

PART 2.

DEFINING BRAIN DRAIN

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Organisation of the Report

The section on defining the brain drain presents two papers. The first, *The Evolution in Theories of the Brain Drain and the Migration of Skilled Personnel* has been prepared by our CNR-IRPPS team of Sveva Avveduto and M. Carolina Brandi. This paper examines the link between migration, the emergence of concerns about migration and its relation to economic growth, and brings us forward to today's contentious issues and challenges to define and measure brain drain. The paper begins with an introduction to the issue of migration and how a relationship between migration and brain drain has evolved since World War II. Questions and challenges of measuring the migration of skilled persons are presented. The discussion ends with the identification of challenges facing brain drain analyses and interpretation, such as the difficulty of discriminating between international mobility (flow of knowledge) and actual brain drain and presents some guidelines and suggestions that leave some optimism for measuring, analysing and generating useful indicators on brain drain.

The second paper, *Human, Brain and Knowledge Mobility* written by Enrico Todisco is a discussion of key issues of measurement of flows of persons, skilled persons and knowledge. The paper begins with a detailed explanation of migration. The author highlights the challenge of definition and measurement of mass migration versus skilled migration. The term brain drain was coined to describe the outflow (loss) of researchers, academics, scientists and engineers and despite a defined population, measuring brain drain remains a complicated formula, a formula varied by country situations from academic structures, professional qualifications to economic and social conditions. The paper tells of skilled migrants moving about in the market and as tradable as raw materials of the past. Measurement of international mobility and social and economic impacts can only become more challenging.

1. Evolution of Theories of Brain Drain and Migration of Skilled Personnel¹

1.1. Introduction

Migrations have always been one of the most important phenomenon of human civilisation. It is therefore quite natural that social sciences have been interested in studying them since their origin. Until the end of the Second World War, migrants came from the poorest and less educated classes of their country of origin, and it was on these people the first academic surveys focused. Highly qualified migrants were very rare, and often were not relevant in historical or cultural terms and are therefore considered as a topic for a biographical study of a singular case rather than for a wide scientific analysis. After the end of the War, the way of production changed dramatically and started to include innovations stemming out of general scientific and technological development; and, the number and the economic importance of migrations of highly qualified people increased due to the radical changes of the political and social international picture. These migrations began to get the interest of researchers starting from the first relevant case: the departure from Germany and Italy of scientists persecuted for political and racial reasons during the nazi and fascist dictatorships. It was evident that this exodus had a strong effect on the economic and military potential both of originating and receiving countries (Huges, 1970). However, the changes in socio-economic realities over the past 50 years have brought a strong evolution of the issues surrounding the migration of highly qualified workers.

The original investigations of the phenomenon of highly qualified migration were mainly focused on Anglo-Saxon researchers, and the term *brain drain* first appeared in a report by the Royal Society of London published in the early 1960s (Royal Society, 1963). In its original sense, the term referred to the exodus of British scientists to the United States. This fact is hardly surprising given the conditions in the immediate aftermath of the Second World War, since only the number of researchers who moved from Germany or England to the United States during this period was both numerically and economically significant.

By the 1960s and 1970s, literature on the subject was chiefly concerned with the emigration of academics and professionals from developing countries. From the start of the 1970s, new political and economic realities had led to a shift in focus and the term brain drain was used also to refer to the burgeoning phenomenon of students from poorer countries opting to stay on in the developed countries where they had studied. This change in the academic interest had of course a specific political and economic cause: in the framework of the interest to the Third World, that in those days was assuming a considerable relevance, it was very important that the departure of the best qualified citizens from developing countries was beginning to drain those countries of their already shallow pool of qualified personnel, and was thus depriving them of the very people who were most capable of revitalising their economies. As wealthier countries then used their skills, the result was a transfer of "unfair technological aid" from developing countries to the rich world (Boussaid, 1998). The United Nations Conference on Trade and Development (UNCTAD) (Resolution 39-III/1972) introduced this concept of the "reverse transfer of technology" in 1972.

On the basis of this concept, developing countries made two substantial claims. The first was

¹ This paper was written by S. Avveduto and M. Carolina Brandi, CNR-IRPPS, Rome for the project *The Brain Drain - Emigration Flows for Qualified Scientists*.

that a country suffering from a shortage of qualified workers (either because of the weakness of its educational system or because a surge in its economy had led to a rapid increase in the demand for professional skills) should be permitted to take action to discourage the outflow and encourage the return of skilled workers. The second claim was for economic indemnification from developed countries to compensate for the loss of valuable human capital. One of the ideas mooted was the levying of an international tax on skilled workers who left their country of origin. This drew an immediate legal challenge from wealthy countries that disputed the claims on the strength of Article 13 of the Declaration of Human Rights, which enshrines the right of people to live where they choose. The poorer countries countered by invoking the principle of reciprocity in international trade. Even so, the resolution adopted by UNCTAD was not put into practice. There were several reasons for it, one of which was the intrinsic weakness of the very concept of "reverse technology transfer" (Boussaid, 1998). The weaknesses were hardly negligible: the concept failed to distinguish between different types of developing countries; it failed to account for the fact that migratory flows were not always to the benefit of countries that could be neatly defined as completely 'developed', as, for example, when a worker moved from Africa or Asia to one of the Gulf States. Furthermore, to be workable, the developing countries' demands required a general definition of what was meant by 'highly qualified migrants', which is no easy task. Moreover, the concept takes account of all the possible motivations behind a decision to emigrate, which could include a quest for political asylum or the desire to be reunited with one's family. Finally, it was not clear what should be done in the case of a country, such as the United Kingdom since the 1960s, that 'exports' one sort of skill and 'imports' another.

The whole theoretical framework underpinning studies of the international migration of highly qualified workers was destined to change substantially with the publication in 1978 of a paper by the United Nations Institute for Training and Research (UNITAR, 1978). This study demonstrated that many of those who left their countries of origin, especially the most brilliant of them, returned home later in their career to become important forces for the development of their scientific field. So, for a certain period of time, it looked as if brain drain was no longer a problem, and that developing countries were suffering no harm from what should better be termed 'skills mobility'. Since the 1980s, the development of communication systems, especially the Internet, and the general internationalisation of research has encouraged the belief that the geographical locality of academics is no longer of any great importance because today anyone can work with anyone else regardless of where they live.

Another idea that gained currency was that highly qualified people were moving to emerging economies where they made their skills available — Southeast Asia and Poland appeared to be cases in point. After the major political upheavals, a significant number of highly qualified personnel arrived in the country (Rudolph and Hillmann, 1997). Other studies have shown that it is possible to maintain contact between those who have emigrated abroad and those who have remained behind. Colombia has proved the practicability of this through the "CALDAS" network, which, in 1995, brought together more than 1,000 Colombian scientists and students scattered abroad (Gaillard and Gaillard, 1999). Thus, after the 1980s, researchers concerned with the migrations of highly qualified people turned their attention to labour market mobility within the confines of major multinational companies and the migration of experts within the context of international aid programmes and joint projects (see, for example, Beaverstock, 1992; Findlay *et al.*, 1996, etc.) In recent years, interest in the brain drain phenomenon has revived. The studies, however, have tended to focus mainly on regions such as Latin America and India (Lomnitz, 1998; Iredale, 1999; Awasthi and Chandra, 1994;

Robinson and Carey, 2000) where the state of scientific and technological progress in these regions is rather advanced. These regions therefore have more than a purely academic interest in understanding the factors that threaten to compromise their stock of human resources in the fields of science and technology (S&T).

The massive emigrations from Eastern Europe and the former Soviet Union after the break-up of the Warsaw Pact have been the subject of particularly intense research. A considerable number of surveys on actions and intentions of the highly qualified migrants from Eastern Europe have been carried out to assess the extent of the potential brain drain. The studies into the phenomenon include Ledeniova's examination (1995) of the propensity to emigrate among university students of the former Soviet Union, Tychonov's (1995) study of the patterns of migration from the Russian military-industrial complex, Dolgikh's (1995) study of the migration of Russian physicists, Grecic's (1995) survey of the motivations of expatriate scientists and professionals from Serbia, and there are many others of a similar nature (see, for example, Francovich 2000 and references therein). The conclusions they reached, however, were rather contradictory. For instance, the studies mentioned above argue that what is taking place is not so much a *brain drain* as a *brain waste* because very few of these migrants from East Europe secure a job in the host country that matches their high qualifications. De Tinguy (1994) and other researchers, however, see the flow of research scientists from the former Soviet Union as no more than a normal instance of the international mobility of S&T human resources. The rate of outflow is above average, they contend, simply because it was previously sealed off for many decades by political circumstances, and they conclude that it will prove beneficial both for the countries of origin and the hosts.

Even so, if we look closely at these flows, we can find many good reasons for doubting those who remain optimistic about skilled migration in general, and migration from Eastern Europe in particular.

1.2. Some Open Questions in Highly Skilled Migration Studies

International migration comes in many forms, and no universally accepted definition exists of the concepts of 'highly qualified' or 'migration' (Salt, 1997). Even the term "brain" is used in many different ways depending on the context. For the purposes of some statistical analyses, the term *highly qualified* is allowed to encompass skilled blue- and white-collar workers (Boulier, 1999). Most researchers, however, concur on the definition of highly qualified as referring to those persons who have a university degree or equivalent, and may be grouped as belonging to the category of "intellectuals, scientists and technicians". But having a degree is not in itself sufficient to warrant the use of the term highly-qualified because, even in their own countries, many graduates end up in jobs that do not require a high level qualification. Conversely, many people who are not university graduates hold jobs that undoubtedly demand high end skills. Todisco (2000), for instance, underlines the importance of artists, clergy and athletes. Qualifications can be acquired by experience rather than education or training. Accordingly, if we wish to evaluate the professional level of an expatriate worker, we would be well advised to distinguish between qualifications acquired through experience and qualifications conferred by educational establishments (Koser and Salt, 1997). Simply distinguishing between various countries' education curricula is itself a major aspect of research (see, for example, Brandi, 1998). We should also remember to attach due importance to an employer's objective evaluation of an employee's level of qualification. Findlay *et al.* (1996) demonstrate how the concept of "technical experience" within businesses in Hong

Kong, where workers are essentially international, has a specific cultural value. Some academics have even proposed that any definition of highly skilled migration must include workers on training courses (Kuptsch and Oishi, 1995) and students (Li *et al.*, 1996; Awasthi and Chandra, 1994). Regarding this point, Francovich (2000a) underlines the importance of students abroad in qualified migrations. For the intellectuals, the decision of migrating may be linked to the evolution of the school, university or career patterns and the propensity to migrate is definitely higher during the initial phase of education or job.

In effect, when defining highly qualified migration or seeking to pigeonhole migrants, we can approach the task from any one of three perspectives: the migrant's, the host country's or the employer's (Salt, 1997).

Definitions that focus on the migrant stress the difference between them and manual workers. Concepts such as brain drain, brain waste and brain exchange (Salt, 1983, Paganoni and Todisco, 1995, Bernstein and Shuval, 1995; Todisco, 2000) occur for the most part in research papers whose main purpose is to analyse the decision of a highly educated person to emigrate, and the effect of that decision on his or her country of origin. Yet, some people may emigrate for reasons unconnected with their qualifications, as we may see from the "ethnic" migrations that took place within the former Soviet Union (Rhode, 1993), or the exodus of Jewish academics and professionals from Eastern Europe to Israel (Bernstein and Shuval, 1995).

From the host country's point of view, the concept of "priority workers" introduced by Papademetriou & Yale-Loehr (1996) is more useful because it focuses on the part played by the host country that obtains benefits from highly qualified expatriates whose skills are regarded as advantageous to the national economy. Even in cases where immigrants are accepted for reasons apparently unconnected with the advantages deriving to the host country from their presence, as with the influx of skilled Chinese workers to Canada following the Tiananmen Square repression, this consideration is nonetheless uppermost when technologically advanced countries are framing their immigration policies (Liu, 1997).

Highly qualified migration can also be looked at from a third perspective, that of the employer. Employers, especially transnational corporations, are becoming increasingly involved in and responsible for the migration of qualified personnel. The definition that these corporations make of high qualification will obviously depend on their own specific requirements and organisational strategies (Salt, 1997).

These definitions must then be understood with reference to what is meant by migration, itself an imprecise concept for academics. One particular difficulty arises from the growing incidence of temporary migration. While the United Nations may define "migration" as a transfer lasting more than one year, current national statistics do not abide by any single standard definition of the term. Many academics have also acknowledged that using a time scale as a means of definition is not necessarily valid. It is far from clear that the international movement of qualified personnel should be defined as a migration, especially if there is a highly probability that the person will return home after a given period of time. Some scholars discuss the very applicability of the term "brain drain" for permanent movement of very high skilled professionals in the present socio-economic circumstances (Todisco, 2000). On the opposite extreme stand academics such as Prices (1989) who has suggested that professionals, technicians and employees transferred abroad for a period of 10 to 12 months as well as scientists and academics who work for a foreign institution for a period of 6 to 12 months should not just be included in the count, but should also be regarded as long-term rather than

short-term or transitory migrants.

In light of these difficulties, it will come as no surprise to find that no generally accepted definition exists of *highly qualified migration*, sometimes also referred to as "skilled international migration" (Findlay, 1991), "skilled international labour circulation" (Cormode, 1994), "professional transients" (Appleyard, 1991), "migration of expertise" (Salt and Singleton, 1995) and "quality migration" (Todisco, 2000).

It goes without saying that this absence of a generally accepted definition of the phenomenon causes enormous problems for anyone trying to draw up a meaningful classification based on the traits of individual migrants or the circumstances in which the act of migration took place. Logan's (1992) classification, for example, distinguishes only between international migrations from less to more developed regions and movements within the developed world. Gould (1988) had devised a more complex system of classification that separated workers who made a permanent change of abode from those who were temporarily mobile, and distinguished between migration to the northern and the southern regions of the world.

Another approach is based on the characteristics of the persons involved. For example, Salt (1997) distinguishes between:

- 1) Transfers within companies
- 2) Technical workers on temporary assignments
- 3) Professionals
- 4) Project experts
- 5) Specialist consultants
- 6) Those who migrate for the purposes of career development and training
- 7) Clerics and missionaries
- 8) Entertainment workers, sports players and artists
- 9) Businessmen and independent entrepreneurs
- 10) Academics, including researchers and students enrolled in higher education institutes
- 11) Military personnel and, in some cases
- 12) The wives and children of the same.

Todisco (2000) proposes classifying migrants by their area of employment, as follows:

- 1) Scientists, researchers and academics
- 2) International experts
- 3) International functionaries
- 4) Multinational managers
- 5) Clerics and members of religious orders and organisations
- 6) Artists, actors, entertainment and tourist workers
- 7) Sports professionals
- 8) Specialist workers
- 9) Officers, NCOs and private soldiers
- 10) Students and postgraduates completing their studies.

In addition to the uncertainty of the theoretical framework, few migration statistics are available either from the countries of origin or the countries of destination and, even where they do exist, as in the United States, Canada and Australia, they tend not to be homogeneous and difficult to compare (Koser and Salt, 1997). Some countries are able to provide statistical breakdowns by occupation of their foreign workers, but these are usually by industrial sector

and therefore bundle workers with different qualifications into the one category. In some countries, the definition of "highly qualified" is based on the foreign worker's educational qualifications, while in others the worker's profession is used. Also, different countries apply different types of classification for professions, and often use generic terms that make it impossible to identify migrants' real occupations. Even translating terms relating to professions from one language to another can give rise to confusion (Brandi, 1998).

To add to these problems, highly qualified migrants are so small in number that they are often statistically invisible, especially to polls such as the European Labour Force Surveys that are based on sampling techniques. Another reason for the scarcity of data is that highly qualified migrants are very rarely considered a problem because they generally belong to the middle class and do not stand out socially, by their skin colour or culture (Salt, 1997). In the specific case of Europe, a further complication arises from the fact that many expatriates are citizens of other European states who, moving within an area of free circulation, are easily missed by the statistics (Salt and Singleton, 1993; Rotheram and Salt, 1995).

It is not just the uncertainty of the data that has prompted many academics to argue that the concept of the brain drain may still be valid. On the contrary, many good reasons exist for supposing that the phenomenon persists and is, perhaps, escalating in the present socio-economic situation (Iredale 1999).

It is clearly a good thing for an academic to specialise abroad in a scientific field that is not adequately developed in the country of origin and then return home to put his or her experience to good use. Similarly, we should welcome the fact that countries whose resources are poor have been able to acquire systems of technological research and development through the efforts of nationals who have worked as expatriates inside high level scientific circles abroad, and have thereby tapped into a flow of information and innovation that they would not otherwise have been able to reach (see, for example, Bettahar, 1999; de Tinguy, 1994 etc.). To be sure, the economic development of some countries such as Korea, Taiwan and Southeast Asia (Teng, 1994; Pang, 1994; Skeldon, 1992, etc.) has enabled many of their researchers who had gone abroad to come home again, and their return has then helped accelerate economic development.

On the other hand, it is also evident that if these favourable developments are to take place, the country of origin must contain a sufficiently large nucleus of scientists and retain at least a minimal scientific and economic potential before their expatriate scientists can contribute to its further development or be enticed back home (Boulier, 1999). In the absence of this, not only will the scientific and technical system of the country continue to deteriorate owing to the loss of trained human resources, but also all capable students will inevitably be forced to specialise abroad and remain there (for example, Iredale, 1999; Castanoz-Lomnitz; 1998).

All studies on mobility show how a better organisation of the system in which researchers work plays a role as important as the one played by financial and personal advantages; Todisco (2000) explains how these and similar factors condition highly skilled migrations more than any other mass migration. In most emerging economies, these conditions are not satisfied and in some, such as Algeria, they have actually degraded over time (Bettahar, 1999). This can make an initially temporary movement a permanent one, especially if the new research system the person is involved in, is much more favourable to professional activity than the one left in the country of origin.

Another worsening problem is the progressive privatisation of research and its increasing

inclusion within the production-manufacturing system. This process leads us to fear that private corporations will come to dominate the sciences and technologies with the greatest market potential, and will in all likelihood, be unwilling to allow the networking of their knowledge (Boulier 1999).

Developed countries are increasingly lacking S&T human resources partly as a result of low demographic growth and partly as a result of the sharp fall that has taken place in the number of students enrolled in science faculties, the causes of which have yet to be identified (see, by way of example, *Le Scienze*, 2001).

Inevitably, developed countries will seek to select the most skilled from less developed countries and draw them into the ambit of their research systems. It is strongly probable that these professionals do not leave in their home countries any opportunity for other colleagues as the number of people with similar qualifications that developing economies can train is very small. (Todisco, 2000). We have seen that the figures are unreliable, but it is possible to estimate that between 1985 and 1990 no fewer than 60,000 African doctors, university lecturers and engineers left their countries of origin (*Jeune Afrique Economie*, 1997). France, for example, has already introduced a new type of "scientific visa", and announced that it needs to increase the number of foreign students in its universities by a factor of four. In 1999, the United States declared that it was lacking in human resources for science and technology, and simplified entry procedures for foreign scientists. Meanwhile, the Moroccan Minister for Technology has complained that French companies have headhunted the best Moroccan information technology students, and provided them with contracts of employment and French work visas even before they obtain their degrees (Boulier, 1999).

It is not proven that the migrants themselves gain any substantial advantage from their diaspora. For example, Australia has received an increasing number of immigrants from non-English speaking countries, including a record number of qualified workers. After a decade of receiving skilled foreigners, clear cases of indirect and direct discrimination can be found, as shown in two studies presented by Hawthorne (1997). One study, investigating indirect discrimination, showed how the federal government of Australia has increasingly bowed to the lobbying of the medical association to limit the influx and recognition of immigrant doctors through the imposition of an unjustified requirement for a perfect command of the English language. The second case study looks at a sample of elite expatriates chosen from the qualified immigrants to Australia. It looked at foreign engineers of an age well suited for integration into the Australian workforce, whose command of English was good, and who had excellent previous experience before arriving in the country. The study showed the existence of clear-cut discrimination in favour of immigrants whose mother tongue was English or who were of European origin to the detriment of immigrants of Asian and Middle Eastern origin.

Robertson and Carey (2000) also illustrate evident cases of discrimination. Looking at the phenomenon of Indian doctors working in the United Kingdom, they demonstrate that the situation is far more complex than a mere statistical examination reveals. Their study demonstrates that these highly qualified immigrants have a great deal in common with the impoverished Indian peasants who also travel to England. Both groups, the study found, are greatly influenced by their colonial past, share a common cultural background and have similar histories of earlier diasporas.

Denour and Junker (1999) studied the case of 8,000 foreign doctors working in French public hospitals. They found that they were paid much less than their French peers and were usually

employed on temporary or precarious contracts.

True, the situation, which has for the most part arisen since the 1980s, is partly caused by the difficulties involved in attributing the proper weight and value to different degrees. Mostly, however, it is the result of naked protectionism by the medical lobby. The discrimination persists even though the present French government is actively seeking to mitigate the disparity of treatment between French and expatriate doctors with equal qualifications.

Finally, a study into the fate of experts from the former Soviet Union who recently emigrated to Israel demonstrates that most of them are, at least temporarily, employed in jobs that are not commensurate with their qualifications. This is a straightforward case of "brain waste" (Bernstein and Shuval 1995): this should therefore be the case of a serious "brain waste" as, considering the relative level of the education and technical systems of Israel and ex-USSR countries it is not conceivable that the qualification obtained in the country of origin is not adequate for the receiving country, as it has been possible in other cases (Todisco, 2000).

Some researchers have highlighted the disproportionate presence of highly qualified immigrants in a limited number of "global cities". The primary reason for this concentration is simply that cities have a greater availability of specialist work for qualified expatriates and the higher salaries that go with it (Beaverstock, 1992; Salt and Singleton, 1995; Findlay *et al.*, 1996). Even if acceptance of foreigners is far greater in these environments than elsewhere, it cannot be ruled out that a massive inflow of well-qualified foreigners into a restricted geographical area could eventually give rise to problems of rivalry and even ethnic friction in places that should be immune to such things. Actually, we must not forget that the global economic situation is once again evolving at great speed and while the policy of attracting qualified immigrants is generally still practised, restrictions on other forms of immigration continue. There is some evidence that the practice of almost automatically accepting immigration applications from highly qualified foreign workers is now being called into question. Misgivings have been expressed in the United States, Canada and Australia regarding the efficacy of "emigration market" policies designed to draw in highly qualified workers (Borjas, 1990). The impact of this sort of immigration on the local skilled population is now a matter of discussion (Papademetriou & Yale-Loehr, 1996). David North (1995) has even gone so far as to claim that the ready and cheap availability of immigrants with scientific training and preparation is sapping the ability of the United States system to take effective action to combat the steep decline in the number of students enrolling in science faculties. He argues that the number of entrance visas for foreign scientists and technicians should be restricted to force more Americans to enter the field of science and technology.

Many academics have claimed (for example Findlay *et al.*, 1983; Salt, 1997) that there is a positive correlation between the inflow of skilled labour and investment spending, as foreseen by a model of expertise migration following the economic theory of globalisation, but this is certainly not always the case. Boyle *et al.* (1994) examined the relationship between foreign investment and the transfer of experience in the case of small French companies operating in Great Britain. They demonstrated that the relationship between investment and the presence of experienced workers depends also on the local availability of adequate skills in the first place, either in the form of expert local workers or skilled expatriates already present. It is also clear that European and US transnational corporations have, in recent years, tended to favour a model of expansion that makes use of far fewer international transfers than Japanese companies (Koser and Salt 1997). On the other hand, no one has yet examined in detail the effects of the recent economic crisis in Southeast Asia. It is thus

possible that the mobility of skilled personnel in this region, that has been often cited as proof of soundness of the globalisation model, is now following patterns that do no more fit the same model (Iredale, 1999).

The relationship between highly-qualified migration and technology transfer to the less developed nations is far from clear (Lamarra, 1992). Findlay (1990) offers two reasons why such transfers are limited in number. In the first place, experience suggests that transnational corporations are very reluctant to let citizens from other countries achieve high technical or administrative rank within the company. These posts remain occupied by expatriates on transfer to the countries in which the transnational company operates. Secondly, these companies do not see it as being in their interest to release their technical know-how to the local work force (see, for example, Kanjanapam, 1992). For these reasons, it is far from safe to assume that the international migration of S&T human resources should be studied only in the light of economic globalisation.

1.3. The Key Challenge: To Differentiate Between International Mobility for R&D and Brain Drain

A review of literature dealing with the phenomenon of skilled migration evidences the need for a survey that will distinguish between the international mobility of S&T human resources, which can only be interpreted as a positive thing, from the brain drain phenomenon whose effect is the "reverse transfer of technology" (UNCTAD, 1972) and can only aggravate imbalances in the world economy and the social injustice that ensues. It is interesting to note that many of the studies carried out by researchers in receiving countries are mainly concentrated on positive aspects of highly-qualified migrations, and on the other side the analysis made by scholars living in countries with a high emigration rate generally underline the negative aspects of the phenomenon.

We need to bear in mind that the concept of brain drain implies that the departure of highly qualified workers must be marked off as a loss to their country of origin's stock of S&T human resources ("Canberra Manual", OECD, 1995). It follows, therefore, that if the migration involves a person who is completely trained and ready to carry out a qualified professional activity, and if that person opts to work elsewhere, this must always count as a loss for the country of origin that will have wasted resources in training a permanent expatriate. Whether the act of migration constitutes an advantage for the host country or the expatriates themselves, and whether it leads to some sort of return such as a financial or cultural remittance, the diminishing intellectual unemployment (Todisco, 2000) for the country of origin will depend on the economic and social conditions surrounding the act of migration. Nevertheless, it is an example of brain drain.

The problem is more complicated in the case of the researcher who never ceases to study and train. In this case, as many academics have pointed out, living abroad provides an opportunity for expatriate researchers to increase their knowledge and eventually apply their full potential when they return home. Alternatively, the researchers may transfer their knowledge to the scientific community back home without even having to return, something that rarely occurs in other professions. So it may not be automatically assumed that the stock of S&T human resources in the country of origin is compromised by the diaspora of researchers, and we may not necessarily speak of a brain drain.

The challenge, therefore, is to make a quantitative evaluation of the loss suffered by the

country of origin by the absence of the researcher, and the advantage gained by the host country. If the losses exceed the gains, we have a case of brain drain; if not, we should be speaking instead about “mobility” or “scientific networking”.

The main factor to examine here is the length of the period of absence. The longer the absence, the more the host country can avail of the expatriate’s labour, and the weaker become all links with the country of origin. On one extreme, it is clear that if the expatriate worker completely severs contacts with his or her country of origin and never returns, then the loss is total. The age of the migrant at the beginning and at the end of his or her period abroad is also relevant. Although researchers are continuously learning and training, at the start of their career they obviously spend more time acquiring knowledge than producing it. Only when they grow older and gain more experience do they start producing more and learning less. It follows that a young researcher can spend more time abroad than an older researcher without causing an equivalent loss to his or her country of origin. Indeed, if the entire early period — during which learning prevails over productive activities — is spent abroad, and the subsequent period — when output is highest — is spent at home, the country of origin gains rather than loses.

We also have to ascertain whether this increasing productivity with age and experience holds true for all disciplines, for it has often been claimed that in certain sciences, researchers peak in their early years and lose creativity thereafter. In this case, if the “golden moment” in the researcher’s career coincides with his or her time abroad, then no matter how brief the absence, the country of origin is the net loser.

Time is not the only determinant. A researcher may return at the end of his or her career having accumulated experience not available in the country of origin, and transplant a whole new activity that would not otherwise have taken root in native soil. This is what happened with Italian physicists who emigrated to the United States in the 1930s as a result of the Race Laws. If we take account of the fact that some gains can only take place after the return of scientists, the time scale over which losses and gains are calculated also assumes considerable importance.

Even if a researcher was to come home after retirement, or not return at all, the country of origin could still obtain some advantage in respect of its S&T stock of human resources. If the researcher contributes to the education of an entire generation of researchers in his or her country of origin, then the country will have increased its stock of knowledge whether the researcher returns or not. We must also keep an eye on the sort of contacts that exist between the expatriate researcher and the scientific community in his or her homeland. If the contacts are kept up by, for example, the training of PhD students in the country of origin or by creating research openings for compatriots, the length of the absence becomes less important provided that the country of origin is equipped to take advantage of the opportunities created by its scientific diaspora. If the country of origin is not in a position to take advantage, then the maintenance of close contacts can, on the contrary, set off a chain reaction of emigration without return. This is what happened for a long period with Indian doctors (Robison and Carey, 2000).

A particular problem concerns the qualified migrations within the European Union (Frankovich, 2000): during the last two decades, mobility of university students and human resources for R&D has been generally recognised as a powerful means to make economic levels and cultures of European Union countries homogeneous, and as such it has been and still is an incentive (Ruberti, 1997). Up to our days, due also to the mentioned statistical difficulties, to

our knowledge there has been no study carried out which has analysed the consequences of the increased movement of people (either permanent or not) within the European area. It is therefore of primary importance to verify if the expected results have been met and if the possible benefits have been homogeneously distributed among all European countries.

The difficulty lies in quantifying these parameters in a way that makes it possible to calculate where gain stops and loss begins. The only way of resolving this difficulty is to carry out a direct survey on a sufficiently large sample to discover the true character of the international migration of S&T human resources.

1.4. References

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2. Human, Brain and Knowledge Mobility²

2.1. A Definition of Migration

Few demographic and social phenomena are as hard to define as migration. Let us begin with the simpler example of birth. Generally, a new born is a product of conception; a being that comes into the world after a gestation period of nine months. The concept of birth itself is quite clear: it is the end product of conception that takes place inside the reproductive apparatus of a woman after a gamete from a male has combined with a gamete from a woman. To define death, we can follow a similar logic. At a certain moment in time, a living being ceases to live: that is death. We can distinguish between the causes and type of death, but it is always accepted that when a human being shows no signs of life (what doctors describe as a cardio-circulatory collapse), the human must then be considered dead.

Birth and death are biological processes that follow a rigorous logic. Migration, on the other hand, belongs to a class of social processes that resist pigeonholing. It is a mutable phenomenon and open to cultural interpretation. Migration cannot be meaningfully analysed without reference to a whole host of considerations relating to the emigrant's country of origin and chosen destination, the culture of the country of origin and the culture of the country of destination, the individual, familial, social and political forces that prompted the migration, the policies that have been put in place to stem immigration flows and so on.

Golini (2000) observes that in a “normal” society where the natural rate of growth is determined exclusively by births and deaths, it takes six years for a child to reach school age, around 20 years for the child, now an adult, to enter the world of employment, around 25 years for the child to get married, around 60 years to reach retirement, and around 75 years to die. The precise age of an individual when any one of these life events occurs, if it occurs, will vary, sometimes by a wide margin but, broadly speaking, the rhythms and the course of an individual's life will conform to the pattern described. Whereas certain changes to the pattern will take place over the course of years, the phases of the life cycle are hysteretic. That is to say, changes to the general rhythm occur gradually enough to allow us to make a pretty good reckoning of what the population of schoolchildren, newlyweds, workers and pensioners will be at any given time. We are thus in a position to adapt our educational policies, pension systems and so on accordingly.

Migration, however, has the potential to alter and even overwhelm the predictable regularity of the generational processes. In a brief interval of time, a migratory flow can bring about a shift in the population dynamics both of the country of origin and the country of destination. A sharp rise in the number of immigrants can suddenly swell the number of schoolchildren or workers and, occasionally, even the number of pensioners in the receiving country. The country of origin will experience precisely the opposite effect, and, depending on the form of emigration, experience a corresponding drop in the number of schoolchildren, workers, newlyweds or pensioners.

Migrants are mostly youths or young adults (generally in the 20 to 40 age group), male

² This paper was written by Enrico Todisco of University 'La Sapienza', Rome for the project *The Brain Drain - Emigration Flows for Qualified Scientists*

(though the number of women is not all that much smaller) and unmarried. With this as the profile of the typical immigrant, it is easy to see how their arrival in a country will change its demographic balance of sex, age and civil status, and necessitate changes to educational, labour and pension policies.

So far, we have considered only the quantitative ramifications of immigration, but we cannot ignore the various cultural and social aspects that can produce a whole range of outcomes in society. Sometimes the effect of immigration is hard to perceive, sometimes it causes an outright crisis.

Migration is a multifaceted phenomenon that cannot possibly be understood with reference only to demographic considerations that constitute no more than a single variable. What we have to do, then, is examine the phenomenon through a mesh of interpretative filters. The more intricate the mesh, the better our chances of getting actual cases of migration to fit into our scheme of understanding. Naturally, the greater the number of variables and hence the more intricate our interpretative mesh, the more detailed the description of what we call “migration” must become.

Authoritative dictionaries and encyclopaedias tell us that migration refers to the movement of human or animal populations from one area to another. The causes of the movement may vary, but generally they have to do with the necessity for survival. We may not, however, indifferently assign the same meaning to *migration* and *movement*, though both words do contain the idea of motion. By current and universally accepted definitions, the word migration may not be used to refer to daily travel to another place. A factory worker who travels every day to reach his place of work or an African hunter who is always on the move in his hunting ground does not belong to the category of migrants even though they move from one place to another, and even though their survival may depend on their doing so. Migration hardly ever consists in daily and recurrent movement (commuting) within a single area of operation. According to the current understanding of the term, migration is a movement that takes more than one day (or a few days) to complete, and generally leads to a change in the person’s fixed place of abode. The causes, too, are various and include, but are not limited to, survival necessities.

Golini proposes a mesh of four “filters” through which we can arrive at a definition and understanding: distance, frequency and duration, cause, and legitimacy (Golini, 1987 and 2000). Todisco (2000) believes that three filters are sufficient, though he proposes their further division into smaller parts. His three filters, or variables, are: spatial, temporal and social.

To begin with, we should unpack the meaning of several terms that are sometimes used interchangeably but should really be kept distinct. Mobility, movement and migration are three terms all of which convey the sense of a change of geophysical position. A housewife who goes to market, a pupil who goes to school or a pilot who flies an aircraft all effect a form of movement that, while far from permanent, is connected with the notion of mobility. A Moroccan who goes to France for work, an Italian who moves to Argentina or an English doctor who goes to Canada to specialise makes moves that are more lasting, and so their mobility is more permanent, indeed, these are instances of migration. So if the generic term mobility is used in reference to changes in geographical position that are lasting or long-term, then this use of the term encompasses the notion of migration. Mobility is also used in reference to daily and frequently repeated transfers from one place to another, which has nothing to do with migration; and so mobility can be said to encompass the notions of both movement

and migration.

According to Todisco (2000), migration can be adequately defined using three interpretative variables. In Todisco's system, the concept of *spatial dimension* is not the same as the usual measurements of geographical distance. Strictly speaking, a measurement of movement from point A to point B has to account not only for the linear difference between the geographical co-ordinates of the two points, but also the curvature of the globe. The distance, therefore, is not given by measuring movement along a plane, but across an arc. The error is amplified as the distance between the two points increases. If the distance between the two points is a matter of kilometres, the difference between the straight and the curved lines is negligible. However, if the two points are antipodes of each other, then the linear distance will be considerably less than the arc. This consideration is of academic interest and does not need to be taken into account.

Yet this is not the only aspect of distance that is overlooked. For instance, there is a great difference of distance between a linear geophysical movement from one co-ordinate to another and the actual course that needs be followed to reach point B from point A. It is one thing to measure a distance by drawing a straight line between two points on an atlas, but quite another to follow that notional route. Take the case of two points plotted on opposite sides of a mountain. In measuring the real difference, various fortuitous circumstances come into play, including the steepness of the mountain and the difficulty of the ascent. The result is that a traveller may have to follow a series of U-turns as he wends his way up the mountainside, but this happens to be the easiest way to make the ascent. It may, perhaps, be necessary to go around the mountain altogether and take a route that adds enormously to the notional distance as calculated by measuring the length of the line between the two points on a map.

When it comes to migration, we often make the same miscalculation by tending to look at the shortest distance between two points rather than the "safest" route. Clandestine migrants are obliged to optimise their routes by looking for the frontiers and borders where their risk of detection is lowest. The migrants are therefore obliged to follow routes that are not economical if viewed purely in terms of cost and duration, but are easier and safer in other respects.

The same does not apply when migration is effected by air plane. In this case, the distance can be expressed in flight hours, although of course different types of air plane go at different speeds. We shall limit our considerations to the sort of air plane used by migrants, namely subsonic commercial ones. Even here, the cruising and operational speeds of different models of aircraft differ. The intermediate stops on a route will reduce the average speed and increase the time expended on landing and takeoff. Not all airline companies can offer direct flights. Depending on the carrier, the stopover destinations will change, and this is by no means a negligible difference. Each of these variables brings about differences between one case and another. Sea travel also offers a host of complexities, and the number of commercial operators is somewhat lower. Very often, the journey takes place on board a dual-purpose ship (cargo and passengers) with the emphasis on the delivery of the cargo. The commercial routes they follow may therefore be less than ideally direct. As with air travel, the unit of measurement here might be the time taken, though in this case the time is calculated in days rather than hours.

In fact, traditional forms of measurement are not suitable for measuring distance with reference to migration. No one takes account of the number of kilometres travelled, the hours of flying time or the days spent at sea. It is currently common practice to identify the derivation

of a migrant simply by referring to the country of origin. None of the statistics for migration ever provides information on the distance travelled or the time taken.

Although identification by country of origin is therefore no more than a rough indicator, it is still more useful than a measurement of distance alone because it provides information on the social complications facing migrants. It is certainly more revealing to say that 1,000 immigrants have arrived from Albania than to say that 1,000 immigrants have travelled 500 kilometres to reach Italy. Besides, distance can hide great enormously diverse circumstances. The immigrants who travelled 500 kilometres to reach Italy came from Albania, which is outside the European Union; but with distance as our only guide, they could just as easily have come from Spain, a member of the EU.

Even so, identification by country of origin is not without its problems. We should distinguish between country of birth, country of citizenship and country of last residence, even though the criteria usually overlap. It is possible to be born “by chance” outside one’s parents’ country of origin. Citizenship, meanwhile, is an administrative and legal concept. It may be awarded by virtue of one’s parentage (*jus sanguinis*) or one’s place of birth (*jus soli*). It is also possible to change citizenship. Further, citizenship might not coincide with the last place of residence; it might be based on the place of birth or, simply, the previous place of residence. The frequency with which cases of undetermined status are occurring has risen owing to the new phenomenon of stateless persons who, though very few, do exist. Stateless persons do not have formal citizenship, or else do not have the formal citizenship of their country of birth or origin. The number of official such cases is swollen by the statistical methods of some receiving countries. The immigration statistics of Italy, for example, include several dozen stateless persons whose status is probably the result of problems encountered by frontier guards who, faced with contentious cases, found it easier to register certain immigrants as stateless.

Another drawback of the practice of generic identification by country of origin is that the one label can hide major differences. If we describe someone as simply Moroccan, we do not know whether he or she comes from a city or the country, from somewhere near the border, or from the farthest reaches of the country.

In spite of these uncertainties, country of origin has by now become a universal criterion that national and international statistics use. The failure to specify whether “origin” refers simply to the place the immigrant came from, the place in which he or she lived, or the place of birth reflects the fact that in the vast majority of cases these are all the same, and the distinction is unnecessary. As a rule, an immigrant born in a given country will be a citizen of that same country and will have been resident there until migrating.

The *temporal variable* is more complex. Time may have a *current significance* or else an *expected significance*. Almost always, migrants consider their movement as temporary. A migrant’s idea of mobility usually contains the idea of a termination. The temporal *expectation*, therefore, is limited to a year or two, the idea being to improve one’s economic situation before returning to the country of origin. However, the few years originally planned for may stretch to become many more, well beyond the migrant’s original expectations. The migration may become ever longer lasting and eventually definitive. Often, the temporal expectations inherent in the migratory project will not match the real duration of the actual migration.

That said, the very use of the term duration at least implies that the migration has a beginning

and an end. The beginning is easy to identify: the end less so, because the termination of the migratory project does not necessarily entail a return to the country of origin. Migration may also be said to end when the migrant, by acquiring citizenship in the receiving country, relinquishes immigrant status.

It is the termination of the “migratory project” that marks out the difference between *temporary* and *definitive* migration. Migration is temporary if a person eventually discards the status of migrant, returns home and recovers his previous status. Definitive migration, on the other hand, is when the migrant’s status in the host country ceases to be temporary and becomes permanent. There are two types of possible permanence. The first is when the subject acquires the citizenship of the receiving country; the second is when the subject dies there. The acquisition of new citizenship entails percolation through whatever administrative and judicial filters the host country has put in place. Acquisition of citizenship implies a certain continuous period in the host country as well as a wish to remain there. In event of the death, permanence is unconnected with duration. If a person dies one year after emigrating abroad, then from the perspective of that person’s existence, the emigration was definitive.

Yet, if we are to arrive at a workable definition of definitive migration, we can hardly wait for all the migrants to die or change their citizenship. We need to use a “current” temporal reference that measures the length of time a migrant has been in a country. It is a very loose term of reference because some might decide that ten years is the cut-off point after which a migration should be considered definitive, others might select 15 years or even longer. No international consensus exists on the question. In any case, even if we were to set a temporal limit of, say, 15 years, that would not prevent cases of migrants staying long enough to be categorised as permanent only to return to their countries of origin or move to a third country.

Measuring by the duration of stay implies that a sufficiently lengthy interval of time must pass. However, it is possible for there to be more than one interval. For example, a subject might change his or her country of residence several times over. A single person, in other words, may become an immigrant many times over, without ever reaching a conclusive status. This would happen, for example, if a person left his country of origin and went to live in country B for several years, moved to country C for several more years, then to country D and so on. None of the intervals of time in one country is sufficiently long for the person to be considered a definitive migrant because the migrant will fail to reach the minimum duration requirement set by each of the states. If no opportunity exists to return to the country of origin, from the individual’s perspective, the migration is certainly definitive, even though not associated with the one place.

Instead of moving from one country to another and another as in the example above, a migrant might keep leaving and returning to a host country. A person could arrive in a host country, stay there for a certain period of time, return to his county of origin and then go back to the host country. The person might make the journey back and forth many times in the course of his life. This is a form of commuting, even though the interludes between journeys may not be uniform or regular. In common with the migrant who keeps switching countries, this migrant who moves continually back and forth will not achieve the permanence required for citizenship. Indeed, in light of the preference shown for alternating between the two countries, the grounds for supposing that the migrant is sufficiently eager to settle in the host country do not exist. Yet the individual has clearly shown a desire to remain mainly abroad.

Migration statistics do not usually allow for cases such as those described above. This is

because the temporal variable is not usually mentioned in international statistics. When it is included as part of a census, it can provide information on the length of time migrants have been present in a host country. The temporal variable can be and is used in *ad hoc* surveys of foreign residents. Yet these are limited usage that generally refers to a single state and, often, a particular region within the state. Rarely are the surveys repeated over time. In some cases, the duration of residence is implicit in a request for citizenship, but to use this as a yardstick would enormously underestimate the numbers of immigrants, because not all those who reach the minimum period of permanence required by local law for citizenship will apply for citizenship, and not all of those who do apply will do so immediately upon qualifying. If a state has set ten years of continuous residence as its minimum requirement, it is not inconceivable that a migrant may get round to making a citizenship application long after that period. In short, it is a variable of little value in national and international statistics, but can serve as a subject of research for academics.

Social criteria form the third dimension of migration. In this sense, “social” encompasses two of Golini’s criteria (2000, op. cit), namely *cause* and *legitimacy*.

With reference to the causes of territorial movements, Golini lists the following:

- Work**, which is the main reason for movements. It functions as a means of social, economic and professional promotion;
- Family** formation, change or break-up;
- Abode**: the acquisition of a different home may be the reason for migration;
- Desire or necessity to live near** to (or far from) a workplace, or in more comfortable places (better climate, services, lower living costs, nature). This category encompasses the increasingly frequent phenomenon of retirement migration, which is different from return migration. The latter takes place when individuals who had previously emigrated, having reached the end of their working lives, return to their country of origin. The former, on the other hand, refers to individuals who, upon reaching retirement, decide to spend the rest of their days in a foreign country (such as the British who retire to Spain, the Germans in Italy and the Americans who set up home in Florida). Both groups consist of pensioners, but whereas return migrations are strictly associated with the country of origin, the choice of country for retirement purposes is quite open-ended;
- Study**: the number of students who migrate to study is considerable;
- Natural catastrophes** such as floods, drought and earthquakes which force people to move for long, sometimes very long, periods;
- Wars, undemocratic regimes, military occupation, treaties, lack of religious freedom** forcing individuals or groups to flee want, persecution or oppression. Many of these migrants can be counted as refugees. The number of asylum seekers is tending to increase over time;
- Work that necessitates recurrent movement** (travelling salesmen, managers, business people *et al.*) or *occasional* movement (by people taking part in training or refresher courses abroad, participants at international congresses, sportsmen playing away games *et al.*);
- Tourism, cultural activities, religious practices or activities related to pastimes**,

consumption, sport and bureaucracy leading to short-, medium- or long-distance transfers for a short, medium or long period of time.

The list above covers social factors that may bring about population shifts. The vast majority of these factors lie at the root of migration in the true sense of the term. In the literature on the subject, they are referred to as “push-pull” factors. Some of the factors above have the effect of pushing people out of their place of origin, while others attract (or pull) immigrants to the country of destination. It should be noted that push factors in one place are not always matched by pull factors elsewhere, but when a correlation between push and pull factors does exist, it gives rise to a clearly identifiable migratory flow. In many cases, however, the push factors are far more powerful and compelling than the pull factors, and the migration that ensues lacks a definite sense of direction. One example of this is when natural catastrophe strikes, or when political or religious persecution force people to flee for their physical survival. In such cases, the urge to leave a difficult situation is so strong that little consideration is given to the future destination. It is not so much the quest for wealth or work that induces migratory flows as the immediate and compelling need to escape from an emergency situation. The need to flee is uppermost because to stay would be to put one’s very survival at risk. Since the important thing is to leave, where to is only a secondary consideration, and little forethought is given to the new place of residence.

In other cases, the pull factors are prevalent. Managers, academics and scientists form part of this phenomenon, and their decision to live in a new country is based on a calculation of the new country’s capacity to offer them the opportunity to engage in activities that match their qualifications and expectations. The direction that they take is an integral part of their migratory process. These skilled migrations (see below) are intended to satisfy well-defined professional objectives, and the migrants are quite conscious beforehand of what they intend to accomplish.

Other criteria of classification are based on the social or sociological characteristics of people who move from one place to another. So we need to consider whether emigration is based on an individual’s decision or forms part of a group movement and, in the case of the latter, whether the group consists of family members, people of the same ethnic extraction, friends or professional colleagues. The distinction is important if we consider that many forced migrations refer to either individuals or ethnic groups, whereas many skilled migrations refer to families or groups of professionals. Exceptionally, an entire population may move, in which case the migration can be defined as an exodus.

Another criterion of definition is whether a migration is voluntary or not. Migration may be spontaneous, but may also be organised by central or local government or other powers.

All these observations go to show that the identification of a migrant or act of migration poses a difficult task. It should also be said that categories outlined above do not preclude further and alternative classifications. We shall shortly turn our attention to the difference between mass immigration and the immigration of skilled workers. Generally speaking, it is useful to distinguish between migration as an individual and migration as a collective action. The socio-economic ramifications of integration will vary according to the type of migration. The demands on services, welfare, education, health and pensions are closely linked to whether the migration consists of families or individuals, and individual migration tends to be of a temporary nature.

The migratory plans between the two typologies of migrations are different. The mass

migrations concern individuals with low or insufficient schooling without specific qualifications that move more under the influence of ‘push’ factors than attraction or ‘pull’ factors. For example, this would include persons who move in search of an occupation with the hope of returning to their country of origin after some years but without certainty of that possibility. The ‘quality’ migrations, that of skilled and qualified persons, in contrast are more conditioned by ‘pull’ factors. They may have a more temporary nature in that the persons with professional qualifications and working skills have the options although the plans are not necessarily clear at time of departure.

Modalities that push an individual to emigrate are various. A person included in mass migration is strongly (or even exclusively) conditioned by the attractions and options offered by relatives and friends who have already undertaken the same route. For them the migratory route is fundamental. The cohesion of ethnic groups is practically all and often constitutes the only source of information. In the case of skilled migrants, the decision to emigrate may depend on the individual or on his/her organisation such as the case of officials of international organisations, managers in multinational enterprises, professional sportsmen and persons in professions of a mobile character (e.g. Doctors without Frontiers, consulting engineers).

The mass migrant is nearly always a person in search of a job and ‘pushed’ to leave and quickly get a job in the new country, the skilled person typically moves with more precise idea, plans and is well informed. The skilled person has acquired the information necessary to make the decision through channels like his/her own organisation or through those of the organisation in which he/she is destined or through his/her professional or personal network. For example, researchers and scientists, and also students and postgraduates, have already ‘researched’ and acquired useful information on the laboratory or university department they intend to join. This can be a thorough knowledge based on Internet sites, announcements of international vacancies in membership newsletters and so on. We can define this as a ‘migratory chain’ for skilled persons, one of a professional, academic and scientific type.

2.2. Migration as an Event and Migration as a Process

When we spoke earlier of births and deaths we were referring to two demographic events, the one marking the beginning and the other the end of the process that constitutes an individual’s life. A lifeline can be imagined as beginning with the moment of birth and ending with the moment of death. The greater the distance that separates these two moments, the longer the life. When we look at all the people living in a given area, we see many lifelines, many of which will become definitive (in that we can identify the moment of birth and the moment of death), but many more of which will remain inconclusive because the individuals to whom they belong are still alive. When we consider a given place, we enumerate the events (the entrance and exit points, i.e., births and deaths) and the ongoing life processes (the number of live individuals).

If we want to make a statistical calculation of a population, we have to sum births and deaths. Let us take a closed society that has no demographic relations with the outside world. The only possible variations in numbers are caused by births or deaths. If P_o represents the population at a certain point in time, namely o , the population at time t will be equal to that of P_o plus any events adding to or subtracting from the original population that took place during interval i that separates o from t to, or:

$$P_t = P_o + B_i - D_i$$

where B_i are the births that took place in the interval i and D_i are the deaths that took place in the interval i . The living population at the time t is equal to the number of living people at our selected reference point, o to which we have added the net balance of the births and deaths that have occurred in the intervening period. If the net balance is positive, the population is expanding (births outnumber deaths); if it is negative, the population is shrinking (deaths outnumber births).

Populations, however, are almost never closed in this way. Some individuals will leave their society and others will join it. So we have to rewrite the equation as:

$$P_t = P_o + B_i - D_i + I_i - E_i, \text{ or}$$

$$P_t = P_o + (B_i - D_i) + (I_i - E_i)$$

where $(B_i - D_i)$ is the natural balance and $(I_i - E_i)$ is the balance of immigrants (I) against emigrants (E). The population, therefore, is expanding/shrinking not only in biological tandem with the rate of births and deaths, but also in social tandem with the movement of immigrants and emigrants. The population will expand if the two balances, natural and migratory, produce a positive number; the population is shrinking if the two balances produce a negative number.

For the sake of conceptual correctness, we should subdivide our starting population, P_o into two parts: P_{ro} , which represents the number of national residents; and P_{io} , which represents the number of immigrants, or, in equation form:

$$P_o = P_{ro} + P_{io}.$$

Our excursion into equations here serves as a reminder not to fall prey to the sort of statistical confusion that arises when estimates of stocks are allowed to overlap with estimates of flows. The terms I and E refer to immigration and emigration, but not as processes. Rather, I and E refer to the starting point of the process of immigration or emigration within the population that is being considered. The terms refer to migrant flows that occur within a time interval. Stock-based calculations, on the other hand, are based on snapshots of a population. A census enables us to identify the constituent elements of the stock of a population at a single moment of time.

It is often necessary to determine what the stock of immigrants is. This can be done if we can determine P_{io} , i.e. the immigrant population at time o , to which we must then add all the immigrant *events* and subtract the emigrant *events* that fall within the interval separating o from t . We can view P_{io} as representing the remainder of people from the immigration process, and P_{ro} as the remainder of the original resident population.

Just as the census enables us to ascertain the stock of the population, a survey carried out on a fixed date (at the end of the year, for example) enables us to estimate the *stock of immigrants*.

It is important to draw the distinction because the quantitative survey can to some extent be influenced by the methods. A certain amount of confusion arises from the fact that births and deaths are events in a process (life), while migration is considered both as a process and as an event. So a poll taken at the end of a year will not include the presence of immigrants present in a given area, and will measure the local population by calculating the number of settled residents only. The poll does not count people with immigrant status, namely those engaged

in the *migratory process*. The statistics that are published limit themselves to reporting the end-of-year total of immigration *events* that have taken place during the year. This engenders a sense of uncertainty in the public mind, because the bearing of the starting point on the type of measurement being made (of events or processes) is not always clear (Commission for the Monitoring of Statistical Information, 2001).

2.3 Mass Migration and Skilled Migration

We have seen the difficulties that immediately beset us when we try to pin down a definition of migration. We have also seen how the various subdivisions and schemes we have introduced are of only limited value because they are constrained by factors of time and space, which makes comparisons with different countries difficult.

We can identify two migration movements: economic and non-economic. In the first group of economic driven migration are included movements connected with work, both the present work activity or a new one. In the second non-economic group are included all migrations connected with non-work issues such as family reunions, hospitalisations, refugees, prisoners, pensioners and elective residences. Economic migrations can be divided into two broad classes: mass migration and quality (skilled) migration. Each of these classes has its own properties that are useful to know, not only because we want to be able to distinguish between the two classes, but also because the class of migration has important consequences for the population in the receiving country.

Mass migration involves people who are poorly educated or wholly uneducated and lacking specific skills, and whose impulse to migrate was the result of push factors in the place or origin rather than pull factors in the country of destination. The participants in such a migration are acting out of desperation, are seeking only to survive and will accept any work. Being unskilled to begin with, they are different from the migrant who, though equipped with educational qualifications, is willing to carry out unskilled, mean, unhealthy and harsh labour for the sake of earning enough money for himself/herself and family. The migrant's hope and expectation of return to his country of origin in the near future will often fade in the face of the difficulties encountered abroad and the lower-than-expected savings that he manages to put by. These difficulties will lengthen the period of migration and, most crucially, render it indefinite. Often, the migrants are unmarried young men, or else young husbands who have left their wives in their home country. These young men adapt themselves to living in precarious conditions.

Young people who experience migration for the first time live in a state of constant standby, waiting for the right moment to take the next step. If they hear from family or friends of possible work in a different country, they will change their destination and thus protract the time it will take them to become integrated in their new environment. Their plans are sketchy, though they almost always treasure the idea of returning to the country of origin someday. In fact, the migrant's search for remunerative and less precarious work has the effect of prolonging the period abroad.

The transition from temporary to stable or definitive migrant status is brought about by a change in the individual's demographic and social status. If a migrant forms a family, if his family accompanied him at the outset, or if the family joins him later, his economic needs increase, as do the demands he and his family make on local services. The social burden that these immigrants impose on a local community can be sizeable. The local community has to

deal with the problem of providing accommodation, schooling, health care, pensions and transportation for the foreign arrivals. In addition to the material burdens, social tensions can rise as immigrants find themselves drawn into micro-criminal activities and organised crime. Central and local government policies are influenced by the financial costs of dealing with the new arrivals, and political attitudes are often shaped by the local populace's impulse to reject the immigrants.

In many respects, skilled migration is the mirror image of mass migration. It does not involve a large number of people, the migrants have medium-high or very high qualifications such as doctorates, and the migratory project is clearly identified. The period abroad is usually temporary, and proportionately far fewer qualified migrants end up becoming permanent residents in the host country. The migrants do not cause social tensions because they often arrive with a job arranged and are therefore not desperately seeking work. They have enough money to pay for essential services (accommodation, health care, welfare contributions, schooling and so on) both for themselves and their families. These migrants are more likely than the unskilled to travel with their entire family. Integration with the local community is usually straightforward because the migrants tend to be the sort of people who know how to communicate with others. As their economic autonomy means that they place little or no social burden on the recipient community, they are less visible socially and less likely to give rise to forms of rejection or racism than are the unskilled who arrive as part of a mass influx. Few government policies regulating this sort of immigration exist because the migrants make no demands on the social assets of the nation. Whereas national policy is always geared towards restricting and limiting mass immigration, the policy (if it exists) on qualified immigration is to accept and even encourage it.

We have referred to *skilled* rather than *intellectual* migration, as some commentators are wont to do. Skilled in this sense is a broader and more comprehensive term than intellectual, and as it also includes intellectual migration, we prefer it. Of course, some highly paid and highly skilled professions do not require intellectual prowess or scientific knowledge. For example, a foreign football player may have no educational qualifications, but his work is highly paid and recognised as professional.

Skilled migration is a limited phenomenon, yet its economic and social importance can be so great as to be vital to the development of a nation. A good example of this is the case of a manager from a multinational company who arrives in a Developing Country with the task of deciding whether or not to open a new factory there. A single immigrant has the power of influencing the lot of an entire local population. The creation of jobs in the local economy as well as the economic and social development of the area may depend on the manager's decision. A single immigrant can thus have a greater effect than the economic policies of a government.

Qualified migrants have certain recognisable characteristics, and we may divide the category as a whole into the following professions and identities as follows:

—***Scientists, Researchers and Academics.*** These are typical examples of intellectual migrants. A great deal of literature exists in this field, partly because these are the migrants whose departure may create a brain drain in their home countries. A brain drain occurs if highly qualified workers find themselves compelled to leave their country to obtain work that befits their qualifications. They find work abroad in

public or private research institutes or universities.

- International experts.** These are people with excellent professional skills who are recruited by means of international job vacancy notices. Their employers are the United Nations or other agencies, and they are assigned to resolve organisational or technical problems in various places throughout the world, almost always in Developing Countries. Usually they work on contracts with a duration of several months or, at most, a few years. They are paid as experts and selected according to a rigorous evaluation of their technical, scientific and professional competence.
- International functionaries.** Tens of thousands of functionaries world wide are working on behalf of international organisations. The staff of the United Nations and associated agencies such as FAO, UNESCO, UNCTAD, WHO are one example. Generally, each state has a certain quota of such functionaries whose number varies according to its size and importance. A similar quota system operates in the EU. Thousands of functionaries work in Brussels for the European Commission or in other institutes such as Eurostat, the European Parliament and the European Court of Justice. Other international bodies employ staff drawn from different nations, among them the WTO, the OECD and the Council of Europe. These functionaries are recruited in their home countries and spend their professional lives working within the organisation. Sometimes, the functionaries may be employed on limited-term contracts, but usually not. Thanks to the lasting nature of their contracts and hence their long stay in the country to which they are posted, their integration with the local population is almost total. Indeed, at the end of their careers, they quite often choose to stay on in the country where they worked so long. This category does not include embassy workers who, though immigrant functionaries, enjoy special judicial privileges exonerating them from the obligation to acquire the usual papers (such as permits of stay and work permits). Embassies enjoy extraterritorial status, and are legally part of the country they represent. The workers in the embassy, therefore, have technically not left their country of origin, do not require permits of stay and cannot be considered immigrants.
- Multinational managers.** This group is composed of directors and managers from large corporations, major industrial groups and international commercial enterprises. The managers may specialise in finance and investment or in factories and production. Their strategic importance is considerable because their opinions influence the investment decision of the multinational. Their task is to analyse and evaluate the potential of local markets, and ascertain whether a given area has a suitable labour force. They often decide on whether new factories should be opened and, as we noted above, they therefore often have the power to determine the economic future of the country in which they are staying, or more narrowly, the market sector in which their corporation operates. The decisions of managers can often be of greater economic importance to a country than the policies and plans of its own government, which is often constrained by scarce and unreliable financial resources.
- Members of religious orders.** Members of religious orders and organisations do not belong to the category of mass migration because, in the first place, their numbers are too small, and secondly, because their movements are not dictated by the need to find paid employment. Members of a religious order or sect might move to new countries because this forms part of their pastoral duties, and often their job is to provide help and religious instruction to the inhabitants of the place to which they transfer

themselves. Often, their work is unpaid. The migrations can bring them to the farthest-flung regions of the world. The choice to migrate may be made by the individual, but just as often the choice is made by superiors in the religious order to which the individual religious worker belongs. We are referring mainly to missionaries who carry out proselytising work among the impoverished people, though sometimes clerics may be included within an ethnic flow as happened during the European emigration to the United States and Australia in the late nineteenth and early twentieth centuries. In addition to missionaries, we also have to include members of religious orders who look after the organisation of religious orders and move from one base to another for lengthy periods of time. For instance, a large number of administrators come to Rome where many of the main religious orders have based their headquarters. The presence of the Holy See requires the maintenance of many international contacts and links. Nor should we be considering Catholic orders alone, especially now that emigration from the Islamic world is growing. Many mosques are springing up, often inside Catholic cities, and these mosques must have their muezzins to call the faithful to prayer and provide pastoral services.

—**Artists, actors, entertainment and tourist workers.** Actors and entertainment workers also belong to the category of quality migration because they are professionals in their field of activity. Usually, their transfers are short-term. Long-running spectacles in which a cast remains aboard for months are rare. Stage actors tend to migrate within their own countries rather than farther afield. Cinema actors, on the other hand, are internationally mobile. Sculptors, painters and those working in the figurative arts tend to migrate for longer periods than actors. Indeed, a glance at the curriculum of many of these artists will often show that they have spent a long part of their artistic careers abroad. Entertainment workers are those who administrate, build sets and stages, organise, work as talent scouts and agents, makeup artists, electricians, sound engineers and so on. Tourist workers are not so much those who work on a seasonal basis as animators in tourist resorts (their migration is merely seasonal) as the administrators and managers stationed abroad to run subsidiary and affiliate agencies. Often, in addition to their tasks of ordinary administration, these workers will also act as promoters. This group could also be considered managers, in which case they could be categorised as belonging to d) above.

—**Sport professionals.** This group needs to be divided into two categories: those who practise sport and those who provide the organisational back-up. The former group includes athletes who play sports in a professional capacity. These are the basketball players, the footballers and so on who are signed up for one or more seasons with a team in a national league. The growing number of international meets and contests has made it easier for athletes to get noticed. The professional sports market is highly competitive, and so it is convenient for teams to engage players for several seasons. Sports professionals are mostly young people at the peak of their ability who migrate to another country in the hope of obtaining a good contract and becoming part of a prestigious team. The club offering the contract is making an investment for the sake of the success of its team. Clubs and sporting organisations, however, will try to secure a commitment from their athletes, and this obliges them to offer contracts for two or three seasons at a time, also because they need to give the athlete time to find his or her place on the squad. Working along side the athletes are other professionals, some of who are well known in their own right, others are less well known but just as

necessary. They are the coaches whose task is to instil a sense of team spirit, make the most of each player's skills, gauge the players' fitness and devise game strategies to beat opponents. The second category is comprised of those who provide back-up services, namely the team doctors, trainers and managers. They play a less visible but equally necessary role (Todisco, 1997).

- Specialist workers.** Often, a specialist worker belongs to one of the categories already mentioned. The addition of this category is necessary to include also those professional workers who have to be brought in from abroad for the execution of very specific tasks. They are not managers, but highly qualified technicians. They are to be found at major infrastructure projects such as the building of dams, reservoirs, super-highways and bridges or ground drilling operations. Contracts for these major works are open to international tenders, and the successful bidder will often be a foreign company that brings in its own managers and technical experts who would be difficult to find in the country where the work is taking place. The staff in charge of project design and the upper echelons of the executive are also imported. This migration is strictly limited, and is usually based on fixed-term contracts of medium duration (a few years).
- Officers, NCOs and military.** This category encompasses all those military staff who carry out their duties in multinational armies. The duration of international service varies, and the transfers abroad may be for the purpose of refresher courses, training and co-ordination with other international forces. The military personnel may be transferred abroad as part of a detachment engaged in military action or war. The staff are war and defence professionals. NATO, for instance, has bases in which staff from allied nations receive training and engage in co-ordination activities. The United Nations sends peace keepers to flash points in the world. These operations may be of limited duration, but sometimes they may be protracted, as is the case with the permanent NATO bases in various countries.
- Students and trainees.** Last, but definitely not least if measured by scale, are students who travel abroad. By necessity, this category is a loose one because it is very hard to compare the schooling systems and educational qualifications of different countries. The accepted understanding is that the young people are sufficiently adult and independent to look after themselves. This excludes all elementary and most secondary school pupils, but it may include final-year students. The bulk of the numbers, however, consists of students attending universities or technical colleges. The members of this category are engaged in higher educational activities, and their presence in a foreign country forms part of their preparation for a third-level qualification. University courses vary in length and the terminology is varied. The students are working to obtain university diplomas, degrees, research doctorates, master degrees, specialist certifications and so on. The reason for migration is the need to continue with one's studies in an environment that is more conducive or appropriate to them than anything available in the country of origin. This definition should also be taken to include migration caused by the complete lack of university institutions in the country of origin, which occurs in some developing nations. The acquisition of a university degree necessarily entails a period of study abroad. The category also covers those students who have been unable to get into the university structures of their home country and choose to go abroad to acquire their qualifications. A good example is Greece whose university system operates on a closed-number system. The

students who fail to get in will often decide to pursue their studies in a nearby country such as Italy, Austria or France. The choice of country and university will often be based on the advice of family and friends. The duration of the migration is usually limited to the time it takes the student to obtain the qualification. A clear majority of students will return to their home countries once they have obtained their degree or qualification abroad, and start practising the profession for which they studied. That said, a far from negligible number will stay on the country where they studied to practise their professions. For these students, it is easier to enter the liberal professions such as medicine than the world of business. A survey of businesses in the Veneto (a highly industrialised region in north-east Italy that boasts several prestigious universities attended by foreign students) failed to turn up a single non-Italian graduate employee (Todisco, 2000 b). The European Union, meanwhile, has given a strong impulse to student mobility through the Socrates and Erasmus projects that encourage exchanges with foreign universities, usually for a period lasting no more than a single academic year.

The two major categories we have established, mass and skilled migration comprise a huge slice of the total, and account for most typologies of mobility; but they do not cover everything. Some forms of emigration defy both categories. Neither category will do, for example, for those who travel to a foreign country for medical treatment, those who decide to set up home abroad without needing to seek employment, retired people who want to live in countries that better suit their personal needs and demands (the retirement migrants mentioned above), those in prison or remanded in custody and awaiting trial abroad, and adopted children.

2.4. Brain Drain, Brain Waste, Brain Gain

The term brain drain was originally introduced to describe the outflow of researchers, academics, scientists, doctors and professionals from England, Germany and, more generally, Europe to the United States and Canada (Huges, 1977). The professionals quit their country of origin because their skills could not be put to proper use at home, and so they emigrated to destinations that offered them better prospects. This gave rise to a heated debate over the values and costs of the brain drain, and the advantages and disadvantages resulting from this transfer of professional skills. The debate continues today, even though the countries that suffered these losses have since become highly effective competitors in the world economy.

One school of thought maintains that the country of origin suffers a net loss because it funds the education and training of professionals who, precisely at the moment they start producing, decide to emigrate. In other words, the country that invests in human resources is not the one that enjoys the return on its investment. Conversely, the receiving country obtains qualified workers without having to bear the costs of training them, and therefore makes a net gain.

This position is contested by those who argue that the migrant professionals would not have been able to work in their own countries anyhow owing to labour market deficiencies or poor economic development. Had the migrants remained at home, they would only have made the labour market situation even worse, and would themselves have risked unemployment or underemployment. It follows, then, that the efforts made by the country to forge these professional workers would have been squandered in any case, even without emigration. At least

emigration accords the donor country the benefit of lower unemployment, which eventually facilitates general economic recovery. The receiving country, on the other hand, enjoys the benefits accruing from the capitalisation of professional skills that would otherwise have been lost. This constitutes what is known as a brain gain. The receiving country acquires intellectual assets that it can use in its labour market. From the individual's point of view, too, this solution must be considered a gain because it provides them with employment and pay that they would not have been able to obtain in their home country. Further, as they pursue their professional careers in a more productive and advanced environment, the emigrants also gain the advantage of intellectual stimulation. Both these interpretations are economically logical and difficult to repudiate. In reality, all the forces mentioned above come into play simultaneously along with several other less visible and subtler influences.

The brain drain from the United Kingdom or Germany is unlike a brain drain from an African or a Developing Country. Unemployment or underemployment in the United Kingdom or Germany, the motivating force that causes the individual to leave his country of origin for the United States, are aspects of a temporary economic crisis. The loss of a single well-qualified person whose professional skills should have been used by the labour market does not cause a gap in the national system because someone else with similar qualifications will immediately replace the individual. Emigration therefore benefits the local system because it reduces the rate of unemployment and underemployment. If an engineer, doctor or architect decides to leave other engineers, doctors and architects are there to take his or her place.

The situation in a developing country is different. Let us suppose that a developing country has, at considerable economic and social cost to itself, trained a doctor. As soon as the doctor acquires his professional qualifications and becomes potentially useful for the socio-economic system of the country, he decides to leave for a country better equipped to satisfy his professional aspirations. In this case, the donor country has not only lost the value of an investment in human capital, but continues to suffer the loss because no substitute doctor is available. No professional workers can be found to replace the emigrants.

We must not forget that developing countries do not always have universities, and even when they do, they are generally below the standards of the universities of more advanced countries. The qualification acquired by a professional in such a country, for all that it may be essential to the economic and social fabric of the country, is simply not on a par with the qualification that can be obtained in more advanced countries. A doctor who decides to leave his home country for a destination with higher intellectual standards may end up working in a job that demands fewer qualifications than he possesses. This is an example of brain waste. The underemployment may be the result of inadequate qualifications or the inability of the individual to make headway in a highly competitive labour market.

The situation changes if the academic qualification and professional skills are obtained abroad: i.e., if the individual has gone abroad to complete his studies and training. In this case, the emigrant's cultural and professional grade advances in tandem with those of local students. The degree or PhD thus acquired can be put to immediate use because it is recognised as valid in the more advanced country where the studies took place. In a certain sense, the equation is reversed. In this case, the investment spending and training costs are borne by the receiving country (though offset if the immigrant is paying university fees). However, the added value to the human capital generated by the academic training is to the advantage of the donor country.

Of course many of these foreign students decide to remain in the country where they

completed their studies and training, especially if the country in question is the USA or Canada, both of them preferred destinations. On the other hand, it is also true that those emigrants who do return home bring with them the higher standards of professionalism that they acquired by participating in a superior educational system. The donor country can thus build up a managerial and professional class by relying on another country's educational structures that, moreover, are of a standard that the donor country is simply incapable of matching.

It can be objected that there is little point in having highly professional qualifications if the opportunity to use them is absent. The objection is certainly valid in some respects. It makes no sense to have a doctor who has specialised in brain microsurgery in a country that lacks the health care structures in which he might operate. On the other hand, it is also true that the presence of professional skills that are greater than those currently available can prod a country into upgrading its structures to the necessary level. The very presence of the brain surgeon may persuade local authorities to build the operating theatre he needs.

The phenomenon of qualified emigration can therefore be interpreted from several perspectives. The negative aspects are partly compensated by positive ones, and we cannot say that skilled emigration is all good or all bad.

We must also remember that the societies in today's world operate in context of vastly greater trade opportunities than in the past. One result of globalization has been to initiate an ongoing process of reciprocal osmosis among different countries. It is becoming increasingly easy for countries to trade, and trade nowadays is not based exclusively on the commerce of consumer goods but also on the exchange of information and migrant workers. We are no longer dealing with a single form of mobility (i.e. the movement of humans) but rather of a tripartite mobility consisting of goods, ideas and people. It no longer makes much sense to speak of a brain drain because the transfer of professional skills from one place to another now forms part of an economic system in which human resources are available to various systems of production no matter where they are located. It makes more sense to speak of brain movement than brain drain or brain waste, because human resources now form part of a global economic system that transcends international boundaries.

2.5. The Economics of Population Movements in Mass Migrations

The movement of a population from one country to another, i.e. international migration, has advantages and disadvantages for both the country of origin and country of destination. We have already mentioned many of these factors, but let us recapitulate them with reference to the phenomenon of mass migration.

The advantage accruing to a country that receives an inflow of immigrants is derived from the fact that it acquires fresh manpower that, though unskilled, is cheap. The new workforce permeates the labour market niches that local workers had left unfilled. The jobs are unhealthy, dangerous and exhausting, and this is why the local workers were unwilling to do them. Yet the jobs are often essential to the economic system. The local workers are only too willing to delegate these tasks to the new arrivals, especially if the immigrants are impoverished and obliged to accept.

The result is the maintenance of economic system built upon the coexistence of forms of employment that require both skilled and unskilled or under-skilled workers. Social progress

by industrialised countries has raised the standards of all workers. Education has become compulsory, training brings workers to higher levels than before and advanced techniques are imparted to employees. Workers expect their jobs to be more modern, cleaner, less fatiguing, less demanding and better paid than before. This leaves a number of jobs on the margins of society that, though necessary, local workers turn down. Immigrants who find themselves forced to accept any type of work, even if it is unhealthy, fatiguing and poorly paid, take up these jobs.

The receiving country's economic system derives benefit from the arrival of foreign workers who take up these unwanted jobs. Some of these jobs are the direct result of the social evolution of the receiving society. In advanced countries, the relative number of old people is increasing, and the poor health that comes with old age has obliged many to look for permanent assistance. The younger generations have found it more convenient to leave the demanding task of nursing and caring for old people to immigrants. In many factories, labour-intensive and dangerous jobs such as manning blast furnaces in steelworks are given to immigrants. The same is true for construction work, agriculture and animal husbandry.

It should also be noted that the immigrant workforce can be very useful for business when it needs to take on more workers to increase production in times of economic boom. In the immediate aftermath of the Second World War, France, Belgium and many Central European countries faced demographic deficits and gaps in the labour market. They found that the population of the nation was not able to meet the demand for production, and so they looked for assistance in the form of immigrant workers.

Foreign workers offer other benefits to business and the economy of a country. Having less trade union protection, immigrants work longer shifts. Not only do they satisfy the needs of businesses, but their vulnerable status also makes them the preferred choice of industrialists who can use them to force down wages. Immigrants act as a brake on rising labour costs in the local economy.

While foreign workers can plug the production gap in a booming economy and provide essential work in particularly trying times, problems arise when there is a downturn in the economy and businesses start reducing their work forces. Foreign workers are the first to suffer from redundancies. This occurred during the oil shock in the mid Seventies when German firms sent back a large number of Italian, Turkish and Spanish labourers. Even so, companies will not always do this, sometimes as a result of resistance by the workers themselves, and sometimes as a result of humanitarian considerations. At this point, foreign workers can become a drag on corporate efficiency.

The country from which the workers depart benefits because the outflow reduces domestic unemployment that is at least a partial compensation for the loss of healthy young workers and entrepreneurs, some of them with good academic qualifications, which is the profile of the average migrant. The exit of emigrants leaves those who remain behind with a slightly better chance to make their way in the local labour market.

Another major advantage for the donor country consists of the financial remittances that emigrants send to their families back home. These remittances amount to a sizeable sum, which the donor country receives without incurring any costs, which are borne by the receiver country instead. In this way the donor country receives a net income that bolsters local consumption and, in some cases, is channelled into investment in small enterprises. The increased cash available to families stimulates domestic production, and may go towards

creating or improving public services. Not only do the remittances cover the cost of basic necessities, they also generate a level of demand and consumption that would have been unthinkable without them. The money from immigrant workers can also be used by a family to replace obsolete agricultural equipment, to buy seeds or even to send children to school, all of which will contribute to the general improvement of the economic and social circumstances of the society left behind.

Remittances home can be seen as a form of hidden aid that the developed world devolves to poorer nations. We ought not forget that many European countries, reduced to a state of misery by the World War, were able to rebuild thanks also to the remittances from emigrant compatriots. Thanks to this money, European nations managed to repair their balance of payments. The income set in motion a series of internal synergies, which enabled the countries to make significant economic headway. This is still going on today in many developing countries whose domestic progress is fuelled by the savings of emigrants. To be sure, this is not always the case and the remittances are not always sufficient to cover every economic and social need.

We described these remittances as hidden aid because they are made in ways that are very often statistically invisible, namely through informal channels that are difficult to monitor. However they are made, these remittances amount to a net loss for the production systems of industrialised countries. True, the money is earned in exchange for labour, but the survival of an economic system depends on this money being used for consumption, the ultimate and the primary purpose of production. The transfer of money outside the domestic system of production reduces consumption, and therefore also output. As long as foreign workers make up a small proportion of the workforce, and as long as the value of the remittances is low enough not to have a major effect on domestic consumption, the consequences for the system of production will remain limited. If, on the other hand, the proportion of foreign workers becomes large, the outflow of money will become increasingly significant, even assuming that the value of each individual's remittance remains the same, and this will begin to have it is a deleterious effect on the domestic economies of countries that have made factors of production available, but failed to derive a full profit. For the time being, several hundreds of thousands of dollars leave European countries every year for African, Asian or South American countries. The estimate should be regarded as low because it is based on a measurement of official transactions only. In 1991, the estimated value was put at between 30 and 40 billion pounds sterling (Keely, Tran, 1989; Russel, Teitelbaun, 1992).

It might be thought that this transfer of money would be followed by a transfer in spending capacity, and that companies would therefore broaden their markets to reach faraway places. If a company making a good that is consumed locally sees that its sales are falling owing to a drop in disposable income, it might consider exporting the good to countries where disposable income is increasing, and indeed, this is one of the forces contributing to the globalization of markets. Nonetheless, it is not always possible for a company to take this step, at least not immediately, because the new economies where disposable income is increasing are not yet ready for mature consumption. It makes no sense for a company manufacturing such as video recorders to try to compensate for falling consumption on the domestic market by trying to sell to a developing country that lacks the right sort of environment for the consumption of this good (for instance, the electricity needed to run the recorder may not be available).

There are, of course, additional complexities and ramifications. The propensity to transfer

part of a salary to the home country is contingent on two factors. Sometimes the transfer is a remittance in the strict sense of the term, namely money that is intended to cover the current needs of the family back home. Sometimes, however, the money sent back home consists of savings. The value of the remittances is directly proportionate to family responsibilities in the country of origin, and inversely proportionate to family responsibilities in the host country (Confalonieri, 1979).

It is important to realise that savings have a special significance for immigrants, particularly temporary immigrants, and determine their economic behaviour. To say that savings are what is left over after consumption is a definition that will do for native workers at home in an advanced economy, but it will not do for the immigrant workers who join them. An immigrant will tend to save as much as possible, and the accumulation of funds is a primary objective. For an immigrant, therefore, the reverse is true: consumption is what takes place after saving.

A certain degree of financial speculation on the part of the immigrant also enters the equation. An immigrant worker will examine the comparative advantages of sending savings home or holding them in the country in which he is guest. Expectations regarding the future political and economic developments of the home country will heavily influence a decision as will, most particularly, expectations regarding exchange rates between the home and the host country. The expectation that the home currency is likely to depreciate in value will encourage immigrants to hold their savings in the country where they work. We should also keep in mind that those Developing Countries that are the source of major migratory outflows often experience double-digit currency depreciation.

Numerous surveys have confirmed that immigrant workers tend to keep their savings in banks in the host country. The host country has a clear interest in offering favourable terms and conditions to ensure that immigrants put as much of their earnings as possible in the domestic banking system. Economic policies do not always reflect this, because receiving countries often mistakenly believe that the value of the remittances is not so great as to make a dent in the national accounts. In reality, the remittances leaving countries such as Italy are far greater than either the banking system or the Central Bank recognises. We must always remember that any estimate of the value of remittances will be lower than the true sum, partly because many of the contracts of employment and pay cheques are kept hidden, and partly because the money flows out of the country by means of informal channels whose structure and efficiency are unknown quantities. The money may be brought directly back to the home country by the immigrant worker, but it may also be conveyed by friends and acquaintances. Rather complex forms of debt repayment that deliberately avoid bureaucratic channels also exist. Certain ethnic groups also provide economic support for new arrivals by reinvesting the savings of those who have already settled.

We might get a more accurate reading by examining the records of those companies that provide money transfer services throughout the world. Obviously, these records are classified, though the companies engaged in the business have hinted that the mass of funds sent in this way is far greater than the total sent through official channels.

There is another angle to the question that needs to be given due attention. The remittances constitute an asset in the trade balance of the home country and therefore increase the home country's import capacity. This is a significant financial item especially for those countries that find it difficult to increase their exports. Apart from certain raw materials, less advanced systems of production have difficulty in manufacturing finished products that compete on the

international market, because their technology, functionality and economic value are inferior. Given this, poorer countries will substitute the export of goods with the export of workers (Salt, 2000).

It takes time and requires periods of stability before the economics of remittances will start making a significant impact on Developing Countries. The economic mechanism will not work if the Developing Country is at the mercy of seasonal fluctuations and economic cycles, at least not beyond a reasonable threshold, because a programme of development requires a sustained rate of imports in order to bring about significant technological and productive modernisation. If the income drops or the fluctuations are too great, the development projects will be severely compromised by sudden balance of payment deficits (Neri, 1976). This means that labour demand abroad must be reasonably stable and not given to sharp variations, and so the immigrant workers abroad must become a structural part of the labour market of the receiver country. Analogously, the type of work that the host country offers immigrants must be steady and substantive before the effects of repatriated earnings can be felt in its economy.

Financial remittances will stimulate domestic production in countries of origin only if the funds are used to increase the availability of domestically produced goods. The remittances could, however, have unfavourable repercussions if they give rise to the consumption of goods made outside the country. In this case, the remittances will aggravate the dependence of the country on others, worsen the balance of payments, and have precisely the opposite effect to what is desirable.

We must also account for what economists call the multiplier effect when we are looking at the impact of remittances from abroad on domestic production. In Greece in 1990, the purchase of consumer goods using cash sent back from immigrants generated a multiplier effect on domestic production of 1.8. In Egypt, the multiplier was 2.2 and in Pakistan 2.4 (Zucchetti, 1997). Studies of the phenomenon have shown that the multiplier effect is greater if the remittances reach rural rather than urban populations. In the countryside, living conditions are lower and so consumption is focused on goods of primary necessity, which are generally made locally. When remittances reach family units living in cities, however, the multiplier effect is less pronounced because the extra cash is more likely to be used to purchase imported products.

2.6. The Economics of Population Movements in Skilled Migrations

Much of what we have said in respect of mass migration is also true of skilled migration. When the migration of skilled people takes place, the donor country foots the educational bill but loses the skilled worker at the very moment he or she enters the most productive stage of life. The receiving country gains by being able to make use of a worker without having had to spend anything on his or her upbringing. Also, the donor country is deprived of an asset whose added intellectual value makes its loss far more difficult to sustain than the loss of a worker with few or no qualifications. It is no accident that the 1990 Immigration Act of the United States underscored the importance of quality immigration for the protection of the country's commercial position in the global economy. In the United Kingdom, ministerial spokesmen have announced a liberalisation of immigration policy with special reference to qualified workers. The number of work permits in 1999 was 83,000 and the country hopes to grant 140,000 in 2000 (Salt, 2000).

In section 1.4, we considered the importance of brain drain, brain waste and brain gain, and looked at the different situations that obtain in donor and receiving countries for highly specialised workers. We have also commented a little on the differences between mass and skilled migration, and how they determine the migratory project, the duration of the period spent abroad and the level of integration achieved.

We should add that “brain mobility”, or, more generally, the global movement of professionals, results in knowledge transfer. Cultural and professional circumstances are not the same everywhere, and substantial differences also exist between one developing country and another. Sometimes, the cultural characteristics of a less advanced country can turn out to be useful to and applicable in an industrialised one. Sometimes, the donor country may have not only a cultural contribution to make, but also has certain physical, anthropological and intellectual assets that can prove important for the integration of different societies. By way of example, the Chinese are often highly skilled in precise sciences; some Indians are particularly gifted in mathematics and computer technology; and some black-skinned peoples produce exceptionally gifted runners and sportsmen. These special characteristics make these immigrants particularly attractive to wealthier countries, even though their basic education, acquired in the home countries, will not reach the same standards as those of the host country.

Often, these immigrants function as “cultural honeybees”, so to speak, gathering the pollen of knowledge in one part of the world and carrying and mixing it with the knowledge of another part. Through their cross-pollinating activities, they contribute to the fertility of the sciences, arts and professions. Quality migrants are harbingers of globalization because they perform the useful function of building bridges between different societies, cultures and markets. The consequences, therefore, are favourable not just for the recipient countries but also for many others including and especially the immigrants’ countries of origin.

Skilled migrants are also standard-bearers for successful integration between different peoples and ethnic groups. Thanks to their high level of education, their knowledge of foreign languages and their greater capacity for cultural adaptation, these skilled immigrants are more inclined and able than most to mix with people of other cultures and professional fields.

In the preceding section, we spoke of the remittances by which emigrants send back some of the financial rewards of their labour, and thereby help the struggling economies of developing countries. Skilled migrants, too, are a source of financial remittances. The remittances tend to be proportionately smaller than those made by unskilled migrants, because skilled migrants will tend to come from wealthier families with less pressing financial needs. Furthermore, the skilled migrant has more urgent spending commitments than the unskilled migrant, and is therefore predisposed to spend more and save less. The qualified immigrant’s non-reliance on the host society to provide essential services (accommodation, schooling for the children, welfare and pensions) increases his personal costs, eats into his savings and leaves less to be sent back home. Besides, it is common for a skilled migrant to be accompanied by his family, and so most income will be consumed *in loco* by the family rather than repatriated.

Intellectual workers also have the faculty of sending the professional or scientific knowledge that they have acquired abroad back to their country of origin. Put another way, an intellectual migrant is able to pay cultural and professional remittances. The country of origin benefits because it acquires knowledge at zero cost, and the recipient country is left to

provide all the factors of production. If the transferred knowledge relates to high-technology sciences, it is legitimate to wonder whether it can be of as much use to a sending country. The value of the fruits of research and the advance of knowledge is far higher for an advanced industrialised country (e.g. the United States) because it has the necessary structures for beneficial exploitation and application. A sending country may not have the right conditions for the immediate consumption of this type of knowledge. That said, imported know-how and experience can act as a stimulus in the country of origin. It can serve to drive forward domestic progress, even if the developing countries still lack the structural potential available in advanced economies. The history of the 20th century is replete with examples of intellectual workers who contributed to the scientific and cultural progress of the world as a whole, but also fuelled the scientific and cultural progress of their own countries. Many a Nobel Prize laureate has worked in laboratories in Canada or the United States before returning to his or her country of origin to continue research and, by so doing, upgrade the scientific and professional standards of their native land.

Cultural, scientific and professional remittances are not considered in the policies adapted by developing countries with respect to migration. Rather, these countries are more attracted by financial remittances, which are more immediately necessary and usable. The income from emigrants has a considerable impact on weaker economies, and its importance will not diminish until the outflow of migrants comes to an end. For this reason, a country may even have an interest in encouraging the emigration of its workers for which it receives ample compensation in the form of the remittances that the emigrants then provide. This is essentially true also for scientific and professional remittances. The advantages for the country of origin (the sender) will persist for as long as skilled migration continues. A worker in a skilled profession abroad can provide his or her country with the knowledge acquired in the course of his or her career. The moment he or she returns, however, the marginal utility for the economy of the country of origin declines steeply. As we have already said, the return can provide a stimulus for improving the domestic conditions, and this improvement is a direct consequence of the scientific, cultural and professional capital that the immigrants bring home with them (Todisco, 2000).

2.7 Conclusions

According to the United Nations (2000),

"International migration is projected to remain high during the 21st century. The more developed regions are expected to continue being net receivers of international migrants, with an average gain of about 2 million per year over the next 50 years. Because of low fertility, this migration has a significant impact on population growth in the more developed regions. Without migration, the population of more developed regions as a whole would start declining in 2003 rather than in 2025, and by 2050 it would be 126 million less than the 1.18 billion projected under the assumption of continued migration."

United Nations' statistics indicate that at least 150 million people are currently living in a country other than their own country of birth or country of citizenship. This is 2.5% of the entire population of the world. If the number of emigrants continues to rise at the expected rate of 2 million per year, by the middle of this century they will number 250 million. If we measure this against the higher-end United Nations population projections, the number of

emigrants will be proportionately lower than now (2.3%). If we take the lower population projections, which would necessitate large drops in the fertility rates of many developing countries, then the proportion of emigrants to total world population would exceed 3%. These are averages for the entire world, but migration is by and large directed toward developed countries, and the proportion of migrants to the local population in the economically advantaged parts of the world could amount to or even greatly exceed 20%, depending on the pattern of population growth.

We can understand how an expression like ‘brain drain’ was adopted. However, it can only be used to categorise a very precise situation (e.g. the movement of scientists and engineers from the UK to North America in time period x). Its validity is based on geographic boundaries (from the UK to North America), type of skilled persons (e.g. engineer) and time period (e.g. number in 2002). It considers loss of persons from the sending country and benefits to the receiving country (e.g. the Netherlands imports university professors from Germany; the US imports electrical engineers from the UK).

The concept of brain drain was associated with a negative aspect of migration, a loss of expertise, of qualified staff, of economic energies invested to train a professional. Yet there are benefits to the sending country, some immediate and some longer term, and these measures remain one of the challenges of human mobility measures.

We know from the discussion in the previous pages that international mobility is not all negative for the sending country, given the potential monetary, professional and scientific and technical spill overs. It is, however, important to keep in mind the quite different situation in the case of migrations of professionals coming from the developing countries where the departure of a doctor, for instance, leaves behind increased demand for these skills and an empty post. There is not sufficient backup in the system to compensate for the loss and the country suffers as a result of brain drain.

Statistics tell us human mobility is increasing as the world and markets globalise. Professional migrations may well become part of career development in some fields. The movement will be the necessary complement of the formative process and the acquisition of professional experience.

This brings us to further comments on the concept, definition and measurement of ‘brain-drain’. First of all, it is necessary to move beyond the rigid borders of brain drain limited by time and space as described above. It is more useful to define it as *brain movement* and consider the costs and benefits to senders and receivers. Just as the loss of HRST to the sending country is an immediate measurable phenomenon, there is perhaps a longer term loss to the receiving country as it relies upon external supply rather than building up its own production system (e.g. talent is imported in lieu of adding to education infrastructure).

In the second instance, the rather primitive concept of ‘brain drain’ initially introduced to refer to the departure of scientists, engineers and academics is still used to measure a range of intellectual migrations. In our view, it would be more appropriate to refer to ‘skilled migration’ as there is mobility of skilled and professional persons beyond the borders of the R&D and academic flow the term ‘brain drain’ was originally intended for.

There are many categories of professionals who are internationally mobile beyond the economic drivers such as specific activities and opportunities, objectives, production and organisational requirements. They include, among others:

- *scientists, researchers and academics*, the classic category of migration for whom the term ‘brain drain’ was coined;
- *international experts* including professional figures of high skills actively recruited by agencies such as the UN or similar agencies to provide advise and expertise in various countries. This would also include persons working in agencies such as the World Health Organisation, Doctors Without Frontiers, and so on;
- *international funtionnaires*, persons with high qualifications that operate within multinational organisations such as the EU, Eurostat, the OECD, The Council of Europe, the UN and other multinational assemblies with regional character;
- *specialist workers*, persons with highly specialised skills and staff specific technical competencies when the local labour market cannot meet the demand for the skills, and,
- *students and trainees*.

It is important to emphasize that each of these categories introduces particular aspects and characteristics of migration. For example, for some mobility is a career choice, for others there is no choice. In some cases, the final destinations are obliged such as working for Eurostat, while in others a multinational company can be in a position to offer a highly qualified person a choice of country destinations. Likewise, students are free to opt for one university and country location over another. Pull factors are often more incidental than push factors. A scientist may be more attracted by one laboratory over another, one foreign university over another. The traditional migratory chain of influence of friends and family tends to be minimised; it is the opportunities that constitute the main pull factor. That said, we can begin to investigate new migratory chains, those made by the circulation of information through professional organisations and global communication of opportunities such as those presented by the Internet and e-mail, rings of this new chain.

The world economy will consist of a single enormous market in which raw materials, labour, capital, and information circulate with ample freedom. Just as raw materials, capital and information will move from one part of the world to another, so labour will tend to move from where it is in superabundance to where it is lacking. We shall talk in terms of labour movement rather than migration because the location of employment in one place or another will be a function of the one globalised system.

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