

INTRODUCTION

The international mobility of highly skilled workers, in particular human resources in science and technology (HRST), is currently an important policy issue in most OECD countries. Accompanying the high demand for skilled labour, especially in industries and professions relating to information technology, there is apparently a growing shortage of such workers in a number of OECD Member countries. To meet these shortages, an increasing number of countries are implementing measures to facilitate the recruitment of foreign skilled workers. Considering that improved knowledge and understanding of these issues are necessary for informing the policy agenda, the OECD held a seminar on International Mobility of Highly Skilled Workers: From Statistical Analysis to the Formulation of Policies, in Paris on 11-12 June 2001. The seminar was organised by the Directorate for Science, Technology and Industry (DSTI) and the Directorate for Education, Employment, Labour and Social Affairs (DEELSA).

The seminar had three main objectives:

- ◆ To provide data on the scale and characteristics of flows and stocks of skilled and highly skilled foreign workers in OECD Member countries and certain non-member countries, to assess the quality of the available data and concepts used and to help improve their comparability.
- ◆ To analyse the mobility of skilled workers and HRST and their impact on the economy through case studies covering most of the major regions that send and receive these workers.
- ◆ To examine appropriate migration policies for facilitating the mobility of skilled workers in ways that are beneficial both to receiving and sending countries.

These objectives form part of a broader study relating to the economic impact of the migration of skilled labour on both host countries (gains in skills, "brain gain" and productivity and economic growth, the reduction of labour shortages, effect on education expenditure) and origin countries (loss of skilled workers, "brain drain" or improved provision of technological skills, thanks notably to return migrants, *i.e.* international flow of knowledge or "brain circulation").

Over 20 documents were presented and discussed by the delegates and experts of the OECD Member countries and a number of non-member countries and the representatives of the European Commission and international organisations concerned by international migration and human resources in science and technology.

The studies showed that, while it is difficult to measure the international mobility of skilled workers, there is every reason to believe that these flows rose substantially during the 1990s. This being the case, mobility of HRST has a major impact on countries' performance in the field of science and technology and therefore on growth. However, these effects remain unequally distributed, especially between sending countries (mostly developing countries) and receiving countries. As a result, policies aimed at facilitating the recruitment and mobility of highly skilled workers, in particular migration policies, must endeavour to ensure a fairer distribution of benefits.

Definitions and the statistical framework for the migration of skilled labour

A number of issues were raised during the discussion of the measurement and definition of these developments. They focused on the definition and identification of highly qualified foreign workers and HRST and the availability, reliability and means of improving the international comparability of statistics in this field.

There are several possible means by which the stock and migration flows of highly skilled workers can be gauged. These include, most notably, censuses, registration data, labour force surveys, administrative data, specific surveys and case studies. None of these provides an entirely satisfactory means of measurement. L. Auriol and J. Sexton (Chapter 1) have made a critical assessment of the various sources and have clearly framed the discussion of concepts and definitions. A number of points emerged from this analysis and the ensuing discussions:

- ◆ The definition of HRST provided in the “Canberra Manual” covers a very broad population, and the flows and stocks of HRST as proposed there cannot be completely evaluated using existing statistical sources. In practice, only EU countries and Eurostat have applied the manual’s recommendations. Identifying HRST on the basis of the ISCO (International Standard Classification of Occupations) classification appears to be more appropriate.
- ◆ Population censuses are exhaustive in coverage and are conducted using standard activity classifications but are carried out too infrequently and do not always provide the information desired (for example, on how long migrants actually stay).
- ◆ Labour force surveys, although they also raise problems (sample size, representativeness, etc.) are nevertheless a main source of information available for making international comparisons.
- ◆ Administrative sources (*e.g.* work permits, temporary visas) provide relevant data but do not make use of the concepts, definitions and classifications necessary for calculating international statistics.
- ◆ Specific surveys which track the highly skilled exist in certain countries (the SESTAT system in the United States; surveys carried out by CEREQ in France and presented in D. Martinelli’s contribution in Chapter 6) and deserve to be more broadly used, developed and harmonised.

In general, the information available on migrants’ length of stay, emigration flows, return rates and alternative forms of mobility (such as relocated provision of services) is insufficient. It is suggested that the inventory work begun be pursued in greater depth, in particular with respect to specific surveys on migrants or employers (see R. Winkelmann on Germany in Chapter 7) and on the longitudinal data available. It also appears that the “Canberra Manual” should be revised with the assistance of specialists on labour market and migration statistics.

Main characteristics of the mobility of HRST and highly skilled workers and their impact on the economy

Several case studies on OECD Member countries and non-member countries have made it possible to assess the magnitude of the mobility of HRST, skilled workers and students and to describe their main characteristics. Other contributors have focused on the economic impact of the migration of skilled and highly skilled labour on sending and receiving countries.

D. Guellec and M. Cervantes (Chapter 3) showed the main effects anticipated from the mobility of HRST for receiving and sending countries. The positive effects for the main host countries are the stimulation of innovation capacity, an increase in the stock of available human capital and the international dissemination of knowledge. For origin countries, the loss of human capital can be at least partially offset by the return of migrants and the development of networks facilitating the circulation of skilled workers between host countries and their country of origin (as J.-B. Meyer shows for South Africa in Chapter 13). The mobility of skilled workers can also promote investment in training in sending countries and increase inflows of currency through remittances.

As regards the mobility of students and researchers, several contributions showed that OECD countries increasingly seek to attract specialised foreign students, particularly in the field of science and technology, and to facilitate their access to the labour market (see Chapter 2 by K. Tremblay, Chapter 17 by G. Hugo and Chapter 6 by D. Martinelli). This is not only because their tuition fees are of direct financial benefit to the universities concerned but also because they provide a potential highly qualified reserve of labour that is familiar with prevailing rules and conditions in the host country.

More generally, the cases of the United States (Chapter 16 by P. Martin), Ireland (Chapter 8 by A. Barrett), Japan (Chapter 5 by S. Kobayashi), Sweden (Chapter 14 by A.-M. Gaillard) and Canada (Chapter 4 by M. Bordt) fuelled discussions. Five key points should be emphasised:

- ◆ The policy objectives regarding the immigration of highly skilled workers in most OECD countries are threefold: *i*) to respond to cyclical labour market shortages; *ii*) to increase the stock of human capital; and *iii*) to encourage the circulation of the knowledge embodied in highly skilled workers and promote innovation.
- ◆ The share of skilled foreign workers on the labour market varies considerably across countries but is growing in most OECD countries. In some, inflows of this category of workers are constituted mainly by immigrants admitted on the grounds of family reunification or for humanitarian reasons (refugees and asylum seekers).
- ◆ Many countries are affected both by the emigration and immigration of skilled workers, but it appears that the brain drain has been overestimated in developed countries, notably because the return rate is high (see Chapter 14 by A.-M. Gaillard for Sweden and Chapter 6 by D. Martinelli for France).
- ◆ Temporary labour migration is becoming increasingly frequent, especially in Australia (see Chapter 17 by G. Hugo) and the United States (see Chapter 16 by P. Martin). The economic downturn that started in Spring 2000, notably in the US high-technology sector, may trigger a readjustment of the flows.
- ◆ The mobility of HRST may have an impact on inequalities, for example by reducing them when skilled emigrants return home, and on the long-term equilibrium of the labour market (incentives to invest in initial and vocational training).

The case of non-member countries is illustrated for South Africa (Chapter 13 by J.-B. Meyer), China (Chapter 11 by A. Guochu and L. Wenjun), India (Chapter 12 by V. Gayathri), Israel (Chapter 9 by A. Paltiel), Russia (Chapter 10 by L. Gokhberg and E. Nekipelova) and Chinese Taipei (Chapter 15 by Y.-L. Luo and W.-J. Wang). It appears that developing and transition countries can in general provide their most highly qualified workers only with limited opportunities. Indeed, notwithstanding the effects on public finance linked to expenditures on education, developing countries may benefit in the short run from the emigration of their highly skilled personnel through the effects on remittance flows and reduced labour surpluses as well as, in some cases, the internationalisation of the domestic

economy. In the long run, however, the picture may be very different if emigration of highly qualified workers prevents these countries from reaching a critical threshold level of HRST in some very dynamic sectors with high value added, or if it affects the provision of basic socio-economic services (*e.g.* education, health). The cases of Chinese Taipei, Korea and Ireland, tend to show that when skilled migrants return to their country of origin after a long stay abroad, they make a considerable contribution to the expansion of their national high-technology industry.

Policies facilitating the mobility of HRST and highly skilled workers

A significant portion of discussions dealt with recent migration policy developments aimed at enhancing the mobility of highly skilled workers. Detailed presentations on Germany (see Chapter 18 by H. Werner), Australia (Chapter 17 by G. Hugo), the United States (see Chapter 16 by P. Martin) and the United Kingdom (Chapter 19 by N. Rollason) made it possible to show the diversity of the policies implemented in different OECD Member countries and to discuss their strengths and weaknesses.

The traditional immigration countries have, within the general framework of their migration legislation, developed specific policies to promote the temporary residence (European countries) or permanent residence (Australia, Canada) of foreign HRST, both students and workers. In other countries, measures have recently been adopted that specifically target employment in the information and communications sector, for example, in order to ease labour market tensions. In this regard, a key issue to be considered is how to strike a balance between the interests of the main partners concerned, *i.e.* government, employers, the domestic and foreign workforce and sending countries.

However, even in free-circulation areas, there remains considerable scope for facilitating the mobility of HRST through such policy initiatives as the mutual recognition of diplomas and the transfer of social security and pension rights.

Factors that attract HRST are also significantly linked to science and technology policies. The development of a high-technology and innovative industry is important for attracting HRST of all origins. It is therefore the entire range of policies aimed at encouraging innovation that has an indirect but powerful effect on incentives for these workers to enter the labour market of the country concerned. Such policies address notably entrepreneurship, mechanisms for allocating capital, training and education, public research and its links with business. More specifically, centres of high-quality research and higher education (“centres of excellence”) tend to attract foreign researchers and students (some of whom will get jobs in the host country). This is notably the case for certain universities in the United States, and it is an objective of the European policy for centres of excellence. In the case of Chinese Taipei (Chapter 15 by Y.-L. Luo and W.-J. Wang), the creation of science parks has triggered the return of former migrant engineers and researchers trained abroad. Certain countries have specific systems of scholarships for the best foreign students. Conversely, weak public research may be a “push” factor for national researchers, especially the young, owing to scarcity of job openings and resources or to too rigid an organisation that ties career advancement to seniority instead of performance. Finally, policies directed at encouraging HRST based overseas to remain in contact with the home country may also be expected to promote the diffusion of the knowledge and experience gained (Chapter 13 by J.-B. Meyer on South Africa).