the current universe of researchers by scientific area and the effects of the contraction in recent years. The largest area with the highest number of agents continues to be Biological and Health Sciences (CBS), while Agricultural, Engineering and Materials Sciences (CAIM) appears in second place. The Exact and Natural Sciences (CEN) and Social Sciences and Humanities (CSH) are almost even. A recent CONICET report show that, analyzed the internal composition of the areas in relation to the category of their members, the CSH has a lower proportion of researchers in the higher category than the rest of the areas. This is related to the determinants that interrupted its growth process during the dictatorship (1976-1983), while it was between 2011-2015 when this area concentrated the highest level of admitted candidates. However, the promotion rates, compared to other areas, show an important difference in the Senior Researcher category where CSH have the lowest success percentage of success (34.5%) (Jeppesen *et al*., 2019).

Between 2013 and 2016 admission calls, the CONICET researchers increased by 34%, closing the period of expansion that had begun in 2005. The biggest jump was made by

the CAIM area, with a growth of 58%. The other areas experienced a more modest, but equally notable expansion, CSH (38%), CBS (30%) and CEN (17%). In all these cohorts, female incomers reached the majority, with a maximum of 60% in 2015 and a minimum of 55% in 2018. In CBS and CSH, for the whole period, women accounted for a 64% on average in CBS, and 60% in CSH. In CAIM feminization also took place (average of 56% in these five years) although they less in 2018 (48%). At CEN, years of majority of men and women were alternated, with two years -2014 and 2018- of exact coincidence in the sexes of the incomers. The vast majority of these people are inserted in the institutional network of CONICET (68.7%) or in national universities (24.1%). In other workplaces such as national science and technology organizations (2.8%), private universities (1.8%), foundations, associations and non-state non-profit organizations (1.1%), provincial organizations (0.5%) and private enterprises (0.1%).

We have already observed that the growth in terms of the number of researchers during the expansion did not solve structural asymmetries related to the historical intra-national and inter-institutional inequalities (Beigel *et al*., 2018). The most significant result of the federalization policies was registered in the Southern zone, but the University of Buenos Aires continues to concentrate an important part of the researchers at CONICET. Seen in a geographical perspective, 78% of current researchers are concentrated in the four main districts: Buenos Aires (29%), CABA (28.4%; 19% in the UBA), Córdoba (11.7%) and Santa Fe (8.8%). Other provinces such as Mendoza, Tucumán, Río Negro, Chubut, San Luis, Salta and San Juan count together 16% of the total researchers. The remaining 13 provinces have less than 1% each one and together account for 5% of the total. For 1% of the agents the province could not be accurately established. In the same line, Niembro (2020) argues that the traditional concentration changed very little despite the federalization initiatives in the last decade. Geographical quotas in CIC competitions or initiatives such as the call for I+D+i Strengthening tended to grant a minimum of researchers in some provinces (sometimes, a single researcher) rather than modify the structural concentration itself.

Regarding gender asymmetries, as we said before, that the participation of women in the universe of CONICET researchers has grown significantly and they currently represent 53.6% of the total (**Table 1**). There are, however, some gender gaps that still persist and that are not alien to the structures that dominate in other science and technology organizations, as well as in national universities and other Ibero-American countries (Albornoz, Barrera, Matas, Osorio & Sokil, 2018). It is not only a matter of vertical barriers, but there are also horizontal gaps, despite the growth of female doctors and researchers. This can be observed in the reduced presence of women in certain scientific and/or technological disciplines and their role played at institutes or laboratories, as well as in the research teams that are strongly masculinized (Perelló Tomás, 2012; Thelwall, 2019; Sarthou 2019). Convergently, it should be noted that women tend to be overrepresented in the evaluation committees that carry most of the administrative work, but underrepresented, on the other hand, in the composition of higher-ranking decision making. At CONICET, this situation is observed in the composition of the Qualifying Board of Merits (60% of its members are men) and in the Board of Directors, where there are only two women nowadays.[4]

Moschkovich & Almeida (2015) carried out a case study at the State University of Campinas and observed that the number of female doctors and teachers rose constantly in the last period, surpassing 50% of the total. They recognize higher education as a space particularly prone to the insertion of women in Brazil due to a series of factors that provide advantages over other types of spaces in the labor market. But they highlight the

[4] It is not a minor novelty that the recently elected President at CONICET is a woman, Dr. Ana Franchi, and this should have a positive impact in increasing gender equity in this agency.

poor female participation in the universities power structures, both in teaching hierarchies and in management positions. Buquet, Cooper, Mingo & Moreno (2013) argue that in Mexico it is common to consider that the lower presence of women in the highest spheres of the academic world is the historical result of their late incorporation to higher education institutions, and that this phenomenon will be corrected over time. However, the data they put into consideration shows that historical inertia is not a sufficient factor to explain the inequalities in the participation of both sexes in academic hierarchies.

Let´s now analyze the recent evolution of gender equity in the distribution of CIC hierarchies.[5] **Table 1** shows that asymmetries persist in the highest categories, although, compared to 2016, they were reduced in the Principal position and increased in the Superior category, which provides an explanation for the growth of women in promotions, given the increase in the population in the last 5 years. Precisely, in the years of 2014-2018, 5,228 researchers promoted to a higher category, with 52% being women. They were the majority in promotions to the Assistant (55.7%) and Adjunct (51%) categories, but the relationship changes in the move to Principal (45.5%) and is reversed at Superior (23%).

Table 1. CONICET researchers by category and sex, years 2015 and 2020 [percentages of the general total]

	2015 (n = 7,905)			***2020 (n = 10,619)***		
Category	**Women**	**Male**	***Subtotal***	**Women**	**Male**	***Subtotal***
Assistant	17.4%	13.5%	*31%*	17.3%	11.2%	*28.5%*
Adjunct	17.5%	15.1%	*32.7%*	20.0%	15.9%	*35.9%*
Independent	11.6%	12.5%	*24.1%*	11.5%	11.8%	*23.3%*
Principal	3.8%	5.9%	*9.7%*	4.4%	6.1%	*10.4%*
Senior	0.7%	1.9%	*2.6%*	0.4%	1.5%	*1.9%*
Subtotal	*51%*	*49%*	*100%*	*53.6%*	*46.4%*	*100%*

Source: self-built based on SIGEVA-CONICET, 2015 and 2020.

In another vein, we shall discuss: do gender asymmetries have a direct impact on publishing? According to Albornoz *et al.* (2018) globally in Ibero-America, 46% of the articles published in WoS are signed by women, a lesser participation than their demographic representation in the scientific systems of this region. On the other hand, there is a higher productivity of men and, also, that they are more connected than women with other Ibero-American colleagues in collaborative articles: on average, 27% more. In the case of India, for example, the participation of women in publications is considerably lower, swinging between 20 and 37% depending on the discipline (Paswan & Singh, 2019).

The participation in the structures of university power or scientific management do not guarantee a greater circulation, but access to collaborative networks, mobility and institutional social capital is decisive for publishing. Although the historical trend is an increase of the number of articles signed by women, the system of evaluation and peer review in the mainstream circuit is dominantly male in its forms, uses and customs. So, we can assume that this boosts the success rate in journals in favor of articles signed by men. Hypothesizing now in the opposite direction, this does not necessarily mean that

[5] The researcher career at CONICET includes five positions: Assistant, Adjunct, Independent, Principal and Superior

women have greater possibilities of local circulation, in journals of their own country or of the institutions which they are part. We are not aware of studies that have observed the behavior of the bounce/success rates in journals according to the circuits and disciplines, but the data that we analyze in this work allows us to verify that there is an important productivity difference among sexes. This trend was surely exacerbated during the current COVID-19 pandemic, as is suggested by several studies that observe the reduction in the number of articles submitted by women, a consequence of the intensification of care tasks and domestic work (Vincent- Lamarre, Sugimoto & Larivière, 2020).

The analysis by sex of the cumulative number of publications throughout the trajectory up to February 2020 points to a general confirmation for the universe in question: productivity in terms of articles is significantly lower for women. While they publish an average of 28 articles, men publish 37. In the case of books and book chapters, the relationship is more balanced. **Table 2** summarizes the average publications including the differences according to language: notably articles by men in English (25.4) compared to women (18.5).

Table 2. Average of articles, chapters and books per researcher, by sex (n = 422,209)

Publication type	Women	Male
Articles	28	37
Chapters	6	6.1
Books	1.4	1.7
Publications in Spanish (all types)	12	12
Publications in English (all types)	18.5	25.4

Source: self-built based on SIGEVA-CONICET, February 2020.

It is interesting that the productivity differences are accentuated in the older generations while they are reduced in the new categories. In Assistants, the difference between the productivity of men articles and women is 0.7. But it rises to 2.9 in Adjuncts; to 5.4 in Independents; and to 8.5 in Principals. This difference corresponds with the decrease in the proportion of women towards the highest categories that was observed in **Table 1** (61% in Assistant, 42% in Principal).[6] It is convenient to analyze the relationship between these productivity differences with disciplines to verify the incidence of the degree of feminization of large areas. The area with the greatest presence of women is CBS, where the balance in favor of is very marked in the Independent category (60%) although it is inverted in the Principal category (46%). However, as can be seen in **Table 3**, it is the area with the greatest difference between the productivity average of articles between men and women (14), a value close to that of CEN (12), which has a proportion of women very minor. CBS also has the biggest difference in publishing in English and, leaving aside the CSH, it also has a relevant difference concerning chapters, books, and in Spanish. CSH and CAIM appear, in this focus, as the areas with the least differences between men and women. The only two publishing formats in which the difference

[6] The causal relationship between lower productivity and access to the most hierarchical stages of the career is a complex issue, related to the evaluative culture of promotion processes in CONICET that we are currently observing, but we do not yet have publishable results.

changes - that is, women appear with higher productivity than men - occur in the chapters in CAIM and in Spanish publications in CEN.

Table 3. Average publications and languages per researcher, by sex (n = 10,619)

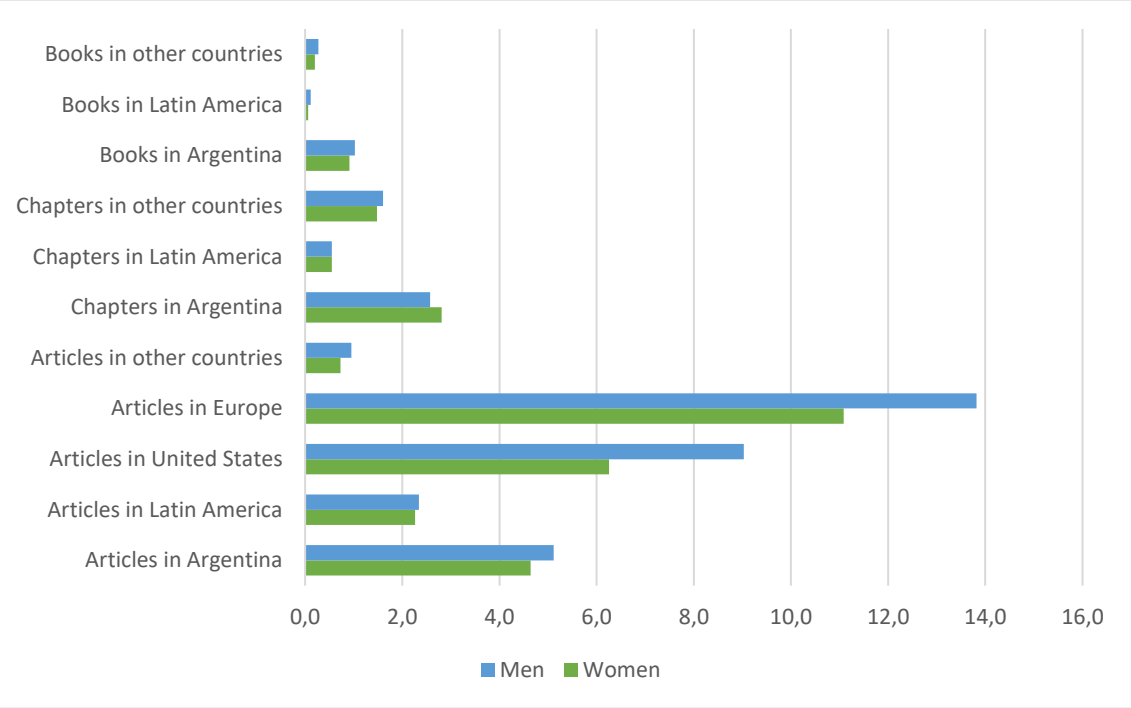
Indicator	CSH	CAIM	CBS	CEN
Males: total average of publications	54.4	35.7	46.5	45.2
Women: total average of publications	47.7	30.5	31.6	33.3
Males: average of articles	31.5	31	42.5	42.1
Women: average of articles	27.6	25.6	28.7	30.4
Males: average of chapters	17.2	3.9	3.4	2.6
Women: average of chapters	15.5	4.1	2.5	2.5
Males: average of books	5.7	0.9	0.7	0.6
Women: average of books	4.2	0.8	0.3	0.4
Males: average of total publications in English	6.5	24.8	32.8	33.2
Women: average of total publications in English	4.5	21	23.3	24.4
Males: average of total publications in Spanish	39.9	5.9	5.5	3.9
Women: average of total publications in Spanish	36.8	5.8	3.4	4.1

Source: self-built based on SIGEVA-CONICET, February 2020.

Figure 2 compares average publications according to country and sex for the entire corpus. In all cases, the productivity of men is higher than women, except in the publication of chapters in Argentina which is slightly higher for women (the average of chapters in the rest of the Latin American countries is the same between both sexes). At book level, male productivity is higher in books edited outside the region.[7] In the case of articles in journals, which is the main component of the published production of CONICET researchers, the average number of articles in Latin America -Argentina excluded- is almost the same for both sexes, but productivity in edited journals in other regions is significantly lower for women.

[7] It is a pattern that is repeated for the rest of the modalities. The average productivity of books published in Argentina is higher for men than for women (1 and 0,9 respectively) and the difference is accentuated in the case of books edited in the rest of Latin America (0,07 and 0,1) and in the rest of the world (0,2 and 0,3), although these are, in all cases, very small absolute values.

Figure 2. Average number of books, chapters and articles according to place of publication, by sex



Source: self-built based on SIGEVA-CONICET, February 2020.

In previous studies (Beigel, 2017; Gallardo, 2019) we verified that circulation in mainstream journals and writing in English does not depend so much on inherited cultural capital and language abilities acquired in primary socialization. Learning to write in academic English involves the networks offered by research teams with a long tradition on publishing abroad, as well as knowledge and dispositions acquired in institutes with accumulated international prestige. Cosmopolitan capital weights equally to have the collaboration of native speakers who play an important role as correctors and, sometimes even as vocational trainers in these language skills. The comparative study of linguistic abilities and internationalization that we developed through a survey in Brazil, Argentina and Chile showed that the initial scholar capital did not have a decisive impact on the publication in English. In the case of Argentina, the survey showed that 95.1% of researchers with very low/low primary scholar capital had published at least once in English. Moreover, the percentage of English publishing decreased as the initial linguistic capital increased, being 93.5% (Beigel, Almeida and Piovani, 2020; Gallardo, 2020). While social origin does not determine performance in academic writing, gender inequalities observed in the linguistic distribution of published articles can be explained in change by the existing obstacles for women to access to leadership positions in international networks. To deepen in the structural asymmetries that affect women in the hierarchies established in the international teams and projects, we are currently undertaking a new study with a qualitative approach.

Bibliodiversity and bilingualism in CONICET publications

Let´s now deepen the comparison of format, language and publication circuits to deploy the existing bibliodiversity at CONICET. Within the complete corpus of 422,209 documents, articles represent the main modality of publication in CONICET: a total of

341,622 publications. The total 10,619 researchers have published at least one article, at an average rate of 32 and a mode of 12. Logically, these values change if broken down by CIC categories: among Assistant the average is 15 articles; between Adjuncts, 25; for Independents, 42; Principals, 67; and for Superiors, 116. Appreciable differences also emerge when disaggregating the 4 big scientific areas (**Table 4**). So far, it is worth highlighting the similarities between the CBS and the CEN, and their opposition to the CSH, leaving the CAIM in an intermediate position. The highest average number of articles per person corresponds to the CEN (37), followed by the CBS (34). CSH and CAIM appear with lower values, 29 and 28, respectively. Publishing at least one chapter and at least one book is practically the norm in the social sciences, and the average number of books per person is particularly high (4.9). The chapters and parts of book are more relevant in the CAIM than in the CBS and, especially, than in the CEN. In book authorship, on the other hand, CEN's values are not so low and even exceed CBS in the agent's proportion who have signed at least one book.

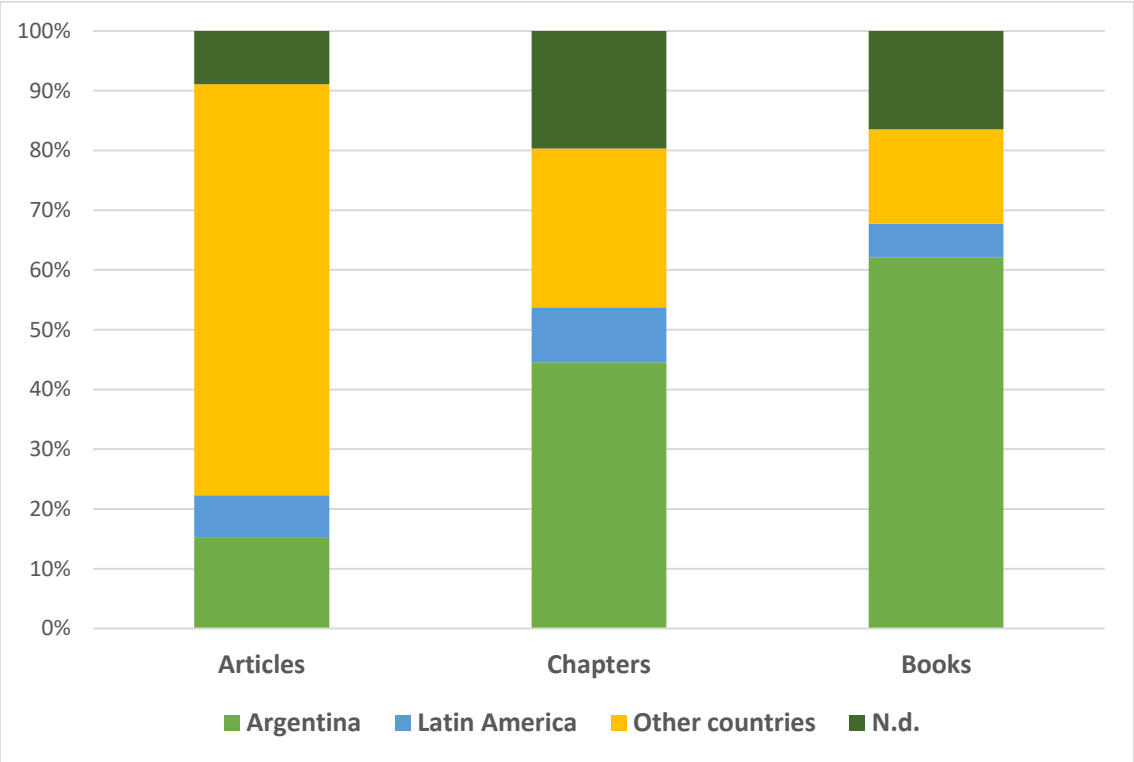
Table 4. Average publication by researcher, format and disciplinary area. (n = 10,619)

Indicador	CSH	CAIM	CBS	CEN
Average of articles per person	29	28	34	37
Average of chapters per person	16	4	2.8	2.5
Average of books per person	4.9	0.8	0.5	0.5
People with at least one chapter	99%	73%	70%	60%
People with at least one book	88%	30%	21%	25%

Source: self-built based on SIGEVA-CONICET, February 2020.

It is interesting to note the global weight of the publication in Argentina, which transcends what is traditionally expected for the social and human sciences. Considering the complete corpus, 21.5% of the publications were published in Argentina, 7.4% in Latin America and 60.3% in other countries (10.8% of cases without data). **Figure 3** shows that publication outside the country and the region is very strong in the case of articles, but this relationship is reversed in participation in chapters and, especially, in the authorship of books where national publication is very significant.

Figure 3. CONICET publications, by format and place (columns at 100%) (n = 422,209)

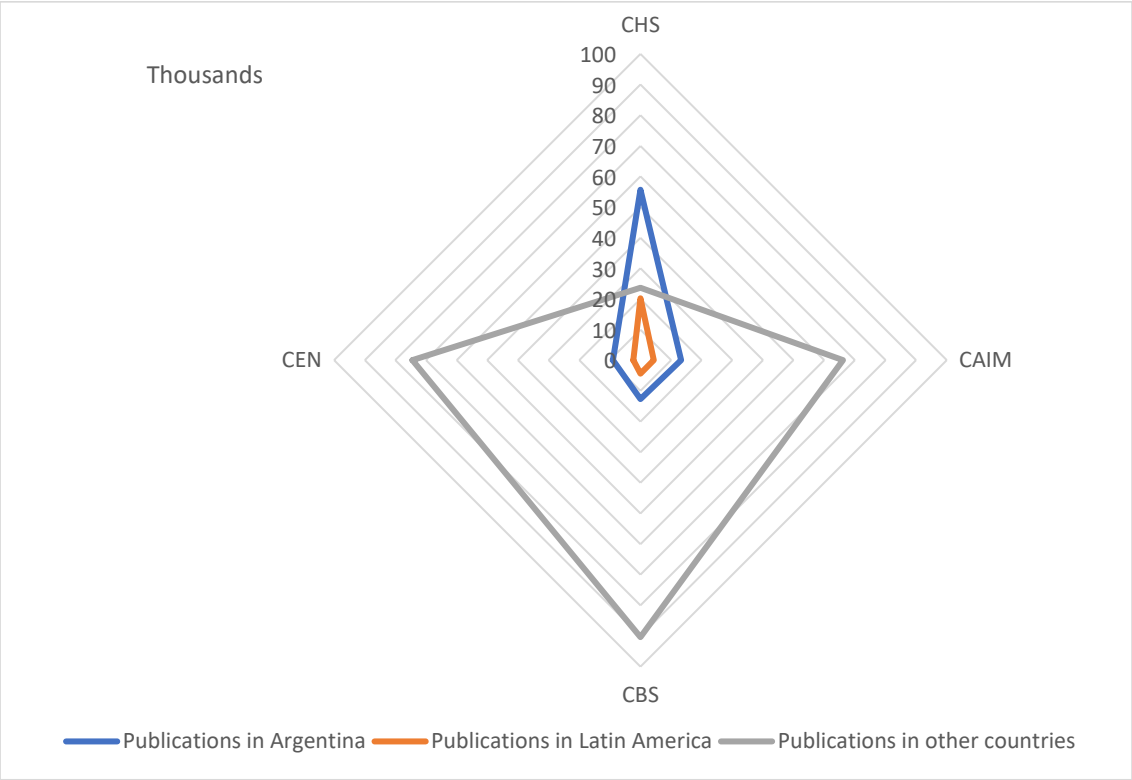


Source: self-built based on SIGEVA-CONICET, 2020.

Figure 4 only the documents with complete data on the place of publication and informs on different publishing circuits according to disciplinary areas. The productivity of the CBS and CEN researchers is concentrated mainly in American, European and rest of the world journals,[8] with an opposite side of few publications in Argentina and, especially, the rest of Latin America. CAIM presents a less marked publications abroad. In CSH, on the other hand, the main place of publication is Argentina, while the Latin American region and the rest of the world present analogous values.

[8] Among the countries included in this category Australia, China, India, Israel, Japan, New Zealand, Singapore and South Africa can be mentioned as important publishing places.

Figure 4. CONICET publications according with disciplinary area, by place of publication (in thousands) (n = 376,444)



Source: self-built based on SIGEVA-CONICET, 2020.

It is interesting that articles published in Argentinian journals decrease going up from the initial category to the highest ones. This tendency may have been stimulated by the enlargement of the demographic composition that occurred in the expansion period. But it is also the consequence of the 2014 Resolution of the Board of Directors at CONICET (D-N ° 2249), which classified journals and publishing houses for evaluation in the CSH: the novelty was the inclusion of Scielo in group 1 journals (the highest category). Afterwards, Latindex-Catalog, the repository where most Argentine journals are indexed, was also included in group 1. This evaluation instrument makes CONICET a unique case in Latin America, where regional repositories and national journals are highly considered for tenure and promotion.

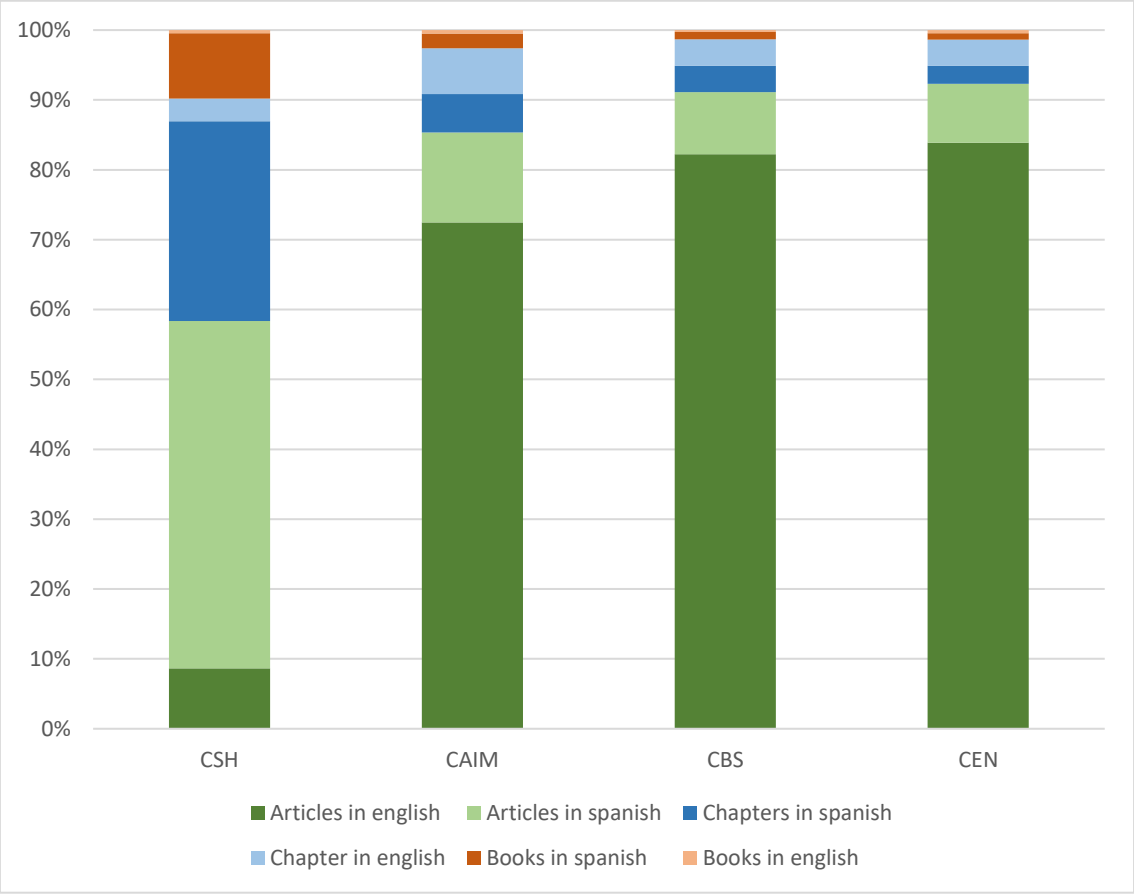
Let us now focus on linguistic diversity. From the total number of publications, more than half of them are in English (54.5%).[9] This is a relatively low percentage compared to studies that emerge from international databases and reinforce the hypercentrality of English. But it is also low when compared with previous studies in similar corpus like the one we are dealing with in this paper. In a study of the “5 most relevant productions” that CONICET researchers choose to apply for promotion (a total of 23,852 publications), it emerged that 83% were in English (Beigel, 2017). This data speaks of the evaluative culture of this institution because, when researchers must choose 5 publications that will be effective for promotion, they tend to select articles in English, while their complete trajectories show more diversity. However, the language balance is sharply modified when each type of publication is considered separately. **Figure 5** shows that English clearly dominates in articles, representing 62% of the documents, compared to 22% in

[9] It should be noted that for 13,9% of the publications there is no data about their language, which surely reflects information loaded incompletely in SIGEVA.

Spanish. The situation is practically reversed when observing chapters or book chapters, among which Spanish is 61% and English 24%. Analyzing only the books, the shares are 79% and 9%, respectively. The presence of other languages is minimal in all types of publication: only in social sciences it has some relevance (2.5% of the total).

As expected, linguistically, the CSH are clearly opposed to the rest of the 4 big areas, reversing the relations between Spanish and English, although it should be noted that articles in English represent a relevant portion (12.9%). In CSH the ratio between articles in Spanish and articles in English is 8 for Assistant. But it decreases to 6.5 for Adjuncts, 4.8 for Independents, and 3.8 for Principals /Superiors. **Figure 5** shows that in the other areas, the share of Spanish tends to decrease as one moves towards the highest categories of the CIC and in English, inversely, it increases. At CEN, the relationship between articles in English and in Spanish rises along the categories: it is 6.8 among Assistants; 8.6 for Adjuncts; 10.7 for Independents; and 11.9 between Principals and Superiors. At CAIM and CBS the relationship is much more stable for Assistants, Adjuncts and Independent; but it takes an important leap when observing Principals and Superiors. In CAIM, the average of the first three categories is 4.8; for the top two categories, on the other hand, it is 9.1. In the case of CBS, the values are 8.5 and 12, respectively. In sum, the higher the category, the higher the tendency to publish in English. In the younger generation there is a growing trend towards publication in Argentina, mainly stimulated by the CSH.

Figure 5. CONICET publications according to disciplinary area, by format and language (columns at 100%) (n = 358,780)



Source: own elaboration based on SIGEVA-CONICET, 2020.

Analyzed in the individuals' trajectory significant differences can be noted within different disciplines that are integrated in each of the 4 areas. In CBS, for example, the average number of articles in Spanish is 7% of the total number of articles per person. Veterinary appears as the discipline with a highest value (11%), while Biochemistry and Molecular Biology with the lowest (3%). For CEN, the average is 9% of the articles in Spanish, but 23% in the particular case of Earth, Water and Atmospheric Sciences. In the other four disciplinary commissions of the area, on the other hand, the value is 2% in each of them. Something similar happens in CAIM. The average for the area as a whole is 13% of articles in Spanish. Technological and Social Development; Civil, Electrical, Mechanical and Related Engineering; and Agricultural Sciences present values very close to this. But it is lower in Computer Science and Telecommunications; Materials Engineering and Technology; and Process Engineering (7%). At the other extreme, Environment, Conservation and Sustainability has 20% and Habitat and Design 75% of its articles in Spanish. Finally, in CSH the average for the whole area is much higher than the rest (76% of articles in Spanish). The disciplines with values below this correspond to Psychology and Educational Sciences (72%), Archeology and Biological Anthropology (64%) and Economics, Management Sciences and Public Administration (56%).

At the country level, the journals show the diversity within areas.[10] **Table 5** shows figures for Argentina, Latin America, the United States and Europe, as well as the average number of articles per person in selected disciplines. CAIM and CSH are the most heterogeneous. In the first area, Materials Engineering and Technology shows high productivity, aimed almost exclusively to the United States and Europe. The same for Computer Science and Telecommunications, although here the average number of articles per person is notoriously lower. In the other two disciplines the average number of articles per person is intermediate, but with a marginal role of US journals. In Habitat and Design, manuscripts are concentrated mainly in Latin America, including Argentina, while in Agricultural Sciences, publication national journals also have some relevance.

In CSH, on the other hand, the average number of articles varies considerably among the different disciplines. National journals are relevant in the four selected cases, although it is more relevant in the cases of Linguistic Literature and Semiotics, as well as in Sociology, Social Communication (CS) and Demography (D). On the other hand, European journals are an important destination for Psychology and Education, U.S. journals for Archaeology and Biological Anthropology. The Latin American journals play a significant role mainly for Psychology/Education and Sociology, CS and D.

[10] At CONICET the evaluation committees are organized sometimes representing one discipline and others including 2 or 3 disciplines. The publication data was classified by the agent in these "disciplines" attached to the evaluation committees in SIGEVA and not externally by us on the basis of the contents of the document nor the journal.

Table 5. Total average of articles per person, by place of publication, in selected disciplines

Area	Disciplines	Total articles	In Argentina	In other Latin-Am. countries.	In the United States	In Europe
CAIM	Agricultural Sciences	28.7	3.7	1.3	5.4	15.1
	Habitat and Design	28.8	13.3	5.8	1.6	4.1
	Computer Science and Communications	22.4	1.3	0.8	7.1	10.2
	Materials Engineering and Technology	32.4	1.4	1.4	9.4	17.7
CSH	Archaeology and Biological Anthropology	31	12.0	4.2	5.4	5.3
	Literature, Linguistics and Semiotics	29.7	12.1	4.4	1.9	5.9
	Psychology and Education	38.3	12.9	10	2.5	7.3
	Sociology, SC and D	26.5	10.7	7.1	0.7	3.7
CEN	Earth, Water and Atmospheric Sciences	33.1	7.3	1.8	8	11.9
	Physics	45.7	0.9	0.5	18.1	21.2
CBS	Biology	38.3	4.2	2.5	8.8	17.2
	Biochemistry and Molecular Biology	26.3	0.9	0.3	11.7	11.9
	Veterinary Science	34.2	4.3	1.6	7.7	17.2

Source: self-built based on SIGEVA-CONICET, February 2020.

The area of CEN presents an important homogeneity. The exception is Earth Sciences A&A, with an important orientation towards national publications, but the rest of the disciplines present values very close to those of Physics, where publication in Latin America is extremely marginal. In CBS, Biochemistry and Molecular Biology has a lower productivity than the other three disciplines, almost completely focused on US and European journals. This last feature is shared with Medicine. In the other two disciplines that are part of CEN, on the other hand, publication in Argentina has some relevance. It is also worth noting that Biochemistry and BM and Medicine are the only commissions, together with Archaeology and Biological Anthropology, in which the average publication in US journals is practically equal to that in European journals.

Publishing performance of the young generation and the race for survival

As mentioned at the beginning of this paper, the last decade brought some important changes in CONICET's evaluation criteria for tenure. A new law passed in the national Congress in 2017 banned the age limits for application Calls and forced CONICET to a change in its traditional selection based in on the age ranges established in its Statute - for the lowest category a maximum of 35 years was admitted for candidates. This new National Law (N° 27,385/2017) came to put an end to those age limits in the granting of scholarships and admission to CIC. It is still too short a distance to evaluate how this modification will result in an increase in the average age of the candidates admitted in

the agency, but what is already clear is that this change faced candidates with mature careers in competition with young people with recent doctoral degrees. The evaluation committees created criteria to weigh the trajectory of the candidates, but the shortage of vacancies ended up reinforcing the main feature of CONICET's evaluative culture (the primacy of articles in indexed journals) and pushing up the quantity of papers required for a successful application.

As mentioned before, in the CSH, Resolution 2249/2014 gave a strong impulse to the publication in Latin America and Argentina. In the other disciplinary areas, on the contrary, the classification of journals by the Scimago ranking and the Scopus-Elsevier H index was strengthened, replacing the previous dominance of Web of Science and the Science Citation Index.[11] With specific variants in each committee, the score awarded to a publication varies according to the position of the individual among the authors of the publication, as well as the ranking of the journal according to Scimago quartiles (Q1, Q2, Q3 or Q4). Thus, a participation in an article that is located in quartiles 3 and 4 of its specialty can represent 1.5 points for the applicant; while in the second quartile, 3.5 points; and 5 points if it is the first quartile of impact with relevant place in authorship. In the last call for applications (2019), this type of criteria was applied in Agricultural Sciences; Environmental Sciences; Astronomy; Earth, Water and Atmospheric Sciences; Physics; Materials Engineering and Technology; Biochemistry and Molecular Biology; Civil, Mechanical, Electrical and Related Engineering; Veterinary Science; and Medicine (the latter includes a special factor to increase the value of Nature, Science and Cell). All the evaluation committees give scores to publication in books, varying according to editorial quality, but it is mainly the articles that define the profile and its place in the order of merit.

The opening of different types of Calls for tenure applications started in 2013, for the first time, with a separate call on Strategic Topics (ST) with different criteria comparing with the General Call (GC). This new call, however, represented very few vacancies. It was not until the 2017 call that the ST suddenly gained importance, representing half of the positions opened. Moreover, this year there was a restrictive trend with only 450 new positions, as opposed to more than 800 in 2015. In line with the relevance of the call in ST, the agency's Board of Directors created a Strategic Topics and Technology Evaluation Committee, divided into six subcommittees: agrobusiness, energy and industry, health, environment and sustainable development, social development and technology (resolution 938/2017). The following year, a new twist was given by splitting the call for proposals into three parts: 150 positions for the GC, 150 for ST, and 150 for a new category named "Regional Research Strengthening for Development and Innovation". This implied a specific direction to the applications to open positions in certain small universities, less endowed with research resources and in accordance with the Board of Rectors.[12]

It is interesting to analyze the publishing styles of the young last cohorts considering the set of entrants in the period 2010-2018. We selected this period because it covers both the period of greatest expansion and the most recent contraction along with the

[11] Among other reasons, this change was related to the fact that there was not an agreement with former Thomson & Reuters, and WoS was not available at the national universities or at CONICET during the last decade.

[12] This call as of May 2018 reads "CONICET invites Public Management Universities and National Science and Technology Organizations (ONCyT) of lesser relative development to submit proposals for the incorporation of researchers in the CIC, with the aim of strengthening their capacities in research, development and innovation. For this purpose, 150 entries in the Career of the Scientific and Technological Researcher will be allocated within the framework of specific projects proposed by the counterpart institution and approved by CONICET" (CONICET, 2018b). This last cohort of admitted candidates was made effective in the organism by the end of 2019 so it is beyond the empirical scope of this paper.

transformations occurred in the diversification of the Calls. It is important to note that the available data covers the entire output of these researchers. It is not possible to separate the publications that each group had at the time of entry or during their candidacy. For this reason, at the end of this section we will focus on the last cohort, which does allow us to analyze this corpus as their production at "entrance".

A first highlight is the homogeneity of the publication formats of the cohorts throughout the selected period 2010-2018. For this population, articles account for 79.1% of their total production, compared to 16.7% for book parts and 4.2% for books. It could be assumed that the predominance of articles could be accentuated when approaching the most recent cohorts, based on their increasing value in competition for entrance. Even if the variations are small,[13] chapters and books are not marginal in the corpus of publications observed.

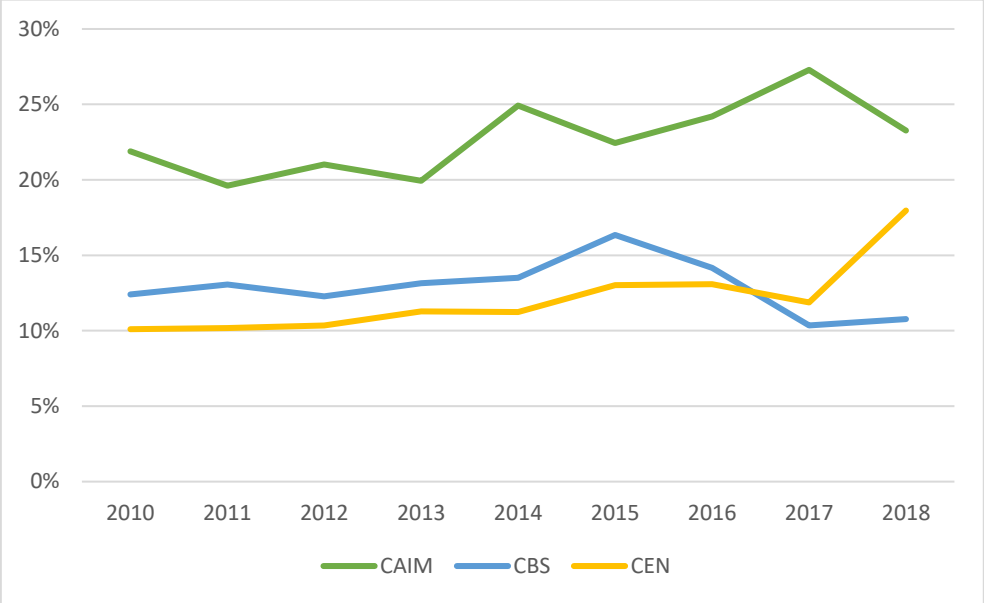
As for the places of publication, small variations are also observed throughout these cohorts analyzed by scientific area. In CSH, the percentage of articles published in Argentina remains between 45 and 50% for all cohorts. In those of 2016-2018, the rest of the Latin American countries appear as more relevant than the United States and Europe, while for the 2010-2015 both sets of countries represent practically the same proportion. This variation is surely related to the legitimization of the Latin American repositories introduced by Resolution 2249.

In the case of CAIM, the share of articles in European and American journals remains between 70 and 80%, with no clear upward or downward trend. Argentine journals also remained stable, between 10% and 20%. In the other two large areas, the proportion of publications in journals from the United States and Europe remained roughly between 80% and 90%. In CBS there is a small peak of publications in Argentina and Latin America between 2014 and 2016, which then drops to 10%. Since then, journals from rest of the world tend to decline in importance. In the case of CEN, always within the limits indicated, there is a very slight trend towards a decline in US and European journals, with a repercussion in Argentine and Latin American journals, which reached 13.1% of the articles among researchers admitted in 2018.

Language of publication shows contrasting trends in these younger cohorts. If we consider the total number of publications -of all types- for which language data are available, in CBS and CEN English represents 83% of the production of each of the groups of researchers admitted per year in 2010-2018. The reverse case is maintained in CSH, where publications in Spanish are 84% of the total throughout the period. In CAIM there is a slight increase in Spanish documents among the researchers admitted in recent years. **Figure 6** summarizes the evolution of Spanish in the 3 non-CSH areas. It can be observed that, in CBS, the presence of Spanish in publications tends to decrease, while it increases in CEN, especially among those admitted in 2018. It is likely that these values have some correlation with the quantitative weight of the entry by the ST Call that admits more diverse production styles.

[13] For example, for researchers admitted in 2011, 77.1% of their production consists of articles; compared to 81.9% of those admitted in 2018. Both are extreme cases but, as can be seen, these are not very pronounced differences. In the case of book chapters, these are more important for the 2012 cohort (18.5% of total production) and less for 2018 (14.5%).

Figure 6. Total publications informed in Spanish by researchers admitted in 2010-2018, in CAIM, CEN and CBS areas (n = 257,444)



Source: self-built based on SIGEVA-CONICET, February 2020.

Let's focus now on the very new cohort admitted in 2018, in which greater divergences are observed, as it is strongly crossed by the determinants of the period of contraction and the new ST call. The grids and the criteria to assign the scores for admission are diversified by area and often have some changes from one Call to the next one. They are not uniform within the different committees that belong to each major area. In contrast, in the case of the ST Call the committees were all guided by the same general structure. In the 2017 ST call for proposals, the item "scientific and technological production" accounted for 15% of the total score. 65% percent of the score was assigned to the quality of the research project (coherence, relevance, consistency with the individual and group trajectory) and the pertinence of the proposed director and the host institution. The remaining 20% was awarded different sides of the academic trajectory. The novelty of this Call was that publications only represented a 15% of the total score.

This proportion was inverse to that assigned to scientific production in the general call for CBS (**Table 6**). The weighing of published results decreases in the grid for CSH but its relevance is still opposite to the prioritization of the ST call. CAIM is the only one where the weight of the research project and production are similar in ST and the General Call.

Table 6. Weighing of the research project, published results and background for admission to CIC-CONICET, by major areas, ST and General Call 2017

Indicator	General Call				Temas estratégicos
	CSH	CAIM	CBS	CEN	
Work plan, relevance, consistency, director, place of work	30%	50%	20%	10-20%	65%
Scientific and technological production	45%	25%	62%	50-70%	15%
Others: teaching, training, human resources, congresses, extension, divulgation, transfer, etc.	25%	25%	15%	15-37%	20%
Other, unspecified	0%	-	3%	5-15%	-
Total	100%	100%	100%	100%	100%

Source: own elaboration based on the evaluation criteria for admission to CIC by major area, 2018 (CONICET Evaluation Management Archive). Note: in the case of CEN, minimum and maximum values that each committee can adopt for each item are established.

A modification of this nature in the weighing schemes of publications should be correlated with an increase in bibliodiversity and a decrease in the productivity patterns for those admitted by ST. Indeed, the 2018 cohort shows that the average publications is lower among those positions in ST and those resulting from the general call. However, **Table 7** shows that the average number of articles for a young incoming CONICET researcher assigned with an assistant category is still notably high. CAIM, CBS and CEN admitted candidates have an average of 10 published articles, those from CHS around 16 articles. When comparing both groups, differentiated by major area, those who joined through the general call have even higher averages of articles. This productivism was stimulated by the contraction of the positions offered since 2016, the knowledge that the applicants were having of the number of articles of the successful applications and the need to apply 3 or 4 times. **Table 7** is built with the data on publications uploaded in SIGEVA up to January 2020, so it does not reflect only the production of individuals at entrance but adds those that have been published in 2019. However, their high performance cannot be attributed to these recent publications that all candidates could have added.

Table 7. Average number of publications of Assistant Researchers admitted in 2018, by ST (n = 197) and General call (n = 300)

Indicator	CAIM	CBS	CEN	CSH
Income by Strategic Themes				
Average of articles per person	10.1	10.7	10.3	15.9
Average of chapters per person	1.5	0.5	1	7.8
Average of books per person	0.3	0.02	0.3	1.2
Average of technical reports per person	1.6	1.5	1.3	1.9
Ratio of articles/chapters	6.1	8.6	8.7	2.5
Income per general call				
Average of articles per person	11.4	13.2	13.3	18.8
Average of chapters per person	1.5	1	0.9	6.1
Average of books per person	0.3	0.2	0.2	1.9
Average of technical reports per person	1.8	0.6	1.9	1.6
Ratio of articles/chapters	6.9	10.5	7.7	4.8

Source: self-built based on SIGEVA-CONICET, February 2020, and career admission resolutions 2018.

The weighting scheme of the ST Call prompted many people to modify the profile of their applications, which sought to acquire tenure at CONICET in a context of budgetary restrictions and undisguised public attacks -by trolls and even government officials- against scientific research and its main public agency in the country. The weight given to ST positions in 2017-2018 addressed a profile supposedly less academicist. However, there is no indication that this policy fundamentally changed the incoming profiles but rather introduced distortions and ambiguous criteria. The published production had a reduced weight in the ST grid, but the weigh given to scientific production was not replaceable by technological transferences, patenting, extension, or other forms of production other than traditional publishing. The high weight given to the research project and its potential contribution to the solution of the problems identified as strategic depended on the opinions of the evaluation committee. Moreover, no mechanism has been established to monitor these effective contributions, nor the insertion of these people in teams and institutions with the minimum resources to ensure the fulfillment of the planned project.

Final words

Although the distortions generated by the Impact Factor in the evaluation processes and in the commodification of science are increasingly evident, the Scopus and Web of Science (Clarivate) databases continue to be dominant when weighing the published production in a scientific trajectory or an institution. Meanwhile, an article published in Scielo can have many more downloads and more citations in Google Scholar than an article by the same author published in a Scopus quartile 1 journal.

The standardization effect that this prestige industry has had in boosting the hyper-centrality of the English publications has been extensively studied and was discussed at the beginning of this paper. Another negative effect of the predominance of impact indicators affects the production of books, which are undervalued in the evaluation process due to the lack of classification systems and comprehensive editorial databases of this type of production at the national and international level. However, books continue

to develop in the academic realm and bibliodiversity emerges when looking at the complete trajectories of researchers outside mainstream databases (Engels, Istenič Starčič, Kulczycki, Pölönen & Siverstsen, 2018; Mounier 2018).[14]

Faced with this diagnosis, and in view of the forthcoming transformations in the transition to open science, one of the most important issues at stake is the impulse of national scientific information systems. Large public interoperable infrastructures are needed to make available the complete scientific production of all researchers and to stimulate all the local, national, regional and global collaborations that nest in this diversity. In this direction, the Nordic countries have made significant progress with the Norwegian model (Sivertsen and Larsen, 2012). This type of system allows the development of production indicators anchored in each national reality, with the possibility of taking advantage of alternative and responsible metrics to complement with qualitative evaluation processes. In most Latin American countries, we do not have an integrated system of curricula with complete lists of the productions of researchers in all disciplines, such as the Brazilian LATTES platform, which is an exceptional case in the region. Nor do we have consolidated information on the use, citation and impact of the productions hosted in institutional repositories in open access. In this paper we studied one of these databases that constitutes a fundamental link in the construction of an integrated national platform of curriculum and scientific production in Argentina: SIGEVA-CONICET. Some figures from this complete corpus analyzed highlight the existing bibliodiversity in the scientific production of this country: 75% of the total of 10,619 researchers, and not only those in the area of CSH, have at least 1 published book chapter. And 39% of the total have published at least 1 book. This is an interesting indication of the resilience of this writing style in a universe strongly driven towards *papers*.

Comparing this corpus with a previous work, in which we analyzed the "five relevant productions" of all CONICET researchers who had applied for promotion between 2013 and 2016 (a total of 23,852 publications), significant differences emerged in this work. That study showed that 80% of the publications that researchers chose were in English, while this study shows that 54% of the 422,209 total publications analyzed here are in English. A similar conclusion can be arrived by considering the place of publication: in the corpus of the five most relevant publications only 7% had been published in Argentina, while in this study of the complete corpus we found a total 21.5% of the total in national publications.

Accordingly, evaluative cultures are closely linked to the rewards offered by recruitment, categorization or promotion policies, but they don’t cancel out the diversity of strategies that people can develop within the "framework of possibilities" offered by these policies and by these institutions. In the case at hand, Resolution 2249/2014 had a main role in enabling bibliodiversity because it stimulated the valuation of publications in Latin American or Argentine journals indexed in the regional repositories. We are not unaware that this Resolution has conceptualization problems, and it is imperative to update it in the light of the new conditions of the international circulation of knowledge and open science. On the other hand, publication in book format is considered quite unevenly and this resolution does not give instruments for standardizing its classification in terms of academic quality. But this Resolution, which distinguishes CONICET from other research agencies in the region, certainly contributed to the fact that the universe

[14] Two regional networks of social and human science researchers are promoting initiatives to revalue bibliodiversity in evaluation processes: the European Network for Research Evaluation in the Social Sciences and the Humanities (ENRESSH) and the Latin American Forum for Academic Evaluation (FOLEC) promoted by the Latin American Council of Social Sciences (CLACSO).

of the published production observed here had an important portion of books, publications in Spanish and in Argentina.

The analysis of the SIGEVA corpus allowed us to focus also on gender asymmetries. Particularly notable was the higher average production of articles in English by men (25.4) compared to women (18.5). These differences are influenced by a set of factors ranging from age at doctoral studies, the time required for the task of motherhood and care, as well as other factors linked to the time and procedures for evaluation of articles in journals. Considering that academic promotion is based on productivity indicators, this is a central fact to consider in a review of the evaluative policies at CONICET to deepen its commitment into the battle against gender inequalities.

Finally, we focused on the younger generation to analyze the impact of the contraction of the system and the specificity of their publishing features. We found that, in the difficult struggle to acquire tenure, the levels of productivity have been rising, reaching averages of minimum 10 and a maximum of 18 articles at entrance for the last cohort. This range, however, is relatively wide because there was an important new Call, Strategic Topics, which had weighting schemes with a high evaluation for the research project and lower scores for scientific production.

There are still many issues to be reviewed in the evaluative culture of CONICET, in order to create differentiated researcher profiles that are representative of the different forms of existing scientific production, some more globalized, others more oriented to the satisfaction of local demands. Reorienting the research incentives and considering the existing bibliodiversity could thus enhance a new national consensus on the definition of scientific quality, in the midst of international standards and local definitions of social relevance. In conjunction with the CONICET institutional repository, the SIGEVA is a key instrument to stimulate these new profiles. To achieve the connection between the national repository system, its interoperability with CVar and with other SIGEVA platform existing in the university system are the challenges of this time.

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