**Dissertation**

# Essays on Immigration Policies

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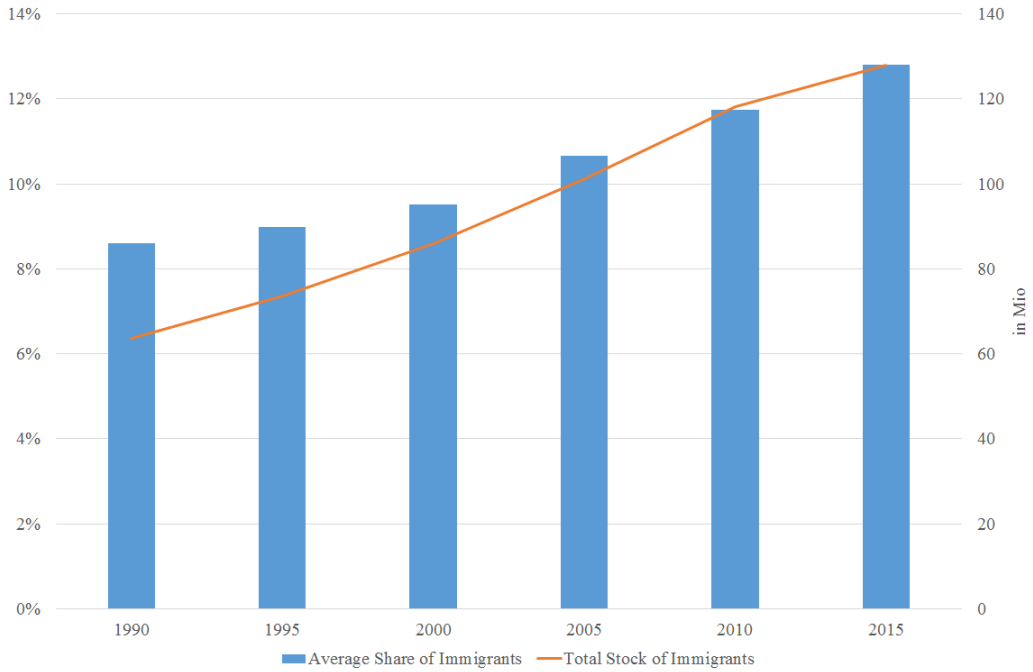
# 1 General Introduction

Over the last 25 years, the number of first-generation immigrants living in OECD (Organization for Economic Co-operation and Development) countries has doubled. The total number rose from 63 million immigrants in 1990 to over 120 million in 2015. Figure 1.1 shows the evolution of the stock and the average share of immigrants between 1990 and 2015. Whereas immigrants represented on average 8.6% of the total population in 1990, the share increased to almost 13% in 2015. Moreover, immigrants are not equally distributed over and within the countries. Whereas countries like Mexico, Japan or Poland have shares below 2%, Australia, Canada or Luxembourg have more than or are close to 30% of immigrants within their populations. Within most countries, immigrants cluster in larger cities or specific regions with the result that the share of immigrants in these areas is significantly above the country average. These figures underline the increased importance of immigration over the last decades. The integration of immigrants into the domestic societies is thus a key challenge for the future development of these countries.

At the same time, we often observe that the labor market performance of immigrants is weaker than the performance of natives, even after having spent several years in the host country. Immigrants are more often unemployed, have lower earnings and work in less secure jobs (OECD/EU, 2015). Economic research on the causes for the lower performance of immigrants has identified several reasons. Firstly, immigrants lack country-specific human capital, in particular language skills (see, e.g., Chiswick and Miller, 1995; Bleakley and Chin, 2004; Dustmann et al., 2010). Using various empirical designs, all respective studies agree on language skills representing a key determinant for economic success of immigrants. Secondly, there is a difference between the educational level of immigrants and natives. A large fraction of immigrants is low educated, immigrated from countries with lower quality of schooling or suffers from non-recognition of foreign credentials (e.g., Eckstein and Weiss, 2004; Dustmann et al., 2013). And thirdly, discrimination reduces the

labor market opportunities of immigrants compared to natives (e.g., Bertrand and Mullainathan, 2004; Kaas and Manger, 2011).

**Figure 1.1:** Immigrants in the OECD




The figure shows the stock and the average share of immigrants in the recent OECD countries. The estimates refer either to the foreign-born or foreign citizens within the population. In 2016, the OECD consists of Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, and the United States.
Source: Own calculations based on the United Nations, Department of Economic and Social Affairs (2015).

An immigration policy which tries to improve the labor market performance of immigrants can influence all these areas. Several countries, for instance, introduced free language courses, implemented specific residence titles for high-skilled immigrants (e.g., the Blue Card in the EU), facilitated citizenship acquisition or adopted strong anti-discrimination laws. Yet, we often do not know the direct and indirect effects and the overall efficiency of such policies. Furthermore, we need to take into account that the group of immigrants is very diverse and some subgroups may need to be targeted differently. In any case, it is relevant to analyze and evaluate immigration policies to understand their impact on the assimilation of immigrants.

In this thesis, I primarily focus on one main element of immigration policies: The opportunity for immigrants to stay permanently in the host country. It builds on the idea that integration is an investment decision. After their arrival, immigrants face the decision if and how much to invest in country-specific human capital. As

every investment induces costs at the beginning, the size of the expected returns in the later periods determines the amount of investments. As a consequence, the willingness to invest in country-specific human capital depends on the expected duration of stay (see e.g., Dustmann, 1993).

Policy makers often ignore this determinant when designing immigration policies. The guest-worker program in Germany is a good example of such a policy that intended to recruit immigrants for a short period of time. However, a large fraction settled in Germany permanently, but immigration policy did not react to the changing realities. The currently weak labor market performance of former guest workers and their descendants (see, e.g., Algan et al., 2012) is most likely a consequence of the missing adjustment.

This thesis empirically investigates three different aspects of such prospects of permanent residency on the integration of immigrants. In Chapter 2, I analyze whether the economic assimilation of refugees differs from the assimilation of economic immigrants. To create and implement effective immigration policies, it is necessary to understand the heterogeneity of different immigration groups. As a large part of low-skilled immigrants in the OECD originates from asylum seekers and low-skilled immigrants are a main target of immigration policies, a deeper understanding of that group is of high relevance. Moreover, immigration via the asylum system will most likely present an important channel for immigration in the future, given events like the recent refugee crisis in the European Union. If immigration policy tries to improve the economic integration of refugees, the peculiarities of the group of refugees should be taken into account designing policy measures.

Chapters 3 and 4 analyze the effects of a particular policy instrument, the acquisition of citizenship. Naturalization grants an immigrant the citizenship of the host country by giving the immigrant the equal rights as the native population. It is predominantly directed to immigrants who have spent several years in the host country and requires specific criteria to be met. The third chapter which is joint work with Christina Gathmann investigates the effect of citizenship acquisition on the economic integration of immigrants. Making use of a novel identification strategy which is based on two policy reforms, we identify the causal effect of citizenship on various economic outcomes. An earlier version of this paper was circulated in the IZA Working Paper series (Gathmann and Keller, 2014). The fourth paper which is joint work with Christina Gathmann and Ole Monscheuer broadens the scope on the effects of citizenship acquisition and analyzes the impact of naturalization on the social integration of immigrants. In particular, we investigate the effects of nat-

uralization on fertility and marriage patterns of immigrants. Despite the primary interest in the labor market effects of immigration policies, these policies might also have significant impact on other dimensions of integration. Previous research has shown that attitudes of natives toward immigrants and immigration in general are not only shaped by their economic impacts (i.e., on wages and taxes), but also on social and cultural differences (e.g., Card et al., 2012; Dustmann and Preston, 2007). Thus, the effects of immigration policies on social integration outcomes are also highly relevant, especially for policy makers which are confined by the public perception of immigration in general.

## 1.1 The Economic Integration of Refugees: New Evidence from Germany

It is one of the main challenges of immigration policy to select immigrants. Most countries like Canada or Australia have set up explicit criteria for immigrants to enter their countries. These criteria are mostly based on attributes which are directly linked to a favorable labor market performance. For the group of refugees, none of such criteria has to be met and their admission is based on humanitarian criteria. As a consequence, one would expect that the labor market integration of refugees is the weakest among the group of immigrants. On the other side, refugees might have no opportunity to return to their home country and have to stay in the host country permanently, whereas economic immigrants might only plan a temporary stay. The planned duration in the host country is a key determinant for human capital investments, in particular country-specific human capital investments. Thus in the long run, the relative performance of refugees compared to the performance of economic immigrants is ex ante not clear. It only shows that the labor market integration of refugees has different requisites and characteristics compared to the labor market integration of immigrants who migrate for economic reasons.

The aim of this paper is to compare the labor market assimilation profiles of refugees relative to the assimilation profiles of economic immigrants. Using two different data sets from Germany, I estimate the assimilation profiles for employment and earnings. Unlike previous studies, I can use information on the reasons for immigration and directly identify refugees in my data sets. The direct identification

allows to compare refugees and economic immigrants from the same region of origin and hence, to disentangle the refugee effect from other effects based on the regional composition across the groups. In addition, I extend prior research on refugees' labor market integration by studying the situation in Germany which has been one of the world's largest refugee receiving countries over the past decade (UNHCR, 2014). But Germany is not only an interesting example due to its relevance, it also presents an institutional environment which is very different compared to previous studies, in particular in terms of selection of refugees and institutional framework (e.g., Cortes, 2004 for the US; Chiswick and Miller,1994 for Canada).

The results suggest that refugees have lower employment rates and earn lower wages, but they catch up over time spent in Germany. After about 13 years, the employment rate has almost reached the level of economic immigrants. Regarding the earnings of refugees, the duration of the assimilation process takes more time. The gap closes after about 17 years. A more detailed analysis of the mechanisms behind the assimilation shows that refugees do not only have difficulties finding their first job, they also have more problems applying their skills. With more time spent in Germany, refugees reduce their disadvantages in language skills and increase their productivity, thus reaching a better labor market performance.

The results reveal two important implications: Firstly, the process of labor market integration is heterogeneous across groups and when designing immigration policies, policy makers should be aware of these differences. Secondly, an assessment of the economic capacity of refugees is heavily dependent on the timing of the assessment.

## 1.2 Returns to Citizenship? Evidence from Germany's Recent Immigration Reforms

Acquiring the citizenship of a country gives immigrants the same privileges as the domestic population. Naturalized immigrants can, for instance, participate in political elections or gain diplomatic protection of the host country. Economic theory suggests various channels why citizenship could also improve the labor market performance of immigrants. Naturalized immigrants get access to certain jobs in the public sector or are less discriminated in the labor market. In addition, citizenship gives immigrants the prospect of staying permanently in the country and thus incentives to increase investments in country-specific human capital. These investments

might later translate into higher productivity and into a better position on the labor market. Employer might be willing to invest more in naturalized immigrants as the immigrant expresses her willingness to stay in the host country.

Although previous studies have tried to investigate the causal effects of citizenship acquisition on labor market outcomes, the question has not been answered comprehensively. Firstly, it is difficult to disentangle the citizenship effect from the general assimilation effect as the eligibility of citizenship acquisition is linked to a certain residency in the host country. Secondly and the major challenge for evaluating the effects of citizenship acquisition is the endogeneity of the naturalization decision. Immigrants who decide to naturalize are a selective sample of the immigrant population (see, e.g., Chiswick and Miller, 2008 for the United States; and De Voretz and Pivnenko, 2006 for Canada). Hence, it is not sufficient to compare naturalized and non-naturalized immigrants. To circumvent the endogeneity problem, we make use of two policy reforms which took place in Germany and which introduced age-dependent eligibility criteria regarding the required duration of residency. We use the access to citizenship to create exogenous variation in the duration of eligibility. To be more precise, younger age cohorts were able naturalize after eight years in Germany whereas older age groups had to wait for 15 years to become eligible.

Our results show that access to citizenship has a substantial and significant positive effect on the earnings of female immigrants, whereas the returns for male immigrants are, if any, few. Eligible women experience occupational upgrading and work in jobs with higher quality and in larger firms. Yet, the economic returns are not distributed evenly across all groups of immigrants and some groups benefit more strongly whereas other groups do not. More recent immigrant cohorts have larger returns than older cohorts.

Overall, naturalization seems to be one channel to speed up the economic integration of immigrants. Given the substantial returns, immigration policy should analyze how to promote citizenship acquisition and thus increase the labor market integration of immigrants.

## 1.3 Access to Citizenship and the Social Integration of Immigrants

Assimilation theory assumes that immigrants adapt to the native population not only in terms of economic outcomes, but also in terms of social and political

outcomes. Even more relevant than for the economic integration, cultural norms and traditions influence the behavior of immigrants, in particular the marriage and fertility pattern of immigrants (Fernández and Fogli, 2009). The role of citizenship acquisition as part of the social assimilation process has not been investigated until now. Firstly, access to citizenship might affect fertility and marriage behavior via a stronger labor market performance of female immigrants. Secondly, citizenship acquisition could also loosen ties to the culture of the home country which often are more traditional regarding the role of women.

Using the same exogenous variation induced by the two policy reforms in Germany, we evaluate the effects of eligibility on fertility, marriage patterns and partner characteristics. In a next step, we then try to disentangle the economic channel from the cultural impact and determine their relative shares of the overall effect of access to citizenship.

We find that eligibility for citizenship has significant effects on the fertility and marriage patterns of female immigrants. The option to naturalize delays marriage to later ages and reduces the likelihood of marrying someone from the country of origin. Female immigrants also have lower fertility overall and tend to postpone their first birth, especially when they are high-skilled. The analysis of the potential mechanisms suggests that higher earnings are important for fertility and marriage choices. Immigrants from a more traditional cultural background have overall higher fertility and marriage rates, but they also assimilate faster than immigrants from EU member countries.

In sum, the results suggest that citizenship acquisition has an impact on the social integration of immigrants and fosters the assimilation of immigrants. Naturalization policy can thus not only contribute to a better economic integration of immigrants, it also induces adjustments in other dimensions of integration.

# 2 The Economic Integration of Refugees: New Evidence from Germany

## 2.1 Introduction

For 2015, the OECD predicts up to one million asylum applications in Europe, about three times as much as each year over the past decade (OECD, 2015).[1] Yet, this tremendous number seems to be too low as, for instance, the German government expects 800.000 applicants only in Germany (Federal Office for Migration and Refugees (BAMF), 2014). For the destination countries, the question arises how to react to the large inflow of foreigners given that in the past a large fraction of asylum seekers has stayed in the countries. In particular, the integration into domestic labor markets is a key challenge. A successful labor market integration not only reduces the fiscal costs for the destinations countries, it also has a positive impact on the social and cultural integration (OECD/EU, 2015). At the present state, we only have limited information who these people are and which skills and expectations they bring along. The scope of the large inflow and the associated challenges are thus not clear yet. At the same time, immigration is no new phenomena in most OECD countries. Many countries experienced large immigration waves in the past and have substantial shares of foreign-born in the domestic populations (e.g., 12% in UK, 13% in Germany, or 16% in Sweden). Thus, can we consider this inflow of asylum seekers as a new wave of economic immigration? Or should we consider them as a distinct type of immigrants which we need to assess differently?

Hence, the aim of this paper is to investigate the labor market integration of

[1] I thank Christine Binzel, Christina Gathmann, Ole Monscheuer, Jens Ruhose, the participants at the Spring Meeting of Young Economists 2015, the ZEW and the doctoral seminar in Heidelberg for valuable comments and discussions.

refugees.[2] Thereby, we firstly provide evidence on a group of immigrants we know very little about, but which is relevant in size. Secondly, we contribute to a literature which has studied refugees, but in very different institutional settings (Cortes, 2004 in USA; Edin et al., 2003 in Sweden and Damm, 2009 in Denmark). Thirdly, we explore the situation in Germany, a country which is one of the largest refugee receiving countries in the world and, at the same time, has an immigration policy which is characterized by very restrictive access to the labor market. And finally, in contrast to previous studies, we can identify refugees directly in the data and circumvent the difficulties distinguishing refugees from economic immigrants.

Economic theory suggests various reasons why we might expect a different assimilation pattern of refugees. First and most importantly, refugees are not selected with respect to labor market relevant attributes, both on the supply and the demand side. As refugees do not decide to leave their country voluntarily, they are less self-selected in terms of favorable labor market characteristics and have no or less time for preparation. Economic immigrants on the other hand can make their migration decision based on labor market considerations. The migration process often takes several years which allows to make country-specific human capital investments prior to migration (Chin and Cortes, 2015). On the demand side, the admission to the host country is determined by humanitarian criteria. It does not include labor market relevant entry characteristics as part of the selection process. Previous research on refugees has confirmed the theoretical consideration that refugees are less (self-)selected than economic immigrants and closer to a random sample of the source country's population (Cortes, 2004).

Moreover, ethnic networks are a major channel through which newly arrived immigrants learn about the host country's institutions (Bertrand et al., 2000) and ease the labor market integration (e.g., Beaman, 2011 for the USA; Edin et al., 2003 in Sweden and Damm, 2009 in Denmark). It is very likely that refugees have less access to such networks as they often cannot choose their residential location independently and are accommodated in areas where no family and friends or even large ethnic communities reside.

The experience of persecution or war might also lead to physical and mental trauma and mistrust toward public institutions. Previous studies have shown that refugees do report higher rates of health problems which will most likely affect their labor market performance (Chin and Cortes, 2015). After arrival, a long

[2] We follow the most common definition that an asylum seekers is someone who is still in the asylum process whereas a refugee or humanitarian immigrant is officially recognized (OECD, 2015).

and complicated asylum procedure up to the final decision might be associated with uncertainty due to the fear of rejection and removal. As a consequence, these fears can prevent refugees from integrating into the host society and labor market. Moreover, the uncertainty reduces the incentives to invest in physical and human capital.

Restricted access to the labor market after arrival could also hamper the labor market opportunities of refugees. The human capital might depreciate over time. Previous research on the impact of economic conditions at labor market entry of immigrants has emphasized that the first years in a new country are especially important for the further labor market career (Chiswick and Miller, 2002).

On the other side, there are reasons to believe that refugees may catch up or outperform other immigrant groups in the long run. The key argument for a favorable performance is the different expected length of stay in the host country. Dustmann (1993) shows that return intentions of immigrants in Germany are important determinants of the steepness of the age-earnings profile. Since refugees have escaped from persecution, they have neither the opportunity nor the willingness to return to their home country. Indeed, empirical evidence has shown that the return probability of refugees is low (Klinthäll, 2008) or lower than for other groups of immigrants (Dustmann and Görlach, 2014). The perspective of permanent residence increases the benefits of investments in country specific human capital and higher qualifications (Cortes, 2004). It might also lead to higher investment in human capital due to higher returns from increasing the transferability of skills (Chiswick and Miller, 1994). Thus, these human capital investments might compensate the initial disadvantages of refugees after some years in the country and lead to similar or favorable assimilation profiles as in the case of economic immigrants. Refugees might also be more motivated and eager to integrate as response to discrimination and repudiation in the home country.

The empirical analysis focuses on Germany which has been one of the world's largest refugee receiving countries over the past decade (UNHCR, 2014). Asylum is one of the main channels for immigration to Germany from outside the European Union. The total number of individuals who entered Germany as asylum seekers and still reside in Germany are, at a rough estimate, 650.000 individuals.[3] In addition, Germany has followed an immigration policy that is very different to that of

[3] Own calculations based on the Microcensus 2008.

traditional immigration countries like the United States or Canada. For economic immigrants from outside the European Union, only a few channels to immigrate exist. In fear of misuse of the asylum system as a channel for low-skilled immigration, the institutional setting for refugees was rather designed to discourage economic immigrants from using the system to enter Germany than to promote refugees' integration. Consequently, the labor market access was highly restrictive and has only been liberalized in recent years.

Differences also exist in the selection within the group of refugees. Asylum seekers in Germany have to claim asylum after entering the country by themselves.[4] In the United States or Canada, the majority of refugees enters via refugee programs designed for individuals or families in the home countries (or neighboring states) and selected by the UNHCR (Department of Homeland Security, 2015). This might have important consequences on the selection of refugees. Credit constraints or physical problems of potential refugees might hamper the escape to Germany and lead to a different sample of refugees.

Geographic proximity is another important determinant explaining the origin of refugee flows and creates a different sample of origin countries (Hatton, 2009). From 2011 to 2013, Serbia, Afghanistan and Syria were the top three source countries in Germany (BAMF, 2014), whereas the largest source countries in the United States were Iraq, Burma and Bhutan (Department of Homeland Security, 2015). In sum, refugees in Germany are very likely to differ in their composition across and within countries compared to the situation in America where previous studies have been conducted.

A major advantage of our analysis is the possibility to identify refugees directly in our data since we have information on the reason for immigration to Germany. Previous studies analyzing refugees and their labor market integration have not directly observed the refugee status and had to rely on an indirect identification. The most common approach is to construct a refugee indicator via a combination of country of origin and year of arrival (see e.g., Cortes, 2004). However, this procedure captures refugees who escape from wars and civil conflicts, but not, for example, members of political groups or minorities who escape from political persecution. One example to illustrate the shortcoming of this approach is migration from Turkey to Germany. The majority of Turkish immigrants arrived as guest workers or their relatives, but a sizable number of Turkish Kurds migrated to Germany as refugees,

[4]Germany also implemented a resettlement program in 2003, but the size of the program is very small. (BMI, 2013).

too. Yet, using the indirect identification approach, Kurdish refugees would not be assigned to the group of refugees. Until 2011, Turkey was always one of the 10 major source countries of asylum applicants in Germany (BAMF, 2014). Hence, the direct identification approach gives us the opportunity to detect variation between refugees and economic immigrants within the same country or region of origin. As refugees' sending countries are arguably not a random set of all immigrants sending countries, a comparison across immigrant groups fails to adjust for these country differences. Within country or region variation allows us to disentangle the region of origin-effect from the refugee status-effect.

Our results suggest that the economic assimilation of refugees differs significantly from the assimilation of economic immigrants. The most important difference is the pace of the integration. All analyzed economic outcomes reveal that refugees need more than a decade to attain a similar level as the comparison group. Refugees start with a large gap in employment. After five years, 60 percent of the gap is closed. After 12 years in the host country, the employment rate of refugees is only slightly smaller than the employment rate of the comparison group. Regarding the earnings of refugees, we observe a similar pattern. The level of earnings is significantly lower than that of economic immigrants, but it catches up over time. The reason for the higher wage growth of refugees are increased working hours, but also a rise in productivity. After 17 years spent in Germany, the gap is almost closed. An explanation for the long duration of the assimilation process is the difficult entry into employment. Refugees work more often in low quality positions or jobs which do not match their qualification. A lack in formal qualifications, language skills and social capital is most likely the reason for the delayed assimilation.

Empirical research on the economic integration of refugees are scarce. The major obstacle is the absence of adequate data allowing to separate genuine refugees from other types of immigrants. A small strand of literature compares the labor market integration of different visa categories (Constant and Zimmermann, 2005a and 2005b for Germany and Denmark; Jaeger, 2000 for USA; Chiswick and Miller, 1994 for Australia; Aydemir, 2011 for Canada; Akgüc, 2013 for France). The results for the visa category which includes refugees indicate that refugees perform worse than immigrants who arrive with employment or student visa. The evidence on the differences between family immigrants and refugees are mixed. In sum, the studies provide clear evidence on the heterogeneity of the labor market integration across immigration groups but focus mainly on short-term labor market outcomes.

Studies with an explicit focus on refugees can be broadly divided into two main methodological approaches: They either compare refugees relative to other immigration groups or use the placement of refugees into localities as exogenous variation. The general finding in the comparison approach is a so-called refugee gap which shall describe the worse labor market performance of refugees compared to other immigrant groups regarding employment, wages or welfare dependency (see Cortes, 2004 for the USA; DeVoretz, Pivnenko and Beiser, 2004 for Canada). Edin et al. (2003) and Damm (2009) use placement policies in Sweden or Denmark to analyze the effect of ethnic enclaves on labor market outcomes. They do not address the potential problem of selectivity within their sample and consider their results as representative for all groups of immigrants.

Closely related to the labor market integration of refugees is the literature on human capital investment of refugees. Due to the long term perspective of staying in the host country, Cortes (2004) shows theoretically and empirically that refugees invest more in human capital in the first years after arrival and thus catch up or even outperform other immigrant groups. Khan (1997), using a similar argument, finds higher post-immigration investment in education among refugees in the U.S. relative to economic immigrants. In contrast, Chiswick and Miller (1994) also report that higher skilled immigrants do invest more in human capital after arrival, but they do not find significant differences for the group of refugees. A more general literature on human capital investments of refugees and temporary migration shows that the expected duration of the stay has a large impact on the human capital investment decision and thus on the career path of immigrants (Dustmann, 1999; Adda et al., 2015).

Finally, our results contribute to the general literature on immigrant assimilation. A large literature studies have analyzed the labor market integration of immigrants relative to natives (for a survey, see Dustmann and Glitz, 2011). Evidence on Germany has so far been weak, most studies do not find assimilation effects (Pischke, 1993; Dustmann, 1993; Schmidt, 1997; Bauer et al., 2005; results in Fertig and Schuster, 2007 and Gathmann and Keller, 2014 are mixed). However, the aim of our paper is to show how assimilation pattern differ between immigration groups and will not focus on the overall assimilation of immigrants in Germany.

This article proceeds as follows: The next section describes the institutional background of asylum in Germany. Section 3 introduces the data sources. The empirical strategy to identify the assimilation profiles of refugees and the definition of the comparison group are explained in section 4. Section 5 discusses the empirical

results including a number of informal validity checks to test the robustness of our results. Section 6 discusses the policy implications of our findings and concludes.

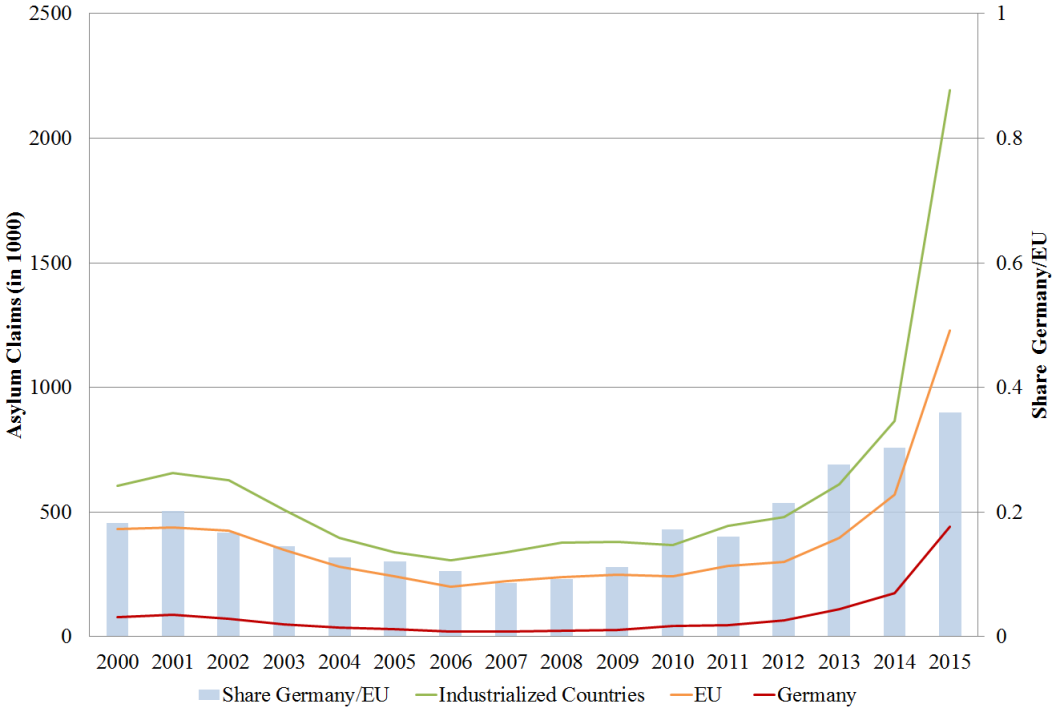
## 2.2 Asylum Policy in Germany

The number of asylum claims is erratic and predominantly determined by exogenous events in the source countries. The inflow of asylum seekers depends on the political situation in the sending countries and only subordinate on the asylum procedures of the host countries. However, countries have - via their asylum regulations - an impact on the numbers of asylum claim (Hatton, 2004). As shown in Figure 2.1, the number of claims in Germany follows the global trends and decreases in the mid of the 2000s continuously to only 28.018 applications in 2008. Since 2008, the numbers increase again up to 441.800 applications in 2015, the largest number for the last 20 years.

The importance of asylum as a channel of immigration started in the 1980 when the number of asylum claims exceeded 100.000 applications (107.818). Trying to reduce the numbers of asylum seekers, German authorities decided to reduce economic incentives deterring future applicants (Tränhardt, 2015). They implemented restrictions on accommodation and public transfers (from cash to food vouchers) and, most importantly, banned asylum seekers from the labor market for one year. Beforehand, asylum seekers were allowed to work immediately. In 1981, the duration of the working ban was extended to two years. (Tränhardt, 2015). The restrictions became even more severe in 1987 as working was prohibited for the first five years (Gesetz zur Änderung asylverfahrens-, arbeitserlaubnis- und ausländerrechtlicher Vorschriften, 1987). In the early 1990s, the numbers of applicants increased again due to the war in Yugoslavia. 438.191 asylum seekers came to Germany solely in 1992. An agreement between the main political parties led to the so-called compromise on political asylum ("Asylkompromiss"). In return for a liberalization of the citizenship law, the Social Democrats (SPD) accepted further restrictions of the asylum legislation. The main part of the amendment was the introduction of the safe third countries-concept (Brücker et al., 2015).[5]

[5] Asylum seeker who travel to Germany via these safe third countries are then not eligible for asylum in Germany as they have to claim asylum in the first secure country they enter. Considering the geographical location of Germany, traveling to Germany without crossing other European Union countries is almost impossible.

**Figure 2.1:** Asylum Claims, 2000-2015




Notes: The figure shows the total numbers of asylum applications. Industrialized countries follow the definition of the UNHCR and include all European countries (38 countries), Australia, Canada, Japan, New Zealand, South Korea and the USA. EU includes the member countries of the respective year.
Source: Own calculations based on UNHCR (2015).

Refugee protection has constitutional status in Germany and is part of the German Basic Law. Article 16a subsection 1 grants everyone political asylum who escapes from political persecution. Besides the entitlement of political asylum, Germany ratified the Geneva Convention on Refugees which represents the legal framework for the refugee protection status (Section 3 subsection 1, Asylum Procedure Act) and the subsidiary protection status (Section 4 subsection 1, Asylum Procedure Act). If none of these statuses are recognized, the prohibition of removal (Section 60 subsection 5 and 7, Residence Act) is the weakest and shortest status of recognition. An important aspect in the legal framework of refugee protection is the individual entitlement of asylum. After entering Germany and claiming asylum, the German authorities have the responsibility to examine the claim of every asylum seeker individually. As a consequence, the number of asylum claims cannot be limited by refugee quotas.

The asylum procedure follows a defined structure of several steps. At first, the

Nevertheless, it is often not feasible to detect which country is responsible for the asylum seeker.

asylum seekers are placed in reception centers which are distributed over the German states following a fixed quota system ("Königsberger Schlüssel").[6] In reception centers, the applicant has to stay for at least three months and is interviewed by the Federal Office of Migration and Refugees regarding her reason for asylum. Afterwards, the asylum seekers are distributed over the municipalities in the responsible state and wait until the decision is made. In 2008, the average duration of the asylum procedure was 17,5 months and after two years, 77% of the asylum applications were settled (BAMF, 2009). During the asylum procedure, the asylum seekers' labor market access is restricted. However, the Federal Employment Agency has the opportunity to permit employment after one year of residency. These regulations were even further liberalized in recent years.[7]

After the examination of the asylum claim, the applicant can receive several protection statuses which differ in their legal consequences. Political asylum and refugee protection status lead to permanent residence permit after three years if the status is not revoked in a reassessment (after three years). Working is permitted for both groups instantly. Refugees with a subsidiary protection status or asylum seekers who are prohibited of removal can receive a permanent residence permit after seven years if several reassessments (every one or two years) are positive and if they fulfill certain requirements like economic self-sufficiency and a clean criminal record. Working needs to be permitted by the Federal Employment Agency. Regarding social welfare or unemployment benefits, all refugees are treated like the native population. The residential location is restricted during the asylum procedure (to split the financial burden across states and municipalities). If the refugee is officially recognized, the residency requirement ends and she can choose her residential location independently.

So far, we described the numbers of asylum claims, but not all claims are recognized and a sizable share of applicants who get rejected has to leave the country thereafter. The recognition rate varies over the years between 5% in 2003 and 37.7% in 2008. Not recognized applicants are not necessarily rejected due to missing asylum reasons. Up to 50% of the decisions are formal decisions. These asylum seekers were not eligible to apply in Germany and sent back to the third country which they

[6] The quota are determined by the size and the economic power (measured in fiscal revenues) of the German states and adjusted annually.

[7] The asylum seeker has to wait three months before he or she can get a work permit with lower rank which means that the job center have to approve that no German or EU-immigrant is available for that job. After 15 months, the labor market access becomes unrestricted. The current regulations are in place since 2014, beforehand working was only permitted after four years (BAMF, 2014).

traveled through before entering Germany.[8] The recognition rate not only varies between years but also among countries of origin. 78.4% of all applications from Iraq, the largest group in 2008, were recognized, whereas only 9.5% of the applications from the second largest sending country Turkey (BAMF, 2009). Other countries with relative high recognition rates are Iran, Syria, Russia and Afghanistan.

## 2.3 Data Sources and Descriptive Statistics

### 2.3.1 Microcensus

The first data set that we use is the German Microcensus (MZ), a repeated cross-sectional survey of a 1% random sample of the German population. It covers detailed information about individual socio-demographic characteristics, including information on employment and personal income. As the Microcensus is the official census in Germany, the advantage of the data is the sample size and that it is highly representative.

For the identification of refugees and the comparison groups, we make use of a supplementary questionnaire which was asked in 2008.[9] Unfortunately, the supplementary questionnaire is only asked to a subsample covering 0.1 % of the population. It asks for the main reason for migration including a category on political or humanitarian reasons/asylum. We define all individuals who answered that their main reasons for migration were political or humanitarian reasons/asylum as refugees. Ideally, one would prefer to have information on the legal status at time of arrival, but no such information is available. On one side, it might be possible that immigrants adjust their beliefs retrospectively and select themselves into categories regarding their economic success in Germany. This might be especially important if the migration decision was based on a combination of motives and the individual has to decide which category applies best. One the other side, the personal perception about the migration motives are the more relevant and interesting parameter reveal-

[8] The European Union introduced a system which determines which country is responsible for the asylum claim, the Dublin convention. The fundamental idea of the system is that every asylum seeker has to claim asylum in the country he or she first enters (Convention determining the State responsible for examining applications for asylum lodged in one of the Member States of the European Communities - Dublin Convention, 1997).

[9] The European Statistical Office (Eurostat) adds every year a different list of questions to the annual questionnaire. In 2008, the subject was immigration and the labor market.

ing the incentive structure of the assimilation process the immigrants is exposed to. If the incentive structure depends on the possibility to return to the home country, the personal perception of the immigrant is the relevant determinant in which we are interested.

A key challenge for the analysis is the definition of a reasonable comparison group. To test our hypotheses, we need a group of immigrants who came to Germany for economic reasons and from a comparable set of countries. For our main analysis, the comparison group consists of immigrants who define themselves as economic (main reason for migration is employment) or family (main reason is family reunification) immigrants.[10] As we will show in the robustness section, our results are robust to various other definitions and do not depend on the composition of the comparison group.

We restrict our sample to first-generation immigrants, i.e. immigrants born outside of Germany. To make our sample more homogeneous, we further restrict the analysis to immigrants arriving in Germany between 1990 and 2008 and were between 25 and 60 years old in 2008. In addition, we narrow our sample to all immigrants who arrived in Germany with age 25 or above. Thus, we hope to reduce potential bias by individuals who had not finished their schooling career. Ethnic Germans who represent a sizable group of immigrants especially in the 1990s and immigrants from the traditional EU-15 member states (e.g., Italy or Greece) are excluded, too. Both groups represent immigrants whose access to Germany and legal status is very different to immigrants from third countries.

Our main outcome variables of interest are employment, economic self-sufficiency and log personal income. Employment is an indicator equal to one if the immigrant pursues any income-generating activity in the week before the interview and zero otherwise. Personal income is measured as net personal income per month. We define economic self-sufficiency, i.e. whether an immigrant receives social assistance payments. The main control variables are the number of years since migration, age, gender and education. We distinguish between low-skilled (no high school or vocational degree), medium-skilled (a higher school degree or a vocational degree) and high-skilled immigrants (a college degree). For the region of origin-fixed effects, we distinguish between immigrants from countries that recently joined the European Union (the so-called EU-12, e.g., Poland or the Czech Republic), immigrants from Turkey, ex-Yugoslavia (except Slovenia) and the Former Soviet Union (except the Baltic States). We lump together other immigrants into broad regions of origin

[10] In the robustness checks, we will use different definitions for the comparison groups to relax our assumptions.

(Asia, Africa, the Middle East and North or South America).

### 2.3.2 IAB SOEP Migration Sample

The second data source is the IAB SOEP Migration Sample (IAB SOEP), a new survey which started in 2013. It includes 2.700 households, each containing at least one person who had either since 1994 immigrated to Germany or whose parents had done so (Brücker et al., 2014). As the survey is developed for migration related research, it covers a wide range of questions regarding the integration and assimilation process which are not included in the Microcensus. To make both data sets comparable, we define the refugee and the comparison group respectively and restrict the sample according to the Microcensus. Besides the main outcome variables of the Microcensus, biographical information on previous employment histories allow to reconstruct the duration until an immigrant found her first job in Germany. We use this information as an additional outcome. The IAB SOEP Migration Sample further gives us the opportunity to analyze differences in assimilation channels. To identify the assimilation channels, we use information on language acquisition, return intentions, human capital transferability, access to social networks and the type of employment.

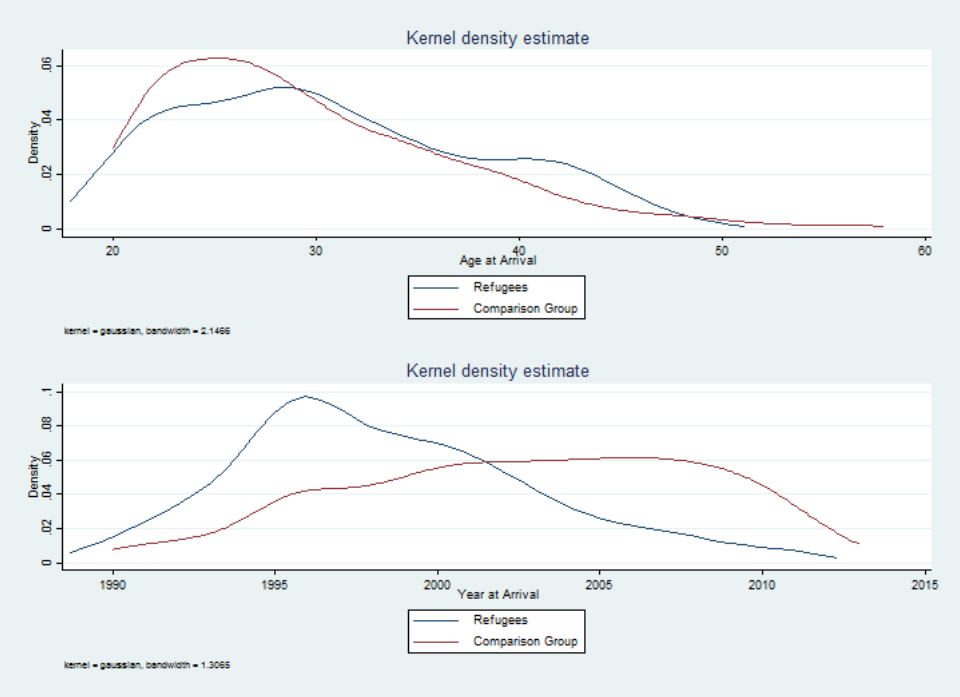
### 2.3.3 Descriptive Statistics

A priori, we hypothesized that refugees are less selected than economic migrants and a more representative sample of the population. Thus, we would expect refugees to be more equally distributed over all age groups when they arrive in Germany. Figure 2.2 shows us the kernel densities of the age distribution and the year of arrival of both groups. Indeed, we can observe that refugees' arrival age is distributed more equally as, for example, a sizable share of the refugees immigrated to Germany aged 40 or above. As expected, the year of arrival of refugees is more erratic and less equally distributed than the comparison group. Most refugees arrived between 1995 and 2000.

Table A.1 and A.2 give an overview of the two data sets. In both samples, the group of refugees is older and has spent more years in Germany. An important

difference between the two groups is the sex ratio. Unlike the expectation that refugees present a more representative sample of the population, refugees have a higher share of men than the comparison group. One explanation might be that the long journey before applying for asylum in Germany is less discouraging for men. Another explanation could be that men are more often politically active and persecuted or escape for the military service (as e.g., in Eritrea).

**Figure 2.2:** Descriptive Evidence




Notes: The figure shows the kernel density estimates of age at arrival and year of arrival for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2013 with an age at arrival of 20 or above and are 25-60 years old. Source: IAB SOEP Migration Sample (2013)

Significant differences between the two groups also exist regarding the educational levels. Refugees have a higher share of low-skilled individuals, whereas immigrants in the comparison group are more often medium skilled. Regarding high-skilled individuals, the data sets show an ambiguous picture. Whereas the share of high-skilled refugees in the Microcensus is approximately eight percentage points larger than their counterparts' share (26% vs. 18%), the IAB Migration Sample displays a higher share of high-skilled in the comparison group (18% vs. 22%).[11] The differences between the data sets are quite substantial and illustrate two important things. First, the importance to rely on several data sources to receive valid

[11] A comparison of immigrants from the same arriving cohorts in both samples (to account for the survey years) show the same results. Thus, immigrants arriving after 2008 (the year of the Microcensus) and only surveyed in the IAB Migration Sample cannot explain the diverging results.

findings, especially if the samples are small. And second, although our estimations control for the education level, both samples might also differ in terms of unobserved characteristics of refugees and the comparison group.

The composition of source countries across the two groups is very different. Refugees in both data sets are mainly from the Balkan states, the Middle East and former Soviet states, whereas the comparison group predominantly consists of immigrants from Eastern Europe, Turkey and the former Soviet states. Yet, there is variation in all region of origin groups which allows us to identify the refugee effect within the regions of origin.

Regarding the labor market outcomes of both groups, refugees have lower employment rates than the comparison group. In both data sets, about 60% of the refugees are employed. In the comparison group, 66% or 71% of the immigrants are employed. Refugees spend more time in Germany until they start their first job. On average, they are employed after 2.5 years in Germany, which is one year more than immigrants in the comparison group. In line with the lower employment rate, the welfare dependency of refugees is significantly higher in both data sets. Yet, the difference is noticeably larger in the IAB SOEP Migration Sample (7 vs. 20 percentage points).

The log personal income is calculated for individuals who are currently employed. Yet, the definition of the personal income is surveyed differently across the data sets. The income measure in the Microcensus includes the net personal income including social transfer and other sources of non-labor income. The IAB Migration Sample allows to disentangle the personal income into labor income and other sources of income. As we want to compare the labor market integration of refugees, we are mostly interested in labor income as outcome for the analysis. In both data sets, we observe that the average net personal income is very similar (MZ) or slightly smaller for refugees (IAB SOEP).

## 2.4 Empirical Strategy

The basic idea is to compare the labor market profiles of refugees and the comparison group. We estimate differences in labor market outcomes using following linear

regression models:

$$Y_{io} = \alpha + \beta Refugee_{io} + \gamma_1 f(YSM_{io}) + \mu_1 Age_{io} + \mu_2 Age_{io}^2 \tag{2.1}$$

$$+\delta' X_{io} + \theta_o + \lambda_s + \varepsilon_{io}$$

where $i$ describes individuals of region of origin $o$ in state $s$. The parameter of interest $\beta$ measures the average difference between the refugee and the comparison group. To identify assimilation effects in labor market outcomes, we include the number of years in Germany (Years since migration, YSM) in the regression.[12] To control for the effects of labor market experience, the regression contains age effects as linear and squared variables. The vector $X$ is a set of additional control variables including the sex and the education of the immigrants. To investigate distinct assimilation profiles across the groups, we estimate assimilation profiles by interacting the refugee indicator with the number of years since migration. Thus, we allow both groups to have distinct assimilation profiles. The corresponding models have the following form:

$$Y_{io} = \alpha + \beta Refugee_{io} + \gamma_1 f(YSM_{io}) + \pi Refugee_{io} * f(YSM_{io}) \tag{2.2}$$

$$+\mu_1 Age_{io} + \mu_2 Age_{io}^2 + \delta' X_{io} + \theta_o + \lambda_s + \varepsilon_{io}$$

where $\pi$ measures the relative change in the assimilation profile of refugees compared to the comparison group. We apply specification tests to determine the best fit between the assimilation profiles and the economic outcomes. Table A.12 shows different specifications of the functional form including the Akaike information criterion. The best specification to model the relationship between years since migration and employment seems to be a second order polynomial whereas a third order polynomial captures the relationship between years since migration and personal income most efficiently. In the robustness section, we provide further evidence on the functional form assumption and estimate non-parametric assimilation profiles.

There are several threats to our identification strategy using cross-sectional data. As first described by Borjas (1985), changing cohort quality can bias our estimates if, for instance, the quality of immigrants (and therefore their labor market per-

[12] In section 2.6, we will show that the results are robust to different specifications of the number of years in Germany.

formance) improves over time. As a consequence, we would underestimate the assimilation profiles of the immigrants.[13] Although we cannot entirely rule out that possibility, there are several arguments why we think that changing cohort quality is not a major concern. In the first place, we analyze the assimilation process of refugees relative to a comparison group. If both groups would follow the same global trend in immigrant quality, the estimates would be unaffected. In the second place, we check for shifts in the educational composition during the sampling period (Figure A.1). If unobserved characteristics which affect productivity are correlated with educational outcomes, we should observe shifts in formal education. However, the average level of education shows no evidence of a shift over time. In the third place, previous evidence suggests that most changes in the cohort quality are across countries of origin and not within countries (Chiswick, 1986). Controlling for region of origin differences should capture changes in the composition of immigration flows.

Another possible threat to identification in cross-sectional data could be selective outmigration in one of the groups (Lubotsky, 2007). Again, the regions of origin-fixed effects reduce the potential bias as outmigration rates differ predominantly across source countries (Dustmann and Görlach, 2014). Apart from this, previous studies have shown that economic immigrants have higher rates of return than refugees (Dustmann and Görlach, 2014). If the least successful economic immigrants leave (as evidence from Constant and Massey for Germany suggests)[14], the estimated labor market profiles of economic immigrants would be steeper (than the true profiles) and our estimates of the assimilation of refugees a lower bound of the true effect. As a further test of the robustness of our results, we estimate our regression models using different definitions of the comparison groups. Family immigrants might be a good comparison testing for outmigration because they tend to be less affected by selective outmigration as economic immigrants (Bijwaard, 2010).

[13] If the cohort quality would decline, we would have the opposite effect and overestimate the assimilation rate.

[14] Constant and Massey (2002) study the return migration of German guest workers and provide evidence that return migration is negatively correlated with employment.

## 2.5 Empirical Results

### 2.5.1 Employment

**Table 2.1:** Estimation Results for Employment

| | Microcensus (MZ) | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Refugee | -0.114*** | -0.111*** | -0.079* | -0.358** | -0.270* |
| | [0.041] | [0.041] | [0.045] | [0.159] | [0.155] |
| Refugee*Years in Germany | | | | 0.040 | 0.035 |
| | | | | [0.034] | [0.033] |
| Refugee*Years in Germany$^2$ | | | | -0.001 | -0.001 |
| | | | | [0.002] | [0.002] |
| Years in Germany | | 0.004 | 0.011 | -0.001 | 0.006 |
| | | [0.015] | [0.016] | [0.018] | [0.018] |
| Years in Germany$^2$ | | 0.000 | 0.000 | 0.001 | 0.000 |
| | | [0.001] | [0.001] | [0.001] | [0.001] |
| Observations | 652 | 652 | 652 | 652 | 652 |
| R Squared | 0.122 | 0.164 | 0.188 | 0.166 | 0.189 |
| | **IAB SOEP Migration Sample (IAB SOEP)** | | | | |
| | (6) | (7) | (8) | (9) | (10) |
| Refugee | -0.169*** | -0.175*** | -0.110*** | -0.578*** | -0.505** |
| | [0.036] | [0.036] | [0.041] | [0.221] | [0.210] |
| Refugee*Years in Germany | | | | 0.070** | 0.072** |
| | | | | [0.034] | [0.033] |
| Refugee*Years in Germany$^2$ | | | | -0.003** | -0.003** |
| | | | | [0.001] | [0.001] |
| Years in Germany | | 0.022** | 0.029*** | 0.013 | 0.019 |
| | | [0.011] | [0.011] | [0.011] | [0.011] |
| Years in Germany$^2$ | | -0.001 | -0.001 | -0.000 | -0.000 |
| | | [0.000] | [0.000] | [0.000] | [0.000] |
| Observations | 1,057 | 1,057 | 1,057 | 1,057 | 1,057 |
| R Squared | 0.088 | 0.122 | 0.152 | 0.126 | 0.156 |
| Gender | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes |
| Education | No | Yes | Yes | Yes | Yes |
| Region of Origin | No | No | Yes | No | Yes |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2008 (MZ) or 2013 (IAB SOEP), aged 20 or above and are 25-60 years old. The dependent variable Employment is one if the individual is employed and zero otherwise. Columns (1) to (5) are based on the Microcensus (MZ), (6) to (10) on the IAB SOEP Migration Sample. All specifications include the same individual characteristics (Gender (indicator), Age (linear and squared), State (Fixed effects)). They also include eight region of origin fixed effects (new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, America/Oceania and Russia/other former Soviet Union states. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree. Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: Microcensus (2008) and IAB SOEP Migration Sample (2013).

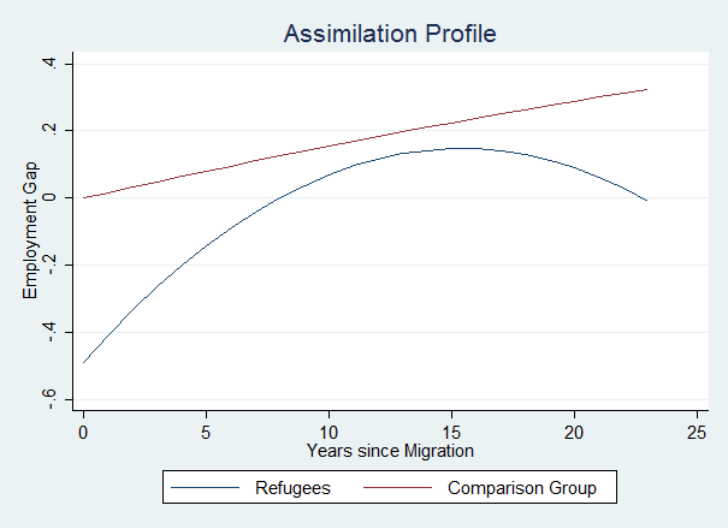
In order to investigate the labor market performance of refugees, we start with an analysis of the employment rate across the two groups. Table 2.1 reports the regression results for the probability of being employed. The estimated coefficients of the first five columns in Table 2.1 are based on the Microcensus, the following five columns on the IAB SOEP Migration Sample. Columns (1) and (6) show the coefficients for a baseline model only including covariates for gender, age and state fixed effects. The following columns add controls for education and years since migration (columns (2) and (6)), and region of origin-fixed effects (Columns (3)

and (8)). Throughout the first two specifications in both data sets, refugees have a significant lower employment rate than the comparison group. The gap varies between 11 and 17.5 percentage points. Including the region of origin-fixed effects reduces the employment gap to 8 and 11 percentage points, which is a reduction of about 24% (MZ) or 37% (IAB SOEP). The massive reduction in the employment gap indicates that a large part of the refugee gap is due to differences in home country (or home region) characteristics rather than refugee specific. This leads us to the question how the employment gap evolves over time in Germany and if we observe different assimilation pattern across the groups. The specifications in columns (4), (5), (9) and (10) allow for both groups to have separate assimilation profiles. We observe the same pattern in both data sets: Refugees start with a large employment gap and reduce the gap consistently with every further year in Germany. Figure 2.3 illustrates the assimilation pattern based on the estimated coefficients of the IAB SOEP Migration Sample. The employment rate of the comparison group increases linearly with every additional year in Germany. The employment rate of refugees rises at a higher rate in the first years. After approximately 13 years, the employment rate of refugees has almost caught up to the employment rate of the comparison group and approximately 93% of the initial gap is closed.[15] Afterwards the gap increases again. The main difference between the groups is thus the pace of assimilation into the labor market.

The IAB SOEP Migration Sample allows us to compare the average duration until an individual is employed for the first time after immigration to Germany. If our findings regarding the assimilation patterns are not just the result of changing cohort quality within the group of refugees, we should observe significant differences across the groups. Table A.3 reports the regression results for the duration until an immigrant finds her first employment. In all specifications, refugees need significantly more time to find their first job in Germany. On average, it takes almost ten months or in other words 20% more time until they are employed for the first time. If we restrict the first job to only full-time employment (columns (3) to (4)), the gap increases to one and a half year which is approximately 50% more time as an immigrant in the comparison group. The estimation results are conditional on having worked in Germany at least once. Considering the lower overall employment

[15] The strong decline at the end of the profile is in parts the result of the functional form of the assimilation process. We address this issue in section 2.6.

**Figure 2.3:** Assimilation Profiles for Employment




Notes: The figure shows the estimated assimilation profiles of refugees and the comparison group based on the estimates of Table 2.1 by year since migration.
Source: IAB SOEP Migration Sample (2013), own calculations.

rate of refugees, the coefficients are likely to be a lower bound estimate of the total effect.

A large part of the public discussion about refugees and low-skilled immigration in general focuses on increased public spending via social transfers. Table A.4 presents the results of welfare dependency. The dependent variable is defined as one if an individual receives unemployment benefits or social assistance and zero otherwise. Indeed, we observe that refugees do have a higher share of individuals who receive public transfers. The coefficients of the Microcensus are smaller, but both samples provide evidence for a higher welfare dependency of refugees. The results reflect the reverse assimilation pattern as observed in Table 2.1. Relative to the comparison group, the welfare dependency of refugees is much higher after arriving in Germany and decreases over time. Yet, the share of refugees receiving transfers does not entirely converge to the rate of the comparison group.

Table A.5 provides us with further evidence on the catch-up process of refugees and tries to detect if the slower labor market integration of refugees is voluntary or the result of searching for a job unsuccessfully. For the sample of unemployed immigrants, we have information whether they plan to be employed in the future. Columns (1) to (4) show the marginal effects of an ordered probit model for a discrete variable from one ("Definitely not") to four ("Definitely"), columns (5) to (8) the results for an indicator variable which is one if the immigrant plans to be

employed and zero otherwise.[16] Unemployed refugees have a higher expectation to be employed in the future than the comparison group. The coefficient in column (8) becomes even larger including the region of origin-fixed effects which indicates the intention of refugees to be employed.

Hitherto, our analysis reveals that refugees and economic immigrants differ significantly in their integration into employment; these differences can be summarized into two main findings. Firstly, refugees have significantly lower employment rate and a significantly higher welfare dependency than the comparison group in the first years after arriving in Germany. Secondly, the annual growth in employment is greater than the growth rates of the comparison group. In other words, the labor market assimilation profiles of refugees are steeper and close large parts of the initial gap. After about 13 years in Germany, the employment rate of both groups has almost converged. Evidence on future employment aspirations suggests that both groups do not differ in their willingness to work, but rather that refugees need more time finding a job.

### 2.5.2 Earnings

So far, we have analyzed the extensive margin of employment between refugees and the comparison group, but not the earnings of both groups. Earnings represent a proxy for the productivity of individuals and, if refugees have higher investments in human capital, it should translate into a greater growth in earnings. For the analysis, we use the monthly personal income and restrict the sample to individuals who are currently employed. Again, we should bear in mind that the measures for income are defined differently across the data sets and are not fully comparable. Thus, we will focus on the results of the IAB SOEP Migration Sample.[17] Table 2.2 presents regression results for log net personal income. The raw differences in labor income between the groups are large, refugees earn 26% less than the comparison group in the baseline model (Column (1)). Including further covariates and the region of origin fixed-effects, the gap substantially reduces to 16%, a decline of about 40%. Figure 2.4 displays the assimilation profiles of both groups. The interpretation of the assimilation pattern is not straightforward. Given that almost no refugee in our

[16] The binary variable is one if the individual answers the question with 3 ("probable") or 4 ("definitely") and zero otherwise.

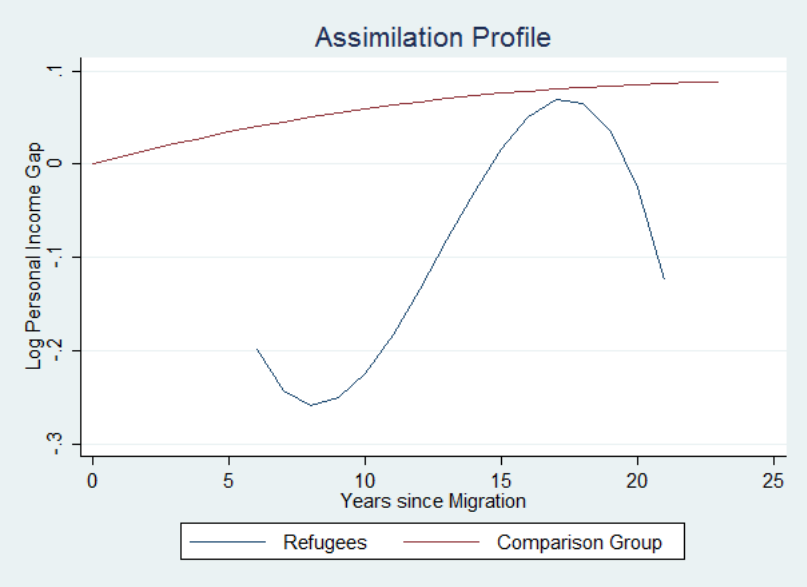
[17] The results of the Micocensus are presented in Table A.6 in the Appendix.

**Table 2.2:** Estimation Results for Income (IAB SOEP)

| | Log Personal Income | Log Personal Income | Log Personal Income | Log Personal Income | Log Personal Income |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Refugee | -0.256*** | -0.233*** | -0.157** | 1.038 | 0.877 |
| | [0.064] | [0.070] | [0.077] | [0.666] | [0.614] |
| Refugee*Years in Germany | | | | -0.407** | -0.339* |
| | | | | [0.199] | [0.180] |
| Refugee*Years in Germany$^2$ | | | | 0.035** | 0.030* |
| | | | | [0.018] | [0.016] |
| Refugee*Years in Germany$^3$ | | | | -0.001* | -0.001* |
| | | | | [0.000] | [0.000] |
| Years in Germany | | -0.064 | -0.043 | -0.024 | -0.009 |
| | | [0.047] | [0.046] | [0.046] | [0.046] |
| Years in Germany$^2$ | | 0.006 | 0.005 | 0.002 | 0.001 |
| | | [0.005] | [0.005] | [0.004] | [0.004] |
| Years in Germany$^3$ | | -0.000 | -0.000 | -0.000 | -0.000 |
| | | [0.000] | [0.000] | [0.000] | [0.000] |
| Observations | 704 | 704 | 704 | 704 | 704 |
| R Squared | 0.229 | 0.275 | 0.300 | 0.280 | 0.304 |
| | Log Hourly Wage | Log Hourly Wage | Log Hourly Wage | Log Hourly Wage | Log Hourly Wage |
| | (6) | (7) | (8) | (9) | (10) |
| Refugee | -0.097* | -0.132** | -0.115* | 1.786** | 1.681** |
| | [0.053] | [0.056] | [0.063] | [0.744] | [0.663] |
| Refugee*Years in Germany | | | | -0.520*** | -0.485*** |
| | | | | [0.196] | [0.175] |
| Refugee*Years in Germany$^2$ | | | | 0.041** | 0.039*** |
| | | | | [0.016] | [0.015] |
| Refugee*Years in Germany$^3$ | | | | -0.001** | -0.001** |
| | | | | [0.000] | [0.000] |
| Years in Germany | | 0.017 | 0.027 | 0.052 | 0.059* |
| | | [0.036] | [0.035] | [0.034] | [0.034] |
| Years in Germany$^2$ | | 0.000 | 0.000 | -0.003 | -0.003 |
| | | [0.004] | [0.004] | [0.003] | [0.003] |
| Years in Germany$^3$ | | -0.000 | -0.000 | 0.000 | 0.000 |
| | | [0.000] | [0.000] | [0.000] | [0.000] |
| Observations | 704 | 704 | 704 | 704 | 704 |
| R Squared | 0.071 | 0.084 | 0.107 | 0.099 | 0.119 |
| Gender | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes |
| Education | No | Yes | Yes | Yes | Yes |
| Region of Origin | No | No | Yes | No | Yes |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2013, aged 20 or above and are 25-60 years old. The sample is restricted to individuals who are currently employed. The dependent variable in columns (1) to (5) is Net Personal Income (in logs) only including earned income. In columns (7) to (10), the dependent variable is log net hourly wage which is the quotient of income and the working hours. All specifications include the same individual characteristics as earlier tables (Gender, Age, State). We also include eight region of origin fixed effects (new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, America and Oceania and Russia and other former Soviet Union republics. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree. Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: IAB SOEP Migration Sample (2013).

**Figure 2.4:** Assimilation Profiles for Income




Notes: The figure shows the estimated assimilation profiles of refugees and the comparison group for log net monthly income based on the estimates of Table 2.2 column (5) by year since migration.
Source: IAB SOEP Migration Sample (2013), own calculations.

sample is employed in the first five years since migration, the assimilation profiles are displayed for refugees who reside for more than six years in Germany.[18] The profile of the comparison group increases with a relative constant growth rate. For the group of refugees, the profile is steeper and we observe a sizable catch-up process of refugees. After 18 years, the income gap reduces to less than 2% which translates into an average annual catch-up rate of 2%. After 18 years, the gap increases again. However, the increasing gap at the posterior part of the profile should be interpreted carefully. Firstly, the number of employed individuals in both groups with more than 20 years since migration is low. Hence, this part of the profile is imprecisely estimated. Secondly, the assimilation profile of refugees based on the Microcensus does not have a negative shape at the posterior part.

Compared to the catch-up rate of refugees in the USA (Cortes, 2004), the annual earnings growth of refugees is slightly smaller in Germany. Yet, the large difference between the two countries is in the initial earnings gap. Whereas refugees in the United States earn on average 17% less within the five years, the gap in Germany is about 30%. Thus, despite a similar relative earnings' growth, refugees in Germany do not entirely close the gap or even offset the gap like in the USA.

An increase in labor income can have two reasons. It could either be due to

[18] In the first five years, the sample includes twelve observations which belong to the group of refugees. Only one observation among them is employed.

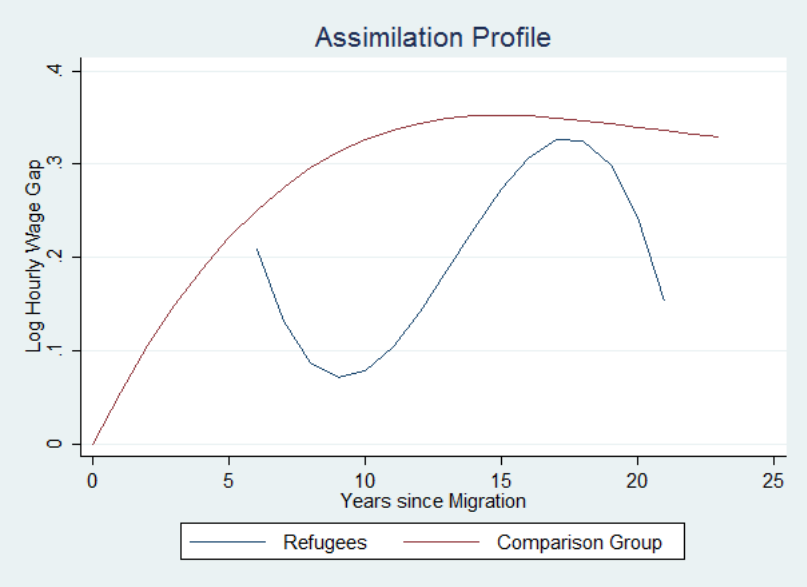
increased working hours or due to higher productivity and therefore higher hourly wages. To disentangle the relative growth of earnings into a part induced by increased working hours and a part induced by hourly wage growth, we calculate the rough net hourly wages.[19] The overall gap in hourly wages between refugees and the comparison group is 12%, roughly a reduction of 25% compared to the monthly personal income. Figure 2.5 describes the assimilation profiles of the log hourly wage. Compared to the monthly earnings, the assimilation profile for the comparison group is much steeper. The hourly wage increases by 30% within 15 years. The assimilation of refugees has a similar pattern as in Figure 2.4. The hourly wage decreases at first and starts to grow after about nine years. After 18 years, the gap is almost closed. The annual growth rate of refugees relative to the comparison groups is 2.1%. Given that the wage growth of the comparison group is also 2%, the total growth rate of refugees is 4.1% per year. The sharp decline in the first years might have the following explanation. In Table A.3, we find that refugees with higher education find their first job much faster. The negative growth in hourly earning might just be the result of less productive refugees finding employment. To test for this possibility, we estimate the assimilation profiles for the full sample defining the labor income for unemployed individuals as zero. If increased employment of less productive refugees induces the negative growth rate in the first years, we should not observe a negative assimilation profile for the unconditional sample (Figure A.2). Indeed, the unconditional income gap decreases with every additional year since migration. This is a clear indication that increased employment of refugees with lower productivity leads to negative growth rate.

### 2.5.3 Type of Employment and Potential Mechanisms

We have investigated that refugees assimilate to the labor market outcomes of economic immigrants in terms of employment and earnings, but the assimilation takes much more time. What are the reasons for the slow assimilation? Table 2.3 summarizes regression coefficients for various employment determinants to give a more detailed picture of the types of job in which refugees work. Overall, refugees work more likely in unstable and unskilled jobs. They have a significantly higher probability to be employed temporarily and to work in jobs which are unskilled or do not

[19] To calculate the net hourly wage, we divide the monthly earnings by the actual working hours. To include self-employed individuals, we decided to use actual working hours instead of contractual working hours.

**Figure 2.5:** Assimilation Profiles for Hourly Wage




Notes: The figure shows the estimated assimilation profiles of refugees and the comparison group for log net hourly wage based on the estimates of Table 2.2 column (10) by year since migration.
Source: IAB SOEP Migration Sample (2013), own calculations.

match their qualifications. In terms of magnitude, the effects are large and relevant given that about 50% of all refugees work in an unskilled position and only 20% work in jobs which match their qualifications. In general, one can say that these job characteristics are associated with lower earnings and less job security. Hence, the lower hourly wages of refugees are likely to be the result of a higher probability to work in low quality jobs.

But what are the channels driving the large initial employment gap, the lower job quality and the catch-up process in the following years? To shed light on the mechanisms behind the observed assimilation pattern, we test whether refugee status has an effect on different channels of assimilation: Human capital investments, language skills as a special type of country-specific human capital and informal networks. Thus, we try to disentangle the mechanisms that hamper refugees' initial labor market integration and to identify areas of immigration policy which can improve the labor market performance of refugees.

One theoretical argument for a larger earnings' growth of refugees is that refugees invest more in human capital due to the missing opportunity to return home. Due to the longer time horizon in the host country, returns to human capital investments become larger and the human capital then translates into higher productivity and wages. The IAB SOEP data provides us with a good measure of the propensity to return home. Individuals were asked if they want to stay in Germany permanently or

**Table 2.3:** Estimation Results for Type of Employment

| | Permanent Contract | | Self-Employed | | Unskilled Position | | Job matches Qualification | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Refugee | -0.120*** | -0.093* | 0.020 | 0.049 | 0.140*** | 0.064 | -0.144*** | -0.105* |
| | [0.045] | [0.052] | [0.030] | [0.033] | [0.052] | [0.061] | [0.053] | [0.061] |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 656 | 656 | 668 | 668 | 605 | 605 | 532 | 532 |
| R Squared | 0.092 | 0.097 | 0.054 | 0.077 | 0.136 | 0.154 | 0.094 | 0.110 |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2013, aged 20 or above and are 25-60 years old. The dependent variable permanent contract (in columns (1)-(2)) is one if the individual possesses a permanent contract and zero otherwise. The dependent variable self-employed (in columns (3)-(4)) is one if the individual is self-employed and zero otherwise. The dependent variable unskilled position (in columns (5)-(6)) is one if the individual works in position which does not require vocational or academic training and zero otherwise. The dependent variable job matches qualification (in columns (7)-(8)) is one if the individual works in the occupation she is trained for and zero otherwise. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany, Region of Origin). Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: IAB SOEP Migration Sample (2013).

if they plan to return home. Table 2.4 reports the regression results for a dependent variable which is one if the individual plans to stay in Germany permanently and zero otherwise. Indeed, we observe a strong and significant positive effect of refugees on the propensity to stay permanently. The share of individuals who plan to stay permanently is about 10 percentage points larger than the share of immigrants in the comparison group (Columns (1) and (2)). Including the region of origin-fixed effects, the coefficient does not change much in size or loses significance. Thus, refugees have a higher propensity to stay even compared to the peers from the same region of origin. However, we do not observe more investments into formal human capital or citizenship acquisition. Refugees are not more likely to naturalize (Columns (3) and (4)), do not plan to acquire more additional qualifications or degrees in the future (Columns (5) and (6)) nor invest in the recognition of their foreign qualifications or degrees (Columns (7) and (8)). One explanation could be that our proxies of human capital investments are not sufficient to measure actual investments. Or, if we consider that about 80% of the refugees work in jobs which do not match their qualifications, further investments in formal qualifications might not seem to be worthwhile. As a consequence, this lack of investments might hamper moving up the occupational ladder in the wider future and explain why we do not observe that refugees outperform economic immigrants.

The key for a successful integration into the host society are language skills. According to the theoretical framework, refugees should have significantly lower language skills before immigration to Germany. Table 2.5 reports the estimation

**Table 2.4:** Estimation Results for Human Capital

| | Stay in Germany permanently | | Naturalization | | Intentions for Further Qualification | | Recognition of Foreign Qualifications | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Refugee | 0.132*** | 0.107*** | 0.034 | 0.004 | -0.007 | -0.030 | -0.025 | -0.009 |
| | [0.030] | [0.034] | [0.034] | [0.038] | [0.026] | [0.031] | [0.051] | [0.060] |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1,040 | 1,040 | 1,057 | 1,057 | 1,051 | 1,051 | 503 | 503 |
| R Squared | 0.060 | 0.083 | 0.098 | 0.165 | 0.118 | 0.132 | 0.053 | 0.059 |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2013, aged 20 or above and are 25-60 years old. The dependent variable in columns (1)-(2) is one if the individual plans to stay in Germany permanently and zero otherwise. The dependent variable in columns (3)-(4) is one if the individual is naturalized and zero otherwise. The dependent variable in columns (5)-(6) is one if the individual has intentions to get further qualifications and zero otherwise. The dependent variable in columns (7)-(8) is one if the individual has recognized her occupational degree and zero otherwise. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany, Region of Origin). Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1. Source: IAB SOEP Migration Sample (2013).

results for the language ability measured as the self-assessed ability to speak German (Columns (1) to (8)). Refugees have significantly lower language skills than the comparison group before immigration to Germany. Yet, if we compare the current level of language skills, the gap in the average level as well as in the share of low proficient immigrants has vanished. In terms of language ability, refugees show a strong convergence and reduce the initial shortcomings. The results for speaking German are consistent with other dimensions of language ability like reading and writing (Table A.7). Overall, the results show that refugees offset their initial shortcomings and that acquiring language skills is most likely one channel which explains the distinct assimilation profiles.

Another potential channel which might explain the different assimilation duration is the access to informal networks in the host country. Several studies have shown that social networks are very important channels to find a job and improve job quality (e.g., Dustmann et al., 2015; for a survey, see Ioannides and Datcher Loury, 2004). Unfortunately, we have no detailed information on the quantity and quality of the social network, but we have information in both data sets whether the individuals have found their first jobs via friends or relatives. We use this information as a rough proxy for access to networks. Informal channels are also very important for the labor market integration in our samples given that more than 50% of both groups report to have found their first job via friends and relatives (Table A.2). Columns (1) to (4) show the effect of refugee status on the probability to find a job via informal networks for both data sets. The coefficients are negative in

**Table 2.5:** Estimation Results for Language Skills

| | Before Immigration | | | | Current Level | | | |
|---|---|---|---|---|---|---|---|---|
| | Speaking | | Speaking badly | | Speaking | | Speaking badly | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Refugee | 0.530*** | 0.489*** | 0.143*** | 0.138*** | 0.022 | -0.103 | -0.002 | -0.020 |
| | [0.101] | [0.111] | [0.031] | [0.036] | [0.086] | [0.100] | [0.020] | [0.022] |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany | No | No | No | No | Yes | Yes | Yes | Yes |
| Region of Origin | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 |
| Log-Likelihood | -1191,49 | -1180,39 | | | -1210,76 | -1166,18 | | |
| R Squared | | | 0.055 | 0.065 | | | 0.092 | 0.111 |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2013, aged 20 or above and are 25-60 years old. The dependent variable speaking (in columns (1)-(2) and (5)-(6)) is self-assessed language skills regarding speaking German (reported on a scale from 1=Very well to 5=Not at all). The dependent variable speaking badly (in columns (3)-(4) and (7)-(8)) is an indicator variable which is one if self-assessed language skills are reported as 5=Not at all or 4=Poorly and zero otherwise. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany, Region of Origin). Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: IAB SOEP Migration Sample (2013).

all specifications and both data sets indicate that refugees lack the same access to informal network as economic or family immigrants. As a proxy for the quality of the network, we use the ethnic composition of the circle of friends. A larger share of natives might raise the overall quality of the network (given the better average labor market position of natives) or provide immigrants with additional information. The dependent variable in columns (5) and (6) is an indicator variable which is one if all or most friends of the individual are foreigners and zero otherwise. In columns (7) and (8), we estimate an ordered probit model for a discrete dependent variable.[20] All coefficients show that refugees have fewer natives within their friends. Given that (close) contact to natives increase the labor force integration (e.g., Meng and Gregory, 2005), refugees have a weaker starting position than immigrants in the comparison group.

Yet, the problem of reverse causality arises. The weaker contact to natives could be a reason for lower labor market performance, but it could also be the result of it. Yet, in sum, we find evidence that refugees have less access to informal networks and that the quality of the network is lower. Both findings indicate that the access to informal network could be one explanation for the slower labor market integration of refugees.

[20]The variable Share of Foreign Friends ranges from one (=all friends are foreigner) to six (=none).

**Table 2.6:** Estimation Results for Informal Networks

| | Informal Job Search (MZ) | | Informal Job Search (IAB) | | Friends mostly Foreigner | | Share of Foreign Friends | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Refugee | -0.189** | -0.129 | -0.049 | -0.053 | 0.104*** | 0.071 | -0.274*** | -0.234** |
| | [0.077] | [0.084] | [0.040] | [0.040] | [0.039] | [0.043] | [0.088] | [0.098] |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany | Yes | Yes | No | No | Yes | Yes | Yes | Yes |
| Region of Origin | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 219 | 219 | 973 | 973 | 1,052 | 1,052 | 1,052 | 1,052 |
| R Squared | 0.173 | 0.239 | 0.025 | 0.035 | 0.060 | 0.098 | | |
| Log-Likelihood | | | | | | | -1602,18 | -1583.73 |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1985 and 2008 (MZ) or 2013 (IAB SOEP), aged 20 or above and are 25-60 years old. The dependent variable in columns (1)-(4) is one if the individual found her job via friends or relatives and zero otherwise. The dependent variable in columns (5)-(6) is one if the individual reports that all or most of her friends are foreigners and zero otherwise. Columns (7)-(8) report marginal effects of an ordered probit model. The dependent variable is the share of foreigners within the circle of friends (from 1=all to 6=none). All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany, Region of Origin). Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: Micocensus (2008) and IAB SOEP Migration Sample (2013).

### 2.5.4 Heterogeneity of the Results

So far, the samples of our analysis included both, female and male immigrants. Yet, the effects might by gender. Table A.8 presents the effects for men and women separately. It appears that the observed patterns of the full sample are more pronounced for male refugees. The initial gap as well as the catch-up rate are larger. Female refugees show a more similar labor market assimilation as female immigrants in the comparison group. This result might not be unexpected as the average labor market integration of female immigrants is relatively low. Yet, female refugees also show a clear convergence in personal income and hourly wage.

If refugees have difficulties to apply their skills and qualifications, refugees with a medium or high level of education should be predominantly affected. Table A.9 shows the estimation results for employment, personal income, and hourly wage by education group. A higher educational level increases the employment probability and the income for both immigrant groups. Relative to the comparison group, the educational level of refugee does not have an impact on employment. However, it has an effect on both, the income and the hourly wage of refugees. High-skilled refugees earn significantly less than high-skilled immigrants in the comparison group. The wage penalty (relative to the comparison group) even offsets the wage premium of being high-skilled. Medium- and low-skilled refugees seem to have a similar labor market performance as the comparison group. Given that we compare refugees to immigrants from the same region of origin, lower quality of the educational degrees

of refugees is not a likely explanation for the finding. Skill depreciation or missing certificates or credentials which could attest qualifications could however be an explanation why high-skilled refugees earn so much less.

## 2.6 Robustness Checks

The idea of the paper is to compare refugees to economic immigrants. Thus, the definition of the comparison group is crucial for the identification of assimilation patterns between the groups. Previous findings could just be the results of a specific definition of the comparison group and not reflect a general pattern. To test the robustness of our results, we set up several different comparison groups. Table A.10 presents the regression results of four different definitions of the comparison group. It ranges from a very broad definition of economic immigrants including all immigrants in Germany to very narrow definitions only consisting of family or economic immigrants. Throughout all specifications, the coefficients of the assimilation process do not vary much. The assimilation pattern of refugees is observable in every specification and shows the catch-up process of refugees. Thus, we are confident that the observed catch-up process is robust and not the result of a selective definition of the comparison group.

Alternatively, the assimilation pattern of refugees could be the result of one specific origin group within the refugee or the comparison group. Refugees from, for instance, the Balkan states could be very successful in their economic integration in Germany and account for large parts of the overall results of refugees. To check for this possibility, we re-estimate the regression models for employment and net personal income always excluding one of the largest regions of origin-groups. Table A.11 displays the results for the restricted samples. Overall, the general patterns are robust over all specifications and do not depend on one specific group of source countries.

Another potential caveat of our analysis might be the functional form of the assimilation profile. The estimated profile might not capture the true relationship between years since migration and economic outcomes. To allow for a more flexible form of the assimilation process, Table A.12 presents regression coefficients for employment, welfare dependency and income including three separate indicators of years since migration. Each indicator captures six years of the assimilation process. The results indicate that our functional form assumption should be capable to capture the true assimilation process. The pace of assimilation is the largest in the

early years in the new host country and decreases over time. As mentioned before, only one refugee in our sample is employed within the first six years. Thus, the interpretation of the coefficients for net personal income of refugees should focus on the comparison of the later indicator variables. As a second test, we estimate the assimilation profiles using linear to quadric polynomial specifications for years since migration. Table A.13 presents the coefficients for all four specifications and Figure A.3 illustrates the differences in the assimilation pattern for employment, log personal income and log hourly wage.[21] For employment, the Figure A.3 shows that the second order polynomial is enough to capture the assimilation process. The assimilation process for income and wage is more complex. Yet, from the third order polynomials, the patterns converge. Thus, we are confident that our results are not the consequence of the selected functional form but represent the relation between years since migration and the respective economic outcomes most efficiently.

## 2.7 Conclusion

The number of refugees living in the OECD has risen over the last years, but not much attention has been drawn to their economic integration. In this article, we attempt to fill the gap and analyze the labor market integration of refugees in Germany. By comparing the labor market assimilation profiles of refugees with the profiles of economic immigrants, we can detect if refugees are a distinct group within the group of immigrants. Moreover, our empirical approach makes it possible to disentangle the effect of refugee status from the region of origin-effect by including region of origin-fixed effects.

Our results are twofold: First, refugees start in a weaker economic position characterized by lower employment and higher welfare dependency. Yet, they catch-up over time in Germany and after around 13 years, the employment rate of refugees has almost reached the employment rate of the comparison group. Secondly, the earnings of refugees are significantly lower than the earnings of economic immigrants. But again, refugees have a greater growth rate and after 17 years, the gap has almost disappeared. The greater relative growth in earnings is not only due to an increase in working hours, but also due to higher productivity. The reason for the slower integration is most likely the lack of country specific human and social capital. Refugees have more difficulties finding jobs in which they can apply their skills than

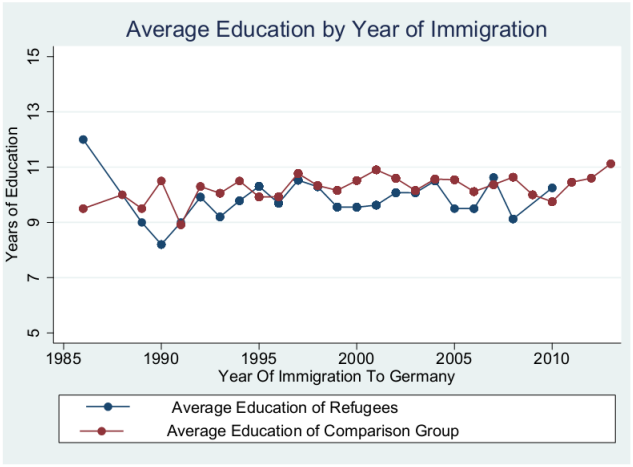
[21] Unlike the previous figures, the lines in Figure A.3 show the estimated difference in outcome by years in Germany between refugees and the comparison group.

economic immigrants.

Our results have important policy implications. Refugees should be considered as one source of immigration which, in the medium and long run, has similar labor market outcomes as economic and family immigrants. Thus, an assessment of refugees' labor market performance should consider the different speed of assimilation. Policies which want to improve the labor market integration of refugees should focus on measures which speed up the job search and matching process. This is especially important in order to avoid skill depreciation and reduce fiscal costs.

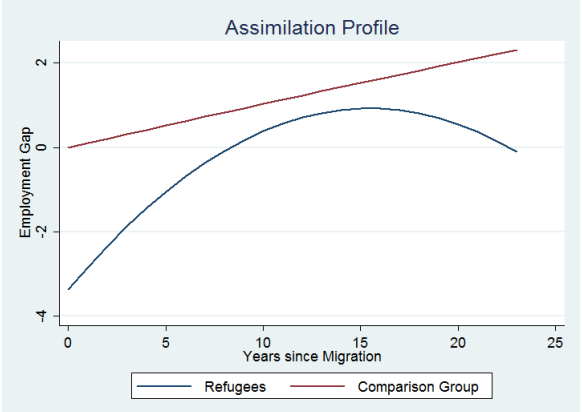
## 2.8 Appendix

**Figure A.1:** Average Education by Year of Immigration



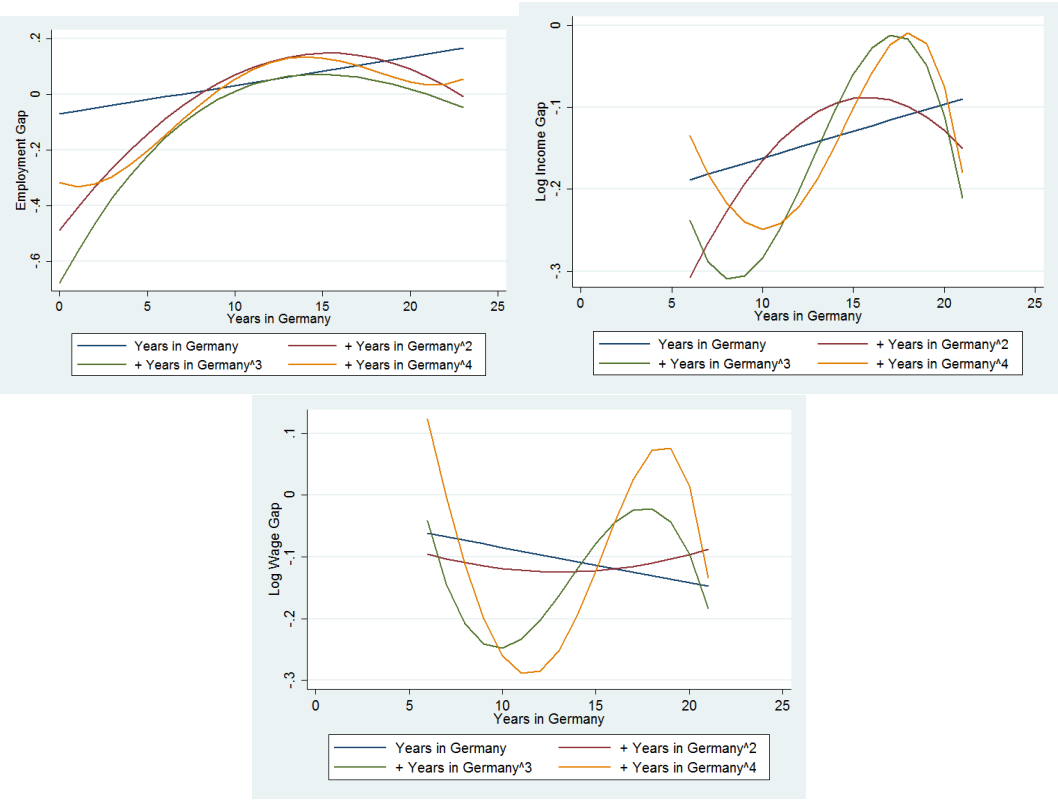

Notes: The figure displays the average level of education by year of immigration for refugees and the comparison group.
Source: IAB SOEP Migration Sample (2013).

**Figure A.2:** Assimilation Profiles for Income (unconditional)




Notes: The figure shows the estimated assimilation profiles of refugees and the comparison group for net monthly income based on estimation for log net personal income unconditional on employment status (unemployed individuals are set to zero) by years since migration.
Source: IAB SOEP Migration Sample (2013), own calculations.

**Figure A.3:** Robustness of the Functional Form




Notes: The figures show the gap in estimated assimilation profiles between refugees and the comparison group for different specifications of the functional form. They include specifications from a linear to a fourth order polynomial relation between years since migration*Refugee and the respective outcome.
Source: IAB SOEP Migration Sample (2013).

## **Table A.1:** Summary Statistics

| | MZ | | | | |
|---|---|---|---|---|---|
| | **Refugees** | | **Economic Immigrants** | | **Significance** |
| | Mean | Std. Dev. | Mean | Std. Dev. | |
| Age | 43.43 | 7.826 | 39.62 | 8.352 | *** |
| Years in Germany | 12.16 | 4.29 | 9.62 | 5.20 | *** |
| Male | 0.588 | 0.493 | 0.479 | 0.500 | ** |
| Naturalized | 0.304 | 0.461 | 0.278 | 0.448 | |
| Low-skilled | 0.387 | 0.488 | 0.333 | 0.472 | |
| Medium-skilled | 0.353 | 0.479 | 0.509 | 0.500 | *** |
| High-skilled | 0.259 | 0.439 | 0.158 | 0.365 | *** |
| Regions of Origin | | | | | |
| New EU Member States (EU-12) | 0.015 | 0.120 | 0.236 | 0.020 | *** |
| Ex-Yugoslavia | 0.284 | 0.031 | 0.091 | 0.288 | *** |
| Turkey | 0.058 | 0.235 | 0.160 | 0.367 | *** |
| Middle East | 0.264 | 0.442 | 0.044 | 0.206 | *** |
| Africa | 0.068 | 0.253 | 0.051 | 0.220 | |
| Asia | 0.112 | 0.317 | 0.071 | 0.257 | * |
| America and Oceania | 0.024 | 0.155 | 0.040 | 0.196 | |
| Former Soviet Union | 0.171 | 0.377 | 0.303 | 0.460 | *** |
| Employment | 0.607 | 0.489 | 0.658 | 0.474 | |
| Receive Welfare Transfers | 0.264 | 0.442 | 0.197 | 0.398 | * |
| Log Personal Income | 7.008 | 0.678 | 7.006 | 0.686 | |
| Observations | 204 | | 448 | | |

| | IAB SOEP | | | | |
|---|---|---|---|---|---|
| | **Refugees** | | **Economic Immigrants** | | **Significance** |
| | Mean | Std. Dev. | Mean | Std. Dev. | |
| Age | 45.07 | 7.22 | 39.94 | 7.72 | *** |
| Years in Germany | 14.63 | 4.44 | 10.32 | 5.39 | *** |
| Age at arrival | 30.44 | 7.156 | 29.61 | 7.215 | |
| Male | 0.627 | 0.485 | 0.380 | 0.486 | *** |
| Naturalized | 0.289 | 0.454 | 0.186 | 0.389 | *** |
| Years of Education | 9.880 | 1.721 | 10.40 | 1.481 | *** |
| Low-skilled | 0.394 | 0.490 | 0.301 | 0.459 | *** |
| Medium-skilled | 0.426 | 0.495 | 0.479 | 0.500 | |
| High-skilled | 0.181 | 0.386 | 0.220 | 0.415 | |
| Regions of Origin | | | | | |
| New EU Member States (EU-12) | 0.008 | 0.089 | 0.425 | 0.495 | *** |
| Ex-Yugoslavia | 0.325 | 0.469 | 0.134 | 0.341 | ** |
| Turkey | 0.120 | 0.326 | 0.178 | 0.383 | *** |
| Middle East | 0.221 | 0.416 | 0.015 | 0.121 | *** |
| Africa | 0.052 | 0.223 | 0.040 | 0.195 | |
| Asia | 0.068 | 0.253 | 0.032 | 0.177 | ** |
| America and Oceania | 0.000 | 0.000 | 0.015 | 0.121 | * |
| Former Soviet Union | 0.205 | 0.404 | 0.162 | 0.369 | |
| Employment | 0.594 | 0.492 | 0.707 | 0.456 | *** |
| Receive Welfare Transfers | 0.369 | 0.484 | 0.153 | 0.361 | *** |
| Log Personal Labor Income | 6.787 | 0.776 | 6.871 | 0.739 | |
| Log Hourly Wage | 5.708 | 0.537 | 5.797 | 0.470 | ** |
| Time till First Job | 1.601 | 2.975 | 2.682 | 3.514 | |
| Observations | 249 | | 808 | | |

Notes: The tables report summary statistics for first-generation immigrants who arrived in Germany between 1990 and 2013 (2008), arrived aged 20 or above and who are 25-60 years old. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree. The variable Employment is one if the individual is employed and zero otherwise. The variable Personal Income (in logs) include net personal income (MZ) or net labor income (IAB SOEP). The variable *Receive Welfare Benefits* is one if the individual receives either unemployment benefits (ALG-I) or social assistance (ALG-II) and zero otherwise. The variable *Time till First Job* is the log time spend in Germany until an individual finds a job (in years). Statistical significance: *** $p<0.01$, ** $p<0.05$ and *$p<0.1$.
Source: Microcensus and IAB SOEP Migration Sample (2013).

## **Table A.2:** Summary Statistics cont'd

| | Refugees | | Economic Immigrants | | Significance |
|---|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. | |
| Permanent Contract | 0.710 | 0.456 | 0.739 | 0.440 | |
| Self-Employed | 0.108 | 0.312 | 0.081 | 0.272 | |
| Unskilled Position | 0.471 | 0.501 | 0.360 | 0.481 | ** |
| Job matches Qualification | 0.210 | 0.409 | 0.396 | 0.490 | *** |
| Stay in Germany Permanently | 0.888 | 0.317 | 0.738 | 0.440 | *** |
| Naturalization | 0.289 | 0.454 | 0.186 | 0.389 | *** |
| Recognition of Credentials | 0.196 | 0.399 | 0.207 | 0.406 | |
| Intentions for Further Qualifications | 0.118 | 0.323 | 0.229 | 0.420 | *** |
| Speaking German (after Immigration) | 4.482 | 1.004 | 4.035 | 1.168 | *** |
| Speaking German badly (after Immigration) | 0.863 | 0.344 | 0.708 | 0.455 | *** |
| Speaking German (Now) | 2.406 | 0.808 | 2.377 | 0.860 | |
| Speaking German badly (Now) | 0.072 | 0.259 | 0.087 | 0.282 | |
| Informal Job Search | 0.543 | 0.499 | 0.568 | 0.496 | |
| Friends mostly Foreigner | 2.751 | 1.299 | 2.991 | 1.254 | *** |
| Share of Foreign Friends | 0.502 | 0.501 | 0.401 | 0.490 | *** |

Notes: The table reports summary statistics for first-generation immigrants who arrived in Germany between 1990 and 2013, whose age at immigration was 20 years or above and who are 25-60 years old. The variable permanent contract is one if the individual posses a permanent contract and zero otherwise. The variable self-employed is one if the individual is self-employed and zero otherwise. The variable unskilled position is one if the individual work in position which does not require vocational or academic training and zero otherwise. The variable job matches qualification is one if the individual works in the occupation she is trained for and zero otherwise. The variable naturalized one if the individual is naturalized and zero otherwise. The recognition of credentials variable is one if the individual has recognized her occupational degree and zero otherwise. The variable Intentions for further Qualifications is one if the individual has intentions to get further qualifications and zero otherwise. The variables Speaking German (after immigration) and Speaking German (Now) are self-assessed language skills regarding speaking German (reported on a scale from 1=Very well to 5=Not at all). The variables Speaking badly (after Immigration or Now) are binary variable which is one if self-assessed language skills are reported as 5=Not at all or 4=Poorly and zero otherwise. The variables Participation in a German Language Course (in Germany) are binary variables which are one if the individuals has participated in a language course and zero otherwise. The variable Informal Job Search is one if the individual found her job via friends or relatives and zero otherwise. The variable Friends mostly Foreigner is one if the individual reports that all or most of her friends are foreigners and zero otherwise. The variable Share of Foreign Friends reports the the share of foreigners within the circle of friends (from 1=all to 6=none). Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: IAB SOEP Migration Sample (2013).

## **Table A.3:** Estimation Results for Time Until First Job

| | Log Years Until First Job | | | |
|---|---|---|---|---|
| | Every Type of Employment | | Full-Time Employment | |
| | (1) | (2) | (3) | (4) |
| Refugee | 0.414*** | 0.194** | 0.484*** | 0.354*** |
| | [0.067] | [0.079] | [0.082] | [0.099] |
| Gender | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes |
| Education | No | Yes | No | Yes |
| Region of Origin | No | Yes | No | Yes |
| Observations | 876 | 876 | 671 | 671 |
| R Squared | 0.160 | 0.209 | 0.141 | 0.159 |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2013, aged 20 or above and are 25-60 years old. The dependent variable is the log time spend in Germany until an individual finds a job (in years). Estimates in columns (1)-(2) include migrants who found a job (both, part-time and full-time). Columns (3)-(4) show the coefficients only including migrants who found a full-time position. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Region of Origin). They also include 8 region of origin fixed effects (new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, America and Oceania and Russia and other former Soviet Union republics. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree. Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: IAB SOEP Migration Sample (2013).

## **Table A.4:** Estimation Results for Welfare Dependency

| | Welfare Dependency MZ | | | | |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Refugee | 0.088** | 0.105** | 0.080* | 0.739*** | 0.732** |
| | [0.041] | [0.042] | [0.045] | [0.282] | [0.289] |
| Refugee*Years in Germany | | | | -0.120** | -0.129** |
| | | | | [0.053] | [0.053] |
| Refugee*Years in Germany$^2$ | | | | 0.005** | 0.006** |
| | | | | [0.002] | [0.002] |
| Observations | 539 | 539 | 539 | 539 | 539 |
| R Squared | 0.082 | 0.107 | 0.137 | 0.117 | 0.148 |
| | IAB SOEP | | | | |
| | (6) | (7) | (8) | (9) | (10) |
| Refugee | 0.185*** | 0.181*** | 0.159*** | 0.604** | 0.539** |
| | [0.033] | [0.034] | [0.038] | [0.236] | [0.225] |
| Refugee*Years in Germany | | | | -0.066* | -0.064* |
| | | | | [0.036] | [0.034] |
| Refugee*Years in Germany$^2$ | | | | 0.002* | 0.002* |
| | | | | [0.001] | [0.001] |
| Observations | 1,057 | 1,057 | 1,057 | 1,057 | 1,057 |
| R Squared | 0.126 | 0.139 | 0.158 | 0.144 | 0.163 |
| Gender | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes |
| Education | No | Yes | Yes | Yes | Yes |
| Years in Germany | No | Yes | Yes | Yes | Yes |
| Region of Origin | No | No | Yes | No | Yes |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2008 (MZ) or 2013 (IAB SOEP), arrived aged 20 or above and are 25-60 years old. The dependent variable is one if the individual receives either unemployment benefits (ALG-I) or social assistance (ALG-II) and zero otherwise. Estimates in columns (1) to (5) are based on the Microcensus, columns (6) to (10) on the IAB SOEP Migration Sample. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany, Region of Origin). They also include 8 region of origin fixed effects (new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, America and Oceania and Russia and other former Soviet Union republics. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree. Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1. Source: IAB SOEP Migration Sample (2013).

## **Table A.5:** Estimation Results for Employment in the Future

| | Plan for Employment in Future | | | | Plan for Employment in Future (Yes/No) | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Refugee | 0.114 | 0.123 | 0.223 | 0.371* | 0.015 | 0.014 | 0.057 | 0.095 |
| | [0.170] | [0.175] | [0.179] | [0.201] | [0.057] | [0.055] | [0.055] | [0.062] |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | No | Yes | Yes | Yes | No | Yes | Yes | Yes |
| Years in Germany | No | No | Yes | Yes | No | No | Yes | Yes |
| Region of Origin | No | No | No | Yes | No | No | No | Yes |
| Observations | 334 | 334 | 334 | 334 | 334 | 334 | 334 | 334 |
| Log-Likelihood | -357.98 | -338.70 | -334.80 | -322.23 | | | | |
| R Squared | | | | | 0.098 | 0.174 | 0.210 | 0.250 |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2013, arrived aged 20 or above and are 25-60 years old. The dependent variable (in columns (1)-(4)) is whether they plan to be gainfully employed in the future ( from 1= Definitely not to 4 = Definitely). The dependent variable (in Columns (5) -(8)) is one if they plan to be gainfully employed ( 4 = Definitely and 3 = Probable) and zero otherwise (2=Improbable and 1= Definitely not). Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: IAB SOEP Migration Sample (2013)

**Table A.6:** Estimation Results for Income (MZ)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| | Income | Income | Income | Income | Income | Wage | Wage | Wage | Wage |
| Refugee | -0.083 | -0.115 | -0.099 | -0.331 | -0.250 | 0.032 | 0.029 | -0.512 | -0.670 |
| | [0.068] | [0.071] | [0.079] | [1.188] | [1.243] | [0.063] | [0.063] | [1.867] | [1.806] |
| Refugee*Years in Germany | | | | -0.024 | -0.028 | | | 0.173 | 0.237 |
| | | | | [0.363] | [0.382] | | | [0.502] | [0.491] |
| Refugee*Years in Germany$^2$ | | | | 0.004 | 0.003 | | | -0.018 | -0.026 |
| | | | | [0.034] | [0.036] | | | [0.043] | [0.042] |
| Refugee*Years in Germany$^3$ | | | | -0.000 | -0.000 | | | 0.001 | 0.001 |
| | | | | [0.000] | [0.000] | | | [0.001] | [0.001] |
| Years in Germany | | -0.013 | -0.006 | -0.033 | -0.021 | -0.016 | -0.015 | -0.015 | -0.018 |
| | | [0.027] | [0.027] | [0.063] | [0.065] | [0.022] | [0.024] | [0.054] | [0.057] |
| Years in Germany$^2$ | | 0.001 | 0.001 | 0.004 | 0.003 | 0.000 | 0.000 | 0.001 | 0.001 |
| | | [0.001] | [0.001] | [0.008] | [0.008] | [0.001] | [0.001] | [0.007] | [0.007] |
| Years in Germany$^3$ | | -0.000 | -0.000 | -0.000 | -0.000 | -0.000 | -0.000 | -0.000 | -0.000 |
| | | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin | No | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 405 | 405 | 405 | 405 | 405 | 405 | 405 | 405 | 405 |
| R Squared | 0.309 | 0.339 | 0.352 | 0.350 | 0.360 | 0.106 | 0.119 | 0.109 | 0.122 |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2008, arrived aged 20 or above and are 25-60 years old. The sample is restricted to individuals who are currently employed. The dependent variable in columns (1) to (6) is Net Personal Income (in logs) only including earned income. In columns (7) to (10), the dependent variable is actual working hours in the last month (in hours). Columns (11) to (14) show the coefficients for the dependent variable log net hourly wage which is the quotient of income and the working hours. All specifications include the same individual characteristics as earlier tables (Gender, Age, State). We also include 8 region of origin fixed effects (new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, America and Oceania and Russia and other former Soviet Union republics. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree. Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: Microcensus (2008)

## **Table A.7:** Language Skills

**Level of German Language Before Immigration**

| | Speaking | | Speaking badly | | Writing | | Writing badly | | Reading | | Reading badly | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Refugee | 0.530*** | 0.489*** | 0.143*** | 0.138*** | 0.504*** | 0.465*** | 0.116*** | 0.118*** | 0.510*** | 0.484*** | 0.122*** | 0.130*** |
| | [0.101] | [0.111] | [0.031] | [0.036] | [0.104] | [0.113] | [0.030] | [0.034] | [0.105] | [0.112] | [0.032] | [0.037] |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany | No | No | No | No | No | No | No | No | No | No | No | No |
| State | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 |
| Log-Liklihood | -1191.49 | -1180.39 | | | -1265.75 | -1255.23 | | | -1260.15 | -1250.96 | | |
| R Squared | | | 0.055 | 0.065 | | | 0.059 | 0.067 | | | 0.061 | 0.068 |

**Current Level of German Language**

| | Speaking | | Speaking badly | | Writing | | Writing badly | | Reading | | Reading badly | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Refugee | 0.022 | -0.103 | -0.002 | -0.020 | 0.096 | 0.009 | 0.014 | 0.002 | 0.077 | -0.014 | -0.007 | 0.007 |
| | [0.086] | [0.100] | [0.020] | [0.022] | [0.081] | [0.093] | [0.030] | [0.034] | [0.084] | [0.094] | [0.024] | [0.026] |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 | 1,055 |
| Log-Likelihood | -1210.76 | -1166.18 | | | -1385.86 | -1372.86 | | | -1310.63 | -1289.26 | | |
| R Squared | | | 0.092 | 0.111 | | | 0.134 | 0.140 | | | 0.131 | 0.143 |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1985 and 2013, arrived aged 20 or above and are 25-60 years old. The dependent variables speaking (in columns (1)-(2)), writing (in columns (5)-(6)) and reading (in columns (9)-(10)) are self-assessed language skills speaking German (reported on a scale from 5=Not at all to 1= Very well). These columns report marginal effects of an ordered probit model. The dependent variable speaking badly (in columns (3)-(4), (7)-(8) and (11)-(12)) is a binary variable which is one if self-assessed language skills are reported as 5=Not at all or 4=Poorly) and zero otherwise. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany, Region of Origin). Robust standard errors are in parentheses. Statistical significance: *** $p<0.01$, ** $p<0.05$ and *$p<0.1$.
Source: IAB SOEP Migration Sample (2013)

## **Table A.8:** Estimation Results by Gender

**Men**

| | Employment | | Log Income | | Log Wage | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Refugee | -0.133** | -0.820*** | -0.193** | 2.936 | -0.161*** | 2.665 |
| | [0.057] | [0.265] | [0.083] | [2.263] | [0.062] | [1.628] |
| Refugee*Years in Germany | | 0.109*** | | -0.762 | | -0.657* |
| | | [0.041] | | [0.522] | | [0.394] |
| Refugee*Years in Germany$^2$ | | -0.004** | | 0.056 | | 0.047 |
| | | [0.002] | | [0.038] | | [0.030] |
| Refugee*Years in Germany$^3$ | | | | -0.001 | | -0.001 |
| | | | | [0.001] | | [0.001] |
| Observations | 463 | 463 | 351 | 351 | 351 | 351 |
| R Squared | 0.151 | 0.164 | 0.253 | 0.197 | 0.226 | 0.192 |

**Women**

| | Employment | | Log Income | | Log Wage | |
|---|---|---|---|---|---|---|
| | (7) | (8) | (9) | (10) | (11) | (12) |
| Refugee | -0.070 | -0.320 | -0.176 | 0.408 | -0.037 | 1.455** |
| | [0.062] | [0.305] | [0.146] | [0.594] | [0.124] | [0.617] |
| Refugee*Years in Germany | | 0.040 | | -0.335 | | -0.484* |
| | | [0.052] | | [0.291] | | [0.260] |
| Refugee*Years in Germany$^2$ | | -0.001 | | 0.033 | | 0.040 |
| | | [0.002] | | [0.028] | | [0.025] |
| Refugee*Years in Germany$^3$ | | | | -0.001 | | -0.001 |
| | | | | [0.001] | | [0.001] |
| Observations | 594 | 594 | 353 | 353 | 353 | 353 |
| R Squared | 0.171 | 0.172 | 0.128 | 0.139 | 0.115 | 0.135 |
| Age | Yes | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin | Yes | Yes | Yes | Yes | Yes | Yes |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1985 and 2013, aged 20 or above and are 25-60 years old. The dependent variable (in columns (1)-(2) and (7)-(8)) is whether the individual is employed or not. Columns (1) and (2) include male immigrants, columns (7) and (8) female immigrants. The dependent variable (in columns (3)-(4) and (9)-(10)) is the log net personal labor income. Columns (3) and (4) include male immigrants, columns (9) and (10) female immigrants. The dependent variable (in columns (5)-(6) and (11)-(12)) is the log net hourly wage. Columns (5) and (6) include male immigrants, columns (11) and (12) female immigrants. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany). They also include 8 region of origin fixed effects (new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, America/Oceania and Russia/other former Soviet Union states. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree. Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: IAB SOEP Migration Sample (2013).

**Table A.9:** Estimation Results by Education Group

| | Employment | | Log Personal Income | | Log Hourly Wage | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Refugee | -0.176*** | -0.136** | -0.073 | -0.000 | -0.014 | 0.009 |
| | [0.059] | [0.062] | [0.103] | [0.103] | [0.063] | [0.065] |
| Refugee *Medium Education | 0.056 | 0.085 | -0.094 | -0.102 | -0.058 | -0.072 |
| | [0.076] | [0.076] | [0.137] | [0.134] | [0.089] | [0.088] |
| Refugee*High Education | -0.125 | -0.063 | -0.590*** | -0.556*** | -0.542*** | -0.528*** |
| | [0.096] | [0.095] | [0.197] | [0.194] | [0.152] | [0.150] |
| Medium Education | 0.154*** | 0.089** | 0.296*** | 0.238*** | 0.115*** | 0.089** |
| | [0.037] | [0.039] | [0.064] | [0.064] | [0.041] | [0.043] |
| High Education | 0.198*** | 0.130*** | 0.573*** | 0.536*** | 0.392*** | 0.375*** |
| | [0.043] | [0.045] | [0.082] | [0.083] | [0.055] | [0.056] |
| Observations | 1,057 | 1,057 | 704 | 704 | 704 | 704 |
| R Squared | 0.125 | 0.154 | 0.304 | 0.325 | 0.169 | 0.181 |
| Age | Yes | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin | No | Yes | No | Yes | No | Yes |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1985 and 2013, arrived aged 20 or above and are 25-60 years old. The dependent variable (in columns (1)-(2)) is whether the individual is employed or not. The dependent variable (in columns 3)-(4)) is the log net personal labor income. The dependent variable (in columns (5)-(6)) is the log net hourly wage. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany). They also include 8 region of origin fixed effects (new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, America/Oceania and Russia/other former Soviet Union states. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree. Robust standard errors are in parentheses. Statistical significance: *** $p<0.01$, ** $p<0.05$ and * $p<0.1$. Source: IAB SOEP Migration Sample (2013).

## **Table A.10:** Different Definitions of the Comparison Group

| | **Employment** | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | All immigrants | | Third Country Immigrants | | Family Immigrants | | Economic Immigrants | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Refugee | -0.103*** | -0.477** | -0.100*** | -0.468** | -0.080* | -0.386* | -0.193*** | -0.799*** |
| | [0.037] | [0.209] | [0.039] | [0.211] | [0.044] | [0.217] | [0.051] | [0.238] |
| Refugee | | 0.061* | | 0.062* | | 0.053 | | 0.110*** |
| *Years in Germany | | [0.032] | | [0.033] | | [0.034] | | [0.037] |
| Refugee* | | -0.002* | | -0.002* | | -0.002 | | -0.004*** |
| Years in Germany$^2$ | | [0.001] | | [0.001] | | [0.001] | | [0.001] |
| Refugee* | | | | | | | | |
| Years in Germany$^3$ | | | | | | | | |
| Observations | 2,004 | 2,004 | 1,384 | 1,384 | 835 | 835 | 565 | 565 |
| R Squared | 0.123 | 0.127 | 0.144 | 0.148 | 0.156 | 0.126 | 0.167 | 0.187 |
| | **Log Labor Income** | | | | | | | |
| | All immigrants | | Third Country Immigrants | | Family Immigrants | | Economic Immigrants | |
| | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
| Refugee | -0.210*** | 0.995* | -0.201*** | 1.001* | -0.177** | 0.887 | -0.242** | 0.593 |
| | [0.072] | [0.581] | [0.073] | [0.591] | [0.087] | [0.606] | [0.097] | [0.491] |
| Refugee* | | -0.358** | | -0.365** | | -0.313* | | -0.350** |
| Years in Germany | | [0.170] | | [0.171] | | [0.175] | | [0.157] |
| Refugee* | | 0.030** | | 0.031** | | 0.026* | | 0.035** |
| Years in Germany$^2$ | | [0.015] | | [0.015] | | [0.015] | | [0.014] |
| Refugee* | | -0.001** | | -0.001** | | -0.001* | | -0.001** |
| Years in Germany$^3$ | | [0.000] | | [0.000] | | [0.000] | | [0.000] |
| Observations | 1,428 | 1,428 | 958 | 958 | 520 | 520 | 410 | 410 |
| R Squared | 0.295 | 0.298 | 0.295 | 0.300 | 0.303 | 0.306 | 0.334 | 0.353 |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1985 and 2013, arrived aged 20 or above and are 25-60 years old. The dependent variable (in columns (1)-(8)) is whether the individual is employed or not. In Columns (9) to (16), the dependent variable is log net labor income. Columns (1)-(2) and (9)-(10) include all immigrants in the data set, columns (3)-(4) and (11)-(12) all third country immigrants (excluding ethnic Germans). The comparison group in columns (5)-(6) and (13)-(14) consists of family migrants, columns (7)-(8) and (15)-(16) of immigrants whose reason for immigration was employment. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany). They also include 8 region of origin fixed effects (new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, America/Oceania and Russia/other former Soviet Union states. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree.Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: IAB SOEP Migration Sample (2013).

## **Table A.11:** Excluding Different Regions of Origin

| | Employment | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total Sample | | Without EU-12 | | Without Balkan States | | Without Middle East | | Without former Soviet States | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Refugee | -0.110*** | -0.505** | -0.120*** | -0.652*** | -0.123** | -0.469* | -0.101** | -0.476* | -0.097** | -0.369 |
| | [0.041] | [0.210] | [0.042] | [0.200] | [0.050] | [0.256] | [0.042] | [0.251] | [0.048] | [0.238] |
| Refugee*Years in Germany | | 0.072** | | 0.087*** | | 0.060 | | 0.069* | | 0.059 |
| | | [0.033] | | [0.033] | | [0.039] | | [0.038] | | [0.037] |
| Refugee*Years in Germany$^2$ | | -0.003** | | -0.003** | | -0.002 | | -0.003* | | -0.003* |
| | | [0.001] | | [0.001] | | [0.001] | | [0.001] | | [0.001] |
| Observations | 1,057 | 1,057 | 712 | 712 | 868 | 868 | 990 | 990 | 875 | 875 |
| R Squared | 0.152 | 0.156 | 0.168 | 0.175 | 0.146 | 0.149 | 0.140 | 0.144 | 0.181 | 0.185 |
| | **Log Labor Income** | | | | | | | | | |
| | Total Sample | | Without EU-12 | | Without Balkan States | | Without Middle East | | Without former Soviet States | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Refugee | -0.157** | 0.877 | -0.150* | 1.840 | -0.209** | 0.849 | -0.155* | 0.383 | -0.008 | 0.719 |
| | [0.077] | [0.614] | [0.084] | [1.733] | [0.104] | [0.589] | [0.080] | [0.378] | [0.074] | [0.504] |
| Refugee*Years in Germany | | -0.339* | | -0.534 | | -0.361* | | -0.212 | | -0.308** |
| | | [0.180] | | [0.385] | | [0.186] | | [0.132] | | [0.145] |
| Refugee*Years in Germany$^2$ | | 0.030* | | 0.043 | | 0.033** | | 0.019 | | 0.031** |
| | | [0.016] | | [0.028] | | [0.017] | | [0.012] | | [0.013] |
| Refugee*Years in Germany$^3$ | | -0.001* | | -0.001 | | -0.001** | | -0.001 | | -0.001*** |
| | | [0.000] | | [0.001] | | [0.000] | | [0.000] | | [0.000] |
| Observations | 704 | 704 | 441 | 441 | 595 | 595 | 685 | 685 | 587 | 587 |
| R Squared | 0.300 | 0.304 | 0.323 | 0.327 | 0.291 | 0.297 | 0.311 | 0.314 | 0.341 | 0.350 |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2013, aged 20 or above and are 25-60 years old. The dependent variable in the upper part of the table is employemt. The dependent variable in the lower part is log net personal labor income (conditional on being employed). The columns (1)-(2) show the results of the main specification. Columns (3) and (4) exclude all immigrants from the EU-12 (Eastern European member states of the EU), (5) und (6) all immigrants from the Balkan states, (7) and (8) all immigrants from the Middle East and (9) and (10) all immigrants from former Soviet states. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany). They also include 8 region of origin fixed effects (new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, America/Oceania and Russia/other former Soviet Union states. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree.Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: IAB SOEP Migration Sample (2013).

## **Table A.12:** Functional Form of Assimilation Process

| | Employment | | Welfare | | Net Income | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Refugee | -0.548*** | -0.425*** | 0.504*** | 0.438*** | 0.027 | 0.004 |
| | [0.116] | [0.110] | [0.159] | [0.156] | [0.079] | [0.078] |
| Refugee*Years in Germany (6-12) | 0.399*** | 0.341*** | -0.295* | -0.286* | -0.417** | -0.277 |
| | [0.138] | [0.129] | [0.174] | [0.168] | [0.203] | [0.202] |
| Refugee*Years in Germany (12-18) | 0.405*** | 0.352*** | -0.303* | -0.259 | -0.213* | -0.110 |
| | [0.126] | [0.115] | [0.166] | [0.160] | [0.118] | [0.128] |
| Refugee*Years in Germany (18-23) | 0.296** | 0.223* | -0.341** | -0.274 | -0.142 | -0.088 |
| | [0.135] | [0.126] | [0.172] | [0.167] | [0.150] | [0.152] |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany | Yes | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,057 | 1,057 | 1,057 | 1,057 | 714 | 714 |
| R Squared | 0.106 | 0.139 | 0.079 | 0.103 | 0.272 | 0.296 |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2008, aged 20 or above and are 25-60 years old. The dependent variable (in columns (1)-(2)) is whether the individual is employed. The dependent variable (in Columns (3) -(4)) is one if the individual receives either unemployment benefits (ALG-I) or social assistance (ALG-II) and zero otherwise. In Columns (5) and (6), the dependent variable is log net labor income. The variables Years in Germany are indicator variables being one if the individual has lived in Germany for the respective duration and zero otherwise. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany). They also include 8 region of origin fixed effects (new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, America/Oceania and Russia/other former Soviet Union states. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree.Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: IAB SOEP Migration Sample (2013).

**Table A.13:** Functional Form of Assimilation Process II

| | Employment | | | | Net Income | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Refugee | -0.071 | -0.488** | -0.677* | -0.316 | -0.259 | -0.629 | 0.877 | 0.003 |
| | [0.113] | [0.211] | [0.386] | [0.668] | [0.254] | [0.578] | [0.614] | [0.755] |
| Refugee*Years in Germany | -0.004 | 0.066** | 0.133 | -0.047 | 0.008 | 0.064 | -0.339* | 0.047 |
| | [0.007] | [0.033] | [0.105] | [0.275] | [0.016] | [0.087] | [0.180] | [0.427] |
| Refugee*Years in Germany$^2$ | | -0.003** | -0.009 | 0.018 | | -0.002 | 0.030* | -0.022 |
| | | [0.001] | [0.009] | [0.038] | | [0.003] | [0.016] | [0.065] |
| Refugee*Years in Germany$^3$ | | | 0.000 | -0.001 | | | -0.001* | 0.002 |
| | | | [0.000] | [0.002] | | | [0.000] | [0.004] |
| Refugee*Years in Germany4 | | | | 0.000 | | | | -0.000 |
| | | | | [0.000] | | | | [0.000] |
| Gender | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Age | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Education | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 1,057 | 1,057 | 1,057 | 1,057 | 704 | 704 | 704 | 704 |
| R Squared | 0.134 | 0.139 | 0.140 | 0.141 | 0.299 | 0.300 | 0.304 | 0.306 |
| AIC | 1267.11 | 1265.06 | 1267.35 | 1270.48 | 1372.93 | 1376.21 | 1375.67 | 1377.26 |

Notes: The table reports regression results for first-generation refugees and a comparison group of immigrants who arrived in Germany between 1990 and 2008, arrived aged 20 or above and are 25-60 years old. The dependent variable (in columns (1)-(4)) is whether the individual is employed. In Columns (5) and (8), the dependent variable is log net labor income. All specifications include the same individual characteristics as earlier tables (Gender, Age, State, Years in Germany). They also include 8 region of origin fixed effects (new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, America/Oceania and Russia/other former Soviet Union states. Low-skilled individuals are those without a high school degree or vocational degree; medium-skilled are those with high school degree or vocational degree; high-skilled are those with college degree.Robust standard errors are in parentheses. Statistical significance: *** p<0.01, ** p<0.05 and *p<0.1.
Source: IAB SOEP Migration Sample (2013).

# 3 Returns to Citizenship? Evidence from Germany's Recent Immigration Reforms

## 3.1 Introduction

Over recent decades, many developed countries have accumulated sizable immigrant populations[1]. In 2013, the share of foreign-born was 12% in France, 17% in Sweden and almost 28% in Switzerland. These numbers are comparable to the share of foreign-born in traditional immigrant countries like Australia, Canada or the United States (OECD, 2015; Hanson, 2009). At the same time, immigrants often seem to perform poorly in the labor market. They have higher unemployment rates and earn substantially less than natives (e.g., Algan et al., 2010; OECD, 2015); in Europe, they often fall short along cultural or political integration as well (Algan et al., 2012).

This lack of social and economic integration poses substantial challenges for destination countries. A disadvantaged economic position reduces the fiscal benefit of immigration to the destination country. In aging societies such as Germany, Italy or Japan, lack of assimilation may undermine efforts to sustain the current standard of living. Economic exclusion might also threaten the social cohesion of host countries producing social unrest and hostility among the native population. While immigrant performance seems to be more successful in traditional immigra-

[1]The paper is joint work with Christina Gathmann. We thank Christine Binzel, George Borjas, Christian Dustmann, Zeno Enders, Ben Elsner, Andreas Haufler, Giovanni Facchini, Eckhard Janeba, Astrid Kunze, Panu Poutvaara, Judith Saurer, Albert Solé-Ollé, Massimiliano Tani, Silke Uebelmesser and participants at the University of Mannheim, University of Heidelberg, CESIfo Conference on Public Sector Economics, IZA Research Seminar, the Workshop on Experiments and Quasi-Experiments, the Spring Meeting of Young Economists, European Economic Association Meeting, Society of Labor Economists Meeting, European Association for Labor Economists Meeting, the Verein für Socialpolitik and the TEMPO Conference in Dublin for valuable comments.

tion countries, the speed of assimilation as well as its underlying mechanisms are still hotly debated (see, e.g., Abramitzky et al., 2012; Borjas, 2013; or Card, 2005 for recent contributions). As such, the current situation raises a number of very important questions how immigrants may be better integrated into host societies. Which public policies are effective in promoting the economic integration of immigrants? Or, does successful integration hinge on the right "selection" of immigrants by the host country instead? Answers to these questions are crucial for the economic and social well-being of immigrants and destination countries alike.

In this article, we investigate what role citizenship plays for the assimilation of immigrants. In particular, does a more liberal access to citizenship speed up the economic integration of immigrants in the host country? And if so, what are the underlying mechanisms? Economic theory suggests a number of reasons why citizenship could improve labor market success compared to a permanent resident status. First, citizenship is required for a number of civil servant or public sector jobs. In some countries like Germany, these restrictions apply to a much wider range of occupations: prior to 2012, non-EU citizens had only restricted access to regulated professions like lawyers, notaries, pharmacists or physicians. To the extent that these jobs offer better pay or working conditions than jobs open to the average immigrant, naturalization improves the labor market prospects of immigrants. A second reason is that citizenship provides full geographic mobility within the European Union. By becoming a citizen in one of the EU member states, an individual therefore obtains not only the right to live and work in one, but all EU labor markets.[2] Employers might therefore hesitate to hire a non-EU citizen for a job with extensive traveling or assignments abroad due to additional visa costs and reduced flexibility, for example. Furthermore, employers in the private sector might be less willing to invest in a foreign employee who, from their point of view, is less committed to remain in the host country (e.g., Lalonde and Topel, 1997). Through naturalization, the immigrant could therefore provide a signal of long-term commitment to the destination country - and thus reduce potential barriers to career mobility.

Finally, access to citizenship also increases an immigrant's incentive to invest in the language or other specific skills of the host country. With better destination-specific skills immigrants are more productive on the job or can take advantage of entirely new job opportunities (Chiswick and Miller, 1995; Dustmann and Glitz, 2011 provide a comprehensive survey). Hence, changes in incentives on both the de-

[2] In contrast, an immigrant with permanent resident status has to prove economic self-sufficiency (and possibly fulfill additional criteria) if she wants to settle in another EU member state.

mand and supply side of the labor market suggest that access to citizenship could be an important policy instrument to improve the economic integration of immigrants.

Yet, there are also reasons to believe that a simple comparison of naturalized and non-naturalized immigrants is likely to overstate the true benefits of citizenship. Because naturalized migrants are not selected randomly from the immigrant population, it is difficult to separate the return to citizenship from the selection into naturalization. Migrants applying for citizenship might well be those with the highest motivation to integrate and the best prerequisites to perform well in the host country. Previous studies from Canada and the United States, for instance, suggest indeed that selection into citizenship is positive with respect to observable skills (see Chiswick and Miller, 2008; Mazzolari, 2009; and Yang, 1994 for the United States; and De Voretz and Pivnenko, 2006 for Canada). A second difficulty is that eligibility to citizenship is closely tied to the number of years an immigrant has lived in the host country. As a result, it is challenging to disentangle the returns to citizenship from assimilation in the host country more broadly.

To overcome these empirical challenges, we exploit the unique setting in Germany. Today, more than ten million foreign-born live in Germany, about 13% of Germany's population. Yet, Germany is an exemplary case for the assimilation and integration problems of immigrants with substantial lower employment and earnings even among second-generation immigrants (e.g., Algan et al., 2010 for recent evidence). Most important for our purpose, Germany has substantially liberalized its access to citizenship over the past decades. Traditionally, Germany had a very restrictive citizenship law which was closely tied to ancestry and ethnic origin. In 1991 however, the federal government introduced for the first time explicit criteria how immigrants could obtain German citizenship. And since 2000, immigrants can naturalize after eight years of residence in Germany.

For the empirical analysis, we use the fact that eligibility for citizenship varied across arrival cohorts and birth years. Specifically, the 1991 reform defined age-dependent resident requirements for naturalization. Eligible adults (aged 23 and above) faced a 15-year resident requirement before they could apply for citizenship. Eligible adolescents (ages 16-22) in turn could apply for citizenship after only eight years in Germany. Hence, immigrants (say, born in 1969) who arrived in Germany in 1985, for example, became eligible for citizenship in 1993. Immigrants (born before 1969) who came to Germany in the same year had to wait until 2000 in order to be eligible, or seven years after the younger cohort. The second immigration reform in 2000 reduced resident requirements for all immigrants to eight years. We

then explore how immigrants who arrived in Germany as children or young teens perform in the German labor market as adults. More specifically, we compare young immigrants from the same arrival cohort who get eligible for citizenship in different years while controlling flexibly for year of birth, general assimilation and time effects.

Our results suggest that the propensity to naturalize is quite low in Germany even after the liberalization of citizenship. Naturalization is more common among immigrants from outside the EU member countries and more recent immigrants arriving after the fall of the Berlin wall. Furthermore, selection into citizenship is intermediate in terms of education for immigrant men and negative for immigrant women. Accounting for selection into citizenship is important in our case. Once we control for selection and other confounding factors, there are few, if any effects of eligibility for immigrant men. In line with negative selection into citizenship for women, adjusting for selection actually increases the returns to citizenship eligibility. Evaluated at the mean number of eligible years, the option to naturalize increases female earnings by 0.122 log points. We also implement an instrumental variable approach using eligibility as an instrument for actual naturalization.

We next investigate potential channels for the substantial wage returns of immigrant women. Access to citizenship changes the job characteristics for women, but not for men. About 50% of the observed wage gains are the result of occupational upgrading and working in better-paying industries. After eligibility, women also have more stable jobs: they are less likely to have temporary contracts, less likely to be self-employed, have longer tenure and work for larger firms. Furthermore, eligible women adjust their labor supply at the intensive margin by working 3.2 hours per week longer. Given that part-time work carries sizable wage penalties in most countries including Germany, longer working hours are a second reason for the observed wage growth. Finally, women also improve their German writing skills after eligibility, while men do not. In contrast, the wage returns for women cannot be explained by a higher propensity to work in the public sector. These channels suggest that there are few returns to citizenship within a given job; rather, citizenship seems to open new opportunities in more productive and stable jobs with better pay. As women took advantage of these new opportunities more than men, the option to naturalize improves the relative economic position of women in the immigrant population. Overall, the results suggest that a more liberal access to citizenship can be a promising policy to improve immigrant assimilation in countries with traditionally restrictive immigration policies.

Our article contributes to three strands of the literature. First, we contribute to the literature on naturalization decisions. Most evidence seems to suggest that there is positive selection into citizenship (Mazzolari, 2009 for the US; Bevelander and Veenman, 2008 for the Netherlands; Constant et al., 2009 for Germany). We find mixed results for Germany. Men are intermediately selected as the medium-skilled are more likely to naturalize than the low- and high-skilled. Women, in contrast, are negatively selected with respect to education. Furthermore, our analysis is closely related to the literature on citizenship and labor market outcomes in the United States or Canada (e.g., Chiswick, 1978; Bratsberg et al., 2002; De Voretz and Pivnenko, 2006) and some European countries (see Bevelander and Veenman, 2008 for the Netherlands; Bevelander and Pendakur, 2011; and Scott, 2008 for Sweden; Fougère and Safi, 2009 for France; Steinhardt, 2012 for Germany). Most studies rely on cross-sectional data comparing naturalized citizens with other immigrants. Recently, a few studies employ panel data to study the relationship between actual naturalization and labor market performance (Bratsberg et al., 2002; Bratsberg and Raaum, 2011; Steinhardt, 2012). We contribute to this literature in three ways: first, we study the effect of legal access to citizenship rather than the individual decision to naturalize. Second, we use arguably exogenous variation in eligibility rules from national immigration reforms for identification. Our study therefore does not face the kind of selection problems of earlier, especially cross-sectional studies. Finally, we provide evidence on the benefits of citizenship in a country where naturalization is the exception rather than the norm. Returns to citizenship might differ from those in traditional immigration countries or countries with a long immigration history, such as the US or the UK. Taste-based discrimination, for example, might be more widespread in a country where the native population is more homogeneous and shares common values or a common religion. Returns to citizenship would then be higher if naturalization eliminates taste-based discrimination in the host country; yet, returns might be lower if discrimination is based on foreign-sounding names or appearance rather than citizenship status alone.[3] Two related studies by Avitabile et al. (2013) and Sajons (2015) also analyze the effect of citizenship on integration outcomes in Germany. However, they focus on social and economic integration

[3]Evidence from the European Social Survey suggests that naturalized immigrants feel much less discriminated against in Germany than non-naturalized immigrants (OECD, 2011, Figure 8.1). At the same time, a recent field experiment for apprenticeships in Germany suggest that there is some discrimination against immigrants based on foreign-sounding names or foreign accents which are largely independent of citizenship status (Kaas and Manger, 2012). As such, it is a-priori unclear whether discrimination increases or reduces the returns to citizenship compared to traditional immigration countries.

outcomes of immigrant parents whose children became eligible for citizenship by birth. In contrast, we analyze how the labor market performance of adults changes when they themselves can naturalize.

Finally, our study also contributes to the literature on immigrant assimilation. Most of the literature compares labor market outcomes between natives and immigrants documenting substantial wage gaps upon arrival. While the literature agrees there is some catch-up with time in the host country, extent and speed of immigrant assimilation is still hotly debated (see e.g., Abramitzky et al., 2012; Borjas, 1985, 1995; Card, 2005; Clark and Lindley, 2009; Duleep and Dowhan, 2002; Hu, 2000; Lalonde and Topel, 1997; Lubotsky, 2007; see Dustmann and Glitz, 2011 for a survey). For Germany, most studies do not find much evidence for assimilation relative to natives (Pischke, 1993; Dustmann, 1993; Licht and Steiner, 1994; Schmidt, 1997; Bauer et al., 2005; results in Fertig and Schuster, 2007 are mixed). We focus instead on the assimilation between subsequent immigrant cohorts which share many characteristics and hence are more comparable with each other than with the native population (see also Lalonde and Topel, 1997). More importantly, we can identify how much citizenship (i.e. a change in immigration status) speeds up economic assimilation and provide novel evidence on its underlying channels: through movements up the occupational ladder, more stable employment, improvements in language skills or economic self-sufficiency. Our results thus have direct implications for policy-makers wishing to promote immigrant assimilation in their respective countries.

This article proceeds as follows: The next section discusses the recent immigration reforms in Germany. Section 3 introduces our data sources, while Section 4 explains our empirical strategy to identify the returns to citizenship. Section 5 discusses the results on naturalization decisions and the returns to citizenship. Section 6 presents a number of informal validity checks to test the robustness of our results. Section 7 discusses the policy implications of our findings and concludes.

## 3.2 Institutional Background

### 3.2.1 A Reluctant Immigration Country

More than ten million - or about 13% of the population - in Germany is foreign-born. After World War II, most immigrants, especially from Turkey, Yugoslavia or

Italy came to Germany as guest workers. From the late 1950s until the guest worker program was abolished in 1973, the German government actively recruited foreign, mostly low-skilled labor through a series of bilateral agreements, in order to meet the growing demand of Germany's booming manufacturing sector. Originally, the guest worker program was intended as a short- to medium-run policy. Initially, guest workers obtained work and residence permits for one year. The regulations after that depended on the country of origin. For Turkish guest workers, for instance, the work permit was tied to a particular employer and occupation for the first years. After three years, the guest worker could apply for other jobs within the same occupation. Full job mobility was granted only after four years of gainful employment in Germany. Until 2005, work permits became permanent after six years of residence or after four years if a person had worked in a job subject to social security contributions.[4] Since 2005, immigrants obtain permanent work permits when they worked in Germany for 4 years or lived there for 5 years. While spouses and children could settle in Germany, they could not take up gainful employment or vocational training until 1979. After 1979, they had to wait for up to three years before obtaining a work permit. Immigrants who came to Germany under the age of 18 could obtain a permanent work permit if they had a secondary school degree of a minimum of 9 years or started some vocational training. Importantly, temporary work permits are subject to the proof of precedence in their first two years which requires that no German or EU employee is available for the job.

Despite the temporary nature of the guest worker program, many guest workers actually stayed and settled down in Germany. Since the late 1980s and especially after the fall of the Berlin Wall, new waves of immigrants arrived in Germany from Eastern Europe and the former Soviet Union. In the early 1990s, around one million foreigners (about 1% of its population) arrived in Germany each year.[5] These immigration rates are comparable to those in the United States during the age of mass migration.

[4]Regulations for guest workers from North Africa, Yugoslavia and many other countries in Africa were a bit more restrictive than for Turkish guest workers. Guest workers from the European Union (resp. its predecssor) did not require a work permit and hence, were not restricted to work for a specific employer, for example.

[5]Many of these were ethnic Germans (i.e. immigrants with some German ancestry), mostly from Eastern Europe and the former Soviet Union, who had access to citizenship within three years of arrival in Germany. Aggregate statistics suggest that migration flows of ethnic Germans started in 1985 with less than 50,000 per year and peaked between 1988 and 1991 at around 300,000 per year. Since 1992, the inflow of ethnic Germans is restricted to 220,000 per year. Stricter application requirements (esp. German language requirements) and less financial assistance further reduced the number of applicants in the late 1990s to around 100,000 per year (Bundesministerium des Innern, 2008). Below, we drop ethnic Germans from our sample as they are not affected by the immigration reforms we study.

Despite substantial inflows of foreign-born, Germany had no explicit naturalization policy at that time. Prior to 1991, German citizenship was closely tied to ancestry (*jus sanguinis*) as laid down in the law of 1913. Explicit criteria how a foreign-born immigrant without German ancestry would qualify for naturalization did not exist. The official doctrine was that foreigners were only temporary residents in Germany - even though many foreigners had lived in the country for many years. The Federal Naturalization Guidelines of 1977 summarize the official view at the time quite well: "The Federal Republic of Germany is not a country of immigration; it does not strive to increase the number of German citizens by way of naturalization [...]. The granting of German citizenship can only be considered if a public interest in the naturalization exists; the personal desires and economic interests of the applicant cannot be decisive." (Hailbronner and Renner, 1992, pp. 865-6).

### 3.2.2 A New Approach to Citizenship

The passage of the Alien Act (*Ausländergesetz (AuslG)*) by the federal parliament on April 26, 1990 (and the Federal Council on May 5, 1990) marked a turning point in Germany's approach to immigration and citizenship. The reform which came into effect on January 1, 1991 defined, for the first time, explicit rules and criteria for naturalization.[6] Most importantly for our purpose, the new law imposed an age-dependent resident requirement. Immigrants who were 16-22 years-old (when they first satisfy the resident requirement) became eligible after eight years; we call these eligible adolescents. Immigrants aged 23 and older (when they first satisfy the resident requirement and have not yet been eligible under the reduced resident requirement) became eligible for citizenship only after fifteen years of residence in Germany; we call this group eligible adults.[7] Note that these resident requirements are still quite restrictive in comparison to other countries. Immigrants in Canada, for example, may naturalize after three years and after five years in the United

[6] The reform was preceded by more than a decade of intense political discussion that oscillated between the desire to restrict immigration and encourage return migration on the one hand; and the recognition that the foreign population had to be better integrated into German society on the other hand. Several reform attempts were made during the 1980s, mostly from left-wing parties, but defeated by the political opposition or influential social groups. The reform in 1991 was pushed on the political agenda by a ruling of the Federal Constitutional Court in 1989 on whether immigrants should be entitled to vote in local elections. The Court ruled those local voting rights unconstitutional but advocated a liberalization of Germany's naturalization policy (see Howard, 2008 for a more detailed discussion).

[7] See § 85 AuslG (Alien Act) for adolescent immigrants and § 86 AuslG (Alien Act) for adult immigrants. If the applicant stayed abroad for no more than 6 months, the period of absence still counted toward the resident requirement. Temporary stays abroad (between 6 months and 1 year) may still count for the resident requirement.

States and many European countries (like the UK or Sweden).

Applicants for German citizenship had to fulfill several other criteria: first, they had to renounce their previous citizenship upon naturalization as the new law did not allow dual citizenship. Few exemptions to this rule existed at that time. The most important exception covered citizens of the European Union who could keep their original citizenship (unless their country of origin prohibits dual citizenship).[8] Second, the applicant must not be convicted of a criminal offense.[9] Eligible adults (23 years or older) also had to demonstrate economic self-sufficiency, i.e. they should be able to support themselves and their dependents without welfare benefits or unemployment assistance. Eligible adolescents (aged 16-22) had to have completed a minimum of six years of schooling in Germany, of which at least four years had to be general education. Note that these job or educational requirements are similar or even somewhat lower than the conditions for obtaining a permanent work or residence permit. As such, they are unlikely to have much influence on the decision whether to naturalize or keep a permanent residence and work permit instead. Finally, an applicant needed to declare her loyalty to the democratic principles of the German constitution. Spouses and dependent children of the applicant could be included in the application for naturalization even if they did not fulfill the criteria individually.[10]

The different resident requirements for adults and adolescents remained in place until the second important reform came into effect on January 1, 2000. The Citizenship Act (*Staatsangehörigkeitsgesetz (StAG)*) reduced the resident requirement to eight years irrespective of the immigrant's age.[11] The other requirements of the

[8] Children of bi-national marriages, for example, did not have to give up their dual citizenship until they turned 18. Exceptions were also granted if the country of origin prohibits the renunciation of citizenship or delayed it for reasons outside the power of the applicant; if the applicant was an acknowledged refugee or if the renunciation imposed special hardships on older applicants. In practice, few exceptions to the general rule were granted in the 1990s.

[9] Applicants with minor convictions, such as a suspended prison sentence up to 6 months (which would be abated at the end of the probation period), a fine not exceeding 180 days of income (calculated according to the net personal income of the individual), or corrective methods imposed by juvenile courts, were still eligible. Convictions exceeding these limits were considered on a case-by-case basis by the authorities.

[10] Similar criteria apply in other countries. Overall, they seem to play a secondary for the naturalization process. A survey of eligible immigrants by the Federal Office of Migration and Refugees showed that most migrants had good knowledge about the naturalization criteria. Of those, 72% reported that they fulfilled all requirements while 23% reported to meet most, though not all of the criteria (BAMF, 2012). Most of these additional criteria have to be fulfilled to obtain a work permit. As such, it is unlikely that many applications for naturalization would be denied because of these other criteria. If anything, this would bias our estimates downward as we would define an immigrant as eligible (based on the resident requirement) even though she is not (based on one of the other eligibility criteria).

[11] The law was adopted with a large majority in the lower house on May 7, 1999 and the upper house on May 21, 1999. The provisions are laid down in § 10 Abs. 1 StAG (Abs. 2 for spouses and dependent children of

1991 reform stayed the same: applicants could not have a criminal record, had to demonstrate economic self-sufficiency and their loyalty to democratic principles. In addition, the new law also required applicants to demonstrate adequate German language skills prior to naturalization. As before, the law of 2000 did not recognize dual citizenship in general though exemptions became more common.[12] The 2000 reform further introduced elements of citizenship by birthplace into German law. A child born to foreign parents after January 1, 2000 was eligible for citizenship if one parent had been a legal resident in Germany for 8 years and had a permanent residence permit for at least three years. Since our analysis focuses on first-generation immigrants, our sample is not directly affected by the *jus soli* provisions of the 2000 reform.[13]

The liberalization of citizenship law after 1991 and again after 2000 is reflected in the number of naturalizations in Germany as shown in Figure 3.1. Prior to the first reform, less than 20.000 persons became naturalized on average each year. After the immigration reform in 1991, naturalizations increase to 60-70.000 per year during the 1990s. After the second reform in 2000, the number of naturalizations jumps to over 180.000 and then gradually declines, but remains above 100.000 per year. Relative to the stock of immigrants, the propensity to naturalize was below 0.4% prior to 1991 and increased to 2 percent annually after 1991. Yet, the propensity to naturalize in Germany remains low in international comparison: by 2007, only about 35-40% of first-generation immigrants with more than ten years of residency had naturalized; the share is about 60% in the United Kingdom and over 80% in Canada (OECD, 2011). To investigate the consequences of liberalizing Germany's citizenship law in the labor market, we next discuss our data sources.

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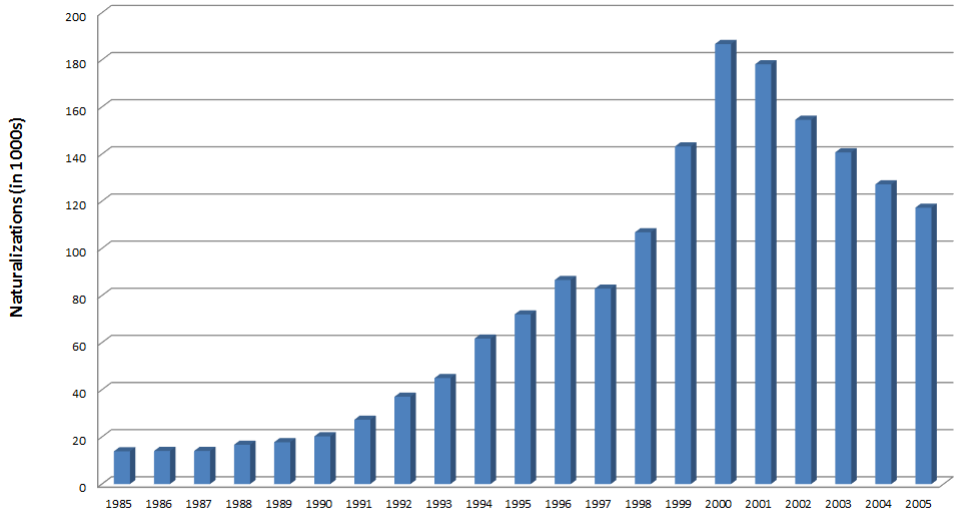
eligible immigrants) which forms the legal basis for over 80% of all naturalizations in Germany (BAMF, 2008). Additional provisions are laid down in § 8 (naturalizations based on a discretionary decision of the authorities because of "public interest") and § 9 (naturalization for spouses of German citizens who face a reduced resident requirement of 3 years).

[12] It became easier for older applicants and refugees to keep their previous citizenship. Applicants could also keep their nationality if it was legally impossible to renounce it or if it imposed a special hardship like excessive costs or serious economic disadvantages (e.g., problems with inheritances or property in their country of origin).

[13] See Avitabile et al. (2013) for an analysis of the *jus soli* provisions of the 2000 reform. There might be an indirect effect on first-generation immigrants, however. Before the 2000 reform, second or third generation immigrants could only become naturalized if their parents applied for citizenship. After the 2000 reform, young children had access to German citizenship independently of their parents' decision (subject to the resident requirements outlined above). Hence, the reform of 2000 might have actually decreased the inter-generational benefits of citizenship for foreign parents with young children. We return to this issue in the robustness analysis below.

**Figure 3.1:** Number of Naturalizations in Germany




Notes: The figure reports the number of naturalizations in Germany (excluding naturalized ethnic Germans); before 1993, the numbers refer to discretionary naturalizations (applications for naturalization based on criteria other than ancestry); after 1993, the numbers refer to naturalizations following the 1991 reform and other discretionary naturalizations. We exclude all naturalizations through a legal claim (based on German ancestry prior to 1990) prior to 1993 and naturalizations based on German ancestry after 1993.
Source: Authors' calculations based on data of the Federal Statistical Office.

## 3.3 Data Sources

### 3.3.1 Microcensus

Our main data to study the consequences of naturalization in the labor market is the Microcensus, an annual survey of 1% of the German population. It covers detailed questions about individual socio-demographic characteristics, employment, personal income and household composition. Most importantly for our purpose, the Microcensus has large samples of foreigners (about 50,000 per year) and precise information on their year of arrival. The sample is restricted to first-generation immigrants, i.e. immigrants born outside of Germany. We also drop ethnic Germans who had faster access to citizenship and therefore are not affected by the 1991 and 2000 reforms. Ethnic Germans have some German ancestry and therefore have access to German citizenship within three years of arrival.[14]

We focus in our analysis on immigrants who arrived in Germany between 1976

[14]We then define ethnic Germans as individuals born outside Germany with a German passport who naturalized within three years of arrival in Germany (which is legally impossible for regular immigrants) and whose previous nationality was Czech, Hungarian, Kazakh, Polish, Romanian, Russian, Slovakian or Ukrainian as ethnic Germans (see Birkner, 2007: Algan et al., 2010 follow the same approach).

and 2000 - and hence become eligible between 1991 and 2008. To make the sample more homogenous, we restrict the sample to immigrants who were between 16 and 30 years-old when they first become eligible for citizenship. It is only since 2005 that the Microcensus elicits information whether an immigrant has obtained German citizenship and the year in which naturalization took place.[15] We therefore use data for the 2005-2010 period for our empirical analysis. This later period allows us to study the decision to naturalize as well as the returns to actual naturalization using an instrumental variable approach. There is a second reason why the focus on these later years is useful. All immigrants in our sample came to Germany as children or young teens - the average age of arrival is 12 years. Many immigrants in our sample are therefore still in full-time education or vocational training at their time of arrival and even when they first become eligible for citizenship.[16] By focusing on later years, we can investigate how eligibility as a teen or young adult affects their labor market careers as adults. The drawback of using this later time period is that most immigrants have become eligible for German citizenship prior to 2005. We return to this issue in the next section when we introduce our empirical strategy.

Our main outcome variables of interest are log personal income and employment. Personal income per month combines labor earnings, income from self-employment, rental income, public and private pensions as well as public transfers (like welfare or unemployment benefits, child benefit or housing subsidies) but is net of taxes and other contributions. To study assimilation in labor income (rather than other sources of personal income), we restrict our sample to those employed (including students and others with some income-generating activity) at the time of the survey. We deflate personal income with the national consumer price index to 2005 prices. Employment is an indicator equal to one if the immigrant pursues any income-generating activity in the week before the interview and zero otherwise. We also analyze economic self-sufficiency, i.e. whether an immigrant receives social assistance payments or unemployment benefits. The variable is coded as one if an individual receives welfare benefits, either unemployment benefits ("Arbeitslosengeld I") or social assistance ("Arbeitslosengeld II"); and zero otherwise. We further analyze working hours per week, job tenure (measured in years) and indicators for the type of job held: whether an individual works on a temporary or permanent contract, whether she is self-employed, employed in the public sector or in a white-

[15] In contrast, no such detailed information is available in the German Socio-Economic Panel (SOEP) or the social security data from the IAB, two other popular data sources.

[16] In Germany, compulsory schooling is between 9 and 10 years. Children typically enter at age 6 which implies that students can leave school around age 15 or 16.

collar job. A white-collar job is defined as working as a clerk or officer, judge or civil servant. The variable is zero if someone is employed as a worker or home worker. Here, we exclude trainees and family workers. Finally, we also analyze the size of the firm which is measured from 1 (1 employee) to 13 (50 employees and more).

The main control variables are birth year, year of arrival, the number of years in Germany and education. We distinguish between low-skilled (no high school or vocational degree), medium-skilled (a higher school degree or a vocational degree) and high-skilled immigrants (with a college degree). We further estimate all specifications separately for men and women. To study heterogeneity in decisions to naturalize and returns to citizenship, we classify immigrants into ten regions of origin: the traditional EU-15 member states (e.g., Italy or Portugal), immigrants from countries that recently joined the European Union (the EU-12, e.g., Poland or the Czech Republic), immigrants from Turkey, ex-Yugoslavia (except Slovenia) and the Former Soviet Union (except the Baltic states). We lump together other immigrants into broad regions of origin (Asia, Africa, the Middle East and North or South America). In addition, we analyze whether the returns to citizenship differ for immigrants from high- and low-income countries using data on GDP per capita in the country of origin in 2005 from the Penn World Tables (Heston et al., 2011). Table B.1 shows summary statistics of our sample of first-generation immigrants in the Microcensus. Further details on the definition of each variable is contained in the data appendix.

### 3.3.2 Socio-Economic Panel

To study additional outcomes and run several robustness checks, we use the Socio-Economic Panel from 1984 to 2009 (SOEP, 2010). The SOEP is an annual panel interviewing more than 20,000 individuals about their labor supply, income and demographic characteristics. The number of immigrants is however much smaller than in the Microcensus.[17] Our basic sample again consists of all first-generation immigrants who arrived in Germany between 1976 and 2000 and are between 16-30 years-old when they first get eligible for citizenship. Because the SOEP does not ask questions about naturalization, we define naturalization based on observed changes in the citizenship recorded. The variable is equal to zero as long as an immigrant reports a foreign nationality and one in all years when a Ger-

[17] Wagner, Frick and Schupp (2007) provide a comprehensive description of the data set. The distribution of immigrants is different from the Microcensus because the SOEP oversampled immigrants in 1984 and 1994/5.

man citizenship is recorded. We perform several consistency checks to ensure that individuals do not change their citizenship more than once.

Our main dependent variables are self-reported language skills in writing or speaking German which range from 0 = not at all to 4 = very well. For the robustness checks, we further analyze log of monthly gross labor earnings (deflated with the national consumer price index) and labor force participation which is equal to one if an immigrant works in any type of employment; the indicator is zero if she is unemployed or out of the labor force. Our main control variables are again year of arrival, year of birth and the number of years spent in Germany. In the SOEP, we distinguish between low-skilled (with no high school or vocational degree), medium-skilled (with high school or vocational degree), high-skilled (holding a tertiary degree) and those currently enrolled in school. We further classify immigrants into ten broad regions of origin which are defined as in the Microcensus. Table B.2 shows summary statistics for our sample of first-generation immigrants in the SOEP.

## 3.4 Empirical Strategy

### 3.4.1 Variation in Eligibility induced by the Immigration Reforms

To estimate the labor market returns to citizenship, one cannot simply compare naturalized and non-naturalized immigrants because the decision to naturalize is endogenous. In addition, eligibility for citizenship is often closely tied to the number of years spent in the host country which makes it difficult to separate the returns to citizenship from general assimilation effects. We now discuss how the step-wise liberalization of Germany's citizenship law discussed in Section 3.2.2 can identify the returns to citizenship net of selection and general assimilation effects.

The key insight here is that the two reforms create variation in the eligibility for citizenship depending on an immigrant's arrival year and year of birth (as well as calendar year).[18] Take two immigrants who arrived in Germany in the same year,

[18] We abstract in our analysis from other eligibility criteria discussed in Section 2 either because we do not have any information (e.g., about the criminal record) or because it is unclear how the criteria is applied (e.g., economic self-sufficiency). As a consequence, we are likely to misclassify a few immigrants who satisfy the resident requirements but are not eligible according to some other criteria. This misclassification will result in a downward bias of eligibility on naturalization propensities (as some individuals, which we classify as eligible,

say 1985. The first immigrant is born in 1971 and therefore becomes eligible for citizenship in 1993 under the eight-year resident requirement. The second immigrant is born in 1970 would not be eligible for citizenship in 1993 (after eight years) because she is then 23 years-old and therefore does not qualify under the reduced resident requirement. Instead, she would become eligible in 2000 - after fifteen years in Germany. The same argument holds for immigrants arriving in Germany in 1983 and 1984. For all arrival cohorts, the younger immigrant is eligible seven years earlier than the older immigrant - though both are of similar age and arrived in Germany in the same year. A similar logic applies to earlier arrival cohorts (arriving between 1977 and 1982): adolescents (born between 1969 and 1975) can naturalize right after the reform in 1991. Adults (born 1968 or before) in contrast can only naturalize between 1992 and 1997 or one and six years later than the adolescents in the same arrival cohort. For all immigrants arriving in 1985 or later, young immigrants are again eligible after eight years while adult immigrants get eligible in 2000 when the resident requirement was reduced to eight years for all immigrants.[19]

One might consider using this variation to implement a regression discontinuity design (RDD) in which the forcing variable is the age when an immigrant satisfies the eight-year resident requirement: individuals between 16 and 22 years of age would be the treatment group, while immigrants between 23 and 30 years of age would be the control group. However, the conditions for a RDD are not satisfied in our setting. The main reason is that eligibility is inevitable as both the treatment and control group get access to citizenship; it is only the timing of treatment that varies across arrival and birth cohorts. In addition, eligibility for citizenship is likely to have persistent effects on labor market outcomes. Therefore, both sides of the threshold will eventually benefit from citizenship in our sample period.[20] As a result and depending on the shape of the returns to citizenship, there need not be any discontinuity in outcome variables around the age threshold (see Lee and Lemieux, 2010 for a discussion of age-dependent eligibility rules in RDD settings). Finally, eligibility in our data varies at an annual level (based on year of arrival and year of birth) for which there is little uncertainty ex-ante about being left and right of the threshold (as would be the case if eligibility hinges on a specific birth date, for

cannot naturalize in practice).

[19] Immigrants arriving between 1992 and 2000 all get eligible with eight years of residency after the 2000 reform. We include arrival cohorts between 1992 and 2000 mostly to identify general assimilation and year of birth effects.

[20] Even if we used data closer to the 1991 reform (for which we have no information about actual naturalization), the fact that adult immigrants eventually become eligible is likely to generate anticipation effects (and hence, changes in labor market behavior). These anticipation effects would again smooth potential discontinuities at the threshold.

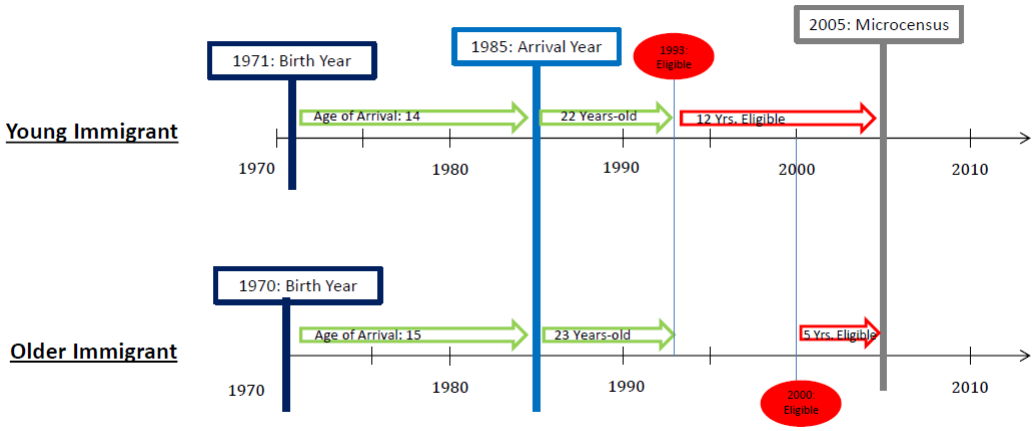
instance). Such ex-ante uncertainty is however, crucial to get quasi-random variation close to the threshold which ensures local identification of the RDD estimator.

We therefore pursue a different approach here: we rely on the differential timing of eligibility which creates variation in how long an immigrant has been eligible for citizenship. To identify labor market returns to citizenship eligibility, we use the number of years an immigrant has been eligible for citizenship as our treatment variable. In the first step, we define the year an immigrant first satisfies the resident requirement. The variable is calculated as follows: (a) the year in which an immigrant has lived in Germany for at least 8 years and is then between 16 and 22 years old in 1991-1999; (b) the year in which an immigrant has lived in Germany for at least fifteen years and is 23-30 years old in the 1991-1999 period (given that she has not qualified for citizenship under (a)); (c) the year in which a 16-30 years-old immigrant has lived in Germany for at least eight years in the 2000-2010 period. Finally, (d) some immigrants who have lived in Germany for at least eight years only become eligible in the year they turn sixteen.

In a second step, we calculate the years since an immigrant has been eligible for citizenship as the difference between the current year and the year of first eligibility. The eligibility variable is zero before an immigrant becomes eligible for citizenship and equal to the number of years since an immigrant has become eligible thereafter. Figure 3.2 demonstrates the variation in years since eligibility we exploit for identification for two immigrants arriving in 1985. The younger immigrant who qualifies under the reduced resident requirement has been eligible for 12 years when we first observe him in the Microcensus in 2005. The slightly older immigrant who qualifies under the regular 15 years-rule has only been eligible for 5 years in 2005. Table B.3 shows for each cohort of arrival from 1976 to 2000 the year in which immigrants first get eligible for citizenship (in column (1) for eligible adolescents and in column (5) for eligible adults). Columns (4) and (8) show how long adolescents and adults have been eligible for citizenship in 2005, the first year in our main data. The last column illustrates that immigrants of the same arrival cohort and the same calendar year differ substantially in the years they become eligible for citizenship depending on their year of birth. These differences in eligibility are also reflected in our data. The bottom of Table B.3 shows that immigrants who qualify under the reduced resident requirement get eligible two years earlier (1999 versus 2001) and have been eligible for naturalization longer (8.1 versus 5.3 years in 2005) than adults. The comparison also shows that eligible adolescents are born on average five years later (1979 versus 1974) and have spent about half a year less in Germany (8.9 versus 9.5 years) when

they get eligible for citizenship. We next discuss our estimation strategy to study naturalization decisions and the returns to citizenship in the labor market.

**Figure 3.2:** Variation in Eligibility Rules




Notes: The figure demonstrates the variation in eligibility rules which was created by the two policy reforms. The example shows two immigrants who arrive in the same year and with a similar age, but face different eligibility regimes.

### 3.4.2 Eligibility and the Decision to Naturalize

We start out with analyzing naturalization decisions. In our data, adolescents who qualify under the reduced resident requirement have higher naturalization rates and naturalized earlier than adults. Whereas only 30% of adults have naturalized, 46% of adolescents have done so during our sample period (2005-2010). To investigate how eligibility affects the decision to naturalize more systematically, we estimate variants of the following model:

$$Nat_{iabt} = \beta Elig_{abt} + \lambda D(YOB_b) + \mu D(ACohort_a) + \gamma_1 YSM_{at} \tag{3.1}$$

$$+\gamma_2 YSM_{at}^2 + \delta' X_{it} + \theta_t + \pi_{st} + \varepsilon_{iabt}$$

where the dependent variable $Nat_{iabt}$ is equal to one if individual $i$ (born in $b$ and arrived in Germany in $a$) is naturalized in year $t$ and zero otherwise. Our key independent variable here is $Elig_{abt}$ which is equal to one if an individual (born in $b$ and arrived in Germany in $a$) is eligible in year $t$ and zero otherwise. The eligibility indicator is derived from the eligibility rules discussed in the previous section and varies by year of birth, year of arrival and time. Our main parameter of interest is$\beta$ which measures how eligibility for naturalization affects the decision to naturalize.

We include cohort of arrival fixed effects $D(ACohort_a)$ to adjust for changes in the quality of immigrants arriving in Germany over time. We further include year of birth fixed effects $D(YOB_b)$ to control for differences in naturalization decisions across birth cohorts and year fixed effects $\theta_t$ to adjust for aggregate changes in the propensity to naturalize over time. We add a second-order polynomial of years since migration $(YSM_{at}, YSM_{at}^2)$ to account for time in the host country. Additional controls $X_{it}$ are immigrant's education and region of origin fixed effects to allow naturalization propensities to differ across education groups and source countries. To capture differences in the numbers of naturalizations across regions and changes therein over time, we further include state fixed effects and state-specific linear trends $\pi_{st}$.[21] Finally, we cluster the standard errors by age x arrival year to adjust for the level of aggregation in the eligibility variable.

### 3.4.3 Eligibility and Labor Market Performance

To identify how eligibility affects the labor market performance of immigrants, we estimate variants of the following model:

$$Y_{iabt} = \tilde{\beta} YrsElig_{abt} + \tilde{\lambda} D(YOB_b) + \tilde{\mu} D(ACohort_a) + \tilde{\gamma_1} YSM_{at} \tag{3.2}$$

$$+\tilde{\gamma_2} YSM_{at}^2 + \tilde{\delta}' X_{it} + \tilde{\theta_t} + \tilde{\pi}_{st} + \tilde{\varepsilon}_{iabt}$$

where $Y_{iabt}$ is a labor market outcome of immigrant $i$ from birth cohort $b$ who arrived in Germany in year $a$ in survey year $t$. Here, the main variable of interest is years since eligibility $(YrsElig_{abt})$ which captures persistent effects of eligibility in the labor market. As in the last section, we control for year of arrival, birth cohort and year fixed effects.[22] Note that we cannot include two-way interactions between these variables as, conditional on birth and arrival cohort, years of eligibility changes only with the reduction of the resident requirement in 2000 (and not every calendar year, for example).[23]

We also want to distinguish returns to citizenship eligibility from economic as-

[21] Since we are primarily interested in the effects of naturalization on the labor market performance of immigrants, we choose this rather reduced form approach instead of including detailed controls for the source countries (as in Chiswick and Miller, 2008, for example). Clearly, there might be other factors determining the decision to naturalize, for example, the political or economic circumstances in the country of origin.

[22] We get almost identical results if we include age fixed effects rather than birth year fixed effects in addition to year fixed effects which is not surprising because our data covers five years (2005-2010).

[23] A regression of years of eligibility on all other control variables in equation (2) gives an R2 of 0.93 for both men and women. Hence, we only absorb a lot of the variation in our eligibility variable though our flexible specification with both individual arrival cohort and birth year fixed effects.

similation that occurs with time in the host country more generally. To avoid perfect multicollinearity between arrival year, calendar year and years since migration, most studies in the assimilation literature estimate the above model for immigrant and natives jointly and restrict the year effects to be the same for natives and immigrants. As we are interested in the returns to citizenship, we pursue a different approach here. We control for a second-order polynomial of years since migration ($YSM_{at}, YSM_{at}^2$) but allow for a full set of cohort of arrival and year fixed effects. We show in Section 3.5.3 that results remain unchanged if we allow for an even more flexible specification of years since migration. All other controls are the same as for the analysis of naturalization decisions above.

The parameter of interest $\tilde{\beta}$ in equation (2) measures whether an additional year of eligibility increases employment or wages. Conditional on year of arrival, year of birth, year fixed effects and other controls, the parameter is identified from the interaction between year of arrival, year of birth and calendar year. As discussed in Section 3.4.1, the variation comes from differences in eligibility rules for adolescent and adult immigrants who arrive in Germany in the same year. The identifying assumption is that labor market outcomes have the same non-parametric year of birth pattern for subsequent arrival cohorts conditional on our control variables. This assumption would be violated, for example, if younger birth cohorts earn more than older birth cohorts among recent immigrants, while the opposite pattern is observed for those same birth cohorts among earlier arrival cohorts.

We show in Section 3.5.3 below that allowing for even more flexible interactions between birth and arrival cohorts does not affect our results. Similarly, we find few changes if we sequentially restrict the set of birth cohorts used in the estimation for which imposing a common age effect seems less restrictive. Another concern for our identification strategy is that age of arrival effects might bias our estimates. Immigrants who arrived at younger ages, for instance, invest more in host-specific human capital like language skills and might therefore perform better in the labor market even independently of citizenship. Including controls for age of arrival however, we find little evidence that age of arrival effects bias our results.

A third issue is that equation (2) only allows for a growth effect on wages but not a level effect immediately after naturalization. The main reason is that we cannot identify a level effect during the 2005-2010 period because our control group of adult immigrants has qualified for citizenship by then as well. Hence, both treatment and control group would have experienced the same upward shift in wage levels in the 2005-2010 period. Yet, existing studies of naturalization (e.g., Bratsberg et al., 2002)

do not find any level effects after naturalization; our robustness checks also suggest that level effects are not important. We address these concerns after presenting our main results (in Section 3.5.3). A final issue in assimilation studies like ours is related to selective in- or outmigration of immigrants. If return migrants, for instance, are negatively selected from the pool of immigrants in the host country, return migration overestimates general assimilation effects. Return migration would not affect our eligibility variable however, as long as selection into return migration is similar for eligible adolescents and adults. We discuss selective in- and out-migration in the robustness analysis (in Section 3.6.1). These additional tests suggest that all four threats to identification do not appear to be a major concern for our study.

## 3.5 Empirical Results

### 3.5.1 The Decision to Naturalize in Germany

To study naturalization decisions, we convert the Microcensus into a pseudo-panel for the 1985-2010 period. We create an indicator equal to one if an immigrant has naturalized in any year between 1985 and 2010 from the reported year of naturalization. We calculate eligibility for naturalization in any year between 1991 and 2009 from information on year of birth and year of arrival in Germany (see the last section for details). Finally, we assign education based on the information recorded in 2005-2010; here, education refers to the highest educational degree attained rather than the education level in a particular year.

Table 3.1 shows that eligibility after the 1991 and 2000 reforms has a surprisingly modest effect on the decision to naturalize: the likelihood of naturalization after eligibility increases by between 3 and 4 percentage points.[24] The second specification adds individual fixed effects, while the third specification uses lagged (rather than current) eligibility status to allow for some delay in the naturalization process. Overall, we find very similar results across all three specifications. We also estimated a probit model; the marginal effects (not reported) are again similar to the linear probability estimates in Table 3.1.

The table further shows some interesting selection patterns into Germany cit-

[24] Note that we cannot compare our estimates directly to the naturalization rates reported by the OECD (discussed in Section 3.2.2) because there naturalizations are scaled by the number of immigrants with more than 10 years of residency in Germany. Here, we study 16-30 years-old immigrants where some are eligible and others are not (yet) eligible for citizenship.

**Table 3.1:** The Decision to Naturalize after the 1991 and 2000 Reforms

| | Male Immigrants | | | Female Immigrants | | |
|---|---|---|---|---|---|---|
| | Baseline | Individual FE | Lagged Elig. | Baseline | Individual FE | Lagged Elig. |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Eligible for Naturalization | 0.029*** | 0.030*** | 0.035*** | 0.035*** | 0.038*** | 0.027*** |
| | [0.007] | [0.007] | [0.008] | [0.007] | [0.007] | [0.008] |
| Years in Germany | 0.010*** | 0.040*** | 0.065*** | 0.013*** | 0.051*** | 0.061*** |
| | [0.001] | [0.007] | [0.003] | [0.001] | [0.005] | [0.006] |
| Years in Germany2 | -0.000* | -0.000** | -0.000* | -0.000*** | -0.001*** | -0.000*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Medium-skilled | 0.005** | | | -0.003 | | |
| | [0.002] | | | [0.002] | | |
| High-skilled | -0.007 | | | -0.019*** | | |
| | [0.004] | | | [0.005] | | |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes |
| Individual FE | No | Yes | Yes | No | Yes | Yes |
| Observations | 38,009 | 38,009 | 38,009 | 37,346 | 37,346 | 37,346 |
| R Squared | 0.084 | 0.114 | 0.141 | 0.078 | 0.114 | 0.133 |
| Mean of Dependent Variable | 0.103 | 0.103 | 0.103 | 0.109 | 0.109 | 0.109 |

Notes: The table reports results from a linear probability model where the dependent variable is a binary indicator equal to one if a migrant has naturalized in a given year and zero otherwise. The sample includes all first-generation immigrants who are not ethnic Germans, arrived in Germany between 1976 to 2000, are 16-30 years old when they first get eligible during the 1991-2010 period, and report valid information on income, naturalization and years lived in Germany. The eligibility indicator is equal to one if an individual is a) 16-22 years old and has lived in Germany for at least 8 years; b) 23-30 years old and has lived in Germany for at least 15 years in 1991-1999; or c) 23-30 years old and has lived in Germany for at least 8 years after 2000. The left-hand side reports results for male immigrants, the right-hand side for female immigrants. Columns (2)-(3) and (5)-(6) include individual fixed effects; columns (3) and (6) lag eligibility by one year to allow for delay in the naturalization process. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU member countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). The omitted region of origin are the EU-15 member states; the omitted education category is low-skilled (no high school or vocational degree). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus Pseudopanel (1985-2010).

izenship. Most interestingly, we find evidence for intermediate and even negative selection in terms of educational attainment. Medium-skilled men are slightly more likely to naturalize than the low-skilled reference group. For immigrant women, we actually find that high-skilled women are about 1.9 percentage points less likely to naturalize than low-skilled women. The evidence on selection is very different from studies in other countries which typically report positive selection into citizenship (see Chiswick and Miller, 2008 and Yang, 1994 for the US; or Fougère and Safi, 2008 for France). Yet, it fits well into the public perception that Germany has had difficulties in attracting high-skilled immigrants. One interpretation of this pattern would be that medium-skilled men (or low- and medium skilled women) are more likely to naturalize because they also benefit more from naturalization in the labor market; our evidence below does however not support such an interpretation (see Table 3.8). We also find no influence of the birth cohort on the decision to naturalize (not reported). This result also differs from traditional immigration countries where older immigrants are more likely to naturalize even conditional on years since immi-

gration (Chiswick and Miller, 2008 for the United States; De Voretz and Pivnenko, 2006 for Canada).

Taken together, the evidence in this section supports the idea that eligibility rules influence naturalization decisions. At the same time, take up of citizenship is low compared to traditional immigration countries which suggests either a lack of information or substantial costs of German citizenship for eligible immigrants. The most important reason for the low take-up rates seems to be that Germany has been reluctant to accept dual citizenship. Immigrants who plan to return to their home country some day might face disadvantages. In Turkey, for example, foreign citizens face restrictions for buying or inheriting property. The need to renounce their source country's citizenship seems to make German citizenship relatively less attractive and lowers naturalization rates among immigrants.

### 3.5.2 Naturalization, Eligibility and Labor Market Performance

We now turn to our main question whether naturalization and the option to naturalize have permanent effects on wages and employment. As a benchmark of comparison, we start with OLS estimates where the key independent variable is years since actual naturalization (rather than years since eligibility) and all other variables are defined as in equation (2). Our main focus is however, on the reduced-form specification and the instrumental variable estimates. The reduced-form identifies whether legal access to citizenship improves labor market outcomes among immigrants. Knowing whether a more liberal access to citizenship affects labor market outcomes is interesting in its own right as it represents the option value of naturalization for immigrants. Furthermore, the intent-to-treat effect is the primary parameter of interest for policy makers who aim to improve the economic integration of immigrants in the host country. In addition, we also implement an instrumental variable approach where we use eligibility for citizenship as an instrument for actual naturalization to estimate the returns to citizenship.

The OLS results in Table 3.2 suggest that an additional year as a German citizen is associated with higher employment rates (by about 0.2 percentage points) for both men and women but not associated with higher earnings. In contrast to most of the earlier studies on assimilation in Germany, we find strong evidence for general assimilation effects. Immigrant men and women who have lived in Germany longer have both higher employment and higher earnings than more recent arrivals.

If immigrants select into German citizenship based on unobservable characteristics, the correlation between actual naturalization and labor market outcomes may be misleading. If the selection pattern into naturalization for education extends to unobservable skills, returns to citizenship for women, for instance, should be larger than the OLS estimates suggest.

**Table 3.2:** OLS Estimates of Naturalization and Labor Market Outcomes

| | **Male Immigrants** | | | **Female Immigrants** | | |
|---|---|---|---|---|---|---|
| | Employment | Log Personal Income | | Employment | Log Personal Income | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Years since Naturalized | 0.002*** | 0.001 | 0.001 | 0.002*** | 0.002 | 0.000 |
| | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] |
| Years in Germany | -0.004 | 0.067*** | 0.051*** | -0.004 | 0.054*** | 0.046*** |
| | [0.006] | [0.009] | [0.009] | [0.008] | [0.013] | [0.012] |
| Years in Germany2 | 0.000 | -0.002*** | -0.001*** | 0.000 | -0.001*** | -0.001*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Medium-skilled | 0.074*** | 0.169*** | 0.142*** | 0.081*** | 0.267*** | 0.147*** |
| | [0.007] | [0.011] | [0.010] | [0.009] | [0.017] | [0.017] |
| High-skilled | 0.127*** | 0.493*** | 0.485*** | 0.197*** | 0.691*** | 0.478*** |
| | [0.012] | [0.021] | [0.021] | [0.014] | [0.028] | [0.028] |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes |
| Occupation and Sector FE | - | No | Yes | - | No | Yes |
| Observations | 16,468 | 12,916 | 12,916 | 14,875 | 9,884 | 9,884 |
| R Squared | 0.044 | 0.404 | 0.477 | 0.060 | 0.172 | 0.260 |
| Mean of Dependent Variable | 0.717 | 7.12 | 7.12 | 0.529 | 6.55 | 6.55 |

Notes: The table reports OLS estimates of the relationship between naturalization and whether a person is gainfully employed (columns (1) and (4)) and log monthly personal income adjusted to 2005 prices (in columns (2)-(3) and (5)-(6)). The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible for citizenship in the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrant became eligible for naturalization after the 1991 or 2000 immigration reforms. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). Columns (3) and (6) add broad occupation and sector dummies. The omitted education category is low-skilled (without high school or vocational degree). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

To identify returns to citizenship net of selection effects, Table 3.3 shows the intent-to-treat effect of citizenship eligibility on labor market performance. Generally, we find no effect of eligibility for men: both employment and earnings are not higher after eligibility (columns (1)-(3)). For women, we also do not find any response in employment rates (column (4)). Yet, we find sizable wage effects for women: wages increase by about 0.15 log points per year. Consistent with negative selection in terms of unobservables, the reduced-form returns for women are larger than the OLS estimates. These returns imply that the option to naturalize carries substantial benefits: at the mean years of eligibility in our sample (7.9 years), earnings for women are 0.12 log points higher than prior eligibility. To put these numbers in perspective, we calculate how the return to eligibility for women com-

pares to wage growth due to general assimilation. Women's earnings increase by about 0.34 log points over their first twenty years in Germany. Access to citizenship then adds another 38% to the wage growth associated with economic assimilation.[25] Finally, we explore how much of the earnings increase is due to sorting across broad occupations and sectors (see column (6) in Table 3.3). Conditional on broad occupations and sectors, wage growth among eligible women falls to 0.08 log points and loses statistical significance. Hence, occupational upgrading and sorting into better-paying industries accounts for almost 50% of the observed wage gains for women. One might also wonder whether a linear specification of years since eligibility is the appropriate specification. In Figure 3.3, we plot the coefficients from re-estimating equation (3.2) where we now include separate indicators for 1-5 years eligible, 6-10 years eligible and more than 10 years eligible for citizenship. The results show that returns for men are always below those for women. In addition, returns exhibit some concavity but are positive for all groups of eligible immigrant women.

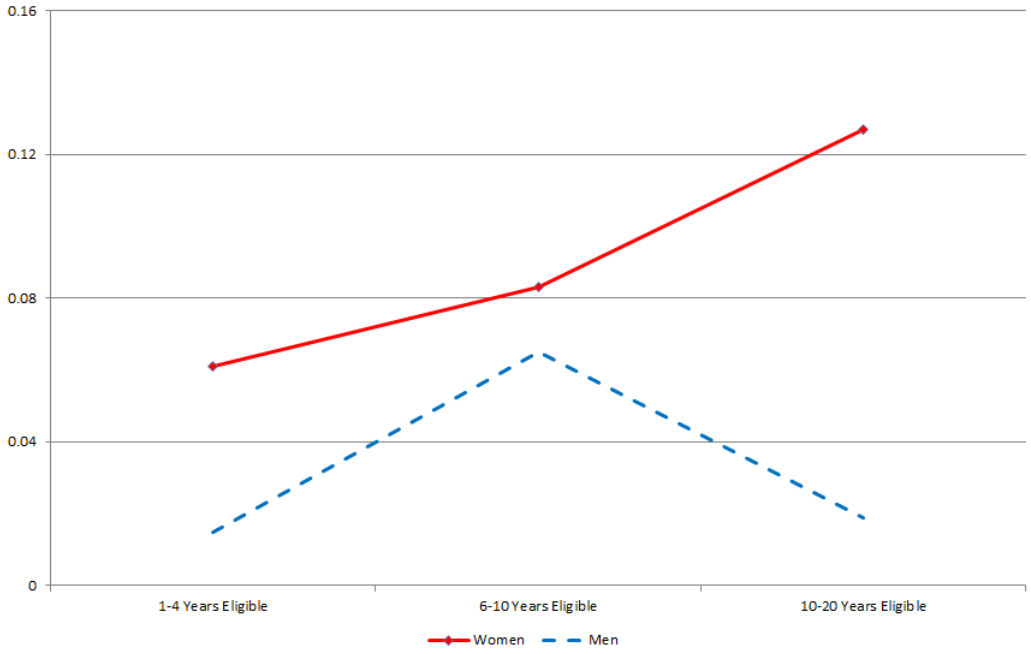
**Table 3.3:** Eligibility for Citizenship, Employment and Wage Growth

| | **Male Immigrants** | | | **Female Immigrants** | | |
|---|---|---|---|---|---|---|
| | Employment | Log Personal Income | | Employment | Log Personal Income | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Years since Eligible | 0.001 | -0.002 | -0.003 | -0.002 | 0.015*** | 0.008 |
| for Naturalization | [0.002] | [0.004] | [0.004] | [0.003] | [0.005] | [0.005] |
| Years in Germany | -0.005 | 0.069*** | 0.053*** | -0.003 | 0.044*** | 0.040*** |
| | [0.007] | [0.010] | [0.009] | [0.008] | [0.013] | [0.013] |
| Years in Germany2 | 0.000 | -0.002*** | -0.001*** | 0.000 | -0.001*** | -0.001*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Medium-skilled | 0.076*** | 0.171*** | 0.143*** | 0.083*** | 0.267*** | 0.147*** |
| | [0.007] | [0.011] | [0.010] | [0.009] | [0.017] | [0.017] |
| High-skilled | 0.129*** | 0.494*** | 0.486*** | 0.200*** | 0.693*** | 0.479*** |
| | [0.012] | [0.021] | [0.021] | [0.014] | [0.028] | [0.028] |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes |
| Occupation and Sector FE | - | No | Yes | - | No | Yes |
| Observations | 16,468 | 12,916 | 12,916 | 14,875 | 9,884 | 9,884 |
| R Squared | 0.043 | 0.404 | 0.477 | 0.059 | 0.172 | 0.260 |
| Mean of Dependent Variable | 0.717 | 7.12 | 7.12 | 0.529 | 6.55 | 6.55 |

Notes: The table reports reduced-form estimates of the returns to citizenship eligibility for male and female immigrants in Germany. The dependent variables are whether a person is gainfully employed (columns (1) and (4)) and log monthly personal income adjusted to 2005 prices (in columns (2)-(3) and (5)-(6)). The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible for citizenship in the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrants became eligible for naturalization after the 1991 or 2000 immigration reforms. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). Columns (3) and (6) add broad occupation and sector dummies. The omitted education category is low-skilled (without high school or vocational degree). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

[25] For wage growth due to assimilation, take the coefficients from column (5) in Table 3.3: 20*0.044-400*0.001=0.48. In turn, eligibility after 8 years in Germany increases wages after 20 years by: 12*0.015 = 0.18. Hence, the wage growth from access to citizenship adds 37.5% (0.18/(0.18+0.48)=0.375) to the wage growth from assimilation.

**Figure 3.3:** Nonlinear Returns to Eligibility for Citizenship




Notes: The figure plots the coefficient from estimating equation (2) where the key independent variables are binary indicators for 1-5 Years Eligible, 6-10 Years Eligible and More than 10 Years Eligible. The omitted category is not yet eligible. See notes to Table 3.3 for the specification and description of other control variables.
Source: Microcensus (2005-2010).

Rather than estimating the return to eligibility, we can also implement an instrumental variable approach using eligibility as an instrument for actual naturalization. Based on the year of naturalization, we define the number of years since an immigrant became a German citizen. Table 3.4 shows that an extra year of eligibility increases the years since naturalization by between 0.06 and 0.09 years for men and 0.15 years for women. The first-stage is relatively weak especially for immigrant men (see the F-statistic and partial $R^2$ at the bottom of column (2) and (3) in Table 3.4) which is in line with the naturalization propensities reported in Table 3.1. The second-stage results again reveal no employment gains or wage returns to citizenship for men.

While there is no change in female employment, naturalization increases wages for women by 0.103 log points. Compared to returns to education in the low- or medium-skilled population, citizenship is about worth as much as an additional 1.5 years of education for immigrant women. While these returns are indeed substantial, it is important to keep in mind that immigrants in Germany have traditionally had much worse labor market outcomes than natives. One explanation for the large gains is then that naturalization not only removes explicit entry barriers to certain jobs and careers - but also reduces implicit taste-based discrimination in hiring and promotion

decisions, for example. This interpretation also fits well into the survey evidence that naturalized immigrants in Germany feel much less discriminated against than immigrants without a German passport (see footnote 3). These findings suggest that citizenship could be a powerful tool to improve assimilation in countries with little tradition of naturalizations like Germany.

**Table 3.4:** Instrumental Variable Estimates of the Returns to Citizenship

| | **Male Immigrants** | | | | **Female Immigrants** | | | |
|---|---|---|---|---|---|---|---|---|
| | First Stage | | Second Stage | | First Stage | | Second Stage | |
| | Years Naturalized | Years Naturalized | Employment | Log Personal Income | Years Naturalized | Years Naturalized | Employment | Log Personal Income |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Years since Eligible for Naturalization | 0.061* | 0.087** | | | 0.155*** | 0.146*** | | |
| | [0.035] | [0.039] | | | [0.035] | [0.052] | | |
| Years since Naturalized | | | -0.080 | -0.023 | | | -0.014 | 0.103** |
| | | | [0.108] | [0.046] | | | [0.019] | [0.050] |
| Years in Germany | 0.374* | 0.475* | 0.105 | 0.136*** | -0.485*** | -1.070*** | -0.014 | 0.151** |
| | [0.213] | [0.257] | [0.066] | [0.035] | [0.182] | [0.275] | [0.020] | [0.064] |
| Years in Germany2 | 0.007*** | 0.008*** | -0.000 | -0.002*** | 0.015*** | 0.015*** | 0.000 | -0.002*** |
| | [0.002] | [0.003] | [0.001] | [0.000] | [0.003] | [0.004] | [0.000] | [0.001] |
| Medium-skilled | 0.973*** | 0.844*** | 0.160 | 0.191*** | 1.171*** | 1.020*** | 0.102*** | 0.166*** |
| | [0.093] | [0.109] | [0.108] | [0.040] | [0.096] | [0.140] | [0.025] | [0.057] |
| High-skilled | 1.068*** | 1.025*** | 0.222* | 0.516*** | 1.379*** | 1.651*** | 0.222*** | 0.531*** |
| | [0.241] | [0.265] | [0.129] | [0.052] | [0.241] | [0.281] | [0.030] | [0.093] |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 16,468 | 12.672 | 16,468 | 12,672 | 14,875 | 9,884 | 14,875 | 9,884 |
| R Squared | 0.346 | 0.363 | | | 0.340 | 0.376 | | |
| F-Test | 3.00 | 4.84 | | | 20.06 | 7.84 | | |
| Partial $R^2$ First Stage | 0.0002 | 0.0004 | | | 0.0014 | 0.001 | | |

Notes: The table reports instrumental variable estimates of the returns to citizenship for male (left-hand side) and female immigrants (right-hand side) in Germany. The dependent variable in the first stage (in columns (1)-(2) and (4)-(5)) is the years since an immigrant is naturalized. The second stages (columns (3)-(4) and (7)-(8)) reports whether the acquisition of citizenship affects employment or log monthly personal income respectively. The sample includes all immigrants who arrived in Germany between 1976 and 2000 and were between the ages of 16 and 30 when they first get eligible during the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrants became eligible for naturalization after the 1991 or 2000 German immigration reforms. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). The omitted education category is low-skilled, i.e. those without high school or vocational degree. The F-statistic and Partial R2 from the respective first stages are reported at the bottom of the table. Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

We further investigate whether naturalization is related to economic self-sufficiency. The dependent variable here is an indicator equal to one if an immigrant receives unemployment benefits or social assistance in the current year and zero otherwise.[26] Note that immigrants can claim both benefits irrespective of their citizenship status

[26] To receive unemployment benefits, a person had to be employed and have paid UI contributions for at least 12 months over the preceding three years. Unemployment benefits were means tested and 60% (67%) of the last net wage for a recipient without (with) children. Welfare benefits are available for everybody but are means-tested. In 2010, welfare benefits were about 260 Euros per month and adult in the household. Benefits for partners in the same household are somewhat lower, while benefits for children under age 25 living in the household depend on their age; additional transfers cover housing allowances and running costs.

as long as they hold a valid work permit. While an immigrant has to demonstrate economic self-sufficiency to obtain a temporary work permit, this is no longer required once an immigrant has a permanent work permit (after at least five years in the country). The OLS estimates in the top panel of Table 3.5 suggest that naturalized immigrants are actually less likely to receive welfare benefits. The reduced-form and IV estimates in the middle and bottom panel of Table 3.5 find no significant effect of eligibility or actual naturalization on benefit receipt. We further check whether immigrants who receive some social transfer are more likely to draw welfare benefits. Columns (2) and (4) in Table 3.5 shows no significant effects for men or women.[27]

**Table 3.5:** Citizenship and Social Assistance

| | **Male Immigrants** | | **Female Immigrants** | |
|---|---|---|---|---|
| | Any Social Assistance (1) | Unempl. Benefits or Welfare Benefits (2) | Any Social Assistance (3) | Unempl. Benefits or Welfare Benefits (4) |
| | OLS Estimates | | OLS Estimates | |
| Years since Naturalized | -0.002*** | 0.002 | -0.002*** | 0.002 |
| | [0.000] | [0.002] | [0.000] | [0.002] |
| Observations | 16,458 | 2,516 | 14,870 | 1,765 |
| R Squared | 0.086 | 0.150 | 0.063 | 0.145 |
| | Reduced Form Estimates | | Reduced Form Estimates | |
| Years since Eligible for Naturalization | 0.001 | -0.005 | 0.001 | -0.004 |
| | [0.002] | [0.007] | [0.002] | [0.007] |
| Observations | 16,458 | 2,516 | 14,870 | 1,765 |
| R Squared | 0.085 | 0.150 | 0.062 | 0.145 |
| | Instrumental Variable Estimates | | Instrumental Variable Estimates | |
| Years since Naturalized | 0.030 | - | 0.004 | - |
| | [0.038] | | [0.013] | |
| Observations | 16,458 | | 14,870 | |
| Individual Characteristics | Yes | Yes | Yes | Yes |
| Years in Germany Polynomial | Yes | Yes | Yes | Yes |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes |
| Mean of Dependent Variable | 0.144 | 0.238 | 0.115 | 0.158 |

Notes: The table reports OLS (top panel), reduced form (middle panel) and instrumental variable estimates (bottom panel) of the returns to citizenship eligibility for male and female immigrants in Germany. The dependent variable in columns (1) and (3) is an indicator equal to one if a person receives unemployment benefits (Arbeitlosengeld I) or social assistance (Arbeitslosengeld II). In columns (2) and (4), the dependent variable is an indicator equal to one if an immigrant receives unemployment assistance and zero if she receives welfare benefits. The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between the ages of 16 and 30 when they first get eligible during the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrants became eligible for naturalization after the 1991 or 2000 immigration reforms. The instrumental variable estimates use years since eligible as an instrument for the years since actual naturalization. All specifications include the same individual characteristics as earlier tables (year of arrival and year of birth fixed effects, a second-order polynomial of years in Germany, education), current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship) and education controls. Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

[27] We do not report IV estimates for the type of benefit received because there is no strong first stage in the small sample of benefit recipients.

In sum, we find that women enjoy substantial returns to citizenship in the labor market; at the same time, we find no evidence that the acquisition of citizenship imposes a burden for the welfare system. An open question is why women enjoy large wage returns from naturalization, while men do not. One potential explanation could be measurement error. Immigrant men, especially those arriving as guest workers, were more likely to move back and forth between their country of origin and the destination country which would introduce measurement error in our eligibility variable (which relies on information about the reported year of arrival in Germany). Assuming additive measurement error, the coefficients on eligibility in Table 3.3 and 3.4 would be biased toward zero. Yet, if the absence of returns to citizenship was only the consequence of measurement error, we should find positive OLS estimates as OLS does not rely on the mismeasured eligibility variable (and selection into citizenship does not seem to be negative for men). The OLS estimates in Table 3.2 are however, economically and statistically close to zero. So, measurement error does not seem to be the primary explanation for the sizable differences in returns to citizenship between men and women. We discuss alternative channels for the observed gender differences in Section 3.5.5.

### 3.5.3 Specification Tests

We now show that potential threats to our identification strategy do not affect our results. Recall that our estimation approach allows for a full set of year of arrival, year of birth and calendar year effects, but imposes a second-order polynomial for general assimilation effects to avoid multicollinearity between calendar year, year of arrival and years since migration. Given that adolescent immigrants not only get eligible faster conditional on year of arrival but also have lived in Germany for a slightly shorter period, we would have a downward bias in our estimates if we did not adequately control for assimilation effects. To test this, we allow for different degrees of polynomials in years since migration starting from a linear specification up to a fourth-order polynomial in years since migration. The dependent variable is again log personal income and all other control variables are the same as in equation (2). The first four columns of Table B.4 show the results for men in the top panel and for women in the bottom panel. The estimates do not change across specifications; the AIC criterion reported at the bottom of each panel suggests no substantive

improvements beyond the second-order polynomial for men or women. Hence, the quadratic specification for general assimilation effects does not affect our results.

A second concern with our estimation strategy is that adolescent immigrants (the treatment group) arrived in Germany at a younger age compared to adult immigrants (the control group) conditional on year of arrival. Research in psychology shows that immigrants who arrive at younger ages are more likely to learn the host country's language (e.g., Birdsong, 2006; Johnson and Newport, 1989; Newport, 2002) and subsequently perform better in the host country's labor market than those immigrating at later ages. If age of arrival effects matter conditional on our control variables, the estimated returns to citizenship would be upward biased because adolescent immigrants arrived in Germany at a younger age. We can assess this concern by following a similar strategy than Bleakley and Chin (2004): we generate a variable equal to one if an immigrant arrived prior to age 11 and zero if she arrived in Germany at a later age. As an additional test, we also include 5-year dummies for age of arrival in addition to all other control variables. Both sets of controls for age of arrival effects have no impact on wage returns for men which remain close to zero and insignificant (see columns (5) and (6), top panel). For women, the coefficient on years since eligible actually increases somewhat (see columns (5) and (6), bottom panel). Yet, we cannot reject the null hypothesis that the two coefficients are the same as in the baseline. Overall then, age of arrival effects cannot explain our results.

Our identifying assumption would also be violated if age effects vary systematically across arrival cohorts, for example, because young immigrants are more favorably selected than older immigrants in later arrival cohorts than in earlier arrivals. Given that we cannot include a full set of birth cohort x arrival cohort interactions, we provide two alternative tests for our identifying assumption. First, we include individual birth cohort effects for immigrants arriving prior to 1990 and a separate set of birth cohort fixed effects for cohorts arriving in Germany after the fall of the wall. Hence, the effect of eligibility is identified as long as birth cohort effects are similar within the 1976-1989 arrival cohorts and again within the arrival cohorts 1990-2000. The results shown in columns (7) of Table B.4 show that estimates are somewhat lower, but remain sizable and significant for women and close to zero for men.

Our second strategy to limit concerns about differential birth year effects across arrival cohorts is to restrict the set of birth years included in the estimation. The last four columns in Table B.4 subsequently restrict the estimation window of birth

cohorts in each arrival cohort: columns (8) again shows the baseline from Table 3.3 (sample of 16-30 years-old when first eligible). Columns (9) restricts the sample to immigrants who are between 19 and 27 years-old when they first get eligible. Column (10) further restricts the sample to immigrants who are between 21 and 25 years-old when they get eligible, while column (11) only includes immigrants aged 22 or 23 when they first get eligible. Across all specifications, immigrants under 23 get eligible under the reduced resident requirement while immigrants 23 and older get eligible later. The estimates for women remain positive and get larger for the most narrow age window where the sample gets rather small. Estimates for men remain around zero and insignificant. Both sets of specifications suggest that differential trends in birth cohorts across arrival cohorts cannot explain our results.

A final specification issue is that our main empirical model (in equation (2)) identifies persistent effects on wage growth (a slope effect). Citizenship will affect wage growth if access to citizenship increases the returns to experience or tenure, for example; or, if immigrants invest more in human capital after naturalization. Our empirical model does however not identify any effect of citizenship on levels of employment or earnings. The reason is that by 2005, the first year of our data from the Microcensus, the control group of adult immigrants has become eligible for German citizenship as well. To test whether employment or earnings change immediately with naturalization (a level effect), we use the much smaller SOEP data. We capture the level effect by a dummy variable whether an individual is naturalized or eligible in the current year. As before, we identify the slope effect by including a measure of years since eligibility for citizenship. Table B.5 shows small level and slope effects for men that are never statistically significant - just like in the larger Microcensus. For women, access to citizenship has no slope or level effect on employment. The slope effects for wages are positive as in the Microcensus but do not reach statistical significance at conventional levels, likely due to small sample sizes.

### 3.5.4 Potential Mechanisms

#### 3.5.4.1 Job Characteristics

As discussed in the introduction, citizenship provides access to certain restricted jobs, for example, in the public sector. In addition, naturalized immigrants might have better chances of moving up the job ladder, for example by switching from

a blue collar to a white collar job; or, by leaving low-paid self-employment. The results in Section 3.5.2 above showed that almost 50 percent of women's earnings gain from citizenship is associated with occupational upgrading and movements across industries. As immigrant women are much more likely to work in the low-paying service sector than immigrant men, part of the wage gains for women could be attributed to the fact that women move to more stable and better-paying jobs after naturalization, while men do not.

**Table 3.6:** Citizenship and Job Characteristics - Men

| | Male Immigrants | | | | | | |
|---|---|---|---|---|---|---|---|
| | Public Sector (1) | White Collar (2) | Firm Size (3) | Self-Employed (4) | Temporary Contract (5) | Job Tenure (6) | Working hours (7) |
| | Reduced Form Estimates | | | | | | |
| Years since Eligible for Naturalization | 0.003* [0.002] | 0.001 [0.003] | 0.017 [0.026] | -0.001 [0.002] | -0.001 [0.003] | 0.010 [0.034] | -0.097 [0.066] |
| Observations | 10,919 | 11,032 | 12,916 | 12,916 | 12,132 | 12,400 | 12,916 |
| R Squared | 0.031 | 0.201 | 0.059 | 0.049 | 0.256 | 0.393 | 0.055 |
| | Instrumental Variable Estimates | | | | | | |
| Years since Naturalized | 0.037 [0.032] | 0.031 [0.027] | 0.141 [0.320] | -0.003 [0.019] | -0.006 [0.030] | 0.007 [0.348] | -0.868 [0.764] |
| Observations | 10,919 | 11,032 | 12,916 | 12,916 | 12,132 | 12,400 | 12,916 |
| Individual Characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany Polynomial | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Mean of Dependent Variable | 0.050 | 0.389 | 10.45 | 0.103 | 0.212 | 6.191 | 38.173 |

Notes: The table reports reduced form (top panel) and instrumental variable estimates (bottom panel) of the returns to citizenship for male and female immigrants in Germany. The dependent variables are whether a person is employed in the public sector (columns (1) and (8)); whether a person works in a white collar job (columns (2) and (9)); the size of the individual's plant (columns (3) and (10)); whether a person is self-employed (columns (4) and (11)); whether a person has a temporary employment contract (columns (5) and (12)); the number years in the current job (columns (6) and (13)); and the number of hours worked per week (columns (7) and (14)). Years since eligible denotes the number of years since an immigrants became eligible for naturalization after the 1991 or 2000 immigration reforms. The instrumental variable estimates use years since eligible as an instrument for the years since actual naturalization. The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible during the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. All specifications include the same individual characteristics as earlier tables: individual year of arrival and year of birth fixed effects, a second-order polynomial of years in Germany, education, current year and state fixed effects, state-specific linear trends and ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: Microcensus (2005-2010).

Table 3.6 and Table 3.7 explores in more detail whether men and women select into different types of jobs after having access to citizenship. In line with the absence of any wage returns for men in Table 3.3 and 3.4, Table 3.6 shows that the job characteristics of men do not change much after eligibility (top panel) or actual naturalization (bottom panel). The only exception is that men are slightly more likely to work in a public sector job when they do no longer face any restrictions on government jobs. Yet, the stronger presence in public sector jobs is not associated

with any wage gains for men. The IV estimates for men in the bottom panel need to interpreted with caution: while eligibility has a positive effect on naturalization in all first stages (which are reported in Table B.6), the corresponding F-statistic (shown in the bottom row of Table B.6) reveal that the instrument is weak for men.

**Table 3.7:** Citizenship and Job Characteristics - Women

| | Female Immigrants | | | | | | |
|---|---|---|---|---|---|---|---|
| | Public Sector (8) | White Collar (9) | Firm Size (10) | Self-Employed (11) | Temporary Contract (12) | Job Tenure (13) | Working hours (14) |
| | Reduced Form Estimates | | | | | | |
| Years since Eligible for Naturalization | 0.001 [0.003] | 0.011*** [0.003] | 0.053* [0.029] | -0.003* [0.002] | -0.006* [0.003] | 0.151*** [0.029] | 0.445*** [0.101] |
| Observations | 8,390 | 8,801 | 9,884 | 9,884 | 9,684 | 9,424 | 9,884 |
| R Squared | 0.038 | 0.283 | 0.034 | 0.04 | 0.202 | 0.249 | 0.099 |
| | Instrumental Variable Estimates | | | | | | |
| Years since Naturalized | 0.007 [0.017] | 0.077** [0.039] | 0.302 [0.214] | -0.019 [0.013] | -0.045 [0.030] | 0.827*** [0.308] | 3.174** [1.296] |
| Observations | 8,390 | 8,801 | 9,884 | 9,884 | 9,684 | 9,424 | 9,884 |
| Individual Characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany Polynomial | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Mean of Dependent Variable | 0.112 | 0.652 | 9.89 | 0.059 | 0.236 | 4.746 | 28.294 |

Notes: The table reports reduced form (top panel) and instrumental variable estimates (bottom panel) of the returns to citizenship for male and female immigrants in Germany. The dependent variables are whether a person is employed in the public sector (columns (1) and (8)); whether a person works in a white collar job (columns (2) and (9)); the size of the individual's plant (columns (3) and (10)); whether a person is self-employed (columns (4) and (11)); whether a person has a temporary employment contract (columns (5) and (12)); the number years in the current job (columns (6) and (13)); and the number of hours worked per week (columns (7) and (14)). Years since eligible denotes the number of years since an immigrants became eligible for naturalization after the 1991 or 2000 immigration reforms. The instrumental variable estimates use years since eligible as an instrument for the years since actual naturalization. The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible during the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. All specifications include the same individual characteristics as earlier tables: individual year of arrival and year of birth fixed effects, a second-order polynomial of years in Germany, education, current year and state fixed effects, state-specific linear trends and ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Source: Microcensus (2005-2010).

The situation is very different for immigrant women (Table 3.7). The first-stage estimates of the IV results in Table B.6 show that eligibility is strongly correlated with naturalization. More importantly, women's job characteristics change dramatically after they become eligible or actually naturalize in Germany. Immigrant women are more likely to work in a white-collar job and for larger firms. They are somewhat less likely to be self-employed and to have a temporary work contract though the IV estimates are not statistically significant. Most importantly, women have more stable jobs as naturalization increases their job tenure by 8.3 months or 17%. Women also work longer hours as naturalization increases working time by about 3.2 hours per week or about 11%. As part-time work carries a substantial

wage penalty in Germany, longer working hours are another reason why women earn more after naturalizing.

#### 3.5.4.2 Investments in Language Skills

Improvements in the command of the host country's language is another potential source of wage growth among immigrants. Since citizenship grants immigrants a long-time perspective in the destination country, it should increase incentives to invest in the local language. We should then see an effect in our data as long as faster eligibility for citizenship speeds up language acquisition. These investments might even occur prior to actual eligibility. Because eligibility is based on arrival year, birth year and calendar year along, prior investments will not bias our reduced form estimates as long as in- and outmigration rates are uncorrelated with the years of eligibility conditional on our control variables. We discuss differential migration in section 3.6.1 below.

While language skills are not observed in the Microcensus, we can analyze them using the SOEP. The dependent variables are now how well immigrants are able to speak or write in German. The self-reported score ranges from 0 to 4 where higher values imply better language skills. The control variables are the same as in equation (2). Table B.7 shows no language improvements for men. In line with the substantial earnings gains for women, we find that German writing skills improve for women with eligibility. Evaluated at the mean years of eligibility in the sample, the improvement is about 11 percent. Other control variables have the expected effect: more educated immigrants have better (self-reported) language skills as do immigrants who have lived in Germany for a longer period of time. While writing skills respond to the better job opportunities that immigrants obtain with citizenship, these improvements are modest compared to the large changes with time in the host country. We interpret these results as evidence that language skills, in particular speaking the language mostly improves with time in Germany rather than through access to citizenship alone.

Overall, our evidence suggests that the large wage gains of women are accompanied by substantial improvements in their labor market position and adjustments on the labor supply side. The question remains why women benefit much more from the liberalization of citizenship than men. We propose three potential explanations. A first reason is related to the traditional employment differences of immigrant men

and women. Women have had much lower labor force attachment with fewer working hours. Given that part-time work carries substantial wage penalties in Germany as in many other countries, more full-time jobs will improve the labor market position of women. A second reason is related to the fact that immigrant women have been working in less stable jobs with lower pay than men. Almost 50% of the wage gains for immigrant women come from occupational and sectoral upgrading. These wage gains are not the result of higher returns to eligibility in white-collar jobs, for example (not reported); rather, white-collar jobs pay higher wages on average and immigrant women are more likely to be employed in white-collar jobs after eligibility while men are not. Hence, access to citizenship allows immigrants to sort into more productive and better jobs - and women had a lot more room for improvements than men. In addition, German language skills are likely to be more important in the service sector where immigrant women are employed than in the manufacturing jobs of immigrant men. As such, improvements in language skills might have been more valuable for women than men. A final reason is related to the legal status prior to eligibility. Most immigrant men have had stable employment careers since entry; most of them therefore had permanent residence and work permits in Germany by the time they get eligible for citizenship. Immigrant women in contrast, might have obtained a permanent permit either through their employed husbands; or after having worked without disruption in the same job for at least three years. As a consequence, fewer women might have had their own permanent work permit prior to citizenship. Citizenship then provides a stronger signal of long-term commitment to current and future employers, for example, than for men.

### 3.5.5 Heterogeneity of Returns

So far, we have estimated the average return to citizenship in the labor market. Benefits of naturalization and hence incentives to naturalize might however differ across immigrants. Most importantly, the potential benefits should be strongest for immigrants from outside the European Union because they face restrictions on job and occupational mobility unless they have a permanent work permit.

Table 3.8 indeed confirms that immigrants from outside the EU have much higher propensities to naturalize: the pattern is very strong for women. It is weaker for men where only immigrants from the former Soviet Union and those with no (or unknown) nationality have statistically significant higher propensities to naturalize than immigrants from EU member countries (EU-15 plus the new EU-12). Does the

propensity to naturalize also differ between guest workers and their families (who came to Germany prior to 1990) and more recent immigrants (arriving after the fall of the Berlin Wall in 1990)? There is indeed some heterogeneity. Eligibility has a modest effect on naturalization for guest workers (only 1.3 percentage points for men and 2.2. percentage points for women). Among more recent immigrants, eligibility increases the likelihood of naturalization by 5 percentage points for both men and women. We find no selection with respect to education for guest workers. For more recent immigrants, selection is intermediate for men and negative for women.

**Table 3.8:** Heterogeneity in the Propensity to Naturalize

| | **Male Immigrants** | | | **Female Immigrants** | | |
|---|---|---|---|---|---|---|
| | by Region of Origin | Guest Workers (1976-1989) | Recent Immigrants (1990-2000) | by Region of Origin | Guest Workers (1976-1989) | Recent Immigrants (1990-2000) |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Eligible for Naturalization | -0.014 | 0.013* | 0.047*** | -0.059 | 0.022*** | 0.049*** |
| | [0.041] | [0.007] | [0.013] | [0.035] | [0.008] | [0.013] |
| Eligible*new EU12 | -0.032 | | | 0.058 | | |
| | [0.047] | | | [0.041] | | |
| Eligible*Ex-Yugoslavia | 0.040 | | | 0.065 | | |
| | [0.045] | | | [0.040] | | |
| Eligible*Turkey | 0.016 | | | 0.077** | | |
| | [0.042] | | | [0.035] | | |
| Eligible*Middle East | 0.069 | | | 0.167*** | | |
| | [0.045] | | | [0.040] | | |
| Eligible*Africa | 0.075 | | | 0.096** | | |
| | [0.047] | | | [0.042] | | |
| Eligible*Asia | 0.062 | | | 0.174*** | | |
| | [0.049] | | | [0.047] | | |
| Eligible*(North and South America) | 0.043 | | | 0.068 | | |
| | [0.098] | | | [0.062] | | |
| Eligible*(Russia and Former SU) | 0.153*** | | | 0.110** | | |
| | [0.055] | | | [0.050] | | |
| Eligible*(Other or No Passport) | 0.171** | | | 0.051 | | |
| | [0.076] | | | [0.062] | | |
| Years in Germany | 0.009*** | 0.006*** | 0.012*** | 0.013*** | 0.006*** | 0.019*** |
| | [0.001] | [0.001] | [0.003] | [0.001] | [0.001] | [0.003] |
| Years in Germany2 | -0.000 | -0.000*** | 0.000* | -0.000*** | -0.000*** | -0.000 |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Medium-skilled | 0.005** | 0.001 | 0.011*** | -0.003 | 0.000 | -0.006 |
| | [0.002] | [0.002] | [0.004] | [0.002] | [0.003] | [0.004] |
| High-skilled | -0.007* | 0.006 | -0.020*** | -0.018*** | -0.007 | -0.034*** |
| | [0.004] | [0.005] | [0.007] | [0.005] | [0.006] | [0.007] |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 38,124 | 19,873 | 18,251 | 37,426 | 18,195 | 19,231 |
| R Squared | 0.089 | 0.059 | 0.100 | 0.081 | 0.050 | 0.090 |

Notes: The table reports results from a linear probability model where the dependent variable is a binary indicator equal to one if a migrant has naturalized in a given year and zero otherwise. The sample includes all first-generation immigrants who are not ethnic Germans, arrived in Germany between 1976 to 2000, are 16-30 years old when they first get eligible during the 1991-2010 period, and report valid information on income, naturalization and years lived in Germany. The eligibility indicator is equal to one if an individual is a) 16-22 years old and has lived in Germany for at least 8 years; b) 23-30 years old and has lived in Germany for at least 15 years in 1991-1999; or c) 23-30 years old and has lived in Germany for at least 8 years after 2000. The left-hand side reports results for male immigrants, the right-hand side for female immigrants. Columns (1) and (4) interact the eligibility variable with the ten region of origins. Columns (2) and (5) show results for immigrants who arrived in Germany between 1976 and 1989. Columns (3) and (6) show results for immigrants who arrived in Germany between 1990 and 2000. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU member countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). The omitted region of origin are the EU-15 member states; the omitted education category is low-skilled (no high school or vocational degree). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

Given that the propensity to naturalize varies a lot with the country of ori-

gin, we might expect that some immigrants also benefit more from citizenship than others. Table 3.9 explores how wage returns to eligibility vary across immigrant groups. Male immigrants from Africa, Russia and the Former Soviet Union have large positive wage returns of 1.2-1.4% per year. All other immigrant groups, including immigrants from EU member states, have no statistically significant returns to eligibility. Women exhibit a different pattern: here, it is mostly immigrants from ex-Yugoslavia as well as Russia and the Former Soviet Union who have positive returns ranging from 1.2-1.6% per year.

To analyze this heterogeneity more systematically, we next explore whether immigrants from poorer countries - which are typically outside the EU - have higher returns to citizenship eligibility.[28] We merge information on the GDP per capita in the source country in 2005 from the Penn World Tables (Heston et al., 2011) and interact the eligibility indicator with the GDP per capita in the immigrant's source country.[29] Immigrants from richer countries have higher earnings (though the coefficient is not statistically significant); but men from poorer countries have slightly higher returns after they become eligible for citizenship than men from richer source countries (see column (2) of Table 3.9). Going from a country like Turkey to Afghanistan, for instance, eligibility increases annual wage returns for men from 0.12% to 0.19%; in contrast, we find no differential effect for women from poorer countries.[30] Alternatively, returns could vary across education groups. We find no heterogeneity in returns across education groups for women (see column (7)) but actually lower returns for medium-skilled men (see column (3)). Hence, the fact that medium-skilled men are more likely to naturalize (see Table 3.1) cannot be explained by higher returns to citizenship.

Finally, the returns to eligibility might vary across cohorts of arrival. More recent immigrants to Germany are more likely to come from Eastern Europe, especially ex-Yugoslavia and the former Soviet Union, than traditional guest workers. We find striking differences in returns. As shown in Table 3.10, guest workers - both men and women - have no returns to citizenship eligibility. For recent immigrants, wage returns are positive for women. One question that emerges from Table 3.9 and 3.10

[28] We also tested whether citizenship affects female employment especially for women from countries with low female labor force participation rates; however, we do not find any evidence for any convergence in employment after citizenship.

[29] The number of observations for this specification is lower because we can merge GDP data only with immigrants for which we observe the actual country of origin (e.g., Turkey), not only the region of origin (e.g., Asia).

[30] In 2005, Turkey's GDP per capita was 7,091 Euros, while Afghanistan had a GDP per capita of 619 Euros. Taking the main effect and interaction effect of column (2) in Table 3.9, the return for a Turkish men is 0.002-0.0001*7.091= 0.0012. A male immigrant from Afghanistan in turn gets 0.002-0.001*0.619= 0.0019.

**Table 3.9:** Heterogeneity of Returns to Eligibility among Immigrants in Germany

| | Male Immigrants | | | Female Immigrants | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | Reduced Form Estimates | | | Reduced Form Estimates | | |
| Years since Eligible for | -0.004 | 0.002 | 0.001 | 0.008 | 0.020*** | 0.016*** |
| Naturalization | [0.005] | [0.005] | [0.004] | [0.007] | [0.007] | [0.006] |
| Years Eligible*new EU12 | -0.000 | | | 0.008 | | |
| | [0.004] | | | [0.005] | | |
| Years Eligible*Ex-Yugoslavia | 0.005 | | | 0.012** | | |
| | [0.004] | | | [0.006] | | |
| Years Eligible*Turkey | 0.000 | | | 0.006 | | |
| | [0.003] | | | [0.005] | | |
| Years Eligible*Middle East | -0.002 | | | 0.014 | | |
| | [0.005] | | | [0.009] | | |
| Years Eligible*Africa | 0.014*** | | | -0.008 | | |
| | [0.005] | | | [0.009] | | |
| Years Eligible*Asia | 0.002 | | | 0.006 | | |
| | [0.005] | | | [0.008] | | |
| Years Eligible*(North/South | -0.014 | | | 0.009 | | |
| America) | [0.009] | | | [0.009] | | |
| Years Eligible*(Russia and | 0.012** | | | 0.016** | | |
| Former SU) | [0.005] | | | [0.007] | | |
| Years Eligible*(Other or | 0.001 | | | 0.017 | | |
| No Passport) | [0.010] | | | [0.014] | | |
| GDP Source Country | | 0.002 | | | 0.002 | |
| | | [0.003] | | | [0.003] | |
| Years Eligible*GDP Source | | -0.000** | | | -0.000 | |
| Country | | [0.000] | | | [0.000] | |
| Years Eligible*Medium-skilled | | | -0.005** | | | -0.004 |
| | | | [0.002] | | | [0.003] |
| Years Eligible*High-skilled | | | -0.006 | | | 0.005 |
| | | | [0.004] | | | [0.005] |
| Individual Characteristics | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany Polynomial | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | No | Yes | No | Yes | Yes |
| Observations | 12,916 | 8,540 | 12,916 | 9,867 | 6,619 | 9,867 |
| R Squared | 0.405 | 0.405 | 0.404 | 0.173 | 0.168 | 0.172 |

Notes: The table reports reduced-form estimates of the returns to citizenship eligibility in Germany. The dependent variable is log monthly personal income (adjusted to 2005 prices). The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between the ages of 16 and 30 when they first get eligible during the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denote the number of years since an immigrants became eligible for naturalization after the 1991 or 2000 immigration reforms. All specifications include year of arrival and year of birth fixed effects, a second-order polynomial of years in Germany, education, current year and state of current residence fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship) and education controls. Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

is why guest workers naturalize at all if there are no labor market benefits associated with naturalization. The likely explanation is that citizenship also has other benefits outside the labor market: it is much easier to bring family members to Germany, for instance, if the immigrant is naturalized than if he has a permanent work permit.

**Table 3.10:** Returns to Eligibility for Different Immigration Waves to Germany

| Y: Log Personal Income | Male Immigrants | | Female Immigrants | |
|---|---|---|---|---|
| | Guest Workers (arrived 1976-1989) | Recent Immigrants (arrived 1990-2000) | Guest Workers (arrived 1976-1989) | Recent Immigrants (arrived 1990-2000) |
| | (1) | (2) | (3) | (4) |
| | Reduced Form Estimates | | Reduced Form Estimates | |
| Years since Eligible for Naturalization | -0.006 | -0.002 | 0.000 | 0.043*** |
| | [0.004] | [0.013] | [0.004] | [0.012] |
| Years in Germany | 0.117*** | 0.045 | 0.040 | 0.016 |
| | [0.025] | [0.032] | [0.032] | [0.037] |
| Years in Germany2 | -0.002*** | -0.002 | -0.001 | -0.001 |
| | [0.000] | [0.001] | [0.001] | [0.001] |
| Medium-skilled | 0.153*** | 0.178*** | 0.286*** | 0.261*** |
| | [0.013] | [0.018] | [0.029] | [0.023] |
| High-skilled | 0.472*** | 0.516*** | 0.692*** | 0.704*** |
| | [0.031] | [0.030] | [0.046] | [0.036] |
| Individual Characteristics | Yes | Yes | Yes | Yes |
| Years in Germany Polynomial | Yes | Yes | Yes | Yes |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes |
| Observations | 5,988 | 6,031 | 3,962 | 4,977 |
| R Squared | 0.305 | 0.430 | 0.155 | 0.181 |
| Mean of Dependent Variable | 7.13 | 6.80 | 6.54 | 6.33 |

Notes: The table shows reduced-form estimates where the dependent variable is log monthly personal income (adjusted to 2005 prices). The sample is restricted to first-generation immigrants (excluding ethnic Germans) who were between 16 and 30 years-old when they first get eligible during the 1991-2010 period. Years since eligible denotes the number of years since an immigrants became eligible for naturalization after the 1991 or 2000 immigration reforms respectively. The first specification shows results for older guestworkers who arrived in Germany between 1976-1989 for men (column (1)) and women (column (3)). The second specification reports results for more recent immigrants who arrived in Germany between 1990-2000 for men (column (2)) and women (column (4)). All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (EU-15, EU12, Ex-Yugoslavia, Turkey, Middle East, Africa, Asia, North and South America, Former Soviet Union and other/no citizenship). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1. See also notes to previous tables.
Source: Microcensus (2005-2010).

Another question is why we see these large differences between guest workers and more recent immigrants. Note that the difference cannot explained by changes in cohort quality as we include a full set of cohort of arrival dummies. Coefficients on these cohort dummies are small and not statistically significant for women; for men, cohort of arrival dummies are sometimes negative for later arrivals - the exact opposite of the pattern observed here. The patterns are also not merely a reflection of non-linear returns to citizenship. While the returns to citizenship decline with years of eligibility, they are still positive even for immigrant women who became eligible in the 1990s. Another possible explanation could be that the economic and social environment in Germany has turned in favor of immigrants. However, reduced discrimination or other more favorable attitudes of natives toward immigrants would only explain our results if immigrants who arrived in Germany recently benefit

from it while more traditional immigrants do not. In addition, the more favorable treatment has to be restricted to immigrants eligible for citizenship earlier, but cannot benefit immigrants who got eligible for German citizenship later. We think this scenario is unlikely. An alternative explanation is that immigrants arriving in Germany after 1990 knew that they can obtain citizenship whereas earlier guest workers came to Germany without that option. As such, incentives to migrate and invest in destination-specific skills might have changed after the 1991 and the 2000 reforms. At the same time however, immigrants arriving after 1990, many from Central and Eastern Europe, are somewhat more educated than traditional guest workers. Their better human capital endowment could be another reason why they perform better in the German labor market. Unfortunately, due to the timing of the reform, we cannot test whether changes in immigrant selection after 1991 are the results of the 1991 reform, or just the consequence of new migration opportunities after the removal of the Iron Curtain.

## 3.6 Additional Robustness Checks

### 3.6.1 Selective Migration, Return Migration and Sample Attrition

As discussed in Section 3.4.3, our estimates might be affected by selective in- or outmigration. The reforms in 1991 and 2000 might have changed the selection of immigrants to Germany. As we control for cohort of arrival fixed effects, changes in the selection of immigrants does not affect our results as long as the selection of immigrants changes in the same direction for immigrants eligible under the reduced resident requirement and those that are not. In Section 3.5.3 above, we allowed the quality of immigrants to change differentially across birth cohorts before and after the announcement of the 1991 reform. Yet, this alternative specification did not change our results which suggests that immigrant quality and years of eligibility are uncorrelated conditional on arrival year, region of origin and our other control variables.

A potentially more severe issue is dropout or return migration. As the immigrant sample is relatively young (between 16 and 49 years-old), survivor bias due

to mortality is of minor concern. A more important issue is selective out-migration. The literature (see Lubotsky, 2007; or Abramitzky et al., 2012 for recent evidence; Dustmann and Göhrlach, 2014 for a survey) suggests that return migration is indeed substantial: depending on the country studied, between 20% and 50% of an immigrant cohort leave within 10 years of arrival in the host country. If return migrants are negatively selected from the pool of immigrants, the average quality of those remaining in the host country improves over time. Selective out-migration then results in the well-known upward bias in estimated assimilation rates between immigrants and natives. Does selective return migration also affect our estimates of citizenship eligibility? The existing evidence suggests that return migration is highest in the first years and levels off after about eight years in the host country (see Figure 3 in Dustmann and Göhrlach, 2014; also Dustmann, 1993; Constant and Massey, 2002). Yet, our sample of immigrants have spent at least five years in Germany but most have been in the country for many more years - the mean is around eighteen years. Return migration during the 2005-2010 period is therefore unlikely to be a major issue.

However, return migration prior to our sample period could still produce a selected sample. If there is negative selection in out-migration and adolescent immigrants (who get eligible faster conditional on the cohort of arrival) are more likely to return than adult immigrants, then we would get an upward bias in the estimated return to citizenship eligibility. If adult immigrants are more likely to leave and there is negative selection into out-migration, there is a downward bias instead. If both groups are equally likely to leave Germany conditional on our control variables, there would be no bias in our estimates. Hence, the sign of the potential bias depends on whether return migration is positively or negatively with immigrant age. The existing evidence on the relationship between age and return migration is however not clear-cut: for immigrants from richer countries, age of arrival seems to be negatively correlated with return migration, while it is positively correlated for immigrants from developing countries (Dustmann and Göhrlach, 2014). In principle then, it is not obvious how return migration before our study period would affect our estimates.

While we cannot assess return migration in the repeated cross-sections of the Microcensus, we can test for selective dropout of immigrants in the SOEP panel. We take the probability of attrition from our sample (either due to mortality, emigration or other dropout) as the dependent variable and test whether attrition depends on eligibility or actual naturalization. All regressions include the same set of control

variables as before (i.e. year of arrival and year of birth fixed effects, a second-order polynomial of years in Germany, education and region of origin). Table B.8 suggests that attrition from the sample due to out-migration or other reasons is somewhat less likely for those who eventually naturalize or those currently naturalized. This result is not surprising because we would expect that naturalized immigrants have a longer-time horizon in the host country and are therefore less likely to return home. Yet, only the coefficient for eventual naturalization is statistically significant for men at the 10% level; the other coefficients do not reach statistical significance at conventional levels. Most importantly, we find no correlation between sample attrition and either an indicator for eligibility in the current year or years since eligible. Based on this evidence, return migration seems unlikely to bias our results.

### 3.6.2 Alternative Samples and Controls

In this section, we provide additional robustness tests to demonstrate that our results are not affected by alternative definitions of the eligibility variable and the immigrant sample. Our main analysis uses the 1991 reform to code our treatment variables. Yet, one may argue that the reform was fully implemented only in 1993 when a legal claim to eligibility was introduced. The first row in Table B.9 redefines our time since eligibility using 1993 as the first year of eligibility for citizenship. We find similar results than in the baseline and even a slight decrease in employment rates for men (by about 0.5%).

Some immigrants in our sample might qualify for citizenship through alternative channels. The most important fast track to citizenship is through marriage to a German citizen. Foreign spouses of citizens can apply for naturalization after three years of residency in Germany.[31] Therefore, some of the immigrants in our sample would be eligible for naturalization much faster than our eligibility variable indicates. Naturalization through marriage is expected to be more important for adult immigrants aged 23 and above. Since those immigrants are more likely to be in the control group, we possibly underestimate the returns to German citizenship. To check whether this could explain the absence of returns for male immigrants, we drop all immigrants who report having a German spouse in 2005-2010.[32] The results

[31] The immigrant has to be married for at least two years by the time he or she applies for naturalization; furthermore, the spouse has to have a German citizenship for at least two years. Finally, the couple has to have a permanent resident permit.

[32] Note that we only observe their current spouse, not the spouse or partner an immigrant had when they first lived in Germany. Some immigrants we drop from the sample might have naturalized through the provisions of the 1990 or 2000 reforms but married a German citizen only afterward. And some immigrants might have

reported in the second row show a very similar pattern than before: no effects of citizenship for men and positive labor market effects for women.

Another potential issue is that the 2000 reform not only changed the resident requirement for adult immigrants but also granted citizenship to children born in Germany to foreign-born parents. Immigrants with dependent children therefore have a higher incentive to naturalize prior to 2000 because they could include spouses and dependent children in their application. After 2000, newborn children obtained German citizenship independently of their parents (except for an eight-year resident requirement for at least one parent). Hence, the benefits of citizenship might be smaller after 2000 for parents with very young children. Controlling for the presence and age structure of children in the household does however not change our results. Alternatively, immigrant parents might adjust their labor supply after their newborn child has access to German citizenship after the 2000 reform. Mothers, for example, might reduce employment in order to give their newborn child a good start in the host country (Sajons, 2015). To check whether access to citizenship by birthplace for children born after January 1, 2000 may explain our results, we rerun our analysis dropping all immigrants with children under ten in the household. The children of the remaining sample were all born prior to 2000 and hence not directly affected by the reform.[33] The results in the fourth row show that women still have positive wage effects; again, there are no effects for men.

Our sample could also be affected by changes in the inflow of refugees and asylum seekers. After the opening of the Iron Curtain, large numbers of asylum seekers and ethnic Germans began to arrive in Germany. Faced with ever-increasing numbers of refugees, the federal government restricted access to political asylum in 1993.[34] Hence, the selection of refugees arriving in Germany might have changed substantially over time, especially after 1993. Refugees who are granted political asylum face the same naturalization criteria as all other immigrants in Germany.

naturalized through a German spouse, but got divorced before we observe them in the 2005-2010 sample period. We think that the number of immigrants we misclassify should be small relative to the number of immigrants with a German spouse in the 2005-2010 period. We find similar results if we use the SOEP where we have annual information on the immigrant's partner from 1984-2009 (not reported).

[33] The 2000 reform also included a transitory provision: Parents with children born between 1990 and 1999 could apply for German citizenship for their child between 2000 and 2001. The parent had to fulfill the other requirements of the 2000 reform granting citizenship by birthplace (most importantly, an 8-year resident requirement). In practice, less than 10 percent of parents did apply which suggest that children older than ten in 2010 have mostly not benefited from the citizenship by birthplace reform. In addition, if we drop immigrants with children younger than 15, we find again very similar results (not reported).

[34] After 1993, immigrants from source countries that are considered safe, or those arriving from safe third countries (which included all of Germany's geographic neighbors) could no longer apply for political asylum in Germany.

In some cases, however, the resident requirement could be reduced to six years. As such, some refugees might have naturalized earlier than our definition of eligibility indicates. Unfortunately, as in most data sources, our data do not record whether an immigrant arrives in Germany as a refugee or applies for asylum. As a proxy for refugee status, we therefore rerun our baseline after dropping all immigrants from ex-Yugoslavia and the Middle East which formed the largest groups of refugees over our sample period. The fifth row in Table B.9 shows slightly larger effects for female wages than our main results in Table 3.3. In addition, our sample might still contain some ethnic Germans who are not directly affected by the immigration reforms. We therefore restrict our data in the sixth row to the 2007-10 Microcensus; in those years, immigrants were asked whether they were eligible as ethnic Germans. The coefficients are almost unchanged.

Finally, changes in the German economy more broadly might influence our results. Germany's labor market experienced a substantial inflow of migrants after the fall of the Berlin Wall and the opening of the Iron Curtain. In addition, wage inequality in Germany increased in the late 1990s and 2000s with substantial net gains for the high-skilled but net losses for the low-skilled. In principle, these changes might be absorbed by year dummies or state-specific trends. Our reduced-form estimates would however be biased if business cycle effects or secular wage changes affect adolescent immigrants differently than adult immigrants. If adolescent immigrants perform better during a recession than adult immigrants, for instance, our estimates would be upward biased. The seventh row drops all East German states because immigration flows and labor market dynamics differ substantially between East and West Germany. Alternatively, we include state-level unemployment rates and GDP growth rates to our specification in the eighth row. In both cases, results are remarkably similar to our main results.

## 3.7 Discussion and Conclusion

Over the past decades, Germany has moved from a country where citizenship was closely tied to ancestry to a more liberal understanding of citizenship and naturalization. We investigate whether citizenship improves the economic assimilation in a country that has traditionally had little experience with naturalization. In contrast to traditional immigrant countries, we do not find positive selection into German citizenship. Men are intermediately selected in terms of observable skills, as medium-skilled immigrants are more likely to naturalize than the low-skilled.

Women, in contrast, are even negatively selected with respect to education, with high-skilled immigrants being less likely to naturalize than low- and medium-skilled immigrants.

Using age-dependent resident requirements of Germany's immigration reforms, we find no persistent benefits of citizenship for men, but substantial wage returns for immigrant women. In contrast to previous evidence from the US, we find only modest effects of citizenship on public sector employment. Rather, access to citizenship allows women adjust their labor market careers along three dimensions: first, they engage in occupational and sectoral upgrading like moving into white-collar jobs. Second, women have more stable careers, have longer tenure and work for larger firms after naturalization. Finally, women work longer hours and improve their language skills with access to citizenship. Exploring the heterogeneity of returns, we find that wage returns are typically larger for immigrants from outside the European Union and for recent arrivals in Germany.

Our empirical evidence differs from an earlier study for Germany which find wage returns for men, but no gains for women (Steinhardt, 2012). There are several important differences to our study: first, our sample includes all employment including self-employed and temporary jobs not subject to social security contributions; given that immigrants have much higher rates of self-employment, this difference is likely to be important. Since women move out of self-employment and temporary jobs after eligibility, upgrading into jobs with social security contributions is one explanation why we see wage returns for women. Second, in the social security data, an employee's citizenship is reported by the employer which is likely to be measured with error. As women have less stable careers with frequent changes of employer, their information on citizenship is less reliable (resulting in a downward bias in returns for women). Finally, the social security data used in Steinhardt's analysis does not contain any information on the year of arrival in Germany. Since time in Germany is positively correlated with naturalization, omitted variable bias will overestimate the returns to citizenship. As men have spent somewhat more time in Germany on average, this bias is likely more severe for men than women.
Overall, naturalization appears to be one channel to speed up the economic integration of immigrants even in countries where access to citizenship has traditionally been restrictive. The benefits of a more liberal immigration policy seem to materialize especially if immigrants have the human capital necessary to succeed in the host country's labor market - a condition more recent immigrants to Germany satisfy. As such, the substantial inflow of immigration over the past decade - making

Germany the second most important immigration country after the United States - is likely to provide large labor market benefits in the long-run. There are however, three caveats to this conclusion. First, our results show that a more liberal access to citizenship does not work automatically for everybody; we find few effects for guest workers. The second caveat is that the take-up of citizenship in Germany among first-generation immigrants is still low compared to more traditional immigration countries, though higher among more recent immigrants. Given the large labor market returns of citizenship for women, the low take-up points to informational issues or substantial costs of obtaining German citizenship. Reducing these costs (e.g., by allowing dual citizenship, for instance) would benefit both the immigrants and the host country. Finally, labor market performance is just one of several margins of assimilation in the host country. It would be interesting to complement our study with an analysis of social or cultural integration outcomes.

# 3.8 Appendix

**Table B.1:** Summary Statistics of the Microcensus

| | Male Immigrants | | Female Immigrants | |
|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. |
| Labor Force Participation | 0.72 | 0.45 | 0.53 | 0.50 |
| Log Personal Income | 6.96 | 0.76 | 6.42 | 0.77 |
| Public Sector Employment | 0.05 | 0.22 | 0.11 | 0.32 |
| White Collar Employment | 0.39 | 0.49 | 0.65 | 0.48 |
| Firm Size | 10.45 | 3.92 | 9.89 | 4.01 |
| Self-Employed | 0.10 | 0.30 | 0.05 | 0.22 |
| Temporary Work Contract | 0.21 | 0.40 | 0.23 | 0.42 |
| Job Tenure | 6.32 | 6.12 | 4.80 | 4.74 |
| Working Hours | 35.66 | 14.41 | 24.21 | 16.39 |
| Receive Transfers (Unemployment or Welfare) | 0.14 | 0.35 | 0.11 | 0.32 |
| Type of Benefits Received (1= Welfare Benefits) | 0.24 | 0.43 | 0.16 | 0.37 |
| Year of Arrival | 1989 | 6.66 | 1990 | 6.57 |
| Years in Germany | 18.65 | 6.76 | 17.65 | 6.63 |
| Naturalized | 0.40 | 0.49 | 0.40 | 0.49 |
| Years since Naturalized | 4.06 | 6.62 | 4.11 | 6.70 |
| Year 1st Eligible | 2000 | 4.93 | 2000 | 4.77 |
| Years since Eligible | 7.97 | 5.05 | 7.29 | 4.87 |
| Birth Year | 1978 | 6.74 | 1978 | 7.3 |
| Low-skilled | 0.49 | 0.50 | 0.53 | 0.50 |
| Medium-skilled | 0.46 | 0.50 | 0.41 | 0.49 |
| High-skilled | 0.06 | 0.23 | 0.06 | 0.24 |
| Region of origin | | | | |
| Traditional EU member states (EU 15) | 0.12 | 0.33 | 0.10 | 0.30 |
| New EU Member States (EU 12) | 0.10 | 0.30 | 0.14 | 0.35 |
| Ex-Yugoslavia | 0.14 | 0.35 | 0.13 | 0.33 |
| Turkey | 0.32 | 0.47 | 0.32 | 0.47 |
| Middle East | 0.08 | 0.28 | 0.07 | 0.26 |
| Africa | 0.05 | 0.21 | 0.04 | 0.19 |
| Asia | 0.04 | 0.19 | 0.05 | 0.21 |
| North and South America | 0.02 | 0.14 | 0.03 | 0.16 |
| Former Soviet Union (without EU12) | 0.11 | 0.31 | 0.12 | 0.32 |
| Other or No Citizenship | 0.02 | 0.13 | 0.01 | 0.11 |
| Source Country GDP per capita | 9178.93 | 7428.41 | 8974.94 | 7012.90 |
| Observations | 18,837 | | 19,688 | |

Notes: The table shows summary statistics for the sample of first-generation immigrants who arrived in Germany between 1976 and 2000 and are 16-30 years old when they first get eligible for citizenship in the 1991-2010 period. Ethnic Germans are excluded from the sample. The means for personal income, public sector and white collar employment are only available for the subsample of working individuals; GDP per capita in the country of origin (measured in 2005 US dollars) is only available for immigrants for which we know the country of origin rather than only the region of origin. The variable firmsize varies from 1 (1 employee) to 13 (50 employees and more). Low-skilled are those without highschool degree or vocational degree; medium-skilled individuals are those with a highschool or vocational degree; high-skilled are those with a college degree.
Source: Microcensus (2005-2010); Penn World Tables (2011).

**Table B.2:** Summary Statistics of the Socio-Economic Panel

| | Male Immigrants | | Female Immigrants | |
|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. |
| Labor force Participation | 0.73 | 0.44 | 0.44 | 0.50 |
| Log Monthly Labor Income | 7.37 | 0.72 | 6.83 | 0.78 |
| Speak German | 3.13 | 0.84 | 2.92 | 1.07 |
| Write in German | 2.58 | 1.15 | 2.59 | 1.29 |
| Year of Arrival | 1987 | 6.47 | 1988 | 6.31 |
| Years in Germany | 10.00 | 8.54 | 9.29 | 8.33 |
| Naturalized | 0.50 | 0.50 | 0.49 | 0.50 |
| Years since Naturalized | 2.75 | 5.10 | 2.52 | 4.94 |
| Eligible | 0.41 | 0.49 | 0.39 | 0.49 |
| Years since Eligible | 2.87 | 4.48 | 2.58 | 4.25 |
| Birth Year | 1974 | 6.36 | 1974 | 5.90 |
| Low-skilled | 0.33 | 0.47 | 0.45 | 0.50 |
| Medium-skilled | 0.39 | 0.49 | 0.30 | 0.46 |
| High-skilled | 0.02 | 0.15 | 0.04 | 0.20 |
| In School | 0.26 | 0.44 | 0.21 | 0.41 |
| Region of origin | | | | |
| Traditional EU Member Countries (EU 15) | 0.10 | 0.29 | 0.10 | 0.30 |
| New EU Member Countries (EU 12) | 0.19 | 0.40 | 0.20 | 0.40 |
| Ex-Yugoslavia | 0.11 | 0.32 | 0.09 | 0.29 |
| Turkey | 0.27 | 0.44 | 0.26 | 0.44 |
| Middle East | 0.03 | 0.16 | 0.01 | 0.11 |
| Africa | 0.02 | 0.12 | 0.02 | 0.13 |
| Asia | 0.01 | 0.10 | 0.02 | 0.14 |
| North and South America | 0.02 | 0.13 | 0.02 | 0.13 |
| Former Soviet Union (without EU 12) | 0.26 | 0.44 | 0.28 | 0.45 |
| Other or no Citizenship | 0.00 | 0.05 | 0.01 | 0.07 |
| Observations | 4,559 | | 4.939 | |

Notes: The table reports summary statistics for first-generation immigrants who are not ethnic Germans, arrived in Germany between 1976 and 2000 and who are 16-30 years-old when they first get eligible for citizenship in the 1991-2010 period. Writing and speaking German are self-assessed language abilities which vary from 0 (not at all) to 4 (very well). Naturalized is equal to one if a person is actually naturalized. Eligible is equal to one if an individual is (a) aged 16-22, has lived in Germany for at least 8 years and the year is 1991 or later; (b) aged 23-30, has lived in Germany for at least 15 years in the period 1991-1999; or (c) aged 23-30, has lived in Germany for at least 8 years and the year is 2000 or later. Low-skilled individuals are those without a high school or vocational degree; medium-skilled are those with high school or vocational degree; high-skilled are those with college degree. Individuals are in school if they still attend school over the past four weeks.
Source: Socio-Economic Panel (1984-2009).

**Table B.3:** Variation in Eligibility after the 1991 and 2000 Immigration Reforms

| Year of Arrival in Germany | Adolescent Immigrants Treatment: Eligible after 8 Years (=1991) | | | | Adult Immigrants Control: Eligible after 15 Years (<2000), 8 Years (=2000) | | | | Difference in Year when first Eligible col. (8)-(4) |
|---|---|---|---|---|---|---|---|---|---|
| | Year 1st Eligible | Years in Germany when 1st eligible | Birth Cohorts | Years Eligible (in 2005) | Year 1st Eligible | Years in Germany when 1st eligible | Birth Cohorts | Years Eligible (in 2005) | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| **1976** | 1991 | 15 | 1969-75 | 14 | 1991 | 15 | 1961-68 | 14 | 0 |
| **1977** | 1991 | 14 | 1969-75 | 14 | 1992 | 15 | 1962-68 | 13 | 1 |
| **1978** | 1991 | 13 | 1969-75 | 14 | 1993 | 15 | 1963-68 | 12 | 2 |
| **1979** | 1991 | 12 | 1969-75 | 14 | 1994 | 15 | 1964-68 | 11 | 3 |
| **1980** | 1991 | 11 | 1969-75 | 14 | 1995 | 15 | 1965-68 | 10 | 4 |
| **1981** | 1991 | 10 | 1969-75 | 14 | 1996 | 15 | 1966-68 | 9 | 5 |
| **1982** | 1991 | 9 | 1969-75 | 14 | 1997 | 15 | 1967-68 | 8 | 6 |
| **1983** | 1991 | 8 | 1969-75 | 14 | 1998 | 15 | 1968 | 7 | 7 |
| **1984** | 1992 | 8 | 1970-76 | 13 | 1999 | 15 | 1969 | 6 | 7 |
| **1985** | 1993 | 8 | 1971-77 | 12 | 2000 | 15 | 1970 | 5 | 7 |
| **1986** | 1994 | 8 | 1972-78 | 11 | 2000 | 14 | 1970-71 | 5 | 6 |
| **1987** | 1995 | 8 | 1973-79 | 10 | 2000 | 13 | 1970-72 | 5 | 5 |
| **1988** | 1996 | 8 | 1974-80 | 9 | 2000 | 12 | 1970-73 | 5 | 4 |
| **1989** | 1997 | 8 | 1975-81 | 8 | 2000 | 11 | 1970-74 | 5 | 3 |
| **1990** | 1998 | 8 | 1976-82 | 7 | 2000 | 10 | 1970-75 | 5 | 2 |
| **1991** | 1999 | 8 | 1977-83 | 6 | 2000 | 9 | 1970-76 | 5 | 1 |
| **1992** | 2000 | 8 | 1978-84 | 5 | 2000 | 8 | 1970-77 | 5 | 0 |
| **1993** | 2001 | 8 | 1979-85 | 4 | 2001 | 8 | 1971-78 | 4 | 0 |
| **1994** | 2002 | 8 | 1980-86 | 3 | 2002 | 8 | 1972-79 | 3 | 0 |
| **1995** | 2003 | 8 | 1981-87 | 2 | 2003 | 8 | 1973-80 | 2 | 0 |
| **1996** | 2004 | 8 | 1982-88 | 1 | 2004 | 8 | 1974-81 | 1 | 0 |
| **1997** | 2005 | 8 | 1983-89 | 0 | 2005 | 8 | 1975-82 | 0 | 0 |
| **1998** | 2006 | 8 | 1984-90 | 0 | 2006 | 8 | 1976-83 | 0 | 0 |
| **1999** | 2007 | 8 | 1985-91 | 0 | 2007 | 8 | 1977-84 | 0 | 0 |
| **2000** | 2008 | 8 | 1986-92 | 0 | 2008 | 8 | 1978-85 | 0 | 0 |
| **Mean** | 1999 | 8.9 | 1979 | 8.1 | 2001 | 9.5 | 1974 | 5.3 | |

Notes: The table shows when an immigrant who arrived in Germany between 1976 and 2000 became eligible for citizenship after Germany's immigration reforms in 1991 and 2000. Adolescent immigrants (on the left-hand side of the table) who are between the ages of 16 and 22 when they first get eligible for citizenship benefit from a reduced residency requirement of eight years after 1991. Adult immigrants (on the right-hand side of the table) who are 23 years-old or older when they first get eligible had to live in Germany for at least fifteen years in the 1991-1999 period; since 2000, the resident requirement has been reduced to eight years for all immigrants. Columns (1) and (5) show the year an immigrant first gets eligible for citizenship; the number of years an immigrant has lived in Germany when she qualifies for citizenship (in columns (2) and (6)). Columns (3) and (7) show the birth cohorts in each category when we restrict our sample to 16-30 years-olds when first eligible. Columns (4) and (8) show how the discontinuity in eligibility rules after 1991 and 2000 transforms into a discontinuity in years of eligibility, our treatment variable in the empirical analysis.

## **Table B.4:** Alternative Specifications

| **Male Immigrants** | Log Personal Income (Reduced Form Estimates) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| Years since Eligible | -0.002 | -0.002 | -0.002 | -0.002 | 0.003 | -0.001 | -0.005 | -0.002 | -0.002 | 0.004 | 0.014 |
| | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.006] | [0.004] | [0.004] | [0.005] | [0.006] | [0.009] |
| Years in Germany Polynomial | Linear | Quadratic | Cubic | Quartic | Quadratic | Quadratic | Quadratic | Quadratic | Quadratic | Quadratic | Quadratic |
| Age of Arrival Controls | No | No | No | No | Before 11 | Dummies | No | No | No | No | No |
| Birth Cohort FE * Before/After 1990 | No | No | No | No | No | No | Yes | No | No | No | No |
| Age Window 1st Eligible Immigrants | 16-30 | 16-30 | 16-30 | 16-30 | 16-30 | 16-30 | 16-30 | 16-30 | 19-27 | 21-25 | 22-23 |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 12,946 | 12,946 | 12,946 | 12,946 | 12,946 | 12,946 | 12,946 | 12,707 | 6,447 | 3,913 | 1,634 |
| R Squared | 0.401 | 0.404 | 0.404 | 0.404 | 0.405 | 0.405 | 0.406 | 0.406 | 0.285 | 0.247 | 0.243 |
| AIC criterion | 19045.9 | 18981.5 | 18981.4 | 18982.1 | | | | | | | |

| **Female Immigrants** | Log Personal Income (Reduced Form Estimates) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (9) | (10) | (11) | (12) |
| Years since Eligible | 0.015*** | 0.015*** | 0.015*** | 0.015*** | 0.019*** | 0.02** | 0.010* | 0.015*** | 0.003 | 0.031* | 0.040* |
| | [0.005] | [0.005] | [0.005] | [0.005] | [0.006] | [0.009] | [0.006] | [0.005] | [0.009] | [0.016] | [0.021] |
| Years in Germany Polynomial | Linear | Quadratic | Cubic | Quartic | Quadratic | Quadratic | Quadratic | Quadratic | Quadratic | Quadratic | Quadratic |
| Age of Arrival Controls | No | No | No | No | Before 11 | Dummies | No | No | No | No | No |
| Birth Cohort FE * Before/After 1990 | No | No | No | No | No | No | Yes | No | No | No | No |
| Age Window 1st Eligible Immigrants | 16-30 | 16-30 | 16-30 | 16-30 | 16-30 | 16-30 | 16-30 | 16-30 | 19-27 | 21-25 | 22-23 |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 9,884 | 9,884 | 9,884 | 9,884 | 9,884 | 9,884 | 9,884 | 9,639 | 4,767 | 2,584 | 1,016 |
| R Squared | 0.171 | 0.172 | 0.172 | 0.172 | 0.172 | 0.173 | 0.176 | 0.173 | 0.159 | 0.170 | 0.216 |
| AIC criterion | 19817.6 | 19809.8 | 19809.7 | 19811.7 | | | | | | | |

Notes: The table reports reduced-form estimates of the returns to citizenship for male (top panel) and female (bottom panel) immigrants in Germany. The dependent variable is log monthly personal income (adjusted to 2005 prices). The first four specifications (columns (1)-(4)) include different polynomials in years in Germany. Columns (5) and (6) test for the influence of age of arrival effects: (5) adds a dummy for immigrants which were under the age of 11 when they arrived in Germany; (6) include separate dummies for age of arrival (5-year bands). Columns (7) allows for separate birth year fixed effects for arrival cohorts prior to 1990 and those arriving after 1990. Columns (8)-(11) change the bandwidth of the age window (when immigrants are first eligible for naturalization): (8) 16-30 years-old; (9) 19-27 years-old; (10) 21-25 years-old; and (11) 22-23 years-old. The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible during the 1991-2010 period (in columns (1)-(8), narrower age band in columns (9)-(11)). We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. All specifications also include education and ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

**Table B.5:** Additional Estimates of the Labor Market Returns to Citizenship Eligibility

| | Male Immigrants | | | | | | Female Immigrants | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Employment | | | Log Monthly Earnings | | | Employment | | | Log Monthly Earnings | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| | Reduced | Form | Estimates | Reduced | Form | Estimates | Reduced | Form | Estimates | Reduced | Form | Estimates |
| Eligible | | -0.008 | -0.012 | | -0.026 | -0.026 | | 0.006 | 0.009 | | -0.052 | -0.068 |
| | | [0.027] | [0.028] | | [0.035] | [0.035] | | [0.025] | [0.026] | | [0.056] | [0.062] |
| Years since Eligible | -0.003 | | 0.002 | -0.008 | | -0.003 | 0.003 | | -0.000 | 0.008 | | 0.012 |
| | [0.006] | | [0.006] | [0.008] | | [0.008] | [0.006] | | [0.006] | [0.013] | | [0.013] |
| Individual Characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany Polynomial | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 4,559 | 4,559 | 4,559 | 3,338 | 3,338 | 3,338 | 4,939 | 4,939 | 4,939 | 2,196 | 2,196 | 2.196 |
| R Squared | 0.229 | 0.229 | 0.220 | 0.621 | 0.621 | 0.612 | 0.176 | 0.175 | 0.165 | 0.388 | 0.388 | 0.365 |

Notes: The table reports reduced-form estimates of the returns to citizenship. The dependent variables are whether a person is employed (columns (1)-(3) and (7)-(9)) and the log monthly gross earnings (columns (4)-(6) and (10)-(12)). The first specification reruns the baseline using years since eligibility. To test for the presence of level effects, the second specification includes an indicator for current eligibility, while the third specification includes both variables. The sample includes all immigrants who arrived in Germany between 1976 and 2000 who were between 16-30 years old when they first get eligible for citizenship during the 1991-2009 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. All specifications include the same individual characteristics as earlier tables (individual year of arrival and year of birth fixed effects, a second-order polynomial of years in Germany and education), current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Socio-Economic Panel (1984-2009).

**Table B.6:** First-Stage Estimates of IV for Job Characteristics

| | Male Immigrants | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Public Sector | White Collar | Firm Size | Self-Employed | Temporary Contract | Job Tenure | Working hours | Social Assistance |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | | | | First Stage | | | | |
| Years since Eligible | 0.069* | 0.115** | 0.081** | 0.096** | 0.082** | 0.098** | 0.096** | 0.061* |
| | [0.042] | [0.045] | [0.039] | [0.038] | [0.039] | [0.042] | [0.038] | [0.035] |
| Observations | 10.704 | 10.819 | 13.009 | 13.375 | 11.918 | 12.152 | 13.375 | 16.145 |
| R Squared | 0.354 | 0.37 | 0.36 | 0.362 | 0.378 | 0.361 | 0.362 | 0.346 |
| F-Statistic First Stage | 2.78 | 6.6 | 4.29 | 6.21 | 4.4 | 5.54 | 6.21 | 3.04 |
| | **Female Immigrants** | | | | | | | |
| | Public Sector | White Collar | Firm Size | Self-Employed | Temporary Contract | Job Tenure | Working hours | Social Assistance |
| | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
| | | | | First Stage | | | | |
| Years since Eligible | 0.146*** | 0.141*** | 0.156*** | 0.147*** | 0.128*** | 0.178*** | 0.147*** | 0.152*** |
| | [0.053] | [0.060] | [0.052] | [0.052] | [0.053] | [0.053] | [0.051] | [0.043] |
| Observations | 8.145 | 8.552 | 9.929 | 10.213 | 9.431 | 9.168 | 10.213 | 14.561 |
| R Squared | 0.362 | 0.3704 | 0.373 | 0.372 | 0.375 | 0.370 | 0.372 | 0.3364 |
| F-Statistic First Stage | 7.56 | 5.44 | 9.01 | 8.33 | 5.74 | 11.26 | 8.33 | 12.67 |

Notes: The table reports the first-stage estimates of the IV estimates shown in the bottom panel in Table 6. The dependent variable in all columns is the number of years since a first-generation immigrant has naturalized. Results are shown for male immigrants in the top panel (columns (1)-(8)) and female immigrants in the bottom panel (columns (9)-(16)). See Table 6 for details on the sample and specification. All standard errors are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05 and * p<0.1.
Source: Microcensus (2005-2010).

## **Table B.7:** Eligibility for Citizenship and Language Skills

| | Male Immigrants | | | | Female Immigrants | | | |
|---|---|---|---|---|---|---|---|---|
| | Speak German | Write German | Speak German | Write German | Speak German | Write German | Speak German | Write German |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | OLS Estimates | | Reduced Form Estimates | | OLS Estimates | | Reduced Form Estimates | |
| Years since Eligible | -0.012* | -0.007 | 0.016 | -0.004 | 0.005 | -0.006 | 0.004 | 0.032** |
| | [0.007] | [0.008] | [0.015] | [0.019] | [0.005] | [0.007] | [0.014] | [0.016] |
| Years in Germany | 0.207*** | 0.297*** | 0.146*** | 0.190*** | 0.157*** | 0.173*** | 0.153*** | 0.155*** |
| | [0.021] | [0.027] | [0.021] | [0.024] | [0.017] | [0.020] | [0.016] | [0.019] |
| Years in Germany2 | -0.003*** | -0.004*** | -0.003*** | -0.003*** | -0.003*** | -0.003*** | -0.003*** | -0.003*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Medium-skilled | 0.214*** | 0.223*** | 0.185*** | 0.221*** | 0.344*** | 0.481*** | 0.298*** | 0.419*** |
| | [0.045] | [0.059] | [0.043] | [0.054] | [0.058] | [0.063] | [0.051] | [0.056] |
| High-skilled | 0.448*** | 0.573*** | 0.392*** | 0.540*** | 0.391*** | 0.893*** | 0.356*** | 0.746*** |
| | [0.136] | [0.168] | [0.103] | [0.118] | [0.107] | [0.116] | [0.084] | [0.087] |
| Individual Characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Years in Germany Polynomial | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Mean of Dependent Variable | 3.00 | 2.58 | 3.00 | 2.58 | 2.59 | 2.20 | 2.59 | 2.20 |
| Observations | 1,800 | 1.795 | 1,800 | 1.795 | 1,858 | 1,856 | 1,858 | 1,856 |
| R Squared | 0.426 | 0.419 | 0.396 | 0.408 | 0.515 | 0.534 | 0.515 | 0.534 |

Notes: The table reports reduced-form estimates of the returns to citizenship for male and female immigrants in Germany. The dependent variables are self-assessed language skills in writing and speaking German respectively (reported on a scale from 0=Not at all to 4= Very well). The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16-30 years old when they first eligible for citizenship during the 1991-2009 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrants became eligible for naturalization after the 1991 and 2000 German immigration reforms. All specifications include the same individual characteristics as earlier tables (individual year of arrival and year of birth fixed effects, a second-order polynomial of years in Germany, education), current year and state of current residence fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Socio-Economic Panel (1984-2009).

**Table B.8:** Return Migration and Other Selective Dropout of Immigrants

| | **Male Immigrants** Exit from Population (Emigration or Mortality) | | | | **Female Immigrants** Exit from Population (Emigration or Mortality) | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Eventually Naturalized | -0.007* | | | | -0.004 | | | |
| | [0.004] | | | | [0.003] | | | |
| Actually Naturalized | | -0.009 | | | | -0.008 | | |
| | | [0.009] | | | | [0.005] | | |
| Eligible for Naturalization | | | 0.000 | | | | 0.001 | |
| | | | [0.008] | | | | [0.005] | |
| Years since Eligible | | | | 0.002 | | | | 0.001 |
| | | | | [0.001] | | | | [0.001] |
| Years in Germany | -0.003 | -0.003 | -0.003 | -0.004 | -0.002* | -0.002* | -0.002 | -0.002* |
| | [0.002] | [0.002] | [0.003] | [0.002] | [0.001] | [0.001] | [0.001] | [0.001] |
| Years in Germany2 | 0.000 | 0.000 | 0.000 | -0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Medium-skilled | -0.004 | -0.003 | -0.004 | -0.004 | -0.003 | -0.003 | -0.003 | -0.003 |
| | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] | [0.004] |
| High-skilled | 0.001 | 0.002 | 0.001 | 0.001 | 0.018 | 0.018 | 0.019 | 0.019 |
| | [0.017] | [0.016] | [0.017] | [0.017] | [0.012] | [0.012] | [0.012] | [0.012] |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 4.362 | 4,362 | 4,362 | 4.362 | 4.689 | 4.689 | 4,689 | 4,689 |
| R Squared | 0.054 | 0.054 | 0.053 | 0.054 | 0.047 | 0.047 | 0.047 | 0.047 |

Notes: The dependent variable is the probability that an immigrant exits from the population (either through mortality or leaving the sample, e.g., by moving abroad). The key independent variables are whether an immigrant eventually naturalizes while participating in the SOEP (columns (1) and (4)); whether the immigrant is currently naturalized (columns (2) and (5)); whether the immigrant is currently eligible for naturalization (columns (3) and (6)); and the years since an immigrant has been eligible for naturalization (columns (4) and (8)). The sample and all control variables are the same as in Table A6. Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05 and * p<0.1.
Source: Socio-Economic Panel (1984-2009).

## **Table B.9:** Alternative Samples and Additional Controls

| | **Male Immigrants** | | **Female Immigrants** | |
|---|---|---|---|---|
| | Employment | Log Personal Income | Employment | Log Personal Income |
| | (1) | (2) | (3) | (4) |
| Use Legal Claim to Eligibility since 1993 | -0.001 | -0.002 | -0.001 | 0.013* |
| | [0.003] | [0.005] | [0.003] | [0.007] |
| Drop Immigrants with German Partners | 0.004 | -0.003 | -0.002 | 0.020*** |
| | [0.003] | [0.005] | [0.003] | [0.006] |
| Control for Children in Household | 0.001 | -0.002 | -0.003 | 0.012** |
| (2000 Reform) | [0.002] | [0.004] | [0.003] | [0.005] |
| Drop Children under Age 10 | 0.005* | -0.005 | 0.003 | 0.018*** |
| (2000 Reform) | [0.003] | [0.005] | [0.003] | [0.006] |
| Drop Ex-Yugoslavia and Middle East | 0.001 | -0.003 | -0.005 | 0.019*** |
| | [0.002] | [0.004] | [0.003] | [0.006] |
| Drop Additional Ethnic Germans | -0.000 | -0.003 | -0.001 | 0.015** |
| | [0.002] | [0.004] | [0.003] | [0.006] |
| Drop East German States | 0.001 | -0.002 | -0.002 | 0.014*** |
| | [0.002] | [0.004] | [0.003] | [0.005] |
| Add Economic Conditions | -0.001 | -0.003 | 0.001 | 0.018** |
| | [0.003] | [0.005] | [0.004] | [0.007] |
| Individual Characteristics | Yes | Yes | Yes | Yes |
| Years in Germany Polynomial | Yes | Yes | Yes | Yes |
| Cohort of Arrival FE | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes |

Notes: The table reports reduced-form estimates where the dependent variable is employment (columns (1) and (3)) and log personal income adjusted to 2005 prices (columns (2) and (4)). The key independent variables are the number of years since a person is eligible for naturalization. The first row uses the introduction of a legal claim to eligibility in 1993 to calculate the eligibility variable (rather than the 1991 reform year). The second row drops immigrants with a German spouse in 2005-10. The third row includes controls for the number and age structure of children in the household. The fourth row drops immigrants with children under 10 who might have benefitted from the introduction of birthright citizenship in 2000 for all children born on or after January 1, 2000. The fifth row excludes all immigrants from Ex-Yugoslavia and the Middle East; the sixth row restricts the sample to the 2007-10 Microcensus where we can directly identify and exclude ethnic Germans. The seventh row drops observations from East German states except Berlin, while the last row adds labor market controls (a linear and squared term in state unemployment rate and the state GDP growth rate). See notes to previous tables for the definition of the sample. All specifications include the same individual characteristics as before (year of arrival and year of birth fixed effects, a second-order polynomial of years in Germany, education), state and year fixed effects, state-specific linear time trends and ten region of origin fixed effects. Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

# 4 Access to Citizenship and the Social Integration of Immigrants

## 4.1 Introduction

Many developed countries have accumulated sizable immigrant populations over the past decades[1]. In Europe, for example, the shares of foreign-born in 2013 is over 12% in France, 17% in Sweden and almost 28% in Switzerland. These numbers are comparable to the share of foreign-born in traditional immigrant countries such as Australia, Canada or the United States (OECD, 2015). At the same time, immigrants often seem to perform poorly in terms of economic assimilation with higher unemployment rates and lower earnings than natives (e.g., Algan et al., 2010; OECD, 2006). In Europe, they often seem to fall short along social, cultural and political integration as well (Algan et al., 2012).

The lack of economic and social integration poses substantial challenges to destination countries. Social exclusion might threaten the social cohesion of societies, for instance, by fostering unrest and hostility among the native population. Anti-immigrant attitudes seem to be only in part explained by economic well-being and the perceived effects of economic competition from immigrants (e.g., Scheve and Slaughter, 2001; Mayda, 2006; Dustmann and Preston, 2004). Instead, natives appear to be just as much concerned about the cultural and social impact of immigration on the host country. Dustmann and Preston (2004), for example, find that opposition to immigration in the UK is more closely related to racial intolerance than to fears about fiscal costs or labor market competition. Based on data for several countries, Mayda (2006) finds that concerns about crime and identity are important determinants for attitudes toward migration. As such, negative attitudes and discrimination against immigrants seem to be a combination of the perceived

[1]The paper is joint work with Christina Gathmann and Ole Monscheuer. We thank participants at the European Economic Association Meeting, RWI Essen, Verein für Socialpolitik and the Ifo Migration Workshop for valuable comments.

economic impact, be it in the labor market or on the welfare state, and the social and cultural influence on the host society - where the latter appears more important among the low-skilled population in the host country (e.g., Card et al., 2012).[2]

The importance of both socio-cultural and economic concerns in the native population suggests that we need to understand assimilation not only in terms of wages, employment or formal education; but also shed light on the process of or barriers to social and cultural assimilation. Understanding these factors facilitating (or hindering) integration along economic but also social dimensions seems crucial for the economic and social well-being of immigrants and destination countries alike.

In this article, we ask whether access to citizenship could be a policy instrument to advance immigrants' position in the destination country. In particular, does a more liberal access to citizenship speed up the social integration of immigrants in terms of family formation, fertility choices or the type of partner chosen?

To investigate the effect of citizenship empirically, we cannot simply compare naturalized and non-naturalized immigrants. Because naturalized migrants are not selected randomly from the immigrant population, it is challenging to separate the causal return to citizenship from the selection into naturalization. Migrants applying for citizenship might well be those with the highest motivation and the best prerequisites to integrate into the host society. Previous studies from Canada and the United States, for instance, suggest indeed that selection into citizenship is positive with respect to observable skills (see e.g., Chiswick and Miller, 2008 for the United States; and De Voretz and Pivnenko, 2006 for Canada). A second difficulty is that eligibility to citizenship is often closely tied to the number of years an immigrant has resided in the host country. Time in the host country in turn is often positively correlated with measures of integration like language skills or intermarriage, for example. As a consequence, it is difficult to disentangle the returns to citizenship from social assimilation in the host country more broadly.

To overcome these empirical challenges, we exploit the unique setting in Germany. Today, almost 10 million foreign-born live in Germany, about 13% of its population. Yet, Germany is an exemplary case for the assimilation and integration problems of immigrants. Immigrants have lower general trust and are more risk averse than natives even in the second generation; they often do not identify themselves as Germans as well (e.g., Algan et al., 2012 for recent evidence).

[2]Experimental evidence from a public opinion survey in the Netherlands suggests that concerns about national identity are an important driver for the opposition against immigrants - and even more important than economic factors (see Sniderman et al., 2004; Hainmüller and Hopkins, 2014 provide a recent survey of the political science literature).

Most important for our purpose, Germany has substantially liberalized its access to citizenship over the past decades. Traditionally, Germany had a very restrictive citizenship law which was closely tied to ancestry and ethnic origin. Starting in the early 1990s, there have been important changes in Germany's immigration policy. In 1991, the government introduced for the first time explicit criteria how immigrants can obtain German citizenship. Since 2000, immigrants can naturalize after eight years of residency in Germany, and children of foreign parents in Germany now obtain citizenship at birth.

To identify the effects of citizenship, we make use of two institutional peculiarities of Germany's reforms. The 1991 reform defined age-dependent residency requirements for naturalization. Specifically, adult immigrants (aged 23 and above) faced a 15-year residency requirement before they could apply for citizenship. Adolescent immigrants (ages 16-22) in turn could apply for German citizenship after only 8-year of residence. Hence, young immigrants (born between 1969 and 1975) who arrived in Germany in 1983, for example, become eligible for citizenship in 1991, right after the reform was passed. Adult immigrants (born before 1969) who came to Germany in the same year had to wait until 1997 in order to be eligible, or 7 years after the younger cohort. The second immigration reform in 2000 reduced resident requirements for all immigrants to 8 years. As a consequence, all adult immigrants who arrived in Germany between 1985 and 1992 became eligible immediately in 2000 but had lived in Germany between 8 and 15 years. We can therefore compare outcomes of immigrants who are somewhat younger or arrived in Germany somewhat earlier and, for this reason, are eligible for naturalization several years earlier than other immigrants. Our analysis thus identifies the returns to eligibility (option to naturalize) while being able to control for the effects of cohort quality, age and general assimilation effects.

The focus of our main analysis is on the reduced-form relationship between eligibility for citizenship and measures of social assimilation. Knowing whether a more liberal access to citizenship affects immigrants' integration is important in its own right. Furthermore, the intent-to-treat effect is the primary parameter of interest for policy makers who aim to improve the integration of immigrants in the host country; for the immigrants themselves, it represents the option value of naturalization.

We have four main results. First, we find that eligibility reduces the demand for children. Because not all immigrant women in our sample have completed their fertility, the declining number of children reflects in part a postponement of births.

Both the decline in fertility and the rising age at first birth indicate that immigrants converge to the fertility choices of natives. After the mean years of eligibility in our sample, the immigrant-native gap in fertility closes by 20-25 percent. Second, eligibility for citizenship reduces the likelihood of marriage for men and women - both the probability of being currently married and the probability of ever being married. As eligibility has no effect on marital stability or cohabitation, this finding suggests that eligible immigrants postpone marriage to search for a suitable match. Third, eligible women but not men choose different partners (whether married or cohabitating). Eligible women are less likely to have a German native or a second generation immigrant from the same origin as a partner. Their partners have been in Germany for a shorter period and are therefore less likely to qualify for citizenship on their own. Finally, we investigate the potential channels why access to citizenship speeds up social integration. We find that income explains about 25 percent of the speed of assimilation. In addition, we find that the cultural heritage of immigrants matters. Immigrants who come from more traditional cultures with higher fertility, for instance, have higher fertility themselves; but they also reduce their fertility much more with access to citizenship. Overall, the speed of assimilation in fertility is about double at the 75th percentile than at the 25th percentile of the source countries' fertility distribution. These findings show that immigrants adapt much faster into the host society if they have the option to naturalize.

This article contributes to three strands of the literature. First, we contribute to the literature on citizenship. The vast majority focuses on citizenship's impact in the labor market (e.g., Chiswick, 1978; and Bratsberg et al., 2002 for the US; De Voretz and Pivnenko, 2006 for Canada; Gathmann and Keller, 2014 for Germany). However, citizenship may not only affect the labor market performance of immigrants but might have an impact on social and cultural integration into the host country as well (see also OCED, 2011). A few recent studies have analyzed the link between birthright citizenship for second-generation immigrants and fertility choices of their parents (Avitabile et al., 2014), educational attainment of second-generation immigrant children (Felfe and Sauer, 2015) or parents' interactions with host country culture (Avitabile et al., 2013; Sajons, 2015).[3] All of these studies analyze how birthright citizenship for newborn children affects the social and cultural integration of their parents. Our paper in turn investigates how fertility, family formation and matching behavior change when the immigrant herself can naturalize in the host

[3] A related literature studies the relationship between naturalization and political involvement (Bevelander, 2011; Hainmüller et al., 2014). Our study focuses on the impact of citizenship on fertility and family formation instead.

country.

Our study is also related to the sizable literature on immigrant assimilation. Most of the literature in economics has focused on labor market assimilation and its determinants (e.g., Borjas, 1985, 1995; Card, 2005; Hu, 2000; Lalonde and Topel, 1997; Lubotsky, 2007; Dustmann and Glitz, 2011 survey the literature).[4] Yet, as noted by Algan et al. (2012), assimilation seems to vary a lot depending on the dimension considered. Economic assimilation, for instance, might be faster than integration along social and cultural dimensions; and some immigrant groups might integrate much faster along some dimensions than others. A small literature analyzes cultural assimilation among immigrants measured, for instance, by national identity (e.g., Dustmann, 1996) or values and beliefs (Algan et al., 2012; Bisin et al., 2008). A much larger literature in economics but also sociology compares natives and immigrants with respect to family formation and fertility behavior (e.g., Ben-Porath, 1973; Bleakley and Chin, 2010; Adsera and Ferrer, 2014; and Furtado and Trejo, 2013 survey the literature). The evidence typically shows that there are substantial differences between natives and immigrants in fertility, marriage behavior and the type of partner chosen. With time in the host country, most studies report a decline in the immigrant-native gap though full convergence may span several generations. Rather than comparing immigrants to natives, we analyze the assimilation process for immigrants who get eligible for citizenship at different points in time.[5] Our main contribution to this literature is however, that we evaluate the effects of a particular policy, liberalization of citizenship, for the speed of social assimilation and its determinants. Our results thus have direct implications for policy-makers wishing to promote immigrant integration in the host countries.

Finally, this paper also contributes to a broader literature examining the impact of culture on economic and social behavior. Several recent studies employ immigrants from different source countries to separate the influence of culture and norms from other institutional factors in a host country. The basic idea is that immigrants have been exposed to different traditions and values, either in the country of origin or, for second-generation immigrants, through parents and ethnic neighborhoods, but face the same institutional and economic incentives in the host country (see Fernandez, 2011 for a detailed exposition of the epidemiological approach). Most related are studies that have analyzed female labor supply (Alesina and Giuliano,

[4]For Germany, most studies do not find much evidence for economic assimilation (see, e.g., Pischke, 1993; or Schmidt, 1997).

[5]Similarly, Lalonde and Topel (1997) and Blau et al. (2011) also use different immigrant cohorts to study the link between years in the U.S. and economic integration.

2010; Blau, 1992; Blau et al., 2011; Fernández and Fogli, 2009), fertility (Fernández and Fogli, 2009), divorce (Furtado et al., 2011) or living arrangements (Giuliano, 2007).[6] The paper closest to ours is by Blau et al. (2011) who analyze how cultural origin affects the speed of labor market assimilation of female immigrants in the US. The research question we address here, how citizenship affects social assimilation, has not been studied so far. What influence does the cultural heritage of immigrants have on the integration through citizenship compared to say, human capital or income?

The article proceeds as follows: The next section discusses the recent immigration reforms in Germany. Section 3 introduces our data sources and the empirical strategy to identify the returns to citizenship. Section 4 discusses the empirical results on social integration, while Section 5 studies potential mechanisms. Section 6 concludes.

## 4.2 Theoretical Considerations

### 4.2.1 Fertility Decisions

Economic theory suggests a number of reasons why access to citizenship might affect fertility behavior of immigrants. One important channel is that citizenship improves the economic position of immigrants in the host country (see e.g., Bratsberg et al., 2002 for the US; or Gathmann and Keller, 2014 for Germany). For Germany, Gathmann and Keller (2014) show that eligible immigrants have higher wages and more stable jobs than immigrants who are not yet eligible. Higher wages would generate both an income and substitution effect on fertility (Becker, 1960; see Hotz, Klerman and Willis, 1997 for a survey). More income should increase the demand for children while higher female wages increase the opportunity cost of children. Since Gathmann and Keller (2014) also find that immigrant women in Germany benefit much more than immigrant men, citizenship is likely to reduce total fertility among immigrant women.[7]

[6] The epidemiological approach has fruitfully been used to study outcomes as diverse as economic growth (Algan and Cahuc, 2008), political participation (Alesina and Giuliano, 2011), preferences for redistribution (Luttmer and Singhal; 2011) or national identity (Manning and Roy, 2010).

[7] Note that women may adjust not only the number of children, but also the quality dimension of their offspring. While we will focus on the quantity effect, our prediction apply to the quality-constant demand for children; hence, the prediction regarding the number of children are ambiguous once the quality dimension is taken into account (see, e.g., Hotz, Klerman and Willis, 1997). Avitabile et al. (2013), for instance, provide evidence that

Better career opportunities in the formal labor market could affect the timing of birth as well. In economic models of fertility, couples time fertility to maximize lifetime income. Two factors then affect the timing of birth: whether skills depreciate during absence from the labor market and whether credit markets are perfect or imperfect. With perfect credit markets and no skill depreciation, fertility will be high at the beginning of the labor market career when female wages are low. If capital markets are imperfect and skills do not depreciate, fertility will be high when the husband's income is high as financial resources cannot be shifted intertemporally. If skills deteriorate, it is no longer clear that these predictions hold because there is an additional cost from human capital loss. Since skill depreciation is likely to be less important among low-skilled women, they will have more children when capital markets are imperfect and postpone children when they are not credit constrained. For high-skilled women, skill depreciation is more important and credit constraints potentially less. As such, we would expect that high-skilled immigrant women are most likely to postpone their first birth after becoming eligible for citizenship.

### 4.2.2 Family Formation

Immigrants often come from more conservative societies where the family plays a very important role and women have more traditional roles in society. These attitudes do not only affect women's labor market performance, but also their family formation. Immigrants often marry younger and are less likely to cohabitate. Immigrants are also less likely to divorce which might be explained by their more conservative values or lack of information about the legal situation in the host country. How would access to citizenship affect immigrants' marriage and divorce decisions in the host country?

Access to citizenship could improve an immigrant's marriage market position for different reasons: First, the better labor market position of eligible immigrants will also make them more desirable spouses if one assumes that income and job stability are attractive traits in the marriage market. Second, a German passport is likely to be a valued characteristic in the marriage market, especially among recently arrived immigrants, because foreign spouses of natives may naturalize after only three years of residence. Finally, citizenship and the implied incentives to invest in country-

fewer children are born if the children obtain citizenship by birth; at the same time, parents also seem to invest more into these children.

specific human capital could lead to less reservations on behalf of natives. In a marriage market with search frictions, the reservation value for accepting a partner might then increase for immigrants with access to citizenship. We would therefore expect that immigrants search for a spouse longer and that the quality of the match increases (Becker, 1973, 1974; Mortensen, 1988; Burdett and Coles, 1999; Browning, Chiappori and Weiss, 2014 for a survey).

For immigrants already married at the time of eligibility, the effects of citizenship are more subtle. In principle, both the immigrant and the spouse can get naturalized when one spouse becomes eligible for citizenship. However, our previous research (Gathmann and Keller, 2014) shows that immigrant women have higher monetary benefits from citizenship than immigrant men. Hence, higher relative earnings of women should affect the relative bargaining power in a couple (as long as the weights depend on relative earnings of spouses). Apart from this power-shift within couples, the risk of divorce can be influenced in different ways by citizenship. In a dynamic search or matching framework, divorce is explained by uncertainty in terms of learning about the quality of a spouse, variations in match productivity, or variations in outside options (Burdett and Coles, 1999; Becker et al., 1977). Access to citizenship and its positive monetary effects for women come into play in all these dimensions: The unexpected change in the earning capacity of women has an impact on the match productivity of marriages. For the US, Weiss and Willis (1997) find that an unexpected increase in the wife's earning capacity increases the divorce risk. On the other hand, a higher total income of a couple can lead to higher gains of a marriage and therefore stabilizes a marriage. Finally, by improving the position on the remarriage market, citizenship improves outside options and could therefore increase the risk of divorce (Becker et al., 1977; Browning, Chiappori and Weiss, 2014 for a survey). Overall then, the expected effects of citizenship on the probability of divorce are ambiguous.

### 4.2.3 Characteristics of Partner

In principle, there are several reasons why immigrants are more likely to have a partner from the same ethnic origin: the first one is that a common ethnic background (including a common religion, for example) is a complement in the production of ethnic household goods like food or a child's education, for instance. A second reason is that immigrants are more likely to meet members of their own group if

they live in an ethnic enclave or are clustered in certain areas. Finally, there might also be constraints imposed by the ethnic group or the family on which partner an immigrant can choose.

The citizenship reforms allow immigrants to obtain a German passport independently of marrying someone with a German passport. Therefore, we might expect that the citizenship reforms actually reduce incentives to marry a native. At the same time, intermarriage with natives is often viewed as an indicator of social assimilation. Access to citizenship could then raise intermarriage rates because their improved position in the labor market brings eligible immigrants in closer contact with natives; or, because naturalization reduces reservations against immigrants in the native population.[8] However, an eligible immigrant also becomes a more desirable spouse, especially among recent immigrants who themselves do not yet satisfy the resident requirement. That would reduce the likelihood of marrying a native and increase the likelihood of marrying another immigrant. Overall then, it is not obvious whether access to citizenship increases or actually decreases intermarriage rates with German natives.

Citizenship might also affect the assortative matching along other observable characteristics such as age or education as well. Researchers have typically observed positive assortative matching with respect to education which might arise if there are important consumption and leisure complementarities among the partners (Stevenson and Wolfers, 2007). Immigrants in turn often downgrade in the marriage market by marrying a less skilled partner; or immigrant women accepting a larger age difference. As a consequence, we might expect that eligible immigrants now downgrade less by choosing more educated partners and, for eligible women, a lower age gap.

## 4.3 Institutional Background

### 4.3.1 Immigration Law Prior to 1991

More than 10 million - or about 13% of the population - in Germany are foreign-born. After World War II, most immigrants, especially from Turkey, Yugoslavia, or Italy came to Germany as guest workers. From the late 1950s until the program

[8] Evidence from the European Social Survey however suggests that naturalized immigrants indeed feel much less discriminated against in Germany than non-naturalized immigrants (OECD, 2011, Figure 8.1).

was abolished in 1973, the guest worker program actively recruited foreign, mostly low-skilled labor, to meet the growing demand of Germany's booming manufacturing sector. Originally, the guest worker program was intended as a short- to medium-run measure. In practice, however, many guest workers stayed, brought their families and settled down in Germany.[9] Since the late 1980s and especially after the fall of the Berlin Wall, new waves of immigrants arrived in Germany from Eastern Europe and the former Soviet Union. In the early 1990s, around one million foreigners (about 1% of its population) arrived in Germany each year.[10] These immigration rates are comparable to those in the United States during the era of mass migration.

Despite substantial immigrant flows, Germany had no explicit naturalization policy at the time. Prior to 1991, German citizenship was closely tied to ancestry (*jus sanguinis*) as laid down in the law of 1913. Explicit criteria how a foreign-born immigrant without German ancestry would qualify for naturalization did not exist. The official doctrine was that foreigners were only temporary residents in Germany - even though many foreigners had already lived in the country for several decades.

### 4.3.2 Germany's Citizenship Reforms in 1991 and 2000

The passage of the Alien Act ("Ausländergesetz" (AuslG)) by the federal parliament on April 26, 1990 (and the upper house on May 5, 1990) marked a turning point in Germany's approach to immigration and citizenship. The reform which came into effect on January 1, 1991 defined, for the first time, explicit rules and criteria for naturalization.[11] Most importantly for our purpose, the new law imposed an

[9] Their legal status was based on a residence and work permit which became permanent after five years and fully unrestricted after eight years if a person had worked for at least five years in a job subject to social security contributions. Close family members could also obtain a residence permit in order to move to Germany. At the same time, the German government used financial incentives to encourage return migration, especially after the guest worker program ended in 1973.

[10] Many of these were ethnic Germans (i.e. immigrants with some German ancestry), mostly from Eastern Europe and the former Soviet Union, who had access to citizenship within three years after arrival in Germany. Since 1992, the inflow of ethnic Germans is restricted to 220,000 per year. Stricter application requirements (esp. German language requirements) and a reduction in financial assistance further reduced the number of applicants in the late 1990s. While the number of admitted ethnic Germans was 397,000 in 1990, it fell to 222,000 in 1994 and to 105,000 in 1999 (Bundesministerium des Innern, 2008). Below, we drop ethnic Germans from our sample as they are not affected by the immigration reforms we study.

[11] The reform was preceded by more than a decade of intense political discussion that oscillated between the desire to restrict immigration, to encourage return migration and the recognition for social integration of the foreign population already living in Germany. Several reform attempts were made during the 1980s, mostly from left-wing parties, but defeated by the political opposition or influential social groups. The reform in 1991 was pushed on the political agenda by a ruling of the Federal Constitutional Court whether immigrants should be entitled to vote in local elections for foreigners in 1989. The Court ruled those local voting rights unconstitutional but

age-dependent residency requirement. Adolescent immigrants (aged 16-22 in 1991 or later) became eligible after eight years in Germany. In contrast, adults (aged 23 and older in or after 1991 who have not yet been eligible under the reduced residency requirement) became eligible for citizenship only after fifteen years of residency in Germany.[12] These residency requirements are still quite restrictive in comparison to other countries. Immigrants in Canada, for example, may naturalize after three years of permanent residence, while residency requirements in the United States and many European countries (like the UK, or Sweden) are five years - and hence substantially shorter than the rules imposed by the German reform.

Applicants for German citizenship had to fulfill several other criteria: first, they had to renounce their previous citizenship upon naturalization as the new law did explicitly not allow dual citizenship. Few exemptions to this rule existed at that time. The most important exception applied to EU citizens who could keep their citizenship if their country of origin allowed dual citizenship as well.[13] A second requirement was that the applicant must not be convicted of a criminal offense.[14] Adult immigrants (23 years-old or above when first eligible) further had to demonstrate economic self-sufficiency, i.e. they should be able to support themselves and their dependents without welfare benefits or unemployment assistance. Adolescent immigrants (16-22 years-old when first eligible) had to have completed a minimum of six years of schooling in Germany, of which at least four years had to be general education. Finally, an applicant had to declare her loyalty to the democratic principles of the German constitution. Spouses and dependent children of the applicant could be included in the application for naturalization even if they did not fulfill the criteria individually.[15]

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advocated a liberalization of Germany's naturalization policy (see Howard (2008) for a more detailed discussion).

[12] See § 85 AuslG (Alien Act) for adolescent immigrants and § 86 AuslG (Alien Act) for adult immigrants. If the applicant stayed abroad for no more than 6 months, the period of absence still counted toward the residency requirement. Temporary stays abroad (between 6 months and 1 year) may still count for the resident requirement. For permanent stays abroad (longer than 6 months), the applicant could count up to five years of residency in Germany toward the resident requirement.

[13] Children of bi-national marriages, for example, did not have to give up their dual citizenship until they turned 18. Other exceptions were granted if the country of current citizenship did not allow the renunciation of citizenship or delayed the renunciation for reasons outside the power of the applicant; if the applicant was an acknowledged refugee or if the renunciation imposed special hardships on older applicants. In practice, few exceptions to the general rule were granted in the 1990s.

[14] Applicants with minor convictions, such as a suspended prison sentence up to 6 months (which would be abated at the end of the probation period), a fine not exceeding 180 days (calculated according to the net personal income of the individual), or corrective methods imposed by juvenile courts, were still eligible. Convictions exceeding these limits were considered on a case-by-case basis by the authorities.

[15] Similar criteria are found in other countries. Overall, they seem to play a subordinate role for the naturalization process. A survey of eligible immigrants by the Federal Office of Migration and Refugees showed that the

The different residency requirements for adult and adolescent immigrants remained in place until the second important reform came into effect on January 1, 2000. The Citizenship Act ("Staatsangehörigkeitsgesetz" (StAG)) reduced the residency requirement to eight years irrespective of the immigrant's age.[16] The other requirements of the 1991 reform remained in place: applicants could not have a criminal record, had to demonstrate loyalty to democratic principles as well as economic self-sufficiency. In addition, the new law also required applicants to demonstrate adequate German language skills prior to naturalization. As before, the law of 2000 did not recognize dual citizenship in general though exemptions became more numerous in practice.[17] The 2000 reform further introduced elements of citizenship by birthplace into German law. A child born to foreign parents after January 1, 2000 was eligible for citizenship if one parent had been a legal resident in Germany for eight years and had a permanent residence permit for at least three years. Since our analysis focuses on first-generation immigrants, our sample is not directly affected by the *jus soli* provisions of the 2000 reform.[18]

The liberalization of the citizenship law after 1991 and again after 2000 is reflected in the number of naturalizations in Germany. Prior to the first reform, less than 20.000 persons become naturalized on average each year. After the immigration reform in 1991, naturalizations increase during the 1990s to 60-70.000 per year. After the second reform in 2000, the number of naturalizations jumps to over 180.000 and then gradually declines, but remains above 100.000 per year. Scaled

majority of migrants had good knowledge about the naturalization criteria. Of those, 72% reported that they fulfilled all requirements completely while 23% reported to meet most, though not all of the criteria (BAMF, 2012). As such, rejection of applications for citizenship based on criteria other than resident requirements should not be a major concern. If anything, this would bias our estimates downward as we would define an immigrant as eligible (based on the resident requirement) even though she is not (based on one of the other eligibility criteria).

[16] The law was adopted with a large majority in the lower house on May 7, 1999 and the upper house on May 21, 1999. The provisions are laid down in § 10 Abs. 1 StAG (Abs. 2 for spouses and dependent children of eligible immigrants), which form the basis for over 80% of all naturalizations in Germany (BAMF, 2008). Additional ways to naturalize are laid down in § 8 (naturalizations based on a discretionary decision of the authorities because of "public interest") and § 9 (naturalization for spouses of German citizens who face a reduced resident requirement of 3 years).

[17] In addition to citizens of the EU member states, it became easier for older applicants and refugees to keep their previous citizenship. Applicants could also keep their nationality if it was legally impossible to renounce it or if it imposed a special hardship like excessive costs or serious economic disadvantages (e.g., problems with inheritances or property in their country of origin).

[18] See Avitabile et al. (2013; 2014) for an analysis of the *jus soli* provisions of the 2000 reform. There might be an indirect effect on first-generation immigrants, however. Before the 2000 reform, second- or third-generation immigrants could only become naturalized if their parents applied for citizenship. After the 2000 reform, young children had access to German citizenship independently of their parents' decision (subject to the resident requirements outlined above). Hence, the reform of 2000 might have actually decreased the inter-generational benefits of citizenship for foreign parents with young children.

by the immigrant population, the propensity to naturalize is still low in Germany: by 2007, about 35-40% of the first-generation immigrant population with more than ten years of residency became German citizens; for comparison, the share is about 60% in the United Kingdom and over 80% in Canada (OECD, 2011).

## 4.4 Data and Empirical Strategy

### 4.4.1 Microcensus

Our main data source to study the effects of citizenship on social integration is the German Microcensus, an annual survey of 1% of the population in Germany. The main advantages of the Microcensus are the large samples of foreigners (about 50,000 per year) and detailed information about household composition, socio-demographic characteristics and year of arrival in Germany. It is only since 2005 that the Microcensus elicits whether an immigrant has naturalized and the year in which naturalization took place.[19] This information allows us to study naturalization decisions and the returns to actual naturalization using an instrumental variable approach; it also allows us to control for the country of origin (even for immigrants who have naturalized). Most of our analysis will therefore rely on data from 2005-2010. The drawback of using this later time period is that many immigrants will have become eligible for German citizenship prior to 2005. We return to this issue in the next section when we introduce our empirical approach.

The sample is restricted to first-generation immigrants, i.e. immigrants born outside of Germany. We drop ethnic Germans who have some German ancestry and therefore can apply for citizenship within three years of arrival. In our sample, we define ethnic Germans as individuals born outside Germany with a German passport who naturalized within three years after arrival (which is legally impossible for regular immigrants even after the 1991 and 2000 reforms) and whose previous nationality was Czech, Hungarian, Kazakh, Polish, Romanian, Russian, Slovakian or Ukrainian as ethnic Germans (see Birkner, 2007; Algan et al., 2010 follow the same approach). We further restrict the analysis to immigrants arriving between 1976 and 2000 who were 16-30 years-old when they first become eligible for citizenship. As a result, individuals in our data are between 16 and 48 years-old which is the

[19] Neither the German Socio-Economic Panel (SOEP) nor the social security data from the IAB, two other popular data sources, contain this detailed information.

relevant age span for marriage and fertility choices.

Our main outcome variables of interest are fertility choices (whether an immigrant woman has any children, the number of children born and the age when she gave birth to her first child; whether she is a single mother); family formation (whether an immigrant is currently married; has ever been married; is divorced; is cohabitating without being married); and the characteristics of partners (whether the partner is a native; an immigrant from the same region or a different region of origin; we also study the partner's duration of residence in Germany as well as their age and education). The main control variables are year of birth, year of arrival, the number of years in Germany, age, gender and education. We distinguish between low-skilled (no high school or vocational degree), medium-skilled (a higher school degree or a vocational degree) and high-skilled immigrants (with a college degree). To study whether some immigrant groups assimilate faster than others, we generate ten regions of origin: the traditional EU-15 member states (e.g., Italy or Portugal), immigrants from countries that recently joined the European Union (the EU-12, e.g., Poland or the Czech Republic), immigrants from Turkey, ex-Yugoslavia (except Slovenia) and the Former Soviet Union (except the Baltic states). We lump together other immigrants into broad categories (Asia, Africa, the Middle East and North or South America).

To investigate the mechanisms underlying social integration, we investigate the role of economic and cultural forces: we first study whether citizenship affects social integration through improvements in education and personal income.[20] To investigate the role of cultural forces, we merge information on fertility rates (World Bank, 2016) and the female labor market participation (ILO, 2003) in the source country prior to an immigrant's departure to our main data. Table C.1 shows summary statistics of our sample of first-generation immigrants in the Microcensus.

### 4.4.2 Socio-Economic Panel

For supplementary analyses we rely on the Socio-Economic Panel (SOEP) from 1984-2009, an annual panel interviewing more than 20,000 individuals about their

[20] Personal income per month combines labor earnings, income from self-employment, rental income, public and private pensions as well as public transfers (like welfare or unemployment benefits, child benefit or housing subsidies) but is net of taxes and other contributions. We deflate personal income with the national consumer price index to 2005 prices.

labor supply, income and demographic characteristics.[21] The main advantage of the SOEP is that we observe immigrants before they get eligible for citizenship. The disadvantages are that we have small samples and have only noisy information whether an immigrant actually naturalized. For the analysis, we impose the same sample restrictions as in the Microcensus: first-generation immigrants who arrived in Germany between 1976 and 2000 and are between 16 and 30 years-old when they first get eligible for citizenship.

Our main dependent variables are the age at first marriage and the marital status after 8 years in Germany. As in the Microcensus, our main control variables are year of arrival, year of birth, the number of years spent in Germany, gender, age and education. In the SOEP, we distinguish between low-skilled (with no high school or vocational degree), medium-skilled (with high school or vocational degree), high-skilled (holding a tertiary degree) and those currently enrolled in school. We further classify immigrants into ten broad region of origins as in the Microcensus. Table C.2 shows summary statistics for our sample of first-generation immigrants in the SOEP.

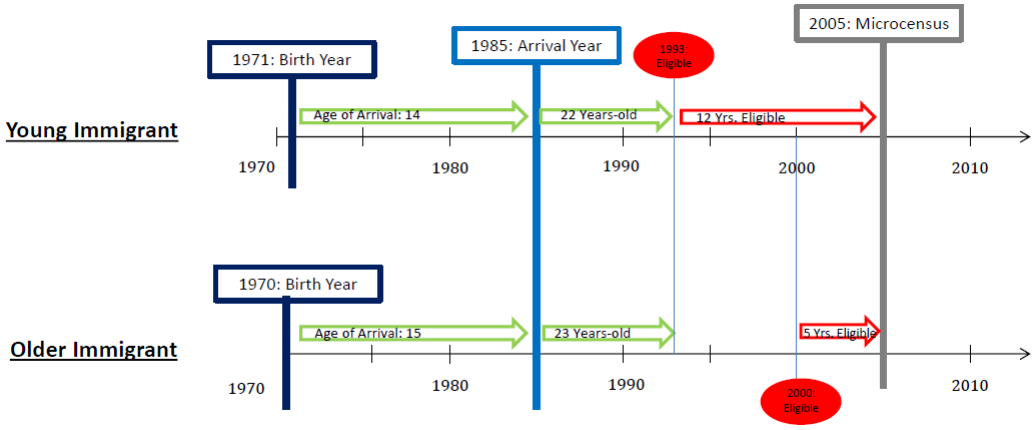
### 4.4.3 Identifying Variation and Estimation Approach

To study the effects of citizenship on social integration, we cannot just compare naturalized and non-naturalized immigrants as the decision to become a German citizen is endogenous. The step-wise liberalization of resident requirements in the 1991 and 2000 reforms introduces variation in years eligible across immigrants and over time which we can exploit to analyze the returns to citizenship. The key insight here is that the two reforms create variation in the eligibility for citizenship depending on an immigrant's arrival year and year of birth (as well as calendar year).[22] Figure 4.1 illustrates the variation for two immigrants who arrived in Germany in 1985. The young immigrant is born in 1971 and therefore becomes eligible for citizenship in 1993 under the eight-year resident requirement. The older immigrant is born in

[21] Wagner, Frick and Schupp (2007) provide a comprehensive description of the data set. The SOEP oversampled immigrants in 1984 and 1994/5; as a consequence, the composition of immigrants in the SOEP differs from the immigrants surveyed in the Microcensus.

[22] We abstract in our analysis from other eligibility criteria discussed in Section 2 either because we do not have any information (e.g., about the criminal record) or because it is unclear how the criteria is applied (e.g., economic self-sufficiency). As a consequence, we are likely to misclassify a few immigrants who satisfy the resident requirements but are not eligible according to some other criteria. This misclassification will result in a downward bias of eligibility on naturalization propensities (as some individuals, which we classify as eligible, cannot naturalize in practice).

**Figure 4.1:** Variation in Eligibility Rules



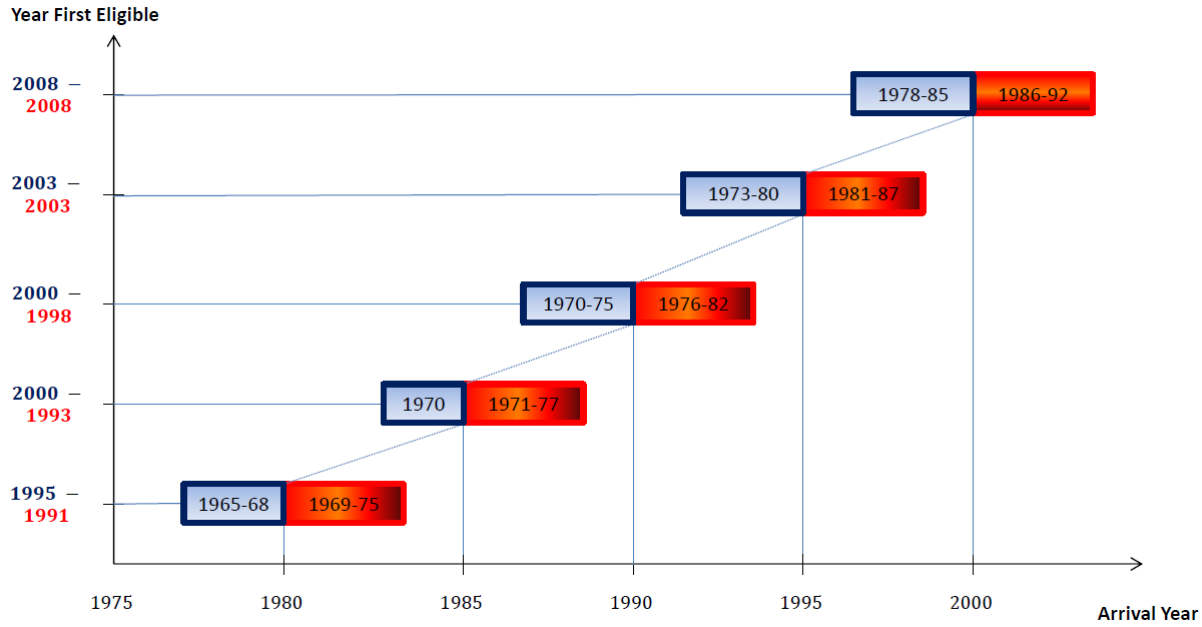

Notes: The figure demonstrates the variation in eligibility rules which was created by the two policy reforms. The example shows two immigrants who arrive in the same year and with a similar age, but face different eligibility regimes.

1970 and would therefore not be eligible for citizenship in 1993 (after eight years) because she is then 23 years-old and therefore does not qualify under the reduced residency requirement. Instead, she would become eligible in 2000 - after fifteen years in Germany. The same logic applies to other immigrants: the older immigrants gets eligible much later than the younger immigrants even though both are of similar age and arrived in Germany in the same year.

Figure 4.2 shows for different arrival years (on the x-axis) the set of birth cohorts that are eligible under the reduced residency requirement (shown in red) and those that are not (shown in blue). The year of first eligibility is shown on the y-axis. For all arrival cohorts between 1977 and 1982, adolescent immigrants (born between 1969 and 1975) can naturalize right after the reform in 1991. Adult immigrants (born 1968 or before) in contrast can only naturalize between 1992 and 1997 or one and six years later than the adolescent immigrants. The 2000 reform which reduced residency requirements to eight years for all immigrants provides additional identifying variation for arrivals after 1985. Take two immigrants who arrived in Germany in 1990: the younger immigrant (born 1976-1982) gets eligible after eight years in 1998, while the older immigrant (born 1970-1975) gets eligible with the 2000 reform. The same argument applies to all immigrants arriving between 1986 and 1992: immigrants who arrive in Germany at age 14 or earlier are eligible after eight years while immigrants arriving at age 15 or later get eligible in 2000.[23] Again, immigrants of the same arrival cohort get eligible in very different years because of

[23] Immigrants arriving between 1992 and 2000 all get eligible with eight years of residency after the 2000 reform. We include arrival cohorts between 1992 and 2000 mostly to identify general assimilation and year of birth effects.

**Figure 4.2:** Eligibility for Different Birth Cohorts an Arrival Year




Notes: The Figure shows the year in which immigrants become eligible by year of arrival and birth cohort. The colors indicate the reduced requirement (in red) or the regular requirement (in blue).

small age differences.

We next discuss how we exploit these differences in access to citizenship for our analysis. In the first step, we define the year an immigrant first satisfies the resident requirement. The variable is calculated as follows: (a) the year in which an immigrant has lived in Germany for at least 8 years and is then between 16 and 22 years old in 1991-1999; (b) the year in which an immigrant has lived in Germany for at least fifteen years and is 23-30 years old in the 1991-1999 period (given that she has not qualified for citizenship under (a)); (c) the year in which a 16-30 years-old immigrant has lived in Germany for at least eight years in the 2000-2010 period. Finally, (d) some immigrants who have lived in Germany for at least eight years only become eligible in the year they turn sixteen. In a second step, we calculate the years since an immigrant has been eligible for citizenship as the difference between the current year and the year of first eligibility. The eligibility variable is zero before an immigrant becomes eligible for citizenship and equal to the number of years since an immigrant has become eligible thereafter.

The focus of our main analysis is on the reduced-form relationship and measures the effect of eligibility for citizenship on social assimilation. Knowing whether a more liberal access to citizenship affects immigrants' integration is important in its own

right. Furthermore, the intent-to-treat effect is the primary parameter of interest for policy makers who aim to improve the integration of immigrants in the host country; for the immigrants themselves, it represents the option value of naturalization. We then estimate variants of the following model:

$$Y_{iabt} = \beta YrsElig_{abt} + \gamma_1 YSM_{at} + \gamma_2 YSM_{at}^2 + \lambda_1 Age_{bt} + \lambda_2 Age_{bt}^2 \tag{4.1}$$

$$+ \sum_{b=1961}^{1992} \mu_b Yob_b + \sum_{a=1976}^{2000} \alpha_a Coh_a + \theta_t + \delta' X_{it} + \varepsilon_{iabt}$$

where $Y_{iabt}$ is a social integration outcome of immigrant $i$ from birth cohort $b$ who arrived in Germany in year $a$ and is observed in calendar year $t$. The key independent variable is $YrsElig_{abt}$ which defines the number of years since an immigrant has been eligible for citizenship. The main parameter of interest is $\beta$ which identifies whether legal access to citizenship improves social integration.

Note that our analysis captures social integration outcomes several years after an immigrant has become eligible for citizenship. Estimation of equation (1) therefore identifies persistent differences of citizenship eligibility on fertility or marriage behavior. Our analysis would not identify a one-time level effect immediately after eligibility or naturalization. The reason is that the control group of immigrants which gets eligible under the 15-year residency requirements also qualifies for citizenship during our sample period. For example, all immigrants arriving prior to 1998 have satisfied the residency requirement before we first observe them in the Microcensus in 2005. The control group would have therefore experienced the same upward (or downward) shift in outcomes than the treated group. Given that many of the outcomes we study, like getting married or having a child, are long-run decisions, we think that the focus on permanent effects is not a limitation of our study. We explore in Section 4.3 that focusing on permanent effects provides conservative estimates. A potential advantage of focusing on persistent effects is that our estimates are less likely to be affected by other transitory shocks around the reform years.

Our specification in equation (1) includes cohort of arrival fixed effects $D(Coh_a)$ to adjust for changes in the quality of immigrants arriving in Germany over time. We further include year of birth fixed effects $D(YOB_b)$ to control for differences in social integration across birth cohorts and year fixed effects ($\theta_t$) to adjust for aggregate

changes in fertility or family formation over time. As is well-known, one cannot separately identify cohort of arrival, current year and general assimilation effects because of multicollinearity (see, e.g., Borjas, 1985; 1995). To control for the general assimilation effects, we therefore include a second-order polynomial of years since migration ($YSM_{at}, YSM_{at}^2$). Along the same logic, one cannot include a full set of year of birth, age and calendar year fixed effects. We therefore include a second-order polynomial in age ($Age_{bt}, Age_{bt}^2$). Additional controls $X_{it}$ are immigrant's education and region of origin fixed effects to allow naturalization propensities to differ across education groups and source countries. To capture differences in fertility, family formation and matching of partners across regions and changes therein over time, we further include state fixed effects and state-specific linear trends.

Conditional on cohort of arrival, year of birth and year fixed effects, the parameter of interest $\beta$ in equation (1) is identified from the nonlinear interaction between year of arrival, year of birth and year. The identifying variation is that there is no differential birth cohort trend in our outcome variables across arrival cohorts conditional on our second-order polynomials in age and years since migration. Finally, we cluster the standard errors by $Age * Coh$ to adjust for the level of aggregation in the eligibility variable.

There are several potential threats to our identification strategy: the first one is that age of arrival might bias our estimates. Immigrants who arrived at younger ages invest more in host country-specific human capital like language skills and therefore might integrate better along other dimensions as well (see Bleakley and Chin, 2010). Since younger immigrants become eligible earlier under the 1991 reform, an omitted age-of-arrival effect would bias our estimates upward. Another concern about our empirical strategy might be that we impose a specific functional relationship how eligibility, assimilation and age affect social and cultural integration outcomes. There might also be selective outmigration of immigrants. If return migrants are negatively selected from the pool of immigrants in the host country, return migration overestimates general assimilation effects, for instance. It would however, not affect our eligibility variable as long as selection into return migration is similar for adolescent and adult immigrants, across arrival cohorts or regions of origin. We return to these issues in Section 4.5.3 after we discuss our main results.

## 4.5 Empirical Results

### 4.5.1 Eligibility for Citizenship and the Naturalization Decision

We first examine whether eligibility for citizenship has an effect on naturalization decisions. Without such a first-stage relationship, it would be unlikely to observe any impact on the social integration of immigrants.[24] To study naturalization decisions, we estimate two different models. The first model uses naturalization propensities as the dependent variable. To implement this model, we convert the Microcensus into a pseudo-panel for the 1985-2010 period. The dependent variable we use is equal to one if an immigrant has naturalized in any year between 1985 and 2010 from the reported year of naturalization. The main independent variable is eligibility for naturalization which is zero prior to 1991 and calculated from information on year of birth and year of arrival in Germany after 1991 (see the last section for details). Finally, we assign education based on the information recorded in 2005-2010; here, education refers to the highest educational degree attained rather than the education level in a particular year. We then estimate a regression with the same control variables as in equation (1) above for the pseudo-panel from 1985-2010. Table 4.1 shows for male and female immigrants that eligibility does affect the naturalization propensities (see columns (1) and (2)). At the same time, the effects are with 2.9 percentage points for both men and women relatively modest.

Our second approach uses the Microcensus 2005-2010 with years since a person has naturalized as the dependent variable and years of eligibility for citizenship as the main independent variable. This specification is closest to our reduced-form relationship in equation (1) and reveals whether an additional year of eligibility speeds up the timing of naturalization (and hence, how long she has been naturalized in the 2005-2010 period). All control variables are defined as in equation (1). Columns (3) and (4) in Table 4.1 show that an additional year of eligibility raises the average duration of naturalization by about 0.16 years for women; for men, the effect is with 0.05 years both economically and statistically weaker than for women.

Table 4.1 then suggests that the citizenship reforms increased the propensity of naturalizations and hence is in line with aggregate statistics on naturalizations (discussed in Section 4.3.2). At the same time, the modest effects raise the ques-

[24] There could still be an effect if eligibility changes the behavior of citizens in the host country even in the absence of higher naturalization rates among eligible immigrants.

**Table 4.1:** The Link between Eligibility and Naturalization

| | Naturalized | | Years since Naturalized | |
|---|---|---|---|---|
| | **Females** | **Males** | **Females** | **Males** |
| | (1) | (2) | (3) | (4) |
| Eligible | 0.029*** | 0.029*** | | |
| | [0.007] | [0.007] | | |
| Years since Eligible | | | 0.158*** | 0.051* |
| | | | [0.030] | [0.029] |
| Years in Germany | 0.014*** | 0.010*** | -0.498*** | -0.072 |
| | [0.001] | [0.001] | [0.090] | [0.094] |
| Years in Germany Squared | -0.000*** | -0.000 | 0.022*** | 0.010*** |
| | [0.000] | [0.000] | [0.002] | [0.002] |
| Age | -0.004*** | 0.002* | 1.030*** | 0.669*** |
| | [0.001] | [0.001] | [0.143] | [0.143] |
| Age Squared | 0.000*** | -0.000*** | -0.014*** | -0.008*** |
| | [0.000] | [0.000] | [0.002] | [0.002] |
| Sample: | Pseudopanel 1985-2010 | | Microcensus 2005-10 | |
| Year of Arrival Dummies | Yes | Yes | Yes | Yes |
| Year of Birth Dummies | Yes | Yes | Yes | Yes |
| Region of Origin Fixed Effects | Yes | Yes | Yes | Yes |
| Year, State FE and State Trends | Yes | Yes | Yes | Yes |
| Observations | 37,822 | 38,564 | 19,850 | 18,994 |
| R-Squared | 0.079 | 0.088 | 0.334 | 0.335 |
| Mean of Dependent Variable | 0.070 | 0.069 | 4.12 | 4.09 |

Notes: The table reports results from a linear probability model for immigrant men and women. In columns (1)-(2), the dependent variable is a binary indicator equal to one if a migrant has naturalized in a given year and zero otherwise; in columns (3)-(4), it is the number of years since an immigrant has naturalized. The sample includes all first-generation immigrants who are not ethnic Germans, arrived in Germany between 1976 to 2000, are 16-30 years old when they first get eligible during the 1991-2010 period. The eligibility indicator in columns (1) and (2) is equal to one if an individual is a) 16-22 years old and has lived in Germany for at least 8 years; b) 23-30 years old and has lived in Germany for at least 15 years in 1991-1999; or c) 23-30 years old and has lived in Germany for at least 8 years after 2000. Years since eligibility is the number of years since an immigrant is first eligible for citizenship. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU member countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship); the omitted region of origin are the EU-15 member states. Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

tion why the take-up of citizenship is so low in Germany. We think there are two potential explanations. The substantive reason why take-up of citizenship is lower than in traditional immigration countries is that immigrants with few exceptions have to renounce their original citizenship if they obtain a German passport. In addition, the way we measure eligibility could be another factor in explaining the low correlation between eligibility and naturalizations. One is that we abstract from any other options to obtain German citizenship, for example, through discretionary decisions by the bureaucracy (especially prior to 1991) or marriage with a German partner. That would induce a negative relationship between eligibility (which is zero before 1991) and naturalization. In addition, there is likely to be substantial measurement error in the years in Germany variable which in turn enters the calculation of the eligibility variable. Our calculation assumes, for instance, that an immigrant has remained in Germany for the whole period since her arrival. If there is circular migration between Germany and the source country, for example, because the immigrant has family back home, we are likely to define eligibility too early (because extended periods abroad do not count toward the resident require-

ment). This upward bias in the eligibility variable is likely to be more important for immigrant men who often arrived in Germany first without their close family. At the same time, there could be a time lag between becoming eligibility and actual naturalization because of the time it takes the administration to process the application for naturalization. In both cases, the statistical relationship between eligibility and naturalization is weakened biasing our estimates to zero.[25] We now turn to the discussion of our main results.

## 4.5.2 Main Results on Social Integration

### 4.5.2.1 Fertility Choices

We start with an analysis of fertility choices among female immigrants. As a benchmark for comparison, we first report the relationship between actual naturalization and fertility (OLS results) followed by the reduced form estimates of how eligibility for citizenship affects fertility. Table 4.2 suggests that access to citizenship reduces both, the likelihood of having at least one child and the number of children born to immigrants. Ten years of eligibility reduces the probability of having children by 7 percentage points or about 11%. In our data, 66% of immigrant women have at least one child, while only 45% of native women do, resulting in an immigrant-native gap of 21 percentage points. How fast immigrants adjust to the native fertility level when they have the option to naturalize? The likelihood of having children of immigrant women reduces by 0.05 percentage points (-0.007*7.17) after the mean years of eligibility in our sample (7.2 years) - which closes around one-fourth (-0.05/0.205) of the immigrant-native gap.

The number of children born to immigrant women reduces in the same time by 0.18 or about 13%. On average, immigrant women in our sample have 1.41 children, while native women have 0.77 children - for an immigrant-native gap of 0.65 children. After 7.2 years, immigrant women have reduced their fertility by 0.13 (-0.018*7.2) or 20% (0.13/0.65) of the immigrant-native gap.

Because not all women in our sample have completed their fertility, the declining number of children may reflect either a reduction in the total demand for children or a postponement of birth among immigrants relative to natives. Columns (5) and (6) of Table 4.2 indicates that immigrant women indeed postpone their first birth: after

[25] The effects become slightly stronger if we use lagged eligibility (by one or two years) to allow for a time lag between satisfying the residency requirement, the application for naturalization and its approval.

**Table 4.2:** Naturalization, Eligibility for Citizenship and Fertility Choices

| Sample: Female Immigrants | Having Children | | Number of Children | | Age at First Birth | | Single Mother | |
|---|---|---|---|---|---|---|---|---|
| | OLS | Reduced Form | OLS | Reduced Form | OLS | Reduced Form | OLS | Reduced Form |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Years since Naturalization | 0.001 | | -0.001 | | 0.057*** | | -0.003*** | |
| | [0.001] | | [0.001] | | [0.008] | | [0.001] | |
| Years since Eligible for Citizenship | | -0.007*** | | -0.018*** | | 0.141*** | | -0.001 |
| | | [0.002] | | [0.007] | | [0.036] | | [0.003] |
| Years in Germany | 0.019*** | 0.022*** | 0.077*** | 0.084*** | -0.040 | -0.138** | 0.003 | 0.005 |
| | [0.005] | [0.005] | [0.015] | [0.015] | [0.064] | [0.070] | [0.005] | [0.005] |
| Years in Germany$^2$ | -0.001*** | -0.001*** | -0.002*** | -0.002*** | 0.002 | 0.002 | 0.000 | 0.000 |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.002] | [0.002] | [0.000] | [0.000] |
| Medium-skilled | -0.158*** | -0.156*** | -0.623*** | -0.624*** | 2.566*** | 2.634*** | -0.000 | -0.004 |
| | [0.009] | [0.009] | [0.020] | [0.020] | [0.088] | [0.089] | [0.008] | [0.008] |
| High-skilled | -0.370*** | -0.369*** | -1.173*** | -1.176*** | 6.429*** | 6.483*** | -0.039*** | -0.043*** |
| | [0.017] | [0.017] | [0.032] | [0.032] | [0.225] | [0.228] | [0.014] | [0.014] |
| Year of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 18.534 | 18.534 | 18.516 | 18.516 | 12.667 | 12.667 | 12.152 | 12.152 |
| R-Squared | 0.422 | 0.422 | 0.422 | 0.422 | 0.287 | 0.284 | 0.041 | 0.039 |
| Mean of Dependent Variable | 0.657 | 0.657 | 1.414 | 1.414 | 23.35 | 23.35 | 0.141 | 0.141 |

Notes: The dependent variables are whether a female immigrant has any child (columns (1)-(2)); the number of children born to the female immigrant (columns (3)-(4)); the age of the mother at the birth of her first child (columns (5)-(6)); and whether she is a single mother (columns (7)-(8)). Odd columns report OLS estimates of the relationship between years since naturalization and the respective fertility outcome. Even columns report reduced form estimates of years since eligibility and the respective fertility outcome. The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible for citizenship in the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrant became eligible for naturalization after the 1991 or 2000 immigration reforms. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). The omitted education category is low-skilled (without high school or vocational degree). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

10 years of eligibility for citizenship, the age at first birth has increased by 1.4 years or about 6% (10*0.141/23.35). We further find that women with a college education postpone their first birth much more (by 0.245 years per year of eligibility) than low-skilled women (by 0.09 years per year of eligibility); the stronger postponement is in line with the potential higher opportunity costs of leaving a high-skilled job. To put these estimates in perspective, we again compare how fast immigrant women converge in their timing of birth to native women. In our sample, immigrant women give birth to their first child on average 4.3 years earlier than native women (23.35 years compared to 27.65 years). After the mean years of eligibility, the immigrant-native gap has declined by 1.0 year or roughly one-fourth (0.141*7.17/4.3) of the gap.

Hence, part of the decline in the demand for children is explained by a timing effect. And almost all of the decline in the number of children arises from immigrant women postponing their first birth and the extensive margin; we find little evidence that higher-order births are affected. Overall, these results suggest that immigration

is not a policy instrument to boost a host country's total fertility rate in the long-run as immigrants adapt their behavior to those of natives. We explore potential mechanisms for these changes in total fertility and the timing of birth in more detail in Section 4.6.

#### 4.5.2.2 Family Formation

We next investigate whether citizenship affects family formation and the type of partners that immigrant men and women choose. For both men and women, we find that access to citizenship reduces the likelihood of marriage - both the probability of being currently married and the probability of ever being married. Eligibility for citizenship seems to have no impact on the stability of marriage however. Both female and male immigrants with access to citizenship are equally likely to be divorced (see columns (3) and (7) of Table 4.3). The absence of an increased risk of divorce is good news given that divorce often implies a higher risk of poverty for children and for those without a full-time job. Similarly, access to citizenship does not persistently shift the likelihood of cohabitation (see columns (4) and (8) of Table 4.3). Hence, the decline in marriage cannot be explained by immigrants choosing alternative models of partnerships.

A third explanation for the decline in marriage could be that immigrants who get eligible for citizenship postpone marriage because the value of searching for a mate has increased. If the gains from search increase, we should see, for instance, that immigrants with access to citizenship marry later. Unfortunately, our main data source does not include information on the age at first marriage. We do observe the age at first marriage in earlier Microcensus years (1999-2004) and in the Socio-Economic Panel. Using the same estimation approach as in equation (1), Table C.3 in the appendix shows that eligibility for citizenship increases the age at first marriage for women, but not for men. The result is mostly driven by women who are still single when they get eligible for citizenship (see column (4)) which supports the idea that women with access to citizenship search longer for a suitable mate.

What do these patterns for family formation imply for the social assimilation process? To answer this question, we again compare the behavior of immigrants to those of natives. Take the example of being currently married. On average, 64% of women and 55.4% of men in our immigrant sample are currently married while among natives, the share is 54.4% and 45.8% respectively. On average, the

**Table 4.3:** Citizenship and Family Formation

| | Female Immigrants | | | | Male Immigrants | | | |
|---|---|---|---|---|---|---|---|---|
| | Currently Married | Ever Married | Divorced | Cohabitation | Currently Married | Ever Married | Divorced | Cohabitation |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | OLS Estimates | | | | OLS Estimates | | | |
| Years since Naturalization | 0.001* | 0.001 | -0.001 | 0.001** | -0.001 | -0.001* | 0.000 | 0.001 |
| | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] |
| Observations | 18,532 | 18,532 | 13,148 | 12,221 | 17,213 | 17,213 | 10,184 | 10,289 |
| R-Squared | 0.332 | 0.467 | 0.032 | 0.134 | 0.400 | 0.467 | 0.029 | 0.151 |
| | Reduced form Estimates | | | | Reduced form Estimates | | | |
| Years since Eligible for Citizenship | -0.006** | -0.009*** | -0.004 | -0.003 | -0.006*** | -0.008*** | 0.003 | -0.001 |
| | [0.003] | [0.002] | [0.002] | [0.002] | [0.002] | [0.002] | [0.002] | [0.003] |
| Observations | 18,532 | 18,532 | 13,148 | 12,221 | 17,213 | 17,213 | 10,184 | 10,289 |
| R-Squared | 0.333 | 0.468 | 0.032 | 0.133 | 0.401 | 0.467 | 0.029 | 0.151 |
| Individual Characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Mean of Dependent Variable | 0.639 | 0.709 | 0.099 | 0.085 | 0.554 | 0.592 | 0.063 | 0.112 |

Notes: The table reports OLS estimates of the relationship between years since naturalization and family formation in the top panel; and reduced form estimates between years since eligibility and family formation in the bottom panel. The left-hand side (columns (1)-(4)) reports results for female immigrants, the right-hand side (columns (5)-(7) for male immigrants. The dependent variables are whether an immigrant is currently married (columns (1) and (5)); whether an immigrant has ever been married (columns (2) and (6)); whether the immigrant is divorced (columns (3) and (7)); and whether an immigrant is cohabitating with a partner without being married; the variable is zero if the person is married (columns (4) and (8)). The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible for citizenship in the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrant became eligible for naturalization after the 1991 or 2000 immigration reforms. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). The omitted education category is low-skilled (without high school or vocational degree). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

immigrant-native gap is 9.5% (9.6%) for women (men). How fast does the gap close with access to citizenship? Evaluated at the mean years of eligibility (7.2 years for women and 8.0 years for men) in our sample, the share of currently married declines in the immigrant population by 4.3% (women) and 4.8% (men). That implies that the initial gap in marriage rates decreases by about 45.3% (women) and 50% (men) with access to citizenship. While citizenship speeds up assimilation in terms of marriage rates, we do not find any assimilation in divorce rates or the propensity of cohabitation after immigrants obtain access to citizenship (this is true even if we condition on those married after 8 years in Germany; see Table C.3, column (5)). As there are sizable immigrant-native gaps in divorce rates (immigrants are around 6% less likely to be divorced) and cohabitation rates (immigrants are about 15% less likely to be cohabitating), it implies that both immigration but also immigrant assimilation tend to reduce the growth in divorce and cohabitation rates in the host country.

#### 4.5.2.3 Characteristics of Partner

Given that immigrants seem to search longer and marry later when they are eligible for citizenship, we would expect that they also choose different partners. Here, we include all partners living in the same household as the immigrant, i.e. independently of whether they are married or cohabitating. We first analyze intermarriage rates or the likelihood of having a German-born partner, a widely used indicator for social assimilation (see Adsera and Ferrer, 2014). As discussed in Section 4.2, the effect of citizenship on intermarriage (or having a German partner) is theoretically ambiguous. In our sample, around 20% of immigrant men and women have a German partner, while slightly over 70% have a partner from the same region of origin (which leaves between 8-10% who have a migrant partner from a different origin). These shares are substantially lower than in France or the Netherlands where about one-third of immigrants have a native partner (Adsera and Ferrer, 2014). The share of intermarriage among natives is with 3-4% much lower in the native population. These numbers are also at the lower end in Europe where the share ranges from 5% to 7%.

Table 4.4 shows in the top panel that immigrants who are actually naturalized are more likely to have a native partner (and hence, less likely to have a partner from the same region of origin). One explanation for the positive relationship between actual naturalization and intermarriage could be reverse causality: immigrants intermarry because they want to get a German passport. Foreign spouses of citizens can apply for naturalization after three years of residency in Germany.[26] Even if a German passport is not the primary motive for intermarriage, immigrants who eventually naturalize might still be those that are most willing and most likely to integrate in the host country society. The reduced form estimates in the bottom panel tell however a different story. Eligible women are less likely to have a German native as partner (column (1) in Table 4.4). They are also less likely to have a second-generation immigrant from the same region of origin (who need not to be naturalized) as partner (not reported). At the same time, immigrant women are not more likely to have a partner from the same region of origin (see column (2)). These patterns suggest that access to citizenship does not increase intermarriage but encourages relationships among immigrants from different backgrounds. One likely interpretation of the reduced intermarriage with natives is that women now have

[26] The immigrant has to be married for at least two years by the time he or she applies for naturalization; furthermore, the spouse has to have a German citizenship for at least two years. Finally, the couple has to have a permanent resident permit.

their own access to citizenship and hence, can choose their partner independently of citizenship status. There is some evidence that access to citizenship makes eligible immigrants a more attractive partner: partners of immigrant women with access to citizenship have lived in Germany for a shorter time and are less likely to qualify for citizenship on their own (see column (3) of Table 4.4). Interestingly, we see no effect of eligibility on the partner's characteristics for immigrant men.

**Table 4.4:** Citizenship and Characteristics of Partner

| | Female Immigrants | | | | | Male Immigrants | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Native Partner | Same Origin Partner | Partner's Years in Germany | Education of Partner | Age of Partner | Native Partner | Same Origin Partner | Partner's Years in Germany | Education of Partner | Age of Partner |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| | OLS Estimates | | | | | OLS Estimates | | | | |
| Years since Naturalization | 0.004*** | -0.003*** | 0.014 | 0.030*** | -0.022* | 0.006*** | -0.006*** | 0.033 | 0.041*** | -0.001 |
| | [0.001] | [0.001] | [0.018] | [0.005] | [0.013] | [0.001] | [0.001] | [0.020] | [0.006] | [0.014] |
| Observations | 10,932 | 10,932 | 8,467 | 10,741 | 10,901 | 9,164 | 9,164 | 6,951 | 8,979 | 9,116 |
| R-Squared | 0.265 | 0.298 | 0.253 | 0.291 | 0.376 | 0.168 | 0.194 | 0.195 | 0.286 | 0.411 |
| | Reduced form Estimates | | | | | Reduced form Estimates | | | | |
| Years since Eligible for Citizenship | -0.006** | 0.002 | -0.464*** | 0.011 | -0.115** | 0.004 | -0.004 | 0.042 | -0.032 | 0.036 |
| | [0.003] | [0.003] | [0.087] | [0.028] | [0.056] | [0.003] | [0.004] | [0.083] | [0.025] | [0.046] |
| Observations | 10,932 | 10,932 | 8,467 | 10,741 | 10,901 | 9,164 | 9,164 | 6,951 | 8,979 | 9,116 |
| R-Squared | 0.262 | 0.297 | 0.256 | 0.288 | 0.376 | 0.161 | 0.189 | 0.194 | 0.281 | 0.411 |
| Year of Arrival | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Mean of Dependent Variable | 0.195 | 0.726 | 19.90 | 12.47 | 35.97 | 0.204 | 0.705 | 16.19 | 11.88 | 30.80 |

Notes: The table reports OLS estimates of the relationship between years since naturalization and family formation in the top panel; and reduced form estimates between years since eligibility and family formation in the bottom panel. The left-hand side (columns (1)-(5)) reports results for female immigrants, the right-hand side (columns (6)-(10) for male immigrants. The dependent variables are whether an immigrant has a German partner or spouse (columns (1) and (6)); whether the partner or spouse comes from the same region of origin (columns (2) and (7)); whether the partner or spouse is a second-generation immigrant from the same region of origin (columns (3) and (7)); the years of education of the partner or spouse (columns (4) and (9)); and the age of the partner or spouse (columns (5) and (10)). The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible for citizenship in the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrant became eligible for naturalization after the 1991 or 2000 immigration reforms. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). The omitted education category is low-skilled (without high school or vocational degree). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

Eligibility for citizenship might not only affect the background of the partner. It

might also affect assortative matching in the marriage (or partnership) market. The assimilation literature has shown that immigrants often downgrade in the marriage (or partnership) market. Hence, they are more likely to have a partner with lower education; and female immigrants in particular are more likely to accept a larger age difference. If access to citizenship improves the position in the marriage or partnership market, it should not only prolong search but also allow immigrants to select different partners. With positive assortative mating we would expect that citizenship increases the partner's education and reduces the partner's age. The OLS estimates in columns (4) and (5) of Table 4.4 exactly reflect this pattern for immigrant men and women. Yet, most of these correlations are due to a selection effect; eligibility for citizenship only reduces the partner's age of female immigrants.[27] Though the coefficient on partner's education is positive for women, it is neither economically nor statistically significant.[28]

#### 4.5.2.4 Eligibility as Instrumental Variable

We also implement a supplementary instrumental variable approach where we use years of eligibility as an instrument for naturalization. Given the weak effects found for men, we focus on immigrant women here. Table 4.5 reports the results where column (1) shows the first stage and columns (2)-(7) show the second stage estimates for fertility and marriage outcomes. We find very similar patterns than for the reduced form estimates though the effects are unsurprisingly larger. At the same time, the instrument is not very strong, for example, for the subset of women having a child (see the reported F-statistic at the bottom of Table 4.5). As a result, the IV estimate for age at first birth is no longer statistically significant; all other outcomes remain statistically significant however.

[27] If we look at age gaps between partners instead, the reduced-form coefficients suggest a reduction in the age gap for immigrant women and men; but none of the coefficients reach statistical significance (not reported). Since we also observe that immigrant men and women marry later on average, these patterns suggest that immigrants live together with their partner at younger ages, but marry later - which is a pattern we also observe among natives.

[28] We also find no effect of citizenship access on the earnings of partners which seems a bit surprising because citizenship does have monetary benefits for the naturalized immigrant herself (Gathmann and Keller, 2015). One possible explanation is that other changes in the partner market (like having a partner with foreign citizenship) offset the beneficial effect of access to citizenship on wages for the partner.

**Table 4.5:** The Impact of Naturalization on Fertility and Family Formation

| Female Immigrants | First Stage | Second Stage | | | | | |
|---|---|---|---|---|---|---|---|
| | Years since Naturalized | Having Children | # of Children | Age at First Birth | Currently Married | Ever Married | Divorced |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Years since Naturalized | | -0.063** | -0.156* | 1.563 | -0.059* | -0.079** | -0.016 |
| | | [0.030] | [0.080] | [1.027] | [0.031] | [0.032] | [0.012] |
| Years since Eligible for Citizenship | 0.112*** | | | | | | |
| | [0.036] | | | | | | |
| Years in Germany | -0.296*** | 0.003 | 0.038 | 0.454 | 0.001 | -0.008 | -0.007 |
| | [0.094] | [0.011] | [0.030] | [0.386] | [0.011] | [0.011] | [0.005] |
| Years in Germany Squared | 0.016*** | 0.000 | 0.000 | -0.026 | 0.000 | 0.001 | 0.000* |
| | [0.003] | [0.001] | [0.001] | [0.020] | [0.001] | [0.001] | [0.000] |
| Medium-skilled | 1.168*** | -0.083** | -0.442*** | 0.420 | -0.019 | -0.000 | 0.023 |
| | [0.097] | [0.036] | [0.097] | [1.501] | [0.037] | [0.039] | [0.018] |
| High-skilled | 1.215*** | -0.293*** | -0.986*** | 4.560*** | -0.115*** | -0.126*** | -0.003 |
| | [0.227] | [0.043] | [0.108] | [1.376] | [0.041] | [0.043] | [0.021] |
| Year of Arrival Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 18,534 | 18,534 | 18,516 | 12,667 | 18,532 | 18,532 | 13,148 |
| R-Squared | 0.327 | | | | | | |
| F-statistic First Stage | | 9.72 | 9.44 | 2.64 | 9.70 | 9.70 | 17.20 |
| Mean of Dependent Variable | | 0.657 | 1.414 | 23.35 | 0.639 | 0.709 | 0.099 |

Notes: The table reports instrumental variable estimates of the effects of the citizenship duration on fertility and marriage outcomes. The first stage estimates regress the years since naturalization on the years since eligible for citizenship and other control variables (column (1)). The second stage estimates (shown in columns (2)-(7)) are for the outcomes shown in the top row. The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible for citizenship in the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrant became eligible for naturalization after the 1991 or 2000 immigration reforms. All specifications include year of arrival and year of birth fixed effects, calendar year and state fixed effects as well as state-specific linear trends. We further include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). The omitted education category is low-skilled (without high school or vocational degree). We further include a linear and squared term for age and years in Germany. Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

## 4.5.3 Robustness Analysis

### 4.5.3.1 Specification Checks

The empirical model in equation (1) allows for a full set of year of arrival, year of birth and calendar year effects, but imposes a second-order polynomial for general assimilation effects to avoid multicollinearity between calendar year, year of arrival and years since migration. Given that adolescent immigrants not only get eligible faster conditional on year of arrival but also have lived in Germany for a slightly shorter period, we would have a downward bias in our estimates if we did not adequately control for assimilation effects. To test this, we allow for different degrees of polynomials in years since migration starting from a linear specification up to a fourth-order polynomial in years since migration. The dependent variables are fertility choices, family formation and partner characteristics, while all other control variables are the same as in the baseline model. The first four columns of Table 4.6 show the results for immigrant women; the results for immigrant men are contained

in Table C.4 in the appendix. The estimates for years of eligibility are sometimes slightly larger and sometimes smaller than in the baseline with the second-order polynomial. Yet, the AIC criterion reported at the bottom of each panel suggests little improvements beyond the second-order polynomial for both women and men. Hence, the necessary functional form assumption for general assimilation effects does not affect our results.

**Table 4.6:** Specification Checks

| Sample: Immigrant Women | Different Polynomials of Years in Germany | | | | Age of Arrival Effects | | Differential Birth Year Effects across Arrival Cohorts | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| | | | | | Number of Children | | | | | |
| Years since Eligible for Citizenship | -0.025*** | -0.020*** | -0.022*** | -0.023*** | -0.012* | -0.024*** | -0.026*** | -0.019* | -0.019*** | -0.021*** |
| | [0.006] | [0.006] | [0.006] | [0.006] | [0.007] | [0.007] | [0.008] | [0.011] | [0.007] | [0.007] |
| R-Squared | 0.427 | 0.428 | 0.428 | 0.428 | 0.429 | 0.428 | 0.428 | 0.429 | 0.428 | 0.428 |
| AIC | 53765.5 | 53725.1 | 53723.0 | 53720.6 | | | | | | |
| (N=18,904) | | | | | | | | | | |
| | | | | | Age at First Birth | | | | | |
| Years since Eligible for Citizenship | 0.150*** | 0.147*** | 0.153*** | 0.166*** | 0.108*** | 0.149*** | 0.225*** | 0.225*** | 0.141*** | 0.146*** |
| | [0.036] | [0.036] | [0.036] | [0.036] | [0.037] | [0.035] | [0.040] | [0.040] | [0.038] | [0.037] |
| R-Squared | 0.287 | 0.287 | 0.287 | 0.288 | 0.288 | 0.291 | 0.289 | 0.289 | 0.288 | 0.288 |
| AIC | 72026.6 | 72025.1 | 72025.0 | 72011.9 | | | | | | |
| (N=12,789) | | | | | | | | | | |
| | | | | | Ever Married | | | | | |
| Years since Eligible for Citizenship | -0.011*** | -0.010*** | -0.010*** | -0.010*** | -0.008*** | -0.011*** | -0.013*** | -0.013*** | -0.011*** | -0.011*** |
| | [0.002] | [0.002] | [0.002] | [0.002] | [0.002] | [0.002] | [0.003] | [0.003] | [0.002] | [0.002] |
| R-Squared | 0.473 | 0.474 | 0.474 | 0.474 | 0.474 | 0.474 | 0.475 | 0.475 | 0.475 | 0.474 |
| AIC | 12198.4 | 12176.6 | 12176.4 | 12179.7 | | | | | | |
| (N=18,921) | | | | | | | | | | |
| | | | | | Native Partner | | | | | |
| Years since Eligible for Citizenship | -0.006** | -0.006** | -0.007** | -0.006** | -0.006** | -0.006** | -0.004 | -0.004 | -0.005 | -0.005* |
| | [0.003] | [0.003] | [0.003] | [0.003] | [0.003] | [0.003] | [0.003] | [0.003] | [0.003] | [0.003] |
| R-Squared | 0.262 | 0.262 | 0.262 | 0.262 | 0.262 | 0.262 | 0.263 | 0.263 | 0.263 | 0.262 |
| AIC | 7674.9 | 7673.0 | 7676.8 | 7670.5 | | | | | | |
| (N=19,932) | | | | | | | | | | |
| | | | | | Age of Partner | | | | | |
| Years since Eligible for Citizenship | -0.104* | -0.115** | -0.116** | -0.117** | -0.110* | -0.110** | -0.129** | -0.096*** | -0.146** | -0.121** |
| | [0.056] | [0.056] | [0.057] | [0.057] | [0.059] | [0.056] | [0.060] | [0.026] | [0.062] | [0.059] |
| R-Squared | 0.376 | 0.376 | 0.376 | 0.376 | 0.376 | 0.376 | 0.376 | 0.376 | 0.376 | 0.376 |
| AIC | 71005.7 | 71005.0 | 71007.0 | 71007.0 | | | | | | |
| (N=10,901) | | | | | | | | | | |
| Years in Germany Cohort Controls | Linear Year FE | Quadratic Year FE | Cubic Year FE | Quartic Year FE | Quadratic Year FE | Quadratic Year FE | Quadratic Year FE | Quadratic Year FE | Quadratic Year FE | Quadratic Year FE |
| Age of Arrival Controls | No | No | No | No | Under 11 | 10-year FE | No | No | No | No |
| Arrival Cohort-Specific Yob Trends | No | No | No | No | No | No | Linear | Quadratic | No | No |
| Arrival Cohort x Year of Birth FE | No | No | No | No | No | No | No | No | 10-year | 5-year |

Notes: The table reports alternative specifications of the reduced-form for female immigrants. The dependent variables are fertility choices (number of children, age at first birth), family formation (whether an immigrant has ever been married) and partner characteristics (whether the partner is a native as well as partner age). The first four specifications (columns (1)-(4)) include different polynomials in years in Germany. Columns (5)-(7) test for the influence of age of arrival effects: (5) adds a dummy for immigrants which were under the age of 11 when they arrived in Germany; (6) include separate dummies for age of arrival (10-year bands). Columns (7) and (8) include linear and quadratic birth year trends separately for each arrival cohort. Columns (9) and (10) include arrival cohort x year and birth cohort fixed effects (for 10-year and 5-year year of birth groups). The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible during the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. All specifications also include education and ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

Another concern is that adolescent immigrants (the treatment group) arrived in Germany at a younger age compared to adult immigrants (the control group) con-

ditional on year of arrival. Research in psychology suggests that immigrants who arrive at younger ages are more likely to learn the host country's language than immigrants arriving at an older age (e.g., Birdsong, 2006; Johnson and Newport, 1989; Newport, 2002). In particular, psychologists speak of a sensitive period for learning foreign languages that ends around age 10 or 11. As a result, immigrants arriving before the age of 11 might also be better integrated into the host society because better language skills facilitate the social contact with natives, for example. If age of arrival effects indeed matter conditional on our control variables, the estimated returns to citizenship would be upward biased because adolescent immigrants arrived in Germany at a younger age. We can assess this concern by following a similar strategy than Bleakley and Chin (2004): we generate a variable equal to one if an immigrant arrived prior to age 11 and zero if she arrived in Germany at a later age.

The results in column (5) of Table 4.6 (and Table C.4 for men) show that the coefficient becomes somewhat smaller for some fertility choices like number of children or age at first birth; it has little effect on partner characteristics like whether the partner is a native or the age of the partner. As an additional test, we include 7-year dummies for age of arrival in addition to all other control variables; now, the coefficient on years since eligibility is identified from groups in the same 10 years of arrival which limits the amount of remaining variation we can use for identification. Column (6) shows that this very flexible model reduces the coefficient but also the precision of our estimates.

Our identifying assumption would also be violated if birth cohort effects (or age effects) differ across arrival cohorts. In that case, our eligibility variable which is identified from the interaction between year of arrival, year of birth and calendar year would also pick up differential trends in birth cohorts for subsequent arrival cohorts. Note that we cannot include a full set of birth cohort trends for each year of arrival because the set of interaction between year of arrival and birth year available in our data is limited. If we regress years of eligibility for naturalization on all control variables in the Microcensus, we get a R2 of 0.93 for both men and women. Given the limited variation left conditional on our control variables, we first include differential birth year trends for groups of arrival cohorts: 1976-82, 1983-89, 1990-95 and 1996-2000. The identifying assumption is now that birth cohort effects are stable within these arrival cohorts but allowed to vary across these groups. The results for a linear year of birth trend and quadratic year of birth trend for each arrival cohort in columns (7) and (8) of Table 4.6 (and Table C.4) are similar to

the baseline. Alternatively, we include for each arrival cohort separate dummies for 10-year birth cohorts (in column (9)) and even 5-year birth cohorts (in column (10)). Again, the results remain unchanged which suggests that our baseline sample is fairly homogeneous conditional on cohort of arrival and therefore not subject to differential year of birth trends over time.

#### 4.5.3.2 Level versus Growth Effects and Selective Return Migration

Our empirical model (in equation (1)) identifies persistent effects on fertility, family formation and partner choice (a slope effect). Citizenship will have permanent effects if, for instance, immigrants invest more in human capital after naturalization. Our empirical model does however not identify any effect of citizenship on outcome levels. The reason is that by 2005, the first year of our data from the Microcensus, the control group of adult immigrants has become eligible for German citizenship as well. To test whether citizenship shifts outcomes immediately after naturalization (a level effect), we make use of additional waves of the Microcensus covering the years 1999-2010. In the earlier years of the Microcensus, a large number of observations becomes eligible for the first time which allows us to disentangle a level from a growth effect. We capture the level effect by an indicator variable measuring whether an individual is eligible in the current year. As before, we identify the slope effect by including the years since eligibility for citizenship. Table C.5 shows the respective results. Access to citizenship has not only persistent growth effects, it also has a one-time effect on the levels. The growth effects that we measure remain significant even if we include the indicator variable. Yet, our baseline specification is capable to capture the largest part of the overall effect of eligibility. Whereas the total effect of eligibility on the probability of being married is -0.05, our baseline specification estimates a slightly smaller effect of -0.03.[29], Our main results are thus only a lower bound of the true effect of citizenship. As an additional test, we follow the idea of a regression discontinuity design and reduce the age window around the cutoff age in which immigrants become eligible (columns (3) to (5)). Even if we narrow the age window, the coefficients of the slope and the level effect remain highly significant.

Another issue we need to address is selective dropout from our sample because

[29] We calculate the sum of level and slope effect: (-0.0322474-7.16*0.0027393) and compare it to the slope effect (-7.16* 0.0037158)

of selective mortality or emigration. As the immigrant sample is relatively young (between 16 and 49 years-old), survivor bias due to mortality is of minor concern. A more important issue is selective out-migration. Return migration seems highest in the first years and levels off after about eight years in the host country (see, e.g., Dustmann and Göhrlach, 2014). Yet, our sample of immigrants has spent at least five years in Germany but most immigrants have been in the country for many more years - the mean is around eighteen years. Return migration during the 2005-2010 period is therefore unlikely to be a major issue.

However, return migration prior to our sample period could still produce a selected sample. If there is negative selection in out-migration and adolescent immigrants (who get eligible faster conditional on the cohort of arrival) are more (less) likely to return than adult immigrants, then we would get an upward (downward) bias in the estimated return to citizenship eligibility. If both groups are equally likely to leave Germany conditional on our control variables, there would be no bias in our estimates. In sum, it is not obvious how return migration before our study period would affect our estimates. While we cannot assess return migration in the repeated cross-sections of the Microcensus, we can test for selective dropout from our sample in the SOEP panel. We take the probability of attrition from our sample (either due to mortality, emigration or other dropout) as the dependent variable and test whether attrition depends on eligibility. All regressions include the same set of control variables as before. The right-hand side of Table C.6 suggests that selective attrition from the sample is not related to eligibility or years since eligibility for immigrant men and women. Based on this evidence, return migration seems unlikely to bias our results.

### 4.5.4 Alternative Samples and Controls

Finally, we investigate whether our results are robust to alternative definitions of our sample. As a first test, we restrict our sample to Turkish immigrants which has been the largest sending country prior to 1990. While the coefficients show a similar pattern for Turks, most coefficients are no longer statistically significant (see first row of Table C.7) - with the exception of age at first birth and partner age. Immigrants in our sample may also qualify for citizenship through marriage to a German citizen. To check whether the fast track affects our results, we drop in the second

row all immigrants who report having a German spouse in 2005-2010.[30] A related issue is that the 2000 reform not only changed the resident requirement for adult immigrants but also granted citizenship to children born in Germany to foreign-born parents. Immigrants with dependent children therefore have a higher incentive to naturalize prior to 2000 because they could include spouses and dependent children in their application. After 2000, newborn children were eligible for German citizenship independently of their parents. Hence, the benefits of citizenship might be smaller after 2000 for parents with very young children. Controlling for the presence and age structure of children (in the third row) in the household does however not change our results. We also rerun our analysis dropping all immigrants with children under ten in the household. In the remaining sample, children in eligible households were all born prior to 2000 and hence not directly affected by the reform.[31]

Our sample could also be affected by changes in the inflow of refugees and asylum seekers. After the opening of the Iron Curtain, large numbers of asylum seekers and ethnic Germans began to arrive in Germany. Faced with ever-increasing numbers of refugees, the federal government restricted access to political asylum in 1993.[32] Hence, the selection of refugees arriving in Germany might have changed substantially over time, especially after 1993. Refugees who are granted political asylum face the same naturalization criteria as all other immigrants in Germany. In some cases, however, the resident requirement might be reduced to six years. As such, some refugees might have naturalized earlier than our definition of eligibility indicates. Unfortunately, as in most data sources, our data do not record whether an immigrant arrives in Germany as a refugee or applies for asylum. As a proxy for refugee status, we therefore rerun our baseline (in the fifth row) after dropping all immigrants from ex-Yugoslavia and the Middle East which formed the largest

[30] Note that we only observe their current spouse, not the spouse or partner an immigrant had when they first lived in Germany. Some immigrants we drop from the sample might have naturalized through the provisions of the 1990 or 2000 reforms but married a German citizen only afterward. And some immigrants might have naturalized through a German spouse, but got divorced before we observe them in the 2005-2010 sample period. We think that the number of immigrants we misclassify should be small relative to the number of immigrants with a German spouse in the 2005-2010 period. We find similar results if we use the SOEP where we have annual information on the immigrant's partner from 1984-2009 (not reported).

[31] The 2000 reform also included a transitory provision: Parents with children born between 1990 and 1999 could apply for German citizenship for their child between 2000 and 2001. The parent had to fulfill the other requirements of the 2000 reform granting citizenship by birthplace (most importantly, an 8-year resident requirement). In practice, less than 10 percent of parents did apply which suggest that children older than ten in 2010 have mostly not benefited from the citizenship by birthplace reform. In addition, if we drop immigrants with children younger than 15, we find again very similar results (not reported).

[32] After 1993, immigrants from source countries that are considered safe, or those arriving from safe third countries (which included all of Germany's geographic neighbors) could no longer apply for political asylum in Germany.

groups of refugees over our sample period. In addition, our sample might still contain some ethnic Germans who are not directly affected by the immigration reforms. We therefore restrict our data in the sixth row to the 2007-10 Microcensus; in those years, immigrants were asked explicitly whether they were eligible as ethnic Germans. Finally, changes in the German economy more broadly might influence our results. Germany's labor market experienced a substantial inflow of migrants after the fall of the Berlin Wall and the opening of the Iron Curtain. In addition, wage inequality in Germany increased in the late 1990s and 2000s with substantial net gains for the high-skilled but net losses for the low-skilled. In principle, these changes might be absorbed by year dummies or state-specific trends. Our reduced-form estimates would however be biased if business cycle effects or secular wage changes affect adolescent immigrants differently than adult immigrants. The seventh row then drops all East German states because immigration flows and labor market dynamics differ substantially between East and West Germany. Alternatively, we include state-level unemployment rates and GDP growth rates to our specification in the eighth row. In all cases, we find that our estimates for fertility choices and family formation are very robust to alternative samples. In contrast, the coefficients for partner characteristics do vary across specifications for immigrant women (while men had few effects even in the reduced form).

## 4.6 Potential Mechanisms

### 4.6.1 The Role of Income

As discussed in the introduction, access to citizenship improves the labor market position of eligible immigrants. In Germany, female immigrants especially benefit from citizenship with higher wages and more stable jobs (Gathmann and Keller, 2014). We first explore whether changes in labor market income may explain our results on the speed of social integration. Unfortunately, we do not observe earnings prior to eligibility. Therefore, we need to be careful with the interpretation as better social integration, for example, because of intermarriage, may also improve wages (see Meng and Gregory, 2005).

The upper part of Table 4.7 shows the baseline estimates for employed women, while the lower part shows the reduced form estimates conditional on personal income. Personal income is significantly associated with all dependent variables. Im-

migrant women with higher personal income delay and decrease their fertility, implying that the substitution effect dominates the income effect. Conditional on personal income, the size of the eligibility coefficient is substantially smaller for the demand for children than unconditionally: from -0.008 to -0.006 for the propensity to have kids and from -0.02 to -0.015 for the number of kids. This reduction implies that 25 percent of the effects of access to citizenship on the static demand for fertility can be explained by changes in personal income (columns (1) and (2)). However, economic forces cannot explain much of the postponement of births, since the coefficient of our eligibility variable for age at first birth is almost unchanged when conditioning on personal income (column (3)). For the family formation outcomes, the personal income of female immigrants is negatively associated with the probability of being married and positively related with the probability of being divorced or cohabitating with a partner (columns (4)-(8)). Conditioning on personal income reduces the eligibility effect on currently married by more than 40 percent. The effect for ever married declines by 11 percent suggesting that higher personal income postpones marriage but does not reduce the incidence of marriage. For partner characteristics, personal income has little effect and cannot explain the effects of eligibility (columns (9)-(13)).

### 4.6.2 Cultural Influence of the Source Country

Our results show substantial effects of access to citizenship on social integration outcomes. Yet, do these integration forces work for all immigrants in a similar way; or, do some immigrants integrate faster than others? Immigrants, especially in the first generation, are imprinted with the norms and values of their country of origin. That influence vanes only slowly with time in the host country. In our case, there is an obvious distinction between EU immigrants who come in many cases from a very similar cultural background and immigrants from outside the EU who mostly come from very different cultural backgrounds. In recent years, the epidemiological approach has provided convincing evidence that the norms and values of the source country still influence immigrants' behavior in the host country. Using this approach, recent studies show, for instance, that immigrant women who come from countries with high fertility rates have more children than immigrants from low-fertility countries (see, e.g., Fernández and Fogli 2009 for the US; Stichnoth and Yeter, 2013 for Germany). Most studies also report a decline in the immigrant-native gap in fertility or labor force participation with time in the host country

## **Table 4.7:** The Role of Labor Market Income

| | Fertility Choices | | | | Family Formation | | | | Characteristics of Partner | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample: Female Immigrants | Having Kids | Number of Kids | Age at 1st Birth | Single Mother | Currently Married | Ever Married | Divorced | Cohabitating | Native | Same origin | Years in Germany | Education | Age |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
| Baseline: | | | | | | | | | | | | | |
| Years since Eligible for Citizenship | -0.008*** [0.002] | -0.020*** [0.007] | 0.145*** [0.037] | -0.001 [0.003] | -0.007*** [0.003] | -0.009*** [0.002] | -0.004 [0.002] | -0.002 [0.002] | -0.006** [0.003] | 0.001 [0.003] | -0.469*** [0.089] | 0.015 [0.028] | -0.118** [0.057] |
| Observations | 18,081 | 18,064 | 12,382 | 11,889 | 18,079 | 18,079 | 12,838 | 11,930 | 10,673 | 10,673 | 8,293 | 10,493 | 10,644 |
| R-Squared | 0.424 | 0.424 | 0.283 | 0.039 | 0.333 | 0.469 | 0.033 | 0.134 | 0.263 | 0.297 | 0.257 | 0.285 | 0.376 |
| Cond. on Income: | | | | | | | | | | | | | |
| Years since Eligible for Citizenship | -0.006*** [0.002] | -0.015** [0.007] | 0.143*** [0.037] | -0.002 [0.003] | -0.004* [0.002] | -0.008*** [0.002] | -0.004 [0.002] | -0.003 [0.002] | -0.007** [0.003] | 0.002 [0.003] | -0.464*** [0.089] | 0.013 [0.028] | -0.112* [0.057] |
| Personal Income (/1000) | -0.114*** [0.009] | -0.357*** [0.026] | 0.311*** [0.078] | 0.227*** [0.019] | -0.180*** [0.012] | -0.084*** [0.007] | 0.137*** [0.011] | 0.065*** [0.008] | 0.032*** [0.007] | -0.049*** [0.008] | -0.752*** [0.212] | 0.143*** [0.046] | -0.591*** [0.149] |
| Observations | 18,081 | 18,064 | 12,382 | 11,889 | 18,079 | 18,079 | 12,838 | 11,930 | 10,673 | 10,673 | 8,293 | 10,493 | 10,644 |
| R-Squared | 0.441 | 0.446 | 0.285 | 0.168 | 0.376 | 0.479 | 0.101 | 0.150 | 0.265 | 0.301 | 0.258 | 0.285 | 0.378 |
| Years in Germany | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Mean of Dependent Variable | 0.66 | 1.41 | 23.35 | 0.14 | 0.64 | 0.71 | 0.10 | 0.08 | 0.20 | 0.73 | 19.90 | 12.47 | 35.97 |

Notes: The table reports reduced form estimates for female immigrants. The dependent variables are fertility choices (columns (1)-(4), family formation (columns (5)-(8) and the characteristics of partner (columns (9)-(13)). The top panel shows the baseline while the bottom panel adds personal income (measured in 1,000 Euros) to the specification. The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible for citizenship in the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrant became eligible for naturalization after the 1991 or 2000 immigration reforms. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). The omitted education category is low-skilled (without high school or vocational degree). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

though full convergence might take several generations (e.g., Ben-Porath, 1973; and Blau et al., 1992 for the US; Mayer and Riphahn, 2000 for Germany).

Little is known however, whether norms and values of the source country also affect the speed of integration through citizenship. To investigate the link between cultural heritage and access to citizenship, we use the epidemiological approach on our sample of first-generation immigrants. First-generation immigrants who might not be a random sample of the population in their country of origin. However, this potential bias is not such an issue here as we focus on the assimilation process of immigrants (and not on the effect of immigrant culture for a random individual in the source country). A second concern could be that first-generation immigrants might experience a disruption or delay in their fertility or family formation because of migration. Yet, this delay should be less of an issue because our sample of migrants has lived in the host country for many years (17 years for women and 18 years for men). In addition, we only compare immigrants from the same arrival cohort who should have experienced the same delay in their choices.[33]

In Table 4.8 and Table 4.9, we investigate the link between country of origin characteristics and the effect of citizenship on fertility and family formation choices, respectively. When analyzing the effect of cultural heritage on the speed of assimilation with respect to fertility outcomes, the total fertility rate of the country of origin serves as the origin country characteristic. For analyzing family formation outcomes, we use the female labor force participation rate in the country of origin. The top panel of both tables shows the baseline results for the sample of immigrants for which we could merge source country characteristics to our data. In the bottom panel, we add the source country characteristic within the five years before migration to our specification as well as an interaction term with our eligibility variable. The main effect of the source country characteristic shows whether cultural heritage affects fertility or family formation choices; the interaction effect in turn indicates whether access to citizenship reduces the cultural influence of the source country. We find substantial heterogeneity with respect to cultural values in the country of origin.

As in the previous literature, we find that fertility is substantially higher for immigrant women from high-fertility regions. Furthermore, they have children earlier

[33]There is a counteracting force where immigrants reduce or at least postpone their fertility until after their relocation or until they get settled in the host country. Fertility might then be lower shortly after arrival because of the disruption of migration. This effect should not be an issue in our setting however, since most immigrants have been in the country for several years (the average duration of residence is 17 years for women and 18 years for men).

**Table 4.8:** The Role of Culture for Fertility Choices

| | Fertility Choices | | | |
|---|---|---|---|---|
| Sample: Female Immigrants | Having Kids | Number of Kids | Age at 1st Birth | Single Mother |
| | (1) | (2) | (3) | (4) |
| Years since Eligible | -0.007*** | -0.018** | 0.178*** | -0.000 |
| | [0.003] | [0.007] | [0.039] | [0.003] |
| Observations | 15,544 | 15,529 | 10,882 | 10,452 |
| R-Squared | 0.431 | 0.432 | 0.289 | 0.041 |
| Years since Eligible | -0.001 | -0.009 | 0.134*** | -0.004 |
| | [0.003] | [0.009] | [0.045] | [0.004] |
| Years since Eligible*Fertility Origin | -0.002*** | -0.003** | 0.014* | 0.001 |
| | [0.001] | [0.001] | [0.007] | [0.001] |
| Fertility Country of Origin | 0.041*** | 0.100*** | -0.455*** | -0.035*** |
| | [0.008] | [0.024] | [0.100] | [0.009] |
| Observations | 15,544 | 15,529 | 10,882 | 10,452 |
| R-Squared | 0.432 | 0.433 | 0.291 | 0.042 |
| Year of Arrival Fixed Effects | Yes | Yes | Yes | Yes |
| Year of Birth Fixed Effects | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes |
| Region of Origin Fixed Effects | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes |
| Mean of Dependent Variable (Total Sample) | 0.657 | 1.414 | 23.35 | 0.141 |
| Mean of Dependent Variable (Sample used) | 0.673 | 1.448 | 23.29 | 0.137 |

Notes: The table reports reduced form estimates for fertility choices of female immigrants. The top panel shows the baseline estimates for the subsample for which we have valid information on the fertility rates in the country of origin prior to immigration. The bottom panel augments the basic model with the fertility rate in the country of origin in the year prior to emigration as well as that variable interacted with years since eligible. All specifications include the same controls as in previous tables. See notes to Tables 2-4 for details. Standard errors are clustered at the age x arrival year level. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

and are less likely to be single mothers. More surprisingly, our results indicate that assimilation in fertility behavior is faster for women originating from high-fertility countries as the interaction terms are negative in columns (1) and (2), and positive in column (3). Taking the difference between the fertility rate in the source country between the 25th (1.84 children) and the 75th percentile (3.7 children) which is similar to the difference between Italy and Turkey, one can see that eligibility for citizenship reduces the likelihood of having children and the number of children for women from Turkey (roughly the 75th percentile) faster than for women from Italy (roughly the 25th percentile). Women in the 75th percentile also postpone their first birth more than women in the 25th percentile. After 10 years of eligibility, the woman in the 75th percentile decreases the difference between her and the woman in the 25th percentile by 3.7 percentage points in the probability to have children, by 0.06 children and by 0.26 years with respect to the age at first birth. These integration effects do not change much when controlling for personal income. That suggests that economic and cultural influences have largely independent effects on fertility choices.

While these results seem somewhat surprising at first, note that immigrant women from high-fertility countries also have the most room for adjustment. In

addition, the institutional and economic constraints of women in high-fertility countries are probably very different from the institutions and family policies in Germany and other low-fertility countries. As such, we would expect that the response to the changing incentives should be largest among immigrants from countries that are very different from Germany both socially and economically. Interestingly, our results are different from Blau et al. (2011) who find that the speed of the assimilation in working hours is very similar for immigrants from very different cultural backgrounds. While women from areas with high female employment work on average more than women from countries with low female employment, the speed of assimilation is very similar for the two groups of women. We, in contrast, find that women from high-fertility countries adjust faster than immigrant women from low-fertility countries.

**Table 4.9:** The Role of Culture for Family Formation

| | Female Immigrants | | | |
|---|---|---|---|---|
| | Currently Married | Ever Married | Divorced | Cohabitation |
| | (1) | (2) | (3) | (4) |
| Years since Eligible | -0.006** | -0.009*** | -0.004* | -0.001 |
| | [0.003] | [0.003] | [0.003] | [0.002] |
| Observations | 14,679 | 14,679 | 10,736 | 9,918 |
| R-Squared | 0.340 | 0.484 | 0.032 | 0.150 |
| Years since Eligible | -0.024*** | -0.024*** | 0.002 | 0.007* |
| | [0.004] | [0.004] | [0.004] | [0.004] |
| Years since Eligible*Female LFP Origin | 0.037*** | 0.031*** | -0.013** | -0.017** |
| | [0.007] | [0.007] | [0.006] | [0.007] |
| Female LFP Origin | -0.280*** | -0.264*** | 0.056 | 0.241*** |
| | [0.065] | [0.058] | [0.062] | [0.064] |
| Observations | 14,679 | 14,679 | 10,736 | 9,918 |
| R-Squared | 0.341 | 0.486 | 0.032 | 0.152 |
| Year of Arrival Fixed Effects | Yes | Yes | Yes | Yes |
| Year of Birth Fixed Effects | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes |
| Region of Origin Fixed Effects | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes |
| Mean of Dependent Variable (Full Sample) | 0.639 | 0.709 | 0.099 | 0.085 |
| Mean of Dependent Variable (Sample used) | 0.658 | 0.731 | 0.099 | 0.078 |

Notes: The table reports reduced form estimates of marriage outcomes for immigrant women. The top panel shows the baseline for the subsample for which we have valid information on the female labor force participation rates in the country of origin. The bottom panel adds the female labor force participation in the country of origin just prior to emigration and that variable interacted with the years since eligibility. All specifications include the same variables in previous tables. See notes to Tables 2-4 for further details. Standard errors are clustered at the age x arrival year level. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

With respect to the family formation choices of immigrant women, we find that women from countries with high female labor participation have a lower probability to be married, and are more likely to cohabitate. This corresponds to the expectation that a high female labor force participation rate is a proxy for more modern norms regarding gender roles and the family model. The coefficients of the interaction terms show in the opposite direction of the effect of citizenship for all family

formation outcomes. This indicates that assimilation in family formation behavior is faster for women from countries with a lower female labor participation rate. Taking again the difference between the female labor force participation in the origin country between the 25th (0.367) and the 75th percentile (0.574), women in the 25th percentile are less likely to be married, and have a higher probability to be divorced and cohabitating than women from the 75th percentile. After 10 years of eligibility, the woman in the 25th percentile decreases the difference between her and the woman in the 75th percentile by 7.6 percentage points in the probability to be currently married, by 6.4 percentage points in the probability to ever have been married, by 2.6 percentage points in the probability of being divorced, and by 3.5 percentage points in the probability of cohabitating. The results for immigrant men do not reflect this pattern. While men from countries with higher female labor force participation are more likely to be married, they are less likely to be divorced. However, the interaction effects are all insignificant, and cultural distance thus does not foster assimilation for immigrant men. As for the fertility outcomes, controlling for personal income does not change these assimilation results a lot.

## 4.7 Conclusion

Germany has accumulated a sizable immigrant population over the past decades and continues to do so today. In international comparison, Germany has ranked second as destination country for immigrants - just behind the United States but before other traditional immigration countries like Australia and Canada. The large stock and rising inflow of immigrants raises important questions on how to integrate the new members into the host society - both in economic terms but also along social dimensions. Along both lines, Germany has traditionally had a relatively weak record compared to traditional immigration countries. In recent years however, substantial progress has been made in facilitating naturalization. Beginning in the early 1990s, Germany has moved from a country where citizenship was closely tied to ancestry to a more liberal understanding of citizenship and naturalization.

To identify the effects of citizenship acquisition on social integration, we exploit age-dependent resident requirements in Germany's reforms and the fact that many immigrants get eligible when the reforms are implemented. Our intention-to-treat effect shows that access to citizenship does have an impact on the marriage and fertility patterns of immigrants. The option to naturalize delays marriage to later

ages and reduces the likelihood of marrying someone from the country of origin. Female immigrants also have lower fertility overall and tend to postpone their first birth, especially when they are high-skilled. An analysis of the potential mechanisms suggests that higher earnings are important for fertility and marriage choices. And while immigrants from a more traditional cultural background have overall higher fertility and marriage rates, they also assimilate faster than immigrants from EU member countries.

Overall, naturalization appears to be one channel to improve the social integration of immigrants even in countries where access to citizenship has traditionally been very restrictive. The benefits of a more liberal immigration policy seem to materialize especially if immigrants have the human capital necessary to succeed in the host country's labor market - a condition more recent immigrants to Germany seem to satisfy. As such, the substantial inflow of immigration over the past decade is likely to provide large fiscal and labor market benefits for Germany. Yet, our results also caution that a more liberal access to citizenship does not work automatically for everybody and for all integration outcomes.

# 4.8 Appendix

**Table C.1:** Summary Statistics of the Microcensus

| | Female Immigrants | | Male Immigrants | |
|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. |
| Having Children | 0.657 | 0.475 | | |
| Total Number of Children | 1.414 | 1.318 | | |
| Age at Birth of First Child | 23.35 | 4.739 | | |
| Single mother | 0.141 | 0.348 | | |
| Currently Married | 0.639 | 0.480 | 0.554 | 0.497 |
| Ever Married | 0.709 | 0.454 | 0.592 | 0.492 |
| Divorced | 0.0994 | 0.299 | 0.0634 | 0.244 |
| Cohabitating | 0.0848 | 0.279 | 0.112 | 0.315 |
| Partner: German | 0.195 | 0.396 | 0.204 | 0.403 |
| Partner: Same Origin | 0.726 | 0.446 | 0.705 | 0.456 |
| Partner: Same Origin (2nd Generation) | 0.0872 | 0.282 | 0.119 | 0.324 |
| Partner: Years in Germany | 19.90 | 9.221 | 16.19 | 9.163 |
| Partner: Age | 35.97 | 7.878 | 30.80 | 7.277 |
| Partner: Age Gap | 3.969 | 6.444 | -2.638 | 5.708 |
| Partner: Years of Education | 12.47 | 3.207 | 11.88 | 3.224 |
| Partner: Years of Education Gap | 0.732 | 3.104 | -0.030 | 3.210 |
| Share Naturalized | 0.365 | 0.481 | 0.381 | 0.486 |
| Years since Naturalized | 3.684 | 6.368 | 3.778 | 6.417 |
| Years since Eligible for Citizenship | 7.169 | 5.137 | 8.003 | 5.285 |
| Years in Germany | 16.86 | 6.937 | 18.07 | 7.112 |
| Age | 30.29 | 6.460 | 30.53 | 7.010 |
| Low Education | 0.549 | 0.498 | 0.497 | 0.500 |
| Medium Education | 0.391 | 0.488 | 0.449 | 0.497 |
| High Education | 0.060 | 0.237 | 0.054 | 0.226 |
| Region of Origin | | | | |
| Traditional EU member States (EU-15) | 0.094 | 0.291 | 0.116 | 0.320 |
| New EU Member States (EU-12) | 0.140 | 0.347 | 0.093 | 0.290 |
| Ex-Yugoslavia | 0.125 | 0.331 | 0.145 | 0.352 |
| Turkey | 0.335 | 0.472 | 0.333 | 0.471 |
| Middle East | 0.068 | 0.251 | 0.086 | 0.281 |
| Africa | 0.039 | 0.193 | 0.047 | 0.211 |
| Asia | 0.049 | 0.216 | 0.042 | 0.200 |
| America | 0.020 | 0.14 | 0.014 | 0.118 |
| Former Soviet Union (without EU-12) | 0.117 | 0.321 | 0.109 | 0.311 |
| Other or No Citizenship | 0.013 | 0.115 | 0.016 | 0.127 |
| Observations | 18.534 | | 17.216 | |

Notes: The table reports summary statistics for first-generation immigrants who arrived in Germany between 1976 and 2000 and who are 16-30 years old in the post-reform period (1991-2009). A person is eligible if (a) she has lived in Germany for at least 8 years in 1991 or later and is then 16-22 years-old; (b) she has lived in Germany for at least 15 years in the period 1991-1999 and is then 23-30 years-old; or (c) she has lived in Germany for at least 8 years and the year is 2000 or later and she is then 23-30 years-old. Low-skilled individuals are those without a highschool degree or vocational degree; medium-skilled are those with a highschool degree or vocational degree; high-skilled are those with a college degree.
Source: Microcensus 2005-2010.

## **Table C.2:** Summary Statistics of the Socio-Economic Panel

| | **Male** | | **Female** | |
|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. |
| Married | 0.530 | 0.499 | 0.701 | 0.458 |
| Divorced | 0.0210 | 0.143 | 0.0422 | 0.201 |
| Age at first Marriage | 22.19 | 3.077 | 20.00 | 2.870 |
| German Spouse | 0.0729 | 0.260 | 0.0938 | 0.292 |
| Years since Eligible | 2.354 | 3.665 | 2.611 | 3.860 |
| Years in Germany | 12.24 | 6.256 | 12.09 | 6.476 |
| Years in Germany Squared | 189.0 | 189.3 | 188.2 | 192.7 |
| Year of Arrival | 1985 | 6.807 | 1986 | 6.945 |
| Age | 26.11 | 6.107 | 26.28 | 5.798 |
| Age Squared | 718.9 | 339.9 | 724.1 | 321.6 |
| Low Education | 0.540 | 0.498 | 0.647 | 0.478 |
| Medium Education | 0.434 | 0.496 | 0.316 | 0.465 |
| High Education | 0.0258 | 0.158 | 0.0376 | 0.190 |
| Region of Origin | | | | |
| Traditional EU member States (EU-15) | 0.053 | 0.224 | 0.0930 | 0.291 |
| New EU Member States (EU-12) | 0.131 | 0.337 | 0.142 | 0.349 |
| Ex-Yugoslavia | 0.095 | 0.293 | 0.091 | 0.288 |
| Turkey | 0.487 | 0.500 | 0.461 | 0.499 |
| Middle East | 0.006 | 0.078 | 0.007 | 0.085 |
| Africa | 0.008 | 0.089 | 0.002 | 0.040 |
| Asia | 0.004 | 0.063 | 0.006 | 0.075 |
| America | 0.003 | 0.053 | 0.002 | 0.046 |
| Former Soviet Union (without EU-12) | 0.211 | 0.408 | 0.194 | 0.396 |
| Other or No Citizenship | 0.003 | 0.053 | 0.003 | 0.054 |
| Observations | 3.259 | | 3.751 | |

Notes: The table reports summary statistics for first-generation immigrants who arrived in Germany between 1976 and 2000 and who are 16-30 years old when becoming eligible. A person is eligible if an individual is (a) aged 16-22, has lived in Germany for at least 8 years and the year is 1991 or later; (b) aged 23-30, has lived in Germany for at least 15 years in the period 1991-1999; or (c) aged 23-35, has lived in Germany for at least 8 years and the year is 2000 or later. Low-skilled individuals are those without a highschool degree or vocational degree; medium-skilled are those with highschool degree or vocational degree; high-skilled are those with college degree. Individuals are in school if they still attend school over the past four weeks.
Source: SOEP (1984-2009).

## **Table C.3:** Citizenship and Additional Marriage Outcomes

| | **Female Immigrants** | **Male Immigrants** | **Female Immigrants** | | |
|---|---|---|---|---|---|
| | Age at First Marriage | | Age at First Marriage (Full Sample) | Age at First Marriage (Single after 8 Yrs) | Divorced (Married after 8 Yrs) |
| | (1) | (2) | (3) | (4) | (5) |
| Years since Eligible for Citizenship | 0.289*** | -0.031 | 0.190*** | 0.134** | 0.000 |
| | [0.036] | [0.038] | [0.043] | [0.066] | [0.006] |
| Observations | 8,864 | 6,479 | 2,930 | 1,450 | 1,576 |
| R-Squared | 0.268 | 0.236 | 0.507 | 0.611 | 0.250 |
| Dataset | Microcensus 1999-2004 | | Socio-Economic Panel 1984-2009 | | |
| Individual Characteristics | Yes | Yes | Yes | Yes | Yes |
| Year of Arrival FE | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes |
| Mean of Dependent Variable | 19.90 | 22.28 | 20.38 | 21.67 | 0.03 |

Notes: The table reports reduced form estimates between years since eligibility and family formation. The left-hand side (columns (1)-(2)) reports results for the Microcensus (1999-2004), the right-hand side (columns (3)-(5) for the GSOEP. Columns (1) and (3)-(5) for female immigrants, column (2) for male immigrants. The dependent variables are the age an immigrant first gets married (columns (1)-(4)); and whether an immigrant is divorced (columns (5). Columns (4) focus on immigrants who are single after 8 years in Germany; column (5) is restricted to immigrants who were married after 8 years in Germany. The sample overall includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible for citizenship in the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrant became eligible for naturalization after the 1991 or 2000 immigration reforms. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). For the Microcensus before 2005, we do not have this information and replace the region of origin fixed effects by recent citizenship fixed effects (same categories including one category for German). The omitted education category is low-skilled (without high school or vocational degree). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (1999-2004); Socio-Economic Panel (1984-2009).

## **Table C.4:** Specification Checks for Immigrant Men

| Sample: Immigrant Men | **Different Polynomials of Years in Germany** | | | | **Age of Arrival Effects** | | **Differential Birth Year Effects across Arrival Cohorts** | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| | | | | | | Married | | | | |
| Years since Eligible for Citizenship | -0.008*** [0.002] | -0.006*** [0.002] | -0.007*** [0.002] | -0.007*** [0.002] | -0.004** [0.002] | -0.007*** [0.002] | -0.010*** [0.003] | -0.008* [0.004] | -0.008*** [0.002] | -0.008*** [0.002] |
| R-Squared | 0.399 | 0.401 | 0.401 | 0.401 | 0.401 | 0.401 | 0.401 | 0.401 | 0.401 | 0.401 |
| AIC | 16217.1 | 16177.5 | 16172.1 | 16175.3 | | | | | | |
| (N=17,213) | | | | | | | | | | |
| | | | | | | Ever Married | | | | |
| Years since Eligible for Citizenship | -0.009*** [0.002] | -0.008*** [0.002] | -0.008*** [0.002] | -0.008*** [0.002] | -0.006*** [0.002] | -0.008*** [0.002] | -0.009*** [0.002] | -0.007* [0.004] | -0.009*** [0.002] | -0.009*** [0.002] |
| R-Squared | 0.465 | 0.467 | 0.467 | 0.467 | 0.467 | 0.467 | 0.467 | 0.467 | 0.467 | 0.467 |
| AIC | 13820.8 | 13778.5 | 13772.5 | 13771.6 | | | | | | |
| (N=17,213) | | | | | | | | | | |
| | | | | | | Native Partner | | | | |
| Years since Eligible for Citizenship | 0.005 [0.003] | 0.004 [0.003] | 0.004 [0.003] | 0.004 [0.003] | 0.000 [0.004] | 0.005 [0.003] | 0.006* [0.004] | 0.006* [0.004] | 0.003 [0.004] | 0.007** [0.003] |
| R-Squared | 0.160 | 0.161 | 0.161 | 0.161 | 0.162 | 0.162 | 0.163 | 0.163 | 0.163 | 0.161 |
| AIC | 7955.4 | 7946.7 | 7950.3 | 7948.7 | | | | | | |
| (N=9,164) | | | | | | | | | | |
| | | | | | | Age of Partner | | | | |
| Years since Eligible for Citizenship | 0.040 [0.046] | 0.036 [0.046] | 0.035 [0.047] | 0.038 [0.047] | -0.007 [0.048] | 0.035 [0.046] | 0.097* [0.054] | 0.097* [0.054] | 0.016 [0.055] | 0.015 [0.050] |
| R-Squared | 0.411 | 0.411 | 0.411 | 0.411 | 0.412 | 0.412 | 0.412 | 0.412 | 0.413 | 0.412 |
| AIC | 57428.5 | 57426.9 | 57430.8 | 57428.4 | | | | | | |
| (N=9,116) | | | | | | | | | | |
| Years in Germany | Linear | Quadratic | Cubic | Quartic | Quadratic | Quadratic | Quadratic | Quadratic | Quadratic | Quadratic |
| Cohort Controls | Year FE | Year FE | Year FE | Year FE | Year FE | Year FE | Year FE | Year FE | Year FE | Year FE |
| Age of Arrival Controls | No | No | No | No | Under 11 | 10-year FE | No | No | No | No |
| Arrival Cohort-Specific Yob Trends | No | No | No | No | No | No | Linear | Quadratic | No | No |
| Arrival Cohort x Year of Birth FE | No | No | No | No | No | No | No | No | 10-year | 5-year |

Notes: The table reports alternative specifications of the reduced-form for male immigrants. The dependent variables are family formation (whether an immigrant is currently married or has ever been married) and partner characteristics (whether the partner is a native and partner age). The first four specifications (columns (1)-(4)) include different polynomials in years in Germany. Columns (5) and (6) test for the influence of age of arrival effects: (5) adds a dummy for immigrants which were under the age of 11 when they arrived in Germany; (6) include separate dummies for age of arrival (10-year bands). Columns (7) and (8) include linear and quadratic birth year trends separately for each arrival cohort. Columns (9) and (10) include arrival cohort x year and birth cohort ficed effects (for 10-year and 5-year year of birth groups). The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible during the 1991-2010 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. All specifications also include education and ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

## **Table C.5:** Additional Specification Checks

| Sample: Immigrant Women | **Functional Form** Baseline | + eligible-Dummy | **Age Window Used for Estimation** Ages 19-27 | Ages 21-25 | Ages 22-23 |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| | | | Having children | | |
| Years since Eligible for Citizenship | -0.006*** | -0.005*** | -0.013*** | -0.016** | -0.018 |
| | [0.002] | [0.002] | [0.005] | [0.007] | [0.020] |
| Eligible | | -0.057*** | -0.045*** | -0.054** | -0.058 |
| | | [0.012] | [0.016] | [0.025] | [0.039] |
| Observations | 35,341 | 35,341 | 17,584 | 8,799 | 3,433 |
| R-Squared | 0.413 | 0.414 | 0.287 | 0.246 | 0.274 |
| | | | Currently Married | | |
| Years since Eligible for Citizenship | -0.004** | -0.003 | -0.011*** | -0.015** | -0.021 |
| | [0.002] | [0.002] | [0.004] | [0.006] | [0.021] |
| Eligible | | -0.032*** | -0.019 | -0.042** | -0.045 |
| | | [0.011] | [0.015] | [0.020] | [0.035] |
| Observations | 35,354 | 35,354 | 17,589 | 8,800 | 3,433 |
| R-Squared | 0.333 | 0.334 | 0.189 | 0.143 | 0.138 |
| Year of Arrival Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Year of Birth Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| Region of Origin Fixed Effects | No | No | No | No | No |
| State Fixed Effects | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes |

Notes: The table reports alternative specifications of the reduced-form for female immigrants using the Microcensus years from 1999 to 2010. The dependent variables are fertility choices (having children) and family formation (whether an immigrant is currently married). The first set allows for both a level and slope effect of eligibility: column (1) shows the baseline specification with a slope effect only, while column (2) also includes a dummy variable whether the individual is eligible for naturalization (level effect). The second set of results reduces the window of ages that are included in the estimation: column (3) only include immigrants between 19 and 27 years-old when first eligible for citizenship; column (4) immigrants between 21-25 years-old and column (5) immigrants aged 22-23 when first eligible. The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible during the 1991-2010 period. All specifications control for year of birth and year of arrival fixed effects as well as calendar year and state fixed effects as well as state-specific trends. We further include education dummies and linear and quadratic terms of current age and years in Germany. Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (1999-2010).

## **Table C.6:** Selective Attrition

| | **Female Immigrants** Selective Attrition (Mortality or Emigration) | | **Male Immigrants** Selective Attrition (Mortality or Emigration) | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Years since Eligible for Citizenship | | 0.001 | | 0.001 |
| | | [0.001] | | [0.002] |
| Eligible for Citizenship | 0.004 | | -0.003 | |
| | [0.005] | | [0.007] | |
| Observations | 5,308 | 5,308 | 4,767 | 4,767 |
| R-Squared | 0.055 | 0.055 | 0.053 | 0.053 |
| Year of Arrival Fixed Effects | Yes | Yes | Yes | Yes |
| Year of Birth Fixed Effects | Yes | Yes | Yes | Yes |
| Year Fixed Effects | Yes | Yes | Yes | Yes |
| Region of Origin Fixed Effects | Yes | Yes | Yes | Yes |
| State Fixed Effects | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes |

Notes: The dependent variable is the probability of attrition due to outmigration or mortality (in columns (1)-(2) for women and columns (3)-(4) for men). The sample includes all immigrants who arrived in Germany between 1976 and 2000 and who were between 16 and 30 years-old when they first get eligible for citizenship in the 1991-2009 period. We exclude ethnic Germans, i.e. immigrants with German ancestry who had faster access to German citizenship than regular immigrants. Years since eligible denotes the number of years since an immigrant became eligible for naturalization after the 1991 or 2000 immigration reforms; eligible is an indicator equal to one if an immigrant may naturalize and zero otherwise. All specifications include year of arrival and year of birth fixed effects, current year and state fixed effects as well as state-specific linear trends. We also include ten region of origin fixed effects (traditional EU countries, new EU entrants (EU-12), ex-Yugoslavia, Turkey, Middle East, Asia, Africa, North and South America, Russia and other former Soviet Union republics, other or no citizenship). The omitted education category is low-skilled (without high school or vocational degree). Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Socio-Economic Panel (1984-2009).

## Table C.7: Alternative Samples

| | Female Immigrants | | | | | | Male Immigrants | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Fertility Choices | | Family Formation | | Partner | | Family Formation | | Partner | |
| | Number of Kids | Age at 1st Birth | Currently Married | Ever Married | Native | Age | Currently Married | Ever Married | Native | Age |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Restrict Sample to Turkish Immigrants | -0.015 | 0.217*** | -0.002 | -0.005 | 0.003 | -0.134** | -0.004 | -0.005 | 0.005 | 0.059 |
| | [0.012] | [0.050] | [0.004] | [0.003] | [0.003] | [0.067] | [0.003] | [0.003] | [0.004] | [0.067] |
| Drop Immigrants with German Partners | -0.018*** | 0.125*** | -0.022*** | -0.027*** | -0.010*** | -0.177 | -0.002 | -0.015*** | -0.001 | -0.036 |
| | [0.004] | [0.041] | [0.004] | [0.004] | [0.003] | [0.255] | [0.002] | [0.003] | [0.002] | [0.203] |
| Control for Children in Household (2000 Reform) | -0.019*** | 0.165*** | -0.016*** | -0.020*** | -0.005** | -0.133 | -0.007*** | -0.017*** | 0.004 | -0.144 |
| | [0.003] | [0.027] | [0.003] | [0.003] | [0.003] | [0.127] | [0.002] | [0.003] | [0.003] | [0.119] |
| Drop if Children under Age 10 (2000 Reform) | -0.018*** | 0.185*** | -0.015*** | -0.019*** | -0.001 | -0.139 | -0.012*** | -0.018*** | 0.003 | -0.124 |
| | [0.004] | [0.070] | [0.003] | [0.003] | [0.005] | [0.127] | [0.002] | [0.003] | [0.005] | [0.119] |
| Drop Ex-Yugoslavia and Middle East | -0.017*** | 0.172*** | -0.014*** | -0.020*** | -0.004 | -0.087 | -0.007*** | -0.019*** | 0.007** | -0.144 |
| | [0.004] | [0.037] | [0.004] | [0.004] | [0.003] | [0.146] | [0.002] | [0.003] | [0.003] | [0.128] |
| Drop All Ethnic Germans | -0.023*** | 0.152*** | -0.016*** | -0.021*** | -0.007** | -0.263* | -0.008*** | -0.021*** | 0.004 | -0.294** |
| | [0.004] | [0.042] | [0.004] | [0.004] | [0.003] | [0.158] | [0.002] | [0.003] | [0.004] | [0.146] |
| Drop East German States | -0.018*** | 0.133*** | -0.015*** | -0.019*** | -0.005* | -0.147 | -0.006*** | -0.018*** | 0.004 | -0.141 |
| | [0.004] | [0.034] | [0.003] | [0.003] | [0.003] | [0.128] | [0.002] | [0.003] | [0.003] | [0.119] |
| Add State Economic Conditions | -0.025*** | 0.148*** | -0.016*** | -0.023*** | -0.005 | -0.374* | -0.009*** | -0.022*** | 0.000 | -0.447** |
| | [0.005] | [0.048] | [0.004] | [0.004] | [0.004] | [0.208] | [0.003] | [0.004] | [0.004] | [0.177] |
| Years in Germany | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Arrival FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year of Birth FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Region of Origin FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| State-specific Linear Trends | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

Notes: The table reports reduced-form estimates where the dependent variables are fertility choices (columns (1) and (2)), family formation (columns (3)-(4) and (7)-(8)) and characteristics of the partner (columns (5)-(6) and columns (9)-(10)). The left-hand side shows the results for female immigrants, the right-hand side for male immigrants. The key independent variables are the number of years since a person is eligible for naturalization. The first row restricts the sample to immigrants from Turkey. The second row drops immigrants with a German spouse in 2005-10. The third row includes controls for the number and age structure of children in the household. The fourth row drops immigrants with children under 10 who might have benefitted from the introduction of birthright citizenship in 2000 for all children born on or after January 1, 2000. The fifth row excludes all immigrants from Ex-Yugoslavia and the Middle East; the sixth row restricts the sample to the 2007-10 Microcensus where we can directly identify and exclude ethnic Germans. The seventh row drops observations from East German states except Berlin, while the last row adds labor market controls (a linear and squared term in state unemployment rate and the state GDP growth rate). See notes to previous tables for the definition of the sample. All specifications include the same individual characteristics as before (year of arrival and year of birth fixed effects, a second-order polynomial of years in Germany, education), state and year fixed effects, state-specific linear time trends and ten region of origin fixed effects. Standard errors in brackets are clustered by age x arrival year. Statistical significance: *** p<0.01, ** p<0.05, * p<0.1.
Source: Microcensus (2005-2010).

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# Bibliography


Abramitzky, R., Boustan L.P. and K. Eriksson (2012), "Europe's tired, poor, huddled masses: Self-selection and economic outcomes in the age of mass migration," *American Economic Review*, 102: 1832-56.

Adda, J., Dustmann C. and J.-S. Görlach (2015), "The Dynamics of Return Migration, Human Capital Accumulation, and Wage Assimilation," Mimeo.

Adsera, A. and A. Ferrer (2014), "Immigrants and demography: marriage, divorce, and fertility," in: *Handbook of the Economics of International Migration*, edited by B. Chiswick and P. Miller, North-Holland: Elsevier, Volume 1A, Chapter 7.

Akgüc, M. (2012), "Do Visas Matter? Labor Market Outcomes of Immigrants in France by Visa Classes at Entry," Mimeo.

Alesina, A. F. and P. Giuliano (2010), "The power of the family," *Journal of Economic Growth,* 15: 93-125.

Alesina, A. F. and P. Giuliano (2011), "Family ties and political participation," *Journal of the European Economic Association*, 9: 817-839.

Algan, Y., Bisin, A., Manning A. and T. Verdier (2012), *Cultural Integration of Immigrants in Europe, Studies of Policy Reform.* Oxford: Oxford University Press.

Algan, Y. and P. Cahuc (2010), "Inherited trust and growth," *American Economic Review*, 100: 2060-92.

Algan, Y., Dustmann, C., Glitz A. and A. Manning (2010), "The economic situation of first- and second-generation immigrants in France, Germany, and the UK," *Economic Journal*, 120: 4-30.

Avitabile, C., Clots-Figueras I. and P. Masella (2013), "The effect of birthright citizenship on parental integration outcomes," *Journal of Law and Economics*, 56: 777-810.

Avitabile, C., Clots-Figueras, I. and P. Masella (2014), "Citizenship, fertility and parental investments," *American Economic Journal: Applied Economics*, 6: 35-65.

Aydemir, A. (2011), "Immigrant selection and short-term labor market outcomes by visa category", *Journal of Population Economics*, 24: 451-475.

Basilio, L. and T. Bauer (2010), "Transferability of human capital and immigrant assimilation: An analysis for Germany," *IZA Discussion Paper* No. 4716.

Bauer, T., Dietz, B., Zimmermann, K.F. and E. Zwintz (2005), "German migration: Development, assimilation, and labor market effects," in: *European Migration. What do we know?* edited by K.F. Zimmermann, 197-261. Oxford: Oxford University Press.

Beaman, L.A. (2012), "Social networks and the dynamics of labour market outcomes: Evidence from refugees resettled in the US," *The Review of Economic Studies*, 79: 128-161.

Becker, G. (1960), "An Economic Analysis of Fertility," In: *Demographic and Economic Change in Developed Countries*, NBER conference series 11, Princeton, NJ, 209-231.

Becker, G. (1973), "A theory of marriage: Part I," *Journal of Political Economy*, 81: 813-46.

Becker, G. (1974), "A theory of marriage: Part II," *Journal of Political Economy*, 82: S11-S26.

Becker, G. (1981), *A treatise on the family*, Cambridge, MA: Harvard University Press.

Becker, G., Landes, E.M. and R.T. Michael (1977), "An Economic Analysis of Marital Instability," *Journal of Political Economy*, 85: 1141-87.

Ben-Porath, Y. (1973), "Economic analysis of fertility in Israel: Point and counterpoint," *Journal of Political Economy,* 81: S202-S233.

Bertrand, M., and S. Mullainathan (2004), "Are Emily and Greg More Employable Than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination," *American Economic Review*, 9: 991-1013.

Bertrand M., Luttmer, E.F.P. and S. Mullainathan (2000), "Net- work effects and welfare cultures," *Quarterly Journal of Economics,* 115: 1019-1055.

Bevelander, P. and R. Pendakur (2011), "Citizenship, co-ethnic populations, and employment probabilities of immigrants in Sweden," *Journal of International Migration and Integration*, 13: 203-222.

Bevelander, P. and J. Veenman (2008), "Naturalisation and socioeconomic integration: The case of the Netherlands," in: *The economics of citizenship*, edited by P. Bevelander and D.J. DeVoretz. Malmö: Holmbergs.

Birdsong, D. (2006), "Age and Second Language Acquisition and Processing: A Selective Overview," *Language Learning*, 56: 9–49.

Birkner, E. (2007), "Aussiedler im Mikrozensus: Identifizierungsprobleme und erste Analysen zur Arbeitsmarktintegration," Presentation at the Workshop „Integrationschancen von Stätaussiedlern," March 29-30, Institute for Employment Research (IAB), Nuremburg.

Bisin, A., Patacchini, E., Verdier, T. and Y. Zenou (2008), "Are Muslims immigrants different in terms of cultural integration?" *Journal of the European Economic Association*, 6: 445-456.

Blau, F.D. (1992), "The fertility of immigrant women: Evidence from high-fertility source countries," in: *Immigration and the Work Force: Economic Consequences for the United States and Source Areas*, edited by G.J. Borjas and R.B. Freeman. Chicago, IL: University of Chicago Press.

Blau, F.D., Kahn, L.D. and K.L. Papps (2011), "Gender, source country characteristics, and labor market assimilation among immigrants," *Review of Economics and Statistics*, 93: 43-58.

Bleakley, H. and A. Chin (2004), "Language skills and earnings: Evidence from childhood immigrants," *Review of Economics and Statistics*, 86: 481-96.

Bleakley, H. and A. Chin (2010), "Age at arrival, English proficiency, and social assimilation among US immigrants," *American Economic Journal: Applied Economics*, 2: 165- 192.

Borjas, G. (1985), "Assimilation, changes in cohort quality, and the earnings of immigrants," *Journal of Labor Economics*, 3: 463-89.

Borjas, G. (1995), "Assimilation and changes in cohort quality revisited: what happened to immigration earnings in the 1980s?" *Journal of Labor Economics*, 13: 201-245.

Borjas, G. and L. Hilton (1996), "Immigration and the welfare state: Immigrant participation in means- tested entitlement programs," *Quarterly Journal of Economics*, 111: 575-604.

Borjas, G. (2015), "The slowdown in the economic assimilation of immigrants: Aging and cohort effects revisited again," *Journal of Human Capital, forthcoming.*

Bratsberg, B., Ragan, J.F. and Z.M. Nasir (2002), "The effect of naturalization on wage growth: A panel study of young male immigrants," *Journal of Labor Economics*, 20: 568–97.

Bratsberg, B. and O. Raaum (2011), "The labour market outcomes of naturalised citizens in Norway," in: *Naturalisation: A passport for the better integration of immigrants?* edited by the Organisation for Economic Cooperation and Development (OECD), Paris: OECD.

Browning, M., Chiappori, P., and Y. Weiss (2014), *Economics of the Family.* Cambridge Surveys of Economic Literature. Cambridge University Press.

Brücker, H., Kroh, M., Bartsch, S., Goebel, J., Kühne, S., Liebau, E., Trübswetter, P., Tucci, I. and J. Schupp (2014), "The new IAB-SOEP Migration Sample: an introduction into the methodology and the contents," *SOEP Survey Papers*, No. 216: Series C.

Bundesministerium des Inneren (2008), *Migrationsbericht des Bundesamtes für Migration und Flüchtlinge im Namen der Bundesregierung*, Berlin: Federal Ministry of the Interior.

Bundesamt für Migration und Flüchtlinge (BAMF) (2008), "Die Einbürgerung von Ausländern in Deutschland," Federal Office for Migration and Refugees, Working Paper No. 17.

Bundesamt für Migration und Flüchtlinge (BAMF) (2009), "Schlüsselzahlen Asyl 2008," Nürnberg: Federal Office for Migration and Refugees.

Bundesamt für Migration und Flüchtlinge (BAMF) (2012), "Einbürgerungsverhalten von Ausländerinnen und Ausländern in Deutschland sowie Erkenntnisse zu Optionspflichtigen," Federal Office for Migration and Refugees, Research Paper No. 15.

Bundesamt für Migration und Flüchtlinge (BAMF) (2014), "Schlüsselzahlen Asyl 2014," Nürnberg: Federal Office for Migration and Refugees.

Burdett, K. and M. Coles (1999), "Long-Term Partnership Formation: Marriage and Employment," *Economic Journal*, 109: 307-334.

Bijwaard, G.E. (2010), "Immigrant Migration Dynamics Model for the Netherlands," *Journal of Population Economics,* 23: 1213-1247.

Card, D. (2005), "Is the new immigration really so bad?", *Economic Journal*, 115: 300-323.

Card, D., Dustmann, C. and I. Preston (2012), "Immigration, wages, and compositional amenities," *Journal of the European Economic Association*, 10: 78-119.

Chin, A. and K.E. Cortes (2015), "The Refugee/Asylum Seeker," in: *Handbook on the Economics of International Immigration,* Volume 1A, Chapter 12, edited by Barry Chiswick and Paul Miller, pp 585-658. North Holland: Elsevier.

Chiswick, B.R. (1978), "The effect of Americanization on the earnings of foreign-born men," *Journal of Political Economy*, 86: 897–921.

Chiswick, B.R., (1986), "Is the New Immigration Less Skilled Than the Old?" *Journal of Labor Economics*, 4: 168-92.

Chiswick, B.R. and C. Houseworth (2011), "Ethnic intermarriage among immigrants: human capital and assortative mating," *Review of the Economics of the Household*, 9: 149-180.

Chiswick, B.R. and P.W. Miller (1994), "The Determinants of Post-Immigration Investments in Education," *Economics of Education Review*, 13: 163-177.

Chiswick, B.R. and P.W. Miller (1995), "The endogeneity between language and earnings: International analyses," *Journal of Labor Economics,* 13: 246-88.

Chiswick, B.R. and P.W. Miller (2002), "Immigrant Earnings: Language Skill, linguistic concentration and the business cycle," *Journal of Population Economics*, 15: 31-57.

Chiswick, B.R. and P.W. Miller (2008), "Citizenship in the US: The roles of immigrant characteristics and country of origin," *Research in Labor Economics*, 29: 91-130.

Clark, K. and J. Lindley (2009), "Immigrant assimilation pre and post labour market entry: evidence from the UK Labour Force Survey," *Journal of Population Economics*, 22: 175-198.

Constant, A.F. and D.S. Massey (2002), "Return Migration by German Guestworkers: Neoclassical versus New Economic Theories," *International Migration,* 40: 5-38.

Constant, A.F. and K.F. Zimmermann (2005a), "Immigrant Performance and Selective Immigration Policy: A European Perspective," *National Institute Economic Review*, 194: 94-105.

Constant, A.F. and K.F. Zimmermann (2005b), "Legal Status at Entry, Economic Performance, and Self-employment Proclivity: A Bi-national Study of Immigrants," *IZA Discussion Paper*, No. 1910.

Constant, A.F., Gataullina, L. and K.F. Zimmermann (2009), "Naturalization proclivities, ethnicity and integration," *International Journal of Manpower*, 30: 70-82.

Cortes, K.E. (2004), "Are Refugees Different from Economic Immigrants? Some Empirical Evidence on the Heterogeneity of Immigrant Groups in the United States," *Review of Economics and Statistics*, 86: 465-480.

Damm, A.P. (2009), "Ethnic Enclaves and Immigrant Labor Market Outcomes: Quasi-Experimental Evidence," *Journal of Labor Economics*, 27: 281-314.

D'Amuri, F., Ottaviano, G.I.P. and G. Peri (2010), "The labor market impact of immigration in Western Germany in the 1990s," *European Economic Review,* 54: 550–570.

Department of Homeland Security (2015), "The Refugee Process," (https://www.uscis.gov/humanitarian/refugees-asylum/refugees, 30.11.2015).

DeVoretz, D., Pivnenko, S. and M. Beiser (2004), "The Economic Experiences of Refugees in Canada," *IZA Discussion Paper*, No. 1088.

De Voretz, D. and S. Pivnenko (2006), "The economic causes and consequences of Canadian citizenship," *Journal of Immigration and Integration*, 6: 435-68.

Duleep, H.O. and D. J. Dowhan (2002), "Insights from longitudinal data on the earnings growth of U.S. foreign-born men," *Demography*, 39: 485-506.

Dustmann, C. (1993), "Earnings adjustment of temporary migrants," *Journal of Population Economics*, 6: 153-168.

Dustmann, C. (1994), "Speaking fluency, writing fluency and earnings of migrants," *Journal of Population Economics*, 7: 133-156.

Dustmann, C. (1996), "The social assimilation of immigrants," *Journal of Population Economics*. 9: 37-54.

Dustmann, C. (1999), "Temporary Migration, Human Capital and Language Fluency of Migrants," *Scandinavian Journal of Economics*, 101: 297-314.

Dustmann, C., Frattini, T. and I. Preston (2013), "The Effect of Immigration along the Distribution of Wages," *Review of Economic Studies*, 80: 145–173.

Dustmann, C. and A. Glitz (2011), "Migration and education," in: *Handbook of Economics of Education*, edited by E. Hanushek, North Holland: Elsevier, vol. 4: 327-439.

Dustmann, C., Glitz, A., Schönberg, U. and H. Brücker (2015), "Referral-based Job Search Networks," *Review of Economic Studies*, 83: 1–33.

Dustmann, C. and J.-S. Görlach (2014), "Selective outmigration and the estimation of immigrants' earnings profiles," in: *Handbook on the Economics of International Migration*, Volume 1A, Chapter 10, edited by B. Chiswick and P.W. Miller, North Holland: Elsevier.

Dustmann, C., Machin, S. and U. Schoenberg (2010), "Ethnicity and Educational Achievement in Compulsory Schooling," *Economic Journal*, 120: F272–F297.

Dustmann, C. and I. Preston (2007), Racial and economic factors in attitudes to immigration," *B.E. Journal in Economic Analysis and Policy,* 7, 1: 1935-1682; DOI: 10.2202/1935-1682.1655.

Edin P.-A., Fredriksson, P. and O. Åslund (2003), "Ethnic Enclaves and the Economic Success of Immigrants: Evidence from a Natural Experiment," *The Quarterly Journal of Economics*, 118: 329-357.

Eckstein, Z. and Y. Weiss (2004), "On the Wage Growth of Immigrants: Israel, 1990-2000," *Journal of the European Economic Association*, 2: 665–695.

Fernández, R. (2011), "Does culture matter?" In: *Handbook of Social Economics*, edited by J. Benhabib, M. O. Jackson, and A. Bisin, North- Holland: Elsevier, vol. 1A.

Fernández, R. and A. Fogli (2009), "Culture: An empirical investigation of beliefs, work, and fertility," *American Economic Journal: Macroeconomics*, 1: 146-77.

Fertig, M. and S. Schurer (2007), "Earnings assimilation of immigrants in Germany: The importance of heterogeneity and attrition bias," *DIW Discussion Paper* No. 30.

Fougère, D. and M. Safi (2009), "The effects of naturalization on immigrants' employment probability (France, 1968-1999)," *International Journal of Manpower*, 30: 83-96.

Friedberg, R.M. (2000), "You Can't Take It with You? Immigrant Assimilation and the Portability of Human Capital," *Journal of Labor Economics*, 18: 221-251.

Furtado, D., Marcén, M. and A. Sevilla-Sanz (2011), "Does culture affect divorce decisions? Evidence from European immigrants in the US," *IZA Discussion Paper* No. 5960.

Furtado, D. and S. Trejo (2013), "Interethnic marriages and their economic effects," in: A.F. Constant and K.F. Zimmermann (eds.), *International Handbook on the Economics of Migration*, chapter 15, Cheltenham, UK, and Northampton, USA: Edward Elgar.

Gathmann, C. and N. Keller (2014), "Returns to citizenship? Evidence from Germany's recent Immigration Reforms," *IZA Discussion Paper*, No. 8064.

Giuliano, P. (2007), "Living Arrangements in Western Europe: Does Cultural Origin Matter?" *Journal of the European Economic Association*, 5: 927-52.

Hainmüller, J., Hangartner, D. and G. Pietrantuono (2014), "Naturalization fosters the long-term political integration of immigrants," Working Paper, Stanford University.

Hainmüller, J. and D. J. Hopkins (2014), "Public attitudes toward immigration," *Annual Review of Political Science*, 17: 225-49.

Hanson, G.H. (2009), "The economic consequences of the international migration of labor," *Annual Review of Economics*, 1: 179-207.

Hailbronner, K. and G. Renner (1992), *Staatsangehörigkeitsrecht, Texte*, Munich: C. H. Beck.

Hanson, G.H. (2009), "The economic consequences of the international migration of labor," *Annual Review of Economics*, 1: 179-207.

Hatton, T.J. (2004), "Seeking asylum in Europe," *Economic Policy*, 19: 5-62.

Hatton, T.J. (2009), "The Rise and Fall of Asylum: What Happened and Why?" *The Economic Journal*, 119: 183–213.

Heston, A., Summers, R. and B. Aten (2011), "Penn World Table Version 7.0," Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania.

Hotz, J. V., Klerman, J. A. and R. J. Willis (1997), "The economics of fertility in developed countries," in: *Handbook of Population and Family Economics*, edited by Mark R. Rosenzweig and Oded Stark, North- Holland: Elsevier, pp. 275-348.

Howard, M.M. (2008), "The causes and consequences of Germany's new citizenship law," *German Politics*, 17: 41-62.

Hu, W.-Y. (2000), "Immigrant earnings assimilation: Estimates from longitudinal data," *American Economic Review P&P*, 90: 368-72.

International Labour Organization (ILO) (2003), *Key Indicators of the Labor market*, Geneva: International Labour Office.

Ioannides, Y.M. and L. Datcher Loury (2004), "Job Information Networks, Neighborhood Effects, and Inequality," *Journal of Economic Literature*, 42: 1056-1093.

Jaeger, D.A. (2000), "Local Labor Markets, Admission Categories, and Immigrant Location Choice," Mimeo.

Johnson, J.S. and E.L. Newport (1989), "Critical period effects in second language learning: the influence of maturational state on the acquisition of English as a second language," *Cognitive Psychology*, 21: 60-99.

Kaas, L. and C. Manger (2012), "Ethnic discrimination in Germany's labour market: A field experiment," *German Economic Review*, 13: 1-20.

Kalmijn, M., Loeve, A. and D. Manting (2007), "Income dynamics in couples and the dissolution of marriage and cohabitation," *Demography*, 44: 159-179.

Khan, A.H. (1997), "Post-Migration Investment in Education by Immigrants in the United States," *The Quarterly Review of Economics and Finance*, 37(Special Issue): 285-313.

Klinthäll, M. (2008), "Immigration, Integration and Return Migration: The Swedish Experience," *Population Bulletin of the United Nations.*

Lalonde, R. and R. Topel (1997), "Economic impact of international migration and the economic performance of migrants," in: *Handbook of Population and Family Economics*, vol. 1B, edited by Mark R. Rosenzweig and Oded Stark. Amsterdam: Elsevier Science.

Lam, D. (1988), "Marriage Markets and Assortative Mating with Household Public Goods: Theoretical Results and Empirical Implications," *Journal of Human Resources*, 23: 462–87.

Lee, D. and T. Lemieux (2010), "Regression discontinuity designs in economics," *Journal of Economic Literature*, 48: 281-355.

Licht, G. and V. Steiner (1994), "Assimilation, labour market experience, and earning profiles of temporary and permanent immigrant workers in Germany," *International Review of Applied Economics*, 8: 130-56.

Lubotsky, D. (2007), "Chutes or ladders? A longitudinal analysis of immigrant earnings," *Journal of Political Economy*, 115: 820-67.

Manning, A. and S. Roy (2010), "Culture clash or culture club? National identity in Britain," *Economic Journal*, 120: F72-F100.

Mayda, A.M. (2006), "Who is against immigration? A cross-country investigation of individual attitudes toward immigrants," *Review of Economics and Statistics*, 88: 510-30.

Mayer, J. and R. Riphahn (2000), "Fertility assimilation of immigrants: Evidence from count data models," *Journal of Population Economics*, 13: 241-61.

Mazzolari, F. (2009), "Determinants and effects of naturalization: the role of dual citizenship laws," *Demography*, 46: 169-91.

Meng, X. and R. Gregory (2005), "Intermarriage and the economic assimilation of immigrants," *Journal of Labor Economics*, 23: 135-75.

Mortensen, D.T. (1988), "Matching: Finding a Partner for Life or Otherwise," *American Journal of Sociology*, 94: 215-40.

Newport, E.L. (2002), "Critical Periods in Language Development," in: *Encyclopedia of Cognitive Science*, ed. Lynn Nadel. London: Macmillan Publishers and Nature Publishing Group.

Organisation for Economic Cooperation and Development (2011), *Naturalisation: A passport for the better integration of immigrants?* Paris: OECD.

Organisation for Economic Cooperation and Development (2015), *Is this humanitarian migration crisis different?* OECD Migration Policy Debates, Paris: OECD.

Organisation for Economic Cooperation and Development/European Union (2015), *Indicators of Immigrant Integration 2015: Settling In*, Paris: OECD.

Pischke, J.-S. (1993), "Assimilation and the earnings of guestworkers in Germany," unpublished manuscript, MIT.

Sajons, C. (2015), "Does immigrants' integration behavior change when their children obtain the host-country citizenship?" Mimeo, University of Freiburg.

Scheve, K.F. and M.J. Slaughter (2001), "Labor market competition and individual preferences over immigration policy," *Review of Economics and Statistics*, 83: 133-45.

Schmidt, C.M. (1997), "Immigrant performance in Germany: Labor earnings of ethnic German migrants and foreign guest workers," *Quarterly Review of Economics and Finance*, 37: 379-97.

Scott, K. (2008), "The economics of citizenship: Is there a naturalization effect?" In: *The economics of citizenship*, edited by P. Bevelander and D.J. DeVoretz. Malmö: Holmbergs.

Sniderman, P.M., Hagendoorn, L. and M. Prior (2004), "Predisposing factors and situational triggers: Exclusionary reactions to immigrant minorities," *American Political Science Review*, 98: 35-49.

Socio-Economic Panel (SOEP) (2010), data for years 1984-2009, version 26, doi:10.5684/soep.v26.

Steinhardt, M.F. (2012), "Does citizenship matter? The economic impact of naturalizations in Germany," *Labour Economics*, 19: 813-23.

Stichnoth, H. and M. Yeter (2013), "Cultural influences on the fertility behaviour of first- and second-generation immigrants in Germany," *ZEW Working Paper* 13-023.

Thränhardt, D. (2015), "Die Arbeitsintegration von Flüchtlingen in Deutschland - Humanität, Effektivität, Selbstbestimmung," Gütersloh: Bertelsmann-Stiftung 2015.

United Nations, Department of Economic and Social Affairs (2015). *Trends in International Migrant Stock: The 2015 revision,* (United Nations database, POP/DB/MIG/Stock/Rev.2015).

United Nations High Commissioner For Refugees (UNHCR) (2014), *Asylum Trends, First Half 2015,* Geneva: UNHCR.

Wagner, G., Frick, J. R. and J. Schupp (2007), "The German Socio-Economic Panel Study (SOEP) - Scope, evolution and enhancements," *Schmollers Jahrbuch*, 127: 139-169.

Weiss, Y. and R. J. Willis (1997), "Match Quality, New Information, and Marital Dissolution," *Journal of Labor Economics*, 15: S293-S329.

World Bank (2016), "Fertility rate, total (births per woman)," *World Development Indicators*, (http://data.worldbank.org/indicator/SP.DYN.TFRT.IN, 10.05.2016).

Yang, P.Q. (1994), "Explaining immigrant naturalization," *International Migration Review*, 28: 449-77.