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European brain drain: what do the American statistics tell us?

Anxieties are often expressed in Europe about the risk of a "brain drain" to foreign countries, in particular to the United States. If we look at the American censuses from 1980 to 2006, we can observe the phenomenon, by distinguishing the successive cohorts of migrants originating from different European countries. Overall, the number of European expatriates increases, but remains small. However, the emigration is selective. The expatriate population is particularly well educated and this selectivity is higher for the most recent cohorts of emigrants. Furthermore, these cohorts include a larger proportion of engineers, researchers and academics than the previous ones, the very people whose qualifications correspond to the innovation activities targeted by the Lisbon Strategy. It is this increasing quality of the expatriates that should alarm us.

Now, in Europe as in the United States, knowledge and skills are the main sources of wealth creation, rather than material resources. Just as Europe needed secondary education and investments in physical capital in order to catch up economically in the post-war period, Europe's take-off in the "knowledge economy" will require increased expenditure dedicated to higher education, research and development and training a workforce capable of using, creating and transmitting the new knowledge. Just like goods and services, the demand for these skills and talents is being felt in an increasingly globalized and competitive market. In this context, anxieties are frequently expressed in Europe about the risks of a "brain drain".[1] For example, the third European report on science and technology points out that Europe educates a large number of university graduates, PhDs and post-doctoral students but that a large number of them are not employed in research and development in Europe. According to the terms of this report, this could be an obstacle to achieving the objective set by the Lisbon European Council of making Europe the most competitive knowledge-based economy in the world.

The term "brain drain" has been primarily used to describe a situation in which rich countries that are relatively well endowed with human capital attract the most qualified workers from poorer regions that have less human capital. Therefore, most of the studies on the brain drain are focussed on migrations of qualified workers from the South to the North.[2] The study carried out by G. Saint-Paul (2004) differs in this respect in that it studies the brain drain from Europe to the United States in the 1990s.[3] Indeed, an increasing percentage of the demand for qualified workers in the United States is satisfied by the supply of foreigners. The percentage of university graduates born abroad increased from 7.3% in 1980 to 14% in 2000;[4] amongst holders of scientific PhDs, this percentage reached 40% in 2000. In this study, we use the

1. European commission (2003), "Third European Report on Science and Technology", J. François-Poncet (2000), "L'expatriation des jeunes Français", Sénat, Commission des Affaires économiques, *Rapport d'information* n° 388.
2. F. Docquier, O. Lohest & A. Marfouk (2007), "Brain Drain in Developing Countries", *World Bank Economic Review*, 21, pp. 193-218.
3. G. Saint-Paul (2004), "The Brain Drain: Some Evidence from European Expatriates in the US", CEPR, *Discussion Paper Series* n° 4680.
4. This proportion was 11% on average in the EU15 in 2000.

data from the four U.S. censuses taken between 1980 and 2006 to evaluate the extent and nature of, and changes in, the migratory flows from Europe to the United States.[5]

A small but an increasing number of emigrants

On the basis of the American census data, we define a European expatriate as a person born in Europe (EU15) to European parents but living in the United States. To exclude students from our reference population, we limit it to people from 25 to 64 years of age. The statistics concerning the populations from home countries come from the ILO and the data on the levels of education from Cohen and Soto (2007).[6]

Table 1 gives an idea of the expatriate population in the United States and its change over time. In 2006, 2.3 million Europeans from 25 to 64 years of age were living in the United States, a number equivalent to 1.1% of the EU15 population in the same age range. Over the whole 1980-2006 period, this average rate of expatriation remains constant. But, in all of the major countries, with the exception of Italy, the rates of expatriation increase.[7]

Table 1 – European expatriate population in the United States

	Number of expatriates of 25-64 years of age			As a share of the 25-64 old population of the home country		
	1980	2006	Changes 1980-2006	1980 %	2006 %	Changes in percentage points 1980-2006
Germany	501	727	45	1.3	1.6	+0.3
Spain	37	77	106	0.2	0.3	+0.1
France	78	136	74	0.3	0.4	+0.1
United Kingdom	375	525	40	1.4	1.7	+0.3
Italy	408	256	-37	1.5	0.8	-0.7
EU15	1936	2274	17	1.1	1.1	0

Interpretation: In 2006, the population from 25 to 64 years of age, born in France and living in the United States (136,000 people), represented 0.4% of the French population of the same age.

Sources: United States censuses and laborsta (ILO), the author's calculations.

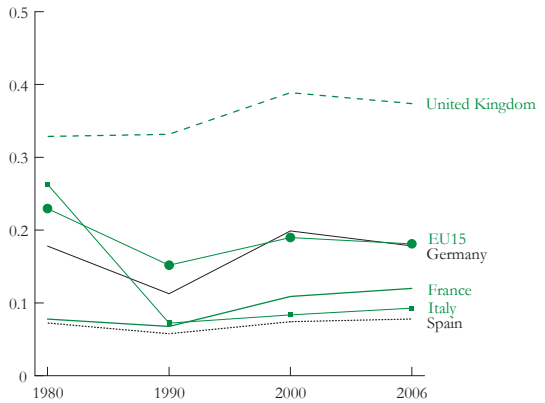
More than half of European expatriates come from Germany or Britain. The German and British expatriation rates, higher than the European average, increase faster than the average. The French and Spanish expatriation rates are the lowest of the EU15, but have the highest relative growth (more than 40% since 1980).

The migratory past of each country and the structure by age of the expatriates have a strong influence on the observations made on the "stock" of emigrants from 25 to 64 of age. Thus, all else being equal, a relatively old expatriate population would see its numbers falling with the number of people reaching the limit of 65 years. This is typically the case for the Italian immigrant population. Therefore, it is more appropriate to study the flows of migrants during successive periods, by distinguishing cohorts according to the date of emigration, to obtain indications of the dynamics of European expatriation.

The change in the migration rates by cohorts (graph 1) is firstly a decrease in the 1980s followed by an increase starting in the 1990s. In 2006, the European expatriates who emigrated to the United States within the last ten years represented 0.18% of the European 25-65 years old population, as against 0.15% in 1990; however, the 2006 expatriation rate is still lower than that of 1980 (0.23%). In this respect, two countries stand out, the United Kingdom and France, where the expatriation rates are higher in 2006 than in 1980. The French expatriation rate increased by 77% between the 1980-1990 cohort compared to that which arrived in the United States between 1996 and 2006. This is the largest increase in the EU15; nevertheless, it still leaves the French emigration rate below the European average.

The increase in the rates of European migration to the United States starting in the 1990s is certainly linked to the US economic performance - particularly in information and communication technologies - which have greatly increased the demand for highly skilled workers. But during the 1980s the gap in performance between the United States and Europe was already large and the US demand for those workers strong, yet European emigration rates decreased significantly during this period. One possible explanation is that, faced with the American labour demand market pull factors, the forces of European work supply push factors

Graph 1 – Migration rates by cohorts* (%)



* 1971-1980, 1981-1990, 1991-2000 and 1996-2006 cohorts.

Interpretation: In 2006, the number of people from 25-64 years of age expatriated in the United States since 1996 represented 0.18% of the EU15 population from 25-64 years of age.

Sources: United States censuses and laborsta (ILO), the author's calculations.

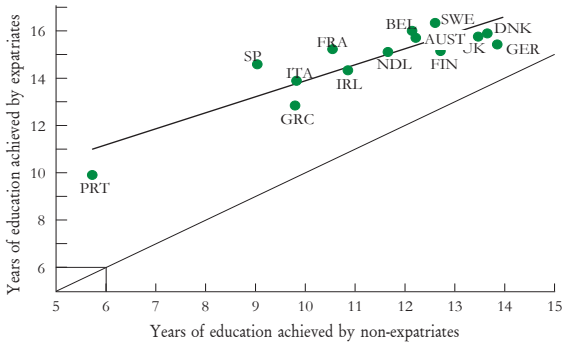
5. See A. Tritah (2008), "The brain drain between knowledge based economies: the European human capital outflows to the US", *CEPII working document*, n° 2008-08, June.
6. D. Cohen & M. Soto (2007), "Growth and human capital: Good data, good results", *Journal of Economic Growth*, 12, pp. 51-76.
7 Amongst the other countries of the EU15, this ratio decreased for Finland, Denmark, the Netherlands, Greece, Austria and Ireland.

have been limited by the slow growth of educated workers in Europe during the 1980s. The increase in emigration rates that started in the 1990s could be due to the joint pull and push forces due to the increase in the number of university graduates in Europe.

More selective emigration

The "brain drain" means that it is the best educated and most skilled that leave their country to take up jobs in another one. Therefore, the extent of the brain drain depends on both the emigration rate and the relative qualification of the emigrants. Graph 2 compares the average level of education of an expatriate in the United States (on the Y-axis) to that of the home country's population (on the X-axis) for each country in 2006. In all cases, emigration is selective: the expatriate population is, on average, better educated.

Graph 2 – Level of education of the expatriate and non-expatriate population – 2006



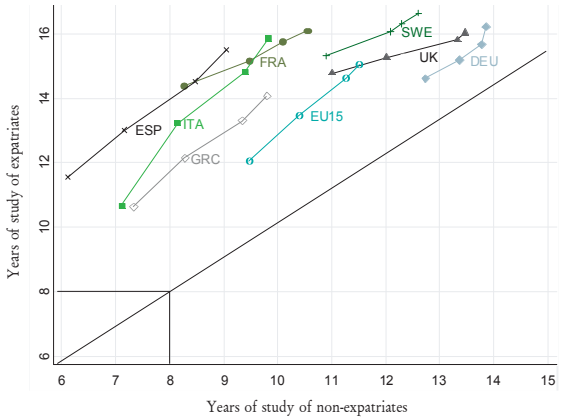
Sources: United States censuses and Cohen & Soto (2007) op. cit., the author's calculations.

If the average level of education of the population is low, this selectivity is seems even greater. In the case of Portugal, where the average level does not reach 6 years, the expatriates to the United States have studied for almost twice as many years as their compatriots. In Germany, where the average level of study is 14 years, that of the expatriates is not much greater: 15 years.

Is this observation made between countries at a given date pertinent over time? In other words, does the selectivity of the emigration to the United States decrease as the average level of education of population increases? According to the data given in graph 3, which covers four successive cohorts of emigrants, the answer is negative. On the contrary, the selectivity is greater for the most recent cohorts of emigrants, for the whole of the EU15 as well as for the major European countries, with the exception of the United Kingdom.

The brain drain indicators above define human capital in terms of the number of years of education. However, the anxieties about the European brain drain refer more specifically to workers involved in activities that adopt

Graph 3 – Level of education of the expatriate and non-expatriate population – Data by cohorts*



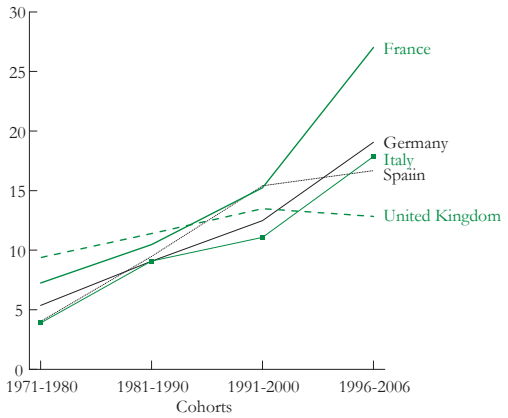
* 1971-1980, 1981-1990, 1991-2000 and, 1996-2006 cohorts.

Interpretation: For each country, each point on the Y-axis represents the average number of years of study of the population that has emigrated in a ten year period (cohorts) and on the X-axis that for the home population. For a given country, a shift to the north-east that deviates from the diagonal indicates an increasing selectivity of the emigration.

Sources: United States censuses, Cohen & Soto (2007) *op. cit.*, the author's calculations.

and adapt new technologies (engineers), innovate and create knowledge (researchers) and transmit knowledge to future generations (academics). In fact, the most recent cohorts of expatriates include a higher percentage of engineers, researchers and academics than the preceding ones (graph 4). There is a particularly significant increase in this percentage in France, where it reached 27% for the 1996-2006 cohort.

Graph 4 – Proportion of scientists* among the cohorts of expatriates (%)

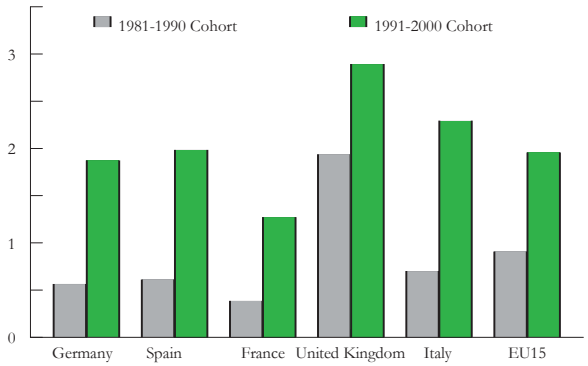


* Engineers, researchers and academics.
Sources: States censuses, the author's calculations.

If we look at researchers alone, we note that their expatriation rate is significantly higher everywhere for the 1991-2000 cohort than for the preceding one (graph 5). This ratio is lowest in France: the number of French people who emigrated to the United States between 1991 and 2000 and are researchers their represents less than 1.5% of French researchers.

Finally, a comparison of the labor market performance of native born US workers and expatriates with identical observable characteristics indicates that in 2000, and even more so in 2006, an expatriate receive a significant wage

Graph 5 – Expatriation rates of researchers (%)



Interpretation: The number of researchers born in France who emigrated to the United States between 1990 and 2000 represented 1.3% of the number of researchers in France in 2000.

Sources: United States censuses, European Commission (2003), "Third European Report on Science and Technology", the author's calculations.

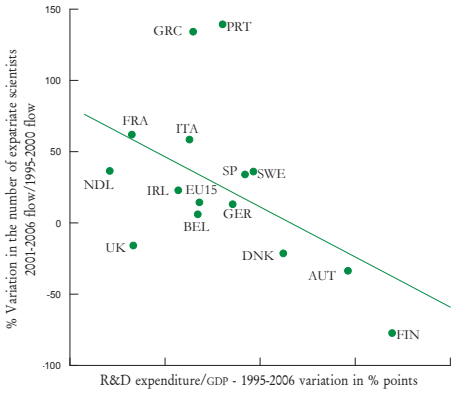
premium, particularly if he or she is British, French or Spanish.[8] This higher wage may be the mark of specific and highly sought after talents (unobservable characteristics) or the mark of over-representation of Europeans in the sectors of the economy with highest value added (new technologies, for example) that hand out the highest wages. Whatever the preferred interpretation, as this premium is higher for the most recent expatriates, it confirms the increase in the quality of the human capital of Europeans working in the United States.

Lisbon and the brain drain

In March 2000, the European Council launched the Lisbon Strategy, aimed at making the European Union the most competitive knowledge economy in the world by 2010. This strategy implies an increase in R&D spending, in particular. At the end of the 1990s, this reached 1.8% of GDP on average in the fifteen European nations. The Lisbon objective was to raise this to 3% of GDP in 2010. But, in the majority of countries, this ratio has hardly increased and remains below 2% in 2006; only Sweden (already at more than 3% in 1995) and Finland meet the objective.[9]

We note over the last ten years that the countries that have increased their R&D spending more in proportion to their GDP are also those whose expatriation of scientists to the United States has grown least (Graph 6).

Graph 6 – Expatriation of scientists and R&D expenditure



Interpretation: Between 1995 and 2006, Denmark increased the percentage of its GDP dedicated to R&D expenditure by 0.6 percent of GDP. The number of Danish scientists expatriated to the United States during the years 2001-2006 dropped by 21% compared to the years 1995-2000.
The regression coefficient is significant: an increase in the R&D expenditure/ GDP ratio of 1 percentage point of GDP reduces the flow of expatriates by 72% on average (R2 = 0.26).

Sources: United States censuses and Eurostat, the author's calculations.

This correlation is obviously too rough and ready to form the basis of economic policy recommendations. Furthermore, remember that in this work we have limited ourselves to the expatriation of Europeans; we have not considered the contribution of the influx of foreign scientists into Europe. Nevertheless, these results seem to support the idea according to which the expatriation of scientists is due, at least to some extent, to the lack of resources dedicated to research in their own countries. Under these conditions, even if the brain drain remains a minor phenomenon, the fact that Europe exports a growing and selective share of its human capital to the United States is a worrying symptom.

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8. *Cf.* A. Tritah (2008), *op. cit.*
9. B. van Pottelsberghe (2008), "Europe's R&D: Missing the Wrong Targets?", Bruegel Policy Brief, 2008/03 ; European Commission (2007), *Towards a European Research Area, Science, Technology and Innovation,* "Key Figures 2007".

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