

# THE EVOLUTION OF IMMIGRANTS' HOMEOWNERSHIP IN GERMANY\*

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DECEMBER 2016

## ABSTRACT

Recently, homeownership rates of migrants in Germany increased by more than 10 percentage points. To shed light on this sharp increase, this paper investigates the change in homeownership rates of immigrant households in Germany between 1996 to 2005 and 2000 to 2012 respectively using a probit-based non-linear decomposition method. Empirical findings suggest that 50 percent of the change in immigrants' homeownership rate within the first time period can be explained by characteristics, especially by age and educational attainment. In the second time period, the explanatory power of characteristics is almost zero indicating that it is the favorable economic environment during that time that is responsible for the increase in homeownership of immigrant households in Germany.

**KEYWORDS:** Homeownership, International Migration, Germany

**JEL CLASSIFICATION:** F22, J15, R21

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\*We would like to thank the participants from the CAWM doctoral research seminar for valuable comments and useful suggestions.

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# 1 Introduction

Triggered by the seminal work of Chiswick (1978), a large number of studies have analyzed the economic performance of immigrants in the past through their assimilation towards comparable natives in labor-market-related outcomes such as earnings and employment. In order to measure long-term economic success however, homeownership is more suitable since it is a more permanent and stable indicator of one's economic situation than income. It permits both current and future consumption (Doiron and Guttmann, 2009), so that it does not only reflect current economic success but also the prospects for future generations (Osili and Paulson, 2007). Besides, homeownership can be seen as an indicator of upward mobility and may reflect a strong commitment to the host country (Myers and Lee, 1998; Constant et al., 2009). This might especially be true in Germany, where the acquisition of housing property requires a high amount of equity and where homeowners are often "one-time-buyers", so that the purchase of own property may be a strong predictor of immigrants to have the intention to permanently stay in the host country. According to Myers and Lee (1998), the acquisition of residential property is one of the most important events in migrants' integration process.

Beside the fact that homeownership allows inferences about the long-term integration success of immigration, it is important for a number of other reasons. Housing wealth constitutes the most valuable asset in a household's wealth portfolio and is an important savings vehicle. Consequently, it highly contributes to the social and economic well-being of individuals (Krivo, 1995) and plays a key role in providing long-term financial security (Sinning, 2010). In the light of the demographic change along with an aging population in numerous industrialized countries, the resulting pressure on the state pension systems leads housing equity to become even more important for private retirement provision.

A large share of immigrants, especially those who immigrated to Germany as guest workers is close to retirement age, which raises the question whether immigrants have accumulated sufficient (housing) wealth to provide for themselves in later life. New data on migrants draw a somehow dramatic picture. Older migrants in particular those who came as guest workers from Turkey, are at a high poverty risk (bpb, 2016). The case of Germany is also interesting since its migration policy has substantially changed since the last century. While Germany has seen itself only as a temporary destination for immigrants for a long time, nowadays, it is the country with the largest number of foreign citizens and with the 9th highest foreign-born share among the EU-27 countries (Mathä et al., 2011). This is due to the fact that a lot of immigrants that came in the 60s and 70s stayed in Germany in contrast to former expectations. Consequently, the long-term integration success as well as the economic performance of immigrants in Germany is of great significance for the social welfare systems. For this reason, low access to homeownership for immigrants and systematic disparities in homeownership probabilities between natives and immigrants is cause for major concern.

The German housing market is characterized by a low homeownership rate in comparison with other countries. According to Voigtländer (2009) the main reasons can be seen in the relative liberal rental market and strong tenant protection as well as relatively few subsidies for the construction of own-occupied property. Additionally, housing financing in Germany is marked by strong borrowing conditions meaning that a relatively high amount of equity is required in order to get a credit, so that low-income households often are excluded from the housing market. Based

on these special characteristics of the German housing market, one may expect that it is not easy for immigrants to generate housing wealth in Germany. Immigrants often are at the lower end of the income distribution and have less time to accumulate enough wealth to meet the down-payment requirements. Discrimination on the credit market and uncertainties about the future may additionally act upon migrant's homeownership rate. Nevertheless, we observe an overall increase in the demand of housing property in the last years (AndeMeulen and Micheli, 2013) and a particularly sharp increase of immigrant's homeownership rates in the last decade (Reimann et al., 2014). It is likely that favorable changing macroeconomic conditions such as low interest rates and a positive economic development as well as the increasing awareness of the need of private retirement provision have contributed to the overall increase in housing demand. However, these factors alone cannot explain why the homeownership rate of immigrants has increased significantly more than that of natives.

Previous literature on the evolution of homeownership rates and nativity homeownership gaps largely concern the US. Most of the studies find that homeownership has risen for all racial and ethnic groups and that the gap between racial or ethnic groups, respectively immigrants and natives, has declined. The causes for the decline in homeownership gaps however, largely remain inconclusive, and seem to depend on the ethnic or racial group and the time period considered, among others. Recent empirical studies investigating immigrant's homeownership in Germany are scarce and have in common a focus on cross-sectional considerations (Constant et al., 2009; Sinning, 2007; Bauer et al., 2011). To the best of our knowledge, the only study that investigates the evolution of homeownership rates of immigrants and natives in Germany over time is Sinning (2010).

Therefore, this paper aims at analyzing the change in homeownership rates of immigrants and natives from 1996 to 2012 using a non-linear decomposition method based on Fairlie (2005). It allows to find out how much of the observed change can be explained by a change in individual-specific, household- and migration-related characteristics. The remaining residual part may reflect a change in unobservable factors and a change in the weights the characteristics have in the housing tenure choice. The empirical analysis uses data drawn from the German Socio-Economic Panel (GSOEP) matched with housing market variables on a low aggregated regional level to control for overall changes in the housing market.

Thus, we contribute to the literature in a number of ways. First, we update the analysis by Sinning (2010) by using more recent data. The investigation of the development of homeownership rates in recent years is especially interesting since the major changes in homeownership rates and the greatest convergence of the rates can be observed in the years from 2007 onwards which are excluded from the analysis of Sinning (2010). Second, using the non-linear decomposition method based on Fairlie (2005), we are able to quantify the contribution of the overall explained part to the observed increase in homeownership rates, namely the characteristics effects, and the quantitative contribution of the specific covariates separately. Third, we employ additional covariates that are excluded from a lot of studies on homeownership differentials due to a lack of data. In specific, we include regional house prices on a low aggregated regional level<sup>2</sup> and include soft integration measures such as language skills of migrants which have often been neglected in other studies (Constant et al., 2009), although they reveal additional insights about migrant's cultural assimilation and commitment to the host country's society.

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<sup>2</sup>Note that Sinning (2010) includes house prices only on the state level.

Our results suggest that about 50 percent of the 8 percentage point increase in immigrant's homeownership rate within the time period from 1996 to 2005 can be explained by characteristics, especially by individual-specific characteristics like age and education. Within the second time period from 2000 to 2012, the homeownership rate of immigrants increased by a similar amount, but this increase cannot be explained by a change in specific characteristics of immigrants during this time. The unconditional homeownership gap between natives and migrants narrowed sharply, especially since 2006. However, we are not able to assign this to the fact that characteristics of migrants and natives changed in a different way. It is rather a change in the housing tenure choice process of migrants that helps to explain the sharp increase in the homeownership rate of the migrant population.

The rest of this paper is structured as follows. The next section presents the related literature and embeds our work into wider context. Section 3 outlines the data and reports some descriptive statistics of the sample. Sections 4 and 5 present the methodology used, respectively the empirical results. Section 6 concludes.

## 2 Related Literature

Early contributions to the literature that analyzed the economic performance of immigrants focused on their assimilation towards comparable natives through labor-market-related outcomes such as wages and employment (Borjas, 1985; Chiswick, 1978). More recently, researchers began to investigate the wealth position of immigrants and natives and to quantify the wealth gap between them, respectively among immigrants and certain ethnic and racial groups in order to assess the integration and assimilation success of immigration. In this context, there evolved a large strand of empirical literature that puts the emphasis on specific components of wealth. Most of these studies examine homeownership differentials between natives and ethnic minorities.

Given the large number of studies existing on homeownership differentials, in the following, we will concentrate the literature review on those studies that are closest to the analysis at hand. Consequently, we review studies that perform a trend analysis and studies that have been undertaken with German data.

### Trend studies

Early research largely concerned the trend in black-white homeownership differentials in the US and showed that blacks are less likely to be homeowner than whites, but that homeownership rates of blacks have increased by a significant amount, so that the black-white gap in homeownership has narrowed. However, they also provide evidence that the houses owned by black couples were substantially less valuable than those of white couples and that this gap in housing values had not shrunk significantly during the periods under consideration (Collins and Margo, 1999; Gabriel and Rosenthal, 2005; Long and Caudill, 1992).

With regard to the methodology, our analysis is closely related to Coulson and Dalton (2010) who examine changes in homeownership rates over time. They use synthetic cohorts stratified by ethnic and age groups for five censuses over the 1960 to 2000-period and, as in the paper at hand, perform probit-based temporal Oaxaca-Fairlie decompositions of the change in ownership rates. They find that homeownership rates increase over time for all cohorts and groups with the exception of older cohorts and that the endowment effect explains relatively little of the observed

change in ownership rates. Moreover, they show that apart from the two decades from 1980 to 2000, where non-white households experienced substantial convergence of endowment effects, the white/non-white homeownership gap did not exhibit large changes over time. Bostic and Surette (2001) also decompose the trend in homeownership rates of ethnic groups in the US and investigate the determinants contributing to it. They consider the period from 1989 to 1998 and additionally distinguish between several income groups. As Coulson and Dalton (2010), they find that homeownership has risen for all groups. Their results suggest a decline in homeownership differences between minority and non-minority as well as between middle-income and lower-income families. As results indicate that changes in family-related characteristics largely cannot explain these declines, the authors conclude that it is the favorable economic circumstances during that time, i.e. changes in mortgage and housing markets as well as changes in the regulatory environment, that are responsible for the decline in the homeownership gap for lower-income families.

Our study is also closely related to Borjas (2002) who analyzes the determinants and trends of homeownership in immigrant households in the US over the period from 1980 to 2000. His findings indicate that immigrant households have lower homeownership rates than native households and that this gap widened significantly over the period under consideration. As in Coulson and Dalton (2010), only a relatively small part of the homeownership gap can be attributed to background variables such as income and household composition. Instead, the author presents evidence that the homeownership gap can largely be explained by the differential location decisions of immigrants and natives and especially by the changing national origin mix of the immigrant population. A similar study is that of Gobillon and Solignac (2015) who investigate the differences in homeownership rates between first-generation migrants and natives in France, and the evolution of the gap over the period from 1975 to 1999. The authors explicitly control for selection effects related to international migration flows by distinguishing between entrants, stayers and leavers. More precisely, they determine the effect of entries and exits into the territory on migrant's homeownership rates and assess the evolution of differences in homeownership rates between those natives and immigrants who remain in the territory over the complete period under consideration. They find substantial selection effects. Immigrant entrants have a lower homeownership rate than immigrant stayers who remained in the country over the period under consideration. Common with Borjas (2002) for the US, Gobillon and Solignac (2015) find that the homeownership gap has increased over the considered period in France. This is explained by the fact that the negative effect of entries into the territory due to lower mean age of entrants and their location choices of large cities where homeownership rates are low, is significantly larger than the positive effect of leavers.

Kuebler and Rugh (2013) examine determinants and changes in racial and ethnic homeownership disparities over the whole period from 2001 to 2010 and for shorter time periods in between to catch up the effects of the housing boom and collapse in the US at that time. Results reveal that during the peak years of the housing boom, the gap between whites and blacks or Puerto Ricans respectively, decreased. While the gap continued to narrow for Puerto Ricans during the crash, gains among blacks eroded. Results further suggest that differences in homeownership between whites, Asians, Mexicans and Cubans are mainly attributed to differences in their socioeconomic status.

## Studies using German data

The literature about immigrant's homeownership in Germany is surprisingly scant. One of the recent applications which is also very close to the analysis at hand is Sinning (2010) who investigates the homeownership gap between immigrants and natives in Germany using data from the GSOEP and putting particular emphasis on the assimilation process of immigrant households. Employing a binary probit model, he first examines the determinants of homeownership status for migrants and natives in West Germany and finds that the probability of immigrant households to become a homeowner is about 20 to 30 percentage points lower than the corresponding probability of comparable natives. Applying a double cohort model, the author shows that the duration of residence in Germany does not affect migrant's homeownership probability indicating a lack of assimilation in homeownership between natives and immigrants over the 1995 to 2006 period. By separating estimates for rural and urban regions, he ensures that the empirical findings are not influenced by different location preferences of immigrants and natives. A similar study is that of Constant et al. (2009) who also investigate immigrant homeownership probabilities with a binary probit approach using GSOEP data. Instead of focusing on the assimilation process of immigrants, they explicitly account for ethnic identity as a potential influence factor on the housing tenure choice. They come to the same result as Sinning 2010 that the probability of immigrants to own their homes is significantly lower than that of natives, even after controlling for a variety of socio-economic, demographic and housing market characteristics. Moreover, they show that the probability of owning a home increases for immigrants with a stronger commitment to the host country.

Also based on GSOEP data, Sinning (2007) examines both the gap in overall net wealth and in various wealth components, among others in own-occupied and other property, and comes to similar results than the two aforementioned studies with respect to the nativity gap in homeownership rates. Furthermore, quantile regression results indicate that natives are much wealthier than immigrants along the entire wealth distribution which is mainly due to differences in housing equity. The semi-parametric decomposition analysis reveals that a large fraction of both the overall wealth gap and the gap in specific wealth components is largely the result of differences in educational attainment, while it cannot be explained by either the distribution of income or by immigrant's demographic characteristics. Bauer et al. (2011) and Mathä et al. (2011) do not focus solely on homeownership either, but study the relative net wealth position of immigrant households in Germany as well as in Australia and the United States, respectively in Italy and Luxembourg. They come to similar results for Germany as Sinning 2007 in that the authors find a substantial wealth gap stemming from differences in the educational attainment rather than from differences in income. Different from the results of Sinning (2007), their findings suggest that demographic characteristics also contribute to the overall wealth gap.

Dustmann and Mestres (2010) do not explicitly compare homeownership or wealth between immigrants and natives, but analyze property, savings and other asset holdings of immigrants in relation to their return plans. They argue that migrant's return plans influence the distribution of savings and assets between their host and home countries and that savings and asset holdings of immigrants are seriously underestimated when neglecting the home country component. Indeed, when considering ownership in the home and host country, the authors find that in 1988, the proportion of all immigrants (temporary and permanent) that holds property amounts to 49.9 percent while that of natives' only amounts to 43.6 percent. Moreover, the authors find that immigrants with intentions to return are less likely to own a home in the host country and are significantly

more likely to own property in the home country. Bauer and Sinning (2011) also analyze saving differences between natives and immigrants in Germany. As in the paper at hand, they employ a non-linear decomposition method and find that the major part of the nativity gap in savings between natives and permanent immigrants can be explained by observable characteristics. In accordance with Dustmann and Mestres (2010), they find that temporary immigrants save more in intention to send remittances to the home country. Thus, the savings gap between natives and temporary immigrants is negative and can mainly be explained by higher preferences of temporary immigrants to save.

Finally, the study of Drever and Clark (2002) focuses on housing quality that is measured by ownership status, housing space, subjective measures and the location of the dwelling. Examining the housing conditions for immigrants between 1985 and 1998 in Germany, they find that being a foreigner has a negative effect on housing quality and that there is a large gap in housing quality between German citizens and foreigners.

Summarizing, although there are differences depending on the country of origin, being an immigrant or belonging to a racial or ethnic group was in the past and still is associated with significantly lower probabilities of owning a home (Coulson and Dalton, 2010; Painter et al., 2001). The empirical evidence about the evolution (convergence or divergence) of homeownership gaps as well as the causes for the development of homeownership rates however remain controversial.

### 3 Data and Descriptive Statistics

#### Data

The empirical analysis uses data drawn from the GSOEP which is a yearly repeated panel study containing about 11,000 households and 20,000 individuals from the Federal Republic of Germany.<sup>3</sup> We employ household level data and define a household as an immigrant household if the household head was born abroad and immigrated to Germany at a certain age. Native households are defined as those where the household head was born in Germany, thus also including second-generation migrants. Consequently, both types of households can be so called “mixed” households, where the partner of the household head has a different nativity, so that an immigrant household must not be necessarily a household where all persons are foreign-born. A household is classified as owner if the household head owns the dwelling the household lives in. The information on ownership is collected each year. In the years 2002, 2007 and 2012, wealth on an individual level is available, so that we also know the value of the dwelling and outstanding mortgages.

The probability of homeownership is influenced by a variety of variables. Common with the homeownership nativity gap literature (Constant et al., 2009), we categorize the covariates in three different groups: First, are socio-economic and demographic variables such as age, gender, family status, educational attainment and employment status, forthcoming labeled as individual-specific characteristics. These individual characteristics are reported for the household head. Second, household-related characteristics like the number of children, the number of persons living in the household and household income<sup>4</sup>. The third group is migration-related variables like year of mi-

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<sup>3</sup>For an overview of the GSOEP see Wagner et al. (2007).

<sup>4</sup>Economic theory suggests that wealth accumulation is affected by permanent rather than current income. Since the GSOEP does not provide a measure of permanent income, we use current income instead.

gration (immigration cohort), country of origin, the wish to stay in Germany and German language skills<sup>5</sup>. These variables are naturally only collected and reported for immigrants. In addition to the three important categories of explanatory variables listed before, we also include regional controls to account for geographic clustering which is supposed to be substantial in Germany, since immigrants are more likely to live in big cities where homeownership rates are low (Borjas, 2002). We use the following regional covariates in our analysis: population density, region type and a dummy variable for living in East or West Germany.<sup>6</sup> In addition, we employ a local housing market variable, in specific regional house prices to account for the recent volatility and regional diversity in the German housing market. For the two variables “regional population density” and “regional house prices”, we have combined the GSOEP data with metropolitan area level data from the German Federal Institute for Research on Building, Urban Affairs and Spatial Development, and from the BulwienGesa AG, respectively. The regional house price index is based on own-occupied dwelling houses in euros per square meter. Since in 1996, the boundaries of the spatial planning regions have changed, we begin our analysis in the year 1996. Hence, we analyze the trend in homeownership rates of immigrants and natives for the period from 1996 to 2012.

We observe between 7,000 and 13,000 households per year, resulting in a total of about 184,532 household-year observations. Of those, 21,102 household-year observations are that of immigrant households.

## Descriptive statistics

Figure 1 presents the evolution of homeownership rates of foreign-born and native-born households in Germany over the sample period from 1996 to 2012. First of all, we see that homeownership rates of natives are significantly larger than that of immigrant households indicating a substantial nativity homeownership gap over the whole period. The average homeownership rate of natives amounts to around 41 percent, whereas that of migrants only amounts to roughly 22 percent in 1996. However, as the homeownership rate of migrants increases more than that of natives especially over the last five years, there is a convergence of foreign-born households towards the homeownership rates of native households over time. Secondly, we observe a clear time pattern with regard to the evolution of homeownership rates which justifies a division of the sample period into three shorter time periods, namely from 1996 to 2001, from 2001 to 2006 and from 2006 to 2012. For descriptive convenience, in the following, we will refer to these periods as period one, two, and three, respectively. In the first period, the homeownership rate of natives increases slightly from 41 to roughly 44 percent whereas that of immigrants goes up and down and nearly ends up at the initial level of around 22 percent. In the second period from 2001 to 2006, the homeownership rate of natives decreases and that of immigrants increases slightly, so that there is already a small convergence of homeownership rates at that time. In the last period from 2006 to 2012, we observe the greatest changes in homeownership rates. Homeownership rates of both natives and immigrants increase, but that of immigrants with a much steeper slope, so that homeownership rates continue to converge. Overall, the homeownership gap decreases

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However, Sinning (2007) showed that the use of a proxy measure of permanent income, in specific predicted income constructed following Blau and Graham (1990), did not affect the results of the empirical analysis substantially.

<sup>5</sup>As measure of German language skills, we use either a variable indicating the language of the newspaper that immigrants read regularly, or one indicating the language that immigrants use most often. The use of the variables depends on data availability.

<sup>6</sup>Regional data rely on the concept of Raumordnungsregionen by the BBRS.



from around 18 to 15 percentage points, but still remains substantial.

### **Figure 1 About Here**

These observations are confirmed by table A1 which presents the average characteristics of immigrants and natives over the period from 1996 to 2012. In order to increase the sample size, we pooled the data for the three periods introduced above.

### **Table A1 About Here**

Descriptive analysis of the sample reveals that on average natives are two years older than migrants (in the first period for example the average native was 52 and the average migrant was 50 years old), and that mean age of both groups rises over the observation period by roughly three years. The average migrant is more often married (60 vs. 45 percent) and male (65 vs. 55 percent) compared to natives. However, the percentage of married and male household heads of both groups decreases significantly over the sample period. Whereas the employment rate does not much differ between migrants and natives (about 58 percent for both) nor between time periods, the differences in educational attainment are substantial in that natives are much better educated. However, immigrants catch up in education over time.

With regard to household-related characteristics, we find that the average native household is smaller, meaning that it has fewer kids and persons. Migrant's household real net income amounts to about 2,100 Euro and that of natives to about 2,268 Euro in the first period and is relatively stable over time for both groups. While the nativity differences in household income thus are rather negligible, differences in household wealth are fundamental.<sup>7</sup> In the second period, overall real net wealth amounts to 80,191 Euro, while that of natives amounts to 173,609 Euro, thus being more than twice as large. We find the same picture for real net own housing wealth, which amounts to 41,983 and 88,273 Euro, respectively. Given that both the amounts of overall net wealth and net own housing wealth are decreasing for natives and increasing for immigrants, the unconditional nativity wealth gap slightly declines over the considered period. Naturally, the corresponding conditional wealth figures are higher. It is striking that conditional real net own housing wealth of natives is only about two times higher than unconditional real net own housing, whereas that of immigrants is more than four times larger. However, in contrast to the unconditional housing wealth, conditional housing wealth of immigrants is decreasing from the second to the third period, although homeownership rates have risen at the same time.

Descriptive analysis of regional variables shows that nearly all immigrants in our sample live in West Germany (97 percent) and more than two thirds live in urban areas, while the percentage of migrants living in rural areas is relatively small and only amounts to around 10 percent. Over the sample period, there is no significant change of this picture. The proportion of immigrants living in West Germany has only slightly increased and that of living in urban areas slightly decreased in favor of rural areas. The majority of natives also live in West Germany (80 percent) and urban areas (55 percent), but the shares of natives are smaller compared to migrants. With regard to region size, descriptive statistics reveal that immigrants live more often in larger regions than natives.

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<sup>7</sup>Average wealth differences between immigrants and natives are reported here, although wealth is not included in the decomposition analysis due to endogeneity problems.

The last group of covariates, that is migration-related characteristics, reveals interesting insights into the composition of the immigrant population and its changes over time. On average, immigrants came to Germany at an age of 27 years in the first period. Age at migration has slightly decreased over time, so that in the last period, immigrants were about 2.5 years younger, when they arrived in Germany. They have been in Germany for 23 years in the first and second period and for roughly 28 years in the last time period. In our sample, half of all immigrants are born in countries of Central and Eastern Europe (CEE) and about one quarter are born in OECD countries. Whereas the percentage of immigrants of those countries of origin has not significantly changed over the sample period, the percentage of immigrants with Turkish origin has decreased by nearly 3 percentage points. Over two thirds of immigrants wish to stay in Germany and this share increased significantly by nearly 10 percentage points, resulting in around 77 percent wishing to stay in the last period. Results show that nearly half of migrants mostly speak German and more than one third speaks German and the language of their home country equally often. While the share of those speaking mostly German has increased from 43 percent to around 50 percent, the share of those mostly speaking the language of their home country has decreased from 17 to 13 percent over the considered time period. A similar picture can be observed with regard to the preferred newspaper language from home and host country. At the beginning of the sample period, half of the immigrants read mostly or exclusively German newspaper and this proportion increases by around 9 percentage points over time, while the shares of immigrants that read newspapers from home and host countries in equal frequency or mostly respectively exclusively read newspapers from their home country decreases significantly. These facts might be a first piece of evidence in favor of cultural assimilation and commitment to the host country's society.

## 4 Methodology

### Probit Regression

To investigate the determinants of the homeownership probability, we use a binary probit model, since the dependent variable, i.e. the homeownership status of household  $h$  ( $H_h$ ), is dichotomous. It takes the value one if the household owns a home and zero otherwise. The model of the homeownership decision assumes the probability of owning a home to be a function of the individual-specific ( $X_{ind}$ ), household-related ( $X_{hh}$ ), locational characteristics of the household ( $X_{reg}$ ), as well as of migration-related characteristics ( $X_{mig}$ ). The specific variables that are included in these vectors are those described in detail in section 3. We have adopted these variables from the voluminous literature examining tenure choice that has shown their importance in the determination of household's homeownership decisions. With  $\epsilon_h$  representing the standard normal error term, it follows that

$$Prob(H_h) = X_{sd}\beta + X_{hh}\alpha + X_{reg}\delta + X_{mig}\mu + \epsilon_h. \quad (4.1)$$

Naturally, the migration-related variables are zero for natives, in specific, if  $M_h = 0$ . In latent binary regression models, the estimated coefficients do not quantify the influence of the covariates on the probability that the explained variable takes on the value one. It is necessary to compute

marginal effects<sup>8</sup>. The marginal effect of a covariate is the effect of a unit change of this variable on the probability  $P(Y = 1|X = x)$ , given that all other explanatory variables are constant.

### Fairlie Decomposition

To analyze the driving forces of the observed increase in homeownership rates of migrants, we decompose the change over time into a characteristics and a coefficients effect using the methodology proposed by Fairlie (2005). This method adjusts the well known Blinder-Oaxaca decomposition to the case of binary dependent variables.<sup>9</sup> We decompose homeownership rate differences between two points of time,  $t + 1$  and  $t$ , as

$$\bar{Y}^{t+1} - \bar{Y}^t = \underbrace{\left[ \sum_{h=1}^{N^{t+1}} \frac{F(X_h^{t+1} \hat{\beta}^{t+1})}{N^{t+1}} - \sum_{h=1}^{N^t} \frac{F(X_h^t \hat{\beta}^{t+1})}{N^t} \right]}_{\Delta_X} + \underbrace{\left[ \sum_{h=1}^{N^t} \frac{F(X_h^t \hat{\beta}^{t+1})}{N^t} - \sum_{h=1}^{N^t} \frac{F(X_h^t \hat{\beta}^t)}{N^t} \right]}_{\Delta_C}, \quad (4.2)$$

where  $h = 1, \dots, N^t$  and  $h = 1, \dots, N^{t+1}$  is the number of households in year  $t$  and year  $t + 1$ , respectively. The vector  $X$  includes the sample means of the variables. The coefficients  $\beta^t$  and  $\beta^{t+1}$  are estimated by two separate Probit models.  $F$  is the cumulative standard normal distribution and  $F(X\beta)$  the predicted homeownership probability at given values of  $X$ .  $\sum_{h=1}^{N^t} \frac{F(X_h^t \hat{\beta}^{t+1})}{N^t}$  is the counter-factual probability to be a homeowner given the characteristics in  $t$  if they were evaluated with the coefficients of  $t + 1$ .

The first term in brackets ( $\Delta_X$ ) is the characteristics effect that reflects how much of the change over time can be explained by a change in the average characteristics of migrants. The second term in brackets ( $\Delta_C$ ) is the coefficients effect which captures the contribution of the change in weights that the individual characteristics have on the choice of homeownership (Coulson and Dalton, 2010). In the standard application of the Blinder-Oaxaca decomposition of average wages between men and women, the coefficients effect is usually interpreted as discrimination. If for example men have higher returns to education than women, the wage benefit of an additional year of education is higher for men than for women and this is often explained with discrimination against women. But what does the coefficients effect reflect in our case? A decrease in the returns of income for example would mean that the importance of income in determining homeownership has weakened and that differences in homeownership rates between income groups decrease over time. This may be due to a change in macroeconomic conditions that mitigate the role of income in determining homeownership. The coefficients effect additionally includes a change in unobservable factors. A major claim of this kind of decomposition technique is that the coefficients effect is biased if unobservable factors are correlated with the independent variables (Fairlie, 2005; Fitzenberger and Sommerfeld, 2015). This makes it quite difficult to interpret the coefficients effect. We come to this later when discussing our results.

Since we decompose differences of an outcome over time, our "group" variables are defined by years. So, we decompose the change in homeownership rates between period one and two and

<sup>8</sup>For the exact analytical derivation of marginal effects in bivariate probit models see Greene (1996).

<sup>9</sup>For a general application of the Blinder Oaxaca decomposition to nonlinear models see Bauer and Sinning (2008).

between period two and three.

The reference period in our decomposition is the time period with the higher homeownership rate which is in both cases the respective later period. Thus, the characteristics of the first time period are evaluated at the coefficients of the second time period and, for the second decomposition, the characteristics of time period two are evaluated at coefficients of time period three. As results may be sensitive to the choice of the reference group (this is true for linear as well as for non-linear decompositions), we additionally run robustness checks for different reference groups.

We do not only want to investigate the contribution of the overall explained part to the observed increase in homeownership rates, but also the contribution of certain covariates separately. We follow Fairlie (2005) who decomposes the explained part by a matching procedure. The contribution of a component is calculated by replacing the distribution of that component in one time period with the distribution of the same component in the following time period. The contribution of the individual-specific characteristics of migrants for example can be expressed as follows

$$\frac{1}{N^t} \sum_{h=1}^{N^t} F(\alpha + X_{ind,h}^{t+1} \hat{\beta}_{ind}^* + X_{hh,h}^t \hat{\beta}_{hh}^* + X_{reg,h}^t \hat{\beta}_{reg}^* + X_{mig,h}^t \hat{\beta}_{mig}^*) - F(\alpha + X_{ind,h}^t \hat{\beta}_{ind}^* + X_{hh,h}^t \hat{\beta}_{hh}^* + X_{reg,h}^t \hat{\beta}_{reg}^* + X_{mig,h}^t \hat{\beta}_{mig}^*). \quad (4.3)$$

Analogous to formula 4.3 we can calculate the contribution of the other group of covariates. Since the matching procedure requires equal sample sizes in both time periods, a random subsample of the time period with the larger sample size is used.

As the results of the detailed decomposition may vary with the order of switching the distributions, Fairlie (2005) proposes to run some robustness checks by varying the ordering of variables. However, note that the contribution of the overall explained part is not affected by the ordering of the covariates.<sup>10</sup>

## 5 Empirical Results

### Determinants of Homeownership

Using the cross-sectional sample of the year 2012 we estimate two probit models, one for natives and one for immigrants. Regression results are reported in table A2. To facilitate the interpretation we show the marginal effects along with associated standard errors.

#### Table A2 About Here

We see that most of the variables are statistically significant and mostly consistent with both economic theory and existing empirical results. The estimates suggest that age, marital status and income play a crucial role in determining homeownership for immigrants and natives. The positive marginal effects of these variables are very large and significant, mostly on the one percent level. The older natives or migrants are, the higher the probability of owning a home. While age is more important for natives in determining homeownership, marital status and income are

<sup>10</sup>Also see Fitzenberger and Sommerfeld (2015) who employ a sequential decomposition that also allows to decompose the coefficients effect into its single components.

more important in explaining migrant's homeownership status. For immigrants for example, being married increases the homeownership probability by 22.4 percentage points, while for natives it increases homeownership probability by only 12.3 percentage points. This might be explained by the fact that for migrants, it is even more important to be married, maybe due to simpler access to the credit market and/or greater confidence in the ability of a married couple to meet the down-payment conditions. For the relationship of income and homeownership, we observe a similar pattern. Again, marginal effects are positive and significant for both groups, indicating that households with relatively higher income levels are more likely to own a home. A migrant that is under the top 20 percent of income earners has a 41.1 percentage point higher probability to own a home compared to a migrant which is in the bottom income quintile. The equivalent marginal effect for natives amounts to 30.8 percentage points. Again, this might be interpreted as evidence in favor of stronger credit market conditions for migrants, and for lenders to have higher confidence in migrant's ability to meet the high amount of down-payment that is required to get a credit.

The estimates further provide evidence for a positive relationship between the educational attainment of the household head and the probability of homeownership for both natives and immigrants. For the number of children and the number of persons in a household, we would also have expected a significant positive effect on the probability of homeownership for natives and immigrants. However, for immigrants both effects are insignificant and for natives, an increase in the number of children even reduces the homeownership probability by 5.1 percentage points. This might be due to the fact that children are very costly, so that families with more children do not have enough money left to meet the high down-payment conditions. The employment status does not seem to have a significant impact on homeownership at all which might be induced by the fact that income is included in the regression and absorbs the effect of employment. Interestingly, homeownership of natives becomes more likely and homeownership of migrants becomes less likely if the household head is male.

Further, results reveal that for immigrants, locational variables do not play a significant role in determining homeownership, while for natives the effect of living in West Germany and the effect of the region type are statistically significant. In particular, living in West Germany increases the homeownership probability of natives by 11.2 percentage points and living in urbanized or urban areas decreases the homeownership probability with respect to living in rural areas by 6.1 and 13.7 percentage points, respectively. As expected, although small, the effect of house prices on the probability of owning a home is negative and significant for both groups, indicating that an increase in housing costs reduces homeownership probability.

With regard to the effect of migration-related characteristics, first of all, we find that immigration cohort effects all have the expected sign, but that the marginal effects for the cohorts 1976 to 1985 and 1986 to 1995 are statistically insignificant.<sup>11</sup> By contrast, the negative marginal effect of the immigration cohort 1996 to 2005 is significant on the one percent level, indicating that immigrants of the youngest cohort are by 25.7 percentage points less likely to own a home than those migrants that immigrated to Germany before 1976 (reference group). The country of origin effect seems to play a minor role in explaining migrant's homeownership probabilities, since only migrants with Turkish origin seem to have a higher homeownership probability than those from CEE countries. Homeownership probabilities of migrants from OECD countries and of other ori-

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<sup>11</sup> Given the same age and year, the cohort effect equals the effect of years since migration.

gins seem not to differ from those of CEE country migrants. While immigrant's language skills seem to not affect homeownership decisions at all, the wish to stay in Germany turns out to be a strong predictor of homeownership. Migrant households who plan to stay in Germany have a 19.6 percentage point higher probability to own a house or apartment than comparable migrants who plan to return to their home country.

## Decomposition Results

The decomposition of the change in homeownership rates between period one (1996-2000) and two (2001-2005) shows that characteristic as well as coefficient effects nearly equally contribute to the 8 percentage point increase in homeownership rates (table A3, columns 2 and 3). The characteristics effect explains about 46 percentage points. By including migration-related variables as migration cohort and country of origin, the explained part rises to 51 percent.

### Table A3 About Here

For the change between period two (2000-2005) and three (2006-2012) we can observe a quite different pattern (table A3, columns 4 and 5). Although homeownership rates increased by nearly the same amount as in the first observation period (by 8.8 percentage points), the contribution of the explained part to this change is almost zero. The characteristics effect becomes even negative if migration-related variables are included. This means that characteristics that positively affect homeownership probability decreased over time. Thus, the homeownership rate of migrants would have increased even more if all characteristics of migrants did not have changed.

By splitting the explained part into the contribution of groups of variables we can see that the largest part of the increase between period one and two can be attributed to a change in individual-specific and migration-related characteristics. The change in household-related characteristics and regional allocation in contrast negatively impacted the increase in homeownership rates.

Again, the results for the change between period two and three show a different picture: the change in individual-specific characteristics have a negative contribution to the overall increase in homeownership rates during this time period. Only the migration-related variables have a positive contribution to the overall increase in homeownership rates, but this contribution is quantitatively smaller than in the first observation period. Thus, the individual characteristics effects compensate each other, so that the overall explained part is close to zero.

By subtracting the explained part from the difference, we get the coefficients effect. In the first decomposition it accounts for about 50 percent and in the second, it even accounts for over 100 percent. The Fairlie method that we apply here does not allow a detailed decomposition of the coefficients effect. Thus, unfortunately, we can not distinguish between the impact of a change in the slope coefficients for the variables and a pure time trend that is reflected by the constant term. Both factors are included in the coefficients effect (Fitzenberger et al., 2011; Fairlie, 2005). Additionally, we do not know, which slope coefficients may have changed.

An increase in the slope coefficients of given characteristics would reflect a divergence in homeownership rates at these characteristics (Fitzenberger et al., 2011). If the role of education in determining homeownership probability for example would have become more important (or more technically: if the coefficients on education increased), the gap in homeownership rates between high and low educated households would have risen.

All unobservable factors that changed during the time period are included in the constant (Fitzenberger and Sommerfeld, 2015). Thus, if the constant shifted upwards, some factors that determine homeownership probability, but that are unobservable to the researcher, did change in the last decade. Such macroeconomic changes or time period effects could bias the coefficients effect upwards. To shed more light on this issue, one may look at how homeownership rates of migrants developed relative to those of natives (Borjas, 1985).

So, we also decompose the change in homeownership rates for natives to capture any macroeconomic changes that equally impacted homeownership decisions of both natives and migrants. Table A4 shows that natives' homeownership rate increased more slowly than that of migrants (by 6 percentage points between 1996 and 2005 and 1.6 percentage points between 2000 and 2012). The characteristics effect accounts for 56 percent of the total increase in the first time period and for minus 29 percent of the total increase in the second time period.

#### Table A4 About Here

The difference in the change in homeownership rates between migrants and natives can be expressed as follows

$$\Delta_Y^{Mig} - \Delta_Y^{Nat} = (\Delta_X^{Mig} - \Delta_X^{Nat}) + (\Delta_C^{Mig} - \Delta_C^{Nat}). \quad (5.4)$$

Due to the higher increase in homeownership rates of migrants compared to natives, the (unconditional) nativity gap has closed over the last years (by 1.21 percentage points during the first two time periods and by 7.25 percentage points between period two and three). The difference in the change of characteristics between migrants and natives is not very high, so that the largest factor in explaining the closing of the nativity gap is the higher coefficients effect of migrants. Consequently, the high coefficient effect may be the result of macroeconomic changes that only affected migrants but did not affect natives, or put differently, did not affect natives as much as migrants. One possible factor might be the implementation of the immigration law in 2005. If this reduced constraints for migrants to generate housing property it can explain the huge coefficients effect in the second decomposition.

Another possible factor that we do not control for is wealth. An exogenous increase in net wealth (may be due to inheritances) could explain an increase in homeownership rates if migrants decided to invest their wealth in housing property. However, it is not possible to check this in our regression because of the reversed causality between wealth and homeownership. If wealth of homeowners has risen during the observation period due to an increase in the value of their houses, the effect of wealth in the decomposition would be overestimated.

## 6 Robustness Checks

As the detailed decomposition may be sensitive to the choice of the ordering of variables (Fairlie, 2005), we checked the robustness of our findings by using different orderings of variables. Column 2 of table A5 shows the original ordering that we have used in the decomposition in the previous subsection. Column 3 shows the results if we reverse the ordering and column 4 shows the results if we randomize the ordering as proposed by Fairlie (2005). What remains fairly constant is the contribution of individual-specific variables as well as the contribution of household-related

characteristics. However, the effects of migration-related and regional variables change substantially. This is true for both decompositions. As the randomized ordering takes the average results over all possible variable orders, it is our preferred specification. According to the results of the randomized ordering, individual-specific characteristics remain the largest factor in explaining the increase of immigrant's homeownership rates in the first period (34 percent). Migration-related variables explain about 10 percent of the total increase in homeownership rates during 1996 and 2005 and the change in regional variables accounts for 12 percent. The explanatory power of household-related characteristics is negligible. In the second time period from 2000 to 2012, all but regional characteristics contribute negatively to the increase in homeownership rates that we observe during this period. The amount of the change that can be explained by the specific covariates is smaller than 10 percent for all characteristics.

#### **Table A5 About Here**

We also did some tests for whether results change when choosing a different reference group. In the main regression we used the period with the higher homeownership rate as reference group. Table A6 shows results of the aggregate decomposition when using the period with the lower homeownership rate (column 3) or using the pooled model as reference (column 4). The pooled model weights the characteristics with the coefficients that are estimated from a pooled model where all years between 1996 and 2005 for the first decomposition or 2000 and 2012 for the second decomposition are pooled in one regression including a time period dummy.

#### **Table A6 About Here**

Our results are quite robust to the change of the reference group. In the first decomposition, the explained part decreases slightly when taking the estimated coefficients from the 1996-to-2000-period as reference. The explained part of the second decomposition increases up to a value of -0.0082 and hence up to 10 percent of the change in homeownership rates. For the pooled model we observe a similar pattern.

So, from the decomposition results we can conclude the following:

- Homeownership rates of migrants increased by about 8 percentage points from 1996 to 2005 and by about 8.8 percentage points from 2000 to 2012.<sup>12</sup>
- 50 percent of the first increase can be explained by the characteristics effect.
- The second increase can mainly be explained by the coefficients effect.
- The coefficients effect for natives is not as high as that for migrants.

Concluding from these findings, it seems reasonable to argue that some macroeconomic shocks improved the conditions for migrants to generate housing property. Still, our methodology does not allow to concretely test this hypothesis.

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<sup>12</sup>A separate analysis for different cohorts of migrants shows that all immigration cohorts had a similar increase in homeownership rates.



## 7 Discussion and Conclusion

The review of the literature on immigrant's homeownership has shown two major points: First, immigrants are significantly less likely to own a home, so that there is a substantial nativity gap in homeownership rates. In Germany for example it accounts for about 20 to 30 percentage points over the period from 1984 to 2006 even after controlling for a variety of characteristics (Sinning, 2010). Second, there is a convergence of foreign-born households towards the homeownership rates of native-born households over time. However, this evidence is mainly found for the US (Bostic and Surette, 2001; Coulson and Dalton, 2010). As studies about immigrant's homeownership in Germany are scant, there is relatively little known about its evolution in Germany and the driving forces behind it. Due to the specific characteristics and constitution of the German housing market, results for other countries can hardly be transferred to the case of Germany.

Just recently, homeownership rates of migrants increased by more than 10 percentage points and thus exhibited by far the largest increase over the last decades. To shed light on this remarkable increase of immigrant's homeownership rates in Germany, we subdivide the time period from 1996 to 2012 into three shorter time periods (1996-2000, 2001-2005 and 2006-2012) and decompose the time trend between period one and two, respectively between period two and three, into a characteristics and coefficients effect using the non-linear decomposition method based on Fairlie (2005). In both time periods (1996-2005 and 2000-2012), homeownership rates of immigrants have increased by a similar amount, in specific by roughly 8 percentage points. Decomposition results suggest that about 50 percent of the increase in immigrant's homeownership rate within the time period from 1996 to 2005 can be explained by characteristics, especially by individual-specific characteristics like age and education. This is in line with Sinning (2007) and Bauer et al. (2011) who also find a large fraction of the overall wealth gap to stem from differences in educational attainment. Although average characteristics of migrants that are positively correlated with homeownership probability such as age and education also improved within the second time period from 2000 to 2012, the characteristics effect in the second decomposition is almost zero. Thus, the sharp increase in homeownership rates cannot be explained by a change in specific characteristics of immigrants during that time. Soft integration measures like the wish to stay in Germany or language skills also have much improved during the observation period, but their explanatory power for the increase in migrant's homeownership rates is relatively low. Instead, it is the high coefficients effect of migrants that mainly contributes to the sharp increase.

The fact that there is a substantial part of the time trend that can not be explained by observable individual-specific or household-related characteristics fits to previous findings for the US. Bostic and Surette (2001) as well as Coulson and Dalton (2010) argue that the observed increase in homeownership rates of minorities is mainly due to a change in the homeownership process. Bostic and Surette (2001) show that this is particularly true for low-income households and conclude that favorable economic circumstances have a strong influence on tenure choices especially for low-income households. This provides evidence that macroeconomic and institutional changes in mortgage and housing markets do affect distinct population groups differently.

Although we cannot directly control for the effect of such changes in our analysis, the high coefficients effect of migrants, especially in the second decomposition where the homeownership rate exhibited its sharp increase, suggests that recent macroeconomic trends are likely to have positively influenced the probability of migrants to generate housing property in Germany. Thus,

nowadays, migrant households with the same characteristics as in 2000 have a higher probability of owning the property they live in. With regard to the aging migrant population and the high pressure on the public pension system in Germany, this seems to be good news. Housing wealth contributes to provide sufficient retirement provision and consequently releases social welfare systems.

Though our results indicate that homeownership rates of migrants follow a positive trend and that there is a closing of the homeownership gap, we do not know if the quality of immigrant's houses improved as well. As Drever and Clark (2002) have shown, there is a large nativity gap in housing quality, too. An increase in homeownership must not necessarily reflect a catching up of immigrants in the housing market, since there could be some overcrowding in owned homes and their quality could be lower. In order to examine if there are improvements in for example housing space, housing quality or residential location as well, it would be necessary to investigate the trend in housing values of immigrant homeowners which might be subject for a follow-up study of the analysis at hand.

To shed more light on the effect of recent changes on the credit market such as the low interest rate, it would be interesting to investigate the trend in homeownership rates by income groups separately. Due to high credit constraints in Germany, we would expect that a decrease of interest rates would affect low-income households more strongly than high-income households. This might also be subject for future research.

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## 8 Appendix

Table A1: Average characteristics of immigrants and natives, 1996-2012

	1996-2000		2001-2005		2006-2012	
	Nat.	Imm.	Nat.	Imm.	Nat.	Imm.
<b>Individual-specific characteristics</b>						
Age	52.0	50.1	53.1	49.8	55.1	52.9
<i>Education (%)</i>						
Less than high school	17.5	43.6	14.6	33.3	12.9	35.9
High school	63.1	40.5	64.1	47.9	64.0	43.9
More than high school	19.4	15.9	21.3	18.8	23.2	20.2
Employed (%)	58.43	59.73	58.37	59.46	56.39	57.56
Male (%)	55.59	69.12	57.11	65.69	53.82	59.40
Married (%)	47.45	62.02	45.67	61.40	43.30	59.36
<b>Household-specific characteristics</b>						
Homeownership (%)	41.91	23.35	43.34	24.68	45.25	29.89
Number of children	0.40	0.64	0.36	0.69	0.30	0.57
Number of persons	2.12	2.62	2.05	2.66	1.98	2.54
Real net income	2268	2100	2312	2134	2282	2155
Real net wealth	n.a.	n.a.	173609	80191	159806	96392
Conditional real net wealth	n.a.	n.a.	202095	117682	183121	135271
Real net own housing	n.a.	n.a.	88273	41983	79595	46773
Conditional real net own housing	n.a.	n.a.	204065	175745	177943	153511
<b>Regional variables</b>						
West Germany (%)	80.28	95.83	79.66	97.17	77.88	97.18
<i>Region type (%)</i>						
Rural area	16.19	7.70	16.59	10.09	17.46	11.42
Urbanized area	28.26	22.72	28.14	23.49	27.68	22.09
Urban area	55.56	69.58	55.27	66.42	54.86	66.49
<i>Region size</i>						
<100000	10.33	7.54	11.47	9.06	13.03	10.59
100000-300000	50.81	43.60	49.52	46.24	47.92	44.92
300000-500000	15.79	23.17	16.29	21.24	13.34	22.56
>500000	23.07	25.69	22.71	23.46	25.70	21.93
Price (on ROR)	1656.17	1716.26	1535.26	1636.77	1522.71	1679.13
<b>Migration-related characteristics</b>						
<i>Immigration cohort (%)</i>						
<1976		54.66		40.86		39.58
1976-1985		14.92		17.08		16.52
1986-1995		29.05		33.98		31.71
1996-2005		1.37		8.08		12.19
Age at migration		26.83		26.07		24.49
Years since migration		22.55		23.02		27.94

(Table A1 *Continued*)

	1996-2000		2001-2005		2006-2012	
	Nat.	Imm.	Nat.	Imm.	Nat.	Imm.
Wish to stay in Germany (%)		68.11		79.28		77.19
<i>Newspaper language (%)</i>						
Exclusively/mostly country of origin		16.81		10.65		10.24
Equally		24.79		21.03		21.57
Exclusively/mostly German		50.67		61.31		59.22
No newspaper		7.73		7.01		8.98
<i>Language used most often (%)</i>						
Mostly German		43.39		50.70		49.50
Mostly language of home country		17.36		15.87		12.94
Both equally		39.24		33.42		37.56
<i>Country of origin (%)</i>						
CEE		49.93		50.58		48.39
OECD		23.17		21.42		25.43
Turkey		18.65		17.59		14.97
Other		8.26		10.41		11.21
Observations	35325	6605	52721	6823	74773	7674

Source: GSOEP v29, 1996-2012, own calculations.

Table A2: Determinants of homeownership: Probit regression results, 2012

	Natives		Immigrants	
	dy/dx	S.E.	dy/dx	S.E.
<b>Individual-specific characteristics</b>				
Age 18-30 (reference group)				
Age 31-60	0.353***	0,026	0.262**	0.103
Age >60	0.510***	0.027	0.263**	0.111
Less than high school (reference group)				
High school	0.050***	0.017	0.000	0.039
More than high school	0.054***	0.019	0.088*	0.047
Employed	0.017	0.014	0.010	0.044
Male	0.018*	0.010	-0.077**	0.037
Married	0.123***	0.013	0.224***	0.046
<b>Household-specific characteristics</b>				
Number of children	-0.051***	0.011	0.005	0.027
Number of persons	0.048***	0.010	-0.017	0.023
Income quintile 1 (reference group)				
Income quintile 2	0.067***	0.015	0.131**	0.055
Income quintile 3	0.116***	0.018	0.169***	0.060
Income quintile 4	0.183***	0.018	0.367***	0.058
Income quintile 5	0.308***	0.019	0.411***	0.061

(Table A2 Continued)

	Natives		Immigrants	
	dy/dx	S.E.	dy/dx	S.E.
<b>Regional variables</b>				
West Germany	0.112***	0.012	-0.053	0.115
<i>Region type</i>				
Rural area (reference group)				
Urbanized area	-0.061***	0.014	0.063	0.063
Urban area	-0.137***	0.014	-0.076	0.056
Price(*100)	-0.002**	0.001	-0.010***	0.003
<b>Migration-related characteristics</b>				
<i>Immigration cohort</i>				
<1976 (reference group)				
1976-1985			-0.039	0.051
1986-1995			-0.056	0.048
1996-2005			-0.257***	0.061
<i>Country of origin</i>				
CEE (reference group)				
OECD			0.067	0.044
Turkey			0.117**	0.059
Other			-0.017	0.060
<i>Newspaper language</i>				
Excl./mostly country of origin (reference group)				
Equally			-0.085	0.069
Excl./mostly German			0.002	0.066
No newspaper			-0.052	0.084
Wish to stay in Germany			0.196***	0.047
Observations	8293		546	
Pseudo $R^2$	0.1895		0.3102	
Wald-statistic	1708.2		183.42	

Source: GSOEP v29 1996-2012, own calculations.

Table A3: Decomposition results for the change in homeownership rate of immigrants

	First Decomposition		Second Decomposition	
	Value	Percent	Value	Percent
Difference	0.0803	100	0.0883	100
Explained part				
sd, reg , hh	0.0367	46	0.0010	1
sd, reg , hh, mig	0.0409	51	-0.0116	-13
<i>Detailed decomposition</i>				
Migration-related characteristics	0.0178	22.20	0.0043	4.89
Socio-demographic characteristics	0.0300	37.33	-0.0128	-14.50
Household characteristics	-0.0035	-4.34	-0.0006	-0.66
Regional characteristics	-0.0026	-3.29	-0.0029	-3.30
Number of observations	5640		4418	

Source: GSOEP v29 1996-2012, own calculations.

Table A4: Decomposition results for the change in homeownership rate of natives

	First Decomposition		Second Decomposition	
	Value	Percent	Value	Percent
Difference	0.0682	100	0.0158	100
Explained part	0.0385	56	-0.0046	-29
<i>Detailed decomposition</i>				
Socio-demographic characteristics	0.0377	55.32	-0.0030	-19.20
Household characteristics	-0.0016	-2.32	-0.0029	-18.48
Regional characteristics	0.0024	3.45	0.0015	9.51
Number of observations	63528		92787	

Source: GSOEP v29 1996-2012, own calculations.



Table A5: Robustness Check: Change of the ordering of variables in the detailed decomposition

	Original	Reversed	Randomized
First decomposition			
<b>Migration-related characteristics</b>			
Value	0.0178	-0.0003	0.0078
Percent	22.20	-0.34	9.77
<b>Socio-demographic characteristics</b>			
Value	0.0300	0.0222	0.0274
Percent	37.33	27.60	34.14
<b>Household characteristics</b>			
Value	-0.0035	-0.0046	-0.0038
Percent	-4.34	-5.67	-4.72
<b>Regional characteristics</b>			
Value	-0.0026	0.0234	0.0098
Percent	-3.29	29.17	12.15
Second decomposition			
<b>Migration-related characteristics</b>			
Value	0.0045	-0.0182	-0.0078
Percent	5.14	-20.61	-8.81
<b>Socio-demographic characteristics</b>			
Value	-0.0129	-0.0076	-0.0083
Percent	-14.56	-8.58	-9.36
<b>Household characteristics</b>			
Value	-0.0006	-0.0003	-0.0005
Percent	-0.65	-0.37	-0.59
<b>Regional characteristics</b>			
Value	-0.0029	0.0146	0.0053
Percent	-3.28	16.50	6.00

Source: GSOEP v29 1996-2012, own calculations.

Table A6: Robustness Check: Change of the reference group

	Original reference group	Change of reference group	Pooled model
First decomposition			
Explained part	0.0409	0.0380	0.0423
Percent	51	47	53
Second decomposition			
Explained part	-0.0116	-0.0008	-0.0005
Percent	-13	-9	-6

Source: GSOEP v29 1996-2012, own calculations.

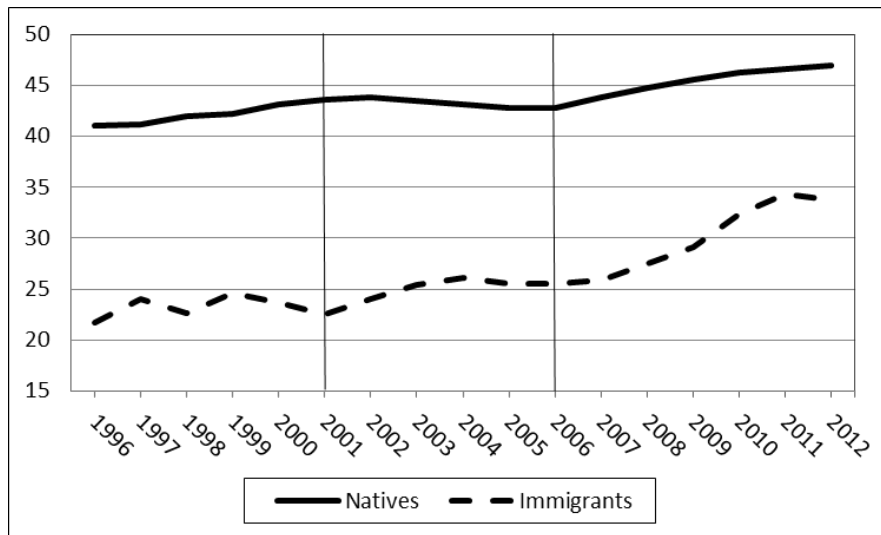


Figure 1: Homeownership rates of immigrant and native households in Germany, 1996-2012. Source: GSOEP v29 1996-2012, own calculations.