

Public policies for the return of qualified human talent in Ecuador and its international insertion: the case of PhD scholars

Políticas públicas de retorno del talento humano calificado de Ecuador y su inserción internacional: el caso de los becarios de doctorado

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Abstract

The paper aims to understand the return process of scientists to Ecuador, with a view to producing coherent data on the reasons for their return, their social, political and disciplinary networks in the country, which contribute to the effort of knowing the disciplinary consolidation dynamics of the scientific fields, its international links, and therefore the process of Ecuador's insertion in the new international working division. The study used the databases of returnees offered by the Secretariat of Higher Education, Science, Technology and Innovation (SENESCYT) of Ecuador for the preparation of a survey. The sample frame of reference was created with more than 700 PhD. A total of 126 surveys were carried out generating an estimation error of 7.8% and the distribution of the cases raised by sex and area of knowledge was recomposed with the use of expansion factors to give greater consistency to the results obtained. Based on the sample, it was able to make inferences by sex and by a grouped variable of completion years of the studies, demographic, labor information and research activities were requested in a very general way. The research concludes on the relevance of public policy and on the profile of returnees.

Keywords

International insertion, qualified human talent, public policy of higher education.

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Resumen

El objetivo de este trabajo es entender el proceso de regreso de científicos a Ecuador, con vistas a producir datos coherentes sobre los motivos de su regreso, sus redes sociales, políticas y disciplinarias en el país, lo que contribuye al esfuerzo de conocer las dinámicas de consolidación disciplinaria de los campos científicos, vinculadas con el exterior y, por lo tanto, el proceso de inserción del país en la nueva división internacional del trabajo. Para eso, el estudio utilizó las bases de datos de retornados ofrecida por la Secretaría de Educación Superior, Ciencia, Tecnología e Innovación (SENESCYT) de Ecuador, para elaboración de una encuesta. El marco muestral de referencia estaba conformada por algo más de 700 PhD. En total, se realizó 126 encuestas, generando un error de estimación del 7,8% y se recompuso la distribución de los casos levantados por sexo y área de conocimiento con el uso de factores de expansión para dar mayor consistencia a los resultados obtenidos. Con base en la muestra, hemos podido realizar inferencias por sexo y por una variable agrupada de años de finalización del doctorado. Se solicitó información demográfica, laboral y de actividades de investigación en forma muy general. Se concluye sobre la pertinencia de la política pública y sobre el perfil del retornado.

Palabras clave

Inserción internacional, talento humano calificado, política pública de educación superior.

Introduction

The theme of the International Labour Division in the current context is the reason for discussion between different authors (Carlotto and Guedes, 2015; Maniglio, 2017; Vercellone and Cardoso, 2016) and assumes different approaches and perspectives that are often complemented. The meeting point for these analyses is the argument that the new International Labour division is based on the cognitive principles of postfordist capitalism and the reinforcement of intellectual property rights (Vercellone and Cardoso, 2016, p. 39). According to this perspective, in the developed capitalist countries, the part of capital called intangible and intellectual and the activities of high knowledge intensity are consolidated as a key variable for the growth and competitiveness. In addition, the training and research system, as well as the free time — the key condition of human development and the experimentation of alternative cooperative models — “are at least as important as wage labour and the business sphere” (Vercellone and Cardoso, 2016, p. 44).

According to these same authors, an important feature of this new system is that knowledge-intensive activities would be territorially anchored and competitiveness increasingly depends on an intellectual work stock. Thus, the discussion of qualified migrations and interpretations of regional migratory flows gains relevance. The global phenomenon of migration and the lack of data or the production of too heterogeneous data generates complexity for the analysis. National Censuses register foreign differently scientists, accounting for all born in another country or only those who have immigrant status or temporary residency visas. Consequently, the acquisition processes of the citizenship and the notion scopes of “foreigners” hinder from entry any effort to appreciate comparatively the migration of scientists and technologists.

In this sense, the objective of this work is to understand the returning process of scientists to Ecuador, with a view to producing coherent data on the reasons for their return and their social, political and disciplinary networks in the country. This contributes to the effort to know the dynamics of disciplinary consolidation of the scientific fields, linked abroad and, therefore, the insertion process of the country in the new international labour division. The research seeks to answer the questions: How is the brain drain articulated in the global process of international migrations? What is its impact on the development gap between North and South? What is the impact on national scientific and educational policies of the return of these scientists to their countries of origin?

En su estado actual, los datos y conocimientos sobre la fuga de cerebros son insuficientes, pero bastan para evidenciar graves asimetrías en las capacidades de los países de la región para contrarrestarla y mostrar que, en algunos de ellos, se produce un drenaje de competencias más que una circulación. Hubo importantes programas de reinserción, retorno y retención en todos los países de América del Sur, cuyos resultados todavía no se conocen claramente.

The data and knowledge about brain drain are insufficient, but are enough to show serious asymmetries in the capacities of the countries to counteract it and to demonstrate that, in some of them, there is a drainage of skills more than a circulation. There were important reintegration, return and retention programs in all countries of South America, the results of which are not yet clearly known.

The new international labor division and the brain drain

According to UNESCO “brain drain” is understood to be the part of the qualified migration that corresponds to the scientific staff and the holders of a postgraduate. On this subject, essentially, the perverse effects of unequal exchanges of highly qualified human resources (which affect a generic area) are emphasized, as they prevent countries of provenance from obtaining return rates from public investments addressed to higher education and to the training of researchers (UNESCO, 2005, p. 28). In this sense, UNESCO places the brain drain as “one of the main problems that must be solved if knowledge is to be a shared common good in future Societies” (UNESCO, 2005, p. 30).

The topic of the relationship between academic training and development is one of the main consequences for the southern countries of the brain drain. From a structuralist perspective, Sunkel argues that there is a mismatch between the nature of the industrial development and modernization, and of them with the development of the university system (Sunkel, 1972). In this sense, the university would be a reflection of the alienated character of the national economic system. There is a transfer of highly qualified human resources from the relatively poorest countries, where universities produce specialists that a technologically dependent economy does not need, towards the central economies that demand a growing number of qualified specialists that their own university systems are unable to satisfy.

Thus, the development of scientific and technological research in universities cannot be a company divorced from fundamental decisions about the very nature of the development process and, particularly, of the national production. The development problem that arises from the periphery of the system is, therefore, quite basic: if staying in the center-periphery development model or if achieving a more autonomous path of development.

Rather than emphasizing the economic effects of the brain drain in terms of non-recovery of investments, it is emphasized that this leakage atrophies the capacities installed for the development and inhibits the expansion possibilities of the technological base, as well as the innovation production in the sending countries, mortgaging their future, and hindering their present. In this sense, the brain drain sponsors an increasingly unequal spiral of concentration of knowledge, placing countries as producers and others as consumers, in new relationships of dependence rather than co-development.

This fact is more evident in the current situation of cognitive capitalism, when the issue of knowledge accumulation gains more relevance.

In the field of studies on economic development and patterns of insertion and international cooperation, the concept of “knowledge society” (Castells, 1999, 2002) has been widely used to describe the predominant organization model of global capitalism, in which the generation and systematic application of knowledge and technology are taken as essential elements of the current economic dynamics. Indeed, the undeniable dynamism that the knowledge-intensive sectors have been presenting in recent years makes it impossible to ignore the impact that innovation processes exert on the economy and, consequently, on the process of knowledge production. Recognizing the importance of scientific research, technical development and innovation for the current economic dynamics does not mean, however, to apply in a uncritical way the paradigm of the knowledge society for the understanding of the present moment of capitalism, nor accept the inevitability of the liberal model of international insertion that this paradigm promotes (Hitner and Carlotto, 2015).

It is necessary to recognize as the essential dimension of the problem, that the concept “knowledge society”, native of the thought centers of the north, played an important political role in Latin America during the 90s (Godin, 2004; Sharif, 2006), turning the hegemonic way of understanding the globalization problem in the region, contributing to legitimize a specific pattern of international insertion based on the establishment of free trade agreements and in the simple adherence to economic liberation (Arbix, 2002; Theis, 2013). The predominance of the liberal paradigm in the 90s meant the abandonment of a structural vision of development. The development model delinked the national production of academic production. On the other hand, the most developed economies, users of science and technology, operate huge magnets that attract large flows of specialists able to generate ideas or products and to apply knowledge in complex production processes and innovation.

On the issue of the brain drain and its impact on the national development of the periphery countries, the OCDE argues in defense of the model:

More recently, literature has suggested that the emigration of skilled workers, such as researchers and scientists, may be associated with beneficial effects in terms of knowledge creation and dissemination in sending countries. In particular, the possibility of emigration can encourage the creation of skills in the sending countries, allowing to increase potentially the levels of human capital and the economic growth via “a beneficial brain drain” [...]. Recent

literature also points to the benefits of brain circulation with regard to transfer of knowledge in the sending countries. The brain circulation can be referred to the return of qualified migrants in their country of origin after a period or to a model of temporary migration or movement between the house and outside. [...]. Considered as a whole, these effects suggest that knowledge flows associated with the emigration of researchers and scientists can provide benefits to the countries of origin. The literature holds the idea that highly qualified mobility is not a simple zero-sum game according to which the destination countries win and the other loses. The mobility of highly qualified human resources can be advantageous for all (OCDE, 2008, p. 5).

The analysis of the total migration data indicate that in 25 years, the world population grew by about 40% (World Bank, 2018), while the number of migrants increased by 59% (International Organization for Migrations, 2018). Thus, 3.3% of the world's population is migrant.

Figure 1
World Migration (1990-2015)

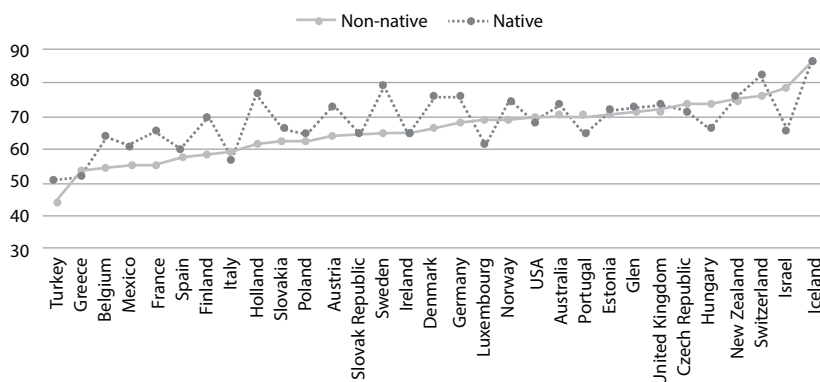


Source: The author from OIM, 2018.

It is estimated that in OECD countries —where about 70% of global trade in goods and services occurs— the number of immigrants with a schooling of at least 13 years increased in the last decade from 12 to 20 million of people, mostly from developing countries, people who have moved in

search of higher salaries and better job opportunities or professional development. Still, unemployment rates in OECD (non-native) countries are higher and in some cases much higher than native unemployment rates.

Figure 2
Employment rate 2016



Source: The author from OIM, 2018.

For Latin American migrants, the U.S. remains the main destination, followed by Spain, with strong presence of South Americans, mainly women with relatively high qualifications, and Canada (Martínez, 2007, p. 41). This substantial exodus implies, for the issuing nations, the transfer of a valuable human resource that decapitalizes them, diminishes their capacities to promote economic and social development, erodes their critical mass and limits their possibilities of generating innovations. Consequently, in these countries, there are many voices that have underlined the need to contain the escape of talents and the emigration of qualified personnel, as well as to alleviate their negative effects.

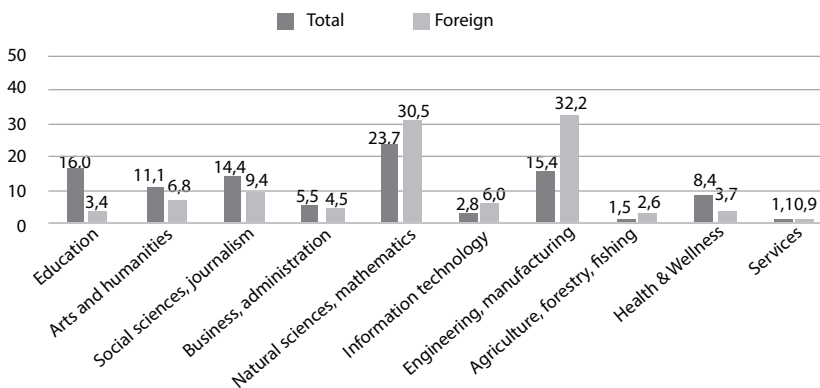
Despite the importance of the discussion, the statistics on the phenomenon, throughout the region, remain imperfect and do not allow to trace, with a degree of acceptable certainty, which professionals leave the region, what degrees they have, where they go and what they do outside. Also, it does not

allow measuring the proportions of those who return to their country of origin after their having completed studies abroad. Thus, migration is paradoxically a matter whose social and cultural perception has changed, in terms of valuation scales, at the same time as a phenomenon that remains poorly known.

In this sense, the research problem that arises has to do, on the one hand, with the current organization of the knowledge society and the brain drain that generates dependence and not codevelopment, and on the other, with the return of high level scientists to their countries of origin that have an impact on the national production. Thus, the meaning of the knowledge society for the countries of the south from the point of view of the production of knowledge and the impact of the knowledge produced, is based on the fact that the world is divided into two “cognitive civilizations”: one that produces knowledge and another that consumes it. And the issue is geographical, since those produce knowledge in the central countries are not necessarily “national”, but foreigners seeking space in other territories to produce such knowledge.

Thus, for example, in the case of the United States, the composition of the doctoral graduates (PhD) has a radically different profile in the comparison of the different areas of knowledge.

Figure 3
Composition of U.S. doctorate graduates (2017)



Source: The author from OECD, 2018.

Although in areas of the human, social and arts sciences the number of nationals is much higher than the number of foreign graduates, in the case of the basic, natural sciences, technology and engineering, the composition is modified. Foreigners have a role, occupying 30% of the total number of doctoral graduates, which could have an impact on the national production.

It is important to mention that there are no detailed data with respect to the nationality of these foreigners or data that allow to follow the real impact that this generates in the production. That is, it is not possible to say what happens to these graduates: if they return to their countries, if they are employed nationally, if they continue or not in the academic or research career. Therefore, studying the returnees of fourth level in Ecuador can be used for the mapping that allows to respond these questions.

Public policy in strengthening the knowledge and human talent In institutional terms, the starting point for the construction of the new higher education system was the establishment of the Constituent Assembly and the expedition in 2008 of the mandates on the evaluation of institutions of higher education (IES), which led to the closure of several universities. Mandate 14 was responsible for the closure of two poorly-quality universities in the country, while the constitution determined the creation of the new governing bodies of the system: the Higher Education Council (CES), the Evaluation Board Accreditation and Assurance of the Quality of Higher Education (CEAACES), the University assembly and the SENESCYT, which replaced the Council of Higher Education (CONESUP) and the Conea (Board of Evaluation and Accreditation).

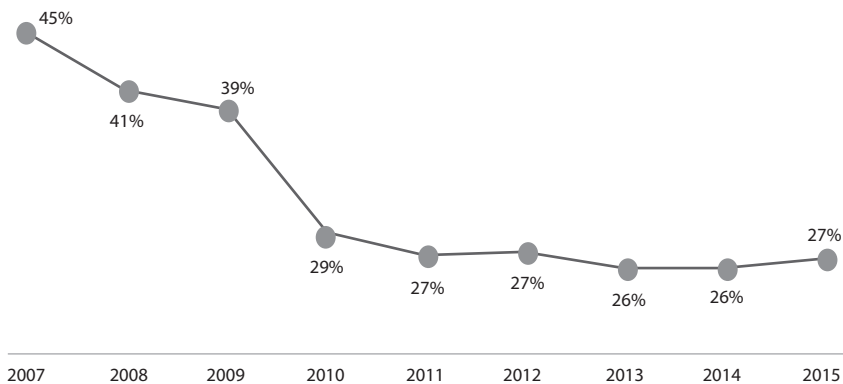
The public policy of strengthening human talent in Ecuador, in the period 2010-2017, was based on the budget that in order to travel towards a knowledge-driven development model, it is necessary to generate sustainable accumulation processes over the time, reducing dependence on scientific knowledge and foreign technology (SENESCYT, 2017).

Thus, the scholarship policy is articulated, on the one hand, towards the change of the higher education in the country and, on the other hand, to the change in the productive matrix. From this perspective, one of the most important principles of higher education, embodied in the Organic Law of Higher Education (LOES), should be that of “relevance”. Beyond the normative analyses of public policy in the country, when studying the specific data, it can be noted that there was an effort by the State to ensure the training abroad of qualified human talent in “relevant areas” for the National

development, that was not in the national offer. Thus, the scholarship policy, formulated from 2012, was part of this process of strengthening human talent.

Two lines of scholarships were offered by Ecuador from the SENESCYT. One of the lines of scholarships had a social character, complement to the gratuitousness of the national higher education; these were national scholarships to circumvent the opportunity cost of accessing the education of the poorest members of the population. It was an important policy of access democratization to higher education, once it allowed thousands of young people access to that level of training. According to the data from the National Leveling and Accreditation System (SNNA), 7 out of 10 students who accept quota in the system are first generation at home to course university studies. Similarly, the percentage of people aged from 18 to 24 who do not attend for economic reasons reduced from 45% in 2007 to 27% in 2015.

Figure 4
Percentage of people from 18 to 24
who do not attend for economic reasons



Source: SENESCYT, 2016 from ENEMDU, 2006-2015.

Even though it is necessary to recognize the importance of this policy for the democratization of higher education in the country, it is not the subject

of analysis of this work. On the other hand, the policy of the second line is based on the offer of scholarships of degree and postgraduate abroad, topic for this manuscript.

According to the SENESCYT, there are four criteria for granting these scholarships: individual excellence, progressiveness, institutional excellence and relevance. Individual excellence refers to the selection processes based on the ability valuation and individual qualities of potential beneficiaries, seeking to create a “meritocratic” system that compensates for the effort, knowledge and academic career. Progressiveness implies the consideration of attention for priority groups, which allows to encourage access to quality education, attention in depressed areas or affirmative action to special groups. Institutional excellence seeks to ensure that public policy beneficiaries enter quality educational programs, so tools are required as a list of universities of excellence. Finally, the relevance is the focus of public resources towards priority areas for the development of Ecuador as: life sciences, natural resources sciences, production and innovation sciences, among others.

Design of the Scholarship programs

Program of Excellence

The “Universities of Excellence” scholarship Program has been designed so people interested can course studies in higher education institutions of the highest global level, for this is defined a list of universities by means of the analysis by knowledge area of academic rankings of world recognition: Academic Ranking of World Universities (ARWU), Times Higher Education World University Ranking (THE), QS World University Ranking and SCImago Institutions Rankings. Scholarships cover tuition, maintenance, transfer, bibliography, thesis and research and health and life insurance

The granting of the scholarship depends exclusively on the admission that the applicants achieve at one of the universities involved in the program. The time of compensation (work in Ecuadorian territory in a public or private institution) is twice the total duration of the postgraduate studies financed by the State.

Open Call

It is a fourth-level study program in universities of academic excellence abroad, for the subsequent transfer of knowledge, which enables the achievement of the great national objectives, financed by the SENESCYT. The scholarships cover tuition, maintenance, transfer, bibliography, thesis and research and health and life insurance. There is a division by prioritization areas for the adjudication. This policy uses a modified list of the knowledge division made by UNESCO and focuses on the following areas: education; arts, natural sciences; mathematics and statistics; information and communication technology; engineering, industry and construction; agriculture, forestry, fisheries and veterinary; health and well-being. The areas of social sciences, psychology, administration and others were discarded since 2014¹. Previously, there was a weighting of the number 10% of scholars for this type of study for the total scholarships allocated, but this possibility has been eliminated.

The grant process includes the approval of an assessment of skills and knowledge, and an interview. Therefore, to obtain the scholarship, after the application, those who have been shortlisted, undergo the examination of postgraduate admission (EXAIP), which measures verbal capacity, logical-mathematical capacity, knowledge in project development and knowledge in English. It is approved with a 75% success in the general part and 60% in the English section.

After carrying out their studies, the fellows return to the country for the compensation stage, for twice the time of the total duration of the postgraduate studies. After this stage, the scholar is no longer linked in any way with the state for the scholarship and is in a position of free labor mobility.

Common Global Program

Through the Common Globe Program, the government in conjunction with institutions and governments of friendly countries, grant scholarships to study higher education with high standards of academic quality at the international level, with the objective of strengthening Ecuadorian

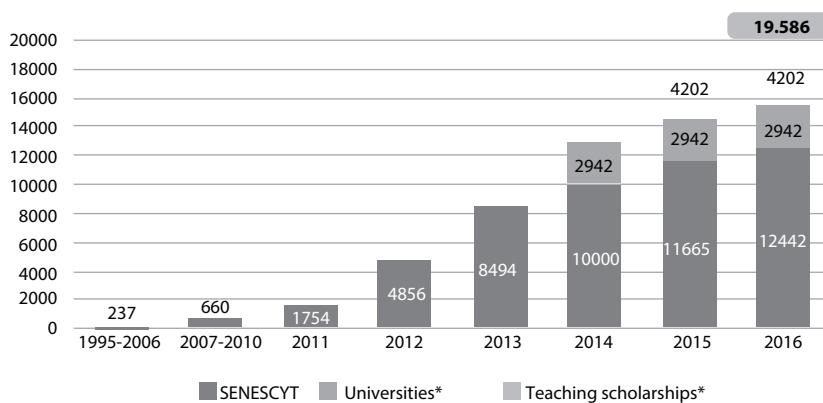
1 At this point it is important to mention that, for the fourth level, there was a policy of strengthening national programmes in areas of human and social sciences.

human talent in different areas of knowledge. In this type of scholarship the guidelines do not depend, at least exclusively, on the policies of the SENESCYT.

Rebuilding the profile of the programs

Scholarship programs abroad have granted a total of 19 586 scholarships abroad since 2007, constituting in the most important financing study program in the history of Ecuador that some Government has undertaken, surpassing 82 times that granted in the previous eleven years. It is also one of the most ambitious specialization programs in the region.

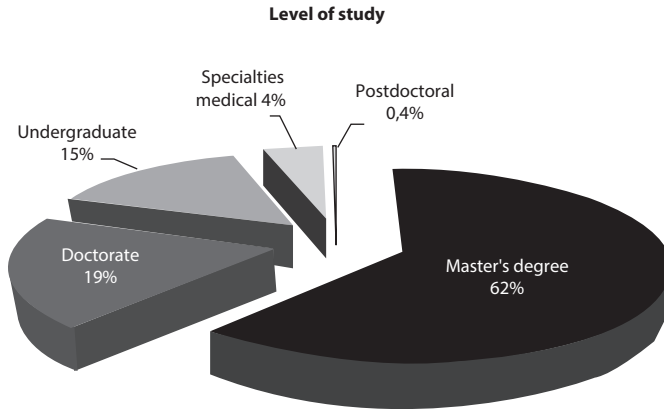
Figure 5
International undergraduate and postgraduate scholarships granted (cumulative total 2007-2016)



Source: SENESCYT, December 2016.

Until December 2016 were reported 4 818 scholars who carried out their studies of higher education and returned to the country, from which 97.6% is in compensation stage: 2% is in the grace period according to the provisions of the program bases (time in which they make their connection to the labor sector) and only 0.4% requested deferred compensation.

Figure 6
Percentage of scholarships according to level of studies



Source: Sub-secretariat for the strengthening of knowledge and human talent.

According to the Sub-secretariat for the strengthening of knowledge and human talent, from all scholarships offered for the fourth level, 62% correspond to master's scholarships, 19% to doctoral scholarships and 0.4% to postdoctoral scholarships. It is noted that the undergraduate scholarships correspond only to 15%, which indicates that the emphasis of the policy is towards the formation of fourth level. All of these training programs abroad presupposed a period of national compensation, i.e., students who traveled abroad were obliged to return to the country once the scholarship period was completed.

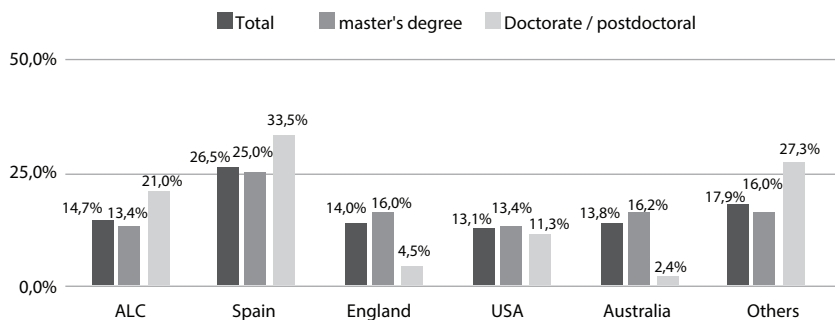
Despite the fact that the international flow of migration for fourth-level studies is mainly directed to the U.S. and England (Maniglio, 2017)², this phenomenon does not occur among Ecuadorian students. For them, despite the English teaching program, which grants scholarships aimed at perfecting the level of this language of teachers and developing their teaching techniques through a total immersion in English-speaking

² According to OCDE data presented by the author, the United States has the largest number of international students at the master's and doctoral level (26% of the total), followed by the United Kingdom (15%), France (10%), Germany (10%) and Australia (8%) (Maniglio, 2017, p. 35).

countries, the choice of fourth-grade students country level is still mostly Spanish-speaking countries. The main destinations are Spain and the Latin American countries. In the case of Latin American countries, the percentage of students who decide to go to Brazil is very low.

For doctoral studies the participation of U.S. and England is even lower, corresponding to 11.3% in the case of the U.S. and only 4.5% of students consider England as a destination for their doctoral studies. For Master's studies, it is interesting the participation of Australia, which receives 13.8% of the fourth-level students.

Figure 7
Country of studies of fourth level returnees (2017)



Source: Sub-secretary for the strengthening of knowledge and human talent.

Even though language can be an important barrier for fourth-level students who have returned to the country, it is interesting to note that from the point of view of the careers they choose to study abroad, the option for mastery and doctorate follows the trend of foreigners graduated in doctorates in American universities. They are also relevant careers, with impact on the national production. The main option for fourth level studies is in the areas of engineering, followed by natural sciences, mathematics and statistics. Those students who study the latter will course their doctorate, corresponding to 30%.

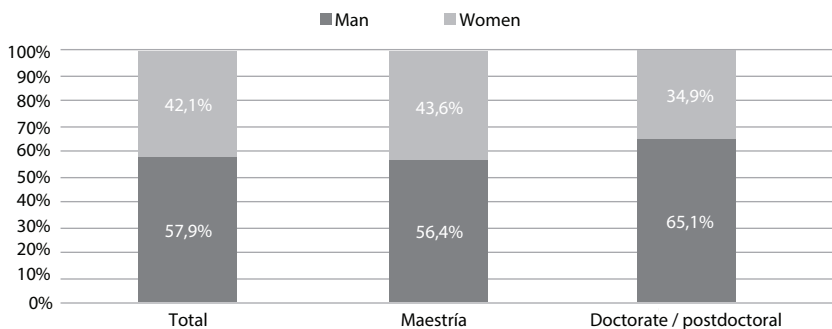
Table 1
Distribution of the students who returned from fourth level
by area of knowledge and training level (2017)

	Total	Training level	
		Master	Doctorate/ Post-doctorate
Education	3.3%	3.6%	1.5%
Arts and Humanities	6.8%	6.9%	6.6%
Social Sciences, Journalism and Information	16.1%	16.9%	12.4%
Business Administration and Law	5%	5.8%	1.2%
Natural Sciences, Mathematics and Statistics	19.9%	17.8%	30%
ICTs	10.3%	10.1%	11.3%
Engineering, industry and construction	29.7%	30.9%	23.8%
Agriculture, Forestry, Fishing and Veterinary Sciences	3.9%	2.8%	8.9%
Health and Well-being	5%	5.1%	4.3%
Total	100%	100%	100%

Source: Sub-secretary for the strengthening of knowledge and human talent

Another important analysis is the relationship between gender and relevance of the studies. The fourth-level returning scholars are mostly men. Of the total returnees, 57.9% are men, while 42.1% are women. The gap is widened in doctoral and postdoctoral studies, where 65.1% are men.

Figure 8
Returned students by gender (2017)



Source: Sub-secretariat for the strengthening of knowledge and human talent.

Despite the existing gender gap, an important figure on the profile of the returnees of fourth level is that women who leave to course their doctoral studies, leave for areas of high relevance for the country. indicating that the relevance policy proposed by the State has worked.

Table 2
Distribution of returnees of fourth level by area of knowledge, gender and training level (2017)

	Total	Training level			
		Master		Doctorate/ Post-doctorate	
		Man	Woman	Man	Woman
Education	3.3%	2.2%	5.5%	1.4%	1.7%
Arts and Humanity	6.8%	5.9%	8.2%	7.3%	5.1%
Social Sciences, Journalism and Information	16.1%	13.5%	21.3%	8.7%	19.2%
Business Administration and Law	5%	5.8%	5.9%	1.1%	1.3%
Natural Sciences, Mathematics and Statistics	19.9%	17.4%	18.2%	28.6%	32.5%
ICTs	10.3%	12.3%	7.4%	12.6%	9%
Engineering, Industry and Construction	29.7%	37.5%	22.5%	27.9%	16.2%
Agriculture, Forestry, Fishery and Veterinary Sciences	3.9%	2.4%	3.5%	9.6%	7.7%
Health and Wellness	5%	3.1%	7.7%	2.7%	7.3%
Total	100%	100%	100%	100%	100%

Source: Sub-secretary for the strengthening of knowledge and human talento.

From the women who leave the country for doctoral and postdoctoral studies, 32.5% study natural sciences, mathematics and statistics. From those who study a master's degree, 37.5% select engineering. This is not reproduced in the national distribution, either at the postgraduate or undergraduate level. Nationally, the choice of women remains for the humanities, health and well-being.

Perception of beneficiaries of the international scholarship program

In addition to the analysis work of the aggregate data previously performed, an important contribution of this research was the conducting of surveys with the returning professionals to the country. The group of individuals subject to the survey is formed by those beneficiaries that already completed their doctoral studies until the middle of the year 2017³, the sample frame of reference that was formed by something more than 700 PhD.

Initially a sample was established with an error of 5%, considering the composition by area of knowledge, but the reception of 126 people did not allow a representative analysis with respect to the areas of knowledge, generating an estimation error of 7.8%. It recomputed the case distribution by sex and area of knowledge with the use of expansion factors to give more consistency to the results obtained. In all cases, inferences were made by sex and by a grouped variable of completion years of the doctorate, also requested demographic information, work and research activities in a very general way.

As a result of the survey it was determined that at the demographic level, seven out of ten doctors are married or united, women to a lesser extent than men (about 15 points less and slightly more than sixteen points if considering the fact of being mothers). That is, among the returnees, 71.7% of men have children and only 54.9% of women.

Another important fact that shows the gender difference is that from the returnees, there are more women than men who do not work when they return, although those who work do not take longer than men to get the job. That is, 95% of the beneficiaries of the programme are working, but the proportion of women who claim to be unemployed (10.5%) is four times higher than that of men. Those who have returned in the years 2016 and 2017 are three times more likely to be unemployed (7.7%). Only 6% are employed in private companies, about 90% work in universities and 1% declares to be linked to a research institute.

3 Contact information of returning scholars was accessed until that date.

Table 3
Occupation of the returnees: distribution
by sex and year of return

	Total	Gender		Year of return	
		Man	Woman	Before 2016	2016 and 2017
Does not work	5.1%	2.5%	10.5%	2.7%	7.7%
Private sector	32%	32%	31.9%	35.5%	28%
Public sector	62.9%	65.5%	57.7%	61.8%	64.2%
	100%	100%	100%	100%	100%
Sample cases	126	80	46	65	61

Source: own elaboration

Table 4
Place where the returnees work: distribution
by gender and year of return

	Total	Gender		Year of return	
		Man	Woman	Before 2016	2016 and 2017
University	86.7%	82.6%	95.9%	89.5%	83.6%
Research institute	0.8%	1.1%			1.7%
Public institution	6.3%	8.2%	2%	5.7%	7%
Private institution	5.5%	7.0%	2.1%	3.5%	7.8%
NR	0.7%	1.1%		1.4%	
	100%	100%	100%	100%	100%
Sample Cases	119	78	41	63	56

Source: own elaboration

Among those who declare to be professors at the general level, 28% are occasional and 36% in the case of those who returned between 2016 and 2017, the latter might suggest that there are difficulties in obtaining tenureship in a university, but in general, they link immediately to the workfield, on average they obtained a job one month after returning. The returnees do not necessarily occupy all their dedication time to research activities, in the case of those who declare to be professors, one fifth of the

PhD do not do research and close to the fourth part at the general level. Women are more satisfied than men with their salary, this difference is statistically significant. One in five doctorates receive additional economic incentives for their accomplishments or goals achieved, but to a lesser extent women and returnees in the years 2016 and 2017.

In relation to the wage differences that may exist between men and women, 80% of men and 73% of women consider that the wage remuneration for women is similar to that of their male counterparts for the accomplishment of the same professional activities; however, there are no significant differences at 1% in these proportions. Likewise, there are no differences in the time proportions that men and women devote to domestic chores.

As mentioned, the policy implemented by the SENESCYT seeks to make human capital return to the country. According to the respondents, 60% of beneficiaries would have returned even if the country's compensation policy had not restricted their ability to stay abroad and among those who had not returned mainly had not done so for employment and professional opportunities. It is important to note that half of the students who returned between 2016 and 2017 declares to have the intention of having completed the compensation period of their scholarship to work within the country and 62% among those who returned before the 2016.

The number of publications and participations in scientific events per year is threefold after obtaining their doctorate and within the main difficulties, according to the perception of the interviewees, there is the lack of financing and infrastructure:

Table 5
In your opinion what are the most important barriers facing research in your area of knowledge? (Multiple)

	Total	Gender		Year of return	
		Man	Woman	Before 2016	2016 and 2017
Financing	61%	65%	53.1%	62.4%	59.5%
Infrastructure	21.2%	23%	17.6%	18.9%	23.8%
Time	15.7%	14.3%	18.6%	16.8%	14.4%
Lack of information for research (databases, bibliography, access to literature of scientific relevance)	11.5%	10.3%	13.9%	8.1%	15.2%

Bureaucracy and administrative procedures	10.7%	10.1%	12%	15%	5.9%
Lack of institutional support	10.6%	13.3%	5.3%	11.3%	9.9%
Lack of government support	10%	9.5%	10.9%	11.6%	8.1%
Excessive hours in teaching and administrative activities	8.2%	7.0%	10.5%	8.2%	8.2%
Shortage of researchers and technical staff	8%	7.7%	8.7%	6.7%	9.5%
Awareness of the importance of research for the country.	7.2%	8.1%	5.4%	9.2%	5%
Lack of incentives for research	6.9%	8.1%	4.4%	8.2%	5.4%
Lack of associations/groups/ research networks in the country.	5.1%	5.7%	4.0%	3.8%	6.6%
N/R	5%	2.3%	10.4%	4.9%	5%
Inefficient/mediocre evaluation processes	4.4%	4.8%	3.7%	5.6%	3.1%
Lack of well-paid job vacancies for researchers.	3.9%	4.9%	1.8%	4.3%	3.4%
Lack of research culture	3.6%	4.7%	1.5%	5.6%	1.5%
Language	3.5%	2.5%	5.6%	3.5%	3.5%
Means of publication	2.8%	4.3%		2.2%	3.6%
Work instability	2.4%	2.4%	2.5%	1.6%	3.4%
Interinstitutional cooperation	2.2%	2.4%	1.8%	3%	1.3%
Legislation/regulations	2.2%	2.3%	1.8%	1.2%	3.3%
Public procurement	1.5%	2.3%		1.5%	1.6%
Vision	1.5%	1.1%	2.5%	2.9%	
Unfair competition	0.8%	1.2%		1.6%	
Sample cases	126	80	46	65	61

Source: own elaboration

Conclusions

Throughout the text the target was to show that there was relevance in the public policy of fourth level scholarships for studies abroad and that the return of the students has an impact on the national production, once the 95% of the returnees are employees and working. In the long term, this process may have an impact on the country's peripheral type of international insertion.

It was demonstrated that the institutionalization of the system is reflected in a better environment to raise research-teaching-innovation relationship, since there was a clear change in the relevance structure of the students. The survey, despite the margin of error, allowed to close a gap with respect to the knowledge acquired in the country to analyze, with scientific data, what the returnees do, where they work, the reasons why they have returned and their impact in the national production.

Historically, migratory flows have consolidated the dependency geography among countries called developed and underdeveloped. A dependency that continues to grow and produce other inequality structures such as corporate governance (Bebchuck and Roe, 2014) and cognitive governance (Maniglio, 2016). In this sense, the public policy of training in the exterior and the return of brains sought to confront the cognitive dimension of the historical dependence and the structuring colonialism of the world system.

Although these creative actions have been viable thanks to the peculiar composition of alternative political forces in the States of the region, they have origins that correspond to social disputes that preceded the arrival of these governments to the power. While it is true that these are policies that seek a better and more sovereign insertion into the system, if they are not maintained in the structure of the state, they may be threatened by the arrival of power groups that find their meaning in dependency, so they seek to revert processes of cognitive autonomy that have initiated in the country. The dispute over cognitive sovereignty must be addressed as one of the main disputes in a country.

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