# Returns to Citizenship: Evidence from Germany's Immigration Reform

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**Abstract**

In many European countries, immigrants seem to have lower employment rates, worse education and lower earnings than Natives. We investigate whether better access to citizenship rights improves the labor market outcomes of immigrants. Specifically, we use a reform in Germany's immigration policy. For identification, we exploit discontinuities in the eligibility rules for younger and older immigrants. Between 1990 and 1999, immigrants between 16 and 22 could obtain German citizenship after eight years, while older immigrants needed 15 years of residency in Germany. OLS estimates show a positive correlation between naturalization and labor market performance. Based on the discontinuity in eligibility rules, our reduced-form and IV estimates show robust positive returns. Overall, our results suggest that a more liberal access to citizenship can improve the economic integration of the foreign-born, but is unlikely to fully eliminate the immigrant-Native wage gap.

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# 1 Introduction

Many European countries have accumulated sizeable immigrant populations since World War II. And yet, immigrants in many European countries perform relatively poorly in the labor market compared to Natives. Many observers argue that the lack of integration and assimilation impose serious political and social problems in many countries. An exemplary case for the assimilation and integration problems of immigrants is Germany. More than seven millions foreign-born individuals live in Germany today which make up almost nine percent of its population. Recent evidence however shows that employment rates of immigrants are substantially lower than for Natives and that the employment gap remains large even among second generation immigrants (see Algan et al., 2010 for recent evidence).

Prior to 1990, access to German citizenship was very restrictive as citizenship was closely tied to descent and ethnic origin (*ius sanguinis*). Hence, an immigrant might have been living in Germany for almost 30 years; and yet, both the immigrant and her offspring could not become naturalized. Despite its large immigrant population, politicians and the society at large did not consider Germany as an immigration country. In recent decades, however, there have been important changes in Germany's approach to immigration. In 1990, the government introduced explicit criteria when immigrants would be eligible for naturalization. Today, immigrants can naturalize after eight years of residence in Germany (given they fulfill some additional criteria). And most children born in Germany to foreign parents now receive German citizenship at birth. Hence, Germany has moved from a country with citizenship by descent alone to a country with elements of citizenship by birthplace (*ius soli*).

In this article, we asks whether the recent reforms of citizenship law improve the labor market performance and integration of immigrants in Germany. Economic theory suggests a number of reasons why citizenship affects labor market success. First, a number of public sector often impose certain citizenship requirements. In Germany, for example, employees in the government sector need to be German citizens or a citizen of one of the EU member states. Similar provisions are in place in countries like the United States, Canada or Australia. To

the extent that these jobs offer better pay or working conditions than jobs open to the average immigrant, naturalization would improve labor market performance. A second reason is that naturalized immigrants could face less discrimination than non-naturalized immigrants by employers. Foreign citizenship might signal to potential employers that an individual intents to stay temporarily, which would reduce an employer's incentive to invest and pay for an employee's training. Hence, even in the absence of taste-based discrimination, statistical discrimination could reduce the career options of an immigrant.[1] Access to citizenship might also improve the incentives of immigrants to invest in education and language skills in the host country. Hence, arguments at both the demand and supply side of the labor market suggest that citizenship could substantially improve the labor market performance of immigrants.

Yet, there are also reasons to believe that the perceived benefits of citizenship (and hence its role for the social and economic integration) are overstated. Most importantly, those applying for citizenship might be the immigrants with the highest motivation to integrate and the best prerequisites to perform well in the host country. The available empirical evidence seems to suggest that selection into citizenship is indeed a concern (see, for example, de Voretz and Pivnenko, 2006; Yang, 1994). In addition, employers might discriminate against foreigners on the basis of names or appearance rather than foreign citizenship. Hence, the acquisition of citizenship might not eliminate or even reduce discrimination in the labor market.[2]

To study the consequences of obtaining citizenship, we exploit an institutional pecularity in Germany's reform of citizenship law in 1990. In particular, the new Alien Law imposed age-dependent residency requirements as one condition for naturalization. Specifically, foreigners aged 24 and above faced a fifteen years residency requirement before they could apply for citizenship after 1990. Foreigners between 16 and 23 in contrast, could apply for German

[1] In the private sector, employers might prefer not to hire a foreign citizen for jobs with extensive traveling to foreign countries, for example, because of additional visa costs.

[2] Recent field experiments suggest that there is substantial discrimination against immigrants based on foreign-sounding names or foreign accents which might be independent of the actual citizenship (see Kaas and Manger, 2012 for Germany; Carlsson and Rooth, 2006 for Sweden; Bosch et al., 2011 for Spain). Banerjee at al. (2009) show similar forces for names attached to specific castes in India.

citizenship after only eight years of residence in Germany. This age-dependent residency requirement implies that immigrants under the age of 24 who arrived in Germany in 1982, for example, became eligible for citizenship right in 1990. Immigrants aged 24 or above who came to Germany in the same year had however, to wait until 1997 until they became eligible - seven years after the slightly younger cohort. The example generalizes to other arrival and birth cohorts.

We then compare labor market outcomes of foreigners who arrived in Germany in the same year but at slightly different ages - and become eligible for naturalization in different years.

The discontinuity in the eligiblity criteria allows us to identify the returns to eligibility (intention-to-treat) separately from immigrant assimilation and labor market experience. A large literature shows that the initial Native-immigrant wage gap upon arrival declines with time in the destination country - independent of whether immigrants naturalize or not. With time in the home country, immigrants, so the argument, acquire the necessary language and other skills, knowledge about jobs and access to social networks more generally to improve their position in the labor market compared to Natives (see Borjas, 1985; Card, 2005; Clark and Lindley, 2006; Duleep and Dowhan, 2002; Hu, 2000; Lubotsky, 2007)[3]A number of studies study immigrant assimilation in Germany (Fertig and Schuster, 2007; Licht and Steiner, 1994; Pischke, 1992; Schmidt, 1997). Most studies (Pischke, 1992; Dustmann, 1993; Licht and Steiner, 1994; Schmidt, 1997; Bauer et al., 2005) do not find evidence for assimilation. Gundel and Peters (2007) report some assimilation, while the results in Fertig and Schurer (2007) are mixed.

Furthermore, comparing immigrant performance arriving in the same year controls for other aggregate labor market shocks such as the German unification and the arrival of ethnic Germans and other Eastern Europeans starting in the late 1980s. Controlling for year of

[3]Using historical data from Norwegian migrants to the United States, Abramitzky et al. (2012) however show evidence that declines in the immigrant-Native wage gap in cross-sectional data overstate assimilation effects. They find that migrants from Norway seem to have been negatively selected and experienced little assimilation after their arrival in the US.

arrival is especially important if labor market shocks affect immigrants differently depending on their time in the host country. Finally, we can compare our reduced-form results with OLS estimates of the benefits of actual naturalization which sheds light on the selection into citizenship.

Our results have important policy implications for devising future integration and immigration policies. If the benefits of citizenship are indeed large, policies that facilitate the access to citizenship might be an important step to improve the economic integration of immigrants in countries Continental Europe. Hence, this article contributes to a heated political and public debate about the benefits and costs of immigrants in Germany and elsewhere.

This article contributes to two strands of the literature. Several studies analyzed the relationship between 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, for the Netherlands; Bevelander and Pendakur, 2009 and Scott, 2008 for Sweden; and Fougère, 2009 for France; Steinhardt, 2008 for Germany). Most studies rely on cross-sectional data comparing naturalized citizens with other immigrants (that are not yet eligible for naturalization). Recently, a few recent studies employ panel data to estimate whether changes in citizenship status improves labor market performance (e.g. Bratsberg et al., 2002; Fougère, 2009; Steinhardt, 2008). We contribute to this literature in three ways: first, we exploit changes in legal access to citizenship rather than the individual decision to naturalize to investigate the benefits of citizenship. Furthermore, we rely on quasi-experimental evidence that uses arguably exogenous variation in eligibility rules to identify the intention-to-treat effect of citizenship eligibility. Our study therefore does not face the kind of selection problems that plague earlier, especially cross-sectional studies. Finally, we provide evidence on the benefits of citizenship in a country where naturalization is rather the exception than the norm. We also contribute to the literature on what determines naturalization decisions. Most evidence seems to suggest that there is positive selection into obtaining citizenship (Yang (1994) for Canada, Bevelander and Veenman (2008) for the

Netherlands; Steinhardt and Wedemeier (2012) for Switzerland; Mazzolari (2009) for the US; but see Abramitzky et al., 2012 for a more skeptical view).

This article proceeds as follows. The next section discusses the institutional background in Germany and the recent immigration reforms. Section 3 introduces the main data and explains our empirical strategy to identify the effects of citizenship on labor market outcomes. Section 4 present the results for immigrant men and women in Germany. Section 5 discusses corroborating evidence from the German Socio-Economic Panel. Section 6 discusses the policy implications of our findings and concludes.

# 2 Institutional Background

## 2.1 A Reluctant Destination Country

More than seven million people - or about 9% of Germany's population - are foreign-born. Early waves of immigrants came to Germany from Southern Europe, especially Italy and Turkey, as guest workers. From the late 1950s until the guest worker program (*Gastarbeiterprogramm*) was abolished in 1973, there was an active recruitment of foreign and mostly low-skilled labor in order to feed the labor demand of Germany's booming manufacturing sector. Originally, the guest worker program was intended as a temporary permit to work in Germany. In practice, however, the temporary migrants often remained and settled 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, over one million foreigners came to Germany per year, equivalent to an inflow rate of over one percent of its population. As such, the migration inflow into Germany is comparable to migration inflows in the United States. [4] Despite these large inflows of migrants,

[4]Many of these were ethnic Germans (*Aussiedler*) from Eastern Europe and the former Soviet Union that could obtain German citizenship immediately because their German ancestry. Since 1992, the maximum number of ethnic Germans which are permitted to come to Germany is restricted to 220,000 per year.

Germany, prior to 1990, had no immigration or naturalization policy. The official doctrine was at the time that foreigners were only temporary resdients - though many foreigners had lived in Germany for twenty years and longer. Explicit criteria when an immigrant would qualify for naturalization other than through German ancestry did not exist.

The Federal Naturalization Guidelines of 1977 summarize the official view on naturalization prior to 1990 drastically: "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 1998, pp. 865-6).

## 2.2 A New Approach to Immigration

The passage of the Alien Act (*Ausländergesetz*) by the federal parliament on July 9, 1990 marked a turning point in Germany's approach to immigration. For the first time, the new law, which came into effect on January 1, 1991, laid down explicit rules and criteria for obtaining German citizenship.[5] Most importantly, the new law established that foreign citizens could naturalize if they have resided legally in Germany for 15 or more years. However, there was a reduced residency requirement for young immigrants: those between the age of 16 and 22 (in German: "vor Vollendung des 23. Lebensjahres") could obtain citizenship if they have resided legally in Germany for at least eight years. Individuals which were 23 years or older when the law came into effect became eligible only after fifteen years of residence in Germany.[6] The applicants had to fulfill several additional criteria: first, they had

Stricter application requirements, in particular language requirements and a reduction in financial assistance upon arrival in Germany further reduced the number of applicants in the late 1990s. While the number of admitted ethnic Germans was 397,000 in 1990, the numbers dropped to 222,000 in 1994 and to 105,000 in 1999.

[5]The text of the law (in German) can be found at http://www.aufenthaltstitel.de/auslg.html#85

[6]If the applicant stayed abroad for a period not exceeding six months, the six months counted toward the residency requirement. Stays of transitory nature exceeding six months up to one year abroad may still count for the residency requirement. For stays of permanent nature abroad exceeding six months, the applicant could count up to five years of residency in Germany toward the residency requirement.

to renounce their previous citizenship upon naturalization. Hence, the new law did explicitly not allow for dual citizenship. Few exemptions to this rule existed at the time. The most important exception covered citizens of the European Union member states; they could keep their citizenship if their country of origin also allowed dual citizenship.[7] Second, the applicant had to have a clean criminal record. This rule excluded anyone with a conviction for a criminal defense.[8] Adult immigrants (defined as those 23 years or older) were also required to demonstrate economic self-sufficiency, i.e. they should be able to support themselves and their dependants without welfare benefits or unemployment assistance. Applicants between age 16 and 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. Finally, an applicant needed to declare her loyalty to the democratic principles of the German constitution. One advantage of the new law was that spouses and minor children of the applicant could be included in the application for citizenship even if they individually did not fulfill the criteria. We return to this issue in the robustness section below.

A second important reform came into effect on January 1, 2000. The Citizenship Act (*Staatsbürgergesetz*) reduced the residency requirement for all immigrants to eight years irrespective of the immigrant's age. The other requirements laid down in the 1990 reform remained in place: immigrants needed to have a clean criminal record, had to demonstrate loyalty to democratic principles and 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 citizenships in general. However, the exemptions to the required renunciation of foreign citizenship became more generous in prac-

[7]Children of binational marriages did not have to give up their dual citizenship until they turned adults. Other exceptions were: the country of current citizenship does not allow the renunciation of citizenship or delayed the renunciation for reasons outside the power of the applicant; if the applicant is an acknowledged refugee or if the renunciation would impose special hardships on older applicants. In practice, few exceptions to the rule were granted at the time.

[8]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 rate (calculated according to the net personal income of the individual), or corrective methods imposed by juvenile courts, would still be eligible. Convictions exceeding these limits would be considered on a case-by-case basis by the authorities.

tice.[9] The 2000 reform also introduced for the first time elements of citizenship by birthplace (*jus soli*) into German law. Specifically, a child born to foreign parents on January 1, 2000 or thereafter was eligible for citizenship if at least one parent had been a legal resident in Germany for eight years and had a permanent residence permit for at least three years. As our analysis focuses on first-generation immigrants, and we further restrict our sample to immigrants arriving in Germany prior to 1992, our sample is not directly affected by the citizenship by birth provisions of the 2000 reform. [10]

Figure 1 provides an overview of the immigration reforms in Germany. After 1990, naturalization became for the first time accessible for immigrants without German ancestry. As Figure 2 shows, only about 42,000 persons became naturalized on average each year before 1990. After the first immigration reform in 1990, naturalizations jumped to 230,000 naturalizations each year between 1990 and 1999. The reform in 2000, in turn, established uniform naturalization criteria for first-generation immigrants (including language requirements). After the second reform in 2000, in contrast, the number of naturalizations was with 137,000 per year actually lower than in the 1990s though higher than under the restrictive policy before 1990. We next discuss our empirical strategy to identify the effects of citizenship on labor market outcomes.

### 2.3 Using the Discontinuity in Eligiblity of the 1990 Reform

Our goal is to estimate the effect of citizenship in a country that has traditionally been very reluctant to grant citizenship rights to foreigners. The key empirical challenge is that the decision to naturalize is not exogenous. Previous studies from traditional immigration

[9] In addition to citizens of the EU member states, it became easier for older applicants and refugees to keep their previous citizenship. Applicants may also keep their nationality if it is legally impossible for them to renounce it or if it imposes a special hardship, e.g. because of excessive costs or degrading procedures. The same is true if renouncing the foreign nationality would bring serious disadvantages, especially economic disadvantages or problems with property and assets.

[10] However, there might be an indirect effect. Before the 2000 reform, second-generation immigrants could only become naturalized as children if their parents applied for citizenship. After 2000 reform however, young children had access to German citizenship independent of their parents' citizenship (subject to the residency requirements outlined above). Hence, the reform of 2000 might have actually decreased the intergenerational benefits of citizenship for foreign parents with young children. We will return to this issue below.

countries suggest that the selection of immigrants applying for naturalization is positive (see Yang, 1994; and DeVoratz and Pivnenko, 2006 for evidence from Canada; Chiswick and Miller, 2008; and Mazzolari, 2009 for the United States). A simple regression of labor market outcomes on an indicator whether a person has naturalized or not might therefore overstate the true benefits of citizenship. In the European context, there might be an additional force at play: immigrants from other EU member states have the same access to jobs than German Natives. Their economic incentives to naturalize might therefore be much lower for this group than for immigrants from developed or developing countries outside the European Union. Since migrants from other EU member states are on average more skilled (in terms of education) than other immigrants to Germany, the takeup of citizenship and selection into naturalization is likely very different. Therefore, OLS estimates might actually understate the true gains of citizenship for a random sample of immigrants.

To identify the benefits of citizenship, we exploit discontinuities in the eligibility rules of the 1990 immigration reform in Germany. Our approach relies on the intention to treat (eligibility for naturalization) to identify the benefits of citizenship in Germany. We start with a simple example. Consider a cohort of foreigners born in 1968 and a cohort of foreigners born in 1969. Both cohorts arrive as immigrants in Germany in 1983. At arrival, the older group is age 15, whereas the younger group is 14 years-old. When the reform comes into effect in 1991, members of both groups have resided in Germany for eight years. However, the immigrants born in 1969 are 22 years of age and can therefore apply for citizenship in 1991 (after eight years of residence). In contrast, the group born in 1968 is 23 years-old and can only apply for citizenship in 1997 (after fifteen years of residence in Germany). Thus, the younger cohort obtains eligibility seven years prior to the older cohort - though members have similar ages and have spent the same numbers of years in Germany.

Figure 3 shows the discontinuity in eligibility for citizenship after the reform for all years of arrival and different birth cohorts. All birth cohorts born after 1968 face the reduced residency requirement of eight years. In contrast, all birth cohorts born 1967 or earlier

face the standard fifteen years residency requirement for obtaining citizenship. The figure demonstrates that for all immigrants arriving between 1982 and 1985, the younger birth cohorts (born after 1968) gets eligible full seven years before the older birth cohorts (born 1967 or earlier), just as in our introductory example. For years of arrival from 1976 to 1981, the treatment cohorts become eligible with the reform in 1990 whereas the control cohorts, because of the longer residency requirement, become eligible between 1991 and 1996 – i.e. one to six years later. The same logic holds for immigrants arriving in Germany between 1986 and 1991.

In contrast, all immigrants arriving in Germany before 1976 become eligible with the reform of 1990 as they all fulfill the fifteen years residency requirement in 1990. And all immigrants arriving in Germany in 1992 or later become eligible after eight years of residency following the 2000 reform. We will therefore focus in our analysis on immigrants arriving in Germany between 1976 and 1991. We next discuss the data and how we estimate the effect of naturalization on labor market outcomes.

# 3 Data Sources

## 3.1 Microcensus

To study naturalization and its consequences in the labor market, we employ the large samples of the German microcensus. The microcensus is a repeated cross-sectional survey of a one percent random sample of the German population and interviews about about 800,000 households every year. It covers detailed question about employment, personal and household income, the household structure and educational background of each person.[11]

Each year, there are more than 50,000 individuals with foreign citizenship in the data. For each foreigner, we know whether he or she was born in or outside of Germany. For

[11] We use for our analysis the scientific-use file which is a 70% random subsample of the original Microcensus data. Further details on the construction of the sample and the variables used in the empirical analysis are contained in the data appendix.

the subsample of people born outside of Germany, we know the year the person arrived in Germany. Since 2005 and especially since 2007, the questionnaire also elicits more detailed information about the acquisition of German citizenship. In particular, the survey asks about whether and how an immigrant has obtained German citizenship (through birth, ancestry or naturalization) and the year in which naturalization took place.

As the 1990 reform applied to first-generation immigrants only, we restrict our sample to those born outside of Germany. Since information about the acquisition of citizenship is crucial to identify the sample of immigrants actually affected by the reform, the main empirical analysis focuses on the survey years 2007 to 2009. [12]We further restrict the sample to first-generation immigrants arriving in Germany between 1976 and 1991 which allows us to exploit the discontinuity in eligibility rules introduced by the 1990 reform. Finally, we want to compare the long-run performance of immigrants under 23 to those above 23. In order to increase the homogeneity in our sample further, we also restrict our main analysis to immigrants who are between the ages of 16 to 35 in the period from 1991 to 1999. After imposing these sample restrictions, we have about 168,000 first-generation immigrants who are not ethnic Germans in our data.

Our main outcome of interest are log personal income and employment. Personal income includes labor income, rental and capital income and public and private transfers. The variable is measured as net personal income per month. The main control variables are the number of years in Germany, age, gender and education. In other specifications, we also control for the sector and broad occupations of the current job. Note that we observe our labor market outcomes in the year 2007 to 2009 while the 1990 reform affected eligibility for naturalization between 1990 and 1999. We will therefore measure the persistent effect of naturalization on income and labor force attachment.

One advantage of the Microcensus is its large sample size which allows to analyze the

[12]In particular, we want to distinguish immigrants who become eligible for German citizenship after the 1990 reform from Native Germans who lived abroad for more than six months and even more importantly ethnic Germans (i.e. immigrants from Central and Eastern Europe) who could naturlize within a couple of years because of German ancestry.

heteorgeneity of returns to citizenship by region of origin. We distinguish between immigrants from EU countries (such as Italy or Portugal), to those from non-EU countries (such as Turkey or Northern Africa) and immigrants from countries that recently joined the European Union (such as Poland or the Czech Republic). In addition, we analyze whether the returns to citizenship are higher for immigrants from low-income countries as they might face the largest restrictions on the labor market and the highest degree on uncertainty regarding their level and qualitiy of human capital. Table A1 present summary statistics of our sample of first generation immigrants in the Microcensus.

### 3.2 Empirical Strategy

To define eligibility for citizenship after the 1990 reform, we use information on the immigrant's year of arrival in Germany and year of birth. We first define the year in which an individual becomes eligible for German citizenship between 1991 and 1999 based on the residence requirement.[13] Consider a migrant who arrived in 1976; she becomes eligible for citizenship in 1990 independent of her age. Consider migrants arriving in Germany in 1985 or later. If the migrant was under 23 in 1993, she becomes eligible in 1993. If she was 24 or older in 1993, she would become eligible only in 2000. We code the year of eligibility in a similar way for all cohorts born between 1968 and 1988 (who are 16 to 35 in the 1991-1999 period) arriving in Germany between 1976 and 1991.

Since we only observe labor market outcomes almost two decades after the reform, we define our main treatment variable the number of years since an immigrant becomes eligible for naturalization in the 1991-1999 period. The variable is zero in the year an immigrant

[13]We abstract from other eligibility criteria either because we have no information on them (e.g. about the criminal record) or because it is unclear how the criteria is evaluated (e.g. demonstrating economic self-sufficiency). As a consequence of focusing on the residence requirement, we likely misclassify a few immigrants who satisfy the residency requirements but are not eligible because of one of the other criteria. This misclassification will result in a downward bias of eligibility on naturalization propensities (since some individuals which we classify as eligible, but are not, will not naturalize). If immigrants with a criminal record and economic dependence have worse labor market outcomes than eligible immigrants, we would also understate the benefits from obtaining German citizenship. In both cases, misclassification yields conservative estimates.

becomes first eligible for German citizenship (8 years of residency in Germany if the individual is under age 23 in the year of eligibility; or, after 15 years if residency if the immigrant was age 24 and above in the year of eligiblity). Positive values indicate the number of years since the immigrant could have naturalized. Our main treatment variable therefore varies by year of birth and year of arrival. We then estimate variants of the following model:

$$Y_{it} = \alpha + \beta Treatment_{arr,yob} + \gamma_1 YearsinGer_{arr,t} + \gamma_1 YearsinGer^2_{arr,t} + \delta_1 Age_{it} + \delta_2 Age^2_{it} + \lambda' X_{it} + \varepsilon_{it} \quad (1)$$

where $Y_{it}$ are labor market outcomes by immigrant $i$ in *year t*. $Treatment_{arr,yob}$ denotes of our measure of eligiblity or actual naturalization. We also control for labor market assimilation which occurs independently (or in addition) to naturalizatin, general labor market experience as well as other individual characteristics (such as gender), year and state fixed effects. Our parameter of interest is $\beta$, how legal access to citizenship between 1991 to 1999 affects labor market outcomes between 2007 and 2009.

Note that we observe labor market outcomes only several years later when the control group has likely qualified for citizenship as well. Therefore, equation (1) will only identify persistent labor market effects. For example, if naturalization only shifts up the level of wages at the same of naturalization, we will not pick up this effect in our data (because the control group qualifies say in 2003 for citizenship and hence, experienced the same upward shift in wages as the treatment group).

# 4 Empirical Results

## 4.1 Propensity to Naturalize after 1990 Reform

One would expect the incentives of obtaining German citizenship to vary systematically for immigrants from EU and non-EU countries. In particular, immigrants from EU countries enjoy full mobility of labor already even without obtaining German citizenship. Hence, their

benefits of citizenship might be lower than immigrants from non-EU countries. However, there might still be benefits of obtaining German citizenship if it improves access to certain jobs and reduces discrimination in the labor market.

Table 1 shows the propensity to naturalize for eligible migrants compared to their non-eligible peer group. We use a linear probability model where the dependent variable is an indicator equal to one if an individual who arrived in Germany between 1976 and 1991 naturalized in a year. The results indicate a significant effect of eligibility rules on actual naturalization behavior. The probability of naturalization increases by 7 or 8 percent, is statistically highly significant and independent of gender. The rise in propensity seems relatively weak, but we have to keep in mind that some migrants might naturalize based on other regulations like marrying a German citizen or as a family member of someone who is already eligible and hence do not face the residency requirements.

The interaction effects between eligibility and the country of origin support our hypothesis of heterogeneity between migrants from different regions. Migrants from the Middle East, Africa and Asia seem the most likely to naturalize immediately after becoming eligible. European migrants habe low incentives to naturalize and hence, we observe little effect of eligiblity on naturalization. In sum, we conclude that eligibility rules do have an impact on actual naturalization behavior and can be used to identify the reduced-form effect (intent-to-treat) on labor market outcomes.

## 4.2 Wage and Employment Effects of Citizenship after the 1990 Reform

Faster access to citizenship might potentially influence migrants' labor market performance in two ways. It could increase the number of naturalized migrants in a cohort as naturalization propensities decrease with time in the destination country (Yang, 1994). Second, a naturalized immigrant would earn a higher wage since earlier naturalization means that immigrants work more years as German citizens.

In the first step of our analysis, we want to examine the relationship between actual naturalization and labor market outcomes. Table 2 shows results for wages (left-hand side) and employment (on the right-hand side). The sample is restricted to immigrants between the ages of 16 to 35 who get eligible for citizenship between 1991 and 1999. The main independent variable is the number of years since an immigrant became naturalized. Even 8 to 18 years after the initial eligibility, each additional year as a German citizen raises monthly earnings by about 0.3%. The effect is robust to the inclusion of region of origin dummes and the years in Germany and its squared term. Column (4) shows that this return comes from occupational upgrading or industry changes. The right-hand side suggest that an additional year as a German citizen has a small positive effect on employment.

We next exploit the differential eligibility criteria for young and older immigrants to identify the reduced-form effect of eligiblity on labor market performance. Male immigrants who naturalized between 1991 and 1999 had 0.7-0.9% higher wage growth between 2007 and 2009. At the same time, we see no effect of eligibility on employment.

Table 4 then reports instrumental variable estimates where the eligibility rules of the 1990 reform are used as an instrument for actual naturalization. The hypothesis is that earlier eligibility also increases the likelihood that an immigrant actually obtains German citizenship. Most interestingly, the effect of eligibility becomes even slightly larger suggesting that selection into actual naturalization is negative. Once we control for years in Germany (using a linear and squared term) however, wage effects are no longer statistically significant.

## 4.3 Occupational Choices and Citizenship

Theory of naturalization suggests that the German citizenship opens up additional job opportunities (public sector, etc.) on the one hand and better chances of employment and promotion on the other hand. Thus, we expect naturalization to have an impact on the occupational distribution of the forein-born. Table 5 reports OLS and reduced-form estimates whether citizenship affects the type of job held by male immigrants. OLS estimates suggest

that male immigrants are more likely to work in the public sector or in a white collar job. The reduced-form effects in contrast, suggest that there is no effect on white collar employment once we control for selection into naturalization. Yet, there still remains a higher propensity to work in the public sector which is likely explained that some public sector jobs are only available to Natives.

### 4.4 Labor Market Performance for Female Immigrants

Do we see similar results for female immigrants? Table 6 and 7 report the OLS and reduced-form estimates for female immigrants. Both employment and wages rise after naturalization and the effects are even somewhat larger than for male immigrants. Based on the discontinuity in eligibility criteria after 1990, the positive effects on both employment and wages become even larger. This result suggests that female immigrants who actually naturalize have lower benefits to naturalization than the average female immigrant who becomes eligible after the 1990 reform. Table 9 show that both public sector and white collar employment increase after naturalization or eligibility.

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# A German Microcensus (2007-2009)

*Definition of sample*: The Microcensus interviews about 800,000 persons each year. The scientific use file we use is a 70 percent subsample of the official dataset. Our analysis focuses on the sample of foreigners in Germany. For each foreigner, we know whether he or she was born in or outside of Germany. For the subsample of people born outside of Germany, we know the year the person arrived in Germany and the country of origin. Note that individuals born abroad to German parents are also contained in the sample of the foreign-born, but can be identified because their country of origin is missing. As the 1990 reform applied to first-generation immigrants only, we restrict our sample to those born outside of Germany. Since 2005, the questionnaire elicits more detailed information about the acquisition of German citizenship. In particular, the survey asks about whether and how an immigrant has obtained German citizenship and the year in which naturalization took place. We further need to distinguish immigrants potentially eligible after the 1990 reform from other immigrants not affected by the reform.

Most importantly, many immigrants arriving in Germany shortly before and after the fall of the Berlin wall were ethnic Germans. Aggregate statistics suggest that migration flows of ethnic Germans started in 1985 with less than 50,000 per year, peaked between 1988 and 1991 at around 300,000 per year, remained at about 200,000 per year between 1992 and 1996 and then subsided to 100,000 and below after 1998 (Migrationsbericht, 2009). As the name suggests, they were regarded as having German ancestry (though the ancestry might go back many generations). As a consequence, ethnic Germans could acquire citizenship within a few years of arrival without any further requirements. Since the eligibility criteria we use and hence, our identification strategy does not apply to ethnic Germans, we need to exclude them from our sample. Our first strategy defines ethnic Germans in the data 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 (Birkner, 2007; Algan et al., 2010 use the same approach). Based on this definition, we identify and exclude 58,143 ethnic Germans in our data over the period from 2005 to 2009. Yet, we still see in our data immigrants from Eastern European countries or the Former Soviet Union who naturalize much earlier than the required eight or fifteen years. We therefore restrict our main analysis to the period from 2007 to 2009 when we have precise information wether an immigrant naturalized as an ethnic German ("Aussiedler").

To define our sample of interest, we first calculate the number of years an immigrant has lived in Germany as the difference between each post-reform year (any year between 1991 and 1999) and the year of arrival in Germany. Together with the age of an individual in the post-reform period (1991-1999), we can then define the first year when an immigrant first becomes eligible for citizenship based on the residency requirement. Based on this information, we then calculate the number of years an immigrant we observe between 2007 and 2009 has been eligible for German citizenship.

*Dependent variables*: Our primary outcome variable is the log of monthly net personal income. The variable 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. As a robustness check, we further restrict the sample to those reporting labor earnings as their main source of income. To deflate income to constant Euros, we use the consumer price index from the Federal Statistical Office (the base year is 2005). The income variable is only recorded as a categorical variable with 24 categories. We use the midpoint of each category to convert personal income into a quasi-continuous variable.

Our second outcome variable is employment. The question about employment asks whether an individual has been working for pay or has been engaged in an income generating activity in the previous week ("Haben Sie in der vergangenen Woche eine bezahlte bzw. eine mit einem Einkommen verbundene Tätigkeit ausgeübt? Dabei ist es egal, welchen zeitlichen Umfang diese hatte."). We define a person as employed if she works fulltime or part-time, works for less than 400 Euros per month, works in a family business or works in a job temporarily. A person is not employed in the current year if she is either unemployed, on long-term parental leave (longer than three months) or out of the labor force. As a robustness check, we also define individuals as employed if they are unemployed but available for work.

We also analyze whether naturalized immigrants are more likely to work in the public sector or in a white-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. We exclude trainees ("Auszubildende") and family workers.

*Control variables*: Educational attainment is defined as low-skilled if the individual has no vocational degree and at most a lower secondary school degree. A migrant is medium-skilled if she has a vocational degree or high school degree (*Abitur*); and she is high-skilled if she has a university or college degree.

To explore the heterogeneity of naturalization effects, we study immigrants from different countries of origin. In particular, we define ten categories of countries of origin. The first group (EU15: Austria, Belgium, Denmark, Finland, France, Greece, Ireland, Italy, Luxem-

bourg, Netherlands, Portugal, Spain, Sweden and United Kingdom) includes all countries from the European Union before the enlargement of 2004 as well as Switzerland and Norway. This group had already free access to the German labor market during the 1990s. The second group consists of immigrants from Eastern European countries which joined the EU in 2004 but did not have full access to the labor market prior to 2011 (EU12: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia as well as Malta and Cyprus). The other origin groups are immigrants from former Yugoslavia other than Slovenia (Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia), from Turkey, the Middle East (for example, Afghanistan, Iran and Iraq), Africa (for example, Morocco), Asia (for example, China and Vietnam), North and South America as well as Russia and other former Soviet republics which are not member of the European Union. The last category contains immigrants who either have no exact region of origin (“"other European country” or “rest of the world”) or do not report having any citizenship at all.

Since we might expect that immigrants from lower-income countries benefit more from naturalization, we also use the GDP per capita in the country of origin (divided by 1,000) in 2005 from the Penn World Tables (Heston, Summers and Aten, 2011). Note that we could only match immigrants where we know the exact country of origin (and not only the overall region of origin such as Asia or North Africa. Therefore, the analysis using the GDP in the country of origin can only be performed with countries that send large numbers of immigrants to Germany (such as Turkey, Italy or Poland).

To control for state-specic labor market shocks, we use the state unemployment rate defined as percentage of registered unemployed people to the total number of employed persons. To control for the broader economic situation in each state, we also include in some specifications the GDP growth rate from the national accounts data.

**Table 1: The Propensity to Naturalize (First Stage)**

| **Natualized between 1991 and 1999** | Men and Women | | | Men only | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Eligible after 1990 Reform | 0.005 | 0.015** | -0.143*** | 0.005 | 0.021** | -0.154*** |
| | [0.008] | [0.008] | [0.020] | [0.010] | [0.010] | [0.030] |
| Eligible*new EU12 | | | 0.072 | | | 0.031 |
| | | | [0.052] | | | [0.060] |
| Eligible*Ex-Yugoslavia | | | 0.100*** | | | 0.102*** |
| | | | [0.021] | | | [0.033] |
| Eligible*Turkey | | | 0.149*** | | | 0.161*** |
| | | | [0.021] | | | [0.031] |
| Eligible*Middle East | | | 0.200*** | | | 0.198*** |
| | | | [0.054] | | | [0.075] |
| Eligible*Africa | | | 0.109*** | | | 0.120*** |
| | | | [0.020] | | | [0.031] |
| Eligible*Asia | | | 0.242*** | | | 0.264*** |
| | | | [0.043] | | | [0.060] |
| Eligible*(North and South America) | | | 0.032 | | | 0.057 |
| | | | [0.025] | | | [0.040] |
| Eligible*(Russia and Former SU) | | | 0.363 | | | 0.380 |
| | | | [0.244] | | | [0.309] |
| Eligible*(Other or No Passport) | | | 0.273** | | | 0.286* |
| | | | [0.119] | | | [0.153] |
| Years in Germany | -0.017*** | | -0.017*** | | | -0.018*** |
| | [0.002] | | [0.002] | | | [0.002] |
| Years in Germany Squared | 0.001*** | -0.002*** | 0.001*** | | | 0.001*** |
| | [0.000] | [0.000] | [0.000] | | | [0.000] |
| Age | -0.003*** | 0.038* | -0.003*** | -0.003*** | | -0.003*** |
| | [0.001] | [0.022] | [0.001] | [0.001] | | [0.001] |
| Age Squared | 0.000*** | 0.001*** | 0.000*** | 0.000*** | 0.001*** | 0.000*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Vocational Degree | -0.001 | | -0.001 | 0.009* | | 0.009 |
| | [0.004] | | [0.004] | [0.006] | | [0.006] |
| College or Similar Degree | -0.026*** | | -0.026*** | -0.019** | | -0.020** |
| | [0.006] | | [0.006] | [0.008] | | [0.008] |
| Male | 0.003 | | 0.003 | | | |
| | [0.003] | | [0.003] | | | |
| Region of Origin Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Fixed Effects | 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 |
| Observations | 20,324 | 20,324 | 20,324 | 10,500 | 10,500 | 10,500 |
| R Squared | 0.13 | 0.07 | 0.13 | 0.14 | 0.08 | 0.14 |
| Share Naturalized 1991-1999 | 17.5% | 17.5% | 17.5% | 17% | 17% | 17% |

*Notes* : The dependent variable is a binary indicator equal to one if a first-generation migrant has been naturalized between 1991 and 1999. The sample includes all migrants who are not ethnic Germans, arrived in Germany between 1976 to 1991 and report valid information on income, naturalization and years lived in Germany. The eligibility indicator is equal to one if an individual is either: a) aged 16-23 and has lived in Germany for at least 8 years; or b) is aged 24 or above and has lived in Germany for at least 15 years. The left-hand side reports regression results from a linear probability model; the right-hand side marginal effects from a logit model. Columns (1)-(2) and (5)-(6) show results for the pooled sample (men and women), while columns (3)-(4) and (7)-(8) for men only. The omitted region of origin are the EU-15 countries; the omitted education category is no vocational degree. Standard errors in brackets are clustered at the birth cohort-year of arrival cohort level. *** p<0.01, ** p<0.05, * p<0.1.

**Table 2: OLS Estimates of Naturalization and Wage Growth/Employment (Men)**

| | Personal Income | | | | Employment | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Years since Naturalized | 0.001 | 0.003*** | 0.003** | 0.001 | 0.002*** | 0.002** | 0.002** |
| | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] |
| Years in Germany | | | 0.024 | 0.029 | | | -0.006 |
| | | | [0.022] | [0.018] | | | [0.012] |
| Years in Germany Squared | | | -0.000 | -0.000 | | | 0.000 |
| | | | [0.000] | [0.000] | | | [0.000] |
| Age | 0.190*** | 0.187*** | 0.188*** | 0.131*** | 0.062*** | 0.064*** | 0.064*** |
| | [0.010] | [0.011] | [0.011] | [0.010] | [0.005] | [0.005] | [0.006] |
| Age Squared | -0.002*** | -0.002*** | -0.002*** | -0.002*** | -0.001*** | -0.001*** | -0.001*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Vocational Degree | 0.206*** | 0.219*** | 0.216*** | 0.117*** | 0.099*** | 0.093*** | 0.093*** |
| | [0.016] | [0.016] | [0.016] | [0.014] | [0.010] | [0.011] | [0.011] |
| College or Similar Degree | 0.561*** | 0.598*** | 0.595*** | 0.445*** | 0.144*** | 0.145*** | 0.145*** |
| | [0.031] | [0.032] | [0.032] | [0.031] | [0.015] | [0.015] | [0.015] |
| Year 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 |
| Region of Origin Dummies | No | Yes | Yes | Yes | No | Yes | Yes |
| Occupation & Sector Fixed Effects | No | No | No | Yes | | | |
| Observations | 6,624 | 6,624 | 6,624 | 6,624 | 7,331 | 7,331 | 7,331 |
| R Squared | 0.228 | 0.236 | 0.237 | 0.461 | 0.081 | 0.090 | 0.090 |

*Notes* : Clustered standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1. The sample includes all migrants who arrived in Germany between 1976 to 1991 aged 16 to 35 (without ethnic Germans).

**Table 3: Eligibility for Citizenship and Wage Growth/Employment (Men)**

| | Personal Income | | | | Employment | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Years since Eligible | 0.009*** | 0.007*** | 0.003 | 0.003 | -0.001 | -0.000 | -0.002 |
| | [0.002] | [0.002] | [0.004] | [0.003] | [0.001] | [0.001] | [0.002] |
| Years in Germany | | | 0.024 | 0.028 | | | -0.004 |
| | | | [0.021] | [0.018] | | | [0.012] |
| Years in Germany Squared | | | -0.000 | -0.001 | | | 0.000 |
| | | | [0.000] | [0.000] | | | [0.000] |
| Age | 0.178*** | 0.179*** | 0.183*** | 0.127*** | 0.061*** | 0.064*** | 0.066*** |
| | [0.010] | [0.010] | [0.012] | [0.010] | [0.006] | [0.006] | [0.006] |
| Age Squared | -0.002*** | -0.002*** | -0.002*** | -0.002*** | -0.001*** | -0.001*** | -0.001*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Vocational Degree | 0.206*** | 0.219*** | 0.218*** | 0.118*** | 0.104*** | 0.095*** | 0.095*** |
| | [0.015] | [0.016] | [0.016] | [0.014] | [0.010] | [0.011] | [0.011] |
| College or Similar Degree | 0.567*** | 0.600*** | 0.599*** | 0.446*** | 0.151*** | 0.148*** | 0.148*** |
| | [0.031] | [0.032] | [0.032] | [0.031] | [0.015] | [0.015] | [0.015] |
| Year 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 |
| Region of Origin Dummies | No | Yes | No | No | No | Yes | Yes |
| Occupation & Sector Fixed Effects | No | No | No | Yes | | | |
| Observations | 6,624 | 6,624 | 6,624 | 6,624 | 7,331 | 7,331 | 7,331 |
| R Squared | 0.230 | 0.236 | 0.236 | 0.463 | 0.080 | 0.089 | 0.089 |

*Notes* : Clustered standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1. The sample includes all migrants who arrived in Germany between 1976 to 1991 aged 16 to 35 (without ethnic Germans).

**Table 4: Instrumental Variable Estimates of the Effect of Naturalization on Wage Growth (Men)**

| | Personal Income | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | First stage | | | | Second stage | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Years Eligible after 1990 Reform | 0.123*** | 0.294*** | 0.015 | 0.018 | | | | |
| | [0.029] | [0.030] | [0.042] | [0.041] | | | | |
| Years since Naturalized | | | | | 0.067*** | 0.023*** | 0.573 | 1.152 |
| | | | | | [0.025] | [0.008] | [1.614] | [2.637] |
| Years in Germany | | | 0.838*** | 0.812*** | | | -0.459 | -0.918 |
| | | | [0.252] | [0.250] | | | [1.371] | [2.183] |
| Years in Germany Squared | | | -0.011** | -0.011** | | | 0.006 | 0.012 |
| | | | [0.005] | [0.005] | | | [0.018] | [0.028] |
| Age | -0.958*** | -0.789*** | -0.401*** | -0.372*** | 0.243*** | 0.196*** | 0.406 | 0.533 |
| | [0.124] | [0.102] | [0.116] | [0.125] | [0.025] | [0.012] | [0.614] | [0.915] |
| Age Squared | 0.012*** | 0.011*** | 0.005*** | 0.004** | -0.003*** | -0.002*** | -0.005 | -0.006 |
| | [0.002] | [0.001] | [0.002] | [0.002] | [0.000] | [0.000] | [0.007] | [0.011] |
| Vocational Degree | 2.517*** | 1.189*** | 1.132*** | 0.976*** | 0.037 | 0.191*** | -0.431 | -1.009 |
| | [0.193] | [0.169] | [0.165] | [0.169] | [0.066] | [0.020] | [1.835] | [2.603] |
| College or Similar Degree | 3.966*** | 1.765*** | 1.686*** | 0.895*** | 0.300*** | 0.559*** | -0.367 | -0.586 |
| | [0.377] | [0.335] | [0.331] | [0.343] | [0.111] | [0.038] | [2.718] | [2.414] |
| Year Fixed Effects | 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 |
| Region of Origin Dummies | No | Yes | No | Yes | No | Yes | No | Yes |
| Occupation & Sector Fixed Effects | No | No | No | Yes | No | No | No | Yes |
| Observations | 6,624 | 6,624 | 6,624 | 6,624 | 6,624 | 6,624 | 6,624 | 6,624 |
| R Squared | 0.080 | 0.322 | 0.333 | 0.338 | | | | |

*Notes* : Robust standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1. The sample includes all migrants who arrived in Germany between 1976 to 1991 aged 16 to 35 (without ethnic Germans).

**Table 5: Public Sector and White Collar Employment (Men)**

| | Public Sector Employment | | | White Collar Employment | | |
|---|---|---|---|---|---|---|
| | | OLS | | | OLS | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Years since Naturalized | 0.002*** | 0.001*** | 0.001** | 0.005*** | 0.004*** | 0.004*** |
| | [0.000] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] |
| Years in Germany | No | No | Yes | No | No | Yes |
| Region of Origin FE | No | Yes | No | No | Yes | Yes |
| Observations | 5,827 | 5,827 | 5,827 | 4,842 | 4,842 | 4,842 |
| R Squared | 0.022 | 0.028 | 0.029 | 0.196 | 0.232 | 0.232 |
| | | Reduced Form | | | Reduced Form | |
| | (7) | (8) | (9) | (10) | (11) | (12) |
| Years since Eligible | 0.002** | 0.002** | 0.003** | -0.005*** | 0.001 | -0.005* |
| | [0.001] | [0.001] | [0.001] | [0.002] | [0.002] | [0.003] |
| Years in Germany | No | No | Yes | No | No | Yes |
| Region of Origin FE | No | Yes | No | No | Yes | Yes |
| Observations | 5,827 | 5,827 | 5,827 | 4,842 | 4,842 | 4,842 |
| R Squared | 0.020 | 0.028 | 0.028 | 0.192 | 0.228 | 0.230 |

*Notes* : Clustered standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1. The sample includes all migrants who arrived in Germany between 1976 to 1991 aged 16 to 35 (without ethnic Germans). Estimations contain year, state and state specific linear fixed effects

**Table 6: Years Since Naturalization and Wage Growth/Employment (Women)**

| | Personal Income | | | | Employment | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Years since Naturalized | 0.006*** | 0.006*** | 0.004*** | 0.001 | 0.002*** | 0.002** | 0.002** |
| | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] |
| Years in Germany | | | 0.023 | 0.016 | | | -0.006 |
| | | | [0.030] | [0.028] | | | [0.012] |
| Years in Germany Squared | | | -0.000 | -0.000 | | | 0.000 |
| | | | [0.001] | [0.001] | | | [0.000] |
| Age | 0.063*** | 0.074*** | 0.077*** | 0.057*** | 0.062*** | 0.064*** | 0.064*** |
| | [0.011] | [0.011] | [0.011] | [0.011] | [0.005] | [0.005] | [0.006] |
| Age Squared | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Vocational Degree | 0.269*** | 0.228*** | 0.217*** | 0.056** | 0.099*** | 0.093*** | 0.093*** |
| | [0.023] | [0.024] | [0.024] | [0.023] | [0.010] | [0.011] | [0.011] |
| College or Similar Degree | 0.679*** | 0.626*** | 0.615*** | 0.344*** | 0.144*** | 0.145*** | 0.145*** |
| | [0.048] | [0.047] | [0.047] | [0.043] | [0.015] | [0.015] | [0.015] |
| Year 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 |
| Region of Origin FE | No | Yes | Yes | Yes | No | Yes | Yes |
| Occupation and Sector FE | No | No | No | Yes | | | |
| Observations | 5,293 | 5,293 | 5,293 | 5,293 | 7,331 | 7,331 | 7,331 |
| R Squared | 0.105 | 0.114 | 0.118 | 0.243 | 0.081 | 0.090 | 0.090 |

*Notes* : Clustered standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1. The sample includes all migrants who arrived in Germany between 1976 to 1991 aged 16 to 35 (without ethnic Germans).

**Table 7: Years Since Eligible for Citizenship and Wage Growth/Employment (Women)**

| | Personal Income | | | | Employment | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Years since Eligible | 0.014*** | 0.018*** | 0.013*** | 0.009** | -0.001 | -0.000 | -0.002 |
| | [0.003] | [0.003] | [0.005] | [0.004] | [0.001] | [0.001] | [0.002] |
| Years in Germany | | | 0.025 | 0.014 | | | -0.004 |
| | | | [0.030] | [0.027] | | | [0.012] |
| Years in Germany Squared | | | -0.000 | -0.000 | | | 0.000 |
| | | | [0.001] | [0.001] | | | [0.000] |
| Age | 0.048*** | 0.056*** | 0.062*** | 0.046*** | 0.061*** | 0.064*** | 0.066*** |
| | [0.011] | [0.011] | [0.012] | [0.012] | [0.006] | [0.006] | [0.006] |
| Age Squared | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** | -0.001*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Vocational Degree | 0.288*** | 0.227*** | 0.224*** | 0.058** | 0.104*** | 0.095*** | 0.095*** |
| | [0.022] | [0.024] | [0.024] | [0.023] | [0.010] | [0.011] | [0.011] |
| College or Similar Degree | 0.710*** | 0.630*** | 0.626*** | 0.347*** | 0.151*** | 0.148*** | 0.148*** |
| | [0.047] | [0.047] | [0.047] | [0.044] | [0.015] | [0.015] | [0.015] |
| Year 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 |
| Region of Origin FE | No | Yes | Yes | Yes | No | Yes | Yes |
| Occupation and Sector FE | No | No | No | Yes | No | No | No |
| Observations | 5,293 | 5,293 | 5,293 | 5,293 | 7,331 | 7,331 | 7,331 |
| R Squared | 0.105 | 0.117 | 0.118 | 0.243 | 0.080 | 0.089 | 0.089 |

*Notes* : Clustered standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1. The sample includes all migrants who arrived in Germany between 1976 to 1991 aged 16 to 35 (without ethnic Germans).

**Table 8: Instrumental Variable Estimates of the Effect of Naturalization on Wage Growth (Women)**

| | Personal Income | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | First stage | | | | Second stage | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Years Eligible after 1990 Reform | 0.233*** | 0.416*** | 0.025 | 0.022 | | | | |
| | [0.034] | [0.034] | [0.050] | [0.050] | | | | |
| Years since Naturalized | | | | | 0.058*** | 0.043*** | 0.500 | 0.205 |
| | | | | | [0.014] | [0.007] | [0.966] | [0.467] |
| Years in Germany | | | 1.603*** | 1.583*** | | | -0.777 | -0.308 |
| | | | [0.298] | [0.293] | | | [1.553] | [0.741] |
| Years in Germany Squared | | | -0.024*** | -0.024*** | | | 0.012 | 0.005 |
| | | | [0.006] | [0.006] | | | [0.023] | [0.011] |
| Age | -0.439*** | -0.565*** | -0.093 | -0.026 | 0.074*** | 0.080*** | 0.108 | 0.057** |
| | [0.128] | [0.121] | [0.132] | [0.134] | [0.011] | [0.010] | [0.076] | [0.023] |
| Age Squared | 0.004** | 0.007*** | -0.000 | -0.001 | -0.001*** | -0.001*** | -0.001 | -0.000 |
| | [0.002] | [0.002] | [0.002] | [0.002] | [0.000] | [0.000] | [0.001] | [0.001] |
| Vocational Degree | 3.834*** | 1.960*** | 1.726*** | 1.446*** | 0.063 | 0.142*** | -0.639 | -0.238 |
| | [0.228] | [0.217] | [0.212] | [0.231] | [0.063] | [0.032] | [1.669] | [0.677] |
| College or Similar Degree | 5.620*** | 2.876*** | 2.600*** | 1.792*** | 0.381*** | 0.506*** | -0.674 | -0.021 |
| | [0.521] | [0.461] | [0.438] | [0.465] | [0.096] | [0.052] | [2.527] | [0.840] |
| Year Fixed Effects | 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 |
| Region of Origin FE | No | Yes | Yes | Yes | No | Yes | Yes | Yes |
| Occupation and Sector FE | No | No | No | Yes | No | No | No | Yes |
| Observations | 5,293 | 5,293 | 5,293 | 5,293 | 5,293 | 5,293 | 5,293 | 5,293 |
| R Squared | 0.113 | 0.324 | 0.345 | 0.354 | | | | |

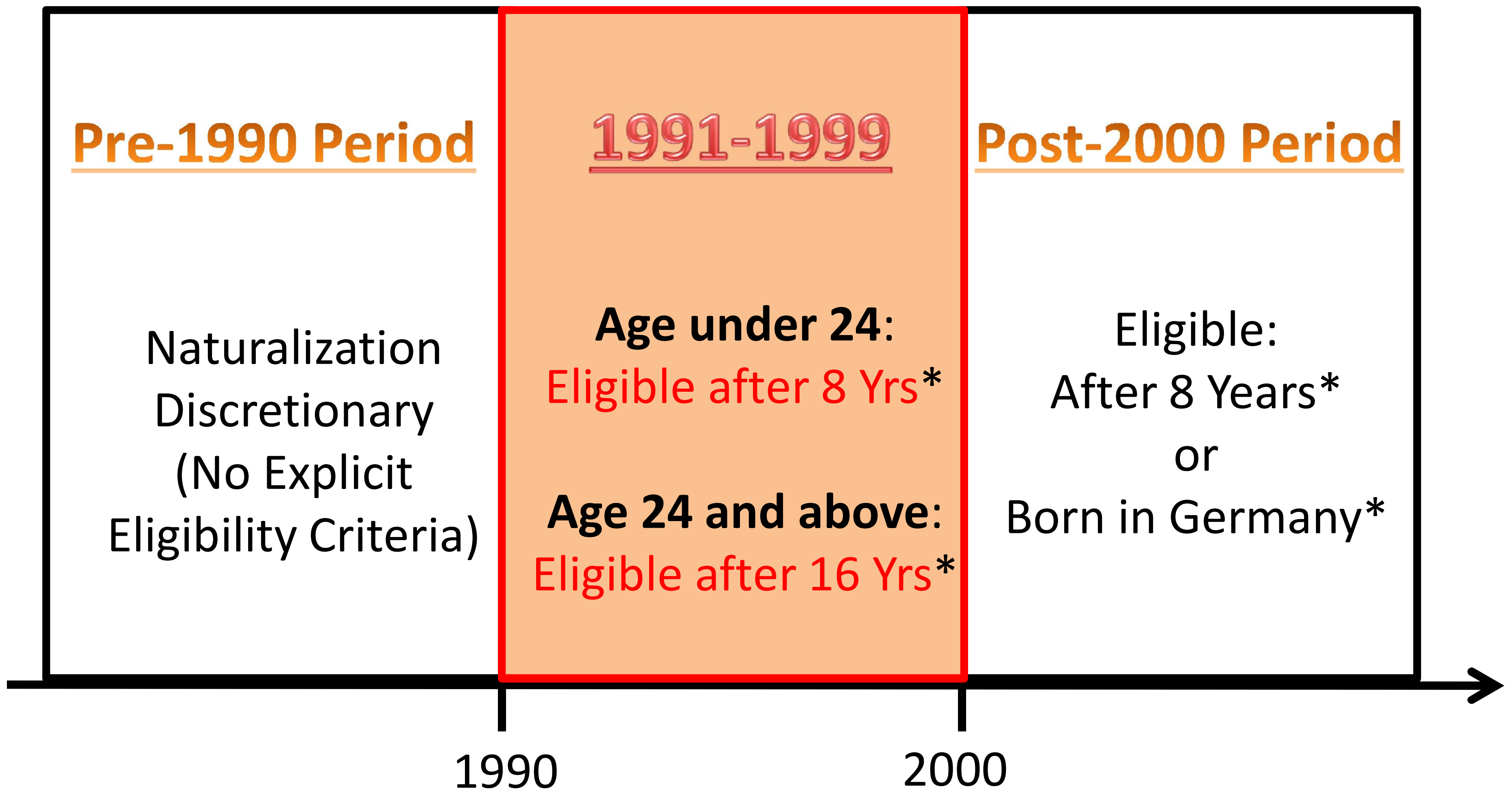
*Notes* : Robust standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1. The sample includes all migrants who arrived in Germany between 1976 to 1991 aged 16 to 35 (without ethnic Germans).

**Table 9: Public Sector and White Collar Employment (Women)**

| | Public Sector Employment | | | White Collar Employment | | |
|---|---|---|---|---|---|---|
| | | OLS | | | OLS | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Years since Naturalized | 0.002*** | 0.001*** | 0.001** | 0.004*** | 0.003*** | 0.002** |
| | [0.000] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] |
| Years in Germany Controls | No | No | Yes | No | No | Yes |
| Region of Origin FE | No | Yes | Yes | No | Yes | Yes |
| Observations | 5,827 | 5,827 | 5,827 | 3,675 | 3,675 | 3,675 |
| R Squared | 0.022 | 0.028 | 0.029 | 0.333 | 0.355 | 0.359 |
| | | Reduced Form | | | Reduced Form | |
| | (7) | (8) | (9) | (10) | (11) | (12) |
| Years since Eligible | 0.002** | 0.002** | 0.003** | 0.005*** | 0.010*** | 0.003 |
| | [0.001] | [0.001] | [0.001] | [0.002] | [0.002] | [0.003] |
| Years in Germany Controls | No | No | Yes | No | No | Yes |
| Region of Origin FE | No | Yes | Yes | No | Yes | Yes |
| Observations | 5,827 | 5,827 | 5,827 | 3,675 | 3,675 | 3,675 |
| R Squared | 0.020 | 0.028 | 0.028 | 0.329 | 0.357 | 0.359 |

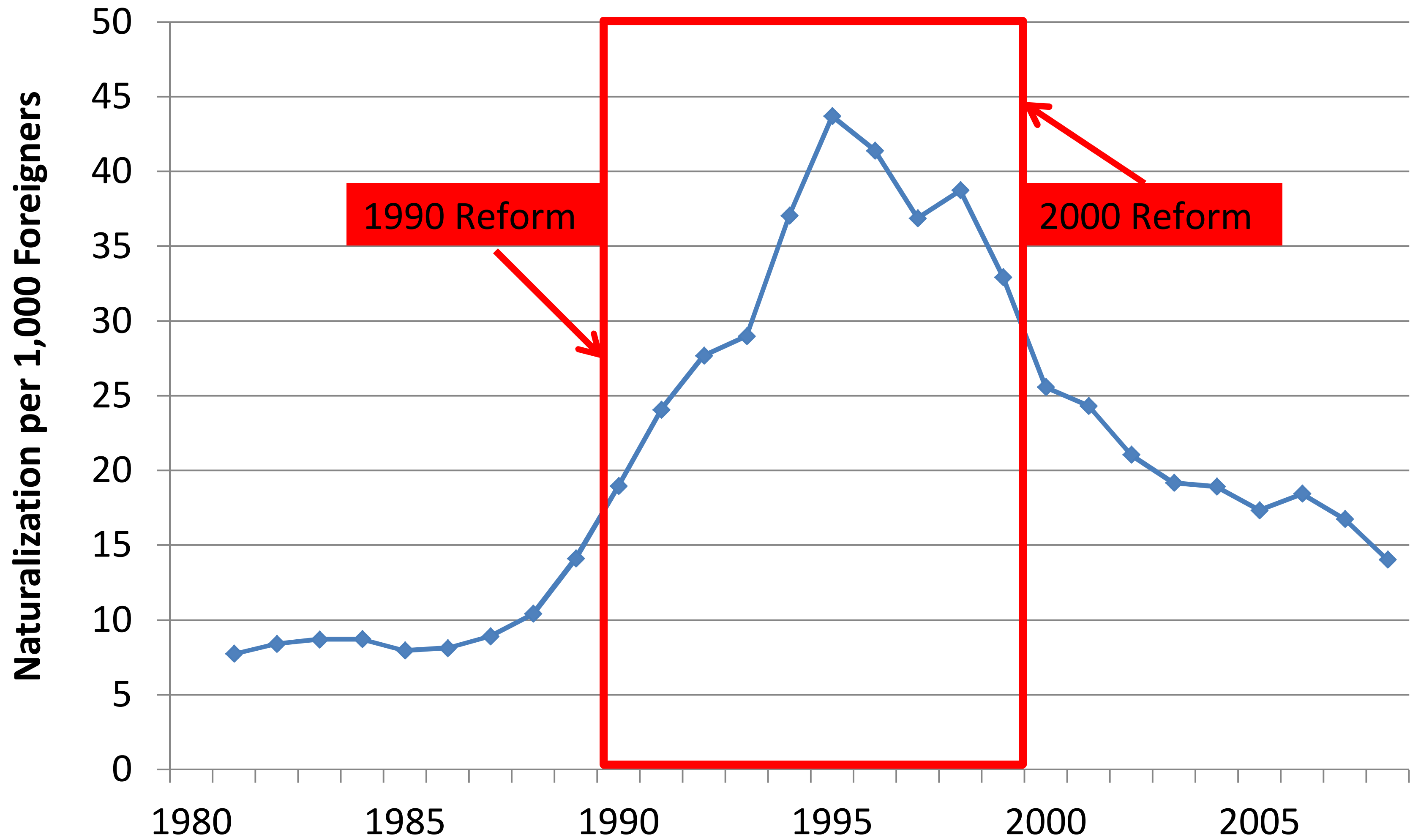
*Notes* : Clustered standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1. The sample includes all migrants who arrived in Germany between 1976 to 1991 aged 16 to 35 (without ethnic Germans). Estimations contain year, state and state specific linear fixed effects

Figure 1: The Citizenship Reforms in Germany

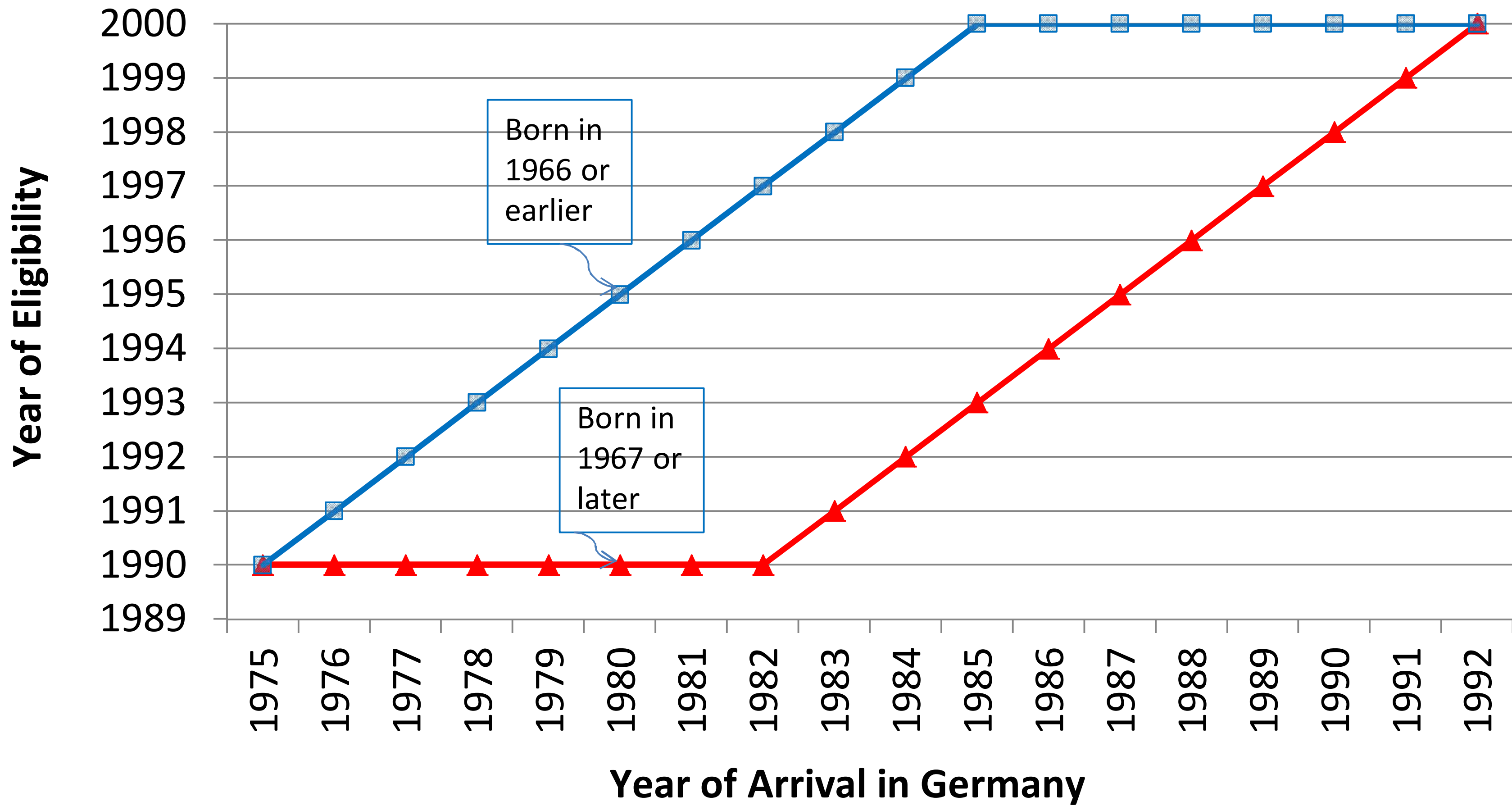



*For additional eligiblity criteria, see main text

# Figure 2: Naturalizations in Germany



# Figure 3: Age-Dependent Eligibility Criteria




*Notes*: The figure shows the year of eligibility as a function of the year of arrival under the reduced (8 years) and regular residency requirement. Immigrants eligible under the 8-years residency requirement had to under age 23, while all immigrants aged 4 and above faced the 15-years residency requirement.

**Table A1: Summary Statistics of the Microcensus**

| Microcensus 2007-2009 | Men | | Women | |
|---|---|---|---|---|
| | Mean | Std. Dev. | Mean | Std. Dev. |
| Personal income | 1544 | 976.19 | 875 | 735.40 |
| Labor force Participation | 0.83 | | 0.75 | |
| Public Sector Employment | 0.05 | | 0.13 | |
| White collar Employment | 0.37 | | 0.60 | |
| Year of arrival | 1983 | 4.76 | 1984 | 4.82 |
| Years in Germany | 24.41 | 4.82 | 23.93 | 4.88 |
| Year 1st eligible | 1996 | 3.70 | 1996 | 3.81 |
| Naturalized | 0.42 | | 0.46 | |
| Age | 37.07 | 7.46 | 36.35 | 7.63 |
| ***Education*** | | | | |
| Low | 0.43 | | 0.48 | |
| Middle | 0.49 | | 0.44 | |
| High | 0.08 | | 0.08 | |
| ***Country of origin*** | | | | |
| EU 15 | 0.13 | | 0.15 | |
| EU 12 | 0.11 | | 0.15 | |
| Balkan | 0.08 | | 0.09 | |
| Turkey | 0.43 | | 0.38 | |
| Middle East | 0.07 | | 0.06 | |
| Africa | 0.05 | | 0.04 | |
| Asia | 0.06 | | 0.07 | |
| America | 0.02 | | 0.02 | |
| Soviet (without EU12) | 0.03 | | 0.03 | |
| Rest | 0.02 | | 0.01 | |
| Number of observations | 6624 | | 5293 | |

*Notes* : Sample including all migrants who arrived in Germany between 1976 and 1991 aged 16-35.