Circular migration between the North and the South:
Effects on the source Southern economies

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Abstract

For a growing number of researchers, international migration has particularly undergone a change in recent decades. In 2006, the recently released Report of the General Secretary of the United Nations on International Migration and Development suggested a "new era of mobility" characterized in part by a greater degree of non-permanent, or circular migration. Although the impact of circular migration on development is far from being determined, a current literature review suggests a growing optimism about its potential of development. This optimism comes mainly from the erosion of the migration structure traditionally polarized in which emigrants are seen as "loss" for the country of origin (Southern country) and immigrants are therefore "won" by the country of destination (Northern country), entering through a direct effect of brain drain i.e. the depreciation of human capital and consequently the reduction of the economic growth of developing countries. In fact, today, emigrants and their descendants are key players in the development agenda of a number of developing countries. In addition to the induced effect of brain drain as a stimulus to domestic education, the value of emigrants comes not only from what they can contribute from far (diaspora option), but also that what they can cause through their return to their country of origin (return option). Thus, in the context of circular migration, there is a brain drain followed by a brain gain (feedback effect) in which we find both the diaspora option and especially the return option, from which the economies of developing countries can benefit in terms of economic growth through technology transfer of their nationals in the North, including on the one hand remittances, links with international trade and foreign direct investment and diaspora networks (diaspora option), and on the other hand the physical return of nationals (return option).

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1. Introduction

The relationship between the emigrations of qualified persons or brain drain and the growth in the country of origin was the object of many sophisticated theoretical analyzes. At this level, various effects of opposite sign were identified; the question became consequently importantly empirical. Thus, more precisely, while focusing on the impacts of the emigration of qualified people on the economies of the countries of origin, in particular of the southern countries, as countries which suffer the most from brain drain, it is possible to classify these effects into three categories: a direct effect, an induced effect, and a feedback effect. The direct effect, negative or unfavorable,
is the depreciation of the human capital and thus the reduction of the economic growth. The induced effect, positive or favorable, consists in the fact that brain drain is a stimulus to domestic education. Whereas, with the feedback effect, it is about an indirect effect of brain drain, a brain gain, with two options linked to it: diaspora option and return option. These latter can constitute channels of international technology transfer from countries of the North, or more precisely from the nationals of the countries of the South in the North, to the Southern countries, on the one hand through the remittances, the links with the international trade and the foreign direct investment, and the diaspora networks (Diaspora option), and on the other hand through the physical return of the expatriates (Return option). This last point will occupy a dominating place in our work insofar as it makes it possible to discover even to confirm another channel of technology transfer from North to South, out of the traditional channels commonly recognized as the international trade and the foreign direct investment. Hereby, the main question which arises at this level is the following: On the basis of whole set of the effects of brain drain from the South to the North on the Southern countries, can we still consider that this phenomenon is a plague for the Southern countries that has to be solved?

2. Direct effect of brain drain: Depreciation of the human capital and reduction of the economic growth

The emigration of skilled workers has been the subject of a great analysis and a great debate since the 1950s and 1960s. More precisely, the theoretical literature on the migration and the growth go back to the end of the 1960s. Important economists, thinkers, politicians, entrepreneurs of the private sector and academicians expressed in a repetitive way their sights on the fatal consequences of brain drain associated with the qualified human emigration and the deterioration of national competitiveness in the developing countries resulting from this phenomenon. Indeed, in a static model, Grubel and Scott (1966) have already implicitly advanced the idea of brain drain by showing that the effects of the emigrations on the income per head depend on the relative productivity of the emigrants. More recent contributions of the growth literature reinforced this point: as education positively affects the growth, qualified emigrations have a negative effect by depreciating the human capital stock in the country of origin. Within this framework, the neoclassical economic growth models showed that brain drain has hostile effects on the development of the country of origin. In particular, the high levels of the qualified emigration slow down the economic growth and harmfully affect the remaining skilled workers. Consequently, poverty and inequality increase. Moreover, the more recent economic theory, i.e. the new growth theory or the endogenous growth theory also foresees that a high qualified emigration reduces the economic growth rates. Indeed, research finds that the average level of the human capital in a society has positive effects on the productivity and the growth. Therefore the departure of highly qualified emigrants generates work gaps and reduces the productivity in specific sectors of the economy. A study on 111 countries from 1960 to 1990 found that a one year increase in the average education of the labor force of a nation increases the production per worker by 5% to 15%. Reciprocally, the low average levels of education can slow down the economic growth, damage the gains of the slightly qualified workers and increase poverty. Besides, Carrington and Detragiache (1999), Docquier and Marfouk (2005), OECD (2005), and Dumont and Lemaître (2005) contributed to the largely accepted idea in the political arena according to which the emigration has a negative impact on the economic performance in the country of origin. This phenomenon was defined as “brain drain”, a negative characteristic which would prevent the development in the least advanced zones of the world. In the same way, for Hansen and al. (2002), the study of data on Latin America and the Caribbean clearly illustrate that the emigration of “well educated population” is a serious problem for the two areas. That obviously creates a challenge for the countries of Latin America and Caribbean since their human capital stock is continuously eroded. It is about a highly complex problem, which is due to a multitude of factors. That applies to the majority of the countries in the area, particularly Mexico and Colombia, where the clear emigration of qualified population results in an export rather than an import of high-tech knowledge. Elsewhere in the area, particularly in Chile, Brazil and Costa Rica, brain drain is less of a problem, but all countries of Latin America and Caribbean do not seem to profit from the current mobility of highly qualified work. Lastly, according to Meyer (2003), independently of the term used to describe the phenomenon of brain drain, the asymmetry of the brain circulation

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1 The least developed countries are slightly equipped in competences. Consequently, the international migration of qualified people from and to these countries can have a strong impact on their human capital stock.


creates deficits of human resources in the developing countries. Lowell, Findlay and Stewart (2004) quoted studies suggesting that up to 30% to 50% of the population of the developing world trained in Sciences and Technologies lives in the developed world. That has a direct impact on the competence basis of the developing countries, on their absorptive capacity and on their possibilities of technological catch-up. This effect is particularly strong in the least developed countries; the majority of them are very slightly equipped in competences.

Consequently, brain drain is perceived as a phenomenon which must endeavored to correct the negative effects. Moreover, according to Hansen and al. (2002), one of the challenges usually faced by the countries of Latin America and the Caribbean is how to neutralize the emigration of highly qualified workers. Within this framework, since the beginning of the 1960s, brain drain was identified as a problem against which policies must react and fight through a voluntarist decision making. At this level, to favorably modify the movement and the asymmetrical distribution of talents, developing countries must set up daring and creative strategies which are supported by national policies to provide educational opportunities of world class, to build knowledge-based research and development industries, and to durably finance the required investment for these strategies. In other words, deprived of most of their most able and most fertile spirits, the developing countries are long in constituting the human capital necessary to the creation of knowledge. To reverse the movement and to make the intellectual riches distributed better in the world, the developing countries must apply daring and creative strategies supported by national policies, which aim at providing training possibilities worthy of what is done best in the world, to set up knowledge-based research and development industries, and to finance these strategies. It is the way followed by Brazil, China and India, who ensure from now on a first order or world class formation in the crucial fields for their development, like biotechnology and computer science, and who, in parallel, invest in R&D. Consequently, only a small proportion of the most graduate elements leaves the country because the opportunities offered in the R&D sector allure the local candidates and attract even foreigners. Moreover, among the remedies which were tried to face brain drain, we find taxation (compensatory financial measurements), regulation of flows through international standards, and emigration control. Indeed, taxation received a strong attention during the second half of the 1970s and the beginning of the 1980s, but it lost its attraction at the end of the 1980s. Concerning the regulation of flows through international standards, it was proposed by organizations inside the United Nations system, but it was not implemented because developed countries, as countries of destination, generally still apply selective immigration policies with an interest for highly qualified labor.

In spite of what precedes, the emigration of skilled workers continues to exist and tends even to rise in the last decades. Moreover, regarded as an evil to fight at all costs during the 1960s and 1970s, the perception of brain drain has improved for a few years. So many authors noted that the exodus of the human capital was always seen by the traditional literature of the brain drain as a plague for the developing countries. More recently, it was commonly sustained that the emigration, even of the highly qualified, can positively affect the economy of origin. Indeed, according to Johnson (1967) and Berry and Soligo (1969), the global well-being is improved by a rational choice of the highly qualified emigrants to seek more important incomes abroad. Moreover, the new literature on the international migration proposed theoretical models where the emigrations of skilled workers can have beneficial effects on the country of origin. Moreover, the more sophisticated dynamic models showed that the beneficial effects of the emigrations of highly qualified workers can dominate the negative effect. The two principal channels for such effects on the developing countries are more important motivations to acquire education (induced effect) and technology transfer through brain gain (feedback effect). In other words, the emigration of the skilled labor of a country can play a potential role in the development of this latter and can be a source of positive externalities, and this can be achieved through two ways: the first way is related on the acquisition of additional qualifications and the increase in the level of ex-ante education; the second way is related to brain gain with all that it can cause in term of technology transfer. Due to the availability of limited data, these points were mainly unexplored until now at the empirical level. However, Bugamelli and Marconi (2006) found a positive and statistically significant effect of the emigration of highly qualified workers on the GDP per worker growth in the country of origin. This result is not specific to the poor or small countries or to the countries with exceptionally high emigration rates.
3. Induced effect of brain drain: Stimulus to domestic education

Although Faini (2002) found that the rate of emigration among the educated individuals is slightly and negatively correlated with the higher schooling rate at home, the probability of emigrating, which is increasing with the level of competences of the individual, would induce an additional investment in the education\textsuperscript{4}. Indeed, the possibility of emigration towards countries with higher wages can stimulate the natives to pursue a higher education preventing them to pursue a more paying job abroad, and the domestic schooling rates can consequently increase. Thus, the share of the skilled workers in the source country increases\textsuperscript{5}. As a result, the economic growth of the source country can be stimulated. Therefore, the level of the post-emigration human capital can increase with positive effects on the economic growth. Within this framework, in a sample of 50 developing countries, Beine and al. (2003), by using data of Carrington and Detragiache (1998), found a positive effect of the emigration of skilled workers on the investment of the human capital in the source country and a positive relation between the economic growth and the proportion of highly educated individuals at home. All that suggests that there is an “optimal level of emigration” or an “optimal brain drain”, neither too large nor too small, which stimulates the continuation of higher education in the developing countries and encourages the economic growth. In other words, a certain degree of emigration can actually benefit for the developing countries, inducing a larger schooling rate in domestic education. However, if the emigration is not beneficial, there will be less motivation to pursue education. Moreover, an excessive level of qualified emigration can exhaust the stock of skilled workers in a way faster than it can be regenerated.

Bugamelli and Marconi (2006) found that indeed, the qualified emigration rates have a positive and significant impact on the economic growth, which go beyond the larger incentives to acquire education according to Beine and al. (2003), including the feedback effect of the qualified emigration or of the brain drain. This result is robust for the small or poor countries or for the countries with exceptionally high emigration rates.

4. Feedback or indirect effect of brain drain: Brain gain

The model which was used to describe and explain why brain drain, defined as a permanent loss for one’s country of a qualified migrant attracted by a magnet of “periphery” towards the countries of the “center”\textsuperscript{6}, proves less and less operative to apprehend the contemporary migratory phenomena. Thus, there was in the literature a progressive replacement of the term “brain drain” by that of “brain mobility”. The “brain mobility” is more and more registered in terms of membership at an international scientific community in a general context of emergence of a science-world and a global economy. Thus the practice of the scientific activities is no longer limited to the territorial framework of the nation and that its networks became necessarily mondial.

Within this framework, since brain drain is almost inevitable, a new wave of thought gained ground in the last decades, which significantly changed the range of the concept of “brain drain” by that of “brain gain”. Indeed, although the migration of qualified and educated human resources from developing nations to developed nations was negatively identified as brain drain for a long time, a serious problem affecting the developing countries in their capacity for development, a brain drain of which some countries are victims becomes a brain gain for the countries which benefit from it. This new line of thought led a growing number of developing countries to consider their qualified diaspora as an asset which can be beneficial for their development.

Altogether, the policies adopted by the developing countries, with an interest to the emigration of their highly qualified citizens, are summarized through two fundamental approaches, which are also important and would not be seen in contradiction one with the other: the first approach, the brain drain approach, is focused on the negative effects of the emigration, i.e. a lack of competences for the source country; the second approach, the brain gain approach, stresses the positive aspects of brain drain and opportunities of using this highly qualified diaspora for national interests.

The international mobility of skilled workers highlights the feedback effects which generally generate favorable economic results. How? Moreover, technology is contained in the human capital, and the technology diffusion then

\textsuperscript{4} Mountford (1997), Beine and al. (2001 and 2003), Mariani (2004).
\textsuperscript{5} Mountford (1997).
\textsuperscript{6} Many works of the 1960s and 1970s are recognized in such a definition of brain drain, like Yesufu (1966), Watanabe (1969), Godfrey (1970), Truscott (1971), Bernard (1971) and Abdollahi (1979), as well as more recent works still such as Washington (1980), Fyodorova (1981), and Mahajan and Sudarshan (1985).
requires a communication between the agents. At this level, Arrow (1969) showed the importance of the interpersonal communication in the facilitation of the technology diffusion. This communication can be remote, lying within the scope of the diaspora option, as well as face to face, lying within the scope of the return option. So in the recent years, two alternative strategies emerged and they are associated with brain gain: the “diaspora option” and the “return option”. More still, the feedback effects of the brain drain are not limited to the technology transfer, but also extend to the remittances. More precisely, there are two feedback effects of the qualified emigration: the emigrants bring back their competences and their work experience from abroad, allowing to improve the productivity of their country of origin. Moreover, the expatriates who remain abroad transfer funds as well as knowledge or technology to the developing countries, thus improving their productivity and their economic development. Altogether, according to Khadria (2007), the source Southern countries suffering from brain drain are supposed to draw in return three types of economic benefits: the remittances, the technology transfer and the return of workers with improved competences from the host countries of the North to their countries of origin in the South. Consequently, according to Burns and Mohapatra (2008), the diaspora is regarded as a brain bank.

4.1. Diaspora option

If the emigrants are a permanent or temporary loss of short to medium terms, their backward links with their source country can offer significant benefits. This backward link causes a return of knowledge and technology. Moreover, Rauch (2003) claimed that the diasporas «should be especially adept at transferring technology» because they «avoid language and cultural barriers to diffusion knowledge». The technology transfer, as an integral share of the diaspora policy, improves the economic growth. Then, within this framework, the final objective of the diaspora option is to create channels through which the expatriates would be effectively and productively related to the development of their country of origin, without any temporary or permanent physical return. At this level, not only the financial resources sent at home, the remittances, help to reduce poverty and to support the economic growth; the emigrants and the diaspora communities are also used like an important source of the international trade and foreign direct investment. Moreover, many communities living abroad establish associations and partnerships to tackle the social and economic problems in their country of origin. More precisely, a promising perspective in the diaspora option is that through the expatriates, the country can have access not only to their individual knowledge but also to the socio-professional networks in which they are inserted abroad. By recognizing the potential positive effects of these economic links, many national governments sought ways to more engage the emigrant and the diaspora communities in the development agenda. Thus, altogether, the emigrants and diaspora communities can use their financial and intellectual resources to help to reduce poverty, contribute to the expansion of the private sector and improve total competitiveness in their country of origin, by making major contributions to the technological progress there.

4.1.1. The remittances

To recover the economic losses faced by the countries of origin, as a result of the emigration of highly educated and qualified individuals, it is interesting to find the ways through which these direct beneficiaries can reimburse their country of origin, perhaps by paying fees for the training that they received in their native country. These fees would be deposited in national fund to support the development of human resource. A complementary mechanism which would give back a portion of the benefit obtained by the institution or the entity having recruited or employed the talent of the other countries would be also invented. These institutions or entities would pay a value calculated on the basis of marginal benefits generated by the highly qualified and educated emigrants of the developing countries. Such resources would be collected through the taxation in the country in which the emigrant lives and works, and transferred to the domestic country to be deposited in accounts established to promote the research and development. Other ways allowing the mobilization of the remittances to the developing countries can be evoked, namely:

4.1.1.1. The mobilization of remittances for consumption purposes

The majority of the people choose to emigrate abroad with the intention to send a part of their gains to their country of origin for their close and extended families. The volume of remittances is used for consumption (better

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7 The principal proof of the contributions of the diaspora to the technology transfer appears in the case studies.
nutrition and health) as well as for the investment in the human capital (education), without a great effect on the increase of the domestic production, employment or exports, increasing, however, the market volatility and inequality. For the poorer families, consumption can have a follow-on effect of an improved standard of living and educational opportunities. At this level, the use of the remittances for consumption can attenuate the problems caused by poverty, without necessarily providing the means to leave poverty. So the families can become dependent on remittances to support their livelihoods.

Although the majority of remittances are sent by individuals to satisfy the needs of their families, a growing number of emigrants and members of diaspora communities want to do more to contribute to the development of the communities and countries from which they emigrated. So the recent empirical literature finds that remittances have “GDP multiplier effects” which increase the national income.

4.1.1.2. The mobilization of remittances for productive purposes

The impact in terms of development of remittances would be to channel the funds towards the productive investments, i.e. towards the financial investments (savings) and the development of the firm. At this level, the billions of dollars sent by the emigrants are largely recognized as a major economic factor in certain developing countries. Although the majority of remittances are mainly used to support the poor families, some actors of development sought ways to mobilize a larger proportion towards the productive activities with the creation of income and job opportunities. In other words, the remittances by the emigrants back to their native country are a powerful economic force for economic development in many labor exporting countries, by providing financial resources which do not reduce only poverty by supporting the fundamental needs for many families, but also by supporting the investment of the private sector. At the end of the 1990s, among the 20 developing countries receiving the greatest incomes from their expatriate citizens, the contribution to the GDP is classified of less than 1% for Brazil to 24% for Yemen.

4.1.1.3. Remittances and technology transfer

Saravia and Miranda (2004) suggested that the innovative mechanisms to recover and invest a portion of the remittances at home by emigrants working abroad would be used to promote the creation of a knowledge-based industry in the developing countries, through the knowledge and technology transfer. How?

Remittances can promote technology diffusion by making investments more affordable. Moreover, they can support the technology diffusion by reducing the credit constraints of receiving households and by encouraging investment and entrepreneurship. Moreover, remittance flows have also contributed to the extension of banking services (often by using innovative technologies), including microfinance, to previously unserved, often rural sectors. This has improved household and firm access to financial services, and their ability to purchase and invest in technology. Lastly, remittances have also helped domestic banks to foster links with banks in high-income countries. In turn, such links have fostered technology transfers as banks in high-income countries have helped local partners to upgrade their systems to comply with the anti-money-laundering, antiterrorism and know-your-customer regulations in developed countries.

4.1.2. Links with international trade and foreign direct investment

There is recognition of the role that the emigrants and diaspora communities can play in the facilitation of trade and investment in their country of origin. While doing so, diaspora is able to contribute to the growth of the private sector, and consequently to the technology transfer to his country of origin.

Within this framework, on the one hand, Gould (1994), Lloyd (1996), Head and Ries (1998), Saxenian (1999), Vertovec (1999) and Stalker (2000) found a statistically significant relation between emigration and trade: emigrants can stimulate the trade with their country of origin. Moreover, according to Rauch and Trindade (2002), 60% of the increase in the bilateral trade in the differentiated products within Southeast Asia can be allotted to the ethnic Chinese networks. Moreover, a research made by OECD on the immigrants in three key receiving nations and their

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8 Sander (2003).
source country found a long-term increase in the exports and the imports between them over the 1980s. More precisely, research finds that the transnational communities stimulate the trade (imports) of their country of origin. Moreover, a literature exists on the consequences of an increasing diaspora on the promotion of international trade. So a Canadian study found over the 1980s that an increase of 10% in the number of emigrants of a given country was associated with an increase of 1% in the exports to this country and an increase of 3% in the imports coming from this country. Also, Head and Ries (1998) examined the links between the Canadian trade and 136 countries by taking into account the origins of the immigrants from these countries in Canada. The two authors found that the qualified emigrants have a larger impact on the Canadian trade than the impact that refugees have. Indeed, their evaluations suggest a very great effect, in such way that the unfolding of the qualified immigrants of East Asia in Canada increases the imports of East Asia coming from Canada of almost 75%\(^{13}\).

In the other hand, Bugamelli and Marconi (2006) tried to identify the mechanism behind the technology transfer improving the growth. Their preliminary exercises showed that the positive effect of the qualified emigrations is in relation with FDI flows, which are largely recognized as an important channel for the technology transfer. This result complement in an interesting way a recent proof of Kluger and Rapoport (2005) on the positive effects of the qualified emigration on FDI flows. Moreover, according to Wei (2004), almost half of the 41 billion dollars in the FDI received by China in 2000 can originate in its diaspora abroad. Moreover, the highly qualified diaspora of countries such as India contributed to the growth of the information technology sector\(^{14}\) and to the FDI in its country of origin. The external FDI flow from the United States is strongly correlated with the stock of emigrants of the country of origin\(^{15}\).

4.1.3. Diaspora networks

The diaspora networks aim to establish and spur the communication and the exchanges between the members living abroad and to bind them to their counterparts in their country of origin. The progress on the educational, social, cultural and professional plans of their members is on the list of priorities. The latter are closely related to a main aim of all the diaspora networks, which is economic, political and social development of the countries of origin.

In order to make sure that the objectives mentioned above are achieved, the members of the network engage themselves in various activities and organize different educational, social and cultural events. So these development projects are concrete examples of the role that the highly qualified expatriate nationals can play in the knowledge and technology transfer from the most industrialized countries in which they work towards their country of origin. However, there is neither enough evidence that these types of projects are numerous nor enough information to evaluate the extent to which they are successfully set up.

4.1.3.1. Diaspora networks and technology transfer

Many developing countries have a number of highly qualified and educated professionals living abroad. Some see this fact as a negative result of brain drain; however, others see the knowledge and competences of these professionals as an economic factor potentially more important than the mobilization of any financial resource. While the externalities of the link diaspora-development imply a certain level of knowledge transfer, many mechanisms of technology transfer exist. In addition to those already seen (remittances and links with international trade and FDI), these mechanisms also include the diaspora networks. So the diaspora networks were created to spur regular contacts, opportunities for businesses and knowledge transfers with researchers, scientists and entrepreneurs in the country of origin. More precisely, for those who remain abroad, the “diaspora option” counts mainly on the creation of networks which return knowledge back to the country of origin, i.e. which facilitate technology transfer. In other words, the expatriates organize networks which stimulate backward knowledge flows and lead to collaborative ventures with the researchers of the source country\(^ {16}\). According to Meyer and Brown (1999), out of the personal relations between the emigrant and his parents and friends, formal networks are created in some developing countries with an explicit objective to spur knowledge and technology diffusion.

\(^{13}\) For a literature review in the context of the East Asian emigration of skilled workers, see also Lucas (2001a).

\(^{14}\) Kapur and McHale (2005b), Pandey and al. (2006).

\(^{15}\) Javorcik, Ozden, Spatareanu and Neagu (2006).

The Internet played a key role in this field. The majority of the diaspora networks have a discussion forum or a newsletter, that is to say a paper or an electronic version, to spur the communication between the members of the network and to inform these members about latest developments at home. Consequently, the mechanisms of technology transfer include the efforts to mobilize a digital diaspora through web-based portals, which take account of a sharing of knowledge between the professional diaspora and the counterparts at home. Altogether, Brown (2000) identified at least 41 e-based diaspora networks for 30 different countries, which were founded during the 1990s. The increase of the diaspora networks, in particular in sciences and technologies (S&T), during the last decades in the developing world indicates a new tendency. These networks tend to being rich agents of talents with high concentrations of members having advanced degrees. Admittedly, there is no simple evaluation of the effects of these diaspora networks, but they keep the promise of the facilitation of links which are able to help economic development. More precisely, these diaspora networks helped to reverse the brain drain phenomenon, facilitating the knowledge transfer from professionals abroad back to their homeland.

The diaspora networks are classified in 5 categories:
- Student/scholarly networks;
- Local associations of qualified expatriates;
- Assistance of Experts groups;
- Developing intellectual/scientific diaspora networks; and
- The United Nations of Development Program (UNDP) on the Transfer Of Knowledge Through Expatriate Nationals (TOKTEN): it was introduced in 1977. The program seeks to bring the knowledge, the expertise and the experience of the expatriates back to their country of origin. Indeed, the United Nations of development program on the transfer of knowledge through expatriate nationals uses the expertise of highly qualified expatriates by helping them to come back to their country of origin for short visits. These visits usually last between three weeks and three months during which the expatriates engage in various developmental projects or undertake teaching missions in local universities.

Moreover, on the other hand, the members of the network engage in conferences, seminars, workshops, etc. Besides, particular networks such as the Tunisian Scientific Consortium have specific periodicals in which the articles and the books written by the members of the network are published. The latter diffuse the research results and information and facilitate the dialogue and the discussion between the members of the network and between them and their counterparts at home. Also, the exchanges taking place between the members of the network and the national community can be of other types: scientific meetings, electronic data interchange or training courses. The latter do not always bring tangible, visible or immediate results and do not take into account a statistical evaluation. This is why it is difficult to determine the success of the diaspora networks according to their impact on the development of the country of origin. However, that does not mean that these exchanges are not significant.

4.1.3.2. Examples of the diaspora networks
A number of increasing initiatives were taken during the last years by several countries to identify, mobilize, organize and reconnect their expatriate researchers with the scientific community present on the national territory, of which here are some examples.

Within the framework of the network approach, among different countries, Colombia has probably been the country which offers one of the most advanced and promising examples, with its network “Red Caldas” of the expatriate researchers, implemented for a few years. More precisely, the “Red Caldas” network of Colombia was established with the assistance of the government in 1991. This network joins the members of the Colombian intellectual diaspora, between them initially, in the different places where they live, as well as with the country itself and their pairs, inside living in that country. The “Red Caldas” network consequently intends to be an extension of the national scientific community out of the borders, and an anchoring for it in the world internationalized science. However, if the idea is simple and tempting, it conceals a great complexity and important difficulties to concretize it. The first difficulty lies in the exercise of the constitution of the diaspora: the “Red Caldas” network is being slowly and gradually built, because the identification and the localization of the Colombian expatriate intellectuals are to be made from the beginning. A second difficulty is to manage to gather these individuals by local “knots” and to organize relations with Colombia. For people having left Colombia since more than 30 years, an identification with the relative stakes to national development is not automatic and immediate. There is an important work to mobilize this volatile population in a collective work. Lastly, it is hardly easy to put into distance communication the authorities and the people who were unaware of themselves or who lived in distinct worlds before creation of the
network. An electronic forum allows the circulation of information among all the members of the network who are connected to Internet. In spite of the difficulties of its implementation, the “Red Caldas” network works and develops. So the “Red Caldas” network was one of the first diaspora networks having succeeded in the promotion of a collaborative research between the domestic scientists and the Colombian researchers abroad, through workshops and symposiums, joint research programs, visits of researchers, scientific events, publications and research and training opportunities17. More precisely, for example, French and Franco-Colombian researchers come to ensure training courses in Bogota, the Colombia’s capital; the Colombian intellectual community in New York collects scientific works and equipment to be sent to Colombia; the one in Belgium organizes and carries out conferences cycles on the scientific cooperation between the European Union and Colombia, etc. Through all these actions, the “Red Caldas” network is going to be ever structuring and extending itself. It now constitutes the most developed version of a “diaspora option” of brain gain, which attracts more and more countries hoping to capitalize on their intellectual resources placed outside.

By taking account of the fact, as it was previously indicated that there was a proof that 41 e-based diaspora networks have existed and have entirely represented the diaspora communities of the world, other examples of the diaspora networks, in addition to the one of Colombia, are to be evoked. These examples include the Brain Drain Project in Serbia and the South African Network of Skills Abroad (SANSA). At this level, one of the best known diaspora networks binds the qualified people living abroad who were interested in the contribution to the economic and social development of South Africa with the local experts and projects. The South African Network of Skills Abroad is an example of an active network with more than 2000 members in more than 57 countries, with an expertise in hundreds of specializations in a number of professional sectors.

In the same way, the scientific diaspora of Popular China, particularly large in North America, organized itself on this continent in a dense network using electronic communication as a privileged means of exchange. This network, on standby of reconnection with the scientific community present on the national territory, undoubtedly represents a formidable potential for the future.

Moreover, the repertories of national researchers working abroad were worked out or are in the phase of constitution in the cases of Chile, Colombia, South Korea, Ethiopia, Eritrea, India, Israel, Romania, Singapore and Taiwan.

Several conferences were organized during the last years in a number of countries of the East (like Romania in 1994) and of the South (like Morocco in 1993 and Colombia in 1994) with an aim of gathering the scientific diaspora dispersed throughout the world and of arousing collaborations with the national scientific community. Several conferences were also organized in countries with strong concentration of the scientific diaspora abroad. It is the case of Eritrea which organized a conference in the United States at the beginning of the year 1995 with an aim of mobilizing its expatriate scientists in this country.

A big number of expatriate researchers associations have also recently developed on the initiative of these researchers, of which for example are the Ethiopian Researchers Association in the United States and the Scientists Latin-American Association. Various associations have established for several years summer schools or joint research programs, like the one of the Uruguayan researchers in biochemistry centered at the Institute Pasteur of Paris or that of the Franco-Vietnamese friendships.

Non governmental organizations also invest themselves in these efforts of mobilization of the expatriate researchers. It is the case of the Third World Academy of Sciences and the Third world foundation of North America. This last foundation lodged by the University of Maryland in the United States undertook to identify all expatriate researchers working on the American territory while starting with the researchers originating from India.

Lastly, less formal networks played an important role in the transition of South Korea, Taiwan and China from developing economies to high-income economies.

The fact that many countries have at the same time established diaspora networks, with comparable characteristics and structures, would indicate that the “diaspora option” is a significant strategy. To our knowledge, none of these networks was dissolved; the fact that they still exist today, although some of them are not so dynamic according to activities and projects, means that the objective of their creation did not disappear and that they still benefit from a certain form of support. Moreover, all these diaspora networks achieved their initial goal of mobilization of highly qualified expatriate human resources for various successes.

17 Chaparro, Jaramillo and Quintero (2006).
All in all, the scientific diasporas represent a new approach of brain drain. For the developing countries, these diasporas constitute an enormous potential of additional resources. Moreover, they are strong potential resources for an effective and mutually beneficial cooperation between these developing countries as countries of origin of these diasporas and the highly industrialized countries as host countries: on the one hand, the country of origin profits from an additional capacity brought by its expatriates; on the other hand, the host country does not lose anything since the work of the scientists and the engineers inside its borders remains where they are. Being implied in their homelands, the diasporas can play a crucial role as “agents of change”, injecting new ideas and resources which are able to catalyze progress in stagnant economies. The objective of implication of these emigrants and diaspora communities in the development process would be the same as any development agenda: Promote a long term and sustained economic growth. However, these benefits of the “diaspora option” differ between the developing countries. Indeed, the benefits of reverse capital flows, trade with the countries of origin and technology transfer, as identified in the cases of India and Philippines, are probable to be small in the majority of the least developed African countries.

4.2. Return Option

4.2.1. Return option and technology transfer

4.2.1.1. The permanent return of permanent immigrants and technology transfer

4.2.1.1.1. Direct investments

The idea that the returnees can become a direct source of investments was advanced several times before. Indeed, a certain proof is accumulated through the years indicating a larger tendency than on average, the immigrants come back to choose an entrepreneurial activity. More recently, Dustmann and Kirchkamp (2002) noted that more than a half of the Turkish returnees remain active in the economy with the majority of them engaging in entrepreneurial activities. Moreover, Black and al. (2003), among others, noted the centrality of the savings in the creation of opportunities for the investment with the return. Rather than simply investing from afar, the two authors support that the individual immigrants having generated a capital surplus, although abroad, will have an opportunity to devote themselves to the creation of a new company on their return. Moreover, Ilahi (1999) found that the level of the savings is positively correlated with the choice of self-employment on return, while Mesnard (1999) found that the majority of the entrepreneurial projects undertaken by returns of Tunisians were completely financed through savings abroad.

4.2.1.1.2. Human capital transfer

Apart from the direct investments, the returnees also bring with them crucial human capital. The Barrett and O’Connell’s study (2000) has concluded that “the returned migrants accumulate skills and competencies while away that are rewarded on return to the home country”. More recently, Sjenitzer and Tiémo (2003) have concluded that “migration, followed by a return to self-employment and the creation of a small business, can represent a potential strategy for poverty alleviation”.

4.2.1.2. The permanent return of temporary immigrants and technology transfer

The current literature also examines how the temporary returning immigrants facilitate the inflow of direct investments and human capital, although with the least degree. The case study of Basok (2003) on the Mexican seasonal emigration in Canada found that the Mexican migrating workers have currently invested in the agricultural land and the small companies at home. It has also noted that even the investments in certain “non productive” activities are also probable to stimulate the development since there are effects such as the increasing demand for the material and the work and/or the improvement in career perspectives of the population. The return phenomenon of the immigrant in the current literature was resuscitated not only with a more positive point of view but also with a transnational tone. In the current discourse, the return is not only supposed as permanent but would be also temporary and even cyclic.
4.2.1.3. The temporary return of permanent immigrants and technology transfer

4.2.1.3.1. Direct investments

Saxenian (2002), in a Silicon Valley’ study, found that many Chinese and Indians immigrants come back regularly to their native country for businesses objectives. Moreover, according to Saxenian (2005): “these cross-regional technical communities have the potential to jumpstart local entrepreneurship, and they succeed over the long term to the extent that they build alliances with technical professionals, businesses, and policymakers in their home countries”.

4.2.1.3.2. Human capital transfer

The temporary returnees do not generate only an inflow of direct investments but also of human capital. As Lowell and Findlay (2001) noticed, certain researchers prefer to use the term “brain circulation” to qualify this type of return. For example, Saxenian (2005) noted that there is “substantial evidence that the 'brain drain' from developing countries such as India and China has been transformed into a more complex, two-way process of 'brain circulation' linking California’s Silicon Valley to select urban centers in India and China”. Moreover, Martin (2004) observed that perhaps there is a new era of ‘brain circulation’ between the Asian countries and the United States.

4.2.1.4. The temporary return of temporary immigrants and technology transfer

The literature stresses also the tendency of temporary immigrants to come back at home only temporarily. In this case, the temporary immigrants only come back to emigrate again: at this level, it’s mainly about a negative circularity. From a developmental perspective, the temporary return has in this case a limited even negative impact. However, it is important to note that the remigration is not perceived in an entirely negative way, at least by the emigrants themselves. As Ellerman (2003) noted, the decision to work abroad is sometimes a “career choice” and not just a “temporary measure to acquire capital or knowledge”. Seen from this perspective, the permanent return before the retirement would be interpreted by the immigrants themselves as “a failure in their chosen career”.

Generally, the contribution to the development process of the migrants who return, temporarily or definitively, to the country will depend on their aptitudes and their degree of preparation, as well as the socio-economic and institutional conditions of the country of origin. The return of migrants to the country will influence, according to any probability, more concretely the development process if, at an individual or collective capacity, by the means of their knowledge network, they succeed in benefiting from the social capital of their country of origin and of the country of destination. In all, the migrants can be agents of economic, technological and social change.

4.2.2. Examples of the Southern countries

It is not by chance or coincidence that the countries which benefit the most from return option are not only the big developing countries such as India and China, but also the new industrialized countries of Asia such as Singapore, South Korea and Taiwan\(^\text{18}\), insofar as these countries have Sciences and Technologies and industrial sectors who are already enough advanced and where the qualified population has many possibilities to pursue the innovation and the production. So more attention in the empirical literature was given to the role of the return option in the improvement of the competences levels and the promotion of the technology transfer and the capital accumulation, in particular in the successful economies of the East and South Asia since 1990s\(^\text{19}\). However, the discourse on the return option is also extended beyond the Asian Continent to concern other parts of the developing world. An example at this level is the role of the returnees in the economic miracle of Ireland: from 1993 to 2001, the Irish economy grew with an amazing annual attract of 8.4\%, that is to say three times the remainder of the European Union. Moreover, McCormick and Wahba (2002) showed that the qualified immigrant, while coming back to its country of origin, Egypt, establishes a new company making use of new advanced technologies, as far as the qualified immigrants, who learned how to use new technologies abroad, can directly transfer their knowledge at home. More recently, according to McCormick and Wahba (2003) and Wahba (2007), the immigrants coming back to Egypt tend to have higher levels of human capital than non immigrants and are probable to be more entrepreneurial as the period of their work abroad is long. Lastly, according to Logan (2009), in the case of the brain

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\(^{18}\) Charum and Meyer (1999).

\(^{19}\) Saxenian, Motoyama and Quan (2002).
gain from the North to the South, the African country obtains the competences of the expert returning to his country of origin and is able to use them for national development efforts.

Consequently, the southern countries need the repatriates to bring back technology in order to improve economic development. Thus, if the countries of origin or of the South need their nationals to come back and bring technology, they must develop an adequate scientific, technological and businesses environment which will provide remunerative opportunities for the return of individuals having improved their competences abroad.

4.2.3. Policies encouraging the circular migration

The onset of the brain gain depends mainly on the state of the development of the country and also the strategies and the planning over a long period of time to reverse the migration. At this level, the majority of the initiatives encouraging circularity are initiated by the governments of the countries of origin and aim specifically at the return of the immigrants and the highly qualified permanent members of the diaspora. Indeed, more precisely, in the past four decades approximately, certain governments of the South initiated policies and programs encouraging circularity among the immigrants and the permanent members of the diaspora. These policies are formulated to attract the returnees directly, mainly through the supply of a whole set of incentives, or to accomplish the same objective indirectly, by generally taking legal measures to encourage the return such as the supply of a dual nationality and flexible residential rights.

4.2.3.1. Direct policies: The reverse brain drain model

To attract the return of the highly qualified nationals, several governments of the South adopted a range of policies with striking similarities. Indeed, the majority of these governments, in addition to the supply of material and non-material incentives, establish a lead coordinating body, research institutes and/or science parks, as well as networks and a database to connect the expatriates to the local employers and colleagues.

4.2.3.1.1. Offer of material and non-material incentives

Some governments of the South offered an array of incentives to entice potential returnees. Taiwan and South Korea’s return programs identified “high flying individuals”, using criteria such as the number of years since PhD, the current position, the number of published papers and the relevance for the national priorities. The governments of these two concerned countries did not only offer to the selected individuals a research autonomy and an opportunity to establish their own firms, but also a variety of incentives including moving costs (which was dropped in the 1990s), salary top-up, subsidized house-purchase mortgages, and the like. There are also programs tending to attract the nationals at home for one-year shorter visits. Similarly, in China, a new service center for returnees was established in 1989, providing allocations for the housing of returnees, duty-free purchases of computers and automobiles, and offers of return airfares for self-financed students.

4.2.3.1.2. Lead coordinating body

Some governments of the South also assigned or created a lead coordinating body to organize their initiatives. For example, efforts were coordinated by the Ministry of Science and Technology in Korea and by the National Youth Commission (NYC) in Taiwan. The latter enjoy a constant budgetary and administrative support from the government. In the same way, Uruguay created the National Commission for the International Organization for Migration (IOM), which contributed to the reintegration of all the types of returnees, although it played a particularly important role in the reintegration of scientists and professionals with ties to the academic world. Likewise, the Ethiopian government established the Ethiopian Expatriate Affairs General Directorate in the Ministry of Foreign Affairs, and the Ethiopian Expatriate Support and Coordination Office as part of the country’s capacity-building efforts. Similarly, Ivory Coast established a department at the Ministry of Foreign Affairs to deal specifically with nationals living abroad.

4.2.3.1.3. Research institutes and/or science parks

One of the pioneers is the Korea Institute for Science and Technology established in 1966. This was followed by several other R&D institutes and engineering schools concentrated in the Seoul Science Park and Daeduk Science

20 It should be noted that China endeavors today to set up strategies to make return its researchers, more than it seeks to structurally profit from its scientific diaspora.
Town. Similarly, the Taiwanese undertook “to improve and strengthen the institutions of higher learning” by supporting centers such as the Hsinchu Science Park. These research institutes track the highly qualified nationals abroad and encourage them to come back or at least to join professional associations of expatriate Korean or Taiwanese scientists and engineers. Moreover, a certain number of science parks, specific development zones and high-tech zones were established in Beijing in China as well as in the majority of the Chinese provincial cities since the 1990s. While being based on experiments in Asia, Hansen and al. (2002) noted that in 1995, the Colombian institution of promotion of sciences “Colciencias” has established centers of excellence to stop the emigration and to encourage the return among highly qualified nationals abroad. Four centers were selected based on their capacity to train researchers and on their contribution to their respective scientific fields. Hansen and al. claimed that “given the successful outcome of similar policies outside the LAC region, such an initiative is expected to reduce the current brain drain in Colombia”.

4.2.3.1.4. Set up and maintain networks and database

The governments of South Korea and Taiwan have also established networks and maintained a database conceived to help the national researchers abroad through a public or private work at home and to help the domestic employers to identify the highly educated nationals abroad. Colombia has established a similar network in 1992, which currently has members in 30 countries. It spurs joint research projects, in fields such as biotechnology and robotics, mainly between the European and local universities. Uruguay has also the same program in place to imply some of its 400,000 highly educated immigrants. In South Africa, the government has established the South African Network of Skills Abroad (SANSA) to connect expatriates with local experts and projects. It is maintained by the National Research Foundation, the government’s national agency responsible for promoting and supporting basic and applied research as well as innovation. The network is built on a database containing information on the localization, the qualifications and other characteristics of the South African highly qualified living abroad. The participants can take share in the network by receiving South African graduate students in the laboratories or the training programs, by participating in the formation or research with the South African counterparts, by facilitating businesses contacts or by imitating research and commercial projects. There are other incentives focused on specific sectors such as health and law, as well as of the databases of the members of diaspora maintained by particular countries including Nigeria, Benin, Burkina Faso as well as South Africa.

4.2.3.2. Direct policies: Business model

Apart from returnees with human capital, the governments also showed the interest in the attraction of returnees with the financial capital. For example, Hsing (2003) noted that since the late 1980s, China has offered generous investment packages to overseas Chinese in an effort to combine sentiment and incentives to attract investment from the diaspora. The author also showed the key role of the local governments in the attraction of the investors of Taiwan: “They have simplified the process and regulation of investment and made concessions in taxes and fees for Taiwanese investors. Such flexibility… was crucial to the success of Taiwanese investment”. Another example is that of the former Federal Republic of Yugoslavia, which encourages the return of the qualified nationals who bring back the capital to invest in productive companies, although its interest is focused on few wealthy expatriates who would buy entire companies. Finally, Ostergaard-Nielsen (2003) noted how local officials offer a hero’s welcome to investors who come back.

4.2.3.3. Indirect policies: Dual nationality and flexible residential rights

The governments of the South also adopted indirect policies aiming at creating a legal atmosphere conducive to return. That is mainly done through the adoption of dual nationality and/or flexible residency rights allowing a much easier re-entry to the country of origin. According to Jones-Correa (2001), in 2000, a certain number of the developing countries have in fact adopted a certain form of dual nationality or citizenship laws: it is about 10 countries in Latin America including Brazil, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Mexico, Panama, Peru and Uruguay. Generally, in the developing world, there is an increasing discussion in connection with the potential benefits of these indirect policies.
At the level of the results of these policies of repatriation, as Cervantes and Guellec (2002) bring it forward: “the harsh reality is that only a handful of countries have been successful in luring their talented émigrés back home”. Within this framework, the “dragons” of South-East Asia are the champions of brain gain. They organize systematic reintegration for their nationals trained abroad. It is consequently about a physical transfer of the person, from his laboratory in a country of the North to a new establishment, reconstituted, in his country of origin. Among the latter, it is probably South Korea and Taiwan which set up the most efficient policies of repatriation. These two countries, in addition to Malaysia, were more recently followed by India and China. In all these cases, it is about voluntarist and incitative policies which engage to preserve the autonomy of the researchers and their membership in the international scientific community. Moreover, according to Goudineau (1994), Singapore also developed an extremely voluntarist policy, seeking to create a scientific “compost” for some of its selected researchers in order to form a small number of “poles of excellence”, by authoritatively making back home students sent to be formed abroad and by surrounding them by high expenses recruited experts. However, there were several cases of failure. At this level, the least developed countries would consequently aim short term visits by qualified professionals, since it is there that political initiatives are most probable to succeed. They can imply teachers and professors giving courses, engineers providing specific inputs in sectors concerned with their field of expertise, etc. Such actions can make a significant difference to the specific development projects and programs. The qualified people selected among the diaspora have an advantage compared to other international experts according to their comprehension of the local circumstances.

The policies of repatriation are not only and exclusively the field of the governments.

4.2.3.4. The role of international organizations

International policies put a bigger emphasis on brain gain via the returns. The interest was related to the maximization of the brain gain while working with the diaspora, spurring incentives for the qualified immigrants to come back in a permanent way. The International organization for migration was in the foreground of these efforts. For example, the IOM (2002) implemented programs of return of talents to Africa such as The Return of Qualified African Nationals (RQAN) program, and later The Migration and Development for Africa (MIDA) program, with the main objective of “mobilizing, and promoting the utilization of highly qualified, qualified and skilled personnel in the development of African countries through voluntary programs”. The IOM also initiated similar programs in Latin America such as The Reintegration of Qualified Latin American Nationals (RQLAN) program, and more recently in Afghanistan with The Return of Qualified Afghans (RQA) program. Generally, the IOM, in collaboration with the governments of the countries of origin, identifies suitable candidates, finds them employment, finances their return, and assists with their reintegration. To attract potential returnees, motivations such as tax exemptions, financial assistance with moving costs, seed capital for starting a business, and even citizenship rights for spouses and children have been introduced.

Although the degree of success of the programs evoked previously is still highly debatable, the IOM has for example succeeded, between 1983 and 1999, in relocating about 2000 expatriates to 11 African countries. A similar example is the United Nations Development Program (UNDP) on the Transfer of Knowledge through Expatriate Nationals (TOKTEN). It allows professionals, with a minimum of a master’s degree or equivalent, and a significant amount of professional work experience, to return to their countries for a short period of time to impart skills acquired while abroad. In lieu of professional fees, TOKTEN consultants collect daily allowances, are reimbursed for travel expenses, and receive medical insurance. TOKTEN is particularly active in the West Bank and Gaza. Since its inception in 1994, more than 400 Palestinian expatriate professionals have served in senior advisory and planning positions in various key Palestinian Authority ministries, leading Palestinian institutions, nongovernmental organizations, and private sector institutions. Moreover, nearly 18% of TOKTEN consultants have decided to return to the occupied Palestinian territories permanently.

4.2.3.5. Policies of the developed countries

While the growth of the permanent admissions in the developed countries has slowed down, the number of temporary workers grew more quickly during the XXI century. That is a result of a new emphasis on the return

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22 Wickramasekera (2002), pp. 11-12.
option as a part of effective migration policies instituted by the countries of destination of the North in Europe and America. Within this framework, in the recent years, the international immigration policies of the developed countries of the North showed a tendency to even encourage the highly qualified immigrants of the developing country of the South not to settle in a permanent way in the country of destination, but to circulate or shuttle between temporary modes of stay (in the host country) and of return (to the country of origin). Thus immigration came to replace continuously the older generations of human capital by younger ones, and consequently to keep the young profile of age of the immigrants, particularly to neutralize their ageing own structures of population. Thus, the age is the primacy of the temporary emigration.

The incentives for the immigrants for a return at home were offered by some European countries. Indeed, France, Italy and Germany have provided loans, training and technical assistance to the immigrants. For example, France has provided loans to the immigrants of Mali and Senegal to establish companies in their country of origin. However, the small size of the programs, the lack of experience in the establishment of companies and the weak economic conditions at home reduced the effectiveness of such programs. All these factors need to be taken into account whether such programs have a significant influence on the return of the immigrants and the impact of their return on the domestic economies.

In all, the diaspora and return options together help to promote the technology adoption. The political commitment of the diaspora in the domestic countries can also improve the local technological absorptive capacity through the return and by exerting from afar a pressure on the politicians of the home country. At this level, for example, the Taiwanese diaspora and the Taiwanese returning migrants were active channels for technology transfer: according to O’Neil (2003), in 2000, 113 out of the 289 companies in the Hsinchu Science-based Industrial Park in Taiwan were launched by Taiwanese educated in the United States. In parallel, the diaspora networks played an important role in the transition of Taiwan from a developing economy to a high-income economy. It’s the same for South Korea and China.

Brain gain, through the diaspora option and the return option, being political answers to the highly qualified emigration or to the brain drain, can be associated with other answers to constitute the “six R”, which are:
1. Return of migrants to their source country;
2. Restriction of international mobility: Many developing countries have restrictive emigration policies, which consist in the restriction of the immigration of foreign nationals to protect their domestic workers from competition;
3. Recruitment of international migrants: If there are domestic shortages of skilled workers, for any reason, why not court foreign workers? For example, the information technology revolution sparked a worldwide competition for workers: new policies worldwide facilitate digital and “protective” regulations on admissions;
4. Reparation for loss of human capital (Tax): It is about a preferred economic prescription but which was never implemented in the 1970s. The idea is that the developed countries either compensate source countries, or more precisely that the emigrants directly submit taxes, to deal with externalities created by the immediate loss of human capital;
5. Resourcing expatriates (Diaspora option);
6. Retention through educational sector policies: Creating a highly educated workforce begins with strengthening domestic educational institutions. A viable educational system which encourages graduates to stay with the system, i.e. which retains people, ensures that the source country keeps its original investment in education. The fact of giving a reason to people to remain is undoubtedly the most effective policy for reducing emigration and the surest long-term means of boosting average human capital, as well as economic growth.

5. Conclusion

Brain drain is indeed a model: it is used explicitly or implicitly as reference to a number of works on the North-South relations and on geopolitics of Science and Technology. At this level, the brain drain experimented by several countries in the developing world can be transformed into a repatriation of knowledge and know-how, in particular

when it is about a brain gain. For this reason, generally, the brain drain is not nowadays regarded any more as a plague which can affect the developing countries, especially if it is considered that the induced even indirect or feedback effect of the brain drain dominate the direct effect; what is not the case of the least developed countries for example, which are the most probable to suffer from the brain drain rather than benefiting from the brain circulation, the brain gain or other positive effects probably associated with the emigration. Any way, and by considering the importance of the circumstances in the countries of origin, the key with the reduction of the costs of the brain drain and with the increase of the benefits of the brain gain is related to the economic and political conditions and the policies adopted in the countries of origin.

References


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