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Skills and Talent of Immigrants:

A Comparison between the European Union and the United States

by

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March 4, 2005

Abstract

The nineties has been a period of increasing migratory flows from less developed countries to industrialized nations. It is instructive to compare the two largest economies in the world, the European Union and the United States, in terms of the magnitude, trends and composition of their migratory inflows. While the two economies are similar in terms of size and level of development, the European Union still lags behind in its ability to attract immigrants and in the degree of internal mobility of its citizens. Moreover we document a general feature that became more prominent during the nineties. While both economies attracted less educated workers (primary school graduates) as well as highly educated workers (college graduates) from less developed countries, the United States have been able to attract “talent” (i.e. the best among the skilled workers) from all over the world at a rate unmatched by the European Union. In fact the U.S. attracted a large number of talents from the European Union itself during the nineties. This “brain drain” (probably driven by the large economic reward granted by the American economy to scientific, technological and professional talent) is worrisome for the European Union. Its ability to keep pace with the economic growth of the United States depends, in fact, on its ability to compete in the scientific and technological fields.

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Skills and Talent of Immigrants: A Comparison between the European Union and the United States

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This version: March, 2005

Abstract: *The nineties has been a period of increasing migratory flows from less developed countries to industrialized nations. It is instructive to compare the two largest economies in the world, the European Union and the United States, in terms of the magnitude, trends and composition of their migratory inflows. While the two economies are similar in terms of size and level of development, the European Union still lags behind in its ability to attract immigrants and in the degree of internal mobility of its citizens. Moreover we document a general feature that became more prominent during the nineties. While both economies attracted less educated workers (primary school graduates) as well as highly educated workers (college graduates) from less developed countries, the United States have been able to attract “talent”, (i.e. the best among the skilled workers) from all over the world at a rate unmatched by the European Union. In fact the U.S. attracted a large number of talents from the European Union itself during the nineties. This “brain drain” (probably driven by the large economic reward granted by the American economy to scientific, technological and professional talent) is worrisome for the European Union. Its ability to keep pace with the economic growth of the United States depends, in fact, on its ability to compete in the scientific and technological fields.*

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1. Introduction: Migrations and the definition of “Europe”

During the nineties the world experienced an increase in the flows of goods, capital and people across countries, helping to make “globalization” a common buzzword in the media and in the political discourse. While economists generally consider this trend beneficial to all economies (including the most advanced ones) a heated debate concerning the “discontented” or the “losers” of globalization has held center-stage in the theatres of politics, economics and the media². Developed nations will often equate the increasing flow of trade and investment from emerging manufacturing giants (such as China, India, Indonesia and others) with an increasing degree of international competition, possibly posing both a threat and an opportunity for their economies. The outsourcing of traditionally skilled services to developing countries is now compelling some trade economists to re-think their theories³ (or at least to think more carefully some of the details). Certainly no aspect of these increased international flows is regarded with more anxiety (or bound to produce more pronounced changes to our societies) than the large migratory flows of workers, mostly from less developed to advanced countries. The United States, always an immigration country, has recently regained the position it had at the beginning of the twentieth century as the quintessential attractor of immigrants. At the beginning of the twentieth century most of the immigrants to the US were European, whereas now they are mostly East-Asian or Latin American. During the last ten years more than a million immigrants entered the country annually; consequently in 2004 13% of the U.S. population was foreign-born⁴. On the other hand, the European Union, a common market of countries that experienced large emigration flows in the past (mainly to North America and Australia) is now becoming the destination of choice for a growing number of North-Africans and Eastern Europeans.

² See, for instance, Stiglitz J. (2002)

³ See the debate between Samuelson (2004) and Bhagwati et al. (2004)

⁴ Notice that the percentage of foreign-born residents was only 5% in 1970, but it was close to 14% back in 1910 at the peak of the immigration wave from Europe.

This collection of foreign-born workers, potentially an extraordinary resource both for the U.S. and the EU, is more often than not perceived as a threat by native citizens. They are often seen as the harbingers of job loss for home-born-workers, or the unwitting disseminators of traditions and values that may “corrupt” the authenticity of native institutions. In some extreme cases, they are seen as a threat to national security. These perceptions are common to many Europeans and American, but are they correct?

At least from an economic point of view the empirical analysis is struggling to find a consensus to either support or dismiss these fears. In the literature analyzing immigration into the United States, labor economists are mainly divided between two positions. One group of economists (lead by George Borjas of Harvard University) argues that immigrants have hurt natives by decreasing the employment and wages of U.S.-born workers with similar skills⁵. In a recent paper Borjas (2003) infers from aggregate evidence on the U.S. labor market that the large inflow of immigrants may have been responsible for a non negligible part of the increased wage gap between more and less educated workers in the US. To the contrary, the competing group of economists (which has in David Card of UC Berkeley its most prominent scholar) argues that the impact of foreign-born workers on natives with similar skills is very small if present at all so that the fears of competition from immigrants should not be overstated. Card and coauthors use mostly evidence from metropolitan areas in the U.S. to argue that large inflows of immigrants do not induce outflows of native workers⁶ and have a small impact on their wage⁷. As for the few existing studies relative to single European countries they seem to show some modest effects of immigration on native workers’ employment and wages⁸. Notably a recent study by Angrist and Kugler (2003) which includes all EU15 countries seems to indicate that the effect of immigration on employment of native residents depends crucially on the type of labor market institution in place. In countries with more “rigid” institutions (those that generally protect insiders) larger negative effects on the employment of natives are associated with the inflow of immigrants.

⁵ Borjas (1999), (2003) Borjas, Freeman and Katz (1997), Filer (1992).

⁶ Card (2001), Card and Di Nardo (2000).

⁷ Butcher and Card (1991), Card (1990).

⁸ Pische and Velling (1997) study immigration in Germany, Winter-Ebmer and Zweimuller (1997) in Austria, Dolado et al. (1996) in Spain, Hunt (1996) in France and Carrington and De Lima(1996) in Portugal.

This paper has a very simple, “exploratory” and mostly descriptive objective. As only recently the European Commission (Eurostat) and the OECD have made available data on the participation of foreign-born to the European labor force in a format comparable across countries (relative to the year 1999 and some previous years) we are able to describe, characterize and analyze the patterns of immigration into the European Union during the nineties and compare them with the patterns of immigration into the USA. More importantly, these recent data contain information on the countries of birth (rather than on nationalities) and the levels of education of workers in most countries of the European Union. They are therefore comparable with US Census data which have been the basis for the analysis of the impact of foreign-born in the USA in recent decades. The prevailing procedure for collecting information on workers in single European countries had been to focus the attention on their nationality (rather than their country of birth). The acquisition of nationality information is regulated by different rules in different EU countries, and therefore is ill suited to generate comparisons of the presence of immigrants across EU countries and between the EU and the United States. Data on individuals’ country of birth are more objective and comparable indicators of the presence of immigrant workers. The European Labor Force Survey and the U.S. Census data, therefore, are the ideal data sets to compare the presence, trends and characteristics of the foreign-born labor force in the two economies. Let us notice, incidentally, that the two datasets aim at covering in a representative way the whole labor force (population) of countries. Therefore even illegal immigrants should be represented, although some evidence for the U.S. finds that illegal aliens are underestimated by the Census to an extent of 10-20% of their total⁹.

Two important questions need to be asked before proceeding with an organized comparison between immigration in the European Union and immigration in the United States. First, which definition of “Europe” (which “EU” concept) do we want to adopt? Second, how do we define immigrants and how do we treat the internal cross-country mobility of workers within the EU?

⁹ See Hanson and Spilimbergo (1999) for a discussion of the magnitude of illegal immigrants from Mexico in the U.S. No one has established, to my knowledge, the extent of under-representation of illegal aliens in the E.U. Labor Force Survey.

There are several possible groups of countries (within the broad aggregate of 25 nations currently defined as the European Union) with a certain degree of homogeneity, integration and similarity which could constitute a sensible definition of “Europe”. We choose as most appropriate the group of countries known as EU-15¹⁰. This group is made up of the European Union members that existed before the last wave of accession taking place in May 2004. It had a total population of 305 million residents in 2000 (U.S. 281 million) and a total GDP only marginally smaller than the U.S.’s. Moreover, while incomes per capita across its countries differ, these differences are much smaller than for the EU-25 group. For instance, Poland (an EU-25 member) has an income per capita smaller than one fifth of the income per capita of Luxemburg (a difference larger than that between the USA and Mexico). Unluckily three of the EU-15 countries (Austria, Finland and Sweden) became part of the Union only by 1995. We can only include them, therefore, from 1995 onwards. In order to have a homogeneous group of countries throughout the 1992-1999 period, we also use the EU-12 group (EU-15 minus those three countries) as a reference. The data from the European Labor Force Survey cover EU-12 countries before 1995 and EU-15 countries from 1995 onwards. These data constitute the most accurate sources in measuring foreign-born residents in most of the EU countries. We therefore use the EU-15 or (where not possible) the EU-12 as our definition of the European Union during the nineties. Other reasonable definitions of a “European aggregate” (such as the Euro-Area which excludes Denmark, the UK and Sweden, or the Schengen area that excludes the UK and Ireland and includes Norway and Iceland) have to be dismissed for lack of coherent data.

The second concept to be clarified is that of “immigrants”. While in the United States all people born abroad (not citizens at birth) are considered immigrants, in the European Union (EU-15) all people not born in a state member of the EU-15 but resident in one of them will be considered immigrants. Sometimes we will characterize this group as “people born outside the EU”. As a consequence people who are born in a country member of the EU-15 but live in another country are not considered as migrant but rather

¹⁰ The members of EU-15 are: Belgium, Denmark, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, Netherlands, Austria, Portugal, Finland, Sweden, and UK.

as “internally mobile” people¹¹. We equate them with people in the U.S. who move across states, in particular those who were born in a state and are residents of a different one. The concept of internal mobility is very important. If the EU is truly an integrated market for goods and factors, then its workers should move freely across countries. In 1992 the formal restrictions to mobility of workers across the EU-12 countries were completely lifted so that, during the period considered, it theoretically should not have been any harder for an EU citizen to transfer jobs between two EU-15 countries than it was for a U.S. citizen to transfer jobs between two states. In actuality the European Union experienced an extremely low degree of internal mobility across its countries. This also bears implications for the impact of outside immigrants on the economies of EU countries. If EU natives are not very mobile across countries, the consequences (positive or negative) of immigration from outside the EU will be concentrated on those countries that receive the largest number of immigrants, rather than spread to all the EU-15 countries through internal mobility.

The rest of the paper is organized as follows. Section 2 uses U.S. Census data and European LFS data to measure the overall size and the recent trends of migrations to the EU-15 (and some of its largest members) and to the U.S. (and some of its largest states). Section 3 compares the internal mobility of workers among EU15 countries and U.S. states. Section 4 analyzes the skill distribution of immigrants, again comparing the EU-15 and the U.S. Section 5 develops the idea that the U.S. has been particularly successful in attracting foreign “talent” from the rest of the world, including Europe, while the EU has been comparatively unsuccessful. Section 6 concludes the paper summarizing some facts and lessons learned from the analyzed statistics.

2. Total Immigration and foreign-born workers during the nineties

2.1 Immigration into the EU and the USA

¹¹ Germany and Italy do not record the place of birth of their residents. As a consequence we will be using the nationality of individuals (rather than their place of birth) for these two countries in order to distinguish between nationals and foreigners.

From an historical perspective, the European Union has only recently become a target of immigration, while the U.S. has a long tradition of large migratory inflows materializing over several immigration waves along its history. As a consequence of its alternating periods of high and low migration, only in recent decades (notably the eighties and the nineties), the U.S. has regained its role as the primary destination for large masses of migrants¹², mainly from East Asia and Latin America. At the same time the European Union has emerged as the destination of choice for those seeking better economic alternatives from Eastern Europe and North Africa. Both economies had therefore experienced a rising inflow of foreigners during the nineties; as such it is useful to compare the magnitudes (in levels and flows) of foreign born workers of the two economies. Such an exercise would put in some perspective the absolute and relative magnitudes of these flows and help us understand whether the recent and growing “fear” of diversity in Europe is justified when looking at the phenomenon with an “American” perspective. Tables 1 and 2 contain some summary statistics that capture the presence of foreign born people in the population and labor force of the U.S. and EU at the beginning and end of the nineties. Due to limited availability of comparable data we consider 1992 as the earliest year for European data and 1999 as the latest year. This choice allows us to use very accurate and detailed statistics from the European Labor Force Survey¹³. Table 1 reports the aggregate values of foreign-born residents for the EU-12, EU-15 and for the five largest economies within the EU (Germany, France, UK, Italy and Spain) which, together, count for more than 80% of the EU-15 population, labor force and GDP. Table 2 reports aggregate values for the U.S. economy and for each of its five largest states (which happens to be those that also attract the largest percentage of immigrants). These data are obtained from the U.S. Census of Population held in 1990 and 2000. Some of the aggregate summary statistics are available from the U.S. Bureau of Census, while others have been calculated using the Integrated Public Use Micro data Samples (Minnesota Population Center, IPUMS, <http://www.ipums.org>.) This section

¹² The percentage of foreign-born residents in the US at the peak of the era of mass-migrations from Europe, in 1910, was equal to 14% of the population. As of year 2004 such percentage was still unmatched as the percentage of migrants was only slightly above 13% of the population.

¹³ I am very grateful to Adriana Kugler and Joshua Angrist for providing to me their dataset covering information on nationality, country of birth, sex, working status, education and country of residence for a representative sample of the EU-15 labor force (from the European Labor Force Survey). The data used here are the same used in Angrist and Kugler (2003) and are described in detail in that article.

compares the aggregate European and American economies, while the next section compares some general features of immigration between particular EU countries and U.S. States.

For the EU-12 as a whole, the presence of immigrant workers (born outside EU-15) increased from 4.1% of the labor force in 1992 to 4.9% in 1999. The corresponding percentages for the U.S. were 9.3% in 1990 and 12.4% in 2000. While both economies experienced an increase in the share of foreign born workers, the levels and growth rates of foreign born residents for the U.S. were larger than for the EU-12. In particular the percentage of foreign born workers in the EU-12 labor force (very similar to the percentage of foreign-born workers in the EU-15) in 1999 was roughly equal to the percentage of foreign-born individuals in the U.S. labor force in 1970 (5.0%). Even if the EU were to attract immigrants at the rates the U.S. experienced in recent decades (which, as we document below, was much higher than its current rate of attraction of immigrants) it would still take thirty years to reach the level of immigrant presence currently found in the US. Therefore, as of 1999, the European Union hosts a percentage of foreign-born workers which was roughly one third the percentage of foreign workers in the U.S. labor force.

Moreover, as shown by the rates of immigration reported in Table 3, the rate of growth of the foreign-born population during the nineties has been faster in the U.S. (+0.45% a year) than in Europe (+0.14% a year), thereby increasing the gap between the presence of foreign-born workers in the two economies. The European Union is still very far from attracting and integrating the number of immigrants that the U.S. economy has. In terms of absolute numbers, from the first row of Table 3 we see that each year, during the nineties, the US economy absorbed more than a million and one hundred thousands foreign-workers, while the EU economy, which had roughly the same size (in GDP with an even larger labor force) absorbed less than one third that number, close to four hundred thousands immigrants per year. The costs and the opportunities of foreign workers (and their skills) to the economies of the U.S. and the EU are apparently still very different, both in levels and in growth rates.

2.2 Immigration into some large economies within the EU(Germany, France, UK, Italy, Spain) and the US (California, New York, Texas, Florida, Illinois)

The aggregate economic market represented by the EU-12 or EU-15 may not be an informative unit of analysis. It is possible that, within it, only a few countries receive very high numbers of immigrants from outside the EU (relative to those received by the U.S.) while others are completely isolated from immigration. We focus here on the five largest economies in the EU (whose data, for 1992 and 1999, are reported in table 1) and compare them with the five largest U.S. states (whose data, for 1990 and 2000, are reported in table 2). Notice that the five largest EU countries are significantly larger (in size of their labor force) than the five largest U.S. states. As a percentage of the total labor force, the top five EU economies account for more than 80% of the total EU labor force, while the top 5 U.S. states account for only 35% of it. If we think that larger economies are more “closed” than smaller ones, including in term of migrant flows, this difference in size could artificially result in lower percentages of foreign born in the considered EU countries. This however does not seem to be the case; both within Europe (France, UK and Germany) and within the U.S. (California and New York) the larger economies are those with a larger percentage of foreign born. Three facts emerge with striking evidence from a comparison of the two tables:

- 1) Not only does the U.S. economy attract more foreign born on average, but its largest state economies are the main attractors of foreigners. All five of the largest states, which have enjoyed very strong growth performances during the nineties, and which contain several of the most important metropolitan areas of the country (Los Angeles, New York, Chicago), have a percentage of foreign-born larger than the national average. California and New York, the largest poles of attraction for immigrants, have a percentage of foreign born in the year 2000 two to three times the average U.S. percentage. Contrastingly some large European economies (such as Italy and Spain) are still hardly affected by immigration, while even France, the major attractor of immigrants among large economies, had a percentage of foreign born in 1999 only 3% higher than the EU-15 average.

- 2) No large country in Europe experienced an increase in the share of foreign-born *larger than 1.1%* of the total labor force during the 1992-1999 period. No large U.S. state experienced an increase in the foreign labor force *smaller than 4%* in the 1990-2000 period. Again, both in the levels of foreign-born and in their inflows, large U.S. states experienced much more immigration than any large European country during the nineties.
- 3) No large European country (indeed, according to Table 1 in Munz, 2004, no EU-15 country besides Luxembourg) had in the year 2000 a percentage of its population (and labor force) born outside the EU-15 as large as the average percentage of foreign-born in the U.S. population. The highest percentage of foreign born, achieved in Austria, was only 10% of its population. Both for individual European countries and for the EU as a whole, the levels (and growth rates) of “diversity” in their populations and labor-forces remain far from what is typical in the U.S. An economy such as California, comparable in size to a large European country, has a percentage of foreign-born residents four times larger than that of France’s and thirty times larger than that of Italy’s.

3. Internal Mobility during the Nineties

Having established that the U.S. (in general and its larger states in particular) attract and integrate a vastly larger percentage of foreign born residents into their economy, let us now consider another crucial aspect of mobility, namely “internal” mobility. The fact that Americans or Europeans are mobile within the boundaries of the U.S. or the EU has important consequences on the impact of immigrants on these economies and is an important feature of their labor markets. If the native labor force is very mobile (as turns out to be the case for Americans) then the (positive and negative) effects of immigration would be in part diffused over time to all states even if immigrants concentrate in just a few states¹⁴. Mobility of labor, as pointed out by Mundell (1961) in his analysis of optimal currency areas, can be a way to absorb (or arbitrage away) asymmetric shocks, such as uneven immigration flows, within an economy. On the other

¹⁴ This point has been made several times by Borjas, Freeman and Katz (1997) and Borjas (2003) among others.

hand, if the labor force is not very mobile, national labor markets are segmented and the effects of immigration are bound to be concentrated in the receiving countries or regions. The present section measures the extent of internal mobility of the population and labor force within the U.S. and EU.

Table 4 shows two measures of long-run mobility across countries in Europe and then details it for the five largest countries. The values presented in the first, third and fifth columns of Table 4 are the percentages of individuals in the labor force who reside in one of the EU-12 country that is different from their EU-12 country of birth. The second, fourth and sixth columns report the percentage of individuals in the population of EU-12 states born in a different EU-12 state. The percentages are similar for population and labor force and they increase by a modest 0.3% in seven years, from 2.2% in 1992 to 2.5% in 1999. Looking at single EU economies, France, which attracted the largest share of EU citizens born in a different country, had a mere 3.5% of non-French Europeans in 1999. Italy and Spain confirm their small power of attraction even for EU citizens, counting less than 1% of foreign Europeans among their residents. The contrast between the EU and the U.S. economies is stunning. In the average U.S. state one third (30-33%) of the labor force and population in the year 2000 was made up of individuals born in a different state. This percentage decreased somewhat from 35% in 1990, although the decreased “out of state” presence was probably offset by the increased share of immigrants. Let me emphasize, however, that some US states are “open” labor markets to an extent positively alien to EU countries. More than half of Florida’s population in the year 2000 was born outside the state. As we will see not even sub-national regions in Europe have such a degree of openness within their labor markets.

To confirm this emerging picture of the U.S. as an economy with a very high internal mobility of labor and the EU as an economy with rather segmented national and regional labor markets, we also calculate (not reported in the table) a few other statistics. First, to consider geographical units larger than states in the U.S. we have considered the nine census regions¹⁵ and measured mobility as the percentage of people residing in a region and born in a different one. This percentage was 26% in the year 2000 (25% in

¹⁵ Each Census region is a group of states, the nine regions are: New England, Middle Atlantic, East North Central, West North Central, East Atlantic, east South Central, West South Central, Mountain, and Pacific.

year 1990), somewhat lower than for states (as regions are much larger units) but still ten times larger than for EU countries. Finally from the OECD we know the percentage of the population in the U.S. that moves between states each year, which was 3% in the year 2000. Such a measure of short-run mobility should be compared with the mobility of Europeans across countries and across regions within a country. Existing estimates for the early nineties from Obstfeld and Peri (1998) and DeGrauwe and Vanhaverbeke (1993) put the yearly mobility across regions within a country at 0.2-0.5% of the population each year for Italy, Germany and the UK, while the mobility across EU countries is lower still at 0.1-0.2% per year. Given their extremely small size, cross-country or within-country labor movements in the EU are unlikely to “arbitrage away” any asymmetric shocks, including those caused by immigration. So far, however, as we showed in the previous section, the inflow of immigrants has also been much smaller for the EU. Interestingly, European countries that have been more prone to immigrant-inflows from outside the EU (France and Germany) have also attracted a higher percentage of outside Europeans, while relatively closed countries (such as Italy and Spain) have attracted lower percentage of both immigrants and Europeans. Not so for the large U.S. states we considered above, where there does not seem to be any correlation between attracting foreign-born and attracting U.S.-born from other states.

4. Skill Distribution of Foreign-Born People

Having established the much larger ability of the US economy, relative to the European Union, to attract foreign-born residents, let us analyze the skill composition of each. It is crucial to discern the skills foreigners bring in order to evaluate their impact on the local economy. In this section we concentrate on just one (but most prominent) aspect of skill-acquisition, namely the schooling of immigrants, and we compare the distribution of education for foreign-born in the labor force between the U.S. and the EU. In the next section we concentrate on the segment of foreign residents that are highly educated, and try to emphasize their quality and their contributions to the U.S. economy.

4.1 The V-shaped Distribution of Skills Among Immigrants

In spite of the large differences in absolute values, Table 6 reveals a commonality in the relative skill composition of foreign born in the U.S. and EU. Considering the first two rows of the table we can see that, both in the early nineties and at the end of the nineties, the “central” skill group of high school graduates is under-represented among immigrants, while the two extreme groups (high school dropouts and college graduates) are over-represented. Considering, for instance, the U.S. in the year 2000, the average share of foreign-born residents was 12.4% of the labor force overall, but as many as 26% of high school dropouts and 12.5% of college graduates were foreign born, while only 8.6% of high-school graduates were foreign born. The corresponding numbers for Europe (EU-12) in 1999 were 5.1% of foreigners in the group of high school dropouts, 3.5% in the group of high school graduates and 5.3% in the group of college graduates. Apparently, Europe was disproportionately drawing immigrants in the same two skill groups as the U.S. (low and high schooling, with a lower percentage of intermediate schooling levels) and, according to the aggregate numbers, was attracting relatively greater percentages of highly educated workers than the U.S. In the U.S. the share of foreigners among college graduates was only 0.1% larger than the average share of foreign born in the labor force, while in the EU it was 0.4% larger. Before showing, however, how the composition of the group of high-skilled workers differs between Europe and the U.S., three qualifications should already dampen the “good news” for the European economy. First, between 1990 and 2000 the growth of high skilled (college educated) migrants was faster in the U.S. than in Europe (both in absolute terms and relative to the increase in foreign born overall). The share of college educated foreigners grew 3.1 percentage points in the U.S. (in line with the 3.1% increase of the overall foreign born share in the labor force) while in Europe it only grew by 0.4% (against a 0.8% growth of the share of foreign born overall). Second while the foreign labor force of all the large U.S. states reproduce the “V”-shaped skill distribution (low in the middle skills and higher at the extremes), Germany, the largest EU economy, clearly attracts mostly low skilled workers with a significant under-representation of both medium and high skilled workers. Thirdly, and perhaps most importantly, we need to keep into account that the skill distribution of natives was quite different between Europe and the

U.S. in the year 2000. For the U.S. the group with intermediate skills (high-school graduates) was by far the largest of the three, about 60% of the U.S. labor force, while high school dropouts and college graduates were respectively 15% and 25% of the labor force. Therefore the flow of immigrants was relatively abundant for the skilled group where native workers were relatively scarce (those who were high and low skilled) and relatively scarce for the groups where natives were relatively abundant (those who were intermediately skilled). This fact is likely to generate a positive response of immigration on overall average wages through basic complementarity effects. To the contrary in the EU-12 the largest skill group (still in year 1999) was that of the low skilled (45% of the labor force) followed by the intermediately skilled (40%) and then by the high skilled (15%). Given such a distribution of native skills the relatively high inflow of the low skilled among immigrants is likely to harm the local economy (as substitution effects prevail on complementarities) more than benefit it.

4.2 Internal mobility of native skills

We have already discussed the much larger levels of inter-state mobility of U.S. residents relative to the inter-country mobility of EU residents. As we are analyzing the skill composition of immigrants and native workers, however, it is very interesting to briefly describe the mobility of people by their skill group. After all, the impact of immigration on the wage of a skill group within a region of high immigration is likely to depend on the internal mobility of that group. It is commonly believed that the more educated have greater mobility than the less educated: professionals move where their best opportunities are; further their cost of moving about should be smaller as they can afford the appurtenances of travel (cell-phones, laptops, video-conferencing devices, etc.). An economy in which the highly educated are attracted to regions of economic opportunity (and are therefore less tied to their place of birth) is an economy that should achieve a more efficient allocation of talents to appropriate jobs. For instance, if an individual was a computer engineer during the nineties, she would have found her best job opportunities in Palo Alto, CA, Austin, TX or San Diego, CA, regardless of her place of birth. Alternatively a person with a master degree in design would have found in New York an ideal job market, while someone with a graduate degree in hotel management

would have found in Las Vegas extremely attractive opportunities. Consistent with this notion, the relatively efficient labor market of the U.S. generates the highest mobility rates for college educated workers. In the year 2000, 43% of college graduates worked in a state different from their state of birth, versus 32% of high school graduates and 20% of high school dropouts. Highly skilled workers in the U.S. are very much a “national” (as opposed to local) resource for the economy. To the contrary for the European Union, not only is overall worker mobility much smaller (only 2.5% of the labor force lived in a country different from their country of birth in 1999) but, even more puzzling, college educated workers are less mobile than the average worker. Low skilled (high school dropouts) turn out to be the most mobile of all workers, with 2.7% of them living in a country different from the country of birth. That percentage is only 2.2% for college graduates and 1.7% for high school graduates. The immobility of the European labor force, and even more the immobility of its highly skilled professionals, are clear signs that labor markets in the E.U. countries are not integrated and that, probably, some of the most skilled and talented are not optimally allocated within the union. Apparently they are constrained, probably due to a combination of insider privilege, market rigidities and cultural barriers, within the boundaries of their country of birth.

The ineffectiveness of Europe in allocating and retaining (see section 5 below and EEAG, 2003) its highly skilled professionals or in attracting them from abroad (vis-à-vis the United States) is an important (and understudied) problem. We believe it is a symptom of the inadequate incentives and rewards to talent in the European Union. We develop in the next and last sections this theme, hoping to spark more interest for research on this theme both in Europe and in the U.S.

5. “Talent”

5.1 Measures of Foreign-Born “Talent” in the U.S. and EU.

While the literature on international migration and most of the literature on immigration into the U.S. focuses largely on unskilled migrants (Borjas 2003, Card 2001), I want to focus our attention on the international mobility of brains. I will use the EU-U.S. comparison to illustrate the very different abilities of the two economies to

attract what I call the “talent”, i.e. those people of the highest quality among the highly educated. Let me first emphasize that for advanced economies human talent may very well be one of the most important factors for growth and development. As scientific and technological progress is the recognized “engine of growth”¹⁶ in economies at the technological frontier (such as the U.S. and Europe), creative minds in the fields of science, engineering and technology have an incomparable role in advancing economic development and well being.

The great discoveries of the last century such as the invention of antibiotics, the mapping of the human genome, the invention of the vaccination against polio, the use of nuclear energy, the invention of plastics, and the creation of computers would have not been possible without the critical contribution of singular “talents” such as Alexander Fleming, Francis Crick, James Watson, Jonas Salk, Enrico Fermi, Leo Baekeland and Federico Faggin, respectively. I chose the above list of major breakthroughs almost randomly but I was not surprised in finding out that the last four of them took place in the United States, and three of them (the first controlled nuclear reaction achieved by Enrico Fermi, the first form of plastic produced by Leo Baekeland and the first microprocessor built by Federico Faggin) were the products of foreign-born talent working in the US¹⁷. This is simply anecdotal evidence, but it emphasizes the fact that even attracting very few extraordinary talents may have a scientific (and later economic) impact on very relevant dimensions. Let us turn, however, to more “objective” measures of foreign-born talent.

In Figure 1 we report the percentage of foreign-born individuals in each of six “skill” groups in the U.S. in the year 2000 (solid black line). While the first three groups are those reported in Table 6 (high school dropouts, high school graduates and college graduates), the last three groups try to identify those groups of workers with progressively higher “skills” and qualities. The fourth group identifies workers with a Masters or a Ph.D. degree, the fifth group identifies those with a Masters or Ph.D. working in science, management or engineering, and the last group are the U.S. based Nobel laureates in natural sciences during the preceding decade. Strikingly, both in 1990

¹⁶ This was recognized by economists since Solow (1956) and re-emphasized by the literature on endogenous growth that has followed Romer (1990).

¹⁷ The discovery of the polio vaccine by Jonas Salk also took place in the US. Jonas Salk was U.S. born but of Russian parents. I do not count DNA as a fully US-based discovery since Francis Crick was operating in Britain. The discovery of penicillin by Alexander Fleming took place in the U.K.

(not reported) and 2000, the foreign born are increasingly represented the higher is the quality of the skill group. While 12.5% of college graduates were foreign-born, 15.3% of the Masters-Ph.D.s and 20.1% of the Masters-PhDs working in science-management-engineering were of foreign origin. Finally a stunning 26% (one out of four) of the Nobel laureates in the sciences that worked in the U.S. (in the decade 1990-2000) were foreign-born¹⁸. The dashed line in Figure 1 represents the percentage of foreign-born in each group for the year 2000, were they distributed homogeneously across skills. While clearly the size of skill groups decreases as we move to the right, their relevance to economic productivity and growth (and even more to technological and scientific growth) increases dramatically. The U.S. has attracted, and continues to attract, a disproportionate fraction of the very highly educated, and among them, the very best brains seem to be even more over-represented¹⁹.

Since Table 6 showed the same “V” pattern for skills of immigrants within Europe, we try to refine the breakdown of highly educated workers for the EU-12 as well in order to paint a clearer picture of the foreign-born citizens in the high end of the skill distribution. While we could not find the overall share of those with a Masters or a Ph.D. born outside the EU-12, we could construct, from national data reported in European Commission (2003), the share of foreign born among the individuals with doctoral degrees operating in the fields of science or engineering. We then calculated the percentage of EU-based, foreign-born Nobel laureates in the sciences. Figure 2 summarizes these percentages, including those of the first three groups (high school dropouts, high school graduates and college graduates). It is clear from the graph that the “V” shape of the distribution disappears: among the college-educated foreign-born workers, the European Union does not seem to attract the “highest quality” ones. The percentage of foreign-born Ph.D. holders in science and technology is a paltry 4.1%, and no Nobel laureate (1990-2000) among those operating in the EU was of foreign origin. While this evidence is preliminary at best it seems to reveal that Europe, in spite of attracting a large share of college-educated immigrants, is not able to select the most

¹⁸ The data for Nobel laureates, their place of birth and their affiliation were found at the official website of the Nobel Foundation: <http://nobelprize.org/nobel/>.

¹⁹ We calculated the distribution of foreign-born by skills also for year 1990 and the shape is the same (at lower overall percentage levels).

talented ones among them. To the contrary, some recent studies (Saint Paul 2004, EEAG 2003) have argued that the EU is losing some of its best talent to the U.S. In the next two sections we consider the magnitude of flows of college educated workers between the EU and the U.S., and the quality of European talent working in the U.S.

5.2 U.S. and EU: Brain Drain or Brain Exchange?

So far we have established that, while the EU12 and the U.S. both seem to have the ability to attract foreign-born college graduates in higher proportion than the average foreign-born, the United States seem to have the ability to attract, among them, the most educated (those with post-graduate degrees), those from the most competitive sectors (science, engineering, management) and, simply put, the most talented (those who end up making major contributions to science). Another indicator of a region's ability to attract high quality college graduates from the rest of the world is the ability of each of the two regions (the U.S. and EU) to attract college graduates from the other. Since the quality of undergraduate college education is high both in the U.S. and the EU, the ability to attract graduates from the competing economy is certainly a sign that the general potential to attract talented graduates is strong. Let me first present the absolute numbers. Given that the EU-12 and the U.S. are of comparable size in terms of labor force (see Table 1 and 2), a simple measure of the number of college graduates who moved to the other economy is informative. In 1992 the number of U.S.-born college graduates working in Europe (EU-12) was 72,330 units, while in 1999 it was 94,700. Conversely college graduates born in the EU-12 and working in the U.S. were 460,000 in 1990 and 643,700 in 2000. These are values five to six times larger than their American counterparts. There can be no doubt that these flows reveal a brain-drain from Europe to the U.S. and not a brain-exchange. During the nineties Europe had a net outflow of 176,300 graduates flocking to the U.S., while only 22,470 U.S. college graduates left the U.S. to work in Europe. In the year 2000 almost 2% of all college graduates working in the U.S. were born in a country of the EU-12. In Europe less than 0.02% of college graduates in the year 1999 were U.S.-born. Things, however, are even more asymmetric than these simple statistics reveal: as we will show, the college graduates from Europe are among those of highest quality, even for U.S. standards. Their loss is certainly a loss of talent for the European Union.

5.3 Quality of Highly Skilled Foreign-Born in the U.S.

It is extremely difficult to measure the contribution of talent to the economic well being and development of a country. As suggested in the previous section attracting some extremely talented individuals may have a very large reward, even if their number is small, because the externalities of major scientific innovations are enormous. We will not try to quantify such contributions. Our goal in this section, using data on wages and personal characteristics of the highly educated, is to give an idea of the unobserved quality of highly educated foreign-born workers in the U.S., especially those coming from the European Union and other developed (and less developed) economies. Adopting the assumption that wages reflect productivity, we select groups of progressively more educated workers in the U.S. labor force and, after controlling for observable characteristics of individuals (age, sex, race, marital status), we estimate the wage premium for people born in foreign countries using a “Mincerian” regression. We consider some specific locations as potential places of origin of “talented” professionals, namely the EU15 countries and Canada, as well as China and India, two large countries that experienced a significant siphoning of talent to the United States. The reference group is always U.S. born workers with the same observable characteristics. The natural interpretation of the wage premium for (say) an Indian born professionals is that it measures the average (unobserved) quality of an Indian relative to the average (unobserved) quality of a U.S. born person in the considered group. Table 7 reports the estimated coefficients for four different definitions of highly skilled workers and for four groups of foreign-born individuals. As in Figure 1, the groups considered are increasingly selective as we move to the right [of Table 7]. First we consider college-graduates, then holders of a post-graduate degree, then the interesting sub-group of *young* holders of a post-graduate degree (less than 45 years of age) and finally people with a graduate degree working in science, engineering or management. The coefficients (obtained from an individual Mincerian regression on individuals from the 2000 1% IPUMS sample) measure the wage premium for an individual born in a foreign economy relative to a U.S.-born worker with the same observable characteristics, in the specific skill group. For instance, if we consider the first column, we see that a EU-born college graduate earns a

17% higher weekly wage (19% higher yearly wage) than a U.S.-born college graduate with the same experience, race, sex and marital status. Our interpretation is that the productivity (quality) of the EU-born college educated working in the US in 2000 was 17-19% higher than that of the average US-born college graduate. Consistent with our previous evidence, we interpret this as yet another indication that the U.S. draws Europeans from the high end of the quality distribution, so that they end up being among the most skilled workers in the U.S. Moving down the column we observe that Canadian-born college graduates are also 19-22% more productive than U.S. college graduates. Even more surprisingly, given that the quality of college education is likely to be lower in China and India than in the U.S., the college graduates attracted from India and China are respectively 8% and 5% more productive than U.S.-born ones (and the difference is significant)²⁰. Let me also emphasize that if there are some unobservable “disadvantages” for foreign born workers in the U.S. labor market (lower tenure of their current job, discrimination, etc.) that we cannot control for, the reported coefficients actually under-estimate the quality differential of foreign-born over U.S.-born. Moving to the other columns we can observe that the wage premium for EU-born is also between 16 and 19 per cent for holders of a graduate degree (column 3 and 4) or for young holders of a graduate degree (column 5 and 6) or for holders of a graduate degree working in science, engineering or management. Similarly for Canadian-born the wage premium fluctuates between 17 and 22 per cent depending on the skill group, and for Indians it seems to increase from 7% to 12-16% as we move to more highly skilled groups (column 3-4 and then 7-8) and as we consider younger workers (column 5 and 6). Finally Chinese-born workers seem to be of slightly better quality than U.S. born in the groups of college-graduate and post-graduate degree holders. When we restrict our attention to post-graduates working in science, engineering or management the quality of Chinese-born professional is the same as that of U.S. born. All in all, not only does the U.S. economy seem able to attract a disproportionate number of highly skilled foreigners, but also,

²⁰ Notice that the sign and magnitude of the coefficients on the country of birth vary depending on the country. In general Latin American and African countries have slightly negative coefficients while other Asian countries have close to 0. Our main interest is to show that the U.S. attracts high quality talent from Europe as well as from some large and important countries experiencing emigration (such as China and India).

especially from the European Union, those people appear to be highly talented within their skill group, and certainly more talented than the average U.S.-born skilled worker.

6. Conclusion: More Differences than Similarities

While a superficial observer may consider the flows of immigrants into the European Union and the United States as the expression of a general tendency of migration out of less developed countries and into rich economies, a more careful look reveals several differences between the two economies. First of all the U.S. receives a much larger flow of immigrants (in absolute and relative terms) from the rest of the world than the EU and this difference has been, if anything, growing during the nineties. Second the United States complements these large inflows of immigrants with a very high internal mobility of its citizens. One third of the U.S. population move between states during their lifetimes in the pursuit of better jobs and opportunities, while less than 3% of the citizens of the European Union ever move at all. This internal mobility redistributes the effects of immigration within the U.S. economy much more than ever happens within the EU. While the international movement of masses in search of jobs has attracted the attention of researchers of migration, an interesting and economically relevant phenomenon has been growing during recent decades. Professionals, highly skilled engineers, managers, scientists and in general what we call “talent” are on the move internationally to take advantage of the best rewards offered to them, apparently irrespective of where they are offered. While the number of these internationally mobile individuals is only a fraction of the total number of unskilled workers, their economic importance is large and in some cases exceptional. The United States seems to emerge as a destination for these talents who, for whatever reason, do not seem particularly attracted to the European Union. The third relevant fact emerging from our analysis is that a significant flow of highly educated individuals took place during the 90’s between the EU and the U.S., with the U.S. at the receiving end. A preliminary analysis of their wages reveals that the highly skilled professionals, who are European-born and work in the United States, belong to the upper end of the quality distribution.

Since we do not analyze the particular determinants of migration, we can only speculate on the reasons for such a strong “brain-attraction” to the U.S. Still, they must

have something to do with differing structures of “rewards” to talent and human capital in Europe and in the US. The more compressed and egalitarian wage distribution of Europe penalizes in relative terms the highly skilled, professionals and talent in general, compared with the more disperse wage-structure in the US where successful professionals, scientists and managers can climb a very steep wage progression. If wages truly compensate for quality and productivity, only the most productive and best individuals would want to move from the European Union to the U.S. to take advantage of the upward earnings potential guaranteed by the U.S. wage structure (as illustrated in Borjas, 1987).

As for the consequences of this “brain-drain” from Europe (as the outflows are not replaced with inflows of talented individuals from the rest of the world) the fields of science, technology and engineering seem to pay the highest costs, as the United States maintains (and possibly increases) its lead over the European Union on new and economically important technologies (IT, Biotech). While immigration constitutes an exceptional opportunity for the European Union to reinvigorate and stimulate its economy, as things stand, it does not seem to be able to play the crucial role that it does in the United States, due to its much smaller scale and less favorable composition.

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Table and Figures

**Table 1: Foreign Born Residents of the EU
1992-1999**

Year:	1992			1996			1999		
Variable:	Total Labor Force ^a	% workers Born outside EU-15	% Population Born outside EU-15	Total Labor Force ^a	% workers Born outside EU-15	% Population Born outside EU-15	Total Labor Force ^a	% workers Born outside EU-15	% Population Born outside EU-15
EU-12	154,007	4.1%	3.9%	156,338	4.7%	4.4%	160,780	4.9%	4.7%
EU-15	n.a.	n.a.	N.A.	167,000	4.8%	4.6%	171,668	5.0%	4.8%
France	24,525	7.1%	7.2%	25,335	8.2%	8.2%	25,875	8.2%	8.3%
Spain	15,141	1.1%	1.0%	15,872	1.4%	1.1%	16,339	1.8%	1.4%
UK	28,556	5.4%	5.5%	28,514	5.3%	5.4%	29,127	5.7%	6.1%
Germany^b	38,994	5.1%	4.7%	39,082	6.1%	5.8%	39,595	6.1%	5.8%
Italy^b	22,769	0.6%	0.6%	22,787	0.3%	0.2%	23,346	0.8%	0.6%

a. In thousands

b. Data on place of birth are not available; therefore statistics are based on nationality of residents.

Source: Author's Calculation using the Extract of the European Labor Force Survey, (1992-1999) produced by Eurostat for Angrist and Kugler (2003).

**Table 2: Foreign Born Residents of the USA
1990, 2000**

Year:	1990			2000		
Variable:	Total Labor Force	% Labor force Born outside USA	% Population Born outside USA	Total Labor Force	% Labor force Born outside USA	% Population Born outside USA
USA^a	124,772,500	9.3%	7.9%	138,733,660	12.4%	11.0%
California	15,237,296	25.4%	21.7%	15,984,433	28.0%	26%
New York	8,969,551	18.2%	15.9%	9,037,552	23.1%	19.9%
Texas	8,270,447	10.5%	8.9%	9,929,292	15.7%	13.9%
Florida	6,269,753	15.1%	12.8%	7,469,356	19.2%	16.5%
Illinois	5,720,396	10.5%	8.4%	6,189,302	14.2%	12.4%

a. In thousands

Source: Author's Calculation on IPUMS 1990 and 2000, Minnesota Population Center, <http://www.ipums.org>

**Table 3: Immigration rates:
USA, (1990-2000) and EU (1992-1999)**

	USA (1990-2000)	EU-12 (1992-1999)	EU-15 (1996-1999)
Total Population beginning of the period	248,124	277,840	300,136
Average yearly inflow of Immigrants (thousands)	1,127	389	349
Average Yearly inflow as percentage of initial total population	0.45%	0.14%	0.11%
Average yearly growth rate of immigrant population	4.6%	3.2%	2.47%

Sources: Author's Calculation using the Extract of the European Labor Force Survey, (1992-1999) produced by Eurostat for Angrist and Kugler (2003) and the IPUMS 1990 and 2000, Minnesota Population Center, <http://www.ipums.org>.

Table 4: Internal Mobility in the EU

Year:	1992		1996		1999	
	Labor Force	Population	Labor Force	Population	Labor Force	Population
EU-12	2.2%	2.1%	2.2%	2.1%	2.5%	2.4%
EU-15	n.a.	n.a.	2.2%	2.0%	2.6%	2.4%
France	3.8%	3.9%	3.7%	3.7%	3.5%	3.6%
Spain	0.8%	0.7%	0.9%	0.8%	1.0%	0.9%
UK	2.2%	2.4%	2.1%	2.3%	2.2%	2.5%
Germany^a	2.8%	2.4%	2.8%	2.3%	2.7%	2.2%
Italy^a	0.2%	0.2%	0.1%	0.1%	0.2%	0.1%

b. The Data on place of birth are not available, therefore statistics are based on nationality of residents.

The Number in each cell represents the percentage of EU.-born labor force/population born in a EU country different from the country of Residence. The first two rows reports the average for the whole Union (EU-12 or EU-15) and each of the following lines reports the percentage of residents (labor force) of the specific country who were born in a different country of the EU.

Table 5: Internal Mobility in the USA

Year:	1990		2000	
	Labor Force	Population	Labor Force	Population
USA	35.3%	32.1%	33.6%	29.2%
California	36.2%	30.6%	28%	23.7%
New York	17.8%	16.6%	16.1%	14.5%
Texas	32.4%	26.1%	30.4%	24.1%
Florida	61.1%	56.6%	55.6%	50.6%
Illinois	25.7%	22.5%	23%	20.7%

The Number in each cell represents the percentage of U.S.-born labor force/population born in a US state different from the state of Residence. The first row reports the average for the whole US and each of the following lines reports the percentage of residents (labor force) of the specific state who were born in a different state.

**Table 6: Percentage of foreign born in each education group
1990-2000**

	Beginning of Nineties ^a (1990-1992)				End of Nineties ^b (1999-2000)			
	Overall	HSD	HSG	COG	Overall	HSD	HSG	COG
USA	9.3%	18.6%	6.1%	9.4%	12.4%	26%	8.6%	12.5%
EU-12	4.1%	4.1%	3.1%	4.9%	4.9%	5.1%	3.5%	5.3%
California	25.4%	55%	17.2%	19%	28%	57%	21%	25%
New York	18.2%	32%	14.7%	15.4%	23.1%	42%	18.5%	19%
Texas	10.5%	25.5%	5.8%	7.7%	15.7%	38%	9%	12.5%
France	7.1%	6.9%	6.5%	9.3%	8.2%	9.7%	5.9%	9.1%
Germany	5.1%	8.9%	2.8%	2.7%	6.1%	11%	3.5%	3.5%
UK	5.4%	6.8%	3.8%	8.2%	5.7%	7.2%	3.3%	7.3%

a: The data are relative to year 1992 for the EU countries and to 1990 for the USA.

b: The data are relative to year 1999 for the EU countries and to year 2000 for the US.

HSD: High school Dropouts

HSG: high School Graduates

COG: College Graduates

**Table 7
Wage differentials relative to US-born:
EU born and other Foreign-born in the US, 2000**

Origin	College Graduates		Post-Graduate Degrees		Young Post-Graduate Degrees		Post-Graduate Degree working in Engineering, Science, Management	
	Weekly Wage	Yearly Wage	Weekly Wage	Yearly Wage	Weekly Wage	Yearly Wage	Weekly Wage	Yearly Wage
EU-15 Born	0.17 (0.01)	0.19 (0.01)	0.17 (0.02)	0.18 (0.02)	0.16 (0.02)	0.17 (0.02)	0.18 (0.02)	0.19 (0.02)
Canada-Born	0.19 (0.02)	0.20 (0.02)	0.20 (0.03)	0.21 (0.03)	0.20 (0.04)	0.22 (0.04)	0.18 (0.04)	0.17 (0.04)
India-Born	0.08 (0.01)	0.074 (0.02)	0.12 (0.02)	0.15 (0.02)	0.13 (0.03)	0.16 (0.02)	0.12 (0.03)	0.11 (0.03)
China-Born	0.07 (0.01)	0.05 (0.02)	0.05 (0.02)	0.06 (0.02)	0.04 (0.02)	0.06 (0.02)	-0.01 (0.03)	0.01 (0.03)
Observations	307,103	307,103	108,933	108,933	55,632	55,632	36,825	36,825

The estimates are from individual regressions on IPUMS, Census 2000 data. The dependent variable is ln(wage) (using weekly or yearly wages). Each column is a separate regression. Each regression includes 5-years experience dummies, gender dummy, race dummy and marital status dummies. The reported value is the coefficient on a dummy that identifies the country of birth. Standard errors are reported in parenthesis.

Figure 1

Percentage of Foreign-Born by Skill Group in the USA, 2000

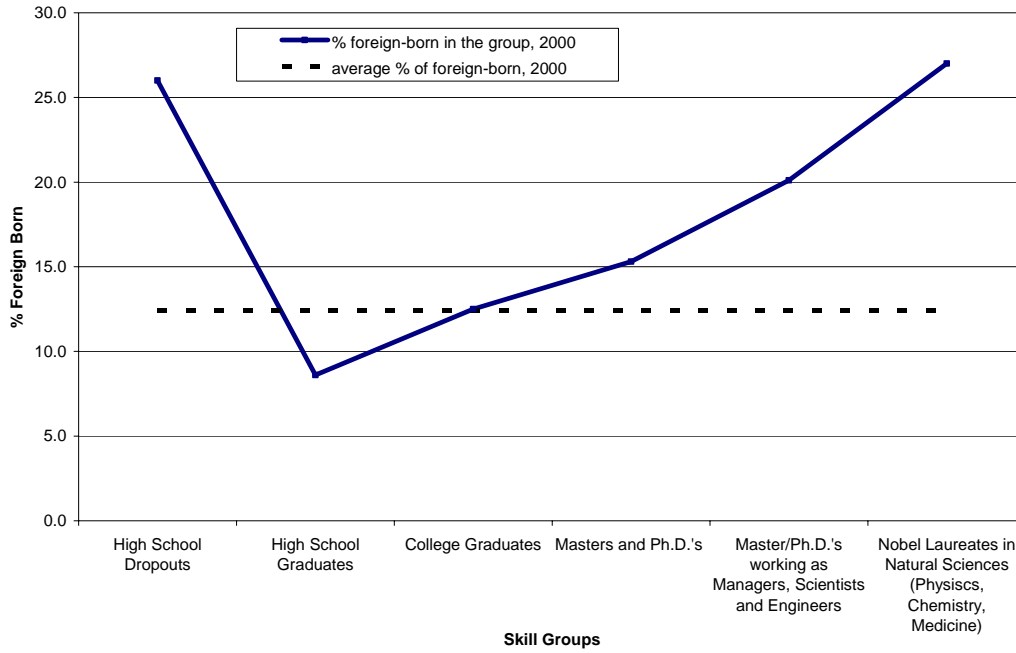


Figure 2

Percentage of Foreign-born by skill group in the EU-12, 1999

