

HOW TO TURN BRAIN DRAIN INTO BRAIN GAIN

POLICIES TO SUPPORT RETURN OF RESEARCHERS AND SCIENTISTS TO THEIR HOME COUNTRIES

Yvona Kostecká, Josef Bernard, Věra Patočková, Tomáš Kostecký



How to Turn Brain Drain into Brain Gain

How to Turn Brain Drain into Brain Gain

**Policies to Support Return of Researchers
and Scientists to Their Home Countries**

Yvona Kostecká, Josef Bernard, Věra Patočková, Tomáš Kostecký



Institute of Sociology AS CR
Prague 2008

This study was reviewed by:

Doc. RNDr. Dušan Drbohlav, CSc.

PhDr. Jana Vavrečková

This study was supported by the Ministry of Education, Youth and Sport of the Czech Republic, grant No. 2E06015, "Obstacles and opportunities factors influencing the decisions of Czech scientists about return to the Czech Republic from abroad." The study was supported also by the Research Plan of the Institute of Sociology of the Academy of Sciences of the Czech Republic "Sociological analysis of long-term social processes in Czech society in the context of European integrational policies, development of the knowledge-based society and of human, social and cultural capital", No. AV0Z70280505.

Contents

Abstract	7
Introduction	9
1. The International Migration of Scientists and Researchers, Its Specific Features, and the Attempts to Influence It.....	11
2. The Policies to Influence the Migration of Highly Educated People	19
2.1. Restrictive, compensatory, and stimulation policies	20
2.2. Recruitment policies	25
2.2.1. Supporting policies for the recruitment of foreign scientists	26
2.2.2. The assessment of recruiting policies for foreign scientists.....	31
2.3. The policies supporting return of skilled labor force from abroad back to a homeland.....	34
2.3.1. The policies supporting long-term returns	36
2.3.1.1. The sandwich programs.....	37
2.3.1.2. Scholarship for the stays abroad with the condition of return	40
2.3.1.3. Return grants for those who completed a stay abroad.....	45
2.3.1.4. Reintegration programs	49
2.3.1.4.1. Multinational programs	49
2.3.1.4.2. European national programs.....	54
2.3.1.4.3. Non-European national programs	65
2.3.1.5. Internet information portals.....	75
2.3.2. The policies supporting short-term returns	79
Conclusion	87
References.....	91
Subject Index	97
About the Authors	101

Abstract

In order to compete in the global labor market of top-qualified workers, many states introduce various types of targeted policies to improve the migration balance of highly qualified workers. The book offers a systematic review of the policies used by different countries in an attempt to encourage scientists and researchers working abroad to return to their home country or in an effort at least to make it easier for information, know-how, and experiences acquired abroad to be passed on back home. This study is based on an analysis of scientific literature, texts published by institutions organizing various forms of return programs, websites with information for potential program participants, and personal correspondence and interviews with professionals working in this specific field.

Experience with applying policies aimed at influencing the migration of highly qualified workers indicate that the best chance of success is enjoyed by those migration policies that employ a complex design, combining an individual approach, targeting an individual scientist, and a structural approach, aimed at changing the domestic science and research environment. Typically, the programs tend to be successful in middle income or high income countries that have a sufficiently strong domestic foundation in science, and have an economy that shows signs of stable growth.

Keywords

Migration of highly skilled, the return of scientists and researchers, migration policy, programs supporting return.

Introduction

Competitiveness and increase in life standard can not be secured in a long term without a large part of highly professional work, high investments in research and its application in the form of innovations, i.e. without construction of the type of economy called “knowledge economy” [Key Figures... 2005]. This type of economy depends fully on the knowledge of highly skilled people. Unsurprisingly, there is a rising demand for such people. In the globalized world, this demand is reflected (among other facts) in a steadily increasing ratio of highly skilled persons among foreign migrants [OECD 2002]. This is one of the reasons why the matters related to potential “brain drain” or “brain gain” are becoming an important issue for scientists as well as politicians [Koser, Salt 1997; Brain Drain... 2000; OECD 2004; Özden, Schiff 2006].

In the quest of holding out at the labor market with the most skilled workers, many countries introduce various types of targeted policies to improve migration balance of highly skilled [McLaughlan, Salt 2002]. The traditional measures could be roughly described as an effort to retain the domestic highly skilled workers and an effort to gain the foreigners by facilitation of their immigration. Besides these, attempts on other types of policies are getting more frequent, based on the targeted effort to re-employ the abilities of highly skilled people who had gone abroad. These policies in practice lie either in the support for creating networks of home and exiled workers in certain professions (usually scientists and researchers – see [Meyer, Brown 1999]), or in a targeted support for the return of highly skilled people from abroad back home [Hugo 2004].

The text hereby presented to the readers is a structured review of information about policies implemented in various countries in order to encourage scientists and researchers working abroad to become more involved in home science, facilitate the transfer of information, know-how, and experience from abroad back to their home country, or possibly motivate them directly to come back home. When compiling this text, we relied on four different informational sources: texts published in scientific literature, texts published by the institutions involved in the programs of this kind, information websites, and personal correspondence and discussions with professionals in this field. Since these problems are rather topical, new activities, policies and programs appear continually. The information

brought about in this text may therefore be subject to a certain obsolescence and for the same reason they cannot be completely exhaustive.

In order to facilitate the orientation in the text, we set the structure as follows: First we render a brief introduction into the subject of international migration and basic characteristics of the migration of highly skilled. The main attention is paid to the policies focused on the influence on the migration of highly educated people. We distinguish various types of policies and briefly describe their basic features and differences. The core of our work consists in a detailed description of the policies aimed to the return of highly skilled from abroad back to their homeland. As a conclusion, we'll try to summarize the information gathered and identify the conditions under which the described policies may be successful.

1. The International Migration of Scientists and Researchers, Its Specific Features, and the Attempts to Influence It

Cross-country migration has always been an important aspect of the human civilization. The migration of whole nations and ethnic groups gradually changes into migration of families and individuals. In spite of that, the numbers of migrants do not decrease, rather on the contrary. At the present time, there are many more people in motion than there have ever been in the history. According to the International Organisation for Migration (IOM),¹ 192 million of people, or 3% of the total population of the world, today live outside the country where they were born. The target migration communities have always tried to regulate the migration in some way. They adopted restrictive measures in order to either regulate the total influx of strangers, or to block the entrance to the country for undesirable classes (poor or sick people, criminals). On the other hand, almost always there have been exceptions – some individuals or groups were accepted without any greater problems. These were especially the cases when the immigrants brought wealth, knowledge, skills, and culture [Kabeleová 2001]. The call for these outstanding individuals today is stronger than ever before since they are a key stimulus for the development of society and for the future competitiveness of individual countries. It is therefore expected that a “war” [Iredale 2001] for qualified labor force, especially scientists and IT engineers, will form an important part of national and supranational policies. It is still more often to be heard [Mahroum 1998] that migration at the present time is really a matter of quality rather than quantity because the migration of “brains” has the largest impact on the national economy.

The migration of scientists and researchers is to a great extent specific. As migrants, the scientists differ from both the common population and from other highly educated migrants. The difference from the common population consists especially in their high education and very scarce numbers. Under normal conditions there is nothing like a “mass migration” of scientists. Scientists work legally in a host country, none of them being an “illegal immigrant”. For the most part, scientists come to the target country with a work contract previously

¹ <http://www.iom.cz>.

signed and with a precisely defined salary. There are practically no cases that scientists or members of their families upon the entrance to the target land would turn reliant on living off welfare or any other form of state support, which is quite a common phenomenon in the case of many other migrants.

Since most of the grant providers and most of the potential employers in target countries take into consideration that a large share of scientists travel with their families, they accordingly adjust the amount of their salary. That is why it is more common for the scientists to leave for another country with all their families than it is for other migrants. The presence of their family is then usually an advantage for their integration into the society. Their children attend local schools, learn the language of the host country, and have friends in the neighborhood which in consequence contributes to an easier integration of the whole family. Of course it is also their intelligence that helps the scientists in integrating to the new society. Foreign scientists have fewer problems in mastering a new language and they are more capable to orientate in the host society. Thanks to their higher social intelligence, these people also make contacts more easily. Therefore, in most cases they do not have any troubles with the local community. As a result of all these factors, the presence of scientists and their families in a host country usually does not create any social tension. This type of migrants is better accepted in a target land so that the governments can afford to employ less regulation on their migration, or even to support it, without provoking a negative reaction of the public [Hansen 2004].

However, the migration of scientists is particular in certain aspects which are even different from the migration of other, highly educated “non-academic” migrants. While major part of highly educated labor force make for the largest cities the scientists are not attracted by them unless they are also seats of renowned research institutes. The geographical localisation of a target place itself is of reasonably little importance to the scientists. They prefer the attractiveness of the research institute to the attractiveness of the locality [Straubhaar 2000]. Since different disciplines have their centers of excellence in different places, also the migration trajectories of the different scientists vary. Each scientific profession has its own specific territorial migration features. Another important difference of migrating scientists in comparison to the migrants of non-academic elites is an unusually high function of their own social networks in which they are engaged already before the migration [Baláž, William 2004]. The scientists keep in a direct touch with their colleagues and institutes from abroad and these contacts represent the most usual channels of their later migration [Brandi, Cerbara 2004]. In spite of the fact that some scientists come to a foreign country on the basis of a bilateral contract or a recruitment for a job

vacancy, most of them travel abroad invited by host institutes which maintain a long-term professional contact with them. Brandi and Cerbara [2004] studied the immigration of foreign scientists to Italy and they discovered that most of them had come to Italy on an invitation of some scientific institute. Those coming on an invitation were motivated primarily by interesting possibilities of study and science, excellent equipment of Italian workplaces, and a good level of Italian science in a particular field. The importance of social networks for the migration of scientists is highlighted by the practice of many scholarship institutes (Fulbright Commission, Marie Curie Fellowships) which require an invitation of a host institute be enclosed to the scholarship application. It is only natural that the scientists prefer to communicate these affairs with the institutes they are in contact with. The scientists in a closer contact with the international scientific community have a better chance for migration. Vavrečková [2005] studied potential migration of Czech highly skilled academic workers to foreign countries. While for most of other highly educated migrants the most important aspect is the salary in a target country, or the difference between their earnings in the homeland and their potential earnings in the target country [Vavrečková et al. 2006], the academic workers are motivated to migrate especially to prestigious, top equipped institutes, and by the opportunity to partake on interesting research projects. Also the salary offered is important to a certain extent but always in combination with the quality of the research institute. If the prestige of a host institute is substantially higher than the prestige of a home institute, a scientist may decide to leave even though their salary will not increase at all. If the prestige of an institute in target land does not compare to the prestige of their home institute, a scientist may not be induced to leave even if the salary could be much higher [Pearson 2001].

In the context of migration we often hear about brain drain. The term brain drain itself has no unified definition in the literature. Some definitions suppose brain drain to be simply the fact of highly skilled² leaving a country which has a consequence that “brains are being lost” [Paterlini in Ackers 2005]. Certain definitions also take into consideration the extent of such migration, for instance

² The OECD Canberra Manual [1995] defines the term ‘highly skilled’ as human resources in science and technology (HRST hereafter), referring to those individuals who comply with one of the following characteristics: individuals who have successfully completed third level education, which implies at least 13 years of schooling within an area of science (knowledge) or technology (application of knowledge); and/or those persons who may not necessarily have had such an education, but who are employed within an area of science or technology and who hold positions that normally require tertiary education.

Adams [2003] uses the term brain drain only when more than 10% people with the third level education are lost. Sometimes brain drain is understood as a negative result of migration process when the influx of skilled people is notably lower than their outflow [Hansen 2004]. And some definitions are even more limited: For example, Lowell et al. [2004] assume that a country may only be labeled as suffering from brain drain when there is a significant outflow of skilled labor force and this fact has a negative impact on the economic development of the country.

The use of the word brain drain attracted people's attention towards this phenomenon which itself had existed long before it was named like that. It also led to a higher effort to solve the problem and it became a topic of the UN conference "*On Trade and Development*" in 1972. On the basis of the discussions about brain drain, developing countries raised two main requests:

1. They demanded approval to discourage their skilled citizens from leaving abroad and to encourage their emigrants to come back home.
2. The second request was taxation of the migration of skilled labor force which would at least partially reimburse the loss of developing countries created by the emigration of this labor force abroad [Hansen 2004].

Thus it was articulated for the first time that countries have the right and duty to influence the problem of migration of highly skilled, and also for the first time certain types of policies were determined which could be possibly employed to influence the migration. However, for several different reasons the policies proposed have never really been adopted. Firstly, developed countries did not agree with the taxation of the migration of skilled labor force, with reference to the Universal Declaration of Human Rights, article 13: "1. Everyone has the right to freedom of movement and residence within the borders of each State. 2. Everyone has the right to leave any country, including his own, and to return to his country." [United Nations 1948]

Along with that, the use of the term brain drain ran up against some practical problems: For example, there was no consent about which countries should be considered developing and which developed, as well as no general agreement was achieved as for the definition of highly skilled labor force [Boussaid 1998].

At first all the discussions about brain drain followed exclusively the concept of the human capital, proposed by Gary Becker [1964]. In his opinion, all education, qualification, skills, proficiency, and competence possessed by an individual is human capital. Although human capital is a private property, states contribute to its development by the means of investments to the education of their citizens. Naturally, the states also expect returns from their investments,

especially in the form of taxation of economically active people [Rosenbaum et al. 1990]. From this point of view, the emigration of highly skilled people, i.e. people with the highest human capital, proves to be an important investment loss for a state, especially in the case of a massive outflow of educated individuals. And of course, the understanding of migration of highly skilled labor force as a loss of investments put in their education was then reflected in the fundamental approach of the states towards the policies of influence on the migration of talents: the basic principle of all policies was the effort to avoid migration, or at least to limit it, by motivation or by force [Brown 2000]. Since human capital was considered possession of individuals, also the respective policies were aimed to individuals.

A traditional political instrument to avoid the outflow of skilled labor force was the effort to control the movement of these people. This was supposed to prevent their uncontrolled emigration. Meyer et al. [1997] traces three basic strategies for brain drain reduction: restrictive strategies, stimulating strategies, and compensatory strategies. Restrictive strategy was based on creating obstacles to the emigration of educated people. Stimulating strategy consisted in offering targeted extra advantages for assorted group of highly educated citizens in order to raise the attractiveness of their homeland and discourage them from leaving. Compensatory strategy endeavored to reduce a potential loss of human capital by requiring special taxes (paid either by highly educated emigrants themselves, or by their future host country) which would financially compensate the loss emerged from the emigration.

The perspective of the migration of highly educated labor force was substantially changed in 1978 when the study *United Nation Institute for Trading and Research* was published [Hansen 2004]. This study resumed the results of long-term analysis of migration of highly educated people. It pointed out the fact that this migration changes with time. It showed that many highly educated experts after a long stay abroad returned to their homeland and their abilities, capacities, and experience were employed for the development of their country. The study adverted to the fact that what may appear as a loss from a short-term view, may turn into a gain in a long-term horizon. It was a completely new concept of the situation. Newly, the migration of brains was not considered just a loss of human capital (brain drain) but in the new and different light, the migration of skilled labor force turned into a potential profit (brain gain). When highly educated people, after some time spent abroad, return back to their homeland, they bring along their experience, knowledge, know-how, language competence, contacts, and often also financial resources that they would never have been able to gain, had they stayed at home. Moreover, the studies of migration

trajectories of highly educated people showed that in many cases they leave their homeland at a very young age and make at least a part of their studies in a host country, mostly with the financial support of the local taxpayers. This result challenged the traditional opinion that the only one to lose human capital by emigration is a home country because in the case of return of the migrants in productive age, it was rather the host country that invested to human capital and lost it by the migration.

Naturally, the new understanding of the problem of highly educated emigrants influenced to a great extent the strategies employed by the states in order to “optimize” the impacts of migration from their own point of view. The positives of brain circulation are emphasized for its capacity to support a positive exchange of experience, knowledge, and know-how, among other things. Some states started to support studies and temporary stays of youth abroad which may seem paradoxical in the face of the previous trends. Since brain circulation is only possible provided the highly skilled emigrants return home, the strategies leading to the return of migrants back to their homeland after having gained experience abroad were especially accented. The students and scholarship holders subsidized by their homelands were usually pledged to come back after their scholarship would have terminated. Special motivation programs were often created for the scientists and researchers who had already lived abroad for a long time. The source country politicians usually wished their permanent return. However, after some time the experience with such strategies showed that in most countries, especially those poorer ones, these goals had not been achieved. This led to the idea that request for a permanent return is not necessary and that even short-term returns allowing know-how, experience, and contact exchange are also asset for a source country.

Poor countries were most afflicted by brain drain. Some of them were not able to implement any motivation strategy at all because there was nothing to offer to potential returnees. Even the countries which were capable to run special policies and thus attract some scientists and researchers to come back learned after some time that this strategy may not prove efficient. It is to say that usually, in spite of a great amount of costs, only a very small number of emigrants were attracted. Like this a question emerged how to utilize the emigrants without the necessity of huge investments into their return or a long waiting time till the situation in a home country improves to such an extent that the emigrants start to return on their own accord. A solution has been found in the use of diaspora. It was found out that highly skilled compatriots may contribute to the development of their homeland without actually living there permanently. It was even proved that sometimes it may be more favorable for a home country

if an individual stays in their host country. If these people keep the contact with their homeland, it can profit from the networks in which they are involved. If they returned home these bonds may be interrupted and the land itself may not be able to draw on their entire potential which therefore would be squandered.

An analysis of the migration of highly educated people and assessment of the strategies employed by various countries to influence the process of migration was done [Thorn, Holm-Nielsen 2006], and after a long study, the scientists involved brought up an important discovery which again changed our view on the topic of brain migration. They pointed out that all the strategies so far used were aimed to the reduction of impacts resulting from the emigration of talents abroad, without really solving its causes. The effort to prevent emigration as well as the effort to attract the emigrants back home was completely useless regarding the elimination of the causes provoking the emigration. As a result of this, more and more special studies appeared, identifying the factors contributing to the decision to stay in a homeland, or go to exile, or possibly come back home. Unsurprisingly one of the basic causes of emigration is the difference in the levels of economic development among different countries. Beside this many more factors have been identified with a specific influence on the migration of highly educated people. These factors were likely to be affected by particular policies in a reasonable time. It was especially the matter of the quality of tertiary education, the amount of state subsidies for science and research, the level and the way of organization of scientific research, transparency in allotting grants for research, career opportunities available to young scientists, the equipment of scientific institutes... This change in understanding the problem again was reflected in the nature of the strategies employed to influence the migration of highly educated people. The goal of these strategies stays the same: the influence on career and migration plans of highly educated people. Nevertheless, the measures are different: they concern especially the change in conditions in which these people work in their homeland. On the one hand, this solution is more difficult to implement, on the other hand it is more universal and its impacts are more durable.

Lately there prevails an opinion that really efficient results may only be achieved provided all the strategies available are utilized. In this complex concept it is recommended to combine all the existing programs and policies to influence the migration of highly educated people. It comprises restrictive measures (e.g. several years compulsory practice after termination of school education, requisite to obtain a certificate) as well as stimulating measures (e.g. preferential notification of work permit for highly skilled foreigners), measures targeted at the support for return (e.g. special reintegration programs and grants), and efforts to improve

How to Turn Brain Drain into Brain Gain

the scientific milieu (e.g. higher expenditures for science and research or tax allowances for private investors to science). However, most of those who advocate these complex strategies are conscious of the fact that it is not easy to achieve their goals and that it is not possible in a short-time horizon.

2. The Policies to Influence the Migration of Highly Educated People

There are many policies targeted at the influence on the migration of highly educated people. Meyer et al. [1997] determines three main types of policies: restrictive whose goal is to hinder emigration from a home country, compensatory aimed to financial compensations for the lands losing their highly educated labor force by migration, and incentive proposing a higher attractiveness of staying at home. Lowell [2001] extends this classification to six types of policies which he calls “the six R’s”. Although he uses different terms, identically with Meyer et al. he distinguishes restriction, reparation, and retention policy. Besides, he defines recruitment policy aimed to gain highly skilled workers among foreigners, return policy for attracting the exiled highly educated workers back home, and the policy of resourcing expatriates which are directed at the achievement of knowledge, technologies, know-how, or financial recourses from the members of a particular scientific diaspora working abroad. Lowell points out that the types of policies distinguished by him comprise both traditional migration policies aimed to influence on the migration of people themselves (restriction, recruitment, retention, return) and measures not based on the effort to influence the migration of people but to diminish its negative impact (reparation) or possibly to utilize its potential advantages (resourcing expatriates).

Our main goal is to render a review of policies aimed to attract highly educated people working abroad, especially scientists and researchers, to come back to their homeland. Since we would like to enable a reader to integrate this information into a broader context, we will also briefly mention other types of policies employed for the influence on migration. Inspired by the existing classifications of the policies for the influence on the migration of highly educated people and its impacts, we distinguish restrictive, compensatory, stimulating, recruitment, and return policy. The first three categories more or less respond to those determined by Meyer or Lowell. The recruitment and return policies are very similar in their effort to gain the brains from abroad and sometimes it is even difficult to tell them apart. In our extensive empirical study of the existing policies we found out that in practice the recruitment and return policies are just two varieties of one simple thing. Some of the recruitment

programs are even set in a way that it is possible to use them to gain highly educated foreigners and also to gain highly educated expatriates. In spite of that, we distinguished these two types of policies. After all, the return policies tend to be quite specific in their direction to the compatriots living abroad or to the scientists born in a particular land. In this text the efforts of home countries to utilize the potential represented by the scientific diasporas abroad are not considered as policies for the influence on migration. We refer to the work by Kostelecká et al. [2007] for more detailed information about the policies aimed to the use of the scientific networks in diaspora for the transfer of information and know-how.

2.1. Restrictive, compensatory, and stimulation policies

The first reactions of the states upon having begun to experience the negative impacts of the emigration of highly educated people was the effort to settle limits to the emigration by some kind of restrictive policy. The goal of such policy is to hinder, postpone or completely prevent the migration of talents from their home country. Most of the restrictive policies are initiated by the source countries where the negative impacts of brain drain are most visible. But sometimes for various reasons and by various means even the target countries resist immigration, including the immigration of skilled labor force.

The source countries naturally often tended to adoption of certain restrictive measures aimed to limit the impacts of brain drain. Theoretically there is a wide range of potentially useful measures available. The most strict measure, adopted exclusively by totalitarian regimes (e.g. in the past most of the countries of the “socialist bloc”), consists in a total closure of borders. This solution is rather extremist and unacceptable for democratic countries. Therefore the restrictive measures are usually milder. For instance, certain countries enable their citizens to travel abroad for work with a permit and under special conditions. For many years this was the practice in South Korea [Puri, Ritzema 1999].

Sometimes the restrictive policies are even less apparent. For example some countries require that their citizens (especially those of certain professions) after their studies work in their home country for a certain officially determined time and thus meet a certain moral obligation towards their homeland. This phenomenon is called postponed migration. A similar strategy, albeit more sophisticated, even includes the work obligation to the study plan. In this case an individual achieves the complete qualification and diploma only after accomplishing a minimal practice [Cohen 1996]. South Africa, for instance, has had

2. The Policies to Influence the Migration of Highly Educated People

a long tradition of this approach. Also in the Czech Republic a medical doctor who would like to work abroad and not to depend on a professional supervision by some other doctor first needs to obtain the certificate which can be obtained only after several years of not really well paid work in the homeland. The requirement that the graduates work for several years at some home workplace has a double effect. First there is the profit for the home economy (the country gains “cheap and qualified labor force”), and the longer a graduate works in their homeland, the more work contacts and experiences gains, and the probability of their wish to leave for exile decreases.

Not merely source countries but also target countries used to implement restrictive measures for hindering the access of skilled immigrants to their labor markets [Cohen 1996]. These measures were for instance more strict immigration laws, special short-term work visa, or visa forbidding multiple entering to the country for work purpose [Lowell 2001], unwillingness to accept diplomas from other countries and setting the duty to complete one’s education and achieve a certificate at a local school in a target country. These measures were motivated especially by the effort to save workplaces for local highly educated population and to raise the flexibility of labor markets in host countries – in case of increasing demand more skilled workers were to be hired from abroad, in case of decreasing demand their visa were not to be prolonged and they were supposed to leave for their homeland. These measures were not aimed primarily to reduce potentially negative impacts of emigration in source countries but they also worked in this way. A special type of restrictive policy in a host land is represented by the special J-1 visa in the USA which allows a stay in the country for up to several years to scientists, researchers, and students, but when visa expires their validity, their holders must go back to their home country and they can neither get any other residential visa nor apply for the US green card.

Generally, it may be stated that the adoption of restrictive measures has never led to long-term efficient results, the basic reason being the usual transience of their deterring effect. In the 90’ there were also many economic and political changes to be seen and they substantially affected the migration of skilled labor force. The Cold War was over, many barriers to the free trade disappeared, the demands for free capital flow and free movement of labor force increased. In many regions the states signed treaties assuring the free cross-border trade, labor force, and capital flow. In the new situation many target countries tend to annul a lot of these restrictive measures because when employed, they limit the competitiveness of the country in the talent contest. Much more often there is a contrariwise tendency of the target lands to abolish the barriers to the migration of highly educated people, the foreign diplomas are being accepted more

than ever before and various certificates of qualification are also more frequently acknowledged [Cohen 1996].

In the 70' a US economist of Indian descent Bhagwati [1972] proposed the application of a compensatory policy which consists in taxation of brain drain by a special tax to be paid to the mother country either by an emigrant themselves or by a host country. Bhagwati suggested that a host country or an expatriate themselves pay a special tax to the mother country which would compensate the loss arisen by their leaving for abroad. Bhagwati reasoned this with the fact that the mother country had to invest public recourses to the educational system which was used by the future highly educated emigrant and as a user, they should therefore pay for this service in the form of a tax even in the case they live in some other country and they do not pay any other taxes in their homeland. This proposal demanded independent surveillance of the UN over such a system, cooperation of the financial authorities in host countries, it concerned only taxation of “professionals”, i.e. people with high education, migrating from a developing land to a rich land, and it limited the taxation just on a certain period after coming to a host country [Bhagwati, Partington 1976]. The involvement of UN to the system also enabled to distinguish the “corrupt and dictatorial countries” not supposed to receive any tax from their emigrants.

The Nigerian scientist Emeagwali [2003] also supported this vision. In his opinion, it is especially unjust to developing countries that there are no regulations for the world labor force “trade” while there are many regulations for the trade with other commodities. Educated labor force abandons developing countries which provided the education, without being able to profit from that anyhow. Developing countries are thus getting to a vicious circle: with relatively high investments they produce highly skilled labor force which, having achieved productive age, leaves for abroad and fills in the gaps in the labor markets of rich countries. The difference between developing and developed countries even increases. Emeagwali advocates the system which he calls Brain Drain Tax. The labor force producing countries should be bestowed the claim for a certain form of reimbursement if the labor force leaves for work in a foreign country. Emeagwali [2003] argues that just the USA alone render 135 000 H1-B visas a year for the best foreign scientists. These people contribute to the American tax system, they have a positive influence on the productivity of labor in the USA, without the host country bearing any costs for their education and training. In practice, this system could be set in the way that the host country authorities would pay an annual tax in the sum of, for instance, one monthly salary of an educated immigrant.

Besides the rightfulness of the taxation of educated expatriates itself, the proposed system would have another positive side effect for poorer countries:

2. The Policies to Influence the Migration of Highly Educated People

the higher taxation would reduce the potential earnings of highly educated emigrants abroad and thus reduce their total numbers [Wilson 2005]. The suggestions of this type, however, have not met much sympathy among politicians and likewise, they have been eagerly criticized by the members of academic community. The first objection was that this proposal is difficult to realize in practice since it is very difficult to calculate the loss of a source land emerged by the leaving of a worker. Another objection was legalistic: an emigrant working in a foreign country would pay higher taxes than their local colleague doing the same job which in many countries would be considered anti-constitutional discrimination [ibid. 2005]. Moreover, many highly educated workers achieved a part of their education in a host country, often with the contribution of the local taxpayers. In the case that education is strictly comprehended as a public service provided by a state to be paid for later in the form of taxation, the host countries could lodge a claim to financial compensations for covering the costs of the education of future immigrants. The studies which started to analyze the emigration of highly educated people from the point of view of the cost-benefit ratio for home and host countries have further complicated our comprehension of compensatory policies. Many of them suggest emigration works for a great economical benefit of home countries, e.g. the money flowing from the emigrants to home countries in form of remittances, the access to technologies or increased interest of local people in education and investments into human capital [Stark, Wang 2002]. Some critics admitted developing countries could abuse the income from the taxation of emigrants [Wilson 2005] or they took for immoral that dictatorial states should be allowed to tax the earnings of their expatriates who went to exile because they had not been satisfied with the government, and they also pointed out that people should be allowed to “vote with their legs” and leave their country if they are not happy there [Hufbauer 1989].

The compensatory policies have not been widely applied in practice, partially because of the protests of the host countries and the emigrants themselves, and partially because they are so difficult to realize. Exceptionally some of these policies have been realized in some developing countries. For instance in South Korea or in Philippines the work permit for abroad was only issued to an applicant who pledged to send at least a certain percentage of their salary to their mother country [Puri, Ritzema 1999]. However, this was only possible provided the states kept total control over the emigration on the whole. And moreover, this policy was not applicable on highly educated emigrants. A certain inspiration by a compensatory policy may be seen in some tax rules in the USA. The financial authorities *Internal Revenue Service, IRS* enable the holders of certain specific work visa to tax their US earnings in their mother country. But the tax systems

of developing countries are not ready for this possibility so that the taxation of earnings in a home country is usually economically very unattractive to the emigrants and most of them do not take this chance offered.

The goal of stimulation policies is to keep highly educated labor force at home by the means of various stimuli which are supposed to make their professional work in their mother country more attractive. These stimulation policies for making the professional milieu more attractive are almost always organized by the very states because they are those who could suffer the negative impact of the emigration of highly educated people. International organizations and private sector exceptionally participate on these policies and programs. It is usually only the case when an acute problem must be solved this way. An example of such a policy is the program launched on 12th April 2005 on the basis of a mutual cooperation of the *UNESCO*, the company *Hewlett & Packard* and the *Ss. Cyril and Methodius University* in Skopje, Macedonia, under the name of *Piloting Solutions for Alleviating Brain Drain in South East Europe*.³ This program emerged as a reaction to the fact that the numbers of scientists and engineers in this area of South East Europe decreased by 70% in 1995–2000. In 1995 there were 1332 researchers and engineers to one million people there, this number having reduced to 337 by 2000. The main goal of the project was to attract young scientists to stay in Macedonia and cooperate with the Macedonian foreign diaspora. The means to achieve this goal are the investments to IT in Skopje and “seed money” for financing exchange visits abroad. The scientists thus will be interconnected with their colleagues in foreign countries. They will be able to share information, look for foreign partners and sources of money for their research. One element of the program is a new interactive website for discussions and interaction between the Macedonian scientists abroad and home. The whole program is primarily concentrated on IT, especially grid technologies. In Bosnia-Herzegovina, Croatia, Montenegro, and Serbia similar programs are being set going. Another example of a stimulation policy, specifically aimed to the prevention of emigration of highly educated people, is the policy in the United Kingdom which tries to keep the graduates of pedagogical faculties in Britain and prevent them from looking for a more lucrative job abroad by forgiving them the studying loan quittance provided they start to teach at British schools [Smither, McGreal 2001]. Germany renders special grants to the foreign scientists who set their research teams in Germany and involve German post-doctorate students in them. The existence of such a research team in Germany

³ http://portal.unesco.org/es/ev.php-URL_ID=27011&URL_DO=DO_TOPIC&URL_SECTION=201.html.

prevents young German scientists from leaving for similar work opportunities abroad [Metzke 2001].

2.2. Recruitment policies

While all the policies mentioned above – restrictive, compensatory, and stimulation – strived to limit the migration of highly educated people and thus reduce the problems of brain drain, in the last decades the opposite policies of support for the migration of highly educated people are asserting more and more. Of course, these policies were applied by the potential target countries which did not concern themselves about brain drain and whose primary goal was to attract as many highly educated immigrants as possible and thus improve their own competitiveness in the world where the economic success depends every day more on the development of science and technology, abundance of highly skilled individuals, innovations, and production and application of knowledge. In this chapter, we will first concentrate on the policies aimed exclusively to the recruitment of highly educated foreigners for crucial disciplines in a target country. In the following chapter, we will go into more details about the policies aimed to the attraction of workers with the highest qualification, especially scientists, and researchers, to return to their home country. It is to be alerted again that this differentiation is artificial to a certain extend, that is to say, many times it is difficult in practice to distinguish whether a policy or program is aimed to the recruitment of foreigners, or to attracting the people working abroad back to their homeland. Some policies and programs from their very definition may be applied in both cases mentioned.

The demand for highly educated labor force increases in many prosperous economies day by day which is a positive indication of the economical development, while on the other hand, this demand in most countries does not meet adequate supply which arouses certain fears. That is why many countries today face the question how to procure enough scientists and researchers for the needs of their economies. In certain specific and key disciplines as natural sciences and engineering the lack of these highly skilled people is already alarming.

Why there is such a lack of scientists? There are several reasons for it. As stated above, the most important factor is the quickly raising demand for these people. This demand cannot be supplied easily and overnight because there are only a certain limited percentage of people with these skills among the population. Moreover, highly professional education is necessary for their work, not achievable without many years of studies. Also the low fertility in most developed

countries plays a certain role as it is reflected, among other things, in the low total number of students. Nevertheless, one of the main reasons is the steadily decreasing interest of young people in research work because the studies of the particular subjects are generally considered as demanding a lot of time and intellectual potential while the social reputation and financial remuneration of a scientist are not adequate to the difficulty and length of studies.

The lack of scientists made the state representatives ponder about the possibility to import this human capital from abroad. It would bring a lot of positives for host countries. First of all, it would be economically very profitable because a host country would not have to fund the education of these people. Their schooling would be from a greater part financed by their homeland. Besides, the highly skilled newcomers are often willing to work in a host country under less favorable conditions (lower salary, lower social prestige...) than local scientists and researchers. The most important potential asset of the recruitment of scientists and researchers from abroad is the fact that the host countries would get an access to almost inexhaustible "supply of brains" which would many times exceed the local sources. Thomas Straubhaar [2000] even flirts with a question whether it is not more efficient for host countries to stop funding the expensive state educational system and training of their own talents, and concentrate themselves merely on the import of the necessary human capital from abroad. Finally he comes to a similar conclusion as most of the politicians and experts: in order to maintain the economical competitiveness it is necessary that the states utilize both these strategies simultaneously, both the production of domestic researchers and the recruitment of foreign scientists. It would be highly hazardous for a state economy to rely on one only source of human capital.

But who decides in practice how will the influx of foreign scientists into a particular country be managed? The answer for this question is not easy at all because the migration of scientists is a very complicated process, influenced by many institutions and organizations. Undoubtedly the government institutions, fulfilling certain general strategies, have the biggest part in the actual wording of recruitment policies. Also grant foundations, international corporations, universities, and other educational and research institutions participate in it [Mahroum 2005].

2.2.1. Supporting policies for the recruitment of foreign scientists

At the present time most of the governments are trying to adopt various pro-immigration measures in order to increase the influx of scientists and researchers to

2. The Policies to Influence the Migration of Highly Educated People

their countries. Giannoccolo [2005] believes there is a direct connection between the intensity of brain inflow/outflow, and the type of strategy chosen by a particular country. The strategies are miscellaneous. Some states pursue their self-sufficiency and only in the case of “emergency” recur to the recruitment of foreigners while for others the aspect of nationality is of low importance and they are not scared of accepting foreign talents even “in stock”, regardless the current needs of their labor market [Mahroum 2005]. It is obvious that most of the countries may be classified somewhere in between of both extreme approaches. The priority of the first one is to train enough local scientists so that, optimally, they take up all the crucial scientific fields. The states of this type do not recruit foreign talents before the demand of the local labor market becomes so high that in spite of all the effort it cannot be supplied from local sources. Switzerland and partially also Germany are examples of this approach. The other strategy consists in the recruitment of foreign talents generally, regardless their nationality and current demand on the labor market [Mahroum 2005]. The states of this type, e.g. the United Kingdom or Ireland, have a very liberal immigration policy, aimed to the highest possible gain of highly skilled people. The states create special recruitment programs with the purpose of attracting the best world talents. Very high investments are put into these programs every year. Although local scientists living abroad may also be recruited via these programs, mostly they are not given any priority to foreigners. At the entrance examination, their quality is the decisive factor more than their nationality.

In spite of clear differences between the particular strategies employed by the individual states it may be stated that a majority of developed countries are turning still more favorable to “brain” immigration. Canada and Australia were the first states to support systematically the recruitment policy already in the 80'. Subsequently, the USA adopted a similar policy in the 90' [Kelo, Wächter 2004]. These states have already developed thorough immigration programs which have helped them gain highly skilled immigrants for years. To the contrary, until recent times the European states did not show any systematic efforts leading to brain gain from foreign countries so that they have almost no experience with a selective immigration. Most of the European states are still in the process of a continual creation of regulations for the facilitation of the access of foreign scientists to their lands [Vavrečková et al. 2006]. The United Kingdom is one of the first European states to try to solve the immigration of highly skilled people from abroad in a complex way. In 2002, they launched the *Highly Skilled Migrant Programme* for the support of immigration of highly skilled labor force [Kelo, Wächter 2004].

Although lately more and more developed countries try to support the immigration of highly educated individuals, there are still various barriers to hinder

this migration. Mahroum [2005] identifies two basic types of barriers which make the influx of scientists to a land more complicated: technical barriers (legislative measures, taxation...), and structural barriers, based on the history and culture of the particular country, and on that account specific for each individual country. Both types of “barriers” play an important part in the migration of students and scientific workers into a land. Were they abolished or at least subdued their impact, the immigration flows may increase substantially. While the executive and legislation of a particular state can quite easily eliminate the technical barriers, the structural barriers are not subordinate to any organized power, they are deeply engraved to the subconscious mind of the people, often they form a part of their cultural customs, behavior patterns, and traditions, so that a change in them may be achieved only with a great endeavor after a longer time [Mahroum 2005].

Most of the particular policies and programs aimed to attracting foreign scientists and researchers to a host land are concentrated on elimination of the barriers hindering their immigration. It is therefore useful to acquaint ourselves with the existing types of barriers. There may be many different types of technical barriers. These are for example high taxes. Some states try to attract foreign brains by exempting them the taxes for a certain time or by reducing their income tax [Salt, McLaughan 2002]. For instance, in Denmark and Sweden scientists pay 20–40% lower taxes for 3 years. In the Netherlands foreign experts enjoy a 30% tax allowance for 10 years [Giannoccolo 2005]. Also strict rules for issuing a work permit may represent a barrier [Mahroum 2005]. In the effort to eliminate this type of barrier, France introduced a new type of visa, the so called “scientific visa”. Their holders are freed from the duty of work permit. Moreover, their partners are automatically issued a work permit as well. Also in Germany the rules for achievement of a work permit have been set easier for the scientists from the third world funded by some of the European grants [Giannoccolo 2005]. Salt and McLaughan [2002] also point out the expanding practice of preferential issuing of green cards and special fast track visa for the immigrants from certain specialized disciplines. An important “technical barrier” hindering the influx of foreign brains is a lack of financial resources for funding the scientific work. The lack of money for research degrades the attractiveness of a country both for foreign and for local scientists. The states where the investments to science are low can offer neither any centers of excellence, top equipped laboratories nor adequate salaries to the scientists. The insufficient funding of science is reflected also in a lower number of people actively employed in this field. For instance, Europe has approximately 5 scientists or researchers to 1000 inhabitants while it is 7,5 in the USA. When comparing the

2. The Policies to Influence the Migration of Highly Educated People

numbers of scientists employed in industry, the proportion is even worse for Europe: 2,5 scientists (to 1000 inhabitants) in Europe and 7 in the USA [Diamantopoulou 2001]. The governments of particular states may try to eliminate these barriers either directly by increasing public expenditures for science and research, or indirectly by introducing tax allowances for science sponsoring societies and companies. An important technical barrier to the migration of scientists is the incompatibility of academic diplomas in different countries. In most disciplines, this problem is eliminated via mutual agreements of validation of diplomas issued in other countries.

There are also various structural barriers. A typical example of a structural barrier is the difference in languages of a home and a target country. An immigrant may run into great difficulties when integrating to a new society if they do not know the host country language. It seems that most scientists are well aware of this fact and when deciding about their migration they also take into consideration their language competence. The Anglo-Saxon countries have a great advantage in this respect because the science is getting still more generally English-spoken and the English language is still more often taken for a self-evident universal means of communication in the international scientific community. The scientists who migrate to some Anglo-Saxon countries have thus an easier work to integrate and they do not experience such a massive “cultural shock” since the knowledge of the English language itself brings along a better understanding of cultural values, traditions, and customs of these countries. In order to reduce their handicap, the non-anglophone countries offer various more or less attractive language courses both for the scientists and (in some case) for their relatives. These courses are organized either before the actual beginning of their stay, or during it [Giannoccolo 2005].

The image of a country also plays an important part in its overall attractiveness. A negative image may be a significant aspect of a low attractiveness of a country for foreign scientists. Mahroum [2005] suggests the example of Germany which has a reputation of being quite unfriendly towards foreigners and thanks to this negative image it loses a part of foreign talents.⁴ Although the image of a country cannot be changed easily, it may be systematically worked on. At the present, Germany endeavors to increase its attractiveness by the means of the program *GATE-Germany (Guide to Academic Training and Education)*.⁵

⁴ For example, in 1999–2001 Germany accepted only 10% Marie Curie Scholarships which is a figure comparable with the Netherlands whose scientific community is much smaller in comparison to Germany [Mahroum 2005].

⁵ <http://www.gate-germany.de/>, http://www.hrk.de/eng/projekte_und_initiativen/118.php.

The goal of this marketing strategy is the propagation of Germany as an attractive international destination for students and scientists as well as providing information about the possibilities of studies and scientific work in Germany. Other countries also run their own marketing policies. E.g. in the Ministry of Schools and Education of the United Kingdom a department has been founded for organizing a world-wide campaign promoting the visibility and propagating the quality of British universities. The sum of money rendered by the government to the activities of this kind is five million pounds every three years [Giannoccolo 2005].

An insufficient influx of foreign scientists to a country may be also caused by the insufficient internationalization of the local science. The process of internationalization of science makes the local scientific work more visible from the international prospect, it informs the international scientific community about the home science, and it positively influences the inflow of students and scientists to the country. Certain specialists are even convinced that the internationalization of science is a more important factor for the intensity of migration than the actual quality of the science in a given field [Mahroum 2005]. However, the degree of internationalization of science is not an unchangeable state and it may be influenced systematically, for instance by taking part in many international scientific projects like CERN, ESO, Eureka, but also by various bilateral international agreements⁶ which guarantee a closer scientific cooperation with certain countries, scientific and educational institutes [Mahroum 2005]. Also more intense personal and business contacts of home and foreign scientists may contribute to a larger internationalization of research, as well as “open” recruitments when the international scientific community is informed about the freed scientific posts in different disciplines via websites of a particular country. The internationalization of the educational system contributes to the internationalization of science as well: promoting of the Anglo-Saxon model, the English as a means of communication and education, Internet, cross-border cooperation between universities, the system of equal validity of credits, harmonization of educational systems, unification of the evaluation methods [Altbach, Teichler 2001]. The governments of some states support systematically the internationalization of science. For example the British government puts huge amounts of money to stays of foreign scientists and students in the country. Also in Luxembourg almost 50% of all national grants for research are allotted to foreign applicants [Giannoccolo 2005]. Japan

⁶ Bilateral agreements reduce the employment of commercial agencies. These provide their service for high charges and they often mislead their clients, while bilateral agreements are a guarantee that the migration flows between the two countries shall be much more transparent.

2. The Policies to Influence the Migration of Highly Educated People

is another example of a successful effort to increase the internationality of research. Thanks to the program *Japan Society for the Promotion of Science (JSPS)* more and more scholarship holders from foreign countries come to Japan every year [Mahroum 2005].

Another structural barrier to the inflow of foreign students and scientists may be low quality of academic institutes, especially if it coincides with a low degree of their autonomy [Mahroum 2005]. For example, the French and German research and educational institutes have a very good reputation which makes these countries attractive for foreign scientists and students but in spite of that the acceptance of foreign scientists and students is highly inflexible. The reason is the high state regulation of the academic institutes [Mahroum 2005]. On the contrary, the British universities are well known not only for their high quality of education, which by itself attracts students and scientists, but also for a high degree of autonomy which facilitates these institutes a more flexible acceptance of foreign workers and an easier brain circulation. Moreover, the United Kingdom encourages the inflow of foreign students and scientists by generous funding. The studies of foreign students alone cost 62 million pound a year which corresponds to about a quarter of the total expenses for the studies of home students [Giannoccolo 2005]. It is thus both absolutely and relatively high sum of money.

When deciding about migration, welcoming gestures of a host institute or a host country towards foreigners may also be an important factor. For example, in Greece the scientific institutes endeavor to integrate foreign scientists allowing them to partake on the decision making in the institute during the time of their stay. Some host institutes allow foreign professors to lecture in a different language from the local one for a certain time and thus allow them enough time to master the local language fluently. The French Kastler Foundation offers individual help for foreign scientists when solving the problems with their stay in France [Giannoccolo 2005]. On the contrary, insensible approach to the private situation of a scientist may discourage them from migration. For instance if the scholarship provider does not consider whether a scientist comes alone or with their family and does not appropriately adjust the total amount of money. Another barrier for migration is the situation when the scientist's partner has difficulties to find convenient work in a host country. Some states try to eliminate these barriers by providing a special legal status for the relatives of scientists.

2.2.2. The assessment of recruiting policies for foreign scientists

Besides many positives, the recruitment of foreign scientists and students brings along momentous negatives, not only for the source countries which are losing

their best labor force⁷ but also for the host countries. Although in a short-term view recruitment of foreigners may seem a highly attractive solution for a host country which gains highly skilled labor force for a very low price, from a long-term point of view the situation is not that simple. Some experts even think that the recruitment of foreigners into crucial disciplines is counter-productive and in a long-term perspective it produces more loss than profit. E.g. North [1995] claims that reasonably easy availability of cheap and highly skilled foreign labor force blunts the local education system in the specific field which cannot face this competition. He expects that there is a direct linkage between the rapidly decreasing numbers of students at the American faculties of natural sciences and the recruitment of foreign scientists. He suggests the only way how to cure the American system of scientific education is to limit the numbers of entrance visa for foreign scientists and thus produce a pressure on American research and educational institutes to make an effort to draw sufficient numbers of local students in these disciplines.

Also Gamlen [2005] alerts certain flaws of the recruitment policy. He studied its practical impacts on the example of New Zealand. He argues especially against the common concept that the recruitment of skilled immigrants is an easy solution for the impacts of brain drain. He takes this for misrepresented and he identifies many quantitative and qualitative problems brought along with the recruitment of foreigners. According to him, the basic problem is the non-existence of precise statistics recording the migration of skilled people and gaining more necessary information about these individuals (the degree and the type of their education, age, practice...). Without this information it is very difficult to judge whether the leaving of highly educated people from a certain country really is compensated by the coming of adequate number of equally skilled immigrants. Gamlen also doubts if highly educated immigrants can automatically and easily replace the left local skilled labor force. On the basis of many studies [Winkelmann, Winkelmann 1998; Glass, Choy 2001] he proves that many skilled immigrants have severe troubles when looking for a job and in some cases they spend many years unemployed or in a work below their qualification degree. It can be partially improved by simplifying the legislation for the employment of immigrants [Ho 2003] or by a more active government support for integration of these people to the labor market [Glass, Choy 2001] but all these measures require certain expenses. Gamlen [2005] takes the resulting

⁷ Morocco complains that French companies offer very profitable work contracts and French visa to the best Moroccan students even before they officially terminate their studies [Boulier 1999].

2. The Policies to Influence the Migration of Highly Educated People

situation for paradoxical. The government lets leave the young New Zealanders provided with the necessary social capital for a smooth integration to the labor market, and it employs immigrants to their positions, having to support financially their active integration. The final solution is generally more expensive and it has also certain negative social impacts since the young New Zealand labor force leaves the country, being replaced by older skilled immigrants, which precipitates the process of ageing of the population [Glass, Choy 2001].

Another disagreeable side-effect of the recruitment of scientists from abroad is their frequent discrimination in a target country [Hawthorne 1997]. Hawthorne studied the life-stories of immigrated medical doctors in Australia. In his study, he identified both direct and indirect discrimination. The indirect discrimination consisted in limiting these doctors access to the labor market, problems with the recognition of their diplomas, and accent on perfect mastering of the English language. The federal government adopted these measures after the lobbying of the local medical associations. The direct discrimination was apparent in the different approaches of the society towards the immigrants from Anglophone and European countries, and from Asia and the Middle East. Bushnell and Choy [2001] discovered similar facts about New Zealand where the immigrants from South Asia had a worse position on the labor market than the immigrants from other parts of the world. The rate of their unemployment in the first year after their immigration was much higher than in other ethnical groups. The discrimination of highly skilled immigrants is also documented in the study of Denou and Junker [1999], concentrated on foreign medical doctors in France. The authors of the study found out that the foreign doctors were less paid and had less favorable work contracts. This situation was caused by the reforms from 1984 which made it practically impossible for a foreign doctor to get a private practice. Foreign doctors were thus forced to work in state hospitals and they were notably underestimated. Foreign medical doctors working in the *Britain's National Health Service (NHS)* face discrimination as well. These doctors are more often interrogated because of supposed professional faults and trespasses and they are more often deleted from the register of medical doctors [Suroor 2007].

Many emigrants leave their country with the vision that their living standard will get better, that they will get an access to more attractive work opportunities... Nevertheless, the reality does not always correspond with their visions. There are studies [Bernstein, Shuval 1995] confirming that many highly skilled emigrants struggle with many different problems in the other country. The emigrants are often undervalued in host countries and often they are "forced" to do jobs where they cannot employ their full qualification and skills. In many cases host

countries are not able to utilize efficiently their intellectual potential. The migration of highly educated people may lead to a final effect of even greater dichotomy in the world where the rich countries in the developed North will attract skilled labor force from the poor southern countries [Séguin et al. 2006]. In the worst case a paradoxical situation may occur that the developing countries will lose their valuable skilled human capital while the developed countries will fail in its adequate use [Riaño 2003].

2.3. The policies supporting return of skilled labor force from abroad back to a homeland

The main goal of this strategy is to help prevent the problems connected with brain drain or possibly turn brain drain into brain gain. For this purpose there are specific programs stimulating individual returns of highly educated emigrants (especially scientists) working abroad for a long time. The current citizenship of a qualified person is not a decisive factor because in some cases countries wish even the return of those people who *de iure* are not their citizens any more. It is enough to prove they were born in a given state. To many people supporting the returns of highly skilled people seems more efficient than the endeavor to integrate highly educated foreigners. The reason is that the returnees usually know well the language and culture of their country and they are also capable to understand the functioning of local institutions which makes their re-integration much easier. The first attempts to support systematically the returns of scientists from abroad began in the 1970'. E.g. already in 1966 the *KIST – Institute for Industrial Technology* sponsored by the Korean and American government started to strive for the return of 18 top-class Korean scientists and engineers, living in the USA and Germany, back to Korea. Although the numbers of those who returned to Korea in 1960' and 1970' were rather scarce, the incoming professionals were glorified as celebrities, their photographs filling the pages of magazines and newspapers and the state pinned its hopes on them very much.⁸ In the following years many similar programs and policies were being created in various countries in order to encourage skilled workers, especially scientists and engineers, to come back home.

Today there are many programs aimed to the returns of scientists back to their homelands. These programs vary considerably. For an easier orientation in the labyrinth of the various programs it is useful to classify them into several

⁸ <http://www.kist.re.kr/en/index.jsp>.

2. The Policies to Influence the Migration of Highly Educated People

groups. At each program we can study the various characteristics and features connected with the actual functionality of the program, its direction and goals etc.

According to the features studied we can classify different types of programs:

- According to the type of administrator we can distinguish state programs (launched, financed, and organized by state institutions) and private programs (organized by private institutions).
- According to the funding source we can distinguish supranational and national programs. The supranational ones are usually funded from international sources and they usually concern more than one target country while the national programs are funded from local sources and they are usually targeted to one country.
- According to the territorial targeting we can again distinguish supranational and national programs. The supranational programs always concern more than one country (they concern either all countries, or entire groups of countries, or possibly pairs of countries when usually one of them is the target country and the other one is the funding country). The national programs always concern just one country which is the target country of migration and the only source of funding the program at the same time.
- According to the specialization we can distinguish general programs supporting the return of all kinds of highly skilled labor force from abroad, and programs specialized on certain selected disciplines (e.g. IT, medicine etc.).
- According to the goals we can distinguish programs trying to achieve permanent return of expatriates, and programs supporting short-term returns (e.g. programs for temporary consultation visits of emigrants in their home countries).

The programs in each group have similar features and attributes. In the terms of their goals and the tools for achieving these goals they are usually very different from other types of programs. A certain classification of these programs may look a bit too schematic, but for the reason mentioned it may prove very useful. In our view the most important criterion of the classification of the programs is whether their goal is a permanent or temporary return of the expatriates. Therefore, in the text as follows we will refer to these two groups of programs separately. The second thing we consider crucial is distinguishing the national and supranational programs because the supranational programs tend to have much larger radius of action. They are not limited to just a national level but they operate in a substantially broader area which makes them very

specific. Some of these programs are of a more general nature and they make efforts to optimize the international migration flows in order to bring the highest profit possible both to the host countries and to the source countries, regardless the type of state. Other programs prefer a certain locality. For instance, they are specialized in improving the future of Europe or developing countries. Under the terms of our classification above we can further distinguish general and specialized programs and the type of administrator. And finally, it must be pointed out that some of the programs are very complex and they combine the typical features of various different types of programs above mentioned – e.g. a program working on the basis of cooperation of an international organization, several states and the private sector, employing various means for the support of both long-term and short-term returns of expatriates. Of course, it is very difficult to fit such complex programs in some classification scheme. The further categorization of the complex programs will therefore be a little inaccurate and will be directed by the factors considered prevailing.

2.3.1. The policies supporting long-term returns

The support of the mobility of students and scientists seems to be a crucial condition for the future competitiveness of each state. It is supposed that the brain circulation has a very positive impact on the standards in science in a given country. When living abroad, a scientist gains experience, knowledge, and tacit knowledge⁹ and after the return they can bring them to their workplace. Migration leads to a natural knowledge and experience exchange between various workplaces. However, the international migration of students, scientists and researches itself would not have the coveted effect for a mother country if these people did not return home with their newly achieved knowledge and experience. In some cases, the positive effect of their return can be even measured. Zweig [Zweig et al. 2004] documents that the Chinese scientists who had studied abroad attracted twice more foreign visitors, three times more international projects, and four times more foreign capital to China than their colleagues educated at home. No wonder that on the international level there are many projects and programs created in order to support the returns of highly educated individuals. Basically we can identify five main types of these programs:

⁹ The term “tacit knowledge” usually means the skills and knowledge which cannot be codified, are usually bond to a certain culture or milieu, and can be therefore transmitted exclusively by a personal experience [Collins 2001].

Sandwich programs

Scholarships for the stays abroad with the condition of return

Return grants for those who completed a stay abroad

Reintegration programs

Internet information portals

The first three types of programs are oriented to the support of brain circulation. They always involve the endeavor to the return of students, scientists, and researchers, but they also comprise encouraging measures for the very leaving for a foreign country. The fourth and fifth type of programs are based on a pre-supposition that potential users of these programs already work abroad and they have already gained the necessary knowledge and experience, so that these programs are primarily targeted to their return home.

2.3.1.1. The sandwich programs

The so called sandwich programs are targeted especially to young people, students or scientists, who are currently not abroad. They are supposed to procure them a foreign experience in the form of study or work opportunity but also secure their return home. As a matter of principle, they phase the study or some other professional education to several (mostly three) stages. Students begin their studies at home, then they continue abroad, and they terminate the studies back in their homeland. The return to their mother country conditions termination of the studies and issuing the diploma. Likewise, young scientists leave for a work stay abroad, then they continue their education at home, and at the end they obtain the due qualification certificate. If this model is followed the probability of a student's or a scientist's return increases considerably.

The targeting of this type of programs to young people is logical and comprehensible, bearing in mind that the migration of young people, especially students, makes a large part of brain drain. The empirical researches incessantly confirm the opinion that there is an apparent connection between the mobility in an early stage of career and a later mobility so that a potential emigration of highly educated people is basically being decided about at the lowest productive age [Baláž, Williams 2004]. It reveals that a great part of the migrating highly skilled labor force came to a foreign country already during their studies in order to gain further education. Today, it is obvious that the studies abroad have substantial impact on the percentage of highly educated labor force in exile [Johnson, Regets 1998].

As an example of such program we may take the program organized in cooperation of the American *National Institutes of Health (NIH)* and the German

Deutsche Forschungsgemeinschaft (DFG), named NIH-DFG Research Career Transition Awards.¹⁰ Its goal is a support for young German scientists at their research for a period of about 5–6 years. The applicants for a financial support must submit a draft of their research project for the whole period mentioned. The research itself has two stages: For the initial 2–3 years, the applicant works on their research at some of the institutes belonging to the US National Institutes of Health network and for the following 2–3 years they continue their research in Germany. The NIH provides them with a fix scholarship and also a contribution for travel expenses for themselves and their family (in the maximal sum of 2000 US dollars). During their stay in the USA, the DFG sponsors four scholarship holder's journeys to Germany. These journeys are supposed to be utilized for a preparation of the second stage of their project. In the second stage of the project, the researcher returns to Germany where they gain the status of a research worker with the work contract for the projected period of time. DFG pays the expenses connected with the work position in Germany, and moreover, it grants 30 000 euro for two more years for covering direct costs connected with the research.

The Pilot Fellowship Program Romania¹¹ is organized in a similar way. It is coordinated by the Dutch Organization for Scientific Research (*Nederlandse Organisatie voor Wetenschappelijk Onderzoek, NWO*) and the Romanian National Committee for University Research (*Consiliul National al Cercet'rii Stiintifice din Invatamantul Superior, CNCSIS*). The goal of this project is to stimulate young Romanian scientists to the work in their home country, and at the same time, to help them integrate to international scientific networks. It is expected that the integration of young Romanian scientists to international network will stimulate their career growth, increase their prestige, and stabilize their position at their home scientific institute. The program is offered to highly talented scientists up to 35 years of age who must have a doctor diploma, must have Romanian nationality, and must pledge to return to Romania. An applicant renders the evidence of their capabilities, among others, presenting a list of their publications in home and foreign magazines. The scholarship is allotted for a period of 12 months. Maximally 6 months are to be spent in the Netherlands where a scientist is provided with a monthly scholarship of 1500 euro. Than they return to Romania and they are paid 200 euro per month during the following six months. Besides that, they get 500 euro for direct expenses connected with

¹⁰ http://www.dfg.de/en/research_funding/promoting_young_researchers/nih_dfg_program/nih_dfg_programm_in_brief.html.

¹¹ <http://www.cnscis.ro/English/Bilateral/PilotFellowship.pdf>.

2. The Policies to Influence the Migration of Highly Educated People

the research and 800 euro for travel expenses. During the time of their program lasting, a scientist must send quarterly reviews about fulfilling their research plan to the NOW and by one month after its termination they must write a final note.

There is a similar program administrated by the Dutch Organization for International Cooperation in Higher Education (*Nederlandse Organisatie voor Internationale Samenwerking in het Hoger Onderwijs, NUFFIC*), called NFP-Fellowship for PhD. Studies.¹² The scholarship is designated for PhD. students from developing countries studying at Dutch universities and it secures their return to homelands for the termination of their studies.

An example of a sandwich program specialized on a certain discipline is the *Programa Postdoctoral P3+3*¹³ organized by the Spanish foundation of the national Center for the Research of Cardiovascular Diseases (*Fundación Centro Nacional de Investigaciones Cardiovasculares Carlos III, CNIC*). These grants have been rendered since 2002. A successful applicant is supported for six years. A Spanish scientist spends the first three years out of Spain, at some of the famous research institutes specialized in the supported field, the following three years in Spain at some of the CNIS institutes. The goal is that the scientists achieve an international experience but they settle down for work in Spain.

Another similar program is the Overseas Doctoral Scholarship (Sandwich Programme)¹⁴ organized by the *South African Medical Research Council, MRC*. Several years ago, the Council decided to repeal all the scholarships supporting doctor studies out of South Africa because it was revealed that a very high percentage of scholarship holders stay abroad. A new program is designated for the citizens of the Republic of South African who have terminated their medical studies and want to continue with PhD. studies, and who are employed by some of the South African research institutes. The scholarship covers maximally 12 months abroad, within the three years of the program. In other words, a scholarship holder must spend at least two thirds of the time at their home research institute. Whenever leaving abroad for more than three months, a scholarship holder must commit themselves at the MRC to return and their home institute must guarantee them their workplace after the return. The contribution is a total sum of 120 000 rands (about 13 000 euro) for the 12 months of foreign stay.

Finally it is to mention another specific form of sandwich programs: the traditional students exchange programs and foreign studies organized by home

¹² <http://www.nuffic.nl/>.

¹³ <http://www.cnice.es/index1.php?inc=6&secc=formacion&programas=2>.

¹⁴ <http://www.mrc.ac.za/researchdevelopment/overseascholar.htm>.

and host universities. A participant of such a program remains a student of the home university and they must return there to get the diploma.

Generally, the sandwich programs are considered quite an efficient form of support for brain circulation whose menace of a following brain drain is reasonably low. There are all possible types of sandwich programs – general or specialized, state organized or organized by individual institutes. Mostly they are based on cooperation of two countries, but also completely international programs comprising more dispatching and hosting countries are not exceptional. These programs are specific in their targeting to young people, especially students. In this respect, the programs exploit the fact that students need diplomas and other certificates for their professional growth so it is reasonably easy to condition issuing them by their return to a home country. The time spent abroad does not exceed a half of the total time of participation in the program. All programs in this group may be classified as programs utilizing restrictive policy, at least to a certain degree. On the one hand, the sponsoring institutes offer something to the potential applicants but they also commit them to come back home. The risk that the students or young scientists abroad gain knowledge, skills, and language capacities increasing their future chance for getting a job in a foreign country and leaving there forever, exists but probably it is not considered too important.

2.3.1.2. Scholarship for the stays abroad with the condition of return

This group comprises programs stimulating brain circulation by the means of support for foreign stays of scientists and researchers. The difference from the previous group consists in the fact that these programs do not concern the situation after the return anyhow. The scholarship applicants are not given any financial or any other support after coming back home. In practice, these are usually scholarship for studies or short-term work attachments abroad, rendered to an applicant under the condition of a written commitment to return back to their homeland after the termination of a scholarship program. In this group of grants and scholarships we may identify both national programs funded by national institutes and supranational programs. The scholarships may be for one or more subjects and may be given by state or private organizations.

A rather numerous part of this group are the programs funded by supranational organizations specialized in the support for research and education in a certain discipline or scientific field. These organizations offer research and educational stays in the most reputable institutes specialized in a particular field. Usually the scholarships are designated for professional from all around the world although in some cases the foundations prefer applicants from less

2. The Policies to Influence the Migration of Highly Educated People

developed countries for whom it would be difficult under normal conditions to get an access to these centers of excellence. The goal of these programs is to facilitate spreading knowledge and capabilities in a given subject from the centers of excellence to the peripheries. An essential condition for fulfilling this goal is the return of a scholarship holder back to their homeland where they should follow on spreading the knowledge achieved during the program. For this reason, a frequent condition for rendering a scholarship is the guarantee of the home institute of the applicant that after absolving the program they will be offered a job there. An example of a program of this type is the International Neurological Science Fellowship Program¹⁵ prepared on the basis of collaboration of the *World Health Organization, WHO*, and the *American National Institute of Neurological Disorder and Stroke, NINDS*. This program supports young workers with PhD. or an equivalent academic degree working in medicine, or young scientists working in the field of neurology. The goal of this project is to improve the capabilities of young doctors or scientists working in basic or clinical research. The program sponsors the stays of these scientists at some of the American research institutes. The applicants from developing countries have the priority in obtaining the scholarship, provided they show some evidence that after the end of their stay they will be able to utilize their new knowledge and skills for a work in their homeland as administrators or educators in research, academic, or state medical institutions. Normally the grant is given for the period of twelve months but exceptionally it is also possible to support a nine-month program. The sum of the yearly scholarship varies between 31 092 and 48 852 US dollars, according to the candidate's practical experience. The host institute obtains a certain sum of money for covering some expenses connected with the stay of the scholarship holder (medical insurance...). The home institute pays for the travel expenses.

The *International Union against Cancer (UICC)* grants another similar program. This institution endeavors, by the means of its grants, to facilitate knowledge and skills transfer to the places where they are needed. The grants are preferentially given to the applicants from developing countries, provided they pledge to return home after the scholarship is over.

Pan American Health Organization (PAHO), a regional subdivision of the *World Health Organization (WHO)*, offers the PAHO Fellowships.¹⁶ These scholarships are designated for the citizens of WHO member countries. The goal of these projects is to support international knowledge and skills exchange in the

¹⁵ http://www.ninds.nih.gov/funding/Intl_Neurol_Fellows_4-02.pdf.

¹⁶ <http://www.paho.org/English/HSP/HSR/fellowships.htm#fellow3>.

field of health care. The scholarship applicants must be currently employed in a national health organization or in a scientific or educational institute. The candidates must have at least two years professional practice, must be in good health condition, younger than fifty years, and must speak the language. A grant applicant is obliged to sign that they intend to come back to their homeland after the scholarship stay is over and apply the newly achieved knowledge there for a period of time depending on the length of the scholarship stay.

Those who get the scholarship for less than half a year pledge to one year work at their home institute, those with more than half a year up to two years pledge to two years work in their home country, and those with more than two years scholarship pledge to three years work at their home institute. The applicant's project must be in accord with the health strategies of their home country. The grant application must be accompanied by the candidate project and a support confirmation of the particular national Ministry of Health Care. The ministry has an important role at the process of rendering a scholarship. It may be even stated that a candidate is nominated for the grant by the Ministry of Health Care on behalf of the national government itself.

Also francophone countries give scholarships conditioned by the return of a student to their homeland. The international *Francophone World University Agency (L'agence universitaire de la Francophonie, AUF)*¹⁷ has the seat in Montreal and it is designed as a network of universities whose primary education language is French. The organization gives scholarships to promote the mobility among francophone universities and francophone scientists. The scholarships are designated for those francophone students who wish to spend a part of their studies in some other francophone country. The scholarship is not intended for the mobility between two "North" countries (e.g. France – Canada) but especially between the "South" and the "North" countries. The scholarships are given only under the condition that the applicant comes back to their homeland after the contract is over.

Although some programs in this group are funded by the recourses of one only state or a single national institution, the potential support beneficiaries are scientists and researchers from various countries. An example of this type is the program organized by the American *National Institute of Drug Abuse (NIDA)* offering scholarship possibilities for post-doctorate students working in medicine, public health, bio-medicine, behavioral psychology, and social sciences. The program named INVEST Research Fellowship¹⁸ is designated for post-doctorate

¹⁷ <http://www.auf.org/rubrique21.html>.

¹⁸ <http://www.international.drugabuse.gov/invest.html>.

2. The Policies to Influence the Migration of Highly Educated People

students with at least two years scientific practice who want to gain experience in some of the American research institutes. A yearly scholarship of this program comprises 36 000 US dollars plus 4000 US dollars more for health insurance and for activities connected with the candidate's professional growth. The grant applicant must provide a written confirmation of their home institute that after the end of twelve months scholarship stay they can return back to their former workplace. Besides, the scholarship holder gets a special J-1 visa whose holder must not get any other type of US visa for two years after the end of their validity and thus has to leave the USA in any case.

The Academy of Sciences for the Developing World, TWAS, which seats in Trieste (Italy) and is financially supported by the Italian government, offers a lot of scholarships belonging to this category. These are *Fellowships in Brazil*, *CAS-TWAS Fellowships for Postgraduate Research in China*,¹⁹ *DBT-TWAS Biotechnology Fellowship in India* etc. All these scholarships are only given provided the scholarship holder returns to their homeland after the grant terminates.

The German Foundation *Schering Stiftung*²⁰ supports talented scientists younger than 33 years working in biology, medicine, or chemistry. It offers short, maximally three months studying stays in laboratories in Germany or some other European country. The monthly scholarship is 1200 euro and the foundation also pays for the travel expenses. The nationality of supported scientists may change from time to time. Currently the support is given to Polish scientists and research workers. Also in this case, a *conditio sine qua non* is that the applicant returns home after the scholarship is over.

The Austrian institute of support for scientific migration and cooperation (*Österreichischer Austauschdienst, ÖAD*) coordinates The World Scholarship Programme.²¹ This program is designated for the support of mobility of students from developing countries. It is open for African, Asian, and Latin American students. It offers them scholarships for studies at Austrian universities. After the studies, the students have to return to their homeland or to some other developing country. If they do not do so they have to give the scholarship back.

Finally, some programs, especially those generated as a result of bilateral cooperation or by activity of one single state, are limited to potential beneficiaries from the particular states or state only. An example of such a program is the one organized by the French-Chinese Foundation for Science and its Application (*La Fondation franco-chinoise pour la science et ses applications, FFCSA*),

¹⁹ http://www.users.ictp.it/~twas/hg/CAS-TWAS_Postgrad.html.

²⁰ http://www.scheringstiftung.de/html/res/shortterm_fellowships.pdf.

²¹ http://www.oead.ac.at/_english/projects/eza/index.html.

belonging to the range of the French Academy of Science. The foundation coordinates a special program of post-doctorate scholarships²² supposed to support the French and Chinese cooperation. The program, created on the basis of a bilateral French and Chinese agreement, is designated for Chinese post-docs who wish to study eighteen months or two years in France. The condition of this scholarship is the commitment that the candidate returns to China after the studies. This program is open for various scientific disciplines but certain priority topics are being announced. The scholarships in the sum of 2300 euro a month (plus health insurance) are given to PhD. holders up to 35 years of age. The Chinese part does a pre-selection, the successful candidates are invited for an interview organized by the French part. It also pronounces the final decision about the candidates accepted.

A similar program is organized by the *Nuffield College* of the Oxford University in cooperation with Australian universities – Oxford Nuffield Medical Fellowship.²³ The scholarship is designated for the Australian scientists in medicine who wish to work in medical research in Oxford for two years (with the possibility of prolongation up to three years). An applicant gets a yearly taxable salary 38 628 to 42 163 pounds (about 57 000 to 62 500 euro), plus health insurance is paid, as well as work related travel costs during their work stay in Britain, return flight tickets for themselves and their whole family, and at every journey they are also provided 1500 pounds (about 2200 euro) for the transport of overweight luggage. The program states that the return of a scientist to Australia and their following work at some of the participating universities is expected. That is why the program even covers the costs of a possible safekeeping of furniture in some of the Australian depositories during the stay in the United Kingdom.

The programs administrated by the Columbian organization *Colfuturo* are an exclusively national activity. The organization was founded as non-profit, based on common initiative of the public and private sectors.²⁴ The organization gives students loans covering their studies abroad under the condition that they return home after the studies. This program funds foreign studies of 120 Columbian students a year. Each student gets a scholarship of maximally 25 000 US dollars a year, maximally for two years. Those who get the scholarship must return to their homeland by ninety days after their studies were completed and they must stay there for certain pre-defined time. The loans are provided by the Columbian

²² http://www.academie-sciences.fr/international/fondation_chine_gb.htm.

²³ <http://www.science.org.au/awards/nuffield.htm>.

²⁴ [http://www.colfuturo.org/index.php?page=54&owner=.](http://www.colfuturo.org/index.php?page=54&owner=)

2. The Policies to Influence the Migration of Highly Educated People

banks. Those students who come back and meet the conditions of the return are released from a substantial part of the loan (up to 45% of the total sum). If a scholarship holder does not come back, paying off the whole sum is required.

The scholarships for foreign stays with the condition of return, likewise the sandwich programs, use especially restrictive forms of policies in order to make the beneficiaries of the financial support come back home. Unlike at the sandwich programs, the restriction does not consist in a potential loss of the possibility to gain a diploma or qualification certificate but the potential sanction is usually financial. If a scholarship holder does not return to their homeland the grant agency may ask a partial or total return of the scholarship or possibly paying a pre-determined sum of money which compensates the costs of the agency bond with rendering the scholarship. In some cases it is even required that the financial support holder finds a warrantor to pay their debt in case they do not return home. Like this, the scholarship may sometimes approximate a loan where the financial institution not only secures the credibility of a client but also lowers the risk by the means of a warrantor. The financial sanctions when not fulfilling the pre-determined conditions make the programs of this type a more universal tool than the sandwich programs, designated especially for young people. But it must be mentioned that the commitment to return to the homeland is not always demanded under the menace of financial sanctions. In some cases a written commitment to return is required without a direct financial sanction of its possible breaking. This is for instance the policy of the Fulbright Commission in Czech Republic – before actually getting the scholarship a successful applicant must sign that after the stay in the USA they will live for at least for two years in Czech Republic.

2.3.1.3. Return grants for those who completed a stay abroad

Although the experience from abroad is very valuable for scientists and researchers, one of important barriers of a greater mobility of scientists is their anxiety that the stay abroad will limit the possibilities of their home career growth. The foreign stays are a great asset for the scientists themselves but the knowledge and experience are often not adequately appreciated in their home countries. Balter [1999] thinks many European post-docs who returned home after a long stay abroad faced difficulties in reintegrating to the home scientific community. Long foreign stays may deprive a scientist of the career growth at home and break the previously established work contacts and social networks. For this reason, it is becoming almost a custom in the international spheres that a financing institution, usually supranational, along with the support for long-term

scientific stays abroad, renders various grants and financial supports facilitating the return and reintegration of these scientists back to their home country and to their home scientific community. The main difference from the two previously mentioned types of programs is that the stimulus for the return is not a restrictive measure but motivation measure – the foreign stay scholarship holders are not forced to return but the potential return is facilitated to them by a financial contribution. However, such a financial contribution for facilitating their reintegration cannot be required – usually it must be applied for in a special selective procedure. Unlike the typical reintegration grants, the potential range of applicants is limited to those who have already obtained a foreign stay scholarship from the same financing institution.

Certain programs of the European Community can be a good example of this type of measure supporting the return of scientists to their homelands. On the platform of *Marie-Curie Actions*, the European Commission came with the offer of European Reintegration Grants²⁵ which should help a scientist to re-integrate if they decide to return to their homeland.²⁶ The grants are designated for the scientists from the EC and affiliated countries who worked abroad for at least two years, supported by the Marie-Curie programs or some older European grant programs. A researcher applies for the grant along with the host institution six months before the termination of their foreign stay. This program is intended for all scientific disciplines. In this program, a scientist gets a sum of up to 40 000 euro for covering the costs of the research project on which they shall work after the return. In case the workplace is in a new EC country, in an affiliated country, or in a less developed region of an old EC country, the program also contributes to the scientist's salary. If the grant is given, the European Commission contracts directly the scientific institution in the scientist's homeland so that their workplace is guaranteed.

Similarly, the *International Centre for Genetic Engineering and Biotechnology (ICGEB)* provides the so-called Return Grant²⁷ since the academic year 2004–2005. This grant is designated exclusively for those who absolved the ICGEB Postdoctoral fellowships. This project is intended to secure that scholarship holders return to their homeland with all the new knowledge and skills achieved during the ICGEB foreign stays. Those scholarship holders who have

²⁵ http://ec.europa.eu/research/fp6/mariecurie-actions/information/publications_en.html.

²⁶ Although this grant may be applied for by the scientists from another EC country the program explicitly states that it is primarily designated for the scientists-citizens of the country where they intend to move.

²⁷ <http://www.icgeb.trieste.it/FELLOWSHIPS/ReturnGrant.htm>.

2. The Policies to Influence the Migration of Highly Educated People

been living abroad for more than three years since the beginning of their scholarship stay are not authorized to apply for this grant. The application of a candidate must be added a confirmation of the host institute that the applicant will be allotted a place in a laboratory for at least the time of the grant. The application for the grant may also contain an application for sponsorship of purchase of necessary laboratory equipment which will enable the scholarship holder to continue their work on an international level.

More grants for the support of return are provided by the *Human Frontier Science Program (HFSP)*. This supranational organization supports original, innovative, and interdisciplinary basic research of the mechanisms in live organisms.²⁸ The scholarships are given under the terms of Long Term Fellowship Programme. After a successful termination of the project, former scholarship holders can apply for the Career Development Award²⁹ which facilitates their return to the mother country.

A similar approach may be also seen at the *International Brain Research Organization (IBRO)*. Unlike HFSP, IBRO serves the scientists in the field of neurology. The goal of this institution is to enable selected professionals from developing countries to gain a work experience in some of the best world laboratories oriented to these problems. At the same time, IBRO does not want to deprive the developing countries of their best labor force. Therefore, it expects successful graduates from these scholarship programs to come back to their homeland after terminating their work stay and to employ their newly achieved experience and knowledge at home. Already when rendering the Research Fellowships³⁰ or John G. Nicholls IBRO Fellowships, the IBRO prefers those candidates who declare their intention to return home after the program. In order to facilitate their returns, IBRO offers return grants. The *Return Home Programme*³¹ (RHP) is designated for young researchers who have already got some of the IBRO scholarship programs and who come from less developed countries. Its goal is to reduce brain drain from developing countries and help to turn it into brain gain. The elect candidates obtain a one-shot sum of about 15 000 US dollars. They should use this money for founding a laboratory or some other work activities that will enable them continue their work on an international level in their homeland. It is also expected that a scientist shall keep in contact with their host country even after returning home.

²⁸ <http://www.hfsp.org/>.

²⁹ http://www.hfsp.org/how/appl_forms_CDA.php.

³⁰ http://ibronew.alp.mcgill.ca/Pub_Main_Display.asp?Main_ID=225.

³¹ http://www.ibro.info/Pub_News_Display.asp?News_Id=1815.

The *Federation of European Societies (FEBS)* provides the reintegration scholarship named Fellowships Follow-Up Research Fund.³² It is supposed to help young scientists who have obtained the FEBS Long-Term Fellowships grant to start working on the return to their homeland. The period between submitting the application for a grant and termination of the scholarship program must not exceed eighteen months. The grants are given once a year in a one-shot sum of 20 000 euro. This money should be used for buying necessary equipment or other material which will enable the young scientist to continue their work in their homeland. However, this contribution can neither be used for covering the salary, reimbursement of travel expenses, conference fees, nor for publication costs.

After a work stay in Germany, funded by some of the following foundations, a candidate from a developing country or from a Middle or East European country may apply for a reintegration scholarship. The foundations are as follows: *Alexander von Humboldt Foundation*, *Roman Herzog Research Fellows of Hertie Foundation* and *Georg Forster Research Fellows*. The Return Fellowships³³ program is established exactly for this purpose.

A slightly different approach may be observed at the American foundation *The Pew Charitable Trusts* funding the program Pew Latin American Program Fellows³⁴ for the scientists in biomedical disciplines, coming from Latin American countries. The elect applicants will get a scholarship in the sum of 60 000 US dollars (about 44 000 euro) which should cover the costs of their two years stay in the USA. It is expected that a host American institute will contribute the scholarship holder with at least 5000 US dollars (about 3650 euro) a year in addition for their personal earnings and that it will pay their health insurance. If a scholarship holder returns to their Latin American home country they will get 35 000 US dollars (about 25 600 euro) in addition. This money may only be used for buying laboratory equipment and for the direct costs of the research after the return. This last part of the scholarship shall not be paid to a scholarship holder who does not return to their mother country.

The return grants for people who obtained the support for their foreign stay are a specific tool for scientists and researchers who successfully terminated their research project. The purpose of a return grant is to facilitate the continuation of a scientific project back in the researcher's home country. Usually it has the form of a one-shot financial contribution which covers the costs connected with

³² <http://www.febs.org/index.php?id=371>.

³³ http://www.humboldt-foundation.de/en/programme/stip_aus/stp_03_rueck.htm.

³⁴ <http://www.futurehealth.ucsf.edu/latin/description.html>.

2. The Policies to Influence the Migration of Highly Educated People

the research project, enables to equip a laboratory and purchase necessary technique instrumentation, less frequently it also comprises a contribution for covering personal expenses. It is based on the idea that a scientist shall be motivated to return home provided their return is eased. The financial contribution should overcome possible problems with the return. It is also expected that once the entrance barrier is broken through it is not necessary to support the scientist any more. That is why the programs of this type are usually just one-shot or short-term.

2.3.1.4. Reintegration programs

These programs are designated for the scientists who spent a long time abroad and now they wish to return to their homeland. They differ from the previous category in the aspect that they are open for a much wider spectrum of potential applicants, not only for those who have already got a financial support for leaving the country and for a work stay abroad in the past. The way how these potential reintegration grants and support receivers have got abroad is not being investigated. The goal of these programs is not only to facilitate return of experts to their home countries but also the continuation of their work on an international level. In practice, these programs are either multinational, open for the applicants from various countries, or national, exclusively or especially designated for the citizens of the state providing the financial recourses for the program. While multinational programs typically endeavor the circulation of knowledge and know-how, usually from more developed to less developed countries, or possibly the knowledge and know-how transfer to a particular region or a group of countries, national programs are rather characterized in their effort to gain knowledge and know-how from the world and increase the competitiveness of a particular state. In the text as follows, we shall discuss both these categories of programs separately.

2.3.1.4.1. Multinational programs

The *International Organization for Migration (IOM)*³⁵ organizes programs with a very special reintegration function. This organization is widely engaged in international migration, it attempts to do something like a “management of international migration”. One of the main occupations of the International Orga-

³⁵ IOM was founded already in 1951. On the basis of the the inciative of Belgium and the USA, the *Preliminary International Committee for Trends in European Migration (PIC-TEM)* was founded, later the *International Committee for European Migration (ICEM)*. Since 1989 it has worked under the name of IOM.

nization for Migration is the assistance at voluntary returns of expatriates back to their home countries. This activity has been recently extended by helping with a following individual reintegration in a home country. These reintegration programs are not selective in the terms of education – they concern returning of expatriates generally, not only those highly educated ones. However, IOM has a lot of more specific activities. For instance, in 1964 it started to run the programs “Migration for Development”. These programs support steered mobility in the way that all the participating countries benefit from it (it offers help in foreign workers sourcing for certain sectors of economy, intermediates journeys etc.). In 1974, the program “Return of Talents” was set in go. Its goal is the return of Latin American experts living out of their home country.

The program The Return of Qualified African Nationals (RQAN)³⁶ was started already in 1983 in three pilot African countries (Kenya, Somalia, and Zimbabwe) and it has spread to other countries. Its goal was the endeavor to the return and reintegration of qualified Africans living abroad. Between 1983 and 2000 it succeeded in attracting 1500 African experts back to Africa. The participating countries are divided into two categories: target and non-target countries. In the target countries (Angola, Cape Verde, Ethiopia, Ghana, Guinea Bissau, Kenya, Uganda, Zambia, and Zimbabwe), priority sectors are determined for which the RQAN program not only searches convenient experts but also intermediates finding a particular job. In the non-target countries (all other Sub-Saharan countries except for South Africa), RQAN contributes for a return but it does not actively help in finding a job. Highly skilled people wishing to come back are paid the expenses of move, return airplane ticket for themselves and their family, they are given money for workshop equipment and necessary material, get reimbursed possible costs of a further education in Africa, and they are provided with a financial support for facilitation of their reintegration. The supported applicants must be citizens of participating African states with necessary qualification, PhD. degree, at least two years of practice, and must have lived out of their homeland. If a person comes from a non-target country, for getting the support they have to document that they have found work by themselves [Lowell 2001].

Migration for Development in Africa (MIDA)³⁷ is a new program created with the cooperation of the *International Organization for Migration*, *The Organization for the African Unity (OAU)*, and the *African Development Bank (ADB)*, with a financial support of international organizations. The goal of this

³⁶ http://www.iom.int/africandiaspora/DDG_Addis_Abeba_2000_02_22.htm.

³⁷ <http://www.belgium.iom.int/Mida2/presentation.asp>.

2. The Policies to Influence the Migration of Highly Educated People

program is to support the return of Africans from diaspora, not only permanent or long-term, but also short-term. Under the terms of MIDA project, there are some other specific sub-projects with the orientation toward a special region or discipline, like e.g. MIDA Great Lakes Project³⁸ oriented to the support for short-term stays or possible reintegration of experts living in Belgium and coming from the Democratic Republic of Kongo, Burundi, and Rwanda, or MIDA Italy³⁹ concentrated on the Sub-Saharan African citizens settled in Italy and the possible reintegration in their home countries.

An example of much more specific international reintegration program is the Reintegration Grant⁴⁰ administrated by NATO within the program *Science for Peace and Security*. This program is designated for young scientists coming from the NATO member countries who have spent at least half a year in another member country and work in the field of security research. An applicant must not apply for the grant earlier than three months before the termination of their foreign stay and later than twelve months after its termination. The grant is intended only for those who absolved postgraduate studies (maximally five years after the graduation) and PhD. students. It is rendered for the period of three years, provided the applicant, on the basis of their research project, gets a position in some host institute in their home country. The host institute is important because the applicant gets one part of the grant and the institute gets the other part for covering the necessary costs of their reintegration. An institute must not administrate more than three grants at a time. The grant holder can use the money for establishing a scientific team and for further expenses connected with their scientific career, including their participation in international conferences. The research project must somehow touch the problems of security. The total sum of grant oscillates between 20 000 and 25 000 euro according to the reintegration country.

The *European Community* provides the International Reintegration Grant⁴¹ under the terms of the mobility program Marie Curie Actions. It is designated for experienced scientists-citizens of a member or associated EC country, who have worked for at least five years in science somewhere out of Europe. The topic of a grant project is not predetermined and the applicant may suggest it by themselves. The sense of these grants is to attract scientists to come back to Europe so that the European research institutions may exploit their experience

³⁸ <http://www.iom.int/jahia/Jahia/pid/1322>.

³⁹ <http://www.iom.int/jahia/Jahia/pid/1324>.

⁴⁰ http://www.nato.int/science/nato_funded_activities/grant_mechanisms/rig-nfa.htm.

⁴¹ http://ec.europa.eu/research/fp6/mariecurie-actions/information/publications_en.html.

and skills. It need not necessarily concern return to their home country but an EC citizen may also return to some other EC country. Along with the researcher, the future host institute also applies for the grant and it commits itself to provide a successful applicant with a work position for at least three years. The grant itself may comprise a sum of up to 80 000 euro, and should cover the costs of the realization of the grant project. It must be spent during the first two years of the project lasting and must not be used for the very salary of the returned scientist.

Another international project oriented to Europe as a target migration region is the European Young Investigator Awards (EURYI)⁴² established on the basis of cooperation between the *European Heads of Research Councils (EUROHORCS)* and the *European Science Foundation (ESF)*. This award is designated for promising young scientists of all scientific disciplines, regardless their country of origin. The EURYI is given for five years, funded with 750 000–500 000 euro according to the complexity of the program approved. The goal of this project is to support excellent young scientists (2–8 years after their PhD. graduation) and enable them to create their own team in the EC scientific institutes. The award declares it should contribute to the creation of a creative scientific background in the EC and thus contribute either to the attraction of young elite scientists from the whole world, and to the motivation for young European scientists, currently working out of the EC, to return home.

Another example of a European program is the Strategic Development Installation Grants⁴³ offered by *The European Molecular Biology Organization (EMBO)*. This grant is intended to encourage skilled scientists to establish independent laboratories in some of the EC member countries. This grant is funded by the particular member countries and it provides a yearly support of 50 000 euro. The condition for obtaining the grant is that the applicant must spend two consecutive years out of the country where they apply for this support. The grant is not primarily intended as a support for the return to a home country but it may be utilized for this purpose. The organization *The Wellcome Trust* is oriented towards another group of potential target countries of the migration of excellent research workers. It came with the program International Senior Research Fellowships.⁴⁴ The main goal of this project is to support the return of excellent scientists in medicine or natural sciences who have spent a long time working abroad and now they wish to come back to their mother country and start their

⁴² <http://www.esf.org/euryi>.

⁴³ <http://www.embo.org/yip/sdig.html>.

⁴⁴ <http://www.wellcome.ac.uk/node2139.html>.

2. The Policies to Influence the Migration of Highly Educated People

scientific career in some of the academic institutions in certain countries (Czech Republic, Estonia, Hungary, Poland, India, or South Africa). A grant applicant must be a PhD. diploma holder and they need not be necessarily citizens of the countries where they want to return but the grant propositions mention this as highly desirable. The grant is applied for by the researcher along with the future host institute which will provide them with a work position and necessary equipment and will also be their sponsor. The Welcome Trust will provide the host institute with financial recourses which may be used for paying the researcher's salary as well as the expenses for the very research, equipment, personal expenses of possible collaborators on the research project, or travel expenses for foreign conferences. An institute applying for the grant for the first time must be assessed as for its capacity to accept the particular applicant.

The Research and Training in Tropical Diseases program is even more specific since it is concentrated on the research and education in the field of tropical diseases. It is an independent worldwide program for scientific cooperation. It was founded in 1975 and it is co-sponsored by *UNICEF (United Nations Children's Fund)* and *UNDP (United Nations Development Programme)*, *World Bank* and *WHO (World Health Organization)*. Its goal is to help in coordination, support, and influence the fight against the diseases affecting poor and developing countries. This organization offers the Re-entry Grant⁴⁵ whose effort is to facilitate a career growth to young scientists from developing countries who wish to return to their homeland and continue their research there. This grant is given on the basis of a competition. The assessment board evaluates not only the quality of an applicant and their research project but also their plan of career growth which must be prepared in cooperation of the applicant and the research institution in the target country. It is given for three years, in the maximal sum of 40 000 US dollars. The applicant must come from a country where there are tropical diseases.

A specific case of a multinational reintegration program is the Spin Postdoc Programme⁴⁶ coordinated by the *Royal Netherlands Academy of Arts and Science, DNAW*. This program is designated for Indonesian post-doctorate students supporting building their scientific career in Indonesia after the studies in the Netherlands.

⁴⁵ <http://www.who.int/tdr/grants/grants/reentry.htm>.

⁴⁶ <http://www.knaw.nl/cfdata/indonesia/spin.cfm>.

2.3.1.4.2. European national programs

AUSTRIA

Also Austria endeavors to reduce its brain drain. For this purpose, there is the program Brain Power Austria,⁴⁷ a part of the program Human Resource. This project has been created as an initiative of the Federal ministry of transport, innovations and technologies (*Bundesministerium für Verkehr, Technologie und Innovation, BMVIT*). It is a very complex program comprising a lot of activities. Some of them are directly aimed to the support for returning of Austrian researchers back to Austria. For example, the Interview Grants cover 80% of the travel expenses for coming to Austria to take part in a tender. There is a board to decide about rendering the grant but all registered applicants should obtain it provided they apply for it at least one day before the interview. In 2006, this grant was given to 21 applicants.

Project Grants sponsors researchers who are preparing a grant leading to creation of a work position in science in Austria. This grant covers the travel expenses to Austria. The Relocation Grants in the maximal total sum of 1000 euro is provided as a contribution for the move expenses for those who have received the Interview Grant and have found a job in Austria.

Besides, the Brain Power Austria organizes individual consulting service and individual support for those scientists who are considering their possible return to Austria. The support comprises also a help with housing, schools for children and jobs for family members. This project enjoys a great government support. In 2003, the government decided to subsidize this program with 600 million euro for 2004–2006 [Vavrečková et al. 2005].

BELGIUM

Belgium intensively supports the migration of scientists and also their return home. There have been created several government-backed programs supposed to help scientists with their return and following reintegration. For example the Federal Office for Policy in Science (*Politique scientifique fédérale/Federaal Wetenschapsbeleid*) coordinates special Return grants for Belgian researchers working abroad.⁴⁸ This program is designated for highly skilled Belgian PhD. scientists who worked abroad for at least two years and wish to come back. The grant is rendered for 24 months. The interested scientists must present their research project and simultaneously they have to be accepted by some of the

⁴⁷ <http://www.brainpower-austria.at>.

⁴⁸ http://www.belspo.be/belspo/home/calls/retour06_en.stm.

2. The Policies to Influence the Migration of Highly Educated People

scientific teams funded by the Belgian federal government. The grant provides a scientist with a full-time job salary for one year (according to their experience and qualification, minimally 1750 euro/month), 1250 euro for travel expenses and a further sum of 12 500 euro facilitating the creation of a work position in a host institute. The second year of the project, the host institute must pay the scientist's salary with its own recourses. The goal of the grant is the return of a scientist to Belgium and their long term work within the Belgian academic community.

Besides the federal Belgian programs there are also special "regional" grants oriented towards the gain of scientists for particular language communities within the Belgian state. The Odysseus programme⁴⁹ sponsored by the Flemish government and organized by the Flemish foundation for research (*Fonds Wetenschappelijk Onderzoek – Vlaanderen, WFO*) is an example. This grant is designated for excellent Belgian scientists of all fields (including humanities and social sciences) who have built their career abroad and they can continue on one of the best Flemish universities. The program of financial support is designed for five years. The sum of the support is between 100 000 and 150 000 euro a year, according to the excellence of the scientist and financial demands of the project. The scientists may found a new scientific team with this money, or a completely new approach to the scientific research. The application to the tender is submitted by the applicant themselves. The application must contain a testimonial of the host Flemish university and its vision of a long term involvement of the applicant and their possible new research team within the university structures. The Flemish government earmarks 12 million euro a year for these grants.

DENMARK

In Denmark, there is also a program for the gain of excellent Danish scientists from abroad. Unlike in Belgium, this endeavor is not organized by the state but by a private pharmaceutical company *Novo Nordisk* oriented to the development, production, and sale of drugs for diabetics. The company has created a special grant pattern Return Fellowship within the existing pattern Novo Nordisk Training and Research Programme,⁵⁰ oriented towards Danish scientists working abroad. An applicant must first make an agreement with one of the Novo Nordisk institutes in Denmark. If there is a mutual compact the applicant sub-

⁴⁹ <http://www.fwo.be/en/FWONews2.aspx?ID=e27a38cb-7aa2-4aa6-9b2f-6dd8d4730668&L=en>.

⁵⁰ http://www.novonordisk.com/jobs/return_fellowships/return_fellowships_2006.asp.

mits an application to a tender. An elect applicant gets the grant of a total sum of maximally 750 000 Danish crowns (about 100 000 euro). This money shall cover the salary for one or two years and the expenses of the move. If the co-operation in the research is successful, they are offered a permanent job and the possibility of continuing their research.

FRANCE

In France there are more programs for the support of returning French scientists to their homeland. As in Belgium, these are primarily funded from public sources and organized by public institutions. One of the most known programs for manpower gain for the French science is the “Chairs d’excellence”.⁵¹ This program helps both excellent foreign scientists and excellent French scientists working abroad for a long time with their integration or reintegration to the French scientific community. The goal of this program is the support for innovative and original scientific projects. The program is supposed to help a scientist found their own research team and run a promising ambitious project. The candidates come to France for temporary or permanent stay. The *Agence Nationale de la Recherche (ANR)*⁵² is responsible for this project and for its costs. The Agence is charged with this quest by the Ministry of higher education and science (*Ministère de l’Enseignement supérieur et de la Recherche*). The candidates are assessed on the basis of their application, sent to the tender by themselves and by the organization interested in accepting them. The decisive factors are the quality of the project, the hitherto results achieved by the applicant, potential importance of the proposed project for the French science, and also the amount of money that the host scientific institute is willing to put into this project, and the workplace conditions the institute is willing and capable to create for the scientist. The applicants need not be necessarily French but also foreigners provided they settle down in France. The following process is very selective – for 2006, only six places were offered for younger scientists and juniors and five places for senior scientists. The junior workers are normally subsidized with 400 000 euro, of which 200 000 is for the first year. For senior workers it is 800 000 euro, 400 000 of which for the first year. However, this money is not being used exclusively for the applicant’s salary but also for the costs of the operation and equipment of the workplace. It is expected that the accepting institute shall partake on funding the project.

⁵¹ <http://www.recherche.gouv.fr/appel/2004/chairesexcellence.htm>.

⁵² <http://www.agence-nationale-recherche.fr>.

2. The Policies to Influence the Migration of Highly Educated People

A little more specialized is the state organized and funded project “Initiative Post-Doc”⁵³ directly designated for encouraging young French post-docs in natural sciences working abroad to come back to France. The goal of this program is to encourage young French scientists to return home, help them with this return and with their professional reintegration to the scientific or educational institutions in France. The program offers a one-shot contribution of up to 5000 euro for travel expenses and for the living costs in France for a period of time when the applicant is looking for an institution willing to accept and employ them.

Young scientists in medicine may use the project Avenir⁵⁴ administrated by the French National institute for health and medical research (*Institut national de la santé et de la recherche médicale, INSERM*). This program was set in go in 2001. It is intended to support innovative scientific projects of young scientists who may face difficulties with its realization in French scientific institutes under normal conditions. The primary goal of this three years program is to enable young scientists to work on original scientific projects. The program is not limited by the applicant’s nationality; it is designated for all young promising scientists regardless the country of origin. Although the primary purpose of the program is not to attract French scientists working abroad to return home, in practice it is employed this way (in 2001, 85% applicants had French citizenship). The program counts with a yearly financial subvention of 60 000 euro. It provides the elect applicants with a work space, access to top equipment, possibility to create their own work team, and for the post-docs an additional monthly contribution of 2300 euro. This program is funded from more sources. It is subsidized by the Ministry of health care, charitable organizations, hospitals, and municipalities. In 2001, 196 candidates applied for this program. The board of French and foreign experts assessed the individual candidates and the projects proposed. 60% candidates were men, 98% were post-docs. Average age of a candidate was 33 years. Altogether 26 project were chosen for the subvention.

For young workers in medicine who have lived a longer time abroad there is also the Programme d’urgence FRM post-doc⁵⁵ organized by the Foundation for medical research (*Fondation recherche médicale, FRM*).

The organization *Genopol*, founded in 1998 as an initiative of French government, local authorities, and the French association against myopathy, also has the return of French scientists back to France as one of its goals. *Genopol* has

⁵³ <http://www.recherche.gouv.fr/appel/2004/programmepostdoc.htm>.

⁵⁴ http://www.inserm.fr/fr/presse/dossiers_presse/att00000407/2octobre2002.pdf.

⁵⁵ http://www.frm.org/demandez/dem_projets_urgencefrm_accueil.php.

an original conception. It wants to create a space for the contact of academic and private laboratories, biotechnological companies, and university institutes. Its goal is to facilitate the development of biology and related disciplines. *Genopol* coordinates the program Atige⁵⁶ oriented to the return of scientists who absolved at least a part of their studies in France. *Genopol* provides them with financial recourses for maximally two years.

FINLAND

Also the Finnish Academy (*Suomen akatemia*) offered return grants for Finnish scientists living abroad for a long time. Subsidy for researcher's return to Finland⁵⁷ was designated for students and scientists who have worked abroad for at least two years and have had no work contracts in Finland during this time. When submitting the application, the candidates had to have a permanent workplace promised by some of the Finnish research institutes. These research institutes were also responsible for securing necessary equipment for the scientific work of the researcher.

Finnish academy (*Suomen akatemia*) and the Finnish agency for funding technologies and innovations (*Teknologian ja innovaatioiden kehittämikeskus, TEKES*) co-organize the Finland Distinguished Professor Programme – FiDiPro.⁵⁸ The goal of the program is to attract top quality professors or top scientific workers from abroad to Finland. The program is open both for scientists of Finnish nationality and for foreigners. The sense of this project is to enhance the quality of Finnish science. The program funds research projects of 2 to 5 years of duration. In 2006, altogether 24 grants were rendered in the total sum of 17,5 million euro.

GERMANY

In Germany, there are plenty of programs aimed to the support for the return of scientists. Their organizers are both public service institutions and private or company foundations.

The non-profit organization *German Scholar Association (GSO)*, with financial contribution of Alfried Krupp von Bohlen und Halbach Stiftung, organizes the program *Rückkehr deutscher Wissenschaftler aus dem Ausland*.⁵⁹ This program is specifically oriented to German university graduates working abroad who

⁵⁶ http://www.genopole.org/html/en/connaitre/cite/politique_emploi.htm'return.

⁵⁷ http://www.lboro.ac.uk/departments/eu/Funding_EU.html.

⁵⁸ <http://www.fidipro.fi/>.

⁵⁹ <http://www.gsonet.org/de/kruppApply.php>; <http://www.gsonet.org/shared/articles/Krupp/KrupPresse.pdf>.

2. The Policies to Influence the Migration of Highly Educated People

wish to get a professor position in Germany. The application is submitted by the university interested in employing a German scientist from abroad as a professor. The condition is that in the moment of the application for support, the professorial procedures are already officially started. The applying university itself secures basic funding of the professor's post. The support rendered is only considered an addition in order to provide the applicant with an "appropriate salary". It is also possible to fund salaries of their scientific collaborators, the move expenses, and other material costs. The time of support is up to five years, its maximal sum is 100 000 euro plus a contribution for the travel expenses connected with the professorial electoral procedures. Every year 8 to 12 elect applicants are subsidized.

The foundation *Volkswagenstiftung* organizes and sponsors the program Lichtenberg-Professur der VW Stiftung.⁶⁰ It offers three types of professorships. One of them is for young scientists in innovative disciplines (until 7 years after the termination of their doctorate studies) who have changed their research institute during the last five years. It is designated mostly (but not exclusively) for the applicant living currently abroad. The application is submitted by the applicant themselves along with the university where they want to work. The university pledges to keep their professorship also after the foundation subsidy is over. It also takes over a part of the expenses (10%). The money is paid to the university, not directly to the researcher. It is designated for salaries and material research expenses, not for overheads. The support lasts for five to eight years and its total sum is up to 0.8–1.5 million euro for the first five years, then it is gradually reduced during the following years. Altogether 6 to 8 scientists are subsidized yearly.

The foundation *Kind-Philipp* organizes and funds the program Kind-Philipp-Rückkehrstipendien.⁶¹ It consists in the support for young scientists up to 35 years of age who want to work in a clinic as well as in the medical research. The applicants may be German scientists working abroad or in some German research institute. The support usually lasts one year. It covers salary, possibly also additional research expenses.

The German Society for Research (*Deutsche Forschungsgemeinschaft, DFG*) is the most important as for the volume of financial recourses given for subsidizing of this type. It offers the Emmy Noether Programme designated for young scientists of all scientific disciplines with at least two years and maximally four years of post-graduate experience who spent at least 12 months abroad during

⁶⁰ http://www.volkswagenstiftung.de/fileadmin/downloads/merkblaetter/MB_79_d.pdf.

⁶¹ <http://www.stifterverband.org/pdf/kind3.pdf>.

their doctorate studies or in their post-graduate term.⁶² An applicant need not be necessarily in a foreign country when presenting their research project and applying for the subsidy. They have to have a workplace promised by a chosen research institute in Germany. The subsidy funds the work of the research team including their salaries and the salary of its leader (the applicant), and necessary equipment. It is first rendered for three years with a possible outlook for two years more. In 1999–2006, altogether 330 applicants were subsidized, among them 20 who applied from abroad.

IRELAND

In the recent years, Ireland has been very successful in attracting its skilled labor force back home. Most of the educated Irish people return to their homeland, attracted by its quick economic development and the new perspectives. Although Ireland has lately become an attractive migration country, there are still some special policies for recruitment of scientists and researchers of certain disciplines. An example may be The President of Ireland Young Researcher Award (PIYRA) rendered and coordinated by the *Science Foundation Ireland (SFI)*.⁶³ This institution awards young scientists of Irish nationality (or foreigners) working abroad in the fields of biotechnology, engineering, and information technologies. This award is supposed to fund their research in Ireland for five years. The foundation gives out up to 1,2 million euro, including 30% contribution for indirect costs. In one year, up to ten young top scientists may be awarded from this source.

ITALY

Since 2001, the project *Rientro dei cervelli* (Return of brains)⁶⁴ has been running, organized by the Ministry of universities and research (*Ministero dell'Università e della Ricerca, MiUR*). This program is primarily aimed to facilitate the return of Italian scientists from abroad to their homeland but it also allows funding work stays of foreign scientists in Italy. An applicant for financial support from this program must have worked in research for at least three years before submitting the application. The application is submitted by the particular university interested in employing the scientist from abroad. The elected scientists get the work contract with the university for three to four years. The financial support holder must work in research and also partake on the teaching.

⁶² http://www.dfg.de/wissenschaftliche_karriere/emmy_noether/index.html.

⁶³ http://www.sfi.ie/content/content.asp?section_id=418&language_id=1.

⁶⁴ <http://www.webalice.it/mvendruscolo/english.html>.

2. The Policies to Influence the Migration of Highly Educated People

The main goal of the program is to offer Italian scientists and researchers working abroad an opportunity to work in their homeland, renew their professional contacts with the Italian scientific community which may have been lost, and share their experience and know-how with the new generation of Italian students – future researchers. It is also expected that a financial support holder shall bring contacts to important foreign institutes, common projects and their own social networks from which the Italian scientific community may benefit even in the case that the scholarship holder does not settle down in Italy for ever. The existing experiences with the program show that most of the beneficiaries leave back for abroad after the termination of the contract because it is easier for them to gain their scientific position out of Italy. The program is not limited to specific disciplines, the applications of all fields are welcomed. Most of the scholarship holders are natural scientists. In 2001–2005 altogether 96 of them received the subsidy [Giannoccolo 2006].

POLAND

In Poland, the Foundation for science (*Fundacja na Rzecz Nauki Polskiej, FNP*) administrates a certain type of reintegration program. The program Homing⁶⁵ is designated for young scientists of Polish nationality up to four years after their PhD. graduation who have already achieved important scientific outcomes. The application for a grant must be accompanied by a clearly defined research project, documentation of the collaboration with a host institute, and continuation in their scientific career must be guaranteed. The foundation renders about 15 grants a year. The grants are given for two years, with the possibility to be prolonged to three years. A scholarship holder receives 50 000 zloty (about 13 300 euro) a year from this grant. This sum contains a personal scholarship and also money for realizing the scientific project. The goal of this program is to attract young excellent Polish scientists from abroad back home by offering them more favorable work conditions and helping them with their reintegration to the Polish scientific community. The cooperation with a former host institute of such scientists is also a matter of effort.

ROMANIA

The Romanian National Committee for University Research (*Consiliul National al Cercetarii Stiintifice din Invatamantul Superior, CNCSIS*) organizes the Annual Program for Young Reserachers.⁶⁶ One of the main goals of the program is to

⁶⁵ http://www.fnp.org.pl/ang/programy/homing_more.html.

⁶⁶ <http://www.cnscis.ro/English/Granturi/program%20tip%20At.pdf>.

encourage young scientists who have already begun their research work in some of the foreign universities or research institutes to continue this research in Rumania, gain scientific and management skills and build their own team for a long-term career in their homeland. The financial support may be applied for by the university where the team should be founded. A team means an individual or a group of people of maximally 35 years of age. The team leader must be a doctorate student or a PhD. and must have a workplace promised by a Rumanian research institution which submits the application for the subsidy. The selected projects are funded for the time of one to two years. The grant may cover salary, social and health insurance, material expenses and investments connected with the project, travel expenses, publication costs, and the host institute overhead.

SPAIN

The Ministry of education and science (*Ministerio de Educación y Ciencia*) coordinates the Ramón y Cajal Programme.⁶⁷ It is designated for PhD. graduates in all scientific disciplines. The elect applicants are offered a five years contract with a yearly salary of 31 650 euro, 15 000 euro subsidy for related scientific activities, and a chance to coordinate their own project. An applicant must be at most ten years since their PhD. graduation and has at least one year practical research experience. The program is not exclusively for Spanish people but in practice they are those who receive the support. Ramón y Cajal Programme is a follow-up to an older Programa 13. This program was also aimed to gaining Spanish scientists from abroad back to their home country.⁶⁸

Besides the previously mentioned general program there is also a specific endeavor of the Spanish government to be noted, aimed to getting back the Spanish expatriates working especially on the subject of human stem cells research.⁶⁹ The government promises to provide the scientists with necessary infrastructure and material allowing them to work on these projects in Spain. Spain hopes in European subsidies and also plans to earmark some national and regional funds for the realization of this project.

SWEDEN

The Swedish foundation for strategic research (*Stiftelsen för Strategisk Forskning*) offers special return grants Ingvar Carlsson Award.⁷⁰ This foundation

⁶⁷ http://www.mec.es/ciencia/jsp/plantilla.jsp?area=cajal_eng&id=20.

⁶⁸ http://www.mec.es/ciencia/jsp/plantilla.jsp?area=cajal_eng&id=6.

⁶⁹ <http://typhlophile.com/medical/2004/01/02.shtml>.

⁷⁰ <http://www.stratresearch.se/eindex.html>.

2. The Policies to Influence the Migration of Highly Educated People

identifies young qualified post-docs (maximally three years after their graduation) who continued their scientific work abroad for at least eight years after their studies. The goal is to offer them a return home and enable them an independent innovative research in Sweden. There is no precise field of research established but applied research is considered priority to basic research. The research in natural sciences, technologies, and medicine is preferred. 8–12 grants are given out yearly, each one offering 2–4 million Swedish crowns (about 215 000–430 000 euro) for covering the costs of the research including the creation of a research team and purchase of laboratory equipment. In addition, each elect applicant is offered a monthly scholarship of 50 000 SEK (about 5400 euro). This grant can cover a scientist's salary for maximally three years.

SWITZERLAND

The program FNS/SNF Professorships⁷¹ administered by the Swiss national foundation (*Fonds national suisse/Schweizerischen nationalfonds, FNS/SNF*) is designated for the scientists who wish to create their own team in order to work on a certain project, for potential scientists or research workers who wish to work in some of the academic institutions, but also for those who wish to come back from abroad and continue their career in some of the Swiss institutions. The support is provided to the disciplines comprised in a FNS/SNF priority list. However, this list is rather long and on nine pages it contains a major part of common disciplines from humanities and social sciences to natural science, engineering, and medicine. The subsidy covers the salary of a successful applicant on the level of assistant professor, i.e. 34 000 to 40 000 Swiss francs (about 20 500 to 24 000 euro) a year, health and social insurance, the research expenses (including wages for possible co-workers), and a contribution for a necessary infrastructure. The total time of the project is three years, with the possibility of prolonging it by two more years. The support may be applied for by candidates with Swiss citizenship, or graduates from a Swiss university, or those who have worked in some Swiss university for several years, have a doctorate, have worked several years in research in Switzerland and abroad, have a several years experience from some other research institute (not their home institute), have published their texts in scientific magazines with a high impact factor, and are younger than 40 years. Woman-applicants may be also provided with a part-time job or they may be given an exception from the age limitation. Preference is given to those candidates who, besides their research practice, are also experienced in education and management of research projects and in cooperation with other

⁷¹ <http://www.snf.ch/e/funding/individuals/snsfprofessorship/seiten/default.aspx>.

scientific institutes on international level. Every year this subsidy is provided to about 30 people.

UNITED KINGDOM

The *Wolfson Foundation* and the governmental *Office for Science and Technology* give the Royal Society Wolfson Research Merit Awards⁷² to about 25 applicants working in some natural science, engineering, or medical disciplines. This award contributes to uplift the quality of British universities by helping them gain excellent scientists with a great scientific potential from abroad, but also to keep those experts who otherwise would search for a better financial recognition out of academic institutions. It is not aimed exclusively to the UK citizens. The applicants may be of any nationality. They must have guaranteed a permanent post in some British university. This grant is given for five years. The university commits itself to pay the applicant's salary and to provide them with a work space, equipment, and funds for realizing the research project. The subsidy provided is supposed to improve the standard university pay of the elect applicant and make their work position more attractive. The sum of such bonus is 10 000–30 000 pounds (15 000–45 000 euro) a year.

The British Royal Society offers the Royal Society Research Fellowships.⁷³ This prestigious scholarship is given every year to four internationally renowned scientists of all nationalities who have achieved extraordinary outcomes in their fields. The applications of British scientists living currently abroad but wishing to come back are especially welcomed. The grant is given for five years with the possibility to be prolonged up to 15 years, but maximally until 55 years of age of the scholarship holder. An applicant must have secured a job in some university. The university must create a new, previously not existing workplace for the applicant, and must pledge to fund this work position from its own sources after the termination of the grant. The yearly salary is 72 000 pounds (107 000 euro), the university itself may offer another contribution. The scientist is given 35 000 pounds (about 52 000 euro) for initial expenses and 16 000 (about 24 000 euro) pounds more are paid to them yearly for covering common research expenses. In addition to that, a host organization shall be paid 80% of operation expenses connected with the work of the scholarship holder (the work space and other indirect costs). This award is provided to the experts of all scientific disciplines. The Royal Society also offered a UK Relocation Fellowships⁷⁴ designated for

⁷² <http://www.royalsoc.ac.uk/funding.asp?id=1127>.

⁷³ <http://www.royalsoc.ac.uk/funding.asp?id=1126>.

⁷⁴ <http://www.royalsoc.ac.uk/publication.asp?id=4145>.

2. The Policies to Influence the Migration of Highly Educated People

the scientist's move. The goal of this project was to support scientists and engineers wishing to follow their partners who have changed their workplace, either at a long distance within Britain, or from abroad to Britain. The goal was to facilitate a scientist to continue their scientific career. The support was for all fields, an applicant had to be PhD. and have worked for at least three years in science. This program was designated for the citizens of EU, Norway, Iceland, and Liechtenstein, or for those who studied and worked for at least three years in these countries. The subsidy was given for two years and it covered 80% of expenses for the labor force plus 13 000 pounds (about 19 000 euro) for research expenses in the first year and 11 000 pounds (about 16 000 euro) in the second year. The goal of the program was to offer a scientist the time for finding a permanent post in science. Every year the scholarship was rendered to about 8 candidates.

2.3.1.4.3. Non-European national programs

CANADA

Canadian government has adopted the strategy of becoming a world leader in knowledge economy. As a part of this strategy, the institution Canada research Chairs/Des Chaires de Recherche du Canada⁷⁵ was founded and it started to organize a homonymous program for this purpose. In 2000, the government of Canada earmarked 900 million dollars in order to create 2000 workplaces for excellent scientists and research workers (45% in natural and technical sciences, 35% in medical research, and 20% in social and human sciences) in Canadian universities. This sum was then increased by 250 million dollars rendered by the Canada Foundation for Innovation/Fondation canadienne pour l'innovation. All 2000 places should be assigned by 2008. This Canadian program is probably the most ample in this category in the world regarding its ambitions and the volume of money invested. Since a huge amount of money is concerned, the Canadian government also ordered an independent assessment of the program results. After five years of effectuation, the consulting company R.A.Malatest & Associates⁷⁶ made the assessment. The statistic data collected by the program organizer and 51 participating universities were used together with 244 reports on grant projects, personal interviews with 53 participants (financial support holders, universities), questionnaires from 606 financial support holders, 1119 other Canadian scientists and 39 unsuccessful applicants, and nine detailed case studies of

⁷⁵ http://www.chairs.gc.ca/web/home_e.asp.

⁷⁶ http://www.chairs.gc.ca/web/about/publications/fifth_year_review_e.pdf.

successful applicants. The results unfold that the program has been successful in brain gain back to Canada. 85% of the questioned people declared the money offered by this program as a key factor for moving to Canada. However, it was not quite clear if they come for a long time or for ever, or only for the period financed by the program. A significant part of the addressed financial support holders (23%) are convinced they will have to leave Canada soon again if the special financial support by the assessed program does not continue. In practice, just a few cases have been observed that a financial support holder does not complete their planned stay in Canada and leave for abroad. It was also clear that the decision of the scientists addressed about a possible further migration is a complicated matter, influenced not only by the sum of financial recourses provided by this program for their disposal but also many other factors, including factors not connected with their own work and career. Although the program Canada Research Chairs was not designated exclusively for the citizens of Canada the evaluation showed that the supported individuals are all Canadian. The supported scientists met the expectations as for their scientific productivity, a number of publications, patents and other application outputs, and also as for their ability to gain more money for their research from other sources. The involvement of the financial support holders in the Canadian scientific community also proved to be very good. Especially the increasing number of students who worked with them and wrote their thesis and doctoral thesis under their leadership was very positively assessed. On the other hand, the program did not really meet the expectations in strengthening cooperation between universities but it considerably improved the cooperation within the institutes themselves, including the cooperation among different disciplines.

The Protein Engineering Network of Centers of Engineering (PENCE) is an organization oriented to protein engineering. It was created in 1990 as a part of the *Network of Centers of Excellence*. PENCE coordinates the program Chair in Protein Science⁷⁷ This program helps Canadian universities to attract young Canadian academic workers. Thanks to this program even some workers who had lived abroad for a long time returned to Canada. The program offers up to 100 000 dollars (about 68 800 euro) a year to the successful applicants.

The Re-entering the Research Community Scholarship funded by the provincial government of Quebec is designated for the university master program graduates who would like to re-enter the field of science and continue their doctoral studies. It is designated exclusively for the Canadian citizens who have lived at least one year in Quebec and pay taxes and health insurance there. However, if

⁷⁷ http://www.nce.gc.ca/ncs-rces/pence_f.htm'2.

2. The Policies to Influence the Migration of Highly Educated People

the people who meet the first two conditions nowadays live abroad and wish to return to Quebec, they need not meet the third condition.⁷⁸ A successful applicant obtains the scholarship of maximally 60 000 Canadian dollars (about 41 200 euro) for their personal expenses during the grant period which does not exceed three years.

AUSTRALIA

The *Australian Research Council* renders scholarship under the terms of the Federation Fellowships Program.⁷⁹ This program supports world-famous scientists whose work may substantially boost the development of the Australian economy and improve natural and social environment. This program is open for all scientists of world importance although the Australian scientists living nowadays abroad are preferred. The program guarantees five years work in some of the supreme education institutes funded by the federal government or the government of some particular Australian state. The *Australia Research Council* also provides the grant Professional Fellowships (APF) which offers a five years work in Australia to world renowned scientists. They must have had at least eight years of professional practice and PhD. degree or an equivalent to it. They can be either expatriated Australians or foreigners wishing to work in Australia. The program is designated for all scientific disciplines but clinical medicine.

The *Association of Rhodes Scholars in Australia* (ARSA) supports capable students enrolled for some university within the Commonwealth, with the exception of Australia, who study some of the scientific disciplines and want to visit Australia for 6–12 months. The purpose of their visit is to consult their scientific issues and theses with leading Australian experts in a given field. The applicants must be Commonwealth citizens but they must not graduate at any Australian or New Zealand university. The program offers 20 000 Australian dollars (about 12 400 euro).⁸⁰

NEW ZEALAND

In New Zealand, there are the James Cook Research Fellowships. These scholarships are funded by the New Zealand government. The program is organized and the scholarships rendered by *The Royal Society of New Zealand* – an independent national academy of sciences which encompasses about sixty scientific and technological societies. This scholarship is among the most prestigious in

⁷⁸ http://www.fqrnt.gouv.qc.ca/nateq/bourses/regles/boGenerauxAng_07.htm.

⁷⁹ <http://fgic-gfci.scitech.gc.ca/details.php?lang=f&id=592>.

⁸⁰ <http://www.research.unimelb.edu.au/admin/rhodes/arsa.html>.

New Zealand. It is rendered in the field of natural and technical sciences, medical research, and social sciences. The scholarship was founded in 1969 at the 200th anniversary of James Cook's landing in New Zealand. Until 1996 scientists regardless their nationality were awarded. Since 1996 the conditions have been modified. The scholarship is now given only to the New Zealand scientists regardless their domicile.⁸¹ A scholarship applicant must have an agreement with some New Zealand research institute or university in advance. They have to confirm their intention to offer the applicant a workplace and provide them with all necessary things they shall need for realizing their research project. A successful applicant receives financial support for two years. Every year, they get a salary of 100 000 New Zealand dollars (about 56 300 euro) plus 10 000 NZD (about 5600 euro) for additional expenses.

MEXICO

Mexico endeavors to gain back the scientists from abroad by the means of the *Presidential Fund for Retention in Mexico*, created by the Mexican government in 1991 [Thorn, Holm-Nielsen 2006]. The purpose of this program is to facilitate the scientists return to their homeland and help them integrate in some academic educational institution or a scientific center. More than 2000 scientists returned to Mexico in 1991–1999 with the help of this program, i.e. about 200 scientists a year. Most of the returned scientists came from six countries: USA (40%), France (15%), United Kingdom (13%), Spain (9%), Canada (5%), and Germany (5%). The total costs of the program during the observed period were 56 million US dollars (about 41 million euro). Nevertheless, the problem was that Mexico could not give the scientists necessary infrastructure and laboratory equipment, and it could not guarantee them they would be able to continue their scientific projects after the return [Guerrero, Bolay 2005].

There are also other similar programs in Mexico. *Programa de Apoyo Complementario para la Consolidación Institucional (Fondo Institucional) Repatriación y Retención*⁸² administrated by the *Consejo Nacional de Ciencia y Tecnología (CONACYT)* endeavors to make Mexican scientists return to their homeland and reintegrate into the local academic community. An applicant must be a PhD. holder and must have relations with some Mexican institute for science and research. The program contributes to increase the returnee's salary.

⁸¹ http://www.rsnz.org/awards/james_cook/.

⁸² http://www.conacyt.mx/Fondos/Institucional/Institucional_Repatriaciones.html.

CHINA

In the recent times, China has been very active in the endeavor to gain its brains back to their homeland. The Chinese system is also an example of a very complex attitude with a remarkable share of state engagement. In 1986–2003, all together 180 different policies were announced, generally aimed to attracting scientists from abroad back home. 8 policies were national, 90 local or regional, 34 concerned industrial zones, 7 supported education of the children of re-emigrants, 27 concerned personal policy, or policy of citizenship, household registration, and marriages of the re-emigrants, 14 concerned customs regulations... [Wescott 2006]. On a national level, these measures fall in the competence of the *Ministry of Personal Sources* (facilitating the stay and its rules), *Ministry of Schools and Education* (special economic benefits for re-emigrants), and *Ministry of Interior* (facilitating a cross-border migration). The particular cities and provinces are even more detailed and helpful in their programs – the return support embraces e.g. priority in various procedures (connecting to gas supply, telephone, a workplace and its equipment for free, grant contributions for research, living, personal assistance at the grant application processing, or sometimes even one-shot “welcome subsidies” (e.g. the city of Guangzhou offers 12 000 dollars, i.e. about 8700 euro). Also institutions such as universities and research institutes have their own programs. Their offer includes e.g. financial bonuses, living subsidies, and research equipment. The government also awards elect re-emigrants with special distinctions and awards. This policy is generally considered necessary – 40% students and scientists who never have been abroad take it for indispensable. Certain programs are specifically aimed to support long-term returns of important experts in crucial fields. For instance, the Chinese *National Foundation for Science* offers special four years grants in the value of 66 000–96 000 US dollars (about 48 000–70 000 euro) for the scientists younger than 45 years. The *One Hundred Talents Program* of the Chinese Academy of Sciences gives the successful applicants 240 000 dollars (about 175 000 euro) for three years. The *National Science Fund for Post-doctoral Fellows* run by the Ministry of Human Sources is similar, as well as the *Outstanding Trans-Century Talents Plan* founded by the Ministry of Schools and Education. Although these programs are open for everyone, the Chinese scientists abroad are the supreme target group and usually are given 80% of grants. Also private companies contribute to these and similar programs. The funds often contribute to raising the salaries of the professors who are being attracted by the universities back to China. An example of such a fund is the Cheung Kong Scholar Award Program which has already supported the return of about 400 scientists from abroad. It is estimated that the Ministry of Schools and Education invests about 37–50 million US dollars

(27–36 million euro) a year into such fund programs, the Ministry of Human Sources invests further about 25 million dollars (about 18 million euro) a year.

PHILIPPINES

In Philippines, there is the *Re-Entry Program for returning Scholars*⁸³ funded by the Ministry of Science and Technology (DOST) and administrated by the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD). The goal of the program is to attract Philippine scientists back to their homeland. The program is designated exclusively for the people with Philippine citizenship who have secured cooperation with some Philippine institution for science and research. A successful applicant must meet many conditions: e.g. they must be impeccable, their work must be of good scientific quality, they must be in a good health and not older than 45 years. They also have to present a research project. The amount of financial support differs according to the level of their education achieved. A MS degree holder gets a one-shot sum of 150 000 Philippine pesos (about 2400 euro), a PhD. holder gets 250 000 Philippine pesos (about 4000 euro).

Besides, the Philippine Ministry of Science and Technology administrates also the *Balik Science Program (BSP)*⁸⁴ which offers the possibility of a long-term (at least two years) return to the scientists of Philippine nationality or Philippine origin living abroad. Successful applicants for a long-term stay are paid the research expenses, plane tickets for the applicant, their partner and two children, and they are guaranteed a customs free import of professional equipment, personal items, and household equipment, and the transportation costs are also reimbursed to them. A support holder is also excluded from the duty of paying the “travel tax” which otherwise all Philippines coming from abroad must pay. A host institute may also provide them with accommodation. After at least two years of research, a grant holder and their family have the claim to free plane tickets to the country where they came from, if they wish. In 1994–1999 84 applicants received the grant, 56 of them stayed in the country (Opiniano, Castro 2006).

AFGHANISTAN

The *International Organization for Migration (IOM)* in the cooperation with the European Commission set to go the Return for Qualified Afghans Programme (EU-RQA)⁸⁵ which in 2001–2005 offered a complex service and financial

⁸³ <http://www.pcarrd.dost.gov.ph/about%20pcarrd/scholarship.html>.

⁸⁴ <http://www.pia.gov.ph/?m=12&fi=p070622.htm&no=30>.

⁸⁵ <http://iom.fi/content/view/127/8>.

2. The Policies to Influence the Migration of Highly Educated People

assistance at the establishment of a workplace and a base in Afghanistan. It was designated for skilled Afghan citizens settled in some EU country. The financial support included reimbursement of the travel costs to Afghanistan, 600 euro for the one-shot expenses connected with settling down in the country, a monthly incentive 300 euro to the salary for 6–12 months (plus further 50 euro more for women as an extra motivation for their participation in the program). Those interested in founding a little enterprise could get an extra grant of up to 3600 euro. The return of all together several hundred highly skilled people was supported and about 150 of them stayed in Afghanistan for a longer time.

The reintegration programs are generally orientated to the support of a long-term or permanent return of a scientist from the country where they work to some other country. In most of the cases the target country is the country of origin of the scientists. In some cases the reintegration programs are also formally open for the citizens of other countries but in practice they are utilized especially by the people born in the target country. The Anglo-Saxon countries represent a certain exception from this rule since some of the reintegration programs are not explicitly designated for the scientists with their citizenship and they are utilized relatively more frequently by foreign scientists and researchers, a probable reason being also the worldwide use of English as an almost universal language in the scientific community. The reintegration programs are mostly funded from public sources, partaking of private sources is rare. The programs usually help scientists with funding their research work after the return to their homeland, building a work team, equipping a workplace, sometimes also the transport to their country of origin and looking for work there. Often the scientist's salary after the return is included in the support, or some contribution to the salary. In any case, it is clear that the sponsoring institutions tend to limit such an "external funding" of personal expenses to a shortest necessary time and convey these costs to a local institution. This should secure that a scientist keeps their work position in the respective target country for a longer time.

The reintegration programs differ considerably not only between various countries but often several programs vary within one single target country. However, we may observe certain general tendencies. Most of the reintegration programs which are or were applied support just relatively small number of applicants, either the world top class scientists or the most promising younger scientists. The reintegration programs attracting scientists to a more developed country are usually more elite-oriented than the reintegration programs for the returns to a less developed country. Richer countries logically offer the coming scientists more money for research and wages than poorer countries. Nevertheless,

it is remarkable that the richer countries usually offer not only higher absolute sums of money (which is expectable) but also relatively more money in the respect of the usual earnings in a particular target country.

Since the reintegration programs have had a certain tradition (the first of them were introduced in the 1970'), there are already efforts to conduct their evaluation. According to the results of certain studies, these programs were not very successful in the beginning [Marks 2004; Mutume 2003]. One of the arguments challenging their efficiency was that they do not have a big added value because the migrants themselves often desire to come back home. For example, a research among the Columbian scientists working abroad showed that three of four scientists wish to return home. Only 20% of the scientists did not want to return [Thorn, Nielsen 2006]. If a major part of scientists would like to return home, then it's possible that the reintegration programs attract just those who wanted to return anyway. The financial recourses would be reasonable only in the case that they would attract back those scientists who otherwise would not return. However, it is quite difficult to identify such individuals [Thorn, Nielsen 2006]. Another argument against the reintegration programs was that a negative selection among the potential re-emigrants is possible. The return programs may really help to the returns of skilled people but especially of those who have achieved the least relative success in a foreign country [Angel-Urdinola et al. 2004]. A program may endeavor to attract the scientists back but paradoxically it may also unwillingly support the leaving of other scientists abroad [Thorn, Nielsen 2006]. If the scientists working abroad are offered a better position after the return, it may inspire other scientists to leave. Some scientists may leave with the intention to gain the support when returning [Dillon 2001]. A critical point of the usefulness of these reintegration programs is the ability or inability of a target country to offer such work conditions that would make the potential returnees stay even after the end of the period funded by the program. This program is also described in the evaluation of the program "*The Return of Talent Programme*" [Cohen 1996]. This IOM program helped to bring 52 South Africans from abroad back home which was far below the expectations of the organizers. One of the biggest flaws of the programs supporting permanent or long-term return is that the skilled compatriots must be offered interesting conditions in a homeland, comparable with the foreign countries (including the salary and infrastructure) or at least competitive with them on a considerable level. However, many developing countries do not have the capacity to compete with developed countries where their skilled expatriates are mostly settled. It may also be a problem in rich countries. Paterlini [2002] points out that some Italian scientists, returned from abroad after a long time, got gradually frustrated from

2. The Policies to Influence the Migration of Highly Educated People

the situation in the Italian research institutes. They complained at the not fulfilled promises, insufficient infrastructure which complicated a practical use of their knowledge, and the priority for the domestic scientists. According to Meyer [2001] all these circumstances may push the scientists to a consequent re-emigration. This way most of the investments to the scientist's return are in vain. In a general opinion, the most important disadvantage of reintegration programs is the fact that it is a very expensive form of support, applicable only to a very small number of talented candidates due to the limited financial recourses. Even reasonably rich countries cannot afford to support great numbers of returning scientists and researchers. Only two rich countries have tried to increase considerably the numbers of coming scientists by a huge increasing of the investments into the reintegration programs: Canada and Austria. In the case of Canada, the results have so far been assessed positively, in Austria, there is not a comprehensive evaluation yet available.

The so far executed evaluations reveal the fact that this strategy is more successful in richer countries, capable to bear the costs of the return of an educated labor force. South Korea, Taiwan, and lately also India and China are considered examples of an efficient employment of these strategies [Meyer et al. 1997]. The reintegration programs evaluations confirmed that for academics it is generally very good to study abroad or gain experience in their scientific discipline there, especially when this discipline is not developed to a sufficient level in their homeland. For their homeland it is then very profitable when an experienced scientist returns back home and brings along new knowledge and experience which they would never be able to achieve in their homeland. For the countries whose own sources are limited, it is profitable to increase their economic growth by emigrants who have worked in a scientific milieu on a high level. It is obvious that the economic growth of such countries as South Korea, Taiwan, and other South-East Asian states is partially connected with their support for the returning of their scientists back from emigration. On the other hand, it is obvious that the scientists started to come back to these countries in the time when it was already clear that the countries are economically successful. It seems to be necessary for the successfulness of a program that a mother country, even before it starts attracting its scientists back, has a certain scientific and economical potential, a network of working research institutes, and minimal critical numbers of its own home scientists [Boulier 1999]. Studies show that the organization of the system where the re-immigrated scientists work in a target country has a great influence on the quality of their scientific work [Todisco 2000]. It is also proved that the more targeted a program is and the more information are available about it, the more profit it shall bring [Thorn, Holm-

-Nielsen 2006]. The most important factor to be considered when evaluating a potential success of a reintegration program is the length of the attracted scientists' stay abroad. The longer they have lived abroad, the weaker are usually their connections with the homeland and the smaller potential profit of a source country from its expatriate. It is also the matter of the scientist's age, both their age when leaving for abroad and when returning. The scientists keep on studying. In the beginning of their work career they study more, at the end they are more productive. A younger scientist may spend a longer time abroad and it is not the same loss for their homeland as in the case of an experienced senior scientist. If a scientist spends all the period of their education abroad and then, when their productivity is highest, they come back home, the profit of their homeland is higher than the loss. Nevertheless, it is necessary to remark that the top productivity is different at the scientists of different disciplines. But if a scientist spends their most productive time abroad (no regard to how short this time may be), for the country of origin it is always rather a loss. But even return of a scientist at the end of their career may represent a certain form of gain for the target country if there is a way how to convey their experience and knowledge to the beginning scientists [Hansen 2004].

The reintegration programs evaluation also points out the fact that those who support the theory of brain circulation often confuse an emigrant's desire for return with the actual return. Many scientists questioned in surveys or interviews often affirm that they consider their return to the mother country, but in the reality they never return [Castles, Miller 1998]. Levitt [2004] quotes a rhetorical question of one of the eminent New Zealand experts on international migration: "How many migrants have you met who do not express their certain plan to return?" Some researches confirm that the scientists tend to stay abroad longer than they originally intended [L.E.K. Consulting 2001].

Another problem displayed in the reintegration programs evaluations is the fact that the return of a scientist to their homeland is somehow automatically considered positive. It is expected that a returned scientist represents an asset. But e.g. Meyer [1997] observes problems that may occur to a qualified labor force after the return. The return of a scientist need not be necessarily a great asset for the society. It shows that in some countries (e.g. New Zealand) a high unemployment remains among the returnees (four months after the return it reaches 30% [Lidgard, Gilson 2002]). After all, not all returns of scientists are motivated by the endeavor to a career growth. Some of them are motivated by non-economical and non-professional factors such as parenthood, care of elderly relatives etc. [Van Ham, Mulder 2004]. Such returns are often called "rest periods" when a migrant only enjoys maternity leave, health care, or pension provided by

2. The Policies to Influence the Migration of Highly Educated People

their homeland, or works on a whole-life *résumé* of their successful work career abroad. Furthermore, some researchers suggest it is not good to support introducing of policies attracting the expatriated scientists and researchers back to their homeland. In their opinion, the endeavor to keep local scientists and researchers is sometimes more efficient than striving for the return of those who have already exiled [Glass, Choy 2001].

2.3.1.5. Internet information portals

The creation of Internet information portals for the members of scientific diaspora is a specific form of policy aimed to the support and facilitation of a possible permanent, long-term or short-term return of scientists and researchers to their homeland. Of course, most of the particular programs supporting the scientists in returning back to their homeland have their websites. However, these primarily inform about a program itself and its activities, thus serving as a means of communication between the program organizers and its potential users. Internet information portals always comprise a wider range of information. They are not bound to one specific project and their operation itself is considered a kind of return program. The basic philosophy of good working of an Internet information portal is based on a presumption that if a scientist working abroad should possibly start to ponder the possibility of returning home they have to get enough information about the opportunities offered in their homeland and about the situation in the local scientific community. It is probable that a scientist who considers returning home has also other information sources and direct contacts with the colleagues in his or her homeland. In spite of this it seems convenient to provide them with a website where a lot of potentially useful information shall be gathered. Furthermore, for certain kinds of information Internet is the best way to display. For instance, it is easy to have an up-to-date database of available work positions in science, to inform regularly about new achievements in science, grant affairs and policy of sciences in a target country, there may be discussion forums for sharing experiences with the people who have already returned or with other people wishing to return.

That is why such Internet information portals have been created in many countries. An example of a portal designed to facilitate returning of scientists to France is the website *Emploi Scientifique en France*⁸⁶ administered by *Association Bernard Gregory* with the support of the Ministry of Higher Education and Research (*Ministère de l'enseignement supérieur et de la recherche*) since 2004.

⁸⁶ <http://www.emploi-scientifique.info/>.

Its primary goal is to facilitate French post-docs to return from abroad but also to contribute to increasing the attractiveness of French science abroad. The server informs about the general situation in France, available workplaces for scientists, planned tenders in science, research, and education. Since 2006, the website also includes information for French scientists about the possibilities of work and education in all Europe.

Another French portal of this type is the Portail français des scientifiques en Amérique du nord⁸⁷ administered by the French general consulate (*Consulat Général de France*) in San Francisco which, as revealed from the title, is concentrated especially on the French scientists working in North America. Its goal is to maintain the contact between these scientists and France, to inform about the contemporary situation in French science, about free workplaces etc. The administrators of the portal endeavor to facilitate the French scientists to return from abroad back to their homeland.

The Researcher's Mobility Portal Finland⁸⁸ administered by the Finnish Academy (*Suomen Akatemia*) should support the mobility of Finnish scientists and also help them with the return back home. This portal is not designated only for Finnish scientists abroad but also for the foreigners who are considering the possibility of scientific work in Finland, and also for the Finnish scientists who may wish to work abroad. In this website it is possible to find general information about the research policy in Finland and the facts about the life and work in Finland (labor laws, taxation, social and health insurance...) but also a lot of specific information about the possibilities of funding a research in Finland, in Finnish universities and research institutes, in representative organizations of the local enterprise community, and an up-to-date offer of work opportunities in the Finnish scientific and research institutions. *The Researchers Mobility Portal Germany*⁸⁹ is organized in a similar way. It serves as an information site about the scientific work and opportunities in Germany. Likewise the Finnish portal, also the German one has been created as a part of the European Network of Mobility Centers (ERA-MORE), founded by the *European Commission*. It organizes many activities oriented to the support of the mobility of scientists. For this purpose, "the European portal of research workers mobility: the gateway to the professional development of research workers" has been created, providing information about scholarships and grants, practical hints about mobility and a database of workplaces for research workers in Europe.⁹⁰ This European portal is

⁸⁷ <http://www.science-odyssee.org/>.

⁸⁸ <http://www.aka.fi/index.asp?id=597bda0d53e84e13835bfacd7b9b3978>.

⁸⁹ http://www.era-careers-germany.de/portal/german_research_landscape.html.

⁹⁰ http://ec.europa.eu/era-careers/index_en.cfm.

2. The Policies to Influence the Migration of Highly Educated People

not primarily designated for the support of returning workers to their countries of origin but it can also serve for this purpose. The German portal GAIN⁹¹ is an Internet portal specifically oriented to the German scientists working in the USA. It has been administered since 2003 by the foundation *Alexander von Humboldt-Stiftung* with the support of the scholarship foundation *Der Deutsche Akademische Austauschdienst* (DAAD) and the *Deutsche Forschungsgemeinschaft* (DFG). GAIN is a project encompassing the operation of the information website and several other activities: publishing an information newsletter about Germany and its science, organization of information activities in the USA and local events of the diaspora, and administration of an on-line list of the US German scientific community members (in 2007, there were about 1800 members included to the network). The Austrian portal BrainPower Austria,⁹² administered with the support of the Ministry of Transportation, Technology and Innovations (Bundesministerium für Verkehr, Technologie und Innovation, BMVTI), offers a labor market bourse (offering average 100–250 free workplaces in science in Austria), a web conference, it publishes an electronic information newsletter (in 2006 it was sent to about 1200 addresses), it organizes information activities about the Austrian science in the USA and it informs about the existing programs for the support of returns of the Austrian scientists from abroad back home and about the possibilities of cooperation between the home and exiled scientific community.

The Internet information portals are not merely an activity of developed countries. In other countries we may find many activities of this kind as well. For instance, in China there are several information portals. They are especially designated for mediating the contact between potential users of the research in China and its “providers” among the Chinese scientists and researchers living abroad. The Chinese scientists living out of China consider them the most important source of information [Wescott 2006]. All institutions which are somehow connected with the members of the scientific diaspora have special websites in Chinese. Basically, there are two kinds of these websites: general and specific. An example of a general websites may be the Chinese Scholars Abroad administered by the *Ministry of Schools and Education* and the China Diaspora Web administered by the *State Council Overseas Chinese Affairs Office* (OCAO). There are also specialized pages providing information about definite policies, e.g. Liuxue.net of the *Ministry of Schools and Education*, China Overseas Talent by the *Ministry of Human Sources*, or the Overseas Study and

⁹¹ <http://www.gain-network.org>.

⁹² <http://www.brainpower-austria.at/webfiles/home.asp>.

Continuing Education of the *Chinese Academy of Sciences*. There are also specialized websites founded by provincial or city authorities. All of them have practically the same structure: they contain an information section about the policies, a registration section for the diaspora members looking for work in China and for their potential Chinese collaborators, and finally, a reference section about other institutions. The fact of existence of several different information websites in China is considered erroneous. The diaspora members claim that the websites are very little attractive for young people and there are too many of them so that those interested do not get a clear vision where they should get the information needed [Wescott 2006].

Under the terms of a complex project Migration for Development in Africa (MIDA)⁹³ there is also an Internet information portal. The portal provider is the *International Organization for Migration (IOM)*, in cooperation with the private sector and with the governments of the participating African states. It identifies the needs for highly skilled labor force in individual disciplines, makes reviews of the workplaces offered and of the investment opportunities in Africa. On the contrary, in developed countries it searches for African diaspora members who have the necessary qualification or financial recourses for the investments. It makes an effort to intermediate the contacts between the demand and the potential offer, it builds and administrates a database of information and contacts of qualified diaspora members.

Similarly, the complex project Thai Reverse Brain Drain⁹⁴ organized by the Thai *National Science and Technology Development Agency (NSTDA)* runs its Internet information portal. It declares its purpose as to provide an information center with the database of information about the Thai professionals and students abroad, as well as the database of the work offers and consultation opportunities in Thailand.

Not all Internet information portals for educated potential returnees are administered by the states. An example of such a “non-state” portal may be the Internet server oriented to potential re-emigrants to the African states. It is administered by a private company *Africa’s Brain Gain, Inc. (ABG)*⁹⁵ with the seat in the USA. This society has been created on the base of activity of US scientists and academics born in Africa. The society proclaims its goal to facilitate returning of talents to Africa. A return is understood quite broadly, not only as an actual return but also as participation on common projects, partaking on the

⁹³ <http://www.belgium.iom.int/Mida2/presentation.asp>.

⁹⁴ http://rbd.nstda.or.th/rbdweb/about_rbd/index.php.

⁹⁵ <http://www.africasbraingain.org/pages/aboutus.php>.

2. The Policies to Influence the Migration of Highly Educated People

investments in Africa, participating in short-term stays in Africa, and consulting activities. For achieving this goal, the society creates and administers four databases: the database of highly educated people wishing to work in Africa, the database of workplaces offered by multinational corporations and located in Africa, the database of work opportunities offered by the governments of African states, and the database of offers of development agencies oriented to Africa. The society publishes and sends a weekly information newsletter, operates a discussion forum on its website, and organizes surveys among the potential returnees to Africa.

2.3.2. The policies supporting short-term returns

Many countries, especially developing countries, realized that the financial expenses connected with attracting of a highly skilled person back to the country are very high and that the realization of such returns in a really meaningful scale is far beyond their possibilities. It was also common that the reasons for which a person decided to leave their country still remained (insufficient infrastructure, insufficient laboratory equipment, low earnings, little prestige of the scientists etc.) and the probability of keeping a scientist in a country for a longer time was rather small. In the worst cases scientists returned to their homeland for some time but the work conditions were so bad that they left completely the field of science and their career was over. This situation made many countries consider short-term returns of the scientists – several weeks or months. These returns would not be so expensive and it would be possible to convey the emigrant's knowledge, skills, and experience to their homeland.

The programs for the support of short-term returns of highly educated expatriates started to be realized already in late 1970' when the TOKTEN program was set to run under the protection of the UN (*United Nations Development Program, UNDP*). The program TOKTEN was based on voluntary work of highly skilled people from developing countries working in developed countries in many different fields. They would go for short-term consultation stays to their mother countries. The program was considered very successful. About 5000 volunteers from 49 countries of the world took part in it.

The project was developed gradually. In 1977 the first TOKTEN program was created for Turkey. The volunteers would go to Turkey for short-term stays of 6–8 weeks and during this time they worked as consultants. Pace by pace, the number of participating countries increased. At the present time, the TOKTEN programs exist in 25 countries of the world (among others in Turkey, India,

China, Philippines, Poland, Palestine, Vietnam, Lebanon, Syria etc.). In 1995–1997 the program was also running in Czech Republic.⁹⁶ Although the TOKTEN consultants are volunteers, the UNDP pays their travel expenses and the living costs. As a great advantage of the project it is being emphasized that the consultants speak local languages and share many cultural values with local people. It helps them understand better the culture and customs of a particular country and judge its needs. Furthermore, the local people trust more the people speaking their language and they sustain more easily possible animadversions from them. The people working for the UNDP are independent. They can uphold their own opinions. The work for UNDP does not commit them to anything, they perform it voluntarily in their free time (besides their regular job), and that is one of the reasons why these programs are so financially effective.

The actual employment of TOKTEN consultants, their total numbers and the organization of their short-term returns varied in different countries. E.g. in Pakistan the program was started in 1980. Since that time until 2003 this program helped to organize 834 short-term returns (3–6 weeks) of Pakistani experts living abroad. Under the terms of TOKTEN program, 257 experts on applied sciences, 204 medical experts, 192 natural scientists, 132 social scientists, and 49 agricultural scientists came to Pakistan. 427 of them came from the USA, 145 from Canada, 116 from the United Kingdom etc.⁹⁷ This program enjoys a great government support. It is organized by the *Ministry of Labour, Manpower and Overseas Pakistanis*, concretely by its subordinate organization *National Talent Pool*, specialized in gaining information about educated Pakistanis living abroad and keeping the contact with them. It is expected that the number of scientists coming to the country shall rise to about 35–40 a year.⁹⁸ Lebanon is another example of a country where the TOKTEN program is strongly supported by the government. The program has been organized already since 1995. However, the volume of activity of the program is smaller than in Pakistan. By 2000, 40 exiled Lebanese experts came for a consultation work stay to Lebanon (6–8 a year) but the information on a special program website announces that thanks to the short-

⁹⁶ The program was introduced in 1995, after the termination of the previous “federal” program TOKTEN, and it was coordinated by the Foreign Ministry. Its activities were consulting service, especially in the field of restructuring of the private sector, management development, management of environmental issues, development of telecommunications and state statistics. Within this program over 40 different events were organized, with the total costs of only 105 000 dollars (about 76 000 euro). The program was evaluated as successful (see <http://www.osn.cz/zpravodajstvi/zpravy/zprava.php?id=633>).

⁹⁷ http://www.pakistan.gov.pk/divisions/ContentInfo.jsp?DivID=30&cPath=349_566&ContentID=2265.

⁹⁸ <http://www.tokten.org.pk>.

2. The Policies to Influence the Migration of Highly Educated People

term visits six experts decided to settle down in Lebanon permanently. Nevertheless, the emigrants mostly serve as external consultants, they provide a know-how source and intermediate the contact between their home institution and their mother country.⁹⁹

The experiences show that the support for TOKTEN from the side of the local political elite is very important. In the case of Philippines, the TOKTEN sponsored short-term three weeks to three months stays of foreign experts born in Philippines and it operated successfully in 1988–1994. However, it did not enjoy by far the great government support as in Pakistan or Lebanon and thus it was interrupted after one important officer of the Foreign Ministry had left his work [Opiniano, Castro 2006]. But there had been another project already since 1975, oriented especially to attracting of scientists – the Balik Science Program (BSP).¹⁰⁰ It was organized by the *Department of Science and Technology (DOST)*. Its goal was to support the development of science and technologies in Philippines and support information and know-how exchange. A supported applicant must be Philippine nationality or origin, live in a foreign country, be graduated from a university, have at least five years practice in private sector, renowned research or academic institution after becoming MS or PhD, and must be in a good state of health. The program has two variants: the support for long-term and short-term returns of scientists. The short-term variant means at least one month. A short-term subsidy holder gets a return plane ticket to Philippines and a grant covering the project costs. However, only very few subsidies are rendered, not more than ten in a year [Opiniano, Castro 2006].

China has also become involved in the TOKTEN program and gradually it has created a very expansive system for short-term stays support. It helped to invite almost 2000 Chinese emigrants for the cooperation in China. They participated in more than 1000 projects.¹⁰¹ China has lately created many national programs for the short-term returns support, well arranged and listed in the study by Wescott [2006]. There are special foundations supporting short visits and short-term experts work in China. For example the program Chnhui (“Spring Daybreak”) has contributed to 7000 short-term visits since 1996. The candidates send their application directly to the Ministry of Schools and Education but they must have their journey to China already agreed with local partners and they have to declare the support of the local authorities of the town where they intend to go. The program usually pays the plane tickets from abroad

⁹⁹ <http://www.toktenlebanon.org/about/about3.php>.

¹⁰⁰ <http://www.pia.gov.ph/?m=12&fi=p070622.htm&no=30>.

¹⁰¹ <http://www.unstar.org/english/program.htm>.

while the local authorities pay the local transport and accommodation. The program also includes and funds a follow-up programs support, e.g. founding of common enterprises and workshops. Other funds are similar. E.g. the Special Fund for Short-term Return to Work and Teach administered by the *National Foundation for Natural Sciences* and KC Wong Education Foundation Fellowship for Short-term Return administered by the Chinese Academy of Sciences are aimed to the support for cooperation between Chinese scientists abroad and local scientists. They sponsor at least two months stays in China. The latter one has been running since 1991. Since 2001, the programs sponsors 193 “men-per-month” a year with a budget of 1,5 million RMB (about 145 000 euro, i.e. about 750 euro per person a month). Also the Ministry of Interior, the Ministry of Economics and the Chinese Academy of Sciences have similar funds for the support of returns of students from abroad.

Besides the fund programs which virtually work as specialized grant agencies there are also programs aimed to the support for particular activities which should serve as bridges or platforms for the exchange of specialized knowledge. The most common activity is the organization and funding visits of scientific delegations of foreign Chinese to China. The most important organization in this respect is the *State Council Overseas Chinese Affair Office (OCAO)*. Since the 1990' it has been organizing such specialized thematic visits of delegations that are expected to provide technical advices in precisely specified topics. In 1999 the OCAO started to organize a yearly event called in English *One Hundred PhD. Holders Homeland Visit Delegation*. Such an event means for instance visiting 512 institutions, organizing 136 academic lectures and 115 seminars, creation of 52 proposals, and the transfer of one particular technology. Some of the delegation members became share holders of Chinese enterprises. A second type of activity is facilitating of the knowledge transfer between the diaspora and the local scientific community. The *Chinese Academy of Sciences* organizes Young Scholars Academic Forums which has sponsored over 100 scientific conferences since 1991. The Chinese scientists from abroad are always invited to these conferences, representing thus about 25% participants. The *Ministry for Science and Technologies* publishes special newspaper where the Chinese institutions inform about their technological problems and look for someone to help them solve the problems. They specifically address the scientists in foreign countries.

In 2004 the *Chinese Association for Science and Technologies* started the project Overseas Talents Serving Homeland. The local subdivisions of the society suggest research projects for solving local problems and they always look for foreign partners to participate in the project solution. Other projects

2. The Policies to Influence the Migration of Highly Educated People

intermediate direct contact between the scientific diaspora members and the local institutions, usually by organizing fairs. For example, the Guangzhou Overseas Students Fair organized since 1998 was visited by 230 000 people in 2003. The fair organizers share the expenses of the participation of the scientists living in foreign countries. Another type of activity is the Convention for Overseas Chinese Professionals' Business Development organized by the province of *Hubei* and aimed specifically to founding joint-ventures, looking for technological advisors abroad, visiting professors and foreign representatives of Chinese universities. This activity is not open for public but only for invited and previously selected participants. The Jilin Convention for Overseas Professionals' Business Development organized by the province of *Jilin* is even more selective. The organizers address about 400 potentially interested people for a formalized cooperation with the local enterprises and at the end they select about 50–60 most perspective ones. These people are then invited and helped in contracting cooperation and its subsequent effectuation. For instance, the conference organized in 2003 cost 75 000 USD (about 55 000 euro). Its outputs were as follows: 59 diaspora members negotiated with 288 local companies about 91 common projects. As a result, 79 agreement were signed in the total amount of investments of about 450 000 USD (about 327 000 euro), about 70 000 USD (51 000 euro) of them were investments from abroad. Another type of activity is The Cooperation and Exchange Convention of Overseas Chinese Enterprise in Science and Technology Innovation organized in 2002 by the province of *Zhejiang*, *ministries* and the *Chinese Academy of Sciences*. It was a whole-national Chinese conference concentrated on the creation of networks and strengthening the relations in the triangle “scientific diaspora” (providing know-how and knowledge), “foreign Chinese business community” (providing capital), and “local enterprises” (providing the contacts of the local market). A specific form of the short-term returns support is represented by some of the programs organized by the *National Natural Science Foundation of China (NSFC)*.¹⁰² For instance, one of the NSCF programs encourages Chinese scientists living abroad to participate actively in research projects sponsored by the NSCF. The support concerns natural sciences. It serves for funding workshops, seminars, participation in international conferences and work on joint projects with the Chinese scientists living in China. Another NSCF program is designated specifically for excellent Chinese scientists living abroad. It enables them to work in China for at least one month in each of three consecutive years and build there a local subdivision of their research base. The research expenses and the living costs during their short visits

¹⁰² http://www.nsf.gov.cn/e_nsf/2006/05in/02.htm.

are paid by the program. This type of support is not applied for by interested expatriates themselves but by the principal investigator of the project funded by the NSCF.

The support for short-term returns of scientists from abroad back home is not an exclusive activity of developing or newly industrialized countries. The Taiwanese *National Science Council* organizes the program Taiwan Tech Trek¹⁰³ in which foreign students and young scientific workers are invited for short-term holiday visits to research institutes, high tech companies, universities and technological parks where they can pass a short-term stay of seven weeks. In spite of the rather technical title, this program is open for candidates of various disciplines, including technical and natural sciences, medical sciences, and social sciences. Foreign students must have completed a foreign high school, must be of Taiwanese origin and aged 18 to 30. They are offered either the possibility of an individual stay, or a group stay in which several successful foreign applicants are joined with some successful applicants of a similar program for home students. A host institution itself elects from the candidates. The successful applicants are offered a scholarship of 50 000 Taiwanese dollars (about 1100 euro) covering the living costs and food. The travel expenses are not reimbursed.

While the Taiwanese program is oriented to students and young scientists, the program New South Wales Residency Expatriate Researchers Awards Project¹⁰⁴ is aimed to the top class scientists. It was created in 2003 as a collective activity of *The University of Sydney*, the provincial *NSW Department of Education and Training*, and the Australian national agency for science *Commonwealth Scientific and Industrial Research Organization (CSIRO)*. Unlike the other Australian programs, it is designated specifically for those scientists who for some reason do not intend to return to Australia for a long time but do wish to stay in a work contact with their mother country. A sponsored stay is maximally three months and it is primarily designated for finding new contacts, preparation of common projects, and conveying of experiences to students and young scientific workers. Several successful applicants a year are provided with accommodation and scholarship covering usual personal needs. The travel expenses of theirs and their family are also reimbursed. The total amount of the subsidy does not exceed 30 000 Australian dollars (about 19 000 euro).

The German Society for Research (*Deutsche Forschungsgemeinschaft, DFG*) administers the program Kongressreisen deutscher Nachwuchswissenschaftler aus

¹⁰³ <https://nscnt12.nsc.gov.tw/ttt/>.

¹⁰⁴ <http://www.cst.usyd.edu.au/expatawards/index.html>.

2. The Policies to Influence the Migration of Highly Educated People

dem Ausland nach Deutschland¹⁰⁵ which supports the participation of young German scientists (up to 6 years after the completion of their doctoral studies), who work for a limited time (at least 1 year) abroad, in German scientific congresses. A condition for getting the scholarship is an active presentation at the congress. An applicant submits the application three months before the congress in Germany. A successful applicant gets a contribution for their travel expenses, living costs, participation fee, and per diem (about 44 euro a day).

The Austrian program Brain Power Austria, sponsored by the Ministry of transportation, technology and innovation (*Bundesministerium für Verkehr, Technologie und Innovation, BMVTI*) provides the so called Speakers' Grant which contributes the Austrian scientists working abroad to their travel expenses when travelling to scientific conferences in Austria.

The Greek *Foundation Aristotelis S. Onassis* sponsors the Thirteenth Foreigners Fellowship Programme.¹⁰⁶ This program is designated for foreigners and descendants of Greek emigrants who live abroad as a second generation, who graduated from a post-graduate education, who achieved their postgraduate education abroad and have lived there for at least 15 years, and for Greek academics, who have practiced their scientific career abroad for at least 10 years. This program is limited to selected disciplines: social and human sciences, law, economics, architecture, and arts. The length of the stay differs according to the categories of applicants (from 1 to 6 months) as well as the amount of the subsidy. In the case of a short-term stay of 1 month, a successful applicant has the claim to 4500 euro plus the reimbursement of travel expenses for one person, in the case of longer stays (3–6 months) a scholarship holder gets 2500 euro a month.

In 2000, the *Bulgarian government* started an initiative called the Bulgarian Easter. Regularly every year hence around the Easter time about five hundred highly educated Bulgarians from all over the world gather in Sofia. At this gathering many questions are discussed, e.g. how to build a positive image of Bulgaria abroad, how to attract foreign investments, the possibilities of return of highly educated Bulgarians from abroad and the investments connected with them. Some participants get the meeting expenses reimbursed by the Bulgarian government while others come on their own costs. The government also organizes the ILO Workshop on the topic of returning of qualified expatriates to Bulgaria. In 2002, *The State Agency for Bulgarians Abroad* organized a one-day conference on the topic of "The contacts of highly skilled expatriates with Bulgaria". The strategies for returning of these expatriates were also discussed [Sretenova 2003].

¹⁰⁵ http://www.dfg.de/forschungsfoerderung/wissenschaftliche_kontakte/kongress_reisen/kompaktdarstellung_kongressreisen_nach_d.html.

¹⁰⁶ <http://www.onassis.gr/english/scholars/announcement.php>.

Our studies of literature and documents seem to show that there are less programs supporting short-term returns of scientists and researchers working abroad than the programs supporting long term or permanent return. It is well possible that there are many more such activities than we have succeeded to find because thanks to the relatively low costs of their realization, they need not be so much institutionalized, and thus not so much visible. It is absolutely obvious that the programs supporting short-term returns are employed relatively more in poorer countries than the programs aimed to long-term or permanent returns of scientists. However, in the case of these countries it need not be necessarily a “substitute solution” caused by the lack of financial recourses. After all, such a short-term return has an advantage: it is secured that a scientist will not interrupt their career in the host country and the possibility of future cooperation of the host and home institution will thus be maintained. It is even possible that it is better for a mother country if a scientist stays in a host country, involved in the research on a world level, keeping the contact with their homeland, and now and then transferring their new knowledge and know-how there, than if they would actually return to their homeland and in the worse scientific conditions given they would not be able to keep the pace with the best scientists in the most developed countries. The programs supporting short-term stays almost always pay the travel expenses of the successful applicants and help them with the accommodation in a target country. The richer a target country, the higher the probability of a contribution for a successful applicant in form of salary or scholarship for their everyday expenses. However, the short time of the stay also enables such an arrangement that a short-term stay participant is not paid at all and works voluntarily. This scheme may be utilized reasonably well also in the case of poorer countries.

Conclusion

As the importance of science and research for the development of the society increases, it is becoming always more important for the individual countries that they have enough scientific workers, capable to work in these crucial disciplines. The “production” of scientists has been traditionally performed especially by the educational systems of the particular countries and the offer of skilled labor force thus reflected especially the number and quality of educational institutions and the amount of investments to the education. However, in the last decades it seems that the scientific world is getting internationalized in a scale exceeding all our hitherto experiences. To a great extent the work market in science and research is becoming a global market. More and more scientists and researchers achieve their qualification in other country than where they were born. An increasing number of scientists and researchers work in a different country than where they achieved their education. The volume of international migration of scientists is larger than ever before and its consequences are more notable. That is why besides the educational policy, the policies aimed to the influence of migration are becoming more important factor determining the supply of qualified workers in science and research. The policies seeking to influence the migration flows also have a reasonably long tradition. In the beginning these were policies trying by various means to limit the brain drain from poorer countries which was primarily generated by the “natural” differences between the career opportunities for the scientists in the most developed countries and in the countries of their origin. In the last decades we may observe development of policies expressing an active interest of the states to gain qualified workers from abroad for the needs of their national science and research. Some countries create their policies for attracting the scientists from abroad regardless their nationality, other countries, especially those who have an ample “deposit” of scientists working abroad, make a specific effort to create policies for attracting the scientists-compatriots back to their homeland.

There are basically two different approaches how the states can try to attract highly educated labor force back home. The first one is individual approach, i.e. endeavor to offer various motivation measures for attracting a single particular scientist. The second one is more general, aimed to the improvement of the overall

scientific atmosphere which shall result in an increasing motivation for the scientists abroad to return home. The individual approach may be characterized as temporary while the approach targeted at improvement of the conditions for science and scientists and the work possibilities in their homeland is considered efficient in a long term.

Under the terms of the individual approach many different policies are employed. The so-called “sandwich programs” set a condition for achieving a complete qualification which consists in the duty to return home from the studies or work stay abroad. The scholarships for foreign stays conditioned by the return support scientists in their endeavor to gain work experience abroad but they bind the support with the commitment to return to their homeland. The return grants for those who absolved some scholarship stay abroad try to offer a financial motivation for return of the foreign scholarship holders back home. The reintegration programs in general are concentrated on attracting the scientists and researchers working abroad, trying to motivate them to return to their home country by the means of various contributions, grants, consultations, and providing them with information and various kinds of advantages.

The general approach for improvement of a home scientific milieu is also connected with many different particular policies. Most generally spoken, these policies are targeted either to the improvement of the overall economic situation, or to the improvement of the educational system in a mother country, or they may be aimed to specific fields important for scientists [Lowell 2001]. Unsurprisingly, in a long-term view the improvement of the economic situation in a country is the best prevention against the emigration of highly educated people. If the economic situation improves the emigration of highly educated people shall probably decrease, more of them shall stay at home, thus contributing to a further growth of the economic profitability of their country and that shall make it even more attractive for local and foreign educated elite. Like this, the “virtuous circle of prosperity” can start to unwind. Meyer [1997] shows it’s not a coincidence that the best results in the motivation of exiled compatriots-scientists to return home can be seen in such countries as Singapore, South Korea and Taiwan, i.e. countries with sufficiently developed industrial sector and also with interesting work opportunities in their quickly developing economy. However, the strategy “aim to the improvement of the economic situation in the country” may be hardly considered a specific type of stimulation policy for attracting educated labor force from abroad back home. First, this strategy is rather general and executed by governments of practically all countries in the world (with a possible exception of the countries currently in war or the countries governed by uncontrolled or corrupt political elites), and second, this

strategy is rather complex (a large number of partial strategies in many different fields lead to a final result of improving the economic situation in a country). The results of such a general strategy, even though it proves successful, need not be automatically reflected in the improvement of the situation of highly educated people or, more specifically, of scientists and researchers. The economic situation may be getting better but not the economic situation of science and research or the position of the scientists and researchers themselves.

A second type of policies for a general improvement of the milieu is represented by the policies concentrated on an improvement of the education system in a country. If the educational system improves usually several different results as for the emigration of highly educated people may be seen as a consequence. The studies of the migration trajectories of highly educated people reveal that the decision to go to exile is more frequent in the case of those who have achieved at least a part of their education abroad. If the studying conditions in their homeland improve the number of people leaving for abroad shall decrease. If the quality of the educational system improves the home labor force shall be better prepared and more efficient at work, the economic performance of the country shall increase which further contributes to a reduced probability of the emigration of highly educated people. Better performing tertiary education may also get involved into the economic system directly or in the cooperation with the business sector. In the practice there are a huge number of specific government policies for improving educational systems. However, the analysis of them stays beyond the range of this text.

The measures for an improvement of the economic situation and quality of the education system are very important and their success may have a considerable influence on the scientists abroad when deciding about a possible return home. But there are many other measures specifically aimed to raise the attractiveness of science and research. Such measures may be as follows: higher investments into the science and research (e.g. the EC Lisbon Strategy), better laboratory equipment, higher subsidies for hospitals, tax allowances for the scientific research sponsoring societies [Lowell 2001], special taxation regimes for the companies in high-tech fields [Hamid 2000], introducing award systems in public institutions which render the salaries according to the actual performance of persons and not according to their age, creation of special grant patterns for young scientists etc. Some analysis show that for the highly educated labor force inflow and outflow it is also important whether there is or is not a national innovative system [Mahroum 2005]. The strengthening of each element of the innovative system – private sector, public research institutions and universities, and especially their mutual relations creates better possibilities for science,

innovations, and private enterprises [Lundvall 1992]. The connection between the public and the private sector is also important [Thorn, Holm-Nielsen 2006]. The scientific milieu in a country may be also improved by financing the scientific research by the means of a contention. It is important that adequate financial recourses are given to science and research but it is important likewise how these recourses are distributed. Supplying research funds through open grant contests and public tenders creates a better scientific milieu for capable scientists. A competition and transparency in finance distribution has many positive effects: it supports quality research, awards the most productive scientists, and increases the efficiency of the research funding. For instance, in the Chinese research sector the finances were traditionally distributed by the central planning system. But China needed to attract its outstanding scientists from abroad back home, so it adopted a number of measures, including creating many funds allotting money in competitions based on a transparent independent project evaluation [Jonkers 2004]. It is being revealed that for the potentially migrating scientists it is also important that they have the possibility to get engaged in the solution of large multipurpose grants and do not have to apply for a number of relatively small grants upon their arrival at their country [Thorn, Holm-Nielsen 2005].

The individual approach endeavoring to attract individual scientists and the approach aimed to a general improvement of the scientific and research milieu in a country are often complementary. Many states make an effort to utilize the advantages of both approaches and join them into some form of a complex policy for influencing migration flows of highly educated people. Such policies are quite expensive and developing countries, most affected by the phenomenon of brain drain, usually do not have sufficient financial sources to compete with developed countries in this respect. On the other hand, these complex migration programs have the best perspectives for success in those countries which are not the most developed but they have a home scientific base strong enough, they are relatively rich and their economy is steadily growing. The Czech Republic undoubtedly belongs among such countries. Thus it seems meaningful for Czech Republic to try to create and implement policies aimed to the attraction of highly educated people.

References

- Ackers, L. 2005. "Moving People and Knowledge: Scientific Mobility in the European Union". *International Migration* 43(5): 99–131.
- Adams, R. H. 2003. "International migration, remittances and the brain drain: A study of 24 labor-exporting countries." *World Bank Policy Research Working Paper 3069*. [online] [cit. 15. 10. 2008]. Available from <<http://www2.gtz.de/migration-and-development/download/adams.pdf>>.
- Altbach, P. G., U. Teichler. 2001. "Internationalization and Exchanges in a Globalized University." *Journal of Studies in International Education* 5(1): 5–25.
- Angel-Urdinola, D., T. Takeno, Q. Wodon. 2004. *From Brain Drain to Brain Gain: Selected Policy Options*. Unpublished paper. Washington DC: World Bank.
- Baláz, V., Williams, A. M. 2004. "‘Been There, Done That’: International Student Migration and Human Capital Transfers from the UK to Slovakia." *Population, Space and Place* 10: 217–237.
- Balter, M. 1999. "Foreign Exchanges: Europeans Who Do Postdocs Abroad Face Re-entry Problems." *Science Magazine* 285: 1524–1526.
- Becker, G. S. 1964. *Human Capital; A Theoretical and Empirical Analysis, with Special Reference to Education*. New York: National Bureau of Economic Research/Columbia University Press.
- Bernstein, J. H., J. T. Shuval. 1995. "Occupational Continuity and Change among Immigrant Physicians from Former Soviet Union in Izrael." *International migration* 33: 3–29.
- Bhagwati, J. N. 1972. "The United States in the Nixon Era: The End of Innocence." *Daedalus* 25–47.
- Bhagwati, J. N., M. Partington (eds.). 1976. *Taxing the Brain Drain: A Proposal*. Amsterdam: North-Holland.
- Boulier, D. 1999. "La Migration des competences: enjeu de justice et de solidarité, internationale." *People on the Move* 28: 69–79.
- Boussaid, L. 1998. "L'exode des cerveaux et les pays en développement." *Migration société* 56(10): 65–71.
- "Brain Drain or Brain Gain?" 2000. *RTD Info – Magazine for European Research*, 25(2): 2000.
- Brandi, M. C., L. Cerbara. 2004. "Foreign Researchers in Italy: Push and Pull Factors." *Taxing the Brain Drain: A Proposal* [online] [15. 10. 2008] Available from: <<http://www.irpps.cnr.it/sito/download/foreignresearchersinItaly.pdf>>

- Brown, M. 2000. *Using the Intellectual Diaspora to Reverse the Brain Drain: Some Useful Examples*. Cape Town: University of Cape Town.
- Bushnell, P., W. K. Choy. 2001. "Go West, Young Man, Go West!" *New Zealand Treasury Working Paper 01/07*. Auckland: New Zealand Treasury.
- Castles, S., M. J. Miller. 1998. *The Age of Migration: Population Movements in the Modern World*. London: Macmillan.
- Cohen, R. 1996. *Brain Drain Migration. South African Commission on International Migration 1996–1997*. Southern African Migration Project. [online] [cit. 15. 10. 2008]. Available from: <<http://www.queensu.ca/samp/transform/Cohen1.htm>>.
- Collins, H. M. 2001. "Tacit Knowledge, Trust and the Q of Sapphire." *Social Studies of Science* 31(1): 71–85.
- Denou, L., R. Junker. 1999. "Médicins étrangers des hospitaux publics: une reconnaissance progressive." *La Dette à l'Envers* 1221: 41–50.
- Diamantopoulou, A. 2001. *Address at Conference An Enlarged Europe for Researchers: Employment and Social Aspects of Researchers: Mobility*. Conference organised by the European Commission. Brussels. 27. June 2001.
- Dillon, N. 2001. "Tackling the Postdoc Brain Drain." *EMBO reports* 2(9): 746–747.
- Emeagwali, P. 2003. "How Do We Reverse the Brain Drain?" *The Pan African Conference on Brain Drain*, Elsah, Illinois 24. October 2001.
- Gamlen, A. 2005. "The Brain Drain is Dead, Long Long Live the New Zealand Diaspora. Centre on Migration, Policy and Society." *Working Paper 10*. Oxford: University of Oxford.
- Giannoccolo, P. 2005. "'Brain Drain Competition' Policies in Europe: a Survey." Department of Economics. University of Bologna.
- Giannoccolo, P. 2006. "'Brain Drain Competition' Policies in Europe: a Survey." *Working Paper 02/01/2006*. Università degli Studi di Milano-Bicocca, Dipartimento di Statistica.
- Glass, H., W. K. Choy. 2001. "Brain Drain or Brain Exchange?" *New Zealand Treasury Working Paper 01/22*. Auckland: New Zealand Treasury.
- Guerrero, G. T., J.-C. Bolay. 2005. *Enhancing Development through Knowledge Circulation: A Different View of the Migration of Highly Skilled Mexicans*. Geneva: Global Commission on International Migration. [online] [cit. 15. 10. 2008]. Available at: <<http://www.gcim.org/mm/File/GMP%2051%20english.pdf>>.
- Hamid, H. 2000. "Budget 2001 A Boom to Workers." *Malaysia Business Times* 2(11): 4.
- Hansen, W. (ed.) 2004. *The Brain-Drain – Emigration Flows for Qualified Scientists*. Maastricht: UNU-MERIT.
- Hawthorne, L. 1997. "The Question of Discrimination: Skilled Migrant' Access to Australian Employment." *International Migration* 35(3): 395–419.
- Ho, E. 2003. "Reluctant Exiles or Roaming Transnationals? The Hong Kong Chinese in New Zealand." Pp. 165–184 in M. Ip (ed.). *Unfolding History, Evolving Identity: The Chinese in New Zealand*. Auckland: Auckland University Press.
- Hufbauer, G. C., 1989. "The State, the Individual, and the Taxation of Economic Migration." Pp. 83–96 in J. N. Bhagwati, J. D. Wilson (eds.). *Income Taxation and International Mobility*, Cambridge: M. I. T. Press.

- Hugo, G. 2004. "International Mobility of the Highly Skilled." Pp. 73–97 in F. Q. Wood (ed.). *Mobility, Competitiveness and Scientific Excellence*. Armidale: University of New England.
- Iredale, R. 2001. The Migration of Professionals. Theories and Typologies. *International Migration* 39(5): 7–26.
- Johnson J. M., M. Regets. 1998. *International Mobility of Scientists and Engineers to the USA – Brain Drain or Brain Circulation?* Arlington: National Science Foundation. [online] [cit. 15. 10. 2008] Available at: <<http://www.nsf.gov/statistics/issuerebrf/sib98316.pdf>>.
- Jonkers, K. 2004. "The Role of Return Migrants in the Development of Beijing's Plan Biotechnological Cluster." Paper prepared for the *Second Globelics Conference: Innovation Systems and Development*. Beijing, 16.–20. October 2004.
- Kabeleová, H. 2001. "Století migrace – Uprchlíci v Evropě." *Europeum* 17. 1. 2001 Institut pro evropskou politiku Europeum. [online] [cit. 15. 10. 2008]. Available at: <http://www.europeum.org/disp_article.php?aid=321>.
- Kelo, M., B. Wächter. 2004. *Brain Drain and Brain Gain. Migration in the European Union after enlargement*. Haque: Academic Cooperation Association. This study was Commissioned by Nuffic for the European Conference Braingain-the instruments, held in The Hague, 29.–30. September 2004.
- Key Figures 2003–2004. Towards a European Research Area. Science, Technology and Innovation* 2005. Brusel: European Commission. Directorate-General for Research.
- Koser, K., J. Salt. 1997. "Research Review 4: The Geography of Highly Skilled International Migration." *International Journal of Population Geography* 3(4): 285–304.
- Kostecká, Y., J. Bernard, T. Kostecký. 2007. *Zahraniční migrace vědců a výzkumníků a nástroje k jejímu ovlivnění*. Sociologické Studie/Sociological Studies 07:6. Praha: Sociologický ústav AV ČR, v.v.i.
- L.E.K Consulting. 2001. *New Zealand Talent Initiative: Strategies for Building a Talented Nation*. Auckland: L.E.K Consulting.
- Levitt, P. 2004. "Redefining the Boundaries of Belonging: Transnational Migration and Beyond." Paper presented at the *Centre on Migration, Policy and Society (COMPAS)*. Oxford: University of Oxford, 4 November 2004.
- Lidgard, J. M., C. Gilson. 2002. "Return Migration of New Zealanders: Shuttle and Circular Migrants." *New Zealand Population Review* 28(1): 99–128.
- Lowell, B. L. 2001. "Policy Responses to the International Mobility of Skilled Labour." *International Migration Papers* 45(12). Geneva: International Migration Branch.
- Lowell, B. L., A. Findlay, E. Stewart. 2004. „Brain Strain: Optimising Highly Skilled Migration from Developing Countries.“ *Asylum and Migration Working Paper 3*. London: Institute for Public Policy Research.
- Lundvall, B.-A. 1992. *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*. London: Pinter Publishers.
- Mahroum, S. 1998. "Europe and the Challenge of Brain Drain." *IPTS report 29* [online] [cit. 15. 10. 2008]. Available at: <www.jrc.es/home/report>.

- Mahroum, S. 2005. "The International Policies of Brain Gain: A Review." *Technology Analysis & Strategic Management* 17(2): 219–230.
- Marks, J. 2004. *Expatriate Professionals as an Entry Point into Global Knowledge – Intensive Value Chains: South Africa*. Knowledge for Development Program, World Bank Institute. Washington D.C.: World Bank.
- McLaughlan, G., J. Salt. 2002. *Migration Policies towards Highly Skilled Foreign Workers*. Report to the Home Office. United Kingdom.
- Metzke, R. 2001. "On the Prowl: Germany Is Looking for More Excellent Scientists." [online] [cit. 15. 10. 2008]. Available at: <<http://sciencecareers.sciencemag.org>>.
- Meyer, J.-B. 2001. "Network Approach vs. Brain Drain: Lessons from the Diaspora." *International Migration Quarterly Issue* 39(5): 91–110.
- Meyer, J.-B., D. Bernal, J. Charum, J. Gaillard, J. Granes, J. Leon, A. Montenegro, A. Morales, C. Murcia, N. Narvaez Berthelemot, L. S. Parrado, B. Schlemmer. 1997. "Turning Brain Drain into Brain Gain: The Colombian Experience of the Diaspora Option." *Science, Technology and Society* 2(2): 285–315.
- Meyer, J.-B., M. Brown. 1999. „Scientific Diasporas: A New Approach to the Brain Drain“. Paper prepared for the World Conference on Science, UNESCO-ICSU, Budapest.
- Mutume, G. 2003. "Reversing Africa's Brain Drain." *Africa Recovery* 17(2). [online] [cit. 15. 10. 2008]. Available at: <<http://www.un.org/ecosocdev/geninfo/afrec/vol17no2/172brain.htm>>.
- North, D. 1995. *Soothing the Establishment: the Impact of Foreign-born Scientists and Engineers on America*. Laham: University Press of America.
- OECD 1995. *The Measurement of Scientific and Technological Activities. Manual on the Measurement of Human Resources Devoted to S&T „Canberra Manual“*. Paris: OECD. [online] [cit. 16. 10. 2008]. Available at <<http://www.oecd.org/dataoecd/34/0/2096025.pdf>>.
- OECD 2002. *The International Mobility of the Highly Skilled*. Paris: OECD.
- OECD 2004. *A New Database on the International Mobility of the Highly Skilled and Policy Option*. Paris: OECD Policy Brief.
- Opiniano, J. M., T. A. Castro. 2006. *Promoting Knowledge Transfer Activities Through Diaspora Networks: A Pilot Study on the Philippines. Converting Migration Drain into Gain: Harnessing the Resources of Overseas Professional*. Mandaluyong City: Asian Development Bank.
- Özden, Ç., M. Schiff. (eds.). 2006. *International Migration, Remittances, and Brain Drain*. Washington D.C.: World Bank Trade and Development Series/ Palgrave Macmillan
- Paterlini, M. 2002. "Brains in Chains." [online] [cit. 15. 10. 2008] Available at: <http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2002_11_08/noDOI.16858356570822777349>
- Pearson, R. et al. 2001. *Supply and Demand for Scientists and Technologists in Europe*. Brighton: Institute of Employment Studies.

- Puri, S., T. Ritzema. 1999. "Migrant Worker Remittances, Micro-finance and the Informal Economy: Prospects and Issues." *Working Paper 21*. Geneva: International Labour Office.
- Riaño, Y. 2003. "Migration of Skilled Latin American Women to Switzerland and their Struggle for Integration." Pp. 313-343 in M. Yamada (ed.). *Emigración Latinoamericana: Comparación Interregional entre América del Norte, Europa y Japón*. Sborník z konference *Population Movement in the Modern World VII*. JCAS Symposium Series 19, The Japan Centre for Area Studies, National Museum of Ethnology, Osaka.
- Rosenbaum, J. E., T. Kariya, R. Settersten, T., Maier. 1990 "Market and Network Theories of the Transition from High School to Work: Their Applications to Industrialized Societies." *Annual Review of Sociology* 16: 263–299.
- Salt, J., G. McLaughlan. 2002. *Migration Policies Towards Highly Skilled Foreign Workers*. London: Migration Research Unit, Migration Department, University College London.
- Séguin, B., L. State, P. A. Singer, A. S. Daar. 2006. "Scientific Diasporas as an Option for Brain Drain: Re-circulating Knowledge for Development." *Int. J. Biotechnology* 8(1/2): 78–90.
- Sretenova, N. 2003. "Scientific Mobility and 'Brain Drain' issues in the Higher Education Sector in Bulgaria". Symposium on Science Policy, Mobility and Brain Drain in the EU and Candidate Countries, 27.–28. July, Leeds [online] [cit. 15. 10. 2008]. Available at: < <http://www.leeds.ac.uk/law/cs/lpe/phare/>>.
- Stark, O., Y. Wang. 2002. "Inducing Human Capital Formation: Migration as a Substitute for Subsidies." *Journal of Public Economics* 86: 29–46.
- Straubhaar, T. 2000. *International Mobility of the Highly Skilled: Brain Gain, Brain Drain or Brain Exchange*. HWWA Discussion Paper 88/2000. Hamburg: Hamburg Institute of International Economics.
- Suroor, H. 2007. "We Are Victims of Racist Mindset: Indian Doctors." Online edition of *India's National Newspaper*, Saturday, August 11, 2007. [online] [cit. 15. 10. 2008]. Available at: < <http://www.hindu.com/2007/08/11/stories/2007081161911900.htm>>.
- Thorn, K., L. B. Holm-Nielsen. 2006. *International Mobility of Researchers and Scientists*. Helsinki: United Nations University – World Institute for Development Economics Research. [online] [cit. 15. 10. 2008]. Available at: <<http://www.wider.unu.edu/publications/rps/rps2006/rp2006-83.pdf>>.
- Todisco, E. 2000. "Mobilità dei cervelli e mobilità delle conoscenze." Conference paper prepared for the conference *Convegno Internazionale Migrazioni, scenari per il XXI secolo*, Sessione di Firenze, Florence, 27.–30. September 2000.
- United Nations. 1948. *The Universal Declaration of Human Rights*. [online] [cit. 17.10.2008]. Available at <<http://un.org/Overview/rights.html>>.
- Van Ham, M., C. H. Mulder. 2004. "Migration Histories, Urban Regions and Occupational Achievement." Paper presented at the *ENHR Conference*. University of Cambridge, 2.–6. July 2004.

- Vavrečková, J. 2005. *Migrační potenciál českého obyvatelstva v procesu evropské integrace*. Výzkumná zpráva. Praha: VÚPSV.
- Vavrečková, J., D. Fischlová, M. Lukeš. 2005. *Sekundární analýzy problematiky Brain drain a tím související skutečností*. Praha: VÚSPV.
- Vavrečková, J. a kol. 2006. *Migrace odborníků do zahraničí a potřeba kvalifikovaných pracovních sil*. Praha: VÚPSV.
- Wescott, C. G. 2006. Harnessing Knowledge Exchange among Overseas Professionals. *International Public Management Review* 7(1): 1–31.
- Wilson, J. D. 2005. “Taxing the Brain Drain: A Reassessment of the Bhagwati Proposal.” A paper for the *Conference in Celebration of the 70th Birthday of Jagdish Bhagwati*, 5.–6. August 2005, New York, Columbia University.
- Williams, A. M., V. Baláž. 2005. “What Human Capital, Which Migrants? Returned Skilled Migration to Slovakia from the UK.” *International Migration Review* 39(2): 439–468.
- Winkelmann, L., R. Winkelmann. 1998. “Immigrants in New Zealand: A Study of their Labour Market Outcomes.” *Occasional Paper 1998/1* Wellington: Labour Market Policy Group, Department of Labour.
- Zweig, D., C. Changgui, S. Rosen 2004. “Globalization and Transnational Human Capital: Overseas and Returnee Scholars to China.” *The China Quarterly* 179: 735–757.

Subject Index

- administrator – 35, 36, 41, 76
- applicant – 23, 30, 38–57, 59–60, 62, 63, 64–71, 81, 84–86
- application – 9, 13, 22, 25, 42, 43, 47, 48, 55, 56, 58–62, 64, 66, 69, 81, 85, 96
- approach – 15, 21, 27, 31, 33, 47, 48, 55, 87
 - general approach – 88, 90
 - individual approach – 87, 88, 90
- assessment – 5, 17, 31, 53, 65
- assistant professor – 63
- autonomy – 31
- awards – 38, 44, 52, 60, 64, 68, 69, 84, 90

- barrier – 21, 27, 31, 45, 49,
 - structural barrier – 28, 29, 31
 - technical barrier – 28, 29
- brain circulation – 16, 31, 36, 37, 40, 74
- brain drain – 9, 13–16, 20, 22, 24, 25, 32, 34, 37, 40, 47, 54, 78, 87, 90
- brain gain – 9, 15, 27, 34, 47, 66, 78

- career – 17, 37, 38, 45, 47, 51, 53, 55, 61–63, 65, 66, 74–76, 79, 85–87
- centers of excellence – 12, 28, 41, 66
- certificate – 17, 21, 22, 37, 40, 45
- citizenship – 34, 57, 63, 69, 70, 71
- competition – 32, 53, 90
- conferences – 51, 53, 82, 83, 85
- conference fees – 48
- congress – 85
- consultants – 79–81
- consulting – 54, 65, 74, 79, 80
- contribution – 23, 38, 39, 46, 48, 49, 54, 57–59, 60, 63, 64, 69, 71, 85, 86, 88
- contribution financial – 46, 48, 49, 58
- cooperation, scientific – 30, 53
- cost – 16, 22, 23, 44–46, 48, 50–52, 56, 57, 59, 62, 63, 68, 70, 71, 73, 80–82, 84–86
 - direct costs – 38, 48
 - indirect costs – 60, 64
- cost-benefit – 23
- countries:
 - Anglo-Saxon countries – 29, 71
 - francophone countries – 42
 - host countries – 11, 12, 15–17, 21–23, 26, 29, 31–33, 36, 47, 86
 - less developed countries – 47, 49, 71
 - source countries – 16, 20, 21, 31, 36, 74
 - target countries – 12, 20, 21, 25, 50, 52
- culture – 11, 28, 34, 36, 70, 80
- customs – 28, 29, 69, 70, 80

- debt – 45
- diaspora – 16, 19, 20, 24, 51, 75, 77, 78, 82, 83
 - scientific diaspora – 19, 20, 75, 77, 83
- diplomas – 21, 29, 33, 40
- disciplines:
 - agriculture – 70, 80
 - architecture – 85
 - arts – 53, 85
 - behavioral psychology – 42
 - biology – 43, 52, 58
 - bio-medicine – 42
 - biotechnology – 43, 46, 58, 60
 - chemistry – 43

- economics – 82, 85
- forestry – 70
- genetic engineering – 46
- humanities – 55, 63
- law – 85
- molecular biology – 52
- medicine – 35, 41–44, 52, 57, 63, 67
- natural resources research – 70
- natural sciences – 25, 32, 52, 57, 63, 64, 82–84
- neurological science, neurology – 41, 47
- protein engineering – 66
- public health – 42
- security – 51
- social sciences – 42, 55, 63, 68, 84
- discrimination – 23, 33
- doctors – 21, 33, 41

- education – 22, 26, 30–32, 40, 42, 57, 68, 87–89
 - tertiary education – 17, 89
- education system – 32, 89
- engineering – 25, 46, 60, 63, 64, 66
- engineers – 11, 24, 34, 65
- equipment – 13, 17, 47, 48, 50, 53, 56–58, 60, 63, 64, 68–70, 79, 89
- evaluation – 66, 72–74, 90
 - evaluation methods – 30
- expatriates – 19, 20, 22, 23, 35, 36, 50, 62, 67, 72, 74, 75, 79, 84, 85
- experience – 9, 15, 16, 20, 21, 27, 29, 36, 37, 39, 41, 43, 45, 47, 51, 55, 59, 61–63, 73, 74, 75, 79, 81, 84, 87, 88

- fellowship – 13, 38–44, 46–48, 52, 55, 64, 67, 82, 85
- follow-up research fund – 48
- foreign capital – 36
- funding – 26, 28, 31, 35, 41, 48, 56, 58–60, 71, 76, 82, 83, 90
- funding source – 35

- government – 12, 23, 26, 29, 30, 32–34, 42, 43, 54, 55, 57, 62, 64–69, 78, 79–81, 85, 88, 89
- grants – 12, 17, 24, 26, 28, 30, 37–43, 45–49, 51–56, 58, 61–65, 67, 69–76, 78, 79, 81, 82, 85, 88–90
 - return grants – 37, 45, 46, 47, 48, 54, 58, 62, 88
- green cards – 21, 28

- health – 42, 70, 74, 81
- health insurance – 43, 44, 48, 62, 63, 66, 76
- health organization – 33, 37, 38, 41, 42, 53, 57
- highly educated – 11–13, 15–17, 19–25, 27, 32, 34, 36, 37, 50, 79, 85, 87–90
- highly skilled – 9, 10, 13–17, 19, 22, 25–27, 32–35, 37, 50, 54, 71, 78, 79, 85
- host institute – 13, 31, 41, 47, 51–53, 55, 61, 62, 70
- housing – 54
- human capital – 14–16, 23, 26, 34

- image – 29, 85
- immigration laws – 21
- information portals – 37, 75, 77, 78
- initial expenses – 64
- innovations – 9, 25, 54, 58, 65, 77, 83, 85, 90
- internationalization – 30
- international projects – 36, 52
- Internet – 30, 37, 75, 77, 78
- IT – 11, 24, 35

- joint projects – 83
- joint-ventures – 83

- know-how – 9, 15, 16, 19, 20, 49, 61, 81, 83, 86
- knowledge – 9, 11, 15, 16, 19, 22, 25, 29, 36, 37, 40–42, 45–47, 49, 65, 73, 74, 79, 82, 83, 86

- laboratory – 47–49, 63, 68, 79, 89
labor markets – 9, 21, 22, 27, 32, 33, 77
language – 12, 15, 29, 31, 33, 34, 40, 42, 55, 71, 80
life-stories – 33
living standard – 33
loan – 24, 44, 45
- marketing – 30
measures – 9, 17, 19, 20, 26, 28, 32, 33, 37, 69, 87, 89, 90
 restrictive measures, 11, 20, 21
 stimulating measures 17
medical insurance – 41
migration of scientists – 11–13, 26, 29, 54, 87
ministry – 30, 42, 54, 56, 57, 60, 62, 69, 70, 75, 77, 80–82, 85
myopathy – 57
- natural sciences – 25, 32, 52, 57, 63, 64, 82–84
negative selection – 72
non-profit – 44, 58
- participation fee – 85
per diem – 85
peripheries – 41
permanent job – 56
permanent post – 64, 65
personal expenses – 49, 53, 67, 71
PhD. studies – 39
plane tickets – 50 (airplane), 70, 81
policy:
 compensatory – 19, 20, 22, 23, 25
 restrictive – 19–21, 25, 40, 45, 46
 stimulation – 19, 20, 24, 25, 88
postponed migration – 20
professor – 31, 58, 59, 63, 69, 83
professorship – 59, 63
programs:
 complex programs – 36, 54
 exchange programs – 39
 general programs – 35, 62
 national programs – 35, 40, 49, 54, 65, 81
 private programs – 35
 sandwich programs – 37, 39, 40, 45, 88
 specialized programs – 36
 state programs – 35
 supranational programs – 35, 40
publication costs – 48, 62
- recruitment – 12, 19, 25, 26, 27, 30, 31–33, 60
reimbursement – 22, 48, 71, 85
reintegration – 17, 34, 37, 46, 48, 49, 50, 51, 53, 54, 56, 57, 61, 71, 72, 73, 74, 88
relocation – 54, 64
remittances – 23
reparation – 19, 38, 84
research – 9, 12, 13, 15, 17, 18, 24, 26, 28–32, 36–44, 46–49, 51–77, 81–84, 86, 87, 89, 90
retention – 19, 68
return:
 long-term return – 36, 69, 72
 permanent return – 16, 35, 71, 86
 short-term return – 16, 35, 36, 75, 79–84, 86
 voluntary return – 50
restriction – 19, 45
- sanctions, financial – 45
seed money – 24
senior scientists – 56, 74
scientists – 9, 11–13, 15–17, 19–22, 24–34, 36–49, 51–90
scholarship – 13, 16, 31, 37–48, 61, 63–68, 70, 76, 77, 84–86
social networks – 12, 13, 45, 61
state regulation – 31
strategies – 15–18, 26, 27, 42, 73, 85, 89

students – 16, 21, 24, 26, 28, 30–32, 36, 37, 39, 40, 42–45, 51, 53, 58, 61, 62, 66, 67, 69, 78, 82–84
post-doctorate students – 42, 53

tacit knowledge – 36

talents – 15, 17, 20, 21, 26, 27, 29, 38, 43, 50, 69, 72, 73, 77, 78, 80, 82

taxation:
brain drain tax – 22
income tax – 28
tax allowances – 18, 29, 89
travel tax – 70

territorial targeting – 35

transparency – 17, 90

transport – 44, 54, 71, 82

travel costs – 44, 71

travel expenses – 38, 39, 41, 43, 48, 53–55, 57, 59, 62, 80

unemployment – 33, 74

visa:
fast track visa – 28
scientific visa – 28

visiting professor – 83

volunteer – 79, 80

warrantor – 45

websites – 9, 30, 75, 77, 78

welcome subsidies – 69

work permit – 17, 23, 28

workplace – 13, 21, 36, 39, 43, 46, 58, 60, 62, 64, 65, 68, 69, 71, 76–79

written commitment – 40, 45

young people – 26, 37, 40, 45, 78

About the Authors

Mgr. Yvona Kostecká, Ph.D. yvona.kostelecka@pedf.cuni.cz

Yvona Kostecká is a research assistant at the Faculty of Education of Charles University in Prague. She graduated with a degree in biology and mathematics from the Faculty of Science and earned her PhD in education at the Faculty of Education of Charles University. Her research focuses on institutions and policies related to education, migration, and the integration of foreigners.

Mgr. Josef Bernard josef.bernard@soc.cas.cz

Josef Bernard is a junior researcher in the Department of Local and Regional Studies at the Institute of Sociology of the Academy of Sciences of the Czech Republic and a PhD student. He graduated from Charles University with a degree in sociology and German language and literature (2004). He is head of the research project 'The Self-Government of Small Municipalities and Their Endogenous Development Potential'. His main research interests include local and regional government, citizen participation, and inter-organizational partnerships.

RNDr. Tomáš Kostecký, CSc. tomas.kostecky@soc.cas.cz

Tomáš Kostecký is a senior researcher at the Institute of Sociology of the Academy of Sciences of the Czech Republic, where he is head of the Department of Local and Regional Studies. His research is oriented towards the study of spatial features of human behaviour, local, regional, and comparative politics, political consequences of metropolitanization, and the migration of highly skilled. His publications include *Political Parties after Communism: Developments in East-Central Europe* (2002), *Political Behavior in Metropolitan Areas in the Czech Republic between 1990 and 2002* (2005), and he has also written numerous articles and contributed chapters to edited volumes.

Mgr. Věra Patočková, M.A. vera.patockova@soc.cas.cz

Věra Patočková is a junior researcher in the Department of Local and Regional Studies at the Institute of Sociology of the Academy of Sciences of the Czech Republic and a PhD student. She graduated from Charles University with a degree in cultural studies in 1994, and she received an MA in international leisure studies from the WLRA International Centre of Excellence in the Netherlands in 1994. Her main topic of interest is social and cultural change in the community.

How to Turn Brain Drain into Brain Gain

Policies to Support Return of Researchers and Scientists to Their Home Countries

Yvona Kostecká, Josef Bernard, Věra Patočková, Tomáš Kostecký

Editor: Denis Jerie

Translation: Jan Jícha

Design: Jaroslav Kašpar

Typeset by: Petr Teichmann

Printed by: ERMAT Praha, s. r. o., Praha 4

Published by: Institute of Sociology, AS CR

Jilská 1, 110 00 Prague 1

Print run: 300 copies

1st edition

Prague 2008

Distribution:

Sales: Press and Publications Department

Institute of Sociology, AS CR

tel.: 222 221 761, 221 183 217, 218, fax: 222 220 143

e-mail: prodej@soc.cas.cz

How to Turn Brain Drain into Brain Gain

In order to compete in the global labor market of top-qualified workers, many states introduce various types of targeted policies to improve the migration balance of highly qualified workers. The book offers a systematic review of the policies used by different countries in an attempt to encourage scientists and researchers working abroad to return to their home country or in an effort at least to make it easier for information, know-how, and experiences acquired abroad to be passed on back home. This study is based on an analysis of scientific literature, texts published by institutions organizing various forms of return programs, websites with information for potential program participants, and personal correspondence and interviews with professionals working in this specific field. Experience with applying policies aimed at influencing the migration of highly qualified workers indicate that the best chance of success is enjoyed by those migration policies that employ a complex design, combining an individual approach, targeting an individual scientist, and a structural approach, aimed at changing the domestic science and research environment. Typically, the programs tend to be successful in middle income or high income countries that have a sufficiently strong domestic foundation in science, and have an economy that shows signs of stable growth.

Prague 2008

ISBN 978-80-7330-148-4



9 788073 301484