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ABSTRACT

Naturalization and Labor Market Performance of Immigrants in Germany*

Naturalization may be a relevant policy instrument affecting immigrant integration in host-country labor markets. We study the effect of naturalization on labor market outcomes of immigrants in Germany. We apply recent survey data and exploit a reform of naturalization rules in an instrumental variable estimation. In our sample of recent immigrants, linear regression yields positive correlations between naturalization and beneficial labor market outcomes. Once we account for the endogeneity of naturalization most coefficients decline in magnitude and lose statistical significance: male immigrants' labor market outcomes do not benefit significantly from naturalization. Naturalization reduces the risks of unemployment and welfare dependence for female immigrants. For males and females, the propensity to hold a permanent contract increase as a consequence of naturalization. The results are robust to modifications of samples and the instrument.

JEL Classification: J61, J15, C26

Keywords: citizenship, migration, naturalization, labor market outcomes, instrumental variables

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1. Introduction

It is generally in the mutual interest of immigrants and host countries to integrate immigrants in host-country labor markets. A relevant but not yet well understood policy instrument is naturalization and its regulation (Liebig 2011). Liebig and Von Haaren (2011, p. 48) point out that "having the host-country nationality is generally associated with better labor market outcomes for immigrants". However, it is still unresolved to what extent this positive association is due to immigrant selection into naturalization or to potential causal effects of naturalization.

The literature distinguishes three potential effects of naturalization: reduced labor market barriers, changes in immigrant behavior, and changes in employer behavior. First, labor market barriers may consist of regulations that limit access to public sector jobs or that restrict the employment of immigrants to situations where no appropriate native candidate is available (priority tests). Here, naturalization can clearly improve the labor market opportunities of immigrants. Similarly, citizenship may affect access to higher education, to financial support for education (e.g., scholarships), or to loans and housing which is of particular importance to young immigrants. Second, immigrant behavior might respond to the opportunity of naturalization (ex ante and ex post) by increased investments in host-country specific human capital such as language and educational or occupational certificates, as well as by providing extra effort to avoid public transfer dependence.[1] Third, employers' hiring costs may decline if a worker is naturalized thus reducing what Fougère and Safi (2011) label 'rational discrimination.' Also, naturalization may serve as a signal to employers that an individual intends to stay in the host-country. The expectation of long-run employment relationships may additionally encourage job offers and employer investments in immigrants' human capital.[2]

[1] Similar to other countries, German naturalization law requires immigrants to be able to support themselves without social assistance or means-tested unemployment benefits (Liebig et al. 2010 and Guimezanes 2011).

[2] For a survey on implications of citizenship acquisition see, e.g., DeVoretz and Irastorza (2017).

Our study addresses the causal effect of naturalization for recent immigrants to Germany using the newly available 2013 wave of the IAB-SOEP migration sample exploiting reforms to German naturalization laws in an instrumental variables strategy.[3] The data show immigrants' naturalization status as observed in 2013. We contribute to a small international literature on the causal effects of naturalization.

To identify the causal effects of naturalization the literature has applied three methods: following the seminal paper by Bratsberg et al. (2002), most analyses apply longitudinal data and aim to identify causal effects conditional on person-specific fixed effects or study wage growth before and after naturalization. Bratsberg et al. (2002) find positive effects of naturalization on wage growth for the United States; in their sample of foreign-born youth first interviewed in 1979 taken from the National Longitudinal Study of Youth (NLSY) they find 2.6 percentage points higher wage returns to experience per year after naturalization. However, these results are not confirmed in studies using similar methods for Sweden (Ohlson 2008, Engdahl 2011) and Norway (Bratsberg and Raaum 2011): none of these studies finds significantly positive naturalization effects once individual fixed effects are considered. Steinhardt (2012) applies panel estimations to determine causal naturalization effects on wages for Germany. He considers administrative data for individuals who initially appeared in the data with a foreign nationality and compares the labor market outcomes of those who did and did not naturalize during the observation period. After accounting for individual fixed effects Steinhardt (2012) finds that wages for males grow 0.49 percent faster per year after naturalization. This effect is statistically significant but smaller than the one found for the U.S. by Bratsberg et al. (2002). He does not obtain significant wage effects for females after controlling for individual fixed effects.

[3] IAB-SOEP stands for Institute for Employment Research (IAB) in cooperation with the German Socio-economic Panel (SOEP).

Gathmann and Keller (2017) pursue a different approach to characterize the effects of naturalization for the German case. They exploit two reforms of the naturalization law as a quasi-experiment and estimate reduced form equations. They correlate the required number of years of residency for citizenship eligibility with labor market outcomes.[4] Based on Mikrozensus (2005-2010) and SOEP (1984-2009) data they study outcomes for immigrants who arrived in Germany prior to age 23 between 1975 and 2002. Similar to Steinhardt (2012), Gathmann and Keller (2017) find positive selection into citizenship for a pooled sample of males and females. The authors find that reduced residency requirements and thus easier access to citizenship go along with hardly any employment and earnings effects for men and with significantly stronger labor force attachment in terms of hours worked, full-time employment, tenure, and white collar employment as well as significantly higher net incomes for females. A one year reduction in residency requirements increases female earnings by about 1.6 percent.

Finally, von Haaren-Giebel and Sandner (2016) use propensity score matching to identify naturalization effects. They study on-the-job training of first generation immigrants in Germany. Based on survey data from the SOEP for 1986-1993 and 1997-2008, the authors find a significant positive average treatment effect of naturalization.

We contribute to the literature in four ways. First, we offer an up-to-date analysis, which covers recent immigration cohorts that have not been investigated so far; in our data the median immigration year is 1999 for men and 2000 for women. Steinhardt (2012) used data for the naturalization period 1974-2004 (with no information on the year of immigration) and Gathmann and Keller (2017) focus on individuals arriving on average in 1985/6 (SOEP) and 1989/90 (Mikrozensus). Given that the country of origin of immigrants to Germany varies over

[4] For other studies using the German citizenship law reform as a natural experiment see, e.g., Felfe and Saurer (2014) and Sajons and Clots-Figueras (2014) on child education outcomes, Avitabile et al. (2013, 2014) on immigrant fertility and integration, and Sajons (2016) on outmigration. For other contributions applying instrumental variable estimation to determine the causal effects of naturalization see, e.g., Bevelander and Pendakur (2011) on voting participation and Bevelander and Pendakur (2012) on employment in Sweden, and Fougère and Safi (2011) on employment in France.

time naturalization effects may differ across cohorts. Second, we can use more outcomes than prior studies. For example, gross monthly earnings and gross hourly wages are not available in the Mikrozensus data and employment status and further job characteristics, could not be studied by Steinhardt (2012). Third, as our data provide substantial detail on past in- and out-migration spells in addition to relevant biographical features, such as age, marriage, and refugee status, we can describe the timing of individual eligibility for naturalization more precisely than other studies. We contribute to the literature by testing the sensitivity of estimates to alternative and commonly used specifications of the instrument. Finally, prior studies on Germany leave some issues unanswered: Steinhardt (2012) finds positive naturalization effects only for men while, Gathmann and Keller (2017) find a stronger benefit for women.[5] We offer new evidence. Overall, we study labor market access, labor market success, and host-country investments to better understand the causal effects of naturalization and the underlying mechanisms.

We find positive correlations between naturalization and labor market success. Once we account for the endogeneity of naturalization most coefficients decline in magnitude and lose statistical significance. While males' labor market outcomes do not benefit significantly from naturalization, naturalization reduces the risks of unemployment and welfare dependence for female immigrants. This reflects that the character of German citizenship status matters more for female than for male immigrants. For both groups, the propensity to hold a permanent contract increases as a consequence of naturalization. The results are robust to modifications of samples and the instrument. Thus our findings confirm the findings of Gathmann and Keller (2017) in that naturalization as an integration policy may be more effective for female than for male immigrants. This gender-specific aspect so far has not been considered in German debates of integration policy and deserves additional attention in future research.

[5] The income measure applied by Gathmann and Keller (2017) describes net monthly personal income, which combines labor earnings, income from self-employment and capital, as well as private pensions, and public transfers.

Next, we summarize the institutional background of naturalization in Germany. Also, we discuss how naturalization may affect different outcomes. Section three describes our data and sections four and five cover methods and results. We conclude in section six.

2. Institutional background and mechanisms

2.1 Naturalization in Germany and its reforms

Our analysis exploits reforms to German citizenship law, which became effective in 1991 and 2000 (for the historical background see, e.g., Morjé Howard 2008). Prior to the 1991 reform, the Nationality Act (*Reichs- und Staatsangehörigkeitsgesetz*, RuStAG) of 1913 regulated German citizenship acquisition. This law stipulated a principle of *jus sanguinis* (right of blood): German ancestry, i.e., being born to a parent with German citizenship rather than place of birth, determined eligibility for German citizenship. The law neither defined an entitlement to acquire German citizenship for foreign nationals nor did it specify clear requirements regarding duration of residency. For decades, foreign applicants for German citizenship had to rely on ad hoc decisions of public authorities; applications could be rejected even if all legally specified requirements were met. Among these specified requirements were legal age, economic self-sufficiency, ability to support relatives, no criminal record, and the renouncement of any previous citizenship.

A reform of the Alien Act (*Ausländergesetz*, AuslG), which came into effect on January 1, 1991, considerably changed the nature of German citizenship law. The new legal situation curbed the power of public authorities and established the right to acquire German citizenship for foreign nationals if they met clearly defined conditions. Among these, the new law introduced a minimum residency requirement for eligibility. Immigrants aged 16-22 became eligible for citizenship after 8 years of residence in Germany, while immigrants above age 22 faced a residency requirement of at least 15 years in Germany. All immigrants had to renounce their previous citizenship and had to have no criminal record. Immigrants above age 22 had to

prove economic self-sufficiency and the ability to provide for their relatives without receiving public transfers. Adolescent immigrants (age 16-22) had to demonstrate 6 years of completed schooling in Germany. The spouse and minor children of applicants could be naturalized with the applicant, even if they did not meet the 15 years residency requirement.

The second substantial reform of German citizenship law came into effect on January 1, 2000. It was passed by a socialdemocrat-green coalition government with more liberal views on citizenship than the previous conservative government. This reform changed and renamed the old Nationality Act (from RuStAG to *Staatsangehörigkeitsgesetz*, StAG), and updated the Alien Act (AuslG). It harmonized the minimum residency requirement to 8 years regardless of an immigrant's age. The reform newly required applicants to demonstrate sufficient German language skills and to profess their loyalty to the free and democratic constitutional order in Germany. The previous requirements remained in place. Interestingly, elements of the *jus soli* (right of the soil) principle were introduced into German citizenship law, allowing children of immigrants to acquire German citizenship if they were born in Germany to parents living in Germany for at least 8 years.

More recently, the Residence Act (*Aufenthaltsgesetz,* AufenthG) replaced the Alien Act (AuslG), on January 1, 2005. Among other things, it introduced integration courses for non-citizens to improve their language skills and to provide them with basic knowledge about German society (in part these courses are mandatory). Successful participation in the course shortens the residency requirement for citizenship eligibility from eight to seven years.

In **Figure 1.1,** we depict the development of the absolute number of naturalizations and in **Figure 1.2** of the share of naturalizations in the stock of foreign residents in Germany. While we see a peak in naturalization early in the 1990s, the share in the stock of immigrants always

remains below 5 percent, which is low by international comparison.[6] Therefore, selection into naturalization may follow different patterns in Germany compared to other countries.

2.2 Mechanisms of naturalization effects

While the literature points to the dual nature of naturalization as both a determinant and a consequence of immigrant integration, we concentrate on the former relationship: we are interested in the correlation between naturalization and immigrant outcomes and in the causal effects of naturalization.

Naturalization can affect labor market outcomes through various channels and mechanisms. While most contributions to the literature focus on employment and wage outcomes, we take a broader perspective. We study the mechanisms behind these developments, as well, and investigate three groups of outcomes: indicators of labor market access, of labor market success, and of investment behaviors.

In a first set of measures, we consider indicators of labor market access. Labor market access may be affected by citizenship through hiring costs, discrimination, and formal employment restrictions; the latter may vary across countries of origins of immigrants. Also, formal restrictions such as priority tests can limit non-naturalized workers' access to certain occupations. We investigate labor market participation at the extensive and intensive margin and focus on overall employment, full-time employment, and unemployment. The international literature generally finds beneficial naturalization effects on labor market outcomes (see, e.g., the survey by Liebig and von Haaren 2011). For Germany, Gathmann and Keller (2017) find a positive correlation between citizenship and employment for males and females. However, in their reduce form results which account for the selectivity of naturalizations, the positive employment effect disappears for men.

[6] For international comparisons see, e.g., Steinhardt 2012, Morjé Howard 2008, or Gathmann and Keller 2017.

Our second group of outcomes describes labor market success. These outcomes result from bargaining and individual negotiations, which may respond to citizenship. Employers could be hesitant to hire immigrants for employment tracks with steep age earnings profiles or to incur costly investments in firm specific human capital if it is uncertain whether and for how long a worker will stay in the country. We investigate whether citizenship is associated with gross hourly wages, gross monthly earnings, holding a permanent contract, and a white collar job. Finally, we consider welfare dependence and its duration as indicators of low household income. While Steinhardt (2012) finds that males' wage growth increased after naturalization with no causal effects for females, Gathmann and Keller (2017) find a higher personal income for women but not for men among immigrants with easier access to naturalization. Here, we offer additional evidence. These authors also present findings for white collar and permanent contract employment. Their results are suggestive of positive citizenship effects on white collar (women) and permanent contract (women) employment.

Finally, we inspect the effect of citizenship on investments in host-country specific (human) capital. These investments may reflect the mechanisms, which connect labor market access and labor market success with behavioral choices related to naturalization. As outcomes of interest, we consider whether immigrants attained an educational degree in Germany. We study their self-reported language skills, in particular, speaking, writing, and reading on 1-5 scale, as well as an average measure. These indicators reflect host-country specific investments. Additionally, we capture whether an immigrant purchased property in Germany. Given the substantial fixed costs of property transactions in Germany this measure indicates a "durable tie to the host-country", which may respond to naturalization. We consider tenure with the current employer as an indicator of investments in firm specific human capital, which may respond to the acquisition of citizenship. Finally, we look at whether the individual found a German partner after migration suggesting intensive investment in host-country culture and traditions. Unfortunately, the data do not offer specific information on individual or employer

investments in worker human capital. As the relevance of different mechanisms may vary for subgroups, e.g., for EU-15 or ethnic German immigrants these groups we offer robustness tests without these subsamples.

3. Data

The 2013 wave of the IAB-SOEP Migration sample describes recent immigrants to Germany. It uses administrative register data of the Federal Employment Agency as a frame to draw a sample of potential immigrants to be surveyed subsequently.[7] The data cover individuals who first appeared in the administrative data in 1995 or later and who are either first or second generation immigrants. In addition, members of their households age 17 and above are interviewed. The survey covers 4,964 individuals from 2,723 households. We focus on first-generation immigrants born abroad, aged 17-65, and who had not obtained German citizenship at birth. Our sample contains 3,359 observations. On average, immigrants spent 14 years in Germany, 85 percent are eligible for naturalization, and 37.5 percent are naturalized.[8]

Our dependent variables describe labor market and investment outcomes. In particular, we describe labor market access using indicators of being employed, full-time employed, and registered unemployed. We describe labor market success using gross hourly wages, gross monthly earnings, holding a permanent contract and a white collar job. In addition, we consider welfare dependence (i.e., unemployment benefit II receipt) and the duration of benefit receipt during the past calendar year. As indicators of investment in host-country (human) capital we consider whether an individual invested in an educational degree in Germany (completed and

[7] For details on the data, see Brücker et al. (2014), Kroh et al. (2015) and Trübswetter and Fendel (2016).

[8] Of those 1,261 naturalized individuals, 399 hold a dual citizenship.

ongoing), German language skills, purchased property in Germany, tenure with the current employer, and having found a native German partner.[9]

Table 1 presents sample means of our dependent variables for naturalized and not naturalized male and female immigrants. In Panel A, we observe higher employment rates among males than among females, and among naturalized than non-naturalized individuals. Full-time employment rates (conditional on employment) are significantly higher for naturalized than for non-naturalized females with almost no difference by citizenship among men. Unemployment is significantly lower among naturalized individuals. In Panel B, we find higher wages and earnings for men than for women. Here, naturalized men are worse off and naturalized females are better off than their not naturalized peers. In additional categories of labor market success the jobs of naturalized immigrants are significantly more likely permanent and both gender groups are significantly less likely to receive welfare benefits (UB2) compared to non-naturalized peers. Finally, Panel C describes the groups' investments: except for the indicator of having a German born partner, all indicators suggest that naturalization is correlated with significantly higher investments in human and physical capital in the host-country, for both men and women.

The data offer information on naturalization and the calendar year of naturalization. In order to address the potential endogeneity of naturalization with respect to labor market outcomes we use an instrumental variables approach. Similar to Bevelander and Pendakur (2011, 2012), we consider 'years since first eligible for naturalization' as an instrument for naturalization, which we can calculate rather precisely. In addition - and going beyond Bevelander and Pendakur (2011, 2012) - we can take advantage of reform-induced changes in eligibility rules. We exploit two major reforms (1991, 2000), which exogenously affected the minimum residency requirement for eligibility in Germany: prior to 1991, there was no defined

[9] The last measure is coded only for those immigrants who entered the country without having a partner already.

right to acquire German citizenship based on explicit criteria. The Alien Act (AuslG) of January 1, 1991 introduced a minimum residency requirement of 8 years for immigrants aged 16-22 and a requirement of at least 15 years in Germany for immigrants above age 22. The reform of January 1, 2000 reduced this latter residency requirement to 8 years regardless of an immigrant's age. Our data provide monthly information on immigrants' migration biographies: for every immigrant we know the start and the end date of residence spells in Germany. This allows us to compute the exact duration of residence. We use this information to determine the precise time of first eligibility for citizenship.

The detailed nature of the data allows us to control for potential interruptions in residence in Germany and to incorporate the rules handling interruptions into our eligibility variable. Based on the Alien Act (AuslG) of January 1, 1991 stays abroad for up to 6 months are not considered as residence interruptions and thus count towards the residency duration requirements for citizenship. Stays abroad for more than 6 months, however, are considered as residence interruptions; any previous residence in Germany counts towards the requirements for citizenship only up to a maximum period of five years.[10]

Finally, we can use relevant biographical features, such as marriage to a German native, ethnic German status, refugee status, and naturalization of parents to account for numerous exceptions in the residency duration requirements for ethnic Germans, refugees, spouses of naturalized individuals, and children of naturalized parents. In our robustness checks we evaluate the impact of these refinements.

An important issue in coding the instrument "years since eligibility" is the treatment of individuals who are not yet eligible. We could (i) omit these observations from the analysis, (ii) include them and code the years since eligibility as zero, or (iii) include them and code negative

[10] In our sample, 242 individuals interrupted their stay in Germany after their first arrival, 209 individuals interrupted their stay for at least 6 months, and in 64 cases accounting for these interruptions reduced their relevant duration of stay to five years.

values if eligibility will be established in the future. The literature uses different approaches. Bevelander and Pendakur (2012) code their instrument to be zero for all who have not yet attained eligibility. This might upward bias the first stage coefficients, with both positive and negative slopes being overestimated. In contrast, Bevelander and Pendakur (2011, p. 76) appear to use negative values, "subtracting the number of years since migrating to Sweden from the number of years to eligibility". In order to reflect the exogenous difference in the eligibility to naturalize between those who entered before and after a reform and between those who spent long and short periods in the host-country, we consider negative values in our instrument of "years since eligibility" in our baseline analyses. We inspect the relevance of coding years since eligible for non-eligible individuals in our robustness tests. Our instrument therefore covers values in the interval from -8 to +53 years.[11]

In our sample, 40.1 percent of male and 35.3 percent of female immigrants are naturalized. On average naturalization occurred after 1.46 (0.98) years of eligibility for males (females). These figures vary substantially by country of origin with the highest naturalization rates among immigrants from the former Soviet Union countries (65.1 percent) and the lowest rates among immigrants from the original EU-15 member states (4.1 percent). In robustness tests we will compare the estimation results for various subsamples.

In addition to naturalization, we consider individual age, years in Germany, indicators for low, medium and high skill, federal state of residence, and region of origin as control variables in our estimations. **Table 2** presents descriptive statistics of these individual characteristics. About 30 percent of the sample originate in countries of the former Soviet Union, 30 percent are from EU member states, and 12 percent are from Turkey. In our sample,

[11] Immigrants arriving in 2013 would be eligible for naturalization after 8 years, yielding the value of -8 for the indicator "years since eligible". At least one individual, who arrived decades earlier became eligible 53 years ago, e.g. via marriage to a native.

men are slightly older and have a longer duration of stay in Germany than females, while female immigrants are slightly better educated (please see **Appendix A** for variable definitions).

4. Empirical Method

Our objective is to describe the relationship between naturalization and labor market outcomes and to identify the causal effect of naturalization. We follow the literature and first regress labor market outcomes (Y) on naturalization to describe overall correlation patterns and to compare it to prior studies. This estimation generates biased estimates of causal naturalization effects if naturalization is endogenous. Several reasons may generate such an endogeneity. First, omitted variables may cause a correlation of naturalization with the error term; examples of such omitted variables are the individual taste for the host-country culture, language skills, or unobserved strength of home country ties. Second, reverse causality may induce individuals to naturalize because of their labor market outcomes. Finally, our survey based naturalization indicator may be measured with error.

In order to account for these issues we pursue an instrumental variable strategy in the second step of our analysis. We exploit heterogeneity in naturalization outcomes generated by our instrument, i.e., years since first eligible for naturalization. We assume that the instrument ceteris paribus affects labor market outcomes only by means of naturalization because immigrants cannot naturalize before they are eligible and the probability of naturalization increases with time since eligibility. The instrument should be highly relevant for naturalization. The exclusion restriction implies that for individuals of given age and years since migration the number of years since eligibility affects outcomes only via naturalization. The instrument identifies the effect of naturalization on labor market outcomes based on a comparison of immigrants under heterogeneous naturalization regulations but with identical age, years since migration and other characteristics: the regulatory differences allowed one person to naturalize while the other had to accumulate additional years of residence.

We apply a standard two stage least squares estimator (2SLS), separately for males and females.[12] First, we model whether an individual *i* has naturalized (N_i) as a function of years since first eligibility ($YrsElig_i$):

$$N_i = \theta_0 + \theta_1 YrsElig_i + \theta_2 Age_i + \theta_3 Age_i^2 + \theta_4 YSM_i + \theta_5 YSM_i^2 + \tau X + \varepsilon_i \quad (1)$$

We account for individual age (Age_i), age squared (Age_i^2), years in Germany (YSM_i) and its square (YSM_i^2), and a set of other covariates X (two education indicators, federal state of residence, and region or country of origin). We evaluate the relevance of our instrument using an F-test of the statistical significance of the θ_1 estimate. Then, we consider a broad set of labor market outcomes (Y_i) as dependent variable and estimate:

$$Y_i = \alpha + \beta \widehat{N}_i + \gamma_1 Age_i + \gamma_2 Age_i^2 + \delta_1 YSM_i + \delta_2 YSM_i^2 + \pi X + \mu_i \quad (2)$$

In addition to the assumptions of instrument exogeneity and relevance, we assume monotonicity, i.e., that nobody refused to naturalize due to the onset of eligibility, which appears plausible. If our identifying assumptions hold, the estimate of β provides the causal effect of naturalization for compliers, i.e., for those individuals who naturalized because they became eligible.

5. Results

5.1 Linear regression estimates of labor market outcomes

In step one of our analysis we regress the outcomes of interest on the naturalization indicator to describe the overall correlation patterns conditional on a set of covariates. **Table 3** shows the estimated coefficients of the naturalization indicator.[13]

With respect to the outcomes describing labor market access (see Panel A) we find a positive correlation of naturalization with employment and a negative correlation with

[12] In additional estimations we tested and confirmed the robustness of our findings when applying bivariate probit estimators, instead.

[13] To improve readability of results tables we do not show standard errors. They are provided upon request.

unemployment. Naturalized men are more likely to be employed, full-time employed conditional on employment, and less likely to be unemployed compared to non-citizen first generation immigrants; however, these estimates are not statistically significant. Among women, the employment and unemployment coefficients are larger than for men and statistically significant.

The indicators of labor market success in Panel B generally show the expected patterns with large and at times highly significant coefficient estimates. Hourly wages, monthly earnings, permanent contract, and white collar employment, are positively correlated with naturalization, while welfare dependence (UB2-last year) and its intensity are significantly lower among naturalized individuals. In most cases, the coefficient estimates are larger for females than for males. As an example, females with German citizenship have roughly 11 and 17 percent higher wages and earnings than non-citizens compared to 7 and 9 percent differences for males. The gender differences in correlation patterns agree with the findings of Gathmann and Keller (2017) who find larger employment and income correlations for females than males.

Finally, in Panel C we describe some indicators of investments in (human) capital. In almost all cases, the naturalization indicator is positively and significantly correlated with the investment measures. Naturalized individuals are about 7 percentage points more likely to invest in German educational degrees, they score higher on all measures of language skills, are more likely to own property and they have a longer tenure with their current employers. We do not find positive correlations between naturalization and having a native partner.

Whereas in Panels A and B, our coefficient estimates are more significant and of larger magnitude for the female than for the male subsample this pattern is reversed in Panel C. Overall, our findings confirm results reported by Gathmann and Keller (G&K, 2017) based on Mikrozensus data for earlier immigrant cohorts.

5.2 Instrumental variable estimations

In step two of our analysis, we investigate whether the endogeneity of naturalization biases the linear regression results in **Table 3**. We apply an instrumental variables estimator with 'years since eligibility for naturalization' as our instrument. **Table 4** shows the estimation results for the instrumented effect of naturalization.[14] We again show three panels, describing labor market access, labor market success, and immigrant investment outcomes with separate estimates for male and female immigrants. For each outcome, the table first presents evidence on the relevance of our instrument in the first stage regression. Following the rule of thumb that the F-statistic must yield a value of at least 10, our instrument is strongly associated with the naturalization outcome (see columns labelled "F-Stat"): in all cases, we obtained statistically significant positive first stage coefficient estimates suggesting that the number of years since eligible for naturalization significantly increases the probability of naturalization. In the next column (see columns labelled "N"), we show the number of observations for each outcome; the numbers vary because some outcomes are only observed conditional on employment or family status and due to missing values in the data.

The coefficient estimates show the causal effect of naturalization on the considered outcomes for those immigrants who complied with the treatment, i.e., who naturalized because they became eligible. The results for the outcomes in Panel A are comparable to those previously discussed in the literature. For males, the estimates regarding labor market access in in **Table 4** hardly differ from those presented in **Table 3**: we find positive effects of naturalization on employment and full-time employment, and negative effects on unemployment. As in **Table 3**, none of these estimates is statistically significant. Therefore, we find no evidence in support of significant causal effects of citizenship acquisition on labor

[14] As an example, **Appendix Table B.1** shows the results of the first stage regression for the full sample. The results suggest a positive selection into naturalization by education. In the presentation of IV estimates (e.g. **Table 4**) we routinely present the value of the F-statistic on the relevance of the instrument in the first stage regression.

market participation for male immigrants. Similarly, the Panel A results for females hardly differ between the IV and the OLS regressions in **Tables 3** and **4**. The previously marginally significant coefficient in the employment equation increases in size but loses statistical significance in the IV estimation compared to OLS (see **Table 3**). The positive full-time employment effect about halves in size. Only the negative effect on unemployment remains statistically significant and almost doubles in magnitude. This suggests that we find benefits of naturalization for women in terms of significantly reduced unemployment risks. Our findings agree with G&K (2017): their reduced form estimates based on residency requirements for naturalization yield significant effects on employment for females but not for males. Bevelander and Pendakur (2012) find for Sweden substantial positive and significant naturalization effects on employment. Ohlson (2008) confirms the correlation of citizenship with employment for Sweden but does not find support for the hypothesis that becoming Swedish increases the probability of finding employment.

Panel B of **Table 4** shows the effects on indicators of labor market success. The first two rows show the naturalization effects on hourly wages and on gross monthly labor earnings. For both outcomes, the OLS estimates in **Table 3** yielded positive and statistically significant associations with naturalization for men and women. These estimates respond strongly to endogeneity controls: for men, we find no positive causal effects of naturalization on wages and earnings, which suggests that the correlations in **Table 3** were due to positive selection into citizenship. For females, the IV estimates continue to yield large positive coefficient estimates. However, these are marginally statistically significant only for monthly earnings and not for hourly wages. This suggests that the response relates to the number of hours worked in addition to workers' wages and productivity as is evidenced by the positive though insignificant effect on full-time employment in Panel A. Overall, we confirm much of the international literature,

which finds no significant effect of naturalization on wages (e.g., Bratsberg and Raum 2011).[15] Also, we confirm G&K (2017) who use different income measures but similarly obtain significant income effects at best for females but not for males in their reduced form estimations.

As one of the strongest results in Panel B of **Table 4**, we find positive effects of naturalization on the propensity to hold a permanent employment contract for both males and females. This agrees with the correlations in **Table 3** and the reduced form results for females in G&K (2017). In contrast, we do not find the expected positive naturalization effects for white collar employment. The significant negative effect of naturalization on white collar employment for men and women is counter to intuition and differs from the literature. The estimates become much smaller in magnitude and lose statistical significance, when we focus on white collar workers who perform at least somewhat demanding tasks.[16]

Finally, we inspect as an indirect outcome of labor market activities whether naturalization causally affects welfare dependence. Least squares results showed negative correlation patterns, which were statistically significant in three of four cases. The instrumental variables estimations confirm negative effects. They are, however, no longer statistically significant for men, yet large and significant for females. Overall, the results in Panel B confirm that naturalization may benefit female immigrants, whereas we find only few beneficial effects for the male sample.

In Panel C of **Table 4**, we inspect the relevance of naturalization for host-country related investments. In almost all cases, the least squares estimates in **Table 3** yielded significant

[15] Given the large number of hypothesis tests performed, we emphasize only significance at the 1 percent level.

[16] We limited the group of white collar workers to those reporting that they perform more than simple basic tasks, i.e., we considered only those performing at least qualified tasks. After re-coding the 180 male and 272 female white collar observations who report that they perform simple tasks (mostly without formal training), the coefficients for males and females change to -0.148 and -0.057, respectively, and are no longer statistically significant. Thus, we do not find a significant negative effect of naturalization on the propensity to work on qualified white collar jobs.

positive coefficient estimates. After accounting for the endogeneity of naturalization, the results change substantially. We obtain an unexpected negative effect for female investments in German educational degrees. This finding emphasizes that the OLS results were affected by positive female selection into naturalization. Among the compliers in our sample the negative education effect is possibly related to the positive increase in labor force participation, which excludes simultaneous investments in education. The gender difference agrees with G&K who find substantially higher additions to education investments among men than among women in response to reduced residency requirements.

There is no significant average language effect for either subsample, which suggests again that a large part of the positive language coefficients in **Table 3** was - at least for females - driven by selection into naturalization. Interestingly, the positive causal effects on owning property in Germany hold up to endogeneity corrections as does the tenure effect for the female subsample. This suggests that naturalization not only increases the probability of holding a permanent contract but also facilitates the accumulation of firm-specific human capital and stable employment relationships, particularly for women. For the subsample of male immigrants who entered the country without a partner we find a significant positive causal effect of naturalization on the propensity to choose a German partner. The effect for females is smaller and insignificant.

Overall, we find some positive labor market effects of naturalization for females that do not appear to be determined by selection into citizenship. For men, however, neither employment nor earnings respond to naturalization. Males and females benefit from citizenship in terms of access to permanent employment contracts and appear to invest in property more after naturalization, suggesting stronger connection to the host-country. A potential explanation for the gender differences in the effects of naturalization with respect to labor market access and labor market success (see Panels A and B) may relate to the relative change in status and independence that naturalization implies for males and females. If a larger share of females

immigrates as tied movers, family members, or - which is often reported for females of Turkish origin - in order to marry, whereas males independently migrate by their own volition, then taking up German citizenship might contain an empowering element for females that males cannot experience. The effect of this empowerment might be reflected in female labor market behavior. Next, we offer a variety of robustness tests to evaluate our findings.

5.3 Robustness and heterogeneity

We offer five sets of robustness tests.[17] First, we modify the definition of the instrumental variable. Second, we adjust the sample of immigrants excluding immigrants from the original EU-15 countries and ethnic Germans who benefit from special regulations. Third, we exclude those observations who benefited from special family-based regulations in becoming eligible for naturalization, fourth we exclude the most recent immigrants because they did not yet have a chance to meet minimum residency requirements for naturalization, and finally we omit observations of immigrants arriving within ten years prior to the survey to reduce the potential impact of endogenous return migration.[18]

In **Tables 5** and **6** we present the results of instrumental variables regressions after the instrument was modified. First, we replaced negative values in the instrument 'number of years since eligible for naturalization' with a value of zero, as has been done in prior contributions to the literature. This affects those observations (i.e., 216 male and 291 female immigrants) for whom the required number of years of residence for eligibility had not yet been reached (see **Table 5**). For the results in **Table 6**, we instead omit all observations on immigrants who were

[17] In an additional test, we considered a sample selection model for the outcomes that are observed conditional on employment. Using the number and age structure of children in the household as exclusion restrictions, we find no evidence for endogenous sample selection for men. For women, the inverse Mills ratio generates statistically significant coefficient estimates on some of the outcomes. However, the coefficient estimates of the naturalization outcome hardly change when sample selection corrections are considered.

[18] In an additional test we modified the set of control variables by adding indicators of marital status and children in the household. Almost all results are robust to this modification; for females the estimates of unemployment and property ownership lose statistical significance once controls are added.

not yet eligible for naturalization and coded only the actually observed positive number of years since eligible for naturalization.

Overall, our results are rather robust to these modifications. The first stage F statistic remains large confirming the relevance of the instrument in both settings. **Tables 5** and **6** confirm the results for Panel A: we obtain no significant naturalization effects for men and significantly reduced unemployment risks for women. Similarly, the patterns regarding hourly wages and monthly earnings hold up to the modifications: only female earnings increase significantly due to naturalization. As before, the propensity to hold a permanent contract goes up and we continue to find surprisingly negative effects for white collar employment. For female immigrants, the risk and duration of welfare receipt continue to decline after naturalization. Similarly, we find no substantive differences in the results in Panel C when we compare **Tables 5** and **6** to **Table 4**. Overall, our results are thus robust to changes in the definition of the instrument.[19]

In a second set of robustness tests, we investigate whether specific subsamples affect our findings. We repeat the analyses presented in **Table 4** after omitting immigrants from the core EU-15 countries, who enjoy particular freedom of international movement. Also, as ethnic German immigrants enjoy permanent residence rights and immediate access to citizenship without residency requirements, their ex ante and ex post response to naturalization may differ from other immigrants. In particular, one might expect less positive effects of citizenship for this subsample. We test whether omitting this group from the sample affects our estimates. In **Table 7,** we show the estimates of the 2SLS estimation after omitting 188 male and 181 female immigrants from the original EU-15 countries. The results show slightly reduced values for the F statistics, which, however, continue to strongly support the relevance of the instrument. The

[19] In separate estimations, we tested the robustness to alternative specifications of the instrument, e.g., quadratic and cubic versus categorical representations. **Appendix Tables B.2** and **B.3** present the results which overall confirm our findings.

estimates presented in Panel A hardly change with the restricted sample. In Panel B some of the estimates for females gain in magnitude and statistical significance, in Panel C some estimates for males are smaller in size and less statistically significant. Overall, however, our findings hold up to omitting immigrants from EU-15 countries from the sample.[20]

In **Table 8,** we show the estimation results after omitting the group of ethnic German immigrants. Dropping ethnic German observations, we lose 355 male and 371 female immigrants.[21] The substantial change in the number of eligible immigrants likely drives the decline in the value of the F statistics reported in **Table 8**. However, our instrument continues to be relevant by common standards. A comparison of the estimates in Panel A in **Tables 8** and **4** suggests that the employment effects gain in magnitude for employment among females and for full-time employment among males. This matches expectations even though the effects remain statistically insignificant. Similarly, the negative effect on unemployment for females almost doubles in size. This suggests that our baseline results present lower bounds to the actual effects on labor market access for non-ethnic German immigrants. For the sample without ethnic Germans the significantly positive earnings effect for women disappears in Panel B and the effects for males remain insignificant. The education effect for females grows in magnitude. At the same time, the other effects for job characteristics in Panel B are robust to the change in sample. We see positive and significant citizenship effects on permanent contracts and again negative effects on white collar employment. Also, the previously observed effects on welfare receipt and the outcomes in Panel C are confirmed. Interestingly, the naturalization effects on finding a German partner increase for both males and females and become statistically significant. This suggests that the ethnic German subsample differs from other immigrants in

[20] In a separate test, we attempted to determine the effects of naturalization for the subsample of EU 15 immigrants only. However, due to the small number of only 15 naturalization events in this group, we did not obtain statistically significant first stage results.

[21] Ethnic German immigrants are identifiable in the data as information on their status is provided.

the effects of naturalization on partnerships. Overall, however, the different subsamples do not call forth substantially different results regarding labor market outcomes of naturalization.

In our third test, we reconsider our instrument. The instrumental variable reflects the individually observed number of years since becoming eligible for naturalization. In order to avoid measurement errors in the calculation of the number of years we considered special regulations for children and spouses of naturalizing immigrants: they can naturalize jointly with their parent or spouse and without meeting residency requirements if the latter meets the residency requirements and naturalizes. As such family related naturalization opportunities may be endogenous, we test for the relevance of observations with reduced required years of residency (or increased years of eligibility for naturalization) due to family issues. **Table 9** presents the estimation results when we omit these observations; we lose 180 male and 240 female observations. The results in Panels A and B are basically unaffected and robust. In Panel C the negative female education effect loses significance and effects on property ownership remain positive but lose statistical significance. Once we omit family based eligibility, the positive naturalization effects on finding a German partner for males disappear and even turn negative for females. Thus, our prior findings for this outcome are not robust. The naturalization effects on partner choice identified on duration of residence, only, are insignificant for men and negative for women. Our previous findings of positive significant effects for men are driven by observations whose instrument was affected by specific family regulations.[22] Overall, however, our results are not determined by considering the full set of rules in the definition of the instrument.

[22] In further estimations, we additionally drop ethnic German observations from the sample used in **Table 9**. Now, the negative effects amount to -0.133 for both males and females and turn insignificant. When, instead, we change the specification in **Table 9** to only omit observations whose eligibility was affected by being a spouse (leaving children in the sample), the effect for males stays insignificant at a value of -0.052 and the female effect drops to -0.0937 and remains significant at the 5 percent level.

In our fourth test, we reduce our sample by omitting all those observations who arrived after 2008 and therefore may not have had an opportunity to fulfill formal residency requirements. **Table 10** shows the estimation results obtained after omitting 158 male and 195 female recent immigrant observations. Again, the results in Panel A are confirmed. In Panel B the effects on white collar employment lose statistical significance and in Panel C some of the positive effects for men become statistically significant. Overall, this corroborates our previous findings.

Finally, any analysis of first generation immigrants' whereabouts in the destination country may be subject to endogenous sample selection due to return migration. If the decisions to leave Germany after immigration is correlated with the outcomes of interest then the estimates may biased. This was tested in the studies by Steinhardt (2012) and Gathmann and Keller (2017) neither of whom found evidence supporting endogenous sample selection. We apply one of the tests performed by Gathmann and Keller (2017) who argue that a large share of return migration happens within the first ten years. When we drop those immigrants from the sample who immigrated within ten years prior to the survey we obtain the results presented in **Table 11**. The sample size declined by about 30 percent but the overall patterns of the results are robust to this modification. Therefore, we are optimistic that our results are not due to endogenous return migration.

6. Conclusions

This study investigates the causal effect of naturalization on labor market outcomes for recent immigrants to Germany. We take advantage of new data, which provide detailed information on recent immigrants, and apply an instrumental variables strategy. Our estimation approach accounts for the potential endogeneity of naturalization by exploiting exogenous variation generated by recent reforms in naturalization regulations.

We study outcomes describing access to the labor market, success in the labor market, and indicators of immigrant investments in host-country (human) capital. Naturalization may affect all of these outcomes. Linear regressions confirm large and statistically significant correlations of these outcomes with naturalization even conditional on years since migration, i.e., assimilation in the host-country. However, once we account for endogenous selection into naturalization, most of the correlation patterns disappear. Instead, we confirm prior findings in the literature, which show that, e.g., male immigrants' labor market outcomes such as employment, wages, and earnings do not benefit from naturalization. For female immigrants we find that naturalization reduces the risks of unemployment and welfare dependence. The positive response of female immigrants' earnings to citizenship acquisition is driven by the group of ethnic Germans and does not result for the remaining immigrant sample. We observe for males and females that the propensity to hold a permanent contract and - for females only - tenure, i.e., potential investments in firm-specific human capital and employment stability, increase due to naturalization. The gender difference in naturalization effects reflects that the character of German citizenship status matters more for female than for male immigrants. Possibly, it provides a sense of independence and empowerment.

Given that we test numerous hypotheses we need to caution against the risk of type-II errors, i.e., erroneous indications of statistical significance. However, as one of our main results is the finding that male immigrants' labor market success does not respond to naturalization and as the findings confirming naturalization effects are corroborated with various samples and specifications, we are confident that our core conclusions are robust.

Overall, our results for men do not yield positive causal effects of naturalization on labor market integration or - vice versa - that the labor market discriminates against workers based on their citizenship. Among women, naturalization appears to enhance employment prospects. In addition, naturalization may affect immigrant investments in host-country specific capital. This suggests that the value of naturalization policies as an instrument to support overall

immigrant integration may be limited and its effects may differ by gender. Future research should pay specific attention to gender differences. Our results do not support the use of access to citizenship as an instrument to assist the integration of, e.g., the predominantly male refugee population.

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Figure 1.1 Annual Number of Naturalizations

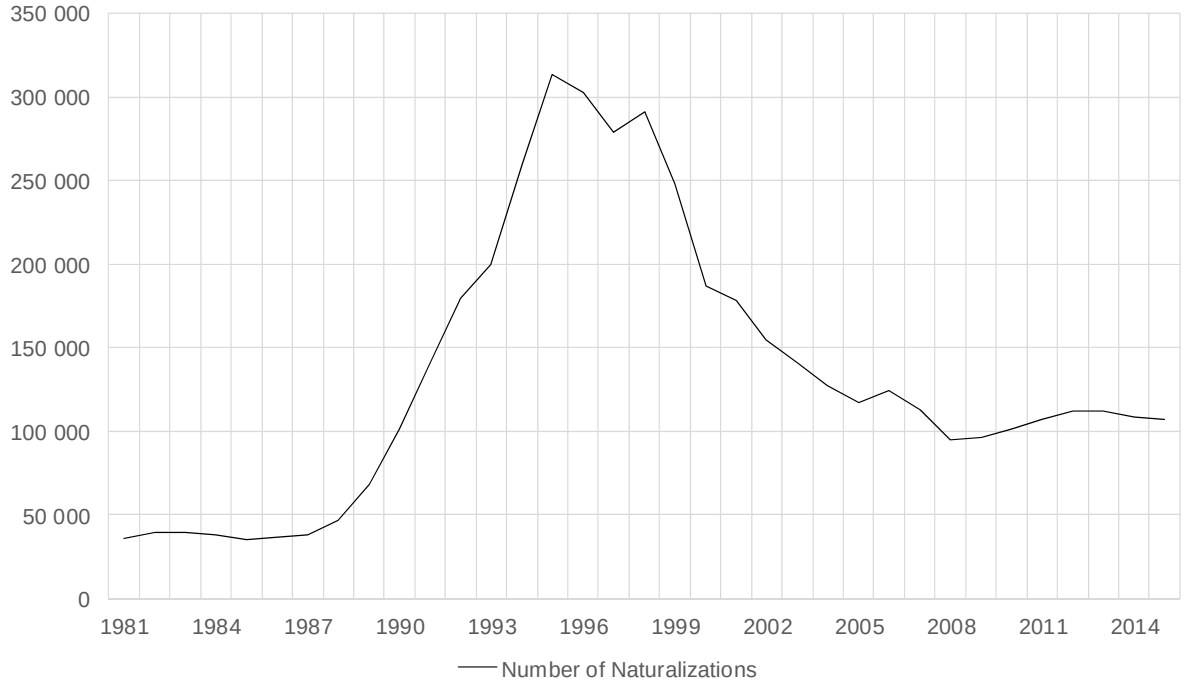
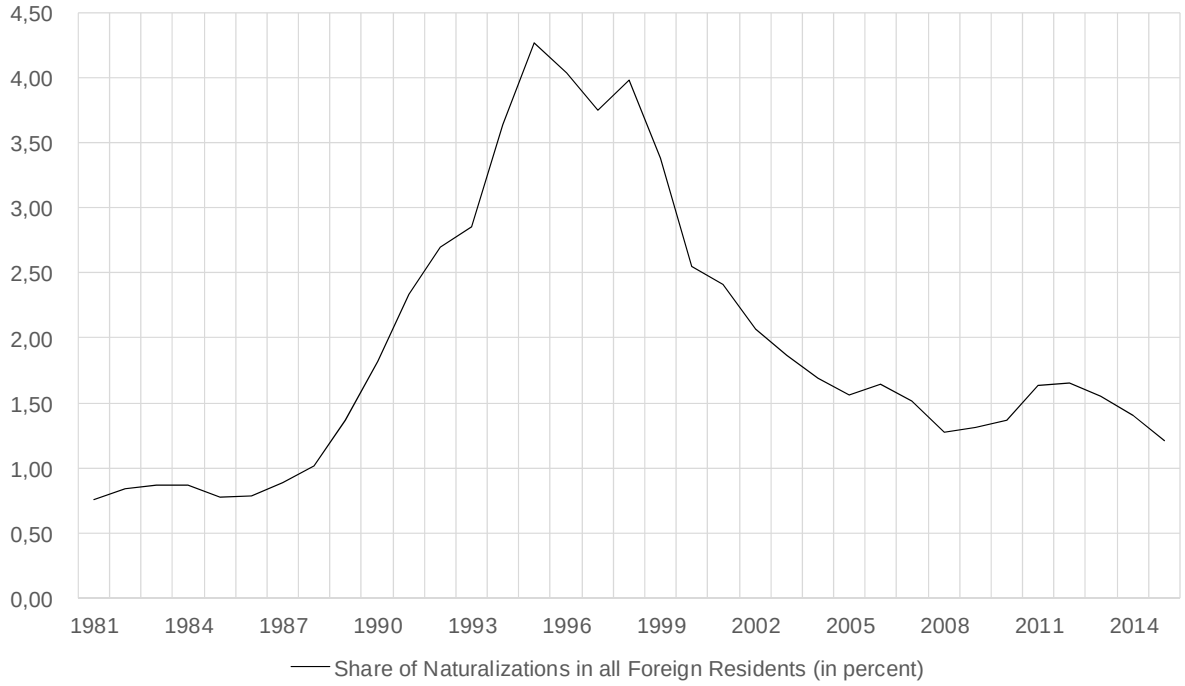


Figure 1.2 Annual Share of Naturalizations in All Foreign Residents



Note: Ethnic Germans are included in these figures.

Source: Federal Statistical Office (2016)

Table 1: Descriptive statistics: dependent variables

	Males						Females					
	Not naturalized		Naturalized		Diff.		Not naturalized		Naturalized		Diff.	
	N	Mean(1)	N	Mean(2)	(2)-(1)		N	Mean(1)	N	Mean(2)	(2)-(1)	
A. Labor market access												
Employed (0/1)	923	0.751	618	0.769	0.018		1,175	0.568	643	0.635	0.067	***
Full-time employed (0/1)	693	0.837	475	0.832	-0.005		667	0.382	408	0.434	0.052	*
Registered unemployed (0/1)	923	0.189	618	0.147	-0.041	**	1,175	0.186	643	0.129	-0.056	***
B. Labor market success												
Gross hourly wage	618	14.262	421	13.250	-1.012	*	609	10.929	368	11.429	0.500	
Gross monthly earnings	625	2,354.8	423	2,220.2	-134.602		615	1,276.7	372	1,371.1	94.373	
Permanent contract (0/1)	693	0.657	475	0.731	0.074	***	665	0.617	408	0.716	0.099	***
White collar job (0/1)	693	0.400	475	0.398	-0.002		667	0.532	408	0.547	0.014	
UB2-last year (0/1)	923	0.158	618	0.117	-0.042	**	1,175	0.176	643	0.118	-0.058	***
UB2-last year (number of months)	922	1.798	618	1.273	-0.525	**	1,175	1.980	643	1.347	-0.633	***
C. Investment												
Education in Germany (0/1)	921	0.201	618	0.401	0.200	***	1,175	0.212	643	0.395	0.183	***
Language skills												
Speaking (1-5)	920	3.798	617	4.159	0.361	***	1,172	3.788	643	4.224	0.436	***
Writing (1-5)	920	3.428	617	3.971	0.543	***	1,172	3.541	643	4.112	0.571	***
Reading (1-5)	920	3.727	617	4.143	0.415	***	1,172	3.787	643	4.275	0.489	***
Average score (1-5)	920	3.651	617	4.091	0.440	***	1,172	3.705	643	4.204	0.498	***
Property owner (0/1)	923	0.160	618	0.288	0.128	***	1,175	0.190	643	0.269	0.079	***
Tenure (number of years)	690	5.633	475	6.361	0.728	*	664	4.085	407	5.231	1.146	***
German-born partner (0/1)	475	0.101	369	0.049	-0.052	***	569	0.104	379	0.069	-0.035	*

Source: IAB-SOEP Migration Sample (2013).

Table 2: Descriptive statistics: individual characteristics

	Males		Females	
	Mean	**Std. Dev.**	**Mean**	**Std. Dev.**
Age	39.573	11.585	38.383	10.988
Years in Germany	15.033	8.463	13.733	7.370
Low-skilled or missing	0.336	0.473	0.343	0.475
Medium-skilled	0.478	0.500	0.427	0.495
High-skilled	0.186	0.389	0.229	0.421
Federal state (0/1)				
Baden-Württemberg	0.143	0.351	0.153	0.360
Bavaria	0.160	0.367	0.172	0.377
Berlin	0.036	0.186	0.041	0.199
Brandenburg	0.029	0.167	0.022	0.147
Bremen	0.013	0.113	0.013	0.112
Hamburg	0.030	0.170	0.032	0.176
Hesse	0.090	0.286	0.089	0.285
Lower Saxony	0.096	0.295	0.090	0.286
Mecklenburg-Vorpommern	0.003	0.057	0.003	0.057
North Rhine-Westphalia	0.250	0.433	0.244	0.429
Rhineland-Palatinate	0.058	0.235	0.050	0.217
Saarland	0.016	0.124	0.011	0.104
Saxony	0.010	0.098	0.019	0.136
Saxony-Anhalt	0.024	0.153	0.021	0.143
Schleswig-Holstein	0.036	0.186	0.030	0.171
Thuringia	0.007	0.084	0.012	0.107
Region of origin (0/1)				
Former Soviet Union	0.304	0.460	0.318	0.466
New EU 12	0.179	0.384	0.229	0.420
Turkey	0.131	0.338	0.102	0.302
Original EU 15	0.122	0.327	0.100	0.299
Ex-Yugoslavia	0.120	0.325	0.114	0.318
Middle East	0.060	0.237	0.055	0.228
Africa	0.043	0.204	0.029	0.167
Asia	0.023	0.149	0.034	0.180
North America	0.014	0.119	0.012	0.109
South America	0.008	0.088	0.009	0.096
Other	0.006	0.076	0.003	0.052
Observations	1,541		1,818	

Note: The table presents sample means of individual characteristics for male and female immigrants in the final sample. For further details on the definition of each variable, please see the data appendix.
Source: IAB-SOEP Migration Sample (2013).

Table 3: Linear regression of labor market outcomes on naturalization (0/1)

	Male		Female	
Dependent Variable	N	Coeff.	N	Coeff.
A. Labor Market Access				
Employed (0/1)	1,541	0.0267	1,818	0.0468 *
Full-time employed (0/1)	1,168	0.0352	1075	0.0490
Registered unemployed (0/1)	1,541	-0.0316	1,818	-0.0626 ***
B. Labor Market Success				
ln(gross hourly wage)	1,039	0.0680 *	977	0.1132 ***
ln(gross monthly earnings)	1,048	0.0952 *	987	0.1692 **
Permanent contract (0/1)	1,168	0.0836 **	1,073	0.0950 ***
White collar job (0/1)	1,168	0.0445	1,075	0.0067
UB2-last year (0/1)	1,541	-0.0313	1,818	-0.0748 ***
UB2-last year (number of months)	1,540	-0.4502 *	1,818	-0.8596 ***
C. Investment				
Education in Germany (0/1)	1,539	0.0756 ***	1,818	0.0735 ***
Language skills (1=low, 5=high)				
Average score (1-5)	1,537	0.2609 ***	1,815	0.2335 ***
Speaking (1-5)	1,537	0.2127 ***	1,815	0.2058 ***
Writing (1-5)	1,537	0.3366 ***	1,815	0.2693 ***
Reading (1-5)	1,537	0.2333 ***	1,815	0.2254 ***
Property owner (0/1)	1,541	0.1220 ***	1,818	0.0847 ***
Tenure (number of years)	1,165	0.9119 **	1,071	0.6547 **
German partner (0/1)	844	-0.0154	948	-0.0098

Note: The table presents the coefficient estimates of the naturalization indicator in regressions of varying dependent variables. The control variables are age, age squared, two education indicators, years since migration and its square, indicators of federal state of residence, and region or country of origin. Standard errors are robust to heteroskedasticity. ***: p<1%, **:p<5%, *:p<10%.
Source: IAB-SOEP Migration Sample (2013).

Table 4: IV estimates of labor market outcomes on naturalization (0/1) instrumented by years since eligibility

	Male			Female		
Dependent Variable	**F-Stat**	**N**	**Coeff.**	**F-Stat**	**N**	**Coeff.**
A. Labor Market Access						
Employed (0/1)	134.9	1,541	0.0566	243.4	1,818	0.0595
Full-time employed (0/1)	102.6	1,168	0.0336	169.9	1,075	0.0223
Registered unemployed (0/1)	134.9	1,541	-0.0703	243.4	1,818	-0.1212 **
B. Labor Market Success						
ln(gross hourly wage)	117.5	1,039	-0.0521	148.6	977	0.1429
ln(gross monthly earnings)	119.3	1,048	-0.0204	151.2	987	0.2805 *
Permanent contract (0/1)	102.6	1,168	0.2350 **	169.9	1,073	0.3024 ***
White collar job (0/1)	102.6	1,168	-0.2546 **	169.9	1,075	-0.2457 ***
UB2-last year (0/1)	134.9	1,541	-0.0200	243.4	1,818	-0.2047 ***
UB2-last year (number of months)	134.8	1,540	-0.2972	243.4	1,818	-2.2357 ***
C. Investment						
Education in Germany (0/1)	134.6	1,539	0.0755	243.4	1,818	-0.1433 **
Language skills (1=low, 5=high)						
Average score (1-5)	135.4	1,537	0.2139	242.6	1,815	0.0179
Speaking (1-5)	135.4	1,537	0.2333 *	242.6	1,815	-0.0024
Writing (1-5)	135.4	1,537	0.2496	242.6	1,815	0.0632
Reading (1-5)	135.4	1,537	0.1590	242.6	1,815	-0.0070
Property owner (0/1)	134.9	1,541	0.1575 **	243.4	1,818	0.1438 **
Tenure (number of years)	101.3	1,165	0.8674	171.5	1,071	2.4799 ***
German partner (0/1)	66.0	844	0.1544 **	148.2	948	0.0320

Note: The table presents the F-statistic of the first stage regression (naturalization with the instrument 'years since eligibility'), estimated for the relevant number of observations as presented in the column labelled N, and the coefficient estimate of the naturalization effect in the second stage regression. The control variables are age, age squared, two education indicators, years since migration and its square, indicators federal state of residence, and region or country of origin. Standard errors are robust to heteroskedasticity. ***: p<1%, **:p<5%, *:p<10%.

Source: IAB-SOEP Migration Sample (2013).

Table 5: IV estimates of labor market outcomes on naturalization (0/1) instrumented by years since eligibility coded zero for those not eligible

	Male			Female		
Dependent Variable	**F-Stat**	**N**	**Coeff.**	**F-Stat**	**N**	**Coeff.**
A. Labor Market Access						
Employed (0/1)	147.4	1,541	0.0299	268.7	1,818	0.0332
Full-time employed (0/1)	114.4	1,168	0.1061	187.8	1,075	0.0768
Registered unemployed (0/1)	147.4	1,541	-0.0557	268.7	1,818	-0.1601 ***
B. Labor Market Success						
ln(gross hourly wage)	124.0	1,039	-0.0387	165.6	977	0.1093
ln(gross monthly earnings)	125.2	1,048	0.0751	171.4	987	0.3454 **
Permanent contract (0/1)	114.4	1,168	0.2175 **	187.9	1,073	0.3361 ***
White collar job (0/1)	114.4	1,168	-0.2266 **	187.8	1,075	-0.2306 ***
UB2-last year (0/1)	147.4	1,541	-0.0183	268.7	1,818	-0.2094 ***
UB2-last year (number of months)	147.3	1,540	-0.2654	268.7	1,818	-2.3659 ***
C. Investment						
Education in Germany (0/1)	146.8	1,539	0.0959	268.7	1,818	-0.1164 *
Language skills (1=low, 5=high)						
Average score (1-5)	147.9	1,537	0.0917	267.2	1,815	-0.1390
Speaking (1-5)	147.9	1,537	0.1731	267.2	1,815	-0.1278
Writing (1-5)	147.9	1,537	0.0826	267.2	1,815	-0.0785
Reading (1-5)	147.9	1,537	0.0193	267.2	1,815	-0.2105 *
Property owner (0/1)	147.4	1,541	0.1604 **	268.7	1,818	0.1241 **
Tenure (number of years)	113.1	1,165	0.7617	190.9	1,071	2.7926 ***
German partner (0/1)	71.8	844	0.1045	154.2	948	-0.0161

Note: see **Table 4**.
Source: IAB-SOEP Migration Sample (2013).

Table 6: IV estimates of labor market outcomes on naturalization (0/1) instrumented by years since eligibility coded only for the eligible

	Male			Female		
Dependent Variable	**F-Stat**	**N**	**Coeff.**	**F-Stat**	**N**	**Coeff.**
A. Labor Market Access						
Employed (0/1)	116.9	1,325	0.0154	216.1	1,527	0.0291
Full-time employed (0/1)	93.6	1,005	0.0616	153.6	928	0.0900
Registered unemployed (0/1)	116.9	1,325	-0.0525	216.1	1,527	-0.1483 **
B. Labor Market Success						
ln(gross hourly wage)	101.3	892	-0.0578	132.4	837	0.1219
ln(gross monthly earnings)	102.3	900	-0.0208	137.2	846	0.4122 **
Permanent contract (0/1)	93.6	1,005	0.1979 *	153.7	927	0.3462 ***
White collar job (0/1)	93.6	1,005	-0.2748 **	153.6	928	-0.2633 ***
UB2-last year (0/1)	116.9	1,325	-0.0295	216.1	1,527	-0.2130 ***
UB2-last year (number of months)	116.9	1,324	-0.4210	216.1	1,527	-2.3253 ***
C. Investment						
Education in Germany (0/1)	116.3	1,323	0.0650	216.1	1,527	-0.1062 *
Language skills (1=low, 5=high)						
Average score (1-5)	117.2	1,322	0.1092	215.0	1,525	-0.0470
Speaking (1-5)	117.2	1,322	0.1936	215.0	1,525	-0.0669
Writing (1-5)	117.2	1,322	0.0722	215.0	1,525	0.0154
Reading (1-5)	117.2	1,322	0.0618	215.0	1,525	-0.0893
Property owner (0/1)	116.9	1,325	0.1472 *	216.1	1,527	0.1275 *
Tenure (number of years)	92.7	1,002	0.6657	155.5	926	2.9218 ***
German partner (0/1)	63.9	755	0.1128	131.1	835	0.0192

Note: see **Table 4.**
Source: IAB-SOEP Migration Sample (2013).

Table 7: IV estimates of labor market outcomes on naturalization (0/1) instrumented by years since eligibility - omitting EU 15 immigrants

	Male			Female		
Dependent Variable	**F-Stat**	**N**	**Coeff.**	**F-Stat**	**N**	**Coeff.**
A. Labor Market Access						
Employed (0/1)	122.9	1,353	0.0407	222.7	1,637	0.0928
Full-time employed (0/1)	90.9	1,018	0.0248	149.5	946	0.0440
Registered unemployed (0/1)	122.9	1,353	-0.0556	222.7	1,637	-0.1248 **
B. Labor Market Success						
ln(gross hourly wage)	97.2	908	-0.1421	131.3	860	0.1573 *
ln(gross monthly earnings)	99.3	915	-0.0707	132.7	867	0.2698 *
Permanent contract (0/1)	90.9	1,018	0.2339 **	149.5	945	0.2795 ***
White collar job (0/1)	90.9	1,018	-0.3016 ***	149.5	946	-0.2938 ***
UB2-last year (0/1)	122.9	1,353	-0.0102	222.7	1,637	-0.2095 ***
UB2-last year (number of months)	122.8	1,352	-0.1884	222.7	1,637	-2.2643 ***
C. Investment						
Education in Germany (0/1)	122.6	1,352	0.0495	222.7	1,637	-0.1228 **
Language skills (1=low, 5=high)						
Average score (1-5)	123.6	1,349	0.1112	222.1	1,634	0.0194
Speaking (1-5)	123.6	1,349	0.1352	222.1	1,634	-0.0090
Writing (1-5)	123.6	1,349	0.1545	222.1	1,634	0.0702
Reading (1-5)	123.6	1,349	0.0439	222.1	1,634	-0.0029
Property owner (0/1)	122.9	1,353	0.1437 *	222.7	1,637	0.1617 ***
Tenure (number of years)	90.6	1,016	1.3911	149.2	943	1.9496 **
German partner (0/1)	65.9	723	0.0729	132.2	846	-0.0058

Note: See **Table 4.**
Source: IAB-SOEP Migration Sample (2013).

Table 8: IV estimates of labor market outcomes on naturalization (0/1) instrumented by years since eligibility - omitting ethnic German immigrants

	Male			Female		
Dependent Variable	**F-Stat**	**N**	**Coeff.**	**F-Stat**	**N**	**Coeff.**
A. Labor Market Access						
Employed (0/1)	28.2	1,186	0.0682	65.7	1,447	0.1414
Full-time employed (0/1)	15.4	893	0.2461	53.6	838	0.0227
Registered unemployed (0/1)	28.2	1,186	-0.0227	65.7	1,447	-0.2361 **
B. Labor Market Success						
ln(gross hourly wage)	24.2	794	0.0303	48.5	758	0.1705
ln(gross monthly earnings)	25.1	800	0.0051	49.1	765	-0.1846
Permanent contract (0/1)	15.4	893	0.4936 *	53.6	836	0.3823 **
White collar job (0/1)	15.4	893	-0.4972	53.6	838	-0.2953 *
UB2-last year (0/1)	28.2	1,186	-0.0018	65.7	1,447	-0.2965 ***
UB2-last year (number of months)	28.2	1,185	-0.3124	65.7	1,447	-3.2785 ***
C. Investment						
Education in Germany (0/1)	28.1	1,184	0.0244	65.7	1,447	-0.2773 **
Language skills (1=low, 5=high)						
Average score (1-5)	28.7	1,183	0.0918	66.0	1,444	0.1486
Speaking (1-5)	28.7	1,183	0.0636	66.0	1,444	0.2692
Writing (1-5)	28.7	1,183	0.0761	66.0	1,444	0.0118
Reading (1-5)	28.7	1,183	0.1356	66.0	1,444	0.1647
Property owner (0/1)	28.2	1,186	0.1842	65.7	1,447	0.3538 ***
Tenure (number of years)	15.2	890	1.2204	56.0	835	3.2534 **
German partner (0/1)	17.4	672	0.4964 **	64.1	779	0.4596 ***

Note: See **Table 4**.
Source: IAB-SOEP Migration Sample (2013).

Table 9: IV estimates of labor market outcomes on naturalization (0/1) instrumented by years since eligibility - omitting individuals who benefited from family rules in becoming eligible for naturalization

	Male			Female		
Dependent Variable	**F-Stat**	**N**	**Coeff.**	**F-Stat**	**N**	**Coeff.**
A. Labor Market Access						
Employed (0/1)	147.5	1,361	0.0272	212.5	1,578	0.0390
Full-time employed (0/1)	128.5	1,029	-0.0255	137.9	922	0.0244
Registered unemployed (0/1)	147.5	1,361	-0.0233	212.5	1,578	-0.1028 *
B. Labor Market Success						
ln(gross hourly wage)	108.9	917	-0.0711	117.2	836	0.1484
ln(gross monthly earnings)	110.5	925	-0.0279	119.3	846	0.3645 **
Permanent contract (0/1)	128.5	1,029	0.1978 *	138.0	920	0.3024 ***
White collar job (0/1)	128.5	1,029	-0.2245 **	137.9	922	-0.2266 **
UB2-last year (0/1)	147.5	1,361	0.0245	212.5	1,578	-0.1572 ***
UB2-last year (number of months)	147.4	1,360	0.2161	212.5	1,578	-1.7310 ***
C. Investment						
Education in Germany (0/1)	147.3	1,359	0.0871	212.5	1,578	-0.0798
Language:						
Average score (1-5)	148.9	1,357	0.1980	211.1	1,576	0.0257
Speaking (1-5)	148.9	1,357	0.2333 *	211.1	1,576	-0.0203
Writing (1-5)	148.9	1,357	0.2528	211.1	1,576	0.0996
Reading (1-5)	148.9	1,357	0.1078	211.1	1,576	-0.0023
Property owner (0/1)	147.5	1,361	0.0736	212.5	1,578	0.0736
Tenure (number of years)	127.3	1,027	-0.0936	137.7	919	2.3602 **
German partner (0/1)	74.2	750	-0.0440	120.6	855	-0.1509 ***

Note: See **Table 4**.
Source: IAB-SOEP Migration Sample (2013).

Table 10: IV estimates of labor market outcomes on naturalization (0/1) instrumented by years since eligibility - omitting individuals who arrived in Germany after 2008

	Male			Female		
Dependent Variable	**F-Stat**	**N**	**Coeff.**	**F-Stat**	**N**	**Coeff.**
A. Labor Market Access						
Employed (0/1)	103.8	1,383	0.0611	209.4	1,623	0.0634
Full-time employed (0/1)	85.2	1,050	0.0667	154.6	981	0.0455
Registered unemployed (0/1)	103.8	1,383	-0.0645	209.4	1,623	-0.1587 ***
B. Labor Market Success						
ln(gross hourly wage)	96.4	931	-0.0407	133.2	889	0.1275
ln(gross monthly earnings)	98.3	939	0.0047	137.1	898	0.3441 **
Permanent contract (0/1)	85.2	1,050	0.2977 ***	154.6	979	0.3048 ***
White collar job (0/1)	85.2	1,050	-0.1049	154.6	981	0.0562
UB2-last year (0/1)	103.8	1,383	-0.0375	209.4	1,623	-0.2203 ***
UB2-last year (number of months)	103.8	1,382	-0.4759	209.4	1,623	-2.3817 ***
C. Investment						
Education in Germany (0/1)	103.8	1,381	0.0816	209.4	1,623	-0.1267 *
Language:						
Average score (1-5)	104.2	1,379	0.2781 **	208.7	1,621	0.0281
Speaking (1-5)	104.2	1,379	0.2975 **	208.7	1,621	0.0355
Writing (1-5)	104.2	1,379	0.3066 *	208.7	1,621	0.0889
Reading (1-5)	104.2	1,379	0.2302	208.7	1,621	-0.0401
Property owner (0/1)	103.8	1,383	0.1426 *	209.4	1,623	0.1460 **
Tenure (number of years)	84.2	1,047	0.7018	156.3	978	2.6594 ***
German partner (0/1)	54.5	787	0.1820 **	125.9	890	0.0410

Note: See **Table 4**.
Source: IAB-SOEP Migration Sample (2013).

Table 11: IV estimates of labor market outcomes on naturalization (0/1) instrumented by years since eligibility - omitting individuals who arrived in Germany after 2003

	Male			Female		
Dependent Variable	**F-Stat**	**N**	**Coeff.**	**F-Stat**	**N**	**Coeff.**
A. Labor Market Access						
Employed (0/1)	77.1	1,084	0.0460	148.2	1,217	0.0585
Full-time employed (0/1)	63.3	833	0.0530	105.8	747	0.0651
Registered unemployed (0/1)	77.1	1,084	-0.0403	148.2	1,217	-0.1129 *
B. Labor Market Success						
ln(gross hourly wage)	84.0	739	-0.0610	89.6	675	0.1643
ln(gross monthly earnings)	86.3	747	-0.0427	91.0	682	0.4199 **
Permanent contract (0/1)	63.3	833	0.2780 **	105.7	746	0.3794 ***
White collar job (0/1)	63.3	833	-0.2309 *	105.8	747	-0.2481 **
UB2-last year (0/1)	77.1	1,084	-0.0223	148.2	1,217	-0.2165 ***
UB2-last year (number of months)	77.0	1,083	-0.1746	148.2	1,217	-2.3246 ***
C. Investment						
Education in Germany (0/1)	77.1	1,083	0.1069	148.2	1,217	-0.0258
Language:						
Average score (1-5)	77.1	1,084	0.1659	147.0	1,216	0.1393
Speaking (1-5)	77.1	1,084	0.1964	147.0	1,216	0.1358
Writing (1-5)	77.1	1,084	0.1899	147.0	1,216	0.1874
Reading (1-5)	77.1	1,084	0.1115	147.0	1,216	0.0946
Property owner (0/1)	77.1	1,084	0.1309	148.2	1,217	0.1479 *
Tenure (number of years)	62.9	830	0.7325	107.5	745	3.9500 ***
German-born partner (0/1)	46.9	645	0.1319	83.2	705	-0.0357

Note: See **Table 4**.
Source: IAB-SOEP Migration Sample (2013).

Appendix A: Data Appendix

A.1 Variables of central interest:

In contrast to the German Mikrozensus and SOEP datasets, the IAB-SOEP Migration sample explicitly provides information on the "year of naturalization". Thus, this information does not have to be imputed from changes in the reported citizenship.

Our indicator of "naturalization (0/1)" takes the value one if an individual is naturalized at the date of survey, in 2013.

"Years spent in Germany" (YSM) is computed from monthly spell data on migration biographies, adding up all periods of residence in Germany up to the date of survey, in 2013. Interruptions in residence for up to 6 months count towards the residency requirement for citizenship. Interruptions in residence for more than 6 months do not count towards the total years spent in Germany. Any period of prior residence in Germany is capped at five years after an individual left the country for more than 6 months.

"Year of first eligibility" is the year in which an individual becomes eligible for German citizenship for the first time. It is based on our own computations of the individual years of residency in Germany (Years spent in Germany). We take into account changes in the German law with respect to residency requirements for citizenship and exceptions in these requirements for ethnic Germans, refugees, spouses of German (naturalizing) citizens and children of naturalizing parents.

"Years since eligibility" is measured by counting the number of years since the year of becoming eligible for German citizenship for the first time up to the survey date in 2013.

A.2 Other control variables:

Based on the 1997 International Standard Classification of Education (ISCED) we distinguish between low-skilled (pre-primary, primary and lower secondary education, ISCED levels 0-2), medium-skilled (upper secondary and post-secondary non-tertiary education, ISCED levels 3-4) and high-skilled immigrants (first and second stages of tertiary education, ISCED levels 5-6). The few cases (N=77) with missing information are added to the reference group of low-skilled workers. Without these additional cases, the share of low-skilled males and females is slightly lower at .319 and .316, respectively.

For the region of origin we distinguish between immigrants from the original EU-15 member states, immigrants from the so-called new EU-12 countries that became part of the European Union later (Estonia, Latvia, Lithuania, Slovakia, Poland, Malta, Slovenia, Czech Republic, Hungary, Cyprus, Bulgaria, Romania), immigrants from Turkey, former Yugoslavia

(except Slovenia), the former Soviet Union (except the Baltic States), immigrants from other regions of origin (Asia, Africa, the Middle East, North and South America), and immigrants without citizenship (other).

A.3 Dependent variables:

Indicators of labor market access (Panel A):

"Employed (0/1)" takes the value one for all individuals who are in employment, whether they are employed full-time, part-time, marginally, or in an apprenticeship.

"Full-time employed (0/1)" is an indicator coded only for individuals in employment (employed = 1) that takes the value one for individuals who are employed full-time.

"Registered unemployed (0/1)" takes the value one for all individuals who are registered as unemployed with the Federal Employment Agency.

Indicators of labor market success (Panel B):

"Gross monthly earnings" are self-reported individual earnings from work in the last month before the date of the survey. These are gross earnings, i.e., before deduction of taxes and social security.

"Gross hourly wages" are computed from gross monthly earnings and working hours per week as stipulated in the individual's contract. We impute missing values in contracted working hours per week with reported actual working hours per week.

"White-collar job (0/1)" is an indicator for individuals in employment (employed = 1) that takes the value one for individuals who are industry or factory foremen/forewomen, salaried employees engaged in unskilled, skilled, or highly skilled activities, salaried employees with extensive managerial duties, civil servants, or trainees in trade or commerce.

"UB2-last year (0/1)" is an indicator that takes the value one if an individual/household received the means-tested unemployment benefit II at any time in the calendar year prior to the survey, i.e. in 2012.

"UB2-last year (number of months)" represents the number of months in 2012 during which an individual/household received the means-tested unemployment benefit II.

Indicators of investment into host-country-specific (human) capital (Panel C).

"Education in Germany (0/1)" is an indicator for being in education or having completed education (attending a school or institution of higher education, completing an apprenticeship or vocational training, or participating in further education or training) in Germany at the date of the survey in 2013.

Our German language proficiency measures are self-reported assessments of speaking, writing and reading abilities on a five-point scale (1=not at all, 2=badly, 3=okay, 4=well, 5=very well) as of the date of the survey in 2013. The "average score" outcome is a measure of overall German language skills and is computed for every individual as the mean of the scores in speaking, writing, and reading.

"Property owner (0/1)" is an indicator that takes the value one if an individual is the owner of their place of residence in Germany.

"Tenure (number of years)" is defined for individuals in employment (employed = 1) and represents the duration of current employment measured in years. For self-employed individuals it is the duration of self-employed work.

"German partner (0/1)" is an indicator that is coded for those individuals who did not have a partner at the time of immigration. The indicators takes the value one if an individual found a native (German-born and German citizenship) partner after immigration. It takes on the value zero if the person either remained single or found a non-native (not German-born or not German citizenship) partner.

Appendix B: Additional Results

Table B1: Linear regression of the naturalization outcome (first stage)

	Male Coeff.	Female Coeff.
Years since eligibility	0.0409 ***	0.0475 ***
Age	-0.0257 ***	-0.0354 ***
Age squared	0.0003 ***	0.0004 ***
Years in Germany	-0.0038	-0.0145 **
Years in Germany squared	-0.0003 ***	-0.0001
High-skilled	0.1148 ***	0.0759 ***
Medium-skilled	0.0539 **	0.0915 ***
Observations	1,541	1,818

Note: All estimations include a constant, 15 state indicators and 10 indicators for region of origin. Standard errors are robust to heteroskedasticity. ***: p<1%, **:p<5%, *:p<10%.
Source: IAB-SOEP Migration Sample (2013).

Table B2: IV estimates of labor market outcomes on naturalization (0/1) instrumented by years since eligibility, as well as the quadratic and cubic of years since eligibility

	Male			Female		
Dependent Variable	**F-Stat**	**N**	**Coeff.**	**F-Stat**	**N**	**Coeff.**
A. Labor Market Access						
Employed (0/1)	50.3	1,541	0.0530	92.4	1,818	0.0353
Full-time employed (0/1)	35.3	1,168	0.0748	66.0	1,075	0.0568
Registered unemployed (0/1)	50.3	1,541	-0.0652	92.4	1,818	-0.1352 **
B. Labor Market Success						
ln(gross hourly wage)	42.6	1,039	-0.0051	58.4	977	0.1293
ln(gross monthly earnings)	42.9	1,048	0.0548	59.8	987	0.2492
Permanent contract (0/1)	35.3	1,168	0.2629 ***	66.0	1,073	0.3043 ***
White collar job (0/1)	35.3	1,168	-0.2172 **	66.0	1,075	-0.2313 ***
UB2-last year (0/1)	50.3	1,541	-0.0166	92.4	1,818	-0.2143 ***
UB2-last year (number of months)	50.3	1,540	-0.2364	92.4	1,818	-2.3660 ***
C. Investment						
Education in Germany (0/1)	50.2	1,539	0.0858	92.4	1,818	-0.1280 **
Language skills (1=low, 5=high)						
Average score (1-5)	50.6	1,537	0.1475	92.1	1,815	-0.0189
Speaking (1-5)	50.6	1,537	0.2102 *	92.1	1,815	-0.0300
Writing (1-5)	50.6	1,537	0.1648	92.1	1,815	0.0254
Reading (1-5)	50.6	1,537	0.0676	92.1	1,815	-0.0520
Property owner (0/1)	50.3	1,541	0.1887 ***	92.4	1,818	0.1491 **
Tenure (number of years)	34.9	1,165	1.5694	66.9	1,071	2.5733 ***
German partner (0/1)	23.8	844	0.1501 **	64.2	948	0.0332

Note: The table presents the F-statistic of the first stage regression (naturalization with the instruments 'years since eligibility' as well as the quadratic and cubic of 'years since eligibility'), estimated for the relevant number of observations as presented in the column labelled N, and the coefficient estimate of the naturalization effect in the second stage regression. Note that 8 years are added to the values of the instrument 'years since eligibility' to account for negative values before the quadratic and cubic terms are computed. The control variables are age, age squared, two education indicators, years since migration and its square, indicators federal state of residence, and region or country of origin. Standard errors are robust to heteroskedasticity. ***: p<1%, **:p<5%, *:p<10%.

Source: IAB-SOEP Migration Sample (2013).

Table B3: IV estimates of labor market outcomes on naturalization (0/1) instrumented by categories of years since eligibility

	Male			Female		
Dependent Variable	**F-Stat**	**N**	**Coeff.**	**F-Stat**	**N**	**Coeff.**
A. Labor Market Access						
Employed (0/1)	34.9	1,541	0.0432	56.7	1,818	0.0180
Full-time employed (0/1)	22.5	1,168	0.1206	35.6	1,075	0.0600
Registered unemployed (0/1)	34.9	1,541	-0.0457	56.7	1,818	-0.1336 **
B. Labor Market Success						
ln(gross hourly wage)	21.6	1,039	-0.0589	30.6	977	0.0319
ln(gross monthly earnings)	21.7	1,048	0.0373	31.7	987	0.1040
Permanent contract (0/1)	22.5	1,168	0.2251 **	35.6	1,073	0.3123 ***
White collar job (0/1)	22.5	1,168	-0.1737	35.6	1,075	-0.2568 ***
UB2-last year (0/1)	34.9	1,541	-0.0591	56.7	1,818	-0.1694 ***
UB2-last year (number of months)	34.8	1,540	-0.7432	56.7	1,818	-1.8862 ***
C. Investment						
Education in Germany (0/1)	34.8	1,539	0.1215	56.7	1,818	-0.1223 *
Language skills (1=low, 5=high)						
Average score (1-5)	35.4	1,537	-0.0060	56.5	1,815	-0.2643 **
Speaking (1-5)	35.4	1,537	0.1231	56.5	1,815	-0.1939
Writing (1-5)	35.4	1,537	-0.0337	56.5	1,815	-0.2653 *
Reading (1-5)	35.4	1,537	-0.1074	56.5	1,815	-0.3337 **
Property owner (0/1)	34.9	1,541	0.0944	56.7	1,818	0.0918
Tenure (number of years)	22.4	1,165	1.2176	35.7	1,071	2.3341 ***
German partner (0/1)	21.9	844	0.1391 **	34.0	948	-0.0256

Note: The table presents the F-statistic of the first stage regression (naturalization instrumented by indicators representing categories of 'years since eligibility'), estimated for the relevant number of observations as presented in the column labelled N, and the coefficient estimate of the naturalization effect in the second stage regression. Values of the instrument 'years since eligibility' are categorized into following intervals: [-8, 0], [1, 5], [6, 10], [11, 18], [19, 53]. The indicator for the [-8, 0] interval is the reference category in the first stage regression. The control variables are age, age squared, two education indicators, years since migration and its square, indicators federal state of residence, and region or country of origin. Standard errors are robust to heteroskedasticity. ***: p<1%, **:p<5%, *:p<10%.
Source: IAB-SOEP Migration Sample (2013).Appendix B: Additional Results