

Foreign S&E Students in France and Germany

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SUMMARY	1
HUMAN CAPITAL	3
FOREIGN STUDENTS IN EUROPE	4
<i>Table 1 Foreign students in Europe 2001</i>	<i>5</i>
FRANCE AND GERMANY	7
ENTRY PROCEDURES	9
STUDY, WORK AND STAY	10
<i>Table 2 Employment of non-EU foreign students while studying</i>	<i>10</i>
RISING STUDENT NUMBERS.....	12
<i>Table 3 Foreign students in French universities by level of studies ("cycle"), 1998-2003.....</i>	<i>13</i>
<i>Table 4: Foreign students in France by origin, 2002-2004.....</i>	<i>13</i>
<i>Table 5 Foreign 1st year students ("educational foreigners") in Germany, 2001.....</i>	<i>15</i>
<i>Table 6 Foreign students by discipline, Germany, 2001.....</i>	<i>16</i>
<i>Table 7. Share of foreign students by discipline, France, 1998-2003.....</i>	<i>16</i>
<i>Table 8 Foreign students by discipline, France, 1980, 1990, 2001</i>	<i>18</i>
<i>Table 9 Foreign students by discipline and origin, France, 2001-2002 (%).....</i>	<i>18</i>
FUTURE SCENARIOS	19
<i>Table 10: French PhD candidates in the US, 1990-99</i>	<i>19</i>
<i>Table 12 French and foreign PhDs granted, 1995, 1998, 2001</i>	<i>20</i>
FOREIGN PROFESSIONALS	22
<i>Table 13. German Green Cards issued: August 2000-June 2003.....</i>	<i>22</i>
CONCLUSIONS	23
BIBLIOGRAPHY	24

Summary

The number of foreign students in the OECD countries doubled between 1980 and 2000 to almost 1.8 million, and one forecast projects the number to quadruple to 7 million by 2025.¹ However, there has been a sharp dip in the number of foreign applicants applying to graduate programs in science and engineering in the US since the September 11, 2001 terrorist attacks, and this slowdown, combined with (1) a belief that human capital, especially that embodied in scientists and engineers, and is a key to economic growth and competitiveness, and (2) the binding ceilings on some H-1B admissions and some employment-related immigrant visas, have led to predictions that the US is “losing its competitive edge” in a globalizing world.

This paper examines enrollment patterns and the employment of foreign students in Western Europe, a major economic competitor of the US. European countries in the past encouraged student mobility over borders for two major reasons, cultural exchange or mutual understanding and foreign aid. However, education for understanding and aid and have been supplanted by education for trade and a quest for brains or human capital, as universities seek revenues from (full) fee-paying foreign students and employers seek foreign graduates of local universities.

Nonimmigrant continental European nations have been latecomers to the education industry and using education as a side door to recruit immigrants. Most European universities are free or low-cost public institutions, and most countries made it difficult for even professional foreigners to settle and naturalize. Instead, governments have expressed fears of brain drains from developing countries to Europe, insisting that graduates from developing countries return to their countries of origin.

This paper explores foreign students in France and Germany to emphasize three major points. First, these countries are relative latecomers to the mercantilist theory that the key to economic competitiveness is human capital. This may be explained by different incentives: there are fewer institutions seeking fee-paying students, fewer university and other labs seeking low-cost research assistants because of more regulated labor markets, and fewer employers and labor brokers seeking to hire foreign professionals. Second, the EU and most EU member nations are following in the footsteps of the US, seeking more foreign students and allowing more foreign graduates of local universities to remain and work. However, foreign students in Europe remain mostly in language, culture, and social science disciplines, not in science and engineering.

Third, there is not yet a significant backlash against foreign students competing for scarce university slots or accused of holding down wages in science and engineering fields. There are several reasons for this, including the fact that is relatively cheap to create additional student slots in the non-science fields selected by most foreign

¹ Half of the foreign students in 2025 are projected to be Chinese and Indian; China and India are expected to account for 35 percent of the world's 7.9 billion residents in 2025 (Bohm et al, 2002).

students and that more rigid European labor markets may limit downward pressure on wages. However, there may be transatlantic convergence, with a native student backlash possible if limits on the number of students allowed to study a particular subject like medicine spread, and as labor market flexibility introduces more Europeans to post-docs and short-term contracts.

Human Capital

Human capital, the stock of knowledge embedded in people, is a key to economic growth. Human capital averages about two-thirds of the total value of the capital of most developed economies, which also includes land, machinery, and other physical assets. Its value is often apparent after physical destruction, as in World War II, when many of the German and Japanese cities that were bombed intensely were soon able to recover 80 to 90 percent of their previous levels of production because people with skills were able to reconstruct them.

Unlike financial and physical assets, human capital is embodied in people. Human capital was first discussed extensively by two Nobel Prize-winning economists, Theodore Schultz (who won the prize in 1979) and Gary Becker (1992). Their contributions explained how a personal decision to sacrifice earnings today for a higher return tomorrow could be analyzed in the same way that a business considers whether to buy new machinery. A nation's stock of human capital and thus its economic growth potential could be increased, they reasoned, if governments lowered the cost of schooling with subsidies while the opportunity cost of lost wages could be reduced with minimum working ages. More people would study as the reward for additional schooling rose with the shift toward a knowledge-based service economy.

The basic model of human capital acquisition compares the present value of the income streams from additional education followed by work with going to work immediately -- rational individuals compare the two earnings streams and choose the option that maximizes the present value of their lifetime earnings. The major costs of schooling are foregone earnings while studying plus tuition and fees (living costs have to be paid whether studying or working), and the benefits are generally higher earnings after graduation. The alternative to schooling is going to work immediately, so differences in wages by level of education as well as the timing of study and work are critical variables in determining how much schooling is optimal.²

Estimates of the private or personal rate of return to a college education range from 12 to 40 percent in most countries, which exceeds the return on most investments in stocks and bonds. The average rate of return to completing a primary school education was estimated to be 29 percent in the early 1990s, 18 percent for secondary schooling, and 20 percent for higher education (Psacharopoulos, 1994), but there was significant variance by region. In developing African countries, rates of return were 39, 19, and 20 percent, for primary, secondary, and higher education, while in the

² From a sociological perspective, extra education might also have non-monetary value. Holding a (particular) degree is sometimes associated with societal prestige and status.

OECD countries, rates of return were 22, 12, and 12 percent, respectively. The social rate of return may be even higher than these private rates if highly educated individuals also provide leadership and have on average more entrepreneurial spirit.

Education adds to the stock of human capital, which explains why practically all countries require children to go to school, make primary and elementary schooling “free,” and set minimum wages and restrict the ability of children to work, giving children (and their parents) reasons to stay in school. Political leaders recognize the value of education, and a key millennium development goal is to have primary school completion universal by 2015.³ Most countries also subsidize education beyond secondary schooling, so-called tertiary or higher education, to encourage young people to get as much education as possible.

Foreign Students in Europe

Continental Europe is a relative latecomer to the mercantilist theory that the key to competitiveness in a globalizing world is a nation’s stock of human capital. However, this theory is advancing rapidly in Europe, which helps to explain why more European nations are following the United States to allow the entry of more foreign students and to allow foreign graduates of local universities to remain and work.

Within the 25 member European Union (EU), there is a fundamental distinction between EU nationals and non-EU nationals, so that a German student in the Netherlands has different rights than a Russian student in the Netherlands. A cornerstone of the EU is freedom of movement, the freedom of EU nationals to seek non-government jobs throughout the EU on an equal basis with local workers. European Court of Justice decisions have made clear that EU nationals also have equal access to universities throughout the EU, which means they pay the same fees as local students although their EU host governments do not have to provide living allowances to non-national students (<http://europa.eu.int/eracareers>).

The EU encourages the mobility of students, with the ERASMUS program⁴ supporting over a million student exchanges between 1987 and 2002⁵ (OECD, 2004, 1.10), but most EU students who study in another EU country do so without ERASMUS support⁶. The countries with the largest foreign student “surpluses” are the UK and Ireland, which hosted almost two foreign students for each one they sent

³ According to the World Bank, only 37 of 155 developing countries have achieved universal primary school completion (www.developmentgoals.org/Education.htm). The Millennium Development Goals statement says: “Education is development. It creates choices and opportunities for people, reduces the twin burdens of poverty and diseases, and gives a stronger voice in society. For nations it creates a dynamic workforce and well-informed citizens able to compete and cooperate globally – opening doors to economic and social prosperity.”

⁴ Named for Erasmus of Rotterdam, a wandering student and philosopher who moved from one European center of learning to another in the late Middle Ages (Renaissance).

⁵ Exchange education programs-- Comenius for schools, Erasmus for higher education, Leonardo da Vinci for vocational training and Grundtvig for adult education—are considered some of the most successful EU programs. In July 2004, significant budget increases for them were announced, including a goal of having three million Erasmus students by 2011.

⁶ http://europa.eu.int/comm/education/programmes/socrates/erasmus/erasmus_en.html

abroad in 1997-98, while Finland and Italy sent almost two students abroad for each ERASMUS student they hosted⁷. ERASMUS also supports non-EU students. For example, the Mundus program will provide EUR 180 million to enable 4,200 non-EU students to study in EU countries for masters degrees.

This paper focuses on Germany and France, countries with about 44 percent of Europe's 857,000 foreign students in 2001. The UK has the most foreign students, about 226,000, followed by Germany and France.

Table 1 Foreign students in Europe 2001

Foreign students in Europe 2001

	Foreign students	Share of Eur total
Austria	31,682	4%
Belgium	38,150	4%
France	147,402	17%
Germany	199,132	23%
Italy	29,228	3%
Netherlands	16,589	2%
Spain	39,944	5%
Sweden	26,304	3%
Switzerland	27,765	3%
UK	225,722	26%
Big 3	572,256	67%
Top 10	781,918	91%
Total	856,733	
Europe		100%

Source: OECD, 2004, Table 3.2.

There is considerable variance in structure and governance of higher or tertiary education in Europe, which means that data on foreign students in Continental Europe must be interpreted with care. Some countries do not include with foreign students those enrolled in programs that last less than one year, such as exchange students who pay fees to institutions in their home countries as well as those enrolled in a branch of the home university that is located abroad. In countries such as France and Germany, analysts have to distinguish between students who hold foreign passports but who received their secondary schooling in the host country (they may be immigrants who grew up in the country and are referred to as "educational inlanders") and foreigners who entered the country for higher

⁷ Some 86,250 students participated in ERASMUS in 1997-98 (OECD, 2004, Table 3.1) The ratios of foreign students in and local students out are larger for all students—the UK in 2001 received 9 foreign students for each one that it sent abroad, Belgium 3.8 and Switzerland 3.5, while Italy sent 1.6 students abroad for each foreign student received (OECD, 2004, Table 3.4).

education, and whose legal stay in the country is linked to their student status, so-called “educational foreigners.” (Kuptsch, 2003).

These differences are apparent in Germany. During the winter semester of 2000/2001, some 187,000 foreign students were registered at German institutions of higher education, including a third who were graduates of German high schools or “educational inlanders” (Isserstedt/Schnitzer, 2002, p. 5). In France, a third of foreign students are also “educational inlanders,” meaning that they graduated from French secondary schools (Gisti, 2000, p. 5).

Germany offers “free” higher education to both domestic and foreign students, and France requires students to pay fees but does not charge foreigners more than domestic students⁸. In 2000 Germany spent about EUR 1.1 billion to subsidize the education in Germany of students from developing and transition countries, with 69 percent allocated for students who received their schooling outside Germany (educational foreigners). These foreign students were enrolled in a variety of subjects. Using OECD guidelines that exclude those studying languages, culture, arts and sports, the German subsidy for foreign students in developmentally useful fields was EUR 570 million, including 78 percent spent for newly arrived students with foreign nationalities (Kultusministerkonferenz, 2003, p. 26-29). The French government provides subsidies of about EUR 6,000 per student per year, both French and foreign (<http://www.edufrance.fr/en/a-etudier/etudes02-6.htm>).

France and Germany subsidize foreign students for reasons echoed by the European Commission: foreign students benefit from their learning in the EU and enrich the learning experience of EU students as well (EC, 2002, Explanatory memorandum, p.3). The OECD highlights the potential positive effects of foreign students on domestic markets for labor, goods and services (OECD, 2001, pp. 112, 113), noting that the foreigners can provide flexibility by studying at institutions or in fields with too few students, spotting new opportunities, and being more mobile after graduation. During the Cold War, foreign policy reasons justified subsidies for foreign students, and considerations of culture, development assistance, and history, such as links to former colonies, remain a reason to provide education subsidies to foreigners.⁹ Many governments assume that exposure to their country’s people and institutions will influence foreign students to think favorably about their former host country and lead to commercial links through the students’ demand for products

⁸ For a classification according to fee payment requirements of other, including non-European countries see OECD 2004, table 1.2, p. 26.

⁹ In a publication of 2004 that analyses the internationalization of higher education worldwide, the OECD distinguishes between four different approaches to cross-border post-secondary education: the *mutual understanding* approach that encompasses political, cultural, academic and development aid goals; the *capacity building* approach that encourages the use of post-secondary education as a quick way to build an emerging country’s capacities; the *revenue generating* approach that offers higher education services on a full-fee basis without public subsidies; and the *skilled migration* approach that emphasizes the recruitment of selected international students and tries to attract talented students to work the host country. The OECD study does not limit itself to the flow of students. It defines cross-border education as three-fold: persons going abroad for educational purposes (people mobility) – the category that we look at here; educational programmes going abroad (programme mobility) and institutions or providers investing abroad (institution mobility). Internationalisation and Trade in Higher Education – Opportunities and Challenges, OECD 2004.

from the host country. As former students rise in politics and business in their country of origin, they can foster political and business ties to the countries in which they studied.

Development policy considerations are also an important reason for encouraging students from developing countries to study in Europe. The return of students who studied abroad can provide development assistance by rapidly building up the local human capital stock in the country of origin.

The Cohen report, submitted to the French Ministries of National Education and Foreign Affairs in 2001, warned that neither competition with other countries nor development cooperation (“international solidarity”) should be the single goal of France’s educational policy (Cohen, 2001). In a similar vein, the German government proclaimed that in addition to a better position in the international “competition for brains,” increasing the number of foreign students would help spread the German language and culture and could accelerate development and European integration.

France and Germany

In January 2000, the French government announced that it would like to double the number of visas delivered to foreign students, with the Ministry of National Education expressing the hope that about 20 percent of the students in higher education in France would eventually come from abroad (Gisti, 2000, p. 5).¹⁰

Germany in the late 1990s embarked on an active policy of attracting foreign students as part of a package of measures designed to strengthen Germany’s economic competitiveness. Policy documents reflected a change in attitude, talking of “internationalizing studies in Germany” rather than simply “being international” in the study of science. In October 2000, representatives from business, academia and political parties launched a campaign to promote Germany as a center for science education (“*Konzertierte Aktion internationales Marketing für den Bildungs- und Forschungsstandort Deutschland*”)¹¹ (Isserstedt/Schnitzer, 2002, p. 11).

These official declarations were accompanied by expanded efforts to recruit foreign students, with official websites serving as a portal to higher education opportunities, including www.edufrance.fr/ for France or www.daad.de and <http://campus-germany.de/> for Germany. Most of these sites highlight the particular advantages of studying in the country. For example, the German government stresses Germany’s combination of old traditions and modern technologies as well as strengths in theory and their practical application (<http://campus-germany.de/english/1.5.35.html>). France advertises its tradition of non discrimination and emphasizes that no distinction is made between French and international students. “Under French law, the requirements for admission are the same, as are the degrees awarded. The

¹⁰ It is not clear whether this statement about the long-run referred to all students with a foreign passport or to only those who had done their schooling abroad.

¹¹ This initiative also included the establishment of offshore universities (e.g. the German University Cairo), an innovative move for Germany.

country that coined the phrase human rights rejects all forms of discrimination.” (<http://www.edufrance.fr/en/a-etudier/choisir02.htm>).

As non-English speaking countries, France and Germany help potential students with their applications. The French ministries of National Education and Foreign Affairs, together with the Ministry of Culture and Communication and the State Secretariat of Foreign Trade, established the *EduFrance Agency* with the task of promoting French higher education abroad (*Journal officiel de la République Française*, 22 November 1998). *EduFrance* organizes education fairs and has 40 offices worldwide that offer information and advice to potential students and help them with their applications to French institutions of higher learning.

The German Academic Exchange Service (DAAD) and the Conference of Deans (Hochschulrektorenkonferenz – HRK) founded the "Application Services for International Students (*uni-assist*)" which began operations at over 50 universities in May 2004. *Uni-assist* offers the opportunity to apply for admission to several universities with *one* set of documents, and pre-checks documents to ensure that they are complete before they are forwarded to universities, with applicants paying 50 Euros for the first application and 10 Euros for each additional application.¹² Since February 2005 *uni-assist* has also offered international applicants the option of submitting their applications online (<http://www.uni-assist.de/english/index.html>).

In addition to marketing their higher education systems and helping applicants, France and Germany have begun to “internationalize” and harmonize their curricula. Internationalization often means teaching in English, and France and Germany have created numerous new English-language programs that lead to bachelor and master degrees. Traditionally, German students worked toward a single degree (the equivalent of an MA or PhD) from their first day of admission, so introducing the BA degree represents a revolutionary change. In the winter semester 2000/2001 Germany had more than 280 BA and over 150 MA degree programs (<http://campus-germany.de/english/1.40.168.html>).

Academic harmonization has been accelerated by the 1999 Bologna Declaration (Mahroum, 2003, p. 4). Initially signed by 29 European Ministers of Education, the Bologna process counted 40 members following a 2003 ministerial meeting in Berlin (OECD, 2004, p. 96). The goal is to standardize higher education in Europe with a three-year bachelor's and a two-year master's degree. This 3-2 system should make participating universities more attractive to EU as well as non-EU foreign students, as one scenario imagines students getting a bachelor's degree in their country of citizenship and a master's in an English-language program in another participating European country, increasing their attractiveness to multinational employers.¹³

¹² The service is less expensive for EU nationals: 25 and 10 Euros respectively.

¹³ Burton Bollag, “European Higher Education Seeks a Common Currency,” *Chronicle of Higher Education*, September 26, 2003. *English-Language-Taught Degree Programmes in European Higher Education*, a book published in December 2002 by the Brussels-based Academic Cooperation Association, reported that 30 percent of the 1,500 institutions in 19 European countries offer English-language courses, most new since 1990.

Although questions of quality and accreditation have not been fully resolved, university systems in Austria, the Netherlands, and Norway are moving to the new 3-2 system, but there is strong resistance in Greece and Switzerland.

In countries such as Germany, some disciplines limit the number of students with quotas, such as medicine, and applicants are ranked by their scores on the comprehensive high-school exit exam, the Abitur. To ensure that foreign students can enroll in impacted fields of study, Germany reserves places for foreign students (www.daad.de), a clear indication of a determination to internationalize higher education despite drawing protests from German students not admitted.

Entry Procedures

Students from outside Europe (that is students from countries other than the European Economic Area¹⁴, plus Andorra, Monaco, San Marino, Switzerland and the Vatican) must obtain a visa to study in France. After the first year of study, visas are automatically renewed, provided the student is able to produce the required documentation. On *EduFrance's* website, students are warned that if they plan to complete two programs in succession (such as a program in French as a foreign language, followed by an academic program), admission to both programs should be obtained before applying for a visa so that the student's visa is valid for the entire duration of studies. Student visas cannot be extended in France.

All non-European students must obtain a residence permit, including those who can enter without visas. International students who intend to study in France for more than three months are required to see the local *préfecture* (government centre) within two months after their arrival to obtain a temporary residence permit showing their student status. This permit, valid until the expiration date of the applicant's passport or until the date of completion of the applicant's academic program, must be renewed annually.

In December 2005 the French Prime Minister announced measures that have the potential to act as a deterrent to foreign students. In addition to university selection procedures, foreign students must pass an additional test, which has drawn protests from the student network *animafac* (Effenterre, 2005, <http://www.animafac.net>). The additional test is part of the restrictive measures taken by the French government following riots that involved foreigners and foreign-born French citizens in Fall 2005 in Paris and other suburbs.

Students from outside the European Union who want to study in Germany must apply for a visa, although nationals of Australia, Canada, Honduras, Israel, Japan, Monaco, New Zealand, San Marino, Switzerland and the United States are excepted. Three types of visas exist for international students: (1) a language course visa which cannot be converted into a student visa and is valid only for the duration of the course; (2) a three-month visa for people who have not yet obtained university

¹⁴ The European Economic Area (EEA) comprises the countries of the European Union and Iceland, Liechtenstein and Norway.

admission that must be converted into a resident permit for students purposes at the office for foreigners' affairs after admission; and (3) the regular student visa, valid for one year and available when the foreigner provides proof of university admission and financial resources for the duration of study.

Study, Work and Stay

Both foreign and native students work while studying. Foreign students in France have the right to work up to 884 hours a year, 19.5 hours a week during the term and full time during vacations,¹⁵ if they hold a residency permit and are enrolled in an institution that participates in the student health plan of the French social security system (*Sécurité Sociale*).

Until January 1, 2005, foreign students in Germany could work up to 90 days a year without obtaining a work permit. Germany's new Immigration Act, effective January 1, 2005, made the "90 days per year" rule more flexible by allowing up to 180 half-days of work without a work permit.¹⁶ Under the new law, there are no limits on jobs at universities where the student is enrolled, serving as e.g. research assistants. In addition, the new law facilitates the entry and work of foreign students by creating a one-stop shop for students. If employment authorities agree, a work permit can be issued by the foreigners' authority with the residence permit.

Table 2 Employment of non-EU foreign students while studying

<i>European Union, 2000 - Employment regulations for students from third countries</i>	
Austria	employment not permitted
Belgium	up to 22 hours/week and during academic holidays
Denmark	during academic holidays; after 18 months residence: up to 15 hours/week
Finland	up to 20 hours/week and during academic holidays
France	half-time work permitted
Germany	up to 3 months; during holidays; other exceptions
Greece	employment not permitted
Ireland	employment not permitted
Italy	up to 20 hours/week for a max. total of 1,040 hours/year
Luxembourg	employment not permitted
Netherlands	up to 10 hours/week
Portugal	supplementary work permitted
Spain	employment not permitted
Sweden	during academic holidays
United Kingdom	up to 20 hours/week during term time and full time during vacations

Source: ICMPD, 2000, p.22

¹⁵ In 2003, the authorities delivered about 30,000 provisional work permits (Harfi, 2005).

¹⁶ In practice this was often allowed even before the introduction of the new rule. <http://www.daad.de/deutschland/en/2.2.1.17.html>

France and Germany traditionally required foreign students to depart upon graduation. This is changing, as European countries follow the approach of traditional immigration countries and treat students as probationary immigrants—if they can integrate sufficiently to graduate from local universities, they are increasingly allowed to stay and work.¹⁷ Liberalization of rules for staying came first for S & E students, with France in 1998 allowing foreign students with French IT degrees to change their status from student to worker without a test of the labor market to ensure that French or EU nationals were unavailable to fill the job.¹⁸ In 2002, this same rule of granting work permits without a test of the labor market was extended to students “presenting a technological and commercial interest to French enterprises.”¹⁹

Before 2005, foreign students in Germany could change their residence permit (*Aufenthaltsbewilligung*) for the purpose of studies into a permit primarily for employment if they were offered a job as a “scientifically qualified person.”²⁰ The 2005 immigration law formalized this practice by asserting that, if there is a “public interest” in the employment of a qualified foreigner, a residence permit may be issued for the purpose of employment in Germany (§ 18, IV AufenthG / Article 18, IV Residence Act). Foreign students may also benefit from a provision in the 2005 law allowing high-ranking academics, researchers and teachers to accept jobs without labor market or other tests. Foreign graduates of German universities may now stay one year after graduation to search for a job in Germany, rather than leaving within 90 days.

In addition to national policies allowing work during and after study, a European Union Council Directive (2003/109/EC) was adopted in November 2003 that governs the status of long-term foreign residents and thus affects foreign students and trainees.²¹ In many EU countries, legal non-EU migrants have the right to convert their temporary residence permit into a permanent or long-term resident status after a given period, usually five years, but legal foreign students have generally been excluded from this right to earned permanent status.²²

The European Commission in 2001 proposed that student years be taken into account automatically if they request permanent residence, but the 2003 Directive says that student years count only if the student subsequently acquires another resident status, that is, an individual cannot become a permanent resident just by studying in

¹⁷ For a detailed discussion see Kuptsch (2006).

¹⁸ See Ministerial circular DPM/DM 2-3/98/429 of 16 July 1998.

¹⁹ See Ministerial circular DPM/DMI 2 2002/25 of 15 January 2002.

²⁰ With the new Immigration Act, the previous five titles of residence were reduced to two, a short-term residence permit (*befristete Aufenthaltserlaubnis*) and a settlement permit (*unbefristete Niederlassungserlaubnis*).

²¹ Council Directive 2003/109/EC on the status of third-country nationals who are long-term residents, which went into force 23 January 2004 and EU Member States must comply by 23 January 2006 (Article 26).

²² See for example in France Ord. 45, art. 15, 12.

Europe.²³ However, under the 2003 EU directive, study years count half towards the five years needed for long-term residence status (article 4, point 2., sentence 2), so that a person who studied six years and changed status after graduation to worker would be able to apply for a long-term resident status after two years in her job, versus five years for a foreigner who entered with a degree from his country of origin.

France and Germany must comply with this directive. By January 2007, they will also have to implement the provisions of *Council Directive 2004/114/EC of 13 December 2004 on the conditions of admission of third-country nationals for the purposes of studies, pupil exchange, unremunerated training or voluntary service* that went into force in January 2005. The United Kingdom, Ireland and Denmark²⁴ are not bound by the directive.

The 2004 directive sets out general conditions for admission of foreign students, such as requiring valid travel documents, parental authorization for minors and health insurance. The student must not be a threat to public policy and security or public health and provide proof that s/he paid the fee for processing the application, if the Member State so requests (Article 6). Students must have been accepted by a higher education institution and provide evidence of sufficient resources, and must have the language skills necessary for the course of study (Article 7). Article 12 stipulates that a renewable residence permit shall be issued to the student for at least one year, except where the course duration is less than a year. This permit may be withdrawn if a student does not make acceptable progress in his/her studies or violates part-time work rules.

The directive anticipates that most foreign students will work part time, as explained in point (18) of the Directive's preamble, and Article 17 confers a right to work, in using the term 'entitlement': "Students shall be entitled to be employed and may be entitled to exercise self-employed economic activity" (point 1). However, this right to work is limited, with Article 17 also stating that the "situation of the labor market in the host Member State may be taken into account" in deciding whether to allow part-time work, and that work may be restricted during the first year of studies (point 3). Member States determine the maximum number of hours per week or days or months per year that foreign students can work, but this must be at least 10 hours a week or the equivalent (point 2); they can allow work for more than 10 hours a week, but not less.

Rising Student Numbers

The number of student visas issued by France doubled between 1997 and 2000 to 46,000, and then rose another 25 percent to 58,000 in 2001. In comparing students issued visas in 2000 and 2001, the *Groupe permanent du Haut conseil à l'intégration*

²³ For a comparison of the draft Directives with the final texts adopted see Kuptsch (2006).

²⁴ These countries did not take part in the adoption of the Directive and are not bound by it or subject to its application. See points (25) and (26) of the preamble to the Directive.

*chargé des statistiques*²⁵ found that about 13 percent more Asians and Africans and 24 percent more Maghreb nationals received student visas, while there were fewer EU foreign students (Groupe permanent, 2002). The Ministry of Foreign Affairs reported that over 180,400 persons with foreign passports were enrolled in French universities in 2003 (http://www.diplomatie.gouv.fr/education/etudiants_etrangers/).

Most of the recent growth in foreign students has been in “educational foreigners,” that is, foreigners who completed secondary school outside France. A 2004 analysis by the French Ministry for National Education, Higher Learning and Research found virtually all of the increase in foreign students between 1998 and 2003 is explained by an increase in foreign students who did not earn a French “baccalauréat.”

Table 3 Foreign students in French universities by level of studies (“cycle”), 1998-2003

	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	1998-2003 Change (%)	Share of change from ed fors (%)
1er cycle	43,047	46,576	51,182	58,182	64,055	68,460	59.0	96.3
2ème cycle	39,420	41,113	45,952	52,081	61,530	71,032	80.2	93.0
3ème cycle	39,723	41,844	44,079	49,299	54,909	61,231	54.1	97.0
TOTAL	122,190	129,533	141,700	159,562	180,494	200,723	64.3	95.0

Source: Ministère de l'éducation nationale, de l'enseignement supérieur et de la recherche, Note d'information 04.23, September 2004 (Teissier, Theulière & Tomasini), Table 2, p. 3, quoting MEN-SISE.

Most foreign students in France are from Africa, including 30 percent from the Maghreb countries and 21 percent from other African nations; only 14 percent came from other EU countries.

Table 4 Foreign students in France by origin, 2002-2004

Nationality	2002-2003	2003-2004	Share of group (2003-04) (in %)
European Union (15) of which:	Germany	5892	6521
	Italy	4095	4452
	Spain	3530	3778
	Belgium	2259	2570

²⁵ Permanent Group on Statistics of the High Council for Integration.

	United Kingdom	2585	2458	1,22
	Greece	2168	2189	1,09
	Portugal	2035	2153	1,07
	Luxembourg	1642	1747	0,87
Total European Union (15)		26976	28653	14,27
Other European countries of which:	Romania	3466	4419	2,20
	Poland	2871	3175	1,58
	Bulgaria	2599	2860	1,42
	Russia	2284	2561	1,28
	Switzerland	1208	1332	0,66
Total other European countries		18068	20571	10,25
Maghreb of which:	Morocco	28563	29044	14,47
	Algeria	17065	21672	10,80
	Tunisia	8253	9130	4,55
Total Maghreb		54987	61078	30,43
Other African countries of which:	Senegal	7324	8020	4,00
	Cameroon	4031	4552	2,27
	Côte D'Ivoire	3537	3726	1,86
	Madagascar	3256	3423	1,71
	Congo	2821	2868	1,43
	Gabon	2452	2654	1,32
	Benin	1868	2050	1,02
	Mauritius	1778	1990	0,99
	Togo	1434	1519	0,76
	Djibouti	1316	1498	0,75
	Mali	1374	1457	0,73
Total Other African countries		38604	41688	20,77
Middle East of which:	Lebanon	3871	4493	2,24
	Syria	1904	2233	1,11
	Turkey	1975	2066	1,03
	Iran	1314	1428	0,71
Total Middle East		10434	11725	5,84
Other Asian countries of which:	China	8774	11908	5,93
	Vietnam	2221	2877	1,43
	South Korea	1884	1965	0,98
	Japan	1717	1851	0,92
Total Other Asian countries		18479	23109	11,51
North America of which:	United States	2612	2700	1,35
	Canada	1238	1253	0,62
Total North America		3850	3953	1,97
South America of which:	Brazil	1551	1774	0,88
	Colombia	1577	1711	0,85
Total South America		5761	6362	3,17
Caribbean and Central	Mexico	1369	1425	0,71

America of which:			
Total Caribbean and Central America	2888	3075	1,53
Total Southern Pacific	298	359	0,18
Total	180494	200723	100

Source: calculations based on Teissier, Theulière and Tomasini, 2004.

The number of educational foreigners is also increasing in Germany; their number rose by 21 percent between 1997 and 2000, versus a 12.1 percent increase in educational inlanders (Isserstedt/Schnitzer, 2002, p. 9). Between 1993 and 2001, among first-year students there was a 103 percent increase in educational foreigners, a 17 percent increase in foreign students who received secondary schooling in Germany, and a 15 percent increase in German students. For all students, the increases were 65, 23 and -4 percent, respectively (Kultusministerkonferenz, 2003, p. 30). The sharpest increases in foreign students were from Central and Eastern Europe, 80 percent more between 1997 and 2000, Africa (23 percent more), and Asia (22 percent) (Isserstedt/Schnitzer, 2002, p. 5, 9).

Table 5 Foreign 1st year students (“educational foreigners”) in Germany, 2001

Rank	Country of origin	Number
1	China	6,180
2	France	3,225
3	Poland	3,208
4	Bulgaria	2,678
5	Spain	2,625
6	Russian Federation	2,504
7	United States	2,363
8	Italy	2,274
9	Austria	1,553
10	Ukraine	1,393
11	United Kingdom	1,203
12	Hungary	1,089
13	Romania	1,057
14	Czech Republic	1,049
15	Turkey	976
16	Morocco	968
17	India	902
18	Cameroon	813
19	Greece	754
20	Dem. Rep. of Korea	692

Source: Kultusministerkonferenz, 2003, p. 34.

France and Germany have received more foreign S & E students, but the share of foreign S & E students has been stable. Over half of the foreign students in Germany opted for disciplines such as language and culture studies, law, economics and social sciences and 35 percent were enrolled in science and engineering in 2001. In France, about 20 percent of the foreign students were in sciences.

Table 6 Foreign students by discipline, Germany, 2001

Foreign students by discipline, Germany, 2001		
1	languages and cultural sciences , incl. sports	27.6%
2	law, economics and social sciences	25.6%
3	engineering	18.3%
4	mathematics and natural sciences	16.9%
5	arts	4.8%
6	health	4.5%
7	agriculture, forestry, nutrition	1.8%

Source for Germany: Kultusministerkonferenz, 2003, p. 35.

The trends highlighted in the appendix show that the number of educational foreigners in German engineering, mathematics and natural sciences has been fairly stable (figures in the appendix). In absolute numbers, foreign students enrolled in languages and cultural sciences (sports are also included in this category) come first, before students in law, economics and social sciences. They are followed by students in engineering and then mathematics and natural sciences. The proportional increases are about the same for the categories “languages and cultural sciences” and “engineering” on the one hand, and for “law, economics and social sciences” and “mathematics and natural sciences” on the other hand.

In France, there has been a shift toward science and technology since 1999, but in both countries over half of the foreign students are in languages, arts, and social sciences. Only about 13 percent of all students in S&E were foreigners in 2004, whereas in economics, administration and the social sciences, there were close to 21 percent foreigners. However, there is an upward trend in foreign students in S & E fields.

Table 7 Share of foreign students by discipline, France, 1998-2003.

Table 7 Share of foreign students in various university disciplines in France, by level of study, 1998-2003.

Level	Discipline	1998-1999 (%)	1999-2000 (%)	2000-2001 (%)	2001-2002 (%)	2002-2003 (%)	2003-2004 (%)	Evolution (1998 to 2003; in points)
1^{er} cycle	Law	6,0	6,4	7,0	7,7	7,9	8,2	2,2
	Econ., admin. & social sc.	9,7	10,8	12,5	14,8	16,4	17,4	7,8
	Languages & cult. sc.	7,1	7,7	8,4	9,5	10,4	10,9	3,8
	Sciences, incl. sports	4,1	4,5	5,3	7,0	8,4	9,3	5,2
	Health	4,6	4,6	5,0	5,3	5,4	5,3	0,8
	Pharmaceutical sc.	5,5	6,1	6,5	8,1	8,1	7,9	2,4
	Technology Inst. (second.)	3,3	3,7	4,4	5,4	6,1	6,3	3,0
	Technology Inst (tertiary)	3,8	4,0	4,4	4,9	5,2	5,4	1,6
Total 1^{er} cycle		5,9	6,4	7,2	8,3	9,2	9,7	3,8
2^{ième} cycle	Law	9,0	9,9	10,6	11,9	13,2	14,1	5,2
	Econ., admin. & social sc.	10,6	11,4	13,0	15,4	17,6	20,1	9,5
	Languages & cult. sc.	8,5	8,8	9,7	10,8	12,3	13,4	4,9
	Sciences, incl. sports	5,7	6,1	6,9	8,5	10,1	12,0	6,2
	Health	9,6	8,5	9,4	7,8	8,6	9,5	-0,1
	Pharmaceutical sc.	3,9	3,5	3,1	3,5	4,1	4,2	0,4
Total 2^{ième} cycle		8,1	8,5	9,4	10,8	12,4	13,9	5,8
3^{ième} cycle	Law	15,0	16,0	16,9	18,6	19,8	21,2	6,3
	Econ., admin. & social sc.	20,7	22,6	23,3	25,8	27,1	29,2	8,5
	Languages & cult. sc.	24,8	25,1	24,6	25,3	25,8	27,2	2,4
	Sciences, incl. sports	19,1	18,9	19,8	22,3	25,3	26,4	7,3
	Health	18,6	18,9	18,8	20,5	22,3	23,6	5,1
	Pharmaceutical sc.	7,3	7,5	7,1	7,5	7,9	7,8	0,5
Total 3^{ième} cycle		19,3	19,8	20,0	21,8	23,4	24,8	5,5
Tous cycles	Law	8,4	9,2	9,9	11,2	12,0	12,8	4,4
	Econ., admin. & social sc.	11,7	12,8	14,4	16,8	18,7	20,7	9,0
	Languages & cult. sc.	9,4	9,9	10,6	11,8	12,8	13,7	4,4
	Sciences, incl. sports	6,8	7,2	8,0	10,0	11,8	13,2	6,4
	Health	11,9	12,1	12,5	13,0	13,9	14,4	2,5
	Pharmaceutical sc.	5,9	6,2	6,1	6,9	7,2	7,1	1,3
	Technology Inst. (tertiary)	3,8	4,0	4,4	4,9	5,2	5,4	1,6

All levels together	8,6	9,1	9,9	11,3	12,6	13,7	5,1
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Source: adapted from Harfi, 2005.

Table 8 shows that about 20 percent of foreign students were enrolled in science fields of study between 1980 and 2001, and table 9 shows that students from Maghreb countries are most likely to be enrolled in science courses.

Table 8 Foreign students by discipline, France, 1980, 1990, 2001

	1980	1990	2001
Law	11%	11%	12%
Economics	10%	10%	18%
Languages/cultural sciences	36%	34%	35%
Sciences	22%	22%	20%
Health	20%	17%	10%
Other	2%	2%	4%
Total	100%	100%	100%
Numbers	136,311	131,654	159,463

Source: Coulon & Paivandi, 2003, table 5, p. 16; quoting DPD (MEN).

Table 9 Foreign students by discipline and origin, France, 2001-2002 (%)

	Maghreb	Africa	Europe	Asia	Americas	all
Law	10	15	16	8	12	12
Economics	18	26	14	17	8	18
Lang./cult.	24	25	48	40	59	35
Sciences	29	21	13	18	14	21
Health	14	9	8	13	6	10
Other	6	5	2	3	1	4
Total	100	100	100	100	100	100

Source: adapted from Coulon & Paivandi, table 6, p. 16, 2003 ; quoting DPD.

The major story from the data is that the share of foreign students in science and engineering in France and Germany has been relatively stable. The number of foreign S&E students is rising, but not their share of foreign students in French and German universities. One reason may be that it is expensive to create additional study places in science and engineering fields, which is important in countries that charge no or low student fees.

Future Scenarios

France and Germany are worried that their best and brightest S & E students and researchers leave for overseas destinations, especially for the United States. Even though French and German government officials have visited their nationals employed in S & E jobs abroad, and lamented their “loss” to the country of origin,²⁶ neither France nor Germany has developed explicit policies that aim to restrict emigration or entice nationals with particular skills to return.

Surveys of young S & E professionals who emigrate normally cite a lack of career prospects created by the German university system. Under German law (Hochschulrahmengesetz or HRG), scientists in publicly sponsored research institutions such as universities, Max-Planck-, Leibniz- and Fraunhofer- institutes or Helmholtz-research centers are generally restricted to five-year contracts at one academic institution, regardless of their research productivity. This makes some 100,000 full-time researchers “gypsies,” moving from one institution to another, for the maximum term of 12 years at public institutions. Germany’s Federal Constitutional Court in 2004 declared this 12-year maximum unconstitutional, but the Federal Ministry for Education and Research planned to re-introduce a similar maximum tenure rule according to *Maintainbrains*, an initiative launched to improve working conditions for researchers in Germany (Müller and Ismail-Zadeh, 2005).

The French government in 2003 began to issue reports on France’s attractiveness to students and researchers, including foreigners (known as the work of the “Saraswati Group”) The first report (“Students and Researchers at the 2020 Horizon: International Mobility and the Attractiveness of France” – the Harfi Report), noted that there were 20,000 engineering students abroad, including 12,000 in internships. Some 7,000 PhD students were in the US, and many intended to stay.

Table 10 French PhD candidates in the US, 1990-99

	All PhDs		S&E PhDs	
	Intention to stay in US (%)	Project to stay in US (includes job offer) (%)	Intention to stay in US (%)	Project to stay in US (includes job offer) (%)
1990	44	32	25	16
1991	51	37	28	21
1992	54	36	31	20
1993	46	29	29	17
1994	58	34	51	30
1995	56	31	31	22
1996	57	37	35	20
1997	52	36	50	30

²⁶ About 10 percent of the 11,000 PhDs educated in German universities in 1998-99 were reported to have left for the United States (Vuilletet, 2005, p. 11).

1998	--	--	49	26
1999	--	--	49	32

Source: adapted from Harfi, 2005, table 17, p. 118, quoting Science and Engineering Indicators, 2000.

In France, more foreigners (educational foreigners and educational inlanders) than French nationals begin third level or graduate studies in the sciences, as shown in Figures 3, 4, and 5 in the appendix. However, many of the foreigners do not graduate—there are 10 French graduates for each six foreign graduates.

Table 11 Foreign students to French student degrees, by level of studies, 2001-2002

Cycle	Ratio all foreign students
1 ^{er} cycle	0,8
2 ^{ème} cycle	0,6
3 ^{ème} cycle	0,7
All levels	0,6

Source: adapted from Teissier, Theulière and Tomasini, 2004.

The gap between number of PhDs granted to French as compared to foreign students has become larger over time. Between 70 and 80 percent of the PhDs granted in the sciences in France go to French nationals.

Table 12 French and foreign PhDs granted, 1995, 1998, 2001

	1995		1998		2001	
	Number	Share (%)	Number	Share (%)	Number	Share (%)
Sciences	6,447	100	6,811	100	5,803	100
French	4,489	69.6	5,206	76.4	4,654	80.2
Foreigners	1,958	30.4	1,605	23.6	1,149	19.8
Social & culture. sc.	2,908	100	3,390	100	3,817	100
French	1,837	63.2	2,342	69.1	2,845	74.5
Foreigners	1,071	36.8	1,048	30.9	972	25.5
Total	9,355	100	10,201	100	9,620	100
French	6,326	67.6	7,548	74	9,620	78
Foreigners	3,029	32.4	2,653	26	7,499	22

Source: adapted from Harfi, 2005, quoting DEP, B3, MENSER.

A 2004 pilot study in selected German universities also points to higher drop out rates for foreign students as compared with German students, with half of the German students, but two-thirds of the foreign students, not completing degrees in their universities of first enrollment. (Heublein, Sommer, Weitz, 2004).

A 2003 report on the technological competitiveness of Germany, commissioned by the Federal Ministry for Education and Research, recognized problems in German S&E education. Since the late 1970s, it has been harder to attract mid-level technical professionals, and the IT boom may have increased the demand for but reduced the supply of university-level graduates in engineering, as some students shifted from classical engineering to IT. The report cautions that the “current slack in the labor market for engineers and IT specialists” (p. viii) should not obscure the need for the government to do more to attract young people to S & E education and careers, with foreign academics “particularly helpful” to fill any labor market gaps (Bundesministerium für Bildung und Forschung, 2003).

In response to questions about foreign students in Germany raised by parliamentarians, including the Liberal Party, the German government in 2002 (a coalition of Social Democrats and Greens) argued that the recruitment of foreign students was the responsibility of German universities, not the federal government. The government response also emphasized that Germany’s attractiveness to foreign students was often in language and cultural studies (Bundesregierung, 2002, p. 8), and the new government elected in September 2005 (a coalition of Christian Democrats-Christian Social Union and Social Democrats) has not announced new policies for foreign students.

France also expects the demand for S&E professionals to exceed supply, especially after the Saraswati Group observed a trend at graduate and post-graduate levels toward applied rather than pure research-oriented studies. The Group’s Harfi Report concludes that, if such trends continue, France’s research capabilities could be reduced.

As one of the options for countering future labor market gaps in S&E, the Group developed four scenarios to increase the number of foreign students in France. Under scenario one, the main objective would be to work on a positive image of France in the world so that by 2015 roughly one quarter of all students in France would come from abroad as compared to less than 13 percent today. The Group recognized that this approach might entail public reservations because the public bears most of the cost for education in France. Under scenario two, foreign students would be welcome in France but the country would also increasingly export its educational institutions so that foreigners would be exposed to France’s educational system without being on French territory; plus they might also pay fees overseas. The third scenario involves a smaller increase in foreign students -- about 30 percent more than currently -- and would likely result in proportionally more students from Asia and Latin America. The same smaller increase in numbers would also be sought under the final fourth scenario. However, besides general promotional measures and some offshoring of

French institutions for higher learning, the government would also try to influence the characteristics of foreign students in the country, including country of origin, subject studied, etc. (Harfi, 2005, pp. 245-249).

The Harfi Report is the first result of the Saraswati Group's work; policy choices are likely to be at a later stage and take into account the findings of other reports as well.

The "brain drain" is a concern in France and Germany, but it has so far mostly resulted in studies that attempt to identify where France and Germany stand in terms of research and technology and speculate about the future. In both countries, there is discussion of recruiting foreign students to eventually fill S&E labor market gaps, but few concrete policies. At the EU level, policies are evolving that allow foreign student graduates of local universities to work while studying and to stay if they find jobs after graduation.

Foreign Professionals

Instead of allowing foreign student graduates of local universities to remain if they find jobs, countries can simply import foreign professionals desired by employers, as the US does via the H-1B program. The most discussed similar program in continental Europe is Germany's "green card" program, approved in response to employer assertions that there was a shortage of 75,000 IT workers.

The German green card program, launched in August 2000, made up to 20,000 five-year work permits available to non-EU nationals coming to Germany to work as computer specialists.²⁷ The admissions process was simplified, allowing foreigners to register their qualifications on the internet so that German employers can search there for needed workers or name the specific individuals they want to hire.

Fewer green cards were issued than expected--fewer than 15,000 in the first three years of the program. About 85 percent went to non-EU foreigners who were abroad (rather than foreign students graduating from German institutions), and 83 percent of the green card holders were admitted on the basis of having a university degree in computer science. Lacking an IT degree, non-EU foreigners could be admitted if their German employers pay them at least EUR 51,000 a year. About a fourth of those admitted were from India, another quarter from Eastern Europe, and an eighth from the ex-USSR.

Table 13 German Green Cards issued: August 2000-June 2003

**German Green Cards issued: August 2000-
June 2003**

	Total	From Abroad	Uni Degree	Per Dist
Others	4,248	3,109	3,514	29%
India	3,771	3,574	2,771	26%
Ex-USSR	1,851	1,680	1,697	13%
Romania	1,033	971	954	7%

²⁷ Many have observed that the German green card program is unlike the US immigrant visa, which is also known colloquially as a green card; in US terminology, the German green card is a nonimmigrant visa entitling a foreigner to remain in Germany for a specific time and purpose.

Czech /Slovakia	974	935	809	7%
Ex-Yugoslavia	746	632	647	5%
Hungary	503	467	425	3%
North Africa	430	150	404	3%
Bulgaria	419	351	378	3%
S America	384	314	298	3%
Pakistan	207	169	185	1%
Total	14,566	12,352	12,082	100%

Source: German Labor Ministry

The green card program arose from the failed effort of the SPD-Green government elected in September 1998 to change German naturalization policy from one of the most restrictive in Europe to one of the most liberal. Under the government's original plan, foreigners who became naturalized Germans could have routinely retained their original nationality. The opposition CDU-CSU parties in February 1999 won a state election in Hesse by opposing routine dual nationality (they argued it would give dual or double benefits for foreigners), and the naturalization compromise eventually adopted allowed children born to legal foreign residents of Germany to be considered dual nationals until age 23, when they normally lose German citizenship unless they give up their old citizenship.

When the IT industry asked for non-EU foreign professionals, the SPD-Green government saw a way to refocus the immigration debate on the benefits of immigration. There was some opposition to the green card program within the government,²⁸ and the opposition CDU based its May 2000 campaign in a state election in North Rhine-Westphalia on opposition to the green card proposal, using the slogan "Kinder statt Inder" (children instead of Indians) to argue that Germans should have more children and train them instead of importing workers from India. This campaign failed, and the green card program went into effect, but did not lead to a comprehensive immigration law at the time.

Conclusions

The increased mobility of students enables human capital to flow more easily over national borders. The developed countries have most of the world's human capital, as measured by years of postsecondary schooling. The rising number of students from developing countries in industrial countries promises more concentration of the world's human capital inside their borders, which could increase the knowledge gap that is mirrored in the division of economic wealth between countries.

Continental Europe is a relative latecomer to the mercantilist theory that the key to competitiveness in a globalizing world is a nation's stock of human capital. However, the mercantilist theory of human capital is spreading across Europe, which helps to explain why more European nations are encouraging the entry of foreign

²⁸ Then Labor Minister Walter Riester (SPD) objected saying: "We cannot allow a general international opening of the job market. We have over four million unemployed people, among them very qualified people in the information technology field." There were 31,000 unemployed IT workers in December 1999.

students and allowing foreign graduates of local universities to remain and work. The fact that there are relatively fewer foreign students and professionals, that European labor markets are more rigid, and that there is no strong private university lobby seeking more fee-paying foreign students may explain the relatively less concern evinced in Europe.

The three major issues involved with international student mobility are selection, stay and significance or impacts. The first question asks which foreign students are selected: those most likely to return to their countries of origin; those who pay fees and fill slots in areas with declining enrollment or add to educational demand so that certain courses can be offered at all; those who settle in the places where they study? “Stay” asks how many and which foreign students remain in the host country to work. Finally, the significance or impacts of foreign students question involves examining the evolution of foreign-student numbers and whether they (begin to) dominate certain fields of study and labor market segments in receiving countries.

Students moving over borders are similar to workers moving over borders in several important respects. First, most countries participate in international education as both senders and receivers of students—as with labor migration, only a few of the poorest countries primarily send students abroad. Second, just as labor markets vary in the wages, benefits, and career opportunities they offer to local and migrant workers, so higher education systems vary in their structure, governance, and goals, with the sharpest distinction between “free” systems geared to providing basic knowledge in much of continental Europe versus private and for-profit US institutions that often recruit fee-paying foreign students for more specialized courses sometimes geared closely to US labor market, which helps graduates to work and settle. Third, as with labor migration, there are strong network effects, with experience and anchor students providing information that encourages and enables more students to follow.

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