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ABSTRACT

The Demand for High-Skilled Workers and Immigration Policy

This paper provides a descriptive analysis of the demand for high-skilled workers using a new firm data set, the IZA International Employer Survey 2000. Our results suggest that while workers from EU-countries are mainly complements to domestic high-skilled workers, workers from non-EU countries are hired because of a shortage of high-skilled labour. The paper, furthermore, provides a short description of recent German policy initiatives regarding the temporary immigration of high-skilled labour. In view of our descriptive results these temporary immigration policies seem, however, to satisfy only partly the demand of firms interested in recruiting foreign high-skilled workers. A more comprehensive immigration policy covering also the permanent immigration of high-skilled workers appears to be necessary.

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1. INTRODUCTION

In the last decade, an increasing demand for high skilled workers could be observed in most developed countries. This development has been associated with the development of increasingly integrated labour markets and the appearance of skill-biased technological change which is often ascribed to the acceleration of technological developments in the information and communication technology (ICT) and an increasing reorganization of workplaces. The observed increase in the demand for high-skilled labour challenges national education systems to produce a sufficiently large number of high skilled and labour markets to absorb high skilled efficiently. Even though the supply of high-skilled workers also strongly increased in the last decade, many countries experienced rising relative wages for skilled labour, indicating that the increasing supply of skilled workers was not sufficient to meet the increasing demand for this type of labour.

In the last few years, employers in developed economies, in particular in the so-called New Economy, complained about a shortage of skilled workers, leading many countries to take initiatives to admit more skilled foreign workers. Countries with existing immigration policies, such as the U.S., Canada, or Australia, increased their quotas for high skilled immigrants. Other countries, especially in Europe, introduced new immigration possibilities directed exclusively towards high skilled immigrants. Overall, these policy initiatives suggest an increasing competition of developed countries for high skilled immigrants (see, among others ROTHGANG und SCHMIDT, 2003).

Empirical evidence that documents the amount of international migration of high skilled is rather scarce. We are only aware of three studies collecting firm level data on high-skilled workers: LOWELL (1999) for the U.S., LIST (1996) for Germany and an EU Report (1992). A caveat of these studies is the low response rate and small sample size. The EU Report, for example, uses data on 286 firms in the 12 EU member countries.¹ The report highlights Germany and France as the countries, and the engineering and chemical sector the sectors with the highest recruitment rates of university graduates in the EU. According to this report, large organisations are more likely to recruit graduates across national boundaries and the bulk of international recruitment is into commercial functions, technical positions, production

¹ In order to target firms recruiting graduates from other member states, a data base was created using the latest directories of recruits of graduates, where they existed, or by liaising with individuals or organizations, i.e. one consultant within each country. The goal of the sampling procedure was to have one observation per 1 million of adult population. If possible, which was mostly not the case, selection should be proportional to sector size.

and information technology (IT). The internationalisation of business is the most important reason given by firms for recruitment of foreign graduates.

In this study we present evidence on the demand for high skilled workers using a new firm data set, the *IZA International Employer Survey 2000* (IZA IES). Covering four countries, Germany, France, the Netherlands, and the UK, the survey focuses on the five economic sectors – chemical, manufacturing, IT, research and development, and finance – that are most important for the employment of high skilled workers. Hence, the data is not representative on a country level, however, arguably representative within sectors. In addition to country, sector and employment characteristics, the data provides a wealth of information on firm characteristics and why firms participate in global labour markets, which makes it particularly interesting for our study.

In the following section we provide a descriptive analysis of the demand for high-skilled of the firms covered by the IZA IES. Concentrating on the German sub-sample of this data set, we describe which firms recruit high skilled foreigners, the reasons why they recruit foreign workers, as well as the qualification profile of these foreign workers. The aim of this analysis is to get a more detailed picture on two hypotheses regarding the determinants of the demand for foreign high skilled. Do firms recruit internationally mainly because they want to gain from knowledge spillover, i.e. they want to obtain knowledge on key technologies that are not nationally available yet or knowledge of foreign markets? In this case the foreign high-skilled workers are complements to native workers. Or do firms recruit internationally because of a domestic lack of skilled labour, in which case the foreign high-skilled are substitutes to native high-skilled? The answers to these hypotheses have important policy implications. In the first case, a more permanent immigration policy is necessary that makes the country more attractive for high-skilled workers from abroad. In the second case, a temporary immigration policy focusing on a particular type of workers may be sufficient to reduce the temporary shortage of labour. The main task for policy in this case is the precise identification of a labour shortage, possibly well in advance (see WINKELMANN, 2002, and ZIMMERMANN ET AL., 2002).

Based on the results of this descriptive analysis, section 3 provides a short description of recent German policy initiatives regarding the immigration of high skilled labour and discuss whether these policy initiatives are effective in meeting the demands of the firms. Section 4 gives a short summary of the findings.

2. THE DEMAND FOR HIGH-SKILLED WORKERS: EVIDENCE FROM AN INTERNATIONAL EMPLOYER SURVEY

In this section we present descriptive statistics on the demand for foreign high-skilled workers in West-Germany using data from the IZA IES.² This survey has been conducted within four neighbouring European Countries: West Germany, France, the U.K., and the Netherlands. In order to ensure a sufficiently large number of firms employing high-skilled foreign workers, the sampling strategy used to collect the data targeted only firms with more than 100 employees. Additionally, the survey focused on the five most important economic sectors for the employment of high-skilled workers: chemical, manufacturing, information technology (IT), research and development (R&D), and finance.³ The data was collected through a telephone interview with the individual responsible for the recruitment of high-skilled workers. In the survey, ‘high-skilled’ has been defined as ‘holding a university degree’ and ‘foreign high-skilled’ as ‘workers with a university degree, who obtained their qualifications abroad and who are foreign citizens’. Workers that are not foreign are labelled ‘domestic’.⁴ Where the respondent was in charge of recruitment for more than one country, he/she was asked to restrict answers to the domestic firm only, in order to exclude foreign based units of multinationals. Accordingly, the firm size in the survey refers to domestic units only. The total sample of the survey contains 850 firms. Dropping firms for which there is missing information on the main variables reduces the sample to 527 firms, of which 234 firms are located in Germany, 99 in France, 76 in United Kingdom, and 118 in the Netherlands. In the following, we show the main results for the demand of high skilled and foreign skilled focusing our discussion on the Germany sub-sample.

2.1 The demand for high skilled foreigners in Germany

Table 1 shows some basic descriptive statistics of the IZA IES by country. Within the five sectors covered by the data set, 36.3 percent of the German firms employ some foreign workers. With an average size of 902 employees, these firms are quite large. 23.6 percent of the employed workers within these firms are high-skilled and 3.33 percent of the high-skilled are foreign. Note that the figures for Germany are quite similar to those for France and the

² For more details see WINKELMANN et al. (2001), WINKELMANN (2002), and KUNZE and WARD (2002).

³ These sectors were identified as particularly important for the recruitment of high-skilled workers through the use of a pre-test.

⁴ Hence, those with domestic citizenship and higher education from abroad or foreign citizenship and

United Kingdom. Nevertheless, while firms in the Netherlands have hired fewer high-skilled, the fraction of foreigners among the high-skilled is higher than in the other three countries.

Comparing firms with foreign high-skilled to those without foreign high-skilled workers shows that the skill structure between these groups differs. While German firms with foreign high-skilled workers have on average 33.8 percent high-skilled workers among their employees, the share of high-skilled workers in firms without foreigners is only 17.7 percent. Although the corresponding percentages vary slightly across the four countries the general findings are similar.

Breaking down figures further by country and sector shows that among the five sectors covered by the survey, IT and R&D are the sectors with highest shares of high skilled workers, followed by financial services (see Table 2). With 8 to 10 percent, the highest share of foreigners among the high skilled is observed in the R&D-sector. In financial services, foreign high skilled seem to be the exception, and for the remaining sectors the fractions vary between 2 and 7.5 percent.

2.2 *Which firms recruit foreign high-skilled workers?*

What distinguishes firms who actually hire foreign workers from other firms? In table 3 we look at more detailed summary statistics comparing firms with and without foreign high-skilled workers. Simple t-test statistics on the differences between these two types of firms confirm significant differences. It appears that those firms that are more internationally orientated are also more likely to employ foreign high-skilled workers. More specifically, we find that they are more likely to be part of a multinational company, have a higher export share and are more likely to be foreign owned. Furthermore, they value the knowledge of foreign language by applicants and experience abroad more highly. Moreover, the distribution across sectors is different and, which is not shown here, they are more likely to be large firms. Firms without foreign high-skilled are more likely to be found in manufacturing and financial services.

In addition to the overall strategy of a firm, distinguishing features may result from differences in the personnel or recruitment strategy. The IZA Survey includes three interesting questions referring to these strategies. They were all asked only to firms with foreign high-skilled workers. The first question asked whether firms never search internationally for applicants. The other questions asked whether they sometimes or never pay for moving costs

domestic higher education are included in the group of domestic high-skilled workers.

and costs for language courses. 35 percent of the firms agreed that they never search internationally, 21 percent said that they never reimburse moving cost and 27 percent pay never language courses. Hence, a considerable part of firms with foreign high-skilled workers has not made a particular effort to recruit those. One can only speculate how come that they have had applicants from abroad at all. The studies by WINKELMANN et al. (2001) and KUNZE and WARD (2002) have shown, that demand analyses conditional on active search does not alter the results.

2.3 What is the qualification profile of the foreign high-skilled workers?

So what are the reasons why firms recruit and not recruit foreign high-skilled workers? The IZA survey includes a list of reasons to recruit firms answered in three categories: agree strongly, agree partly, and agree not at all. In table 4 we present the results for Germany.

Particularly high agreement rates are found for all questions stressing international competence. These include the knowledge of foreign markets and the knowledge of languages, and speaking English. Particularly high disagreement rates are found for all questions stressing the comparison with German applicants. These results suggest that firms recruit foreign high-skilled workers mainly because they have some knowledge that is not available nationally, i.e. the foreign workers are complements to the natives.

Asking all firms in the sample about reasons for not recruiting from abroad one gets quite different responses dependent on whether the firms have hired foreign high skilled (see table 5). While firms with no foreigners agree that getting a working permit causes large difficulties, firms that have direct experience with foreigners add that there are much more specific difficulties, such as language problems, socio-cultural differences and the lack of knowledge about the foreign education system. Especially the latter suggests that firms may face difficulties in judging the qualification of foreign applicants. Splitting the sample into firms with mainly employees from the EU and non-EU countries, results remain virtually unchanged. This result may be restricted due to the fact that the question in this firm survey concerning the country of origin of the foreign workers is asked in a too general way in order to perform more detailed analyses.

Consistent with the latter finding, the IZA IES shows that in fact the qualification profile of foreign and domestic applicants is not very different with respect to field of study. In table 6 the distribution within firms with foreign high-skilled workers across fields is shown.

Among domestic high-skilled the most important field is engineering (38 percent) followed by economics (22 percent). IT is third. The ranking and distribution among foreigners is surprisingly quite similar to the one among domestic high skilled. The main difference is that IT is second and economics third in the ranking. The latter result may be biased due the fact that we pool hires from the EU and the non-EU countries. Indeed, when one distinguishes these two groups one finds that while engineering is still the most important field among foreigners from EU countries, IT is the most important one among foreigners from non-EU countries. More specifically, looking at the countries of origin, firms recruit most often IT-workers from East European countries.

Information on the qualification or work experience of workers is provided by broad measures of the field of work and the position. Six fields of work are distinguished: research and development, IT technology, manufacture, marketing, administration and others. Again the distribution for the two groups of workers, which are not reported here, are quite similar and suggest that domestic and foreign workers are substitutes. Workers are most likely to work in the R&D departments of the firms, followed by marketing and IT. Distinguishing again between hires from EU countries and non-EU countries suggests that, however, EU nationals are more likely to be in the marketing section. This may indicate that their foreign experience or language proficiency are particularly valuable to the firms. For non-EU nationals we still find that they are most likely to work in R&D, hence, are perhaps hired because of their particular qualification. Furthermore, the survey suggests that firms use foreign high-skilled in positions as specialists and as managers in the medium level.

3. IMMIGRATION POLICY TOWARDS HIGH-SKILLED LABOUR: THE GERMAN EXAMPLE

3.1. International competition for high-skilled workers

In the last decade, increasing flows of high-skilled migrants could be observed.⁵ This increasing mobility of high-skilled labour has been associated with the development of increasingly integrated labour and product markets, an increasing appearance of skill-biased technological change in developed economies which is often ascribed to the acceleration of technological developments in the information and communication technologies (ICT) and the re-structuring of the organization of work. Increasing complaints of firms, especially in the so-called New Economy, about a reputed shortage of adequately skilled workers led many

⁵ See BAUER, HAIKEN-DENEW, and SCHMIDT (2003) for a brief survey of recent developments in

developed countries to take new but modest initiatives to admit more skilled labour migrants (ROTHGANG and SCHMIDT, 2003). At least for European countries, these new initiatives mark an outstanding change in immigration policy, given the ‘zero-immigration’ policy they followed since the first oil-price shock in the early 1970s.

In Western Europe, these new initiatives focus on a selective policy based on higher skills relevant for some specific industries, such as the information technology and health industries (OECD, 2002; IOM, 2003). This skill-based entry system in fact is currently the main manner in which non-EU citizens can come to live and work in the EU. All these initiatives have in common, that they reduced existing restrictions for employers to hire high-skilled foreign workers. Nevertheless, almost all of them require either that the employers provide evidence that no appropriate native worker can be found or restrict the facilitation of hiring foreign workers to specific industries. Furthermore, the conditions under which the foreign workers are employed must be identical to those of the native worker with respect to payment and general working conditions.

In the UK, for example, there was some reduction in the skills requirements for highly educated workers, such as little after-graduation labour market experience being required, to enable employers to gain access to a wider range of work permits. Currently, work permits can be applied for electronically in order to reduce transaction costs. Furthermore, if a foreign worker were to change employers in the same field, the worker would not be required to apply for a new work permit. In January 2002, France established a system to induce high-skilled workers from outside the EU to live and work in France. The French Labour Ministry handled the approval procedure and, if successful for the foreign applicant, the employer’s application was approved by the Labour Ministry and Ministry of the Interior promptly. Also several countries outside Europe entered the apparent global competition for high-skilled labor. The U.S. increased the number of H1B-visas (temporary visas for high skilled workers) issued every year several times, and Australia and Canada increased the number of immigration quotas issued through their point systems.⁶

In the following, we provide a more detailed description of the German *Green Card* initiative for IT-specialists from the summer 2000 for at least two reasons. First, this initiative could be

international migration.

⁶ See BAUER, LOFSTRÖM and ZIMMERMANN (2000) for a brief description of the immigration policy in

seen as being representative for similar initiatives in other European countries. Second, the introduction of the *Green Card* started a heated debate on the German immigration policy, leading to the establishment of an immigration commission that aimed to produce a report with recommendations on a more coherent and comprehensive German immigration law. A short survey of the main recommendations and the development of a German immigration law will also be described in this section.

3.2. The German "Green Card" initiative

Reacting to increasing complaints from firms in the ITC industry that they are unable to fill vacancies and that this shortage of appropriately skilled workers will harm innovations and the competitiveness of the German industry, chancellor Schröder announced in February 2000 that a so-called *Green Card* for foreign IT-specialists will be introduced.⁷ In August 2001, the *Green Card* came into force, giving German IT-firms the opportunity to hire up to 20,000 non-EU IT-specialist for a maximum of five years.⁸ This quota stayed far behind the 75,000 IT job vacancies announced by the industry.

In order to hire a foreign IT-specialist, the German IT firm had to apply for a work permit at the employment office. The employment office then verified within a week whether (i) no unemployed skilled German or an EU specialist could meet the requirements of the firm, (ii) the person a firm wanted to hire is qualified for the position, and (iii) the employer is offering the foreign specialist the same working conditions and wage as a comparably qualified German specialist would receive. In order to assess the qualification of the foreign specialist, it was required that foreign IT-specialist has a degree from a university or polytechnic in the field of information and communication technology or the employer needed to confirm that he is willing to pay an annual salary of at least Euro 51,000. The *Green Card* also applied to foreigners graduating from German universities and polytechnics, who had to leave the country after their graduation before the *Green Card* came into force.⁹

Australia and Canada.

⁷ The German *Green Card* should not be confounded with the *Green Card* issued in the United States. As will be described in more detail, the former allows the immigration of high-skilled workers on a temporary basis whereas the *Green Card* in the US addresses permanent migrants. The German *Green Card* is rather more similar to the H1-B visa in the US, which represent temporary visas for high skilled workers.

⁸ IT-specialist are defined as specialist in software development, the development of circuits and IT systems, multimedia development and programming, and IT consulting, as well as system specialists, Internet specialists and network specialists (WERNER, 2002).

⁹ See WERNER (2002) for a more detailed description of the regulations and procedures of the *Green Card*

During the validity of the *Green Card*, the foreign IT-specialist is allowed to change to another IT job in another firm. Becoming self-employed is only possible under certain circumstances. The spouses of the IT-specialists with a *Green Card* are able to obtain a working permission in Germany after a waiting period of one year. Originally, the deadline to apply for a working permission under the *Green Card* initiative for the first time was on July 31, 2003. This deadline, however, has been extended by the German government to the end of 2004, when a new immigration law is expected to regulate work and residency permits for high-skilled, non-European Union workers seeking employment in the country.

Figure 1 shows the number of work permits assured to IT-specialist under the Green Card initiative every month from August 2000 until April 2003. Note that this number could be higher than the actual number of IT-specialists immigrated, because, among other reasons, firms could revise their demand for IT-specialists between the assurance of the working permit and the time the work permit is actually granted or because several firms could apply for the assurance of the same foreign IT-specialist (SCHREYER, 2003). Throughout the period, the number of assured work permits shows a downward trend, with peaks occurring every other quarter. In the first year of the initiative, 680 work permits have been granted on average every month. A sharp drop of the number of work permits could be observed in September 2001. Thereafter, the downward trend levels out to about 200 work permits per month. From the introduction of the Green Card in August 2000 until the end of April 2003, 14,144 Green Cards have been assured to IT specialists from outside the EU (see Table 7).

Figure 1 and Table 7 shows that the total quota of 20,000 green cards has not been used up by the German IT-industry and - given the current average number of 200 work permits per month - will also not be reached until the end of 2004. This seems rather surprising, given the estimated shortage of 75,000 IT-specialist announced by the industry in 2000 and the fact that that only about 6,000 German IT-specialists graduate every year from German universities. Several reasons may be responsible for this discrepancy. First, since the mid of year 2001 the new economy experienced a crisis, which reduced the demand for IT-specialists. Even though there are no administrative statistics available, surveys among Green Card-holders suggest that about 7% of them become unemployed while staying in Germany (SCHREYER, 2003). Furthermore, the sharp drop of Green Cards assured in September 2001 indicates that the events of September 11, 2001 had also an impact on the demand for foreign specialists.

Table 7 also reports some statistics on the characteristics of the IT-specialist who obtained a German Green Card. Almost 88% of them are male, and about 15% had graduated from a German university of polytechnic. Slightly more than 16% received the work permit as a result of an agreement concerning an annual salary of at least 51,000 Euro and almost 60% of the Green Card holders are employed in firms with fewer than 100 employees. In the discussion around the introduction of the Green Card, the media and most politicians expected that the Green Card will be used mainly for IT-specialist from India. Even though India is the single most important country for Green Card holders, their share is far behind the initial expectations. This could be explained with the preferences of Indians to migrate either to the United States or the UK. In both countries, English is spoken, and both have a large Indian community. In addition, the United States offers better opportunities to become self-employed and to settle on a permanent basis. According to Table 7, more than one third of all Green Card holders come from Central or Eastern European countries, which again could be explained by a rather good migration network with Germany. Finally, Table 7 shows that only 1.6% of all applications for a Green Card have been rejected.

Figure 2 shows the number of assured work permits to foreign IT-specialists are regionally very concentrated. Almost 93% of all work permits have been assured to firms located in West Germany, and the federal states Bavaria, Baden-Württemberg, Hessian, and North Rhine-Westphalia account for almost 84% of all Green Cards. Even these numbers, however, deceive the true regional concentration of the Green Card-holders, because half of them are located in either Munich, Frankfurt, or the region of Bonn and Cologne.

3.2. The new German immigration law

The introduction of a “Green Card” for IT-specialists in Germany started a heated debate on the German immigration policy. This debate resulted in the establishment of an immigration commission, called the *Süßmuth-Commission* after the chairwomen Rita Süßmuth, whose mission was to produce a report with recommendations on a more coherent and comprehensive German immigration law. The commission published its final report in July 2001 (INDEPENDENT COMMISSION ON MIGRATION TO GERMANY, 2001). It proposed that Germany should officially acknowledge itself as an immigration country. One of the main arguments of the commission for the need of increased immigration to Germany was the apparent demographic problems and the ageing of the German population. The major recommendations of the commission were to introduce a coherent flexible migration policy

that allows both the immigration of temporary and permanent labor migrants, to introduce measures to foster the integration of immigrants, measures to speed up the German asylum procedure while recognizing Germany's obligations arising from the Geneva Refugee Convention and the European Human Rights Convention, and measures to combat illegal immigration.

Concerning labor migration, the *Süßmuth-Commission* differentiated six groups of migrants: (i) qualified permanent immigrants, (ii) students, (iii) trainees within the German apprenticeship system, (iv) temporary workers to cover labour shortages, (v) executives and key members of staff of firms, scientists, and academics, and (vi) start-up entrepreneurs. Qualified permanent immigrants are proposed to be selected following to a nationwide point system similar to the one use by Canada and Australia.¹⁰ Applicants must score a minimum number of points. Of the applicants who have scored more than this minimum number of points, those who have scored the highest number of points should be chosen. The crucial selection criteria for which points are rewarded should indicate an applicants' ability to integrate into the labor market and the society well. As main indicators the commission mentions a person's age, qualification and the ability to speak German. The commission further suggested setting an initial quota of 20,000 permanent immigrants including their family members, which could be changed later on according to the demographic development in Germany.

In addition to the permanent immigration of qualified workers, the commission suggested to allow also the temporary immigration of workers in order to react in a flexible way to short-term shortages in the labour market under a system of strict quotas and limits on the length of time. Two different methods of identifying labour shortages should be tested in an initial phase.¹¹ According to the first method, labour shortages should be determined using statistical diagnoses. As ZIMMERMANN et al. (2002) show, however, this method is subject to potentially large errors and not able to identify labour shortages in a reliable way. According to the second method, a fee paid by the employers should identify labour shortages and guarantee that domestic applicants will continue to be attractive to the labour market. It could be questioned, however, that a fee to employers could really meet these goals, mainly because the fee will reflect the actual value of hiring a foreigner through that system only by chance.

¹⁰ See ZIMMERMANN et al. (2002 for a detailed description of the Canadian and Australian immigration system.

¹¹ A detailed discussion of how to identify labor shortages is given by ZIMMERMANN et al. (2002).

Because of these problems scientists rather suggest to auction temporary immigration visa to domestic firms (see ZIMMERMANN et al., 2002).

For executives and managers of multinational firms, key staff of firms, scientists and academics as well as start-up entrepreneurs the commission recommended to make access to the German labour market much easier than for all other groups and to offer them the best possible residence conditions. Executives, for example, are only required to prove that they earn twice as much as the income threshold for statutory health insurance¹² in order to obtain full access to the labour market. In addition, start-up entrepreneurs with a sound business idea should be given quick entrance to Germany. Selection of these entrepreneurs should be based on certified business plans, which are reviewed by authorities - such as local chamber of industry and commerce, banks, or industrial development corporations - located in the region where the applicant wants to settle. In addition to having an equity or loan commitment to ensure that the business idea can be implemented, the entrepreneur should not be older than 45, must certify that they are of good health, have a good reputation and can cover their subsistence for an initial period. Finally, the commission suggested to implement a program that encourages young foreigners to either study at a German University or to undergo training in the German dual training system. For the latter they suggested an immigration quota of 10,000 visas.

The report by the commission formed the basis for a new German immigration act.¹³ Concerning the immigration of workers, this Immigration Act followed most of recommendations by the *Süßmuth-Commission*.¹⁴ Even though one of the main goals of the law is to select immigrants more according to the needs of the labour market and to increase the share of skilled migrants, the Ministry of the Interior stresses that the point system to select migrants will only be available to a very limited number of immigrants in the beginning

¹² Currently, this threshold is an annual income of 46.350 Euro.

¹³ See http://www.bmi.bund.de/dokumente/Pressemitteilung/ix_59920.htm for more information.

¹⁴ Concerning family reunification and asylum, the law envisages further restrictions on the possibility to immigrate. With regard to family reunification, the new law plans to give only children under the age of 12 (currently 16) a legal claim to enter the country in order to ensure that the children of immigrants integrate into German society as soon as possible. Note that this restriction does not hold for children of refugees and foreigners who have been granted a settlement permit as highly qualified persons or within the framework of the selection procedure. The children of these groups of migrants will have a legal claim to enter the country until the age of 18. According to the new law, family members entering the country after their families will have the same possibilities of accessing the labour market as the persons they are joining. The current law allows most family members to access the labour market only after a one-year waiting period. Finally, the new law includes many new regulations aiming at making the current asylum procedure more efficient and restricting the possibilities to claim asylum as well as the access to social security.

and will not be expanded before 2010. The Immigration Act passed both chambers of the parliament, but was nullified by the Federal Constitutional Court in December 2002 due to a procedural error during voting in the second chamber (the Bundesrat) on March 22, 2002.¹⁵ Without changing the content of the Immigration Act, the government once again submitted the draft bill for adoption in January 2003 and passed the first chamber (the German Bundestag) on 8 May 2003. In June 2003, the German Bundesrat rejected the Immigration Act. A mediation committee will now examine the bill.¹⁶

4. CONCLUSION

Using a newly available data set of German firms within five potentially high skilled labour intensive sectors, the *IZA International Employer Survey 2000*, this paper provides a descriptive analysis of the demand for high-skilled foreign labour. The analysis has shown that on average 3.3 percent of all high skilled workers are foreigners. It seems that foreigners and domestic high skilled are quite similar with respect to field of study, yet an important difference is the international experience and knowledge of languages of the foreigners that are highly valued by the firms. A comparison of the German figures with outcomes for France, the UK and the Netherlands has shown that sector differences are more important than country differences. Nevertheless, the size of the country and the labour market may be important as the case of the Netherlands suggests. This is the country with lowest shares of high skilled within sectors and highest fractions of foreigners among those. This may be explained by the fact that the Netherlands is a small, very internationally orientated country.

One of the most important questions for policy concerning the immigration of skilled is whether domestic and foreign workers complement or substitute each other. The descriptive analysis does not provide an unequivocal answer to this question, since we find some support for both hypotheses. Even though the results point towards a complementary relationship between foreign and domestic high-skilled, the concentration of foreign high-skilled from non-EU countries in IT-related subjects and functions suggests that the employment of these workers may be driven by a shortage of skilled labour in this area (Winkelmann, 2002). In

¹⁵ Six of the federal states led by the Christian Democratic Union party (CDU) had opposed passing the law in March 2002 and took their complaint to the highest court. The two representatives from the state of Brandenburg, which is governed by a coalition between the Social Democrats (SPD) and the CDU, had been unable to deliver a unanimous vote. The German constitution however prescribes a uniform casting of votes of each state.

¹⁶ The task of the Mediation Committee is to find a compromise whenever there are differences of opinion between the Bundestag and Bundesrat on a piece of legislation.

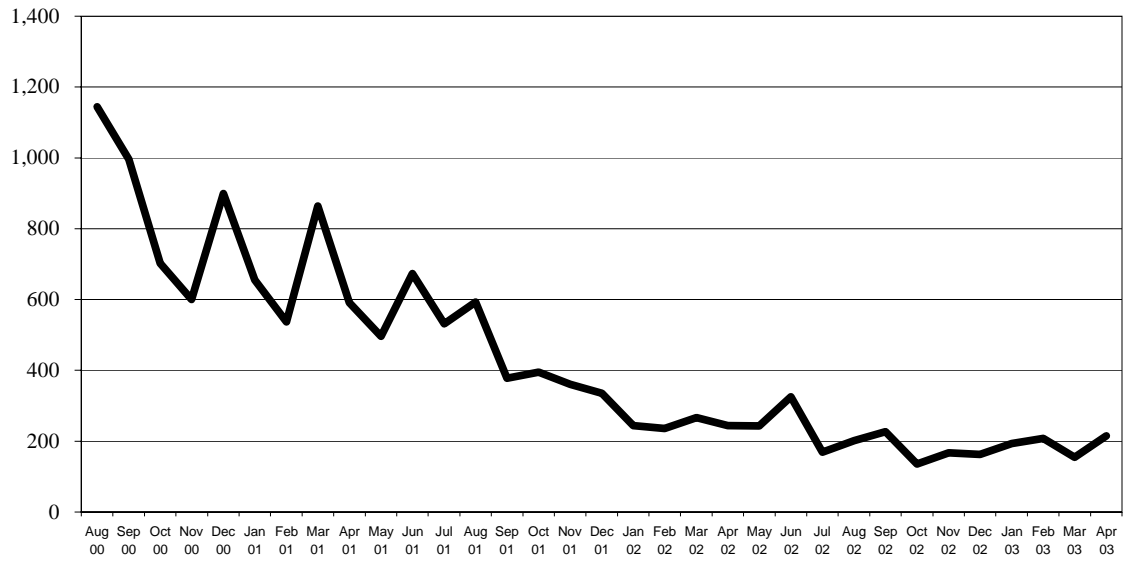
addition, because those firms who hire foreigners tend to have a lot of high-skilled in their work force overall, the above results support the interpretation of a lack or scarcity of high-skilled workers in the short run at fixed prices in the domestic labour market (see Winkelmann, et al., 2001). The IZA IES further shows that the majority of firms who have hired foreign high skilled have paid for moving cost and language courses. This could be interpreted as the payment of efficiency wages to foreigners in order to extract more effort from the employed high skilled (Epstein et al., 2002).

Furthermore, we give a detailed description of the German Green Card initiative that started in 2002 and gives German firms the opportunity to hire IT-specialists from non-EU countries on a temporary basis. This initiative is surely effective in reducing part of the shortage of skilled IT specialist which has been announced by employers in the New Economy and partly confirmed by our descriptive analysis. However, our descriptive analysis also indicates, that such a temporary immigration policy satisfies the demand of firms interested in recruiting foreign high-skilled workers only partly. The analysis of the *IZA International Employer Survey 2000* has shown that German firms hire to a large extent foreign workers that are complements to domestic high-skilled, i.e. they recruit foreign high-skilled mainly because of their knowledge of foreign markets and languages and because of the transfer of new technological skills that are yet not available domestically. An immigration policy that satisfies these types of demand must make Germany more attractive for foreign high-skilled workers in the long term. This includes the reduction of institutional barriers to international mobility not only for high-skilled workers but also for their family members. In addition, smooth and rapid integration should be promoted. Despite some weaknesses, the proposed new immigration law for Germany, which has been described in more detail in section 3 of this paper, is a first step towards reaching this goal. However, the law still awaits its ratification. In view of the importance of globalized product and labour markets and rapid technological progress in modern economies, a fast adoption of this law appears to be necessary for Germany not to fall behind in the global competition for high-skilled labour.

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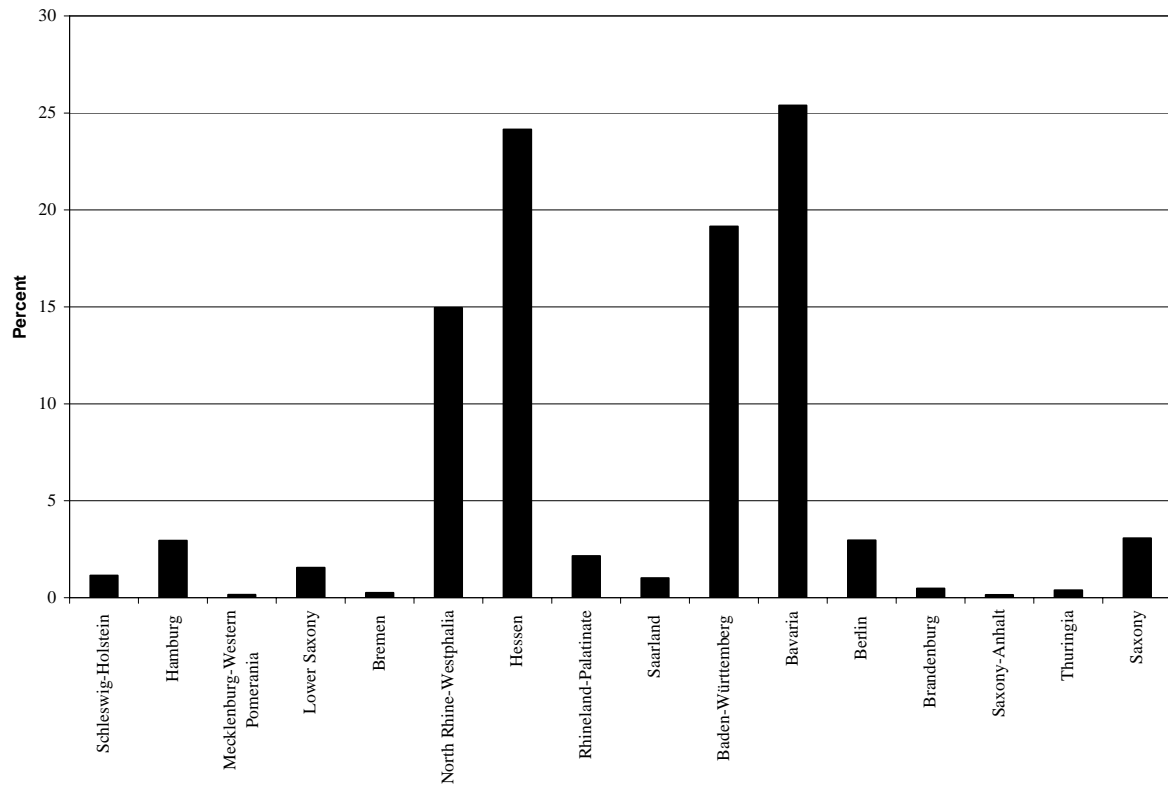
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Figure 1: Work Permission assured to foreign IT-Specialists, August 2000 – April 2003



Source: Bundesanstalt für Arbeit, Nürnberg: Statistik der zugesicherten/abgelehnten Arbeitserlaubnisse nach der IT-ArGV, BA IIIb3; own calculations.

Figure 2: Work Permission assured to foreign IT-Specialists by Region, August 2000 – April 2003



Source: Bundesanstalt für Arbeit, Nürnberg: Statistik der zugesicherten/abgelehnten Arbeitserlaubnisse nach der IT-ArGV, BA IIIb3; own calculations.

Table 1: Summary Statistics, by Country

Country	Germany	France	United Kingdom	Netherlands
All firms				
Number of firms	234	99	76	118
Number of firms with foreign workers	85	33	26	31
Mean size	902	528	831	745
(High-skilled/Employment)*100	23.59 (1.53)	37.79 (2.87)	29.36 (2.97)	17.78 (1.91)
(Foreign High-skilled /Employment)*100	0.010 (0.0018)	0.015 (0.0053)	0.006 (0.002)	0.011 (0.011)
(Foreign High-skilled / High-skilled) *100	3.33 (0.56)	3.35 (0.82)	3.68 (1.35)	4.58 (1.28)
Firms with foreign workers				
(High-skilled /Employment)*100	33.84 (2.87)	44.81 (5.35)	33.84 (5.86)	31.3 (3.44)
(Foreign High-skilled / High-skilled)*100	9.16 (1.32)	10.0 (2.03)	10.7 (3.62)	17.4 (4.14)
Firms without foreign workers				
(High-skilled /Employment)*100	17.7 (1.59)	34.2 (3.32)	27.0 (3.31)	12.9 (2.06)

Note: Results reported using the IZA International Employer Sample 2000. Standard errors in parentheses.

Table 2: Percentage of Foreign High-skilled Workers by Sectors

Sector	Country			
	Germany	France	United Kingdom	Netherlands
Chemical	4.83	2.19	4.14	10.33
Manufacturing	1.93	3.09	3.56	7.30
Financial	1.58	1.56	.28	1.05
IT	4.54	2.60	3.41	4.49
R&D	10.88	10.68	8.84	9.58

Note: Source: International Employer Survey 2000. Reported percentages are the ratio of the number of foreign high-skilled workers divided by the number of high-skilled workers.

Table 3: Summary statistics for firms without foreign high-skilled and with foreign high-skilled workers, percentages

Variable	Firms without foreign high-skilled	Firms with foreign high-skilled	t-test
Multinational firm	15.9	35.4	3.72
Share of foreign business	33.4	45.9	3.6
Foreign owned	34.6	46.8	2.7
Foreign language important	67.3	78.3	2.6
Experience abroad important	26.7	33.1	1.5
Chemical Industry	17.0	24.6	2.0
Manufacturing	38.3	29.1	2.0
Financial Services	24.1	13.7	2.8
Data Processing	13.9	17.1	1.0
Research and Development Sector	6.5	15.4	3.3

Note: Results reported using the German subsample from IZA International Employer Sample 2000. 234 observations. 149 without and 85 with foreign high-skilled workers.

Table 4: Reasons for Hiring Foreign High-skilled Workers, Percentages

Factor	Agree	Strongly agree
<i>'We hire foreign employees because'</i>		
Overall they are the best candidates	49.07	9.26
There is a lack of good domestic applicants	55.45	10.91
They know foreign markets	64.86	36.04
They speak foreign languages	71.17	47.75
They speak English	56.13	26.42
The type of knowledge required for these jobs is not produced by the domestic education system	27.93	4.5
Their skills better fit our work tastes	51.35	15.32

Note: Results reported using German subsample from IZA International Employer Survey 2000. Proportion of firms responding that they agree (strongly agree) that a factor was a consideration in the decision making process for hiring foreign employees with a university degree. Response from firms hiring foreign workers.

Table 5: Problems with Recruiting Foreign Workers, Percentages

Factor	Firms with domestic workers only	Firms with foreign workers with foreign degree	Firms employing foreign workers mainly from the EU	Firms employing foreign workers mainly from the non EU
Language problems	10.17	47.45	44.44	41.30
Socio cultural differences e.g different mentality of habits	5.96	53.57	54.72	56.52
Acceptance by superiors	0.25	7.14	9.43	6.52
Acceptance by subordinates	1.74	12.76	13.21	10.87
Acceptance by customers	3.97	11.22	13.21	10.87
Difficulties in evaluating foreign worker experience	4.96	21.94	22.64	28.26
Lack of awareness of foreign education systems, grades and qualifications	5.71	26.02	27.36	28.36
High recruitment costs	5.71	19.39	16.98	26.09
Is it difficult to obtain a work permit non EU workers	60.53	65.96	60.61	68.52
No applicants	38.91	-	-	-
No need – vacancies filled with domestic workers	22.08	-	-	-

Note: Results reported using the German subsample from IZA International Employer Sample 2000. Proportion of firms responding that a factor was potentially problematic when recruiting foreign employees with a university degree.

Table 6: Subjects of Study of high-skilled workers

	Most common field of domestic employees	Most common field of foreign employees
Engineering	38.32	38.68
Maths and natural science	12.15	15.09
IT	14.95	23.58
Law	1.87	0
Economics	21.5	13.21
Medicine	2.8	2.83
Other	8.41	6.6
Total	100	100

Note: Results reported using the German subsample from IZA International Employer Sample 2000 and only firms with foreign high-skilled in Germany.

Table 7: Work Permissions assured to foreign IT-Specialist by selected Characteristics and Country of Origin, April 2003

Country of Origin	Number of Work Permits		Gender Composition (in %)		Origin (in %)		Qualification (in %)		Firm Size (in %)			Rejected Applications
	Total	in %	Male	Female	Immigrated from a foreign country	Foreign graduate of a German University	University degree	Certificate of annual salary of at least 51,000 Euro	≤100	101 to 500	> 500	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Bulgaria	418	2.96	80.14	19.86	84.45	15.55	90.19	9.81	68.18	10.77	21.05	9
Jugoslavia, Croatia Bosnia-H., Slovenia, Macedonia, Montenegro	719	5.08	82.06	17.94	84.28	15.72	86.79	13.21	56.47	14.33	29.21	15
Rumania	1,017	7.19	84.76	15.24	94.20	5.80	92.43	7.57	60.67	18.19	21.14	20
Hungary	500	3.54	91.40	8.60	92.80	7.20	84.80	15.20	63.60	15.40	21.00	13
Czech and Slovak Republic	961	6.79	94.69	5.31	95.94	4.06	83.04	16.96	67.33	15.09	17.59	10
Russia, Weiss- russland, Ukraine, Baltic States	1,836	12.98	87.85	12.15	90.96	9.04	91.83	8.17	65.85	14.54	19.61	39
India	3,533	24.98	92.33	7.67	94.62	5.38	74.89	25.11	62.24	21.60	16.16	20
Pakistan	201	1.42	98.01	1.99	81.59	18.41	89.55	10.45	63.68	10.45	25.87	7
North Africa (Algeria, Marokko, Tunisia)	424	3.00	92.22	7.78	34.91	65.09	94.10	5.90	52.12	16.98	30.90	18
South America	373	2.64	77.48	22.52	82.04	17.96	77.21	22.79	46.38	17.43	36.19	23
Other countries /regions	4,162	29.43	84.05	15.95	73.38	26.62	82.84	17.16	51.11	16.00	32.89	103
<i>Total</i>	<i>14,144</i>	<i>100.00</i>	<i>87.70</i>	<i>12.30</i>	<i>84.76</i>	<i>15.24</i>	<i>83.50</i>	<i>16.50</i>	<i>58.89</i>	<i>17.03</i>	<i>24.07</i>	<i>277</i>

Source: Bundesanstalt für Arbeit, Nürnberg: Statistik der zugesicherten/abgelehnten Arbeitserlaubnisse nach der IT-ArGV, BA IIIb3; own calculations.

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