Urban Stud OnlineFirst, published on November 5, 2009 as doi:10.1177/0042098009349021

Urban Studies
1–23, 2009

Homeownership and Economic Performance of Immigrants in Germany

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[Paper first received, March 2007; in final form, November 2008]

Abstract

This paper investigates the homeownership gap between native and immigrant households in Germany, paying particular attention to the assimilation process of immigrant households. A double cohort model is derived, which circumvents the identification problem for separating age, period and cohort effects and accounts for differences in the effects. The empirical findings suggest that immigrant households are less likely to own their primary residence than comparable native households. Moreover, the duration of residence in Germany does not affect the homeownership probability of immigrants, indicating that an assimilation process in homeownership between native and immigrant households did not take place. This result is largely consistent with the German immigration policy, which has focused predominantly on short-run economic needs and has neglected long-run economic effects of immigration.

1. Introduction

The ability of immigrants to integrate successfully into the economic, social and political life of their host country depends largely on their economic performance. Starting with the seminal work of Chiswick (1978), numerous studies have investigated the assimilation process of the foreign-born population towards comparable natives. The majority of these studies focuses on the assimilation of labour-market-related outcomes, such as wages and employment, which do not necessarily reflect the long-term economic and social well-being of individuals.

In the context of homeownership, only a few studies have generated empirical evidence for an assimilation process between immigrant and native households. Homeownership, however, is an important measure of economic assimilation. In contrast to wages, homeownership permits inferences about the long-term integration process of immigrant minorities, since it represents an outcome of long-term economic progress and plays a key role in providing long-term financial security.

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0042-0980 Print/1360-063X Online

DOI: 10.1177/0042098009349021

Moreover, housing does not only provide direct services to a family (Wolff, 1998), but may also increase life satisfaction and improve physical and psychological health (Rohe *et al.*, 2001). Additionally, even after controlling for income, children of homeowners are more likely to attain higher levels of education than children of renters (Green and White, 1997). Myers and Lee (1996) identify homeownership as one of the most important events in the integration process of immigrants.

So far, differences in the homeownership probability between natives and ethnic minorities have been examined mainly for the US (Alba and Logan, 1992; Krivo, 1995; Coulson, 1999; Painter *et al.*, 2001, 2003; Borjas, 2002; Gabriel and Rosenthal, 2005). However, in the context of homeownership, empirical evidence on the assimilation process of immigrant minorities in Germany, a major immigration country in the European Union, does not exist. This is unfortunate because intertemporal changes in the homeownership gap between native and immigrant households in Germany differ substantially from the corresponding pattern in the US.[1] These differences are a result of different immigration policies used to shape the skills and settlement intentions of immigrants in the two countries. In contrast to the US, Germany did not consider itself an immigrant-receiving country until the late 1990s, despite the fact that it had more immigration per capita than the US in almost all years in the post-World-War-Two period (Schmidt and Zimmermann, 1992; Fertig and Schmidt, 2002).

During the 1960s and 1970s, low-skilled 'guest workers' from southern Europe were actively recruited by the German government to fill an acute labour shortage in German manufacturing industry. These immigrants were typically very different in education, cultural background and motivation from their higher-skilled European counterparts who migrated to the US after the Second World War. Even though low-skilled workers were expected to stay in Germany only temporarily, many of them decided to stay permanently (Bauer *et al.*, 2005).

Due to the low-skilled and notionally temporary nature of the immigrant population in Germany, it may be expected that substantial homeownership disparities between native and immigrant households exist. For that reason, this paper aims at providing empirical evidence on the homeownership gap between native and immigrant households using data from the German *Socio-Economic Panel* (SOEP) for West German households. In the empirical analysis, the relative importance of the determinants of homeownership and differences in the homeownership probability between different groups of migrants and natives are examined, using homeownership as a binary dependent variable in a cross-sectional analysis. In addition, a double cohort model, which circumvents the identification problem for separating age, period and cohort effects, is estimated to generate empirical evidence on the assimilation process of immigrant households in Germany.

The estimates of a binary probit model reveal that immigrant households are less likely to own their primary residence than comparable native households. Specifically, the results show that the probability of immigrant households owning a house or apartment is about 20–30 per cent lower than the corresponding probability of comparable German households. Moreover, the estimates of the double cohort model suggest that an assimilation process in homeownership between native and immigrant households did not take place. Separate estimates for rural and urban regions indicate that this result may not be attributed to the different location choices of native and migrant households. Both the large homeownership gap and the missing assimilation are consistent with an immigration policy that has focused predominantly on short-run economic needs and neglected long-run effects of immigration.

2. Homeownership and Economic Performance of Immigrants

The economic literature on the performance of immigrants in their host country follows the seminal contributions of Chiswick (1978) and Borjas (1985). Using cross-sectional data, Chiswick (1978) finds that the earnings of recently arrived immigrants are significantly lower than the earnings of more established immigrants. Moreover, since immigrant earnings increase with the duration of residence in the host country, earnings profiles of immigrants assimilate to those of natives. In his work on the earnings assimilation of immigrants, Borjas (1985) demonstrates that the cross-sectional estimate of the parameter of years since migration proposed by Chiswick (1978) implicitly assumes that the average socioeconomic characteristics of successive immigration cohorts do not change. He shows that the duration effect is exaggerated when comparing more established and recent immigrants in a cross-section.

While the economic literature has mainly concentrated on migrants' economic performance in terms of earnings and employment status, much less is known about the long-run economic performance of immigrants. In particular, only a few studies rely on more long-run indicators of overall economic well-being, such as wealth and asset holdings or homeownership. Such long-run indicators of economic integration, however, may provide additional insights to the integration process of migrants, because they do not only measure current integration, but also allow drawing inferences about the future economic situation of immigrant minorities.

There are several ways in which homeownership rates of immigrants may differ from those of their native-born counterparts. Due to self-selection and selective immigration policy, immigrants are neither representative of the population in their home nor of their host country. Selection processes typically result in differences between natives and immigrants in terms of observable and unobservable characteristics generating disparity in homeownership. As the nature of these selection processes varies across receiving countries, it seems likely that the homeownership gap will differ across receiving countries as well. While the US, for example, places more weight on the reunification of families, immigration to Germany has historically been predominantly temporary and since 1973 almost exclusively based on family reunification and humanitarian considerations (Schmidt and Zimmermann, 1992; Bauer *et al.*, 2005). This policy environment results in immigrant populations that are quite different in terms of skills and settlement intentions. At the same time, homeownership is closely related to the long-run earnings potential. Empirical evidence on the earnings assimilation of immigrants suggests that—in contrast to the US—immigrants to Germany face a relatively high earnings disadvantage on arrival and experience no significant earnings assimilation over time (Bauer *et al.*, 2005). These differences point to a relatively large homeownership gap between native and immigrant households in Germany.

Immigrants may face higher credit barriers than native-born individuals because of wage disparities, lack of collateral and increased flight risk. In addition to credit barriers, differences in savings behaviour may be responsible for the gap in housing demand between native and immigrant households (Bauer and Sinning, 2005). However, empirical evidence suggests that these factors seem to play a minor role in explaining homeownership dynamics. Gabriel and Rosenthal (2005) examine the degree to which racial gaps can be explained by differences in household attributes and the influence of credit barriers. They discover that changes in sociodemographic characteristics account for most of the increase in homeownership in the 1990s, indicating that innovation in mortgage finance and declining interest rates were not the primary drivers of the rise in homeownership during the 1990s.

Existing studies on the homeownership gap between native and immigrant households have focused almost exclusively on the US (Alba and Logan, 1992; Krivo, 1995; Myers and Lee, 1998; Coulson, 1999; Painter *et al.*, 2001, 2003; Borjas, 2002; Gabriel and Rosenthal, 2005). On balance, these studies find that immigrant minorities in the US are much less likely to own their primary residence than comparable natives. Some studies also investigate the assimilation in homeownership of immigrant households. Alba and Logan (1992), for example, investigate homeownership differences among 12 racial/ethnic groups. They employ language acculturation as a measure of assimilation and conclude that speaking English at home significantly increases the probability of homeownership. Myers and Lee (1998) examine homeownership of immigrants in southern California, using a double cohort method for analysing immigrant progress between 1980 and 1990. They find that new Asian immigrants achieve high levels of homeownership soon after arrival, while Hispanics experience very low levels of homeownership upon arrival, followed by sustained advancement into homeownership over two decades.

Against this background, this paper investigates the homeownership gap between native and immigrant households in Germany, paying particular attention to the assimilation process of immigrant households. Based on the comparison of natives and immigrants of the same birth cohort at two points in time, a double cohort model is derived. This model may be used to reproduce the empirical approach initially proposed by Myers and Lee (1996) and expanded into the realm of homeownership by Myers and Lee (1998). Moreover, the derived model allows an empirical investigation of small datasets and accounts explicitly for nativity differences in the effects of relevant explanatory variables.

3. Data and Descriptive Statistics

3.1 Data

In the empirical analysis of this paper, data from the German *Socio-Economic Panel* (SOEP) are being utilised. The SOEP is a representative longitudinal survey including German and immigrant households which started in 1984. In 2006, about 20 000 persons in nearly 11 000 households were sampled. The survey methodology of the SOEP is based on pre-tested questionnaires for households and individuals. Interviewers try to obtain face-to-face interviews with all members of a given survey household above 15 years. In addition, the so-called head of household is asked to answer a household-related questionnaire covering information on housing, housing costs and different sources of income (Frick and Haisken-DeNew, 2005). In this paper, data are retrieved from the waves 1984 to 2006.[2] Since less than 2 per cent of the foreign-born population lives in East Germany, the analysis focuses on households residing in West Germany. Immigrants residing in West Germany were oversampled in the SOEP. Different sampling probabilities were chosen to ensure that the number of cases in the sample is large enough for analyses of separate sub-samples (Frick and Haisken-DeNew, 2005). The first sample of foreigners in West Germany was surveyed in 1984. A sample refreshment of immigrants started in 1994/95 in two different samples. In the following empirical analysis, immigrants are defined as foreign-born individuals who immigrated to Germany since 1948 (including foreign-born persons who received German citizenship after immigration).

This definition does not comprise ethnic migrants (i.e. persons who possess German nationality since birth and immigrated to Germany) or the second generation of immigrants (mainly persons with foreign nationality who were born in Germany).

3.2 Descriptive Statistics

Figure 1 reports the homeownership rates of foreign-born households who immigrated before and after 1973 and compares them with the homeownership rates of the native-born population.[3] While homeownership rates of native households are relatively stable over the sample period, the rates of immigrant households are increasing, indicating a convergence of foreign-born households towards the homeownership rates of native households over time. However, although the homeownership rate of more established immigrant households increases from 13.1 per cent in 1984 to 35.3 per cent in 2006, the homeownership gap still amounts to 10.6 percentage points in 2006. Moreover, while more recent immigrant households were able to increase homeownership between 1984 and 1995, their average homeownership rate declined from 26.3 per cent in 1995 to 13.6 per cent in 1997 and then increased again to 33.5 per cent in 2006.

The homeownership rates of native and immigrant households by age-group given in Figure 2 indicate that ageing effects may have a substantial influence on the homeownership probability, with older household heads being more likely to own their primary residence than younger household heads. Again, while the homeownership rates of native households do not vary substantially over the sample period, an increase in homeownership can be observed for immigrant households. Moreover, Figure 2 exhibits substantial differences in the homeownership patterns between the sample periods before

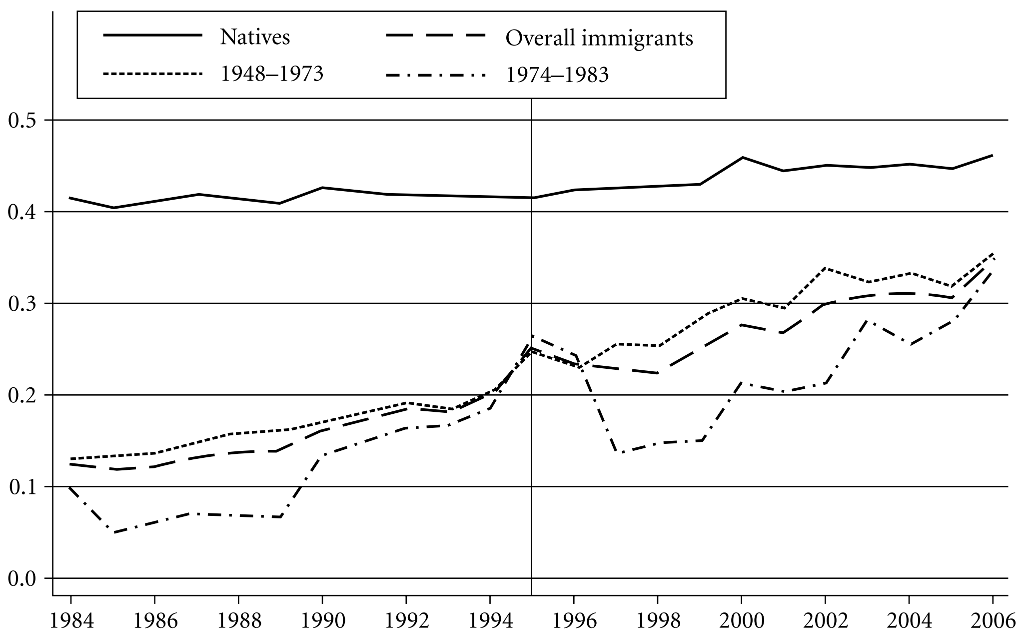

Figure 1. Homeownership rates of foreign-born and native-born households in Germany, 1984–2006

and after 1995. Particularly, while the homeownership rate of immigrant household heads between 18 and 45 years rises from 10.2 per cent to 24.2 per cent between 1984 and 1995, it drops again to 21.8 per cent in 2004 and then surges to 33.6 per cent in 2006. In contrast, the homeownership rate of older immigrants increases steadily from 15.8 per cent in 1984 to 35.5 per cent in 2006.

Both Figures 1 and 2 indicate substantial differences in the homeownership rate of different immigration and age cohorts before and after 1995. These differences are partly attributable to sample refreshments of immigrants in 1994 and 1995. For that reason, the empirical analysis takes into account structural differences in homeownership patterns before and after 1995 by considering changes between 1984 and 1995 as well as between 1995 and 2006 separately. This way of proceeding is also sensible because the change in the law on tax benefits for homeowners in 1996, which might have enabled a large number of immigrant families to acquire a house or apartment, coincides with the peak in immigrant homeownership immediately preceding in 1995.

The homeownership rates by age and period of immigration are presented in Table 1. Similar to Figure 1, the sample means in

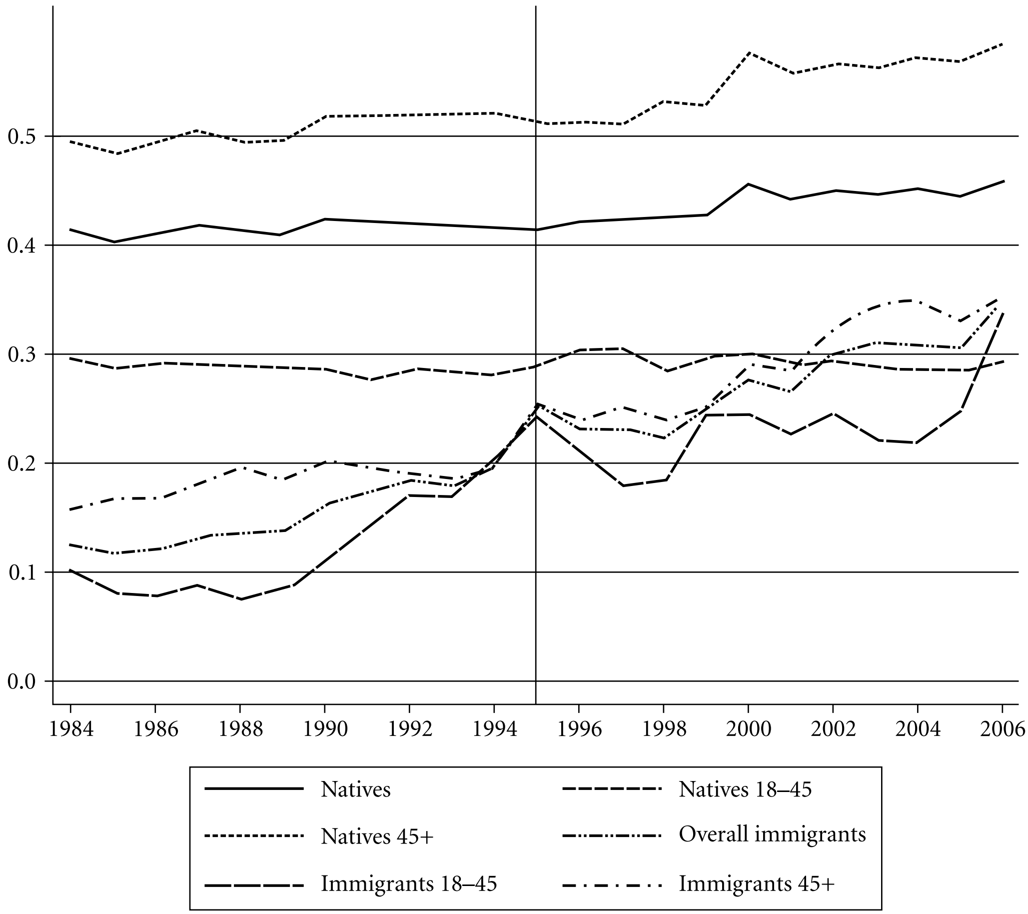

Figure 2. Homeownership rates of foreign-born and native-born households in Germany, by age-group, 1984–2006

Table 1. Homeownership rates by age and period of immigration

	All			*Age < 45 years*			*Age > 45 years*		
	1984–91	*1992–99*	*2000–06*	*1984–91*	*1992–99*	*2000–06*	*1984–91*	*1992–99*	*2000–06*
Natives	0.415	0.422	0.451	0.278	0.284	0.281	0.503	0.519	0.568
	(0.493)	(0.499)	(0.520)	(0.448)	(0.457)	(0.462)	(0.500)	(0.503)	(0.524)
	[29667]	[30195]	[54236]	[12982]	[14853]	[22356]	[16685]	[15342]	[31880]
Immigrants	0.141	0.198	0.248	0.095	0.157	0.187	0.180	0.222	0.290
	(0.348)	(0.402)	(0.436)	(0.293)	(0.370)	(0.396)	(0.384)	(0.416)	(0.455)
	[9363]	[8925]	[6477]	[4711]	[3820]	[2734]	[4652]	[5105]	[3743]
Immigrants: period of immigration									
1948–63	0.265	0.358	0.405	0.241	0.573	0.499	0.270	0.333	0.402
	(0.441)	(0.480)	(0.491)	(0.428)	(0.496)	(0.510)	(0.444)	(0.472)	(0.491)
	[2334]	[1727]	[821]	[396]	[195]	[27]	[1938]	[1532]	[794]
1964–73	0.092	0.150	0.291	0.086	0.148	0.307	0.099	0.151	0.287
	(0.289)	(0.357)	(0.454)	(0.280)	(0.356)	(0.462)	(0.298)	(0.358)	(0.452)
	[5855]	[4921]	[2731]	[3372]	[1777]	[731]	[2483]	[3144]	[2000]
1974–83	0.091	0.178	0.255	0.062	0.156	0.201	0.150	0.217	0.334
	(0.288)	(0.384)	(0.438)	(0.242)	(0.365)	(0.403)	(0.358)	(0.413)	(0.474)
	[1150]	[1505]	[1280]	[919]	[1227]	[853]	[231]	[278]	[427]
1984–91		0.082	0.173		0.035	0.181		0.212	0.162
		(0.303)	(0.395)		(0.204)	(0.405)		(0.441)	(0.376)
		[640]	[1060]		[540]	[733]		[100]	[327]
1992–99			0.117			0.095			0.160
			(0.324)			(0.297)			(0.369)
			[585]			[390]			[195]

Notes: Standard deviations in parentheses; number of observations in brackets.

Table 1 denote that homeownership rates have increased over the sample period for both natives and immigrants. Dividing the sample into household heads aged below and above 45 years reveals that homeownership rates of immigrant and native households differ substantially between age-groups, with older household heads having higher homeownership rates than younger household heads. Moreover, comparing different migration cohorts, it turns out that more established immigrants seem to be more likely to own their primary residence than recent immigrants. In addition, dividing the sample of immigrant households into two age-groups exhibits substantial differences between young and older household heads at different points in time. These results highlight the necessity to take into account both structural changes in the housing market and changes in the age profile of immigrant and native households over time while analysing the effect of immigrants' duration of residence in the host country on the homeownership probability. Consequently, particular attention will be paid to the separation of age, period and cohort effects in the following empirical analysis.

4. Empirical Strategy

4.1 The Homeownership Gap

To investigate the determinants of the homeownership probability, a binary probit model is estimated, using the ownership status as the dependent variable. After restricting the cross-sectional sample of 2006 to household heads and excluding all observations with missing values on one of the variables used in the analysis, the dataset contains 3239 homeowners and 3421 renters. The following underlying relationship is assumed

$$
\begin{aligned}
P(H_h) = {} & \alpha_0 + M_h(\alpha_1 + \alpha_2\mathbf{D}_h \\
& + \alpha_3\mathbf{R}_h + \alpha_4\mathbf{Z}_h) + \alpha_5\mathbf{Z}_h \\
& + \alpha_6\mathbf{V}_h + \varepsilon_h, h = 1, \ldots, N_{2006}
\end{aligned}
\tag{1}
$$

where, H_h is a binary outcome variable for homeownership; M_h represents a dummy variable for immigrant households; $\mathbf{D}_h$ indicates the period of immigration of the respective immigration cohort and $\mathbf{R}_h$ is a vector of region of origin dummies. The vector $\boldsymbol{\alpha}$ contains the parameters to be estimated. The error term ε is assumed to be distributed normal, $\varepsilon \sim N(0,\sigma_\varepsilon^2)$

$\mathbf{Z}_h$ is a vector of explanatory variables comprising individual-specific characteristics of the household head (age, gender, education, employment and marital status) and household-specific characteristics (monthly income, permanent income and number of children).[4] The set of individual-specific characteristics contains explanatory variables that are typically used in empirical investigations of homeownership (Coulson, 1999). Indicator variables for different age levels are considered, because the relationship between the age of the household head and the outcome variables may be non-linear. To examine the relevance of the household composition, the number of children and the marital status of the household head are added to the regression. Finally, since economic theory suggests that wealth accumulation depends on permanent rather than current income, the empirical model does not only include monthly income, but also a permanent income measure.[5] The specification of the empirical model is similar to those of other studies on homeownership (Myers *et al.*, 1998; Coulson, 1999; Painter *et al.*, 2003).

The vector $\mathbf{V}_h$ includes aggregate variables that reflect regional variation in housing markets (district sizes, rent levels and house prices). In particular, the individual-level data of the SOEP were combined with district-level data, which include information about the regional population density. Since housing prices usually depend on the population density of a location, the empirical model contains a set of district size indicators. District-level data could also be used to calculate average rents for each district. An inclusion of the resulting variable into the empirical model permits inferences about the effect of housing costs on homeownership. Finally, since the SOEP does not contain information about regional market prices of property, aggregate price indices were merged to the data. These price indices were collected by the Federal Statistical Office and the statistical offices in each of the West German states (*Bundesländer*).[6]

To facilitate the interpretation of the effects of $\mathbf{D}_h$ and $\mathbf{R}_h$, a reference group is created by including the full set of indicator variables and restricting the estimated coefficients on these variables to sum to zero—i.e. $\sum_v \alpha_{2v} = \sum_w \alpha_{3w} = 0$, where v and w are the numbers of immigration cohorts and regions of origin respectively. Consequently, the marginal effect of the parameter α_1 can be interpreted as the overall difference in the homeownership probability of native-born and immigrant households conditional on characteristics, while the marginal effects of α_2 and α_3 capture deviations across entry cohorts and regions of origin from this overall gap.

The estimates comprise different specifications, which differ in the number of explanatory factors employed. Three different specifications of equation (1) are being estimated. Specification (1a) includes individual- and household-specific characteristics, price and rent levels as well as indicator variables for immigration cohorts and regions of origin. In addition to the set of variables considered in specification (1a), specification (1b) also controls for district sizes. Finally, specification (1c) includes the same set of explanatory variables as specification (1b) and interaction terms.

4.2 Assimilation

Formally, the identification problem for separating age, period and cohort effects may be described by the following linear function for the sample of native-born persons (denoted by $\boldsymbol{n}$)

$$y_t^n(x_t^n, p_t^n, a_t^n, c_t^n) = \theta_{0t}^n + \theta_{1t}^n x_t^n + \theta_{2t}^n p_t^n + \theta_{3t}^n a_t^n + \theta_{4t}^n c_t^n \quad (2)$$

where, y_t^n is the outcome variable at time t ($t = 1, ..., T$); x_t^n is a vector of explanatory variables; p_t^n represents the historical time-period; a_t^n denotes age; and c_t^n represents the birth cohort.

An estimation of all coefficients of equation (2) is not possible without further restrictions because of the linear relationship between age, period and birth cohort

$$p_t^n = a_t^n + c_t^n, \forall t$$

For the sample of migrants (denoted by m), the functional relationship needs to be extended to include the period of immigration (m_t^m) and the duration of residence in the host country (d_t^m)

$$\begin{aligned} & y_t^m(x_t^m, p_t^m, a_t^m, c_t^m, m_t^m, d_t^m) \\ & = \theta_{0t}^m + \theta_{1t}^m x_t^m + \theta_{2t}^m p_t^m + \theta_{3t}^m a_t^m \\ & + \theta_{4t}^m c_t^m + \theta_{5t}^m m_t^m + \theta_{6t}^m d_t^m \end{aligned} \quad (3)$$

where, $t = 1, ..., T$.

This extension leads to another problem of estimating the coefficients induced by the linear dependency of time, immigration cohort and duration of residence

$$p_t^m = m_t^m + d_t^m, \forall t$$

There are different strategies that may be pursued to tackle these problems. Identification may be achieved by imposing model restrictions. Restricting one coefficient, however, may yield biased estimates of the remaining coefficients. Alternatively, one can forego the estimation of period effects and estimate the model only within a specific period. In his work on earnings assimilation of immigrants, Borjas (1985) traces immigrant cohorts over time and demonstrates that the duration effect is exaggerated if more established immigrants are compared with recent immigrants in a cross-section. However, the model that he proposes is based on the assumption that an age profile observed at one point in time defines the future path of a cohort over the life cycle. Since the age profile in Borjas' model is derived from the cross-sectional age, his model does not permit a variation of age profiles at different points in time. Finally, one can derive a double cohort model to estimate the change in the outcome measure over time for the same birth cohorts of natives and migrants. As a starting-point, the change in the outcome measure between $t-1$ and t may be considered for both groups—i.e.

$$\begin{aligned}\Delta y_t^n &= y_t^n(x_t^n, p_t^n, a_t^n, c_t^n) \\ &\quad - y_{t-1}^n(x_{t-1}^n, p_{t-1}^n, a_{t-1}^n, c_{t-1}^n) \\ &= \Delta\theta_{0t}^n + \Delta\theta_{1t}^n \Delta x_t^n + \Delta\theta_{2t}^n \Delta p_t^n \\ &\quad + \Delta\theta_{3t}^n \Delta a_t^n + \Delta\theta_{4t}^n \Delta c_t^n\end{aligned} \tag{4}$$

and

$$\begin{aligned}\Delta y_t^m &= y_t^m(x_t^m, p_t^m, a_t^m, c_t^m, m_t^m, d_t^m) \\ &\quad - y_{t-1}^m(x_{t-1}^m, p_{t-1}^m, a_{t-1}^m, c_{t-1}^m, m_{t-1}^m, d_{t-1}^m) \\ &= \Delta\theta_{0t}^m + \Delta\theta_{1t}^m \Delta x_t^m + \Delta\theta_{2t}^m \Delta p_t^m \\ &\quad + \Delta\theta_{3t}^m \Delta a_t^m + \Delta\theta_{4t}^m \Delta c_t^m \\ &\quad + \Delta\theta_{5t}^m \Delta m_t^m + \Delta\theta_{6t}^m \Delta d_t^m\end{aligned} \tag{5}$$

Since $\Delta c_t^n = \Delta c_t^m = \Delta m_t^m = 0$, a decomposition of equations (4) and (5) yields the following expressions[7]

$$\begin{aligned}\Delta y_t^n &= (\theta_{0t}^n - \theta_{0t-1}^n) + (\theta_{1t}^n - \theta_{1t-1}^n) x_t^n \\ &\quad + \theta_{1t-1}^n (x_t^n - x_{t-1}^n) + (\theta_{2t}^n - \theta_{2t-1}^n) p_t^n \\ &\quad + \theta_{2t-1}^n (p_t^n - p_{t-1}^n) + (\theta_{3t}^n - \theta_{3t-1}^n) a_t^n \\ &\quad + \theta_{3t-1}^n (a_t^n - a_{t-1}^n) \\ &\equiv \lambda_0^n + \lambda_1^n \Delta x_t^n + \tilde{\lambda}_1^n \Delta x_t^n + \lambda_2^n p_t^n \\ &\quad + \tilde{\lambda}_2^n \Delta p_t^n + \lambda_3^n a_t^n + \lambda_4^n \Delta a_t^n\end{aligned} \tag{6}$$

and

$$\begin{aligned}\Delta y_t^m &= (\theta_{0t}^m - \theta_{0t-1}^m) + (\theta_{1t}^m - \theta_{1t-1}^m) x_t^m \\ &\quad + \theta_{1t-1}^m (x_t^m - x_{t-1}^m) + (\theta_{2t}^m - \theta_{2t-1}^m) p_t^m \\ &\quad + \theta_{2t-1}^m (p_t^m - p_{t-1}^m) + (\theta_{3t}^m - \theta_{3t-1}^m) a_t^m \\ &\quad + \theta_{3t-1}^m (a_t^m - a_{t-1}^m) + (\theta_{6t}^m - \theta_{6t-1}^m) d_t^m \\ &\quad + \theta_{6t-1}^m (d_t^m - d_{t-1}^m) \\ &\equiv \lambda_0^m + \lambda_1^m x_t^m + \tilde{\lambda}_1^m \Delta x_t^m + \lambda_2^m p_t^m \\ &\quad + \tilde{\lambda}_2^m \Delta p_t^m + \lambda_3^m a_t^m + \lambda_4^m \Delta a_t^m \\ &\quad + \lambda_5^m d_t^m + \lambda_6^m \Delta d_t^m\end{aligned} \tag{7}$$

Equations (6) and (7) reveal that changes in the outcome measure between $t-1$ and t may be explained by the level and the intertemporal change of the explanatory variables. For simplicity, x_t^n and x_t^m are assumed to be time-invariant in the following empirical analysis—i.e. $\Delta x_t^n = \Delta x_t^m = 0$.[8] Then the difference in the outcome measure between natives and migrants may be written as

$$\begin{aligned}\Delta y_t^{n,m} &= \Delta y_t^n - \Delta y_t^m \\ &= (\lambda_0^n - \lambda_0^m) + (\lambda_1^n x_t^n - \lambda_1^m x_t^m) \\ &\quad + (\lambda_2^n p_t^n - \lambda_2^m p_t^m) \\ &\quad + (\tilde{\lambda}_2^n \Delta p_t^n - \tilde{\lambda}_2^m \Delta p_t^m) \\ &\quad + (\lambda_3^n a_t^n - \lambda_3^m a_t^m) \\ &\quad + (\lambda_4^n \Delta a_t^n - \lambda_4^m \Delta a_t^m) \\ &\quad + (\lambda_5^m d_t^m - \lambda_5^m \Delta d_t^m)\end{aligned} \tag{8}$$

Since time-periods and period changes are the same for natives and migrants (i.e. $p_t^n = p_t^m = p_t$ and $\Delta p_t^n = \Delta p_t^m = \Delta p_t$) and since it may be expected that period changes affect natives and migrants in the same way (i.e. $\tilde{\lambda}_2^n = \tilde{\lambda}_2^m$), equation (8) reduces to

$$\begin{aligned}\Delta y_t^{n,m} &= \lambda_0 + (\lambda_1^n x_t^n - \lambda_1^m x_t^m) + \lambda_2 p_t \\ &\quad + (\lambda_3^n a_t^n - \lambda_3^m a_t^m) \\ &\quad + (\lambda_4^n \Delta a_t^n - \lambda_4^m \Delta a_t^m) \\ &\quad + (\lambda_5^m d_t^m - \lambda_6^m \Delta d_t^m)\end{aligned} \tag{9}$$

Equation (9) reveals that variations over time and differences between natives and migrants may be expressed as a function of socio-economic characteristics, time-periods, differences in levels and intertemporal changes in age between natives and migrants, and the level and intertemporal change in the migrants' duration of residence in the host country. The set of socioeconomic characteristics may differ between the two groups.

The double cohort model defined by equation (9) may be used to reproduce the model proposed by Myers and Lee (1996). Specifically, indicator variables for age levels (a^n_{tj}, a^m_{tj}) and changes in age levels (Δa^n_{tj}, Δa^m_{tj}) may be analysed separately for each birth cohort $j = 1, \ldots, J$. Similarly, the duration of residence d^m_{tk} and its intertemporal change Δd^m_{tk} may be considered separately for each immigration cohort $k = 1, \ldots, K$. The resulting model permits a comparison of age-adjusted immigrant cohorts in relation to natives who are at the same stage of the life cycle. As a consequence, differences between immigrant and native households of the same birth cohort may be interpreted as duration effects, net of period and ageing effects.

Myers and Lee (1996) argue that an investigation of the assimilation of immigrant cohorts requires the consideration of 'age-at-arrival' effects—i.e. a separate estimation of birth cohort effects for each immigration cohort. Consequently, instead of using indicator variables for each birth cohort, they estimate the effects of $a^m_{tj}\, d^m_{tk}$ for $j \times k$ birth and immigration cohorts. Moreover, the change over time due to duration or ageing is measured by interacting age-at-arrival effects with an indicator variable p_t for the time-period—i.e. $\Delta a^m_{tj}\, d^m_{tk} = a^m_{tj}\, d^m_{tk} p_t$. Although both age-at-arrival effects and the rate of change for each birth cohort within a specific immigration cohort may be of potential interest when analysing the historical position of a certain cohort (Myers and Lee, 1998), they are not needed to estimate the effect of the migrants' duration of residence in the host country. Specifically, equation (9) reveals that considering age effects of natives and migrants separately is a sufficient condition for the estimation of duration effects.

One advantage of the proposed double cohort model is its usability for small datasets. In particular, the estimation of at-at-arrival effects requires a sufficiently large sample of immigrants for each of the j x k sub-groups. Moreover, the simplification of the model facilitates its implementation and the interpretation of estimates. The application of this model is particularly convenient if one is only interested in the effect of the duration of migrants' residence in the host country. Finally, in contrast to the model of Myers and Lee (1996), equation (9) accounts explicitly for nativity differences in the effects of other relevant explanatory variables.

To apply the general functional relationship given by equation (9) to the empirical problem of investigating homeownership patterns of native and immigrant households, the following empirical model, which is based on a comparison of two cross-sectional samples, is estimated

$$\begin{aligned} P(H_{ht}) = {} & \mu + \beta_0 P_{ht} + \beta_1 X_{ht} \\ & + \sum_j \beta_{2j} A_{hj} + \sum_j \beta_{3j} A_{hj} P_{ht} \\ & M_h \Bigg[\gamma_0 + \gamma_1 \tilde{X}_{ht} + \sum_j \gamma_{2j} A_{hj} \\ & + \sum_j \gamma_{3j} A_{hj} P_{ht} + \sum_k \gamma_{4k} D_{hk} \\ & + \sum_k \gamma_{5k} D_{hk} P_{ht} \Bigg] + \eta_{ht} \end{aligned} \quad (10)$$

where, $t = 1, 2$; $h = 1, \ldots, \mathrm{N}_t$.

and where, P_{ht} is a time-period indicator for household h at time t, denoting structural differences between two points in time.

In the empirical analysis, differences in homeownership patterns before and after 1995 are taken into account by analysing changes between the cross-sectional cohorts of the years 1984 and 1995 as well as 1995 and 2006. Using the notation of equation (1), the vector of explanatory variables $\mathbf{X}$ is given by $(\tilde{\mathbf{Z}}, \mathbf{V})$ where $\tilde{\mathbf{Z}}$ includes nearly the same set of variables as $\mathbf{Z}$. In contrast to $\mathbf{Z}$, $\tilde{\mathbf{Z}}$ does not comprise indicator variables for different age levels. In addition to the variables included in $\mathbf{X}$, the vector of interaction terms also contains region-of-origin indicators—i.e. $\tilde{\mathbf{X}} = (\tilde{\mathbf{Z}}, \mathbf{V}, \mathbf{R})$.

A_{hj} comprises birth cohort dummies of different age-groups. The following age categories are used: j = (40–54, 55–70) in 1984; with each birth cohort being 11 years older in 1995. Similarly, the age cohorts in the second sample period are j = (40–54, 55–70) in 1995 and 11 years older in 2006. In both periods, the reference group is defined as the cohort below 40 years. The parameter vector β_3 represents the effects of the interaction terms between time-period and birth cohort dummies (ageing effects); γ_2 and γ_3 denote the corresponding birth cohort and ageing effects of immigrants. Moreover, immigration cohort dummies, which exhibit the period of immigration, are included in D_{hk} with k = (1948–73, 1974–83) for the sample period 1984-1995 and k = (1948–73, 1974–83, 1984–94) for the sample period 1995–2006. γ_4 and γ_5 reflect the effects of immigration cohorts and changes in the duration of residence over time (duration effects) respectively. To compare the two immigration cohorts to a reference group consisting of native households, the sample of foreign-born households is restricted to respondents who immigrated to Germany before 1984 for the sample period 1984–95 and respondents who immigrated before 1995 for the sample period 1995–2006 respectively.

Similar to equation (1), the full set of interaction terms of age, duration of residence and region of origin are included in the regression and the estimated coefficients on these variables are restricted to zero—i.e. $\sum_w \gamma_{1w} = \sum_j \gamma_{2j} = \sum_j \gamma_{3j} = \sum_k \gamma_{4k} = \sum_k \gamma_{5k} = 0$, where w is the number of regions of origin indicators included in $\tilde{\mathbf{X}}$. The marginal effect of γ_0 can be interpreted as the overall difference in the homeownership probability of native-born and foreign-born households conditional on characteristics, while deviations across birth and immigration cohorts and regions of origin from the overall gap are measured by the corresponding marginal effects included in $(\gamma_1, \gamma_2, \ldots, \gamma_5)'$.

In the empirical analysis, three different specifications of equation (10) are being estimated for each of the two samples. In specification (2a), control variables and interaction terms are not considered. Specification (2b) takes control variables, as defined by the vector $\mathbf{X}$ in equation (10), into account, while both control variables and interaction terms are included in specification (2c). While the pooled sample of the years 1984 and 1995 contains 9531 household-year observations of 5107 native and 1669 immigrant households, the sample of the cohorts surveyed in 1995 and 2006 includes 11 729 household-year observations of 8183 native and 1248 immigrant households.

5. Empirical Results

5.1 The Homeownership Gap

Table 2 reports the marginal effects and associated standard errors of three different model specifications of equation (1). To derive a marginal effect for categorical variables, a discrete change from 0 to 1 is considered. The first specification of Table 2 includes socioeconomic and demographic characteristics of the household head, household-specific characteristics, price and rent levels, an indicator variable for the immigration status and interaction terms between this indicator variable and indicators for immigration cohorts and regions of origin. Specification (1b) also includes district size effects. In specification (1c), individual- and household-specific characteristics are

Table 2. Determinants of homeownership: probit estimates, 2006

	Specification (1a)		*Specification (1b)*		*Specification (1c)*	
	dF/dx	*S.E.*	*dF/dx*	*S.E.*	*dF/dx*	*S.E.*
Natives and immigrants						
Characteristics of head						
Age 40–54	0.209***	0.026	0.213***	0.026	0.213***	0.026
Age 55–70	0.460***	0.026	0.465***	0.026	0.482***	0.027
Education	–0.035	0.024	0.027	0.026	0.021	0.027
Employed	0.017	0.027	0.014	0.027	0.022	0.028
Female	0.154**	0.072	–0.005	0.076	–0.010	0.077
Married	0.250***	0.021	0.234***	0.022	0.246***	0.022
Household-specific characteristics						
Monthly income × 10^3	0.025***	0.005	0.024***	0.005	0.023***	0.006
Permanent income × 10^3	0.189**	0.083	–0.009	0.089	0.004	0.091
Number of children	0.067***	0.014	0.073***	0.014	0.069***	0.015
Price/rent level						
Price index × 10^2	–0.252	0.619	0.118	0.643	0.169	0.649
Average rent × 10^3	0.485***	0.053	0.075	0.100	0.081	0.100
District size						
≥ 500 000 (reference group)						
≥ 100 000 < 500 000			0.091**	0.036	0.089**	0.036
≥ 20 000 < 100 000			0.271***	0.033	0.268***	0.033
< 20 000			0.359***	0.046	0.357***	0.046
Immigrants						
Characteristics of head	–0.197***	0.042	–0.218***	0.040	–0.310**	0.124
Age 40–54					–0.095	0.090
Age 55–70					–0.256	0.076
Education					0.077	0.056
Employed					–0.023	0.090
Female					0.012	0.184
Married					–0.166**	0.080
Household-specific characteristics						
Monthly income × 10^3					0.005	0.020
Permanent income × 10^3					–0.176	0.193
Number of children					0.033	0.037
Immigration cohort						
1948–1973	–0.017	0.052	–0.018	0.051	0.059	0.053
1974–1983	0.106	0.067	0.100	0.064	0.061	0.058
1984–1994	–0.088	0.068	–0.081	0.064	–0.120	0.059
Region of origin						
OECD	0.100	0.070	0.107	0.070	0.127**	0.063
CEE	–0.021	0.093	–0.031	0.091	–0.083	0.094

(*Continued*)

(**Table 2** *Continued*)

	Specification (1a)		*Specification (1b)*		*Specification (1c)*	
	dF/dx	*S.E.*	*dF/dx*	*S.E.*	*dF/dx*	*S.E.*
Turkey	–0.011	0.079	–0.009	0.074	0.034	0.070
Ex-Yugoslavia	–0.059	0.098	–0.023	0.098	0.010	0.078
Other	–0.007	0.107	–0.044	0.105	–0.088	0.090
Pseudo R^2	0.2151		0.2372		0.2442	
Wald-statistic	725.88		771.18		834.71	

Notes: Number of observations: 6660; weighted estimation using weights provided by the SOEP; $^{**}p < 0.05$; $^{***}\ p < 0.01$.

additionally interacted with the immigrant indicator.

Independent of the model specification, the marginal effect of the migration status is significantly negative, indicating that immigrants are less likely to own their primary residence than comparable native households. While the marginal effect in specification (1a) suggests that the homeownership probability of immigrants is 19.7 percentage points lower than that of comparable natives, the homeownership gap increases to 21.8 percentage points after controlling for district sizes (specification (1b)). The inclusion of additional interaction terms further increases the overall gap to 31.0 percentage points (specification (1c)), highlighting the relevance of considering observable characteristics of natives and immigrants separately. Specifically, the marginal effects of the interaction terms in specification (1c) indicate that immigrant household heads aged 55 and above are significantly less likely to own a house or apartment than native household heads of the same age-group. In addition, the marginal effect of the marital status on the homeownership probability is significantly lower for immigrants. At the same time, immigration cohort and region of origin effects seem to play a minor role in explaining variations in the homeownership probability.

Overall, the estimates provide evidence for a positive relationship between the age of the household head and the probability of homeownership. The level of education and the employment status of the household head do not seem to have a significant effect on homeownership. This result may be induced by the consideration of current and permanent income measures. The estimates further suggest that the gender of the household head does not affect the homeownership probability, while homeownership becomes more likely if the household head is married. The monthly household gross income turns out to be a strong predictor of homeownership, indicating that households with relatively high income levels are more likely to own a house or apartment than low-income households. In contrast, after controlling for district size effects, the theoretically stronger effect of permanent income becomes insignificant, indicating that the predicted income measure does not represent a sensible measure of permanent income. As expected, the number of children in the household has a significantly positive effect on the probability of homeownership. Finally, the estimates of the district size characteristics in specifications (1b) and (1c) reveal significantly positive effects of low population densities on homeownership, partly reflecting higher house prices in areas where the housing demand is high.

The estimates presented in Table 2 are based on a sample that comprises inheritors and persons who did not inherit their primary residence. Since 19.9 per cent of the native and only 6.2 per cent of the immigrant homeowners in the sample reported that they inherited their primary residence, alternative probit regressions were estimated, restricting the sample to non-inheritors. However, the estimates derived from this sample do not change the results qualitatively. For that reason, Table 2 includes only the estimates of the unrestricted sample.[9]

5.2 Assimilation

Table 3 contains the estimates of equation (10) for the years $t_1 = (1984, 1995)$ and $t_2 = (1995, 2006)$ respectively. In all cases, relatively old household heads have a significantly higher probability of owning a house or apartment than the reference cohort. The marginal effects of the interaction terms between year indicators and the respective age cohorts reveal that ageing effects are only significantly positive for household heads aged 40–54 in 1995 (specifications (2b) and (2c) of the second sample period) and even negative for household heads aged 55–70 in 1984, indicating that homeownership probabilities decline in old age.

Moreover, the estimates reveal a significant homeownership gap between immigrants and natives. The marginal effects of the overall immigrant dummy differ substantially between the three specifications presented in Table 3, highlighting the importance of controlling for both additional explanatory variables and interaction terms. After including these variables (specification (2c)), the homeownership gap amounts to 39.7 percentage points in the sample period 1984–95 and 50.1 percentage points in the sample period 1995–2006. However, the marginal effects of specification (2c) reveal deviations of birth and immigration cohorts from the overall constant. Specifically, younger immigrants have higher homeownership probabilities than older immigrants in the first sample period, while more established immigration cohorts are more likely to own their primary residence than more recent immigration cohorts in the second sample period.

The estimates of specification (2c) further reveal that the duration of residence of immigrant households in Germany does not influence their homeownership probability, indicating that a long-term economic assimilation between German-born and foreign-born households did not take place. Moreover, since duration effects are insignificant in the sample period after 1995, the results imply that the law on tax benefits for homeowners did not contribute significantly to the long-term economic assimilation of immigrant households between 1996 and 2006.

5.3 Robustness Check: Location Choices of Immigrants

Location choices of immigrants may be responsible to some extent for the results presented in Table 3. Specifically, the large homeownership gap between native and immigrant households and the missing assimilation process may be attributable to some extent to the concentration of immigrants in metropolitan areas. Coulson (1999) investigates homeownership rates of Hispanic- and Asian-Americans. He shows that homeownership rates are significantly lower for these groups than for comparable natives because they are located in areas where the cost of homeownership is high. Borjas (2002) demonstrates that the residential location choice plays a decisive role in determining the homeownership gap between US-born and foreign-born households.

The homeownership gap between native and immigrant households presented in Table 3 would be overstated if it was attributable to the overrepresentation of immigrant households in urban areas. Table A2 (in the Appendix) includes the descriptive statistics of the explanatory variables for 2006. The numbers of the district size indicators reveal that immigrants in Germany are in fact overrepresented in urban areas. Specifically, while

Table 3. Homeownership gap and assimilation, natives and immigrants: probit estimates

	1984–95						1995–2006					
	Specification (2a)		*Specification (2b)*		*Specification (2c)*		*Specification (2a)*		*Specification (2b)*		*Specification (2c)*	
	dF/dx	*S.E.*	*dF/dx*	*S.E.*	*dF/dx*	*S.E.*	*dF/dx*	*S.E.*	*dF/dx*	*S.E.*	*dF/dx*	*S.E.*
Period	0.126***	0.020	0.116***	0.044	0.129***	0.043	0.130***	0.022	0.123***	0.028	0.128***	0.028
Age group												
18–39 (reference group)												
40–54	0.362***	0.021	0.334***	0.024	0.336***	0.025	0.279***	0.029	0.229***	0.033	0.226***	0.033
55–70	0.344***	0.022	0.465***	0.026	0.478***	0.026	0.360***	0.028	0.438***	0.032	0.437***	0.032
Ageing effect												
18–39 to 29–50 (reference group)												
40–54 to 51–65	–0.107***	0.026	–0.020	0.032	–0.017	0.033	–0.007	0.033	0.096**	0.038	0.097**	0.039
55–70 to 66–81	–0.161***	0.026	–0.083**	0.034	–0.084**	0.034	–0.119***	0.030	–0.038	0.036	–0.038	0.036
Migration background												
Immigrants	–0.221***	0.041	–0.200***	0.043	–0.397***	0.076	–0.228***	0.026	–0.213***	0.034	–0.501***	0.119
Age–group												
18–39	0.146***	0.045	0.151***	0.050	0.277***	0.054	0.155**	0.415	0.102	0.065	0.068	0.056
40–54	–0.079	0.044	–0.038	0.049	0.039	0.053	–0.113**	0.048	–0.094	0.057	–0.051	0.046
55–70	–0.067	0.055	–0.113	0.065	–0.317***	0.076	–0.043	0.060	–0.009	0.070	–0.018	0.061
Ageing effect												
18–39 to 29–50	–0.021	0.066	–0.056	0.075	–0.091	0.076	0.054	0.070	0.106	0.074	0.114	0.067
40–54 to 51–65	–0.072	0.066	–0.059	0.086	–0.132**	0.064	–0.024	0.060	–0.053	0.062	–0.070	0.060
55–70 to 66–81	0.094	0.088	0.115	0.099	0.223**	0.091	–0.031	0.068	–0.053	0.069	–0.044	0.067

Immigration cohort												
1948–1973	−0.075	0.041	−0.104**	0.043	0.090	0.050	0.058	0.049	0.071	0.048	0.142***	0.052
1974–1983	0.075	0.041	0.104**	0.043	−0.090	0.050	0.131	0.070	0.133	0.076	0.093	0.060
1984–1994							−0.190***	0.065	−0.205***	0.074	−0.235***	0.068
Duration effect												
1948–1973	0.102**	0.043	0.142***	0.052	−0.001	0.051	0.055	0.056	0.040	0.057	−0.035	0.061
1974–1983	−0.102**	0.043	−0.142***	0.052	0.001	0.051	−0.104	0.074	−0.095	0.076	−0.004	0.072
1984–1994							0.049	0.071	0.054	0.077	0.040	0.075
Control variables	No		Yes		Yes		No		Yes		Yes	
Interaction terms	No		No		Yes		No		No		Yes	

Notes: Number of observations: 1984–95: 9531; 1995–2006: 11 729. Weighted estimates using weights provided by the SOEP. Standard errors were adjusted to take repeated observations into account. ** $p < 0.05$; *** $p < 0.01$.

73 per cent of the foreign-born population lives in districts with 20 000 inhabitants or more, the share of the native-born population in these districts is only 64.5 per cent.

To assess the extent to which location choices of immigrants may affect the results, Table 4 summarises the separate estimates of specification (2c) of the double cohort model for different district sizes. The estimates for the period 1984–95 indicate that the homeownership gap between native and immigrant households is substantially larger in rural than in urban areas, reflecting comparably high homeownership rates of native-born households in rural areas. At the same time, large differences exist between immigration cohorts in metropolitan areas with a population of 500 000 or above. Variations in the homeownership gap are even more pronounced in the period 1995–2006. Specifically, while the overall gap amounts to 78.7 percentage points in rural and 65.5 percentage points in metropolitan areas, it is insignificant in areas with 100 000–500 000 inhabitants. Again, large differences exist between different immigration cohorts, with more recent cohorts being less likely to own their primary residence than more established cohorts. Although the estimates reveal substantial variations in homeownership patterns of native and immigrant households across districts, they provide no evidence for assimilation. Consequently, the results suggest that the missing assimilation process may not be attributed to the concentration of immigrants in urban areas.

6. Conclusions

This paper examines the economic performance of immigrant households in Germany using homeownership as an indicator of long-term economic well-being. Empirical evidence on the homeownership gap between native and immigrant households is generated by investigating the determinants of homeownership status. The estimates of a binary probit

Table 4. Immigration cohort and duration effects by district size (in 1000s): probit estimates

	< 20		*≥ 20 < 100*		*≥ 100 < 500*		*≥ 500*	
	dF/dx	*S.E.*	*dF/dx*	*S.E.*	*dF/dx*	*S.E.*	*dF/dx*	*S.E.*
1984–95								
Immigrant	–0.665***	0.033	–0.618***	0.049	–0.275***	0.069	–0.186***	0.058
Immigration cohort								
1948–73	0.028	0.072	–0.012	0.101	0.201**	0.099	0.415***	0.135
1974–83	–0.028	0.072	0.012	0.101	–0.201**	0.099	–0.415***	0.135
Duration effect								
1948–73	0.066	0.096	0.046	0.090	–0.123	0.102	–0.226	0.121
1974–83	–0.066	0.096	–0.046	0.090	0.123	0.102	0.226	0.121
Control variables	Yes		Yes		Yes		Yes	
Interaction terms	Yes		Yes		Yes		Yes	
N	3 375		2 564		1 757		1 835	
1995–2006								
Immigrant	–0.787***	0.120	0.686***	0.231	–0.381	0.417	–0.655***	0.228
Immigration cohort								
1948–73	0.033	0.078	0.050	0.093	0.153	0.095	0.158**	0.066
1974–83	0.040	0.096	0.372***	0.104	0.262**	0.102	–0.113	0.068
1984–94	–0.074	0.102	–0.423***	0.125	–0.415***	0.155	–0.045	0.072
Duration effect								
1948–73	0.041	0.104	0.176	0.123	0.095	0.115	–0.220***	0.078
1974–83	–0.052	0.127	–0.296**	0.126	–0.164	0.131	0.207	0.107
1984–94	0.010	0.129	0.119	0.149	0.069	0.157	0.014	0.095
Control variables	Yes		Yes		Yes		Yes	
Interaction terms	Yes		Yes		Yes		Yes	
N	4 503		3 370		2 023		1 833	

Notes: See notes to Table 3.

model reveal that immigrant households are less likely to own their primary residence than comparable native households. Specifically, the results exhibit that the probability of immigrant households owning a house or apartment is about 20–30 per cent lower than the corresponding probability of comparable German households.

To investigate the extent to which the duration of residence in Germany affects the homeownership probability of immigrant households, a double cohort model is derived, which circumvents the identification problem for separating age, period and cohort effects. The results of the double cohort model reveal that an assimilation process in homeownership between native and immigrant households did not take place. Moreover, since the estimates of the sample period 1995–2006 provide no evidence for assimilation in homeownership probabilities between native and immigrant households, the findings suggest that the law on tax benefits for homeowners introduced in 1996 did not contribute significantly to the long-term economic assimilation of immigrant households in Germany. Finally, separate estimates for rural and urban regions indicate that the empirical findings are not affected by different location choices of native and immigrant households. Both the large homeownership gap and the lack of assimilation are consistent with an immigration policy that has focused predominantly on short-run economic needs—by recruiting mainly unskilled and notionally temporary immigrants—and that has neglected the long-run effects of immigration.

Notes

1. Analysing data from US censuses and the *Current Population Survey*, Borjas (2002) finds that the homeownership gap between native-born and immigrant households in the US increased from 14.3 percentage points in 1990 to 19.8 percentage points in 2000. During the same period, the homeownership gap between native and immigrant households in Germany declined from 26.0 to 17.4 percentage points, indicating a convergence in homeownership rates between German-born and foreign-born households.
2. The data used in this paper were extracted from the GSOEP database provided by the DIW Berlin (http://www.diw.de/GSOEP) using the Add-On package v2.0 (November 2007) for Stata(R). PanelWhiz was written by Dr. John P. Haisken-DeNew (john@panelwhiz.eu). The PanelWhiz-generated DO file to retrieve the GSOEP data used here and any Panelwhiz plugins are available upon request. Any data or computational errors in this article are my own. Haisken-DeNew and Hahn (2006) describe PanelWhiz in detail.
3. The year 1973 constitutes a fundamental regime switch which was caused by the oil crises and the beginning of a recession in Germany. As a result of the economic changes, the recruitment of workers was restrained (Fertig and Schmidt, 2002).
4. Table A1 in the Appendix contains a description of all the variables.
5. Permanent income was proxied using a measure of predicted income following Blau and Graham (1990).
6. The overall price index of the Federal Statistical Office was used if a price index was not available at the state level. This was the case for Schleswig-Holstein, Hamburg, Bremen, Rhineland-Palatinate, Lower Saxony (1984–94) and Saarland (1984–99).
7. Note that an alternative decomposition exists for equations (6) and (7). However, the model structure is not affected by the choice of the decomposition equation.
8. The empirical model could also be estimated without imposing this restriction.
9. Estimates not presented in this paper are available from the author upon request.

Acknowledgements

Thomas Bauer, Jan Brenner, Michael Fertig, Joachim Frick and John Haisken-DeNew provided valuable comments and suggestions on earlier drafts. The support of the Australian Group of Eight (Go8) and the German Academic Exchange Service is gratefully acknowledged.

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Appendix

Table A1. Definition of variables

Variable	*Description*
Individual-specific characteristics	
Age	Age of respondent in years
Education	Education of respondent in years
Employed	0/1 variable: 1 if respondent is currently employed; 0 otherwise
Female	0/1 variable: 1 if respondent is female; 0 otherwise
Married	0/1 variable: 1 if respondent is married; 0 otherwise
Household-specific characteristics	
Owner of house, apartment	0/1 variable: 1 if respondent is owner of the dwelling he/she lives in; 0 otherwise
Monthly income	Monthly household gross income (in real 2000 Euros)
Permanent income	Estimated permanent household income (in real 2000 Euros)
Number of children	Number of children in household
Price/rent level	
Price index	Price index for new residential buildings
Average rent level	Regional average rent (in real 2000 Euros)
District size	
≥ 500 000	0/1 variable: ≥ 500 000 inhabitants in household district
≥ 100 000 < 500 000	0/1 variable: ≥ 100 000, < 500 000 inhabitants in household district
≥ 50 000 < 100 000	0/1 variable: ≥ 50 000, < 100 000 inhabitants in household district
≥ 20 000 < 50 000	0/1 variable: ≥ 20 000, < 50 000 inhabitants in household district
< 20 000	0/1 variable: < 20 000 inhabitants in household district
Immigration cohort	
1948–73	0/1 variable: 1 if year of migration between 1948 and 1973; 0 otherwise
1974–83	0/1 variable: 1 if year of migration between 1974 and 1983; 0 otherwise
1984+	0/1 variable: 1 if year of migration in 1984 or later; 0 otherwise
Region of origin	
OECD	0/1 variable: member-states of the OECD (not including Poland, Hungary, Czech Republic, Slovakia, Turkey), Israel and Singapore; 0 otherwise
CEE	0/1 variable: central and eastern European (CEE) countries: Romania, Poland, Hungary, Bulgaria, Czech Republic, Ukraine, Belarus, Slovenia, Slovakia, Estonia, Latvia, Lithuania; 0 otherwise
Turkey	0/1 variable: country of origin: Turkey; 0 otherwise
Ex-Yugoslavia	0/1 variable: country of origin: Ex-Yugoslavia; 0 otherwise
Other	0/1 variable: 1 if other country of origin; 0 otherwise
Cohort model	
Period	0/1 variable: sample period 1984–95: 1 if year = 1995; 0 otherwise; sample period 1995–2006: 1 if year = 2006; 0 otherwise

(*Continued*)

(**Table A1** *Continued*)

Variable	*Description*
Age groups in 1984	
18–39	0/1 variable: 1 if age of respondent in 1984 between 18 and 39 years (11 years older in 1995); 0 otherwise
40–54	0/1 variable: 1 if age of respondent in 1984 between 40 and 54 years (11 years older in 1995); 0 otherwise
55–70	0/1 variable: 1 if age of respondent in 1984 between 55 and 70 years (11 years older in 1995); 0 otherwise
Age groups in 1995	
18–39	0/1 variable: 1 if age of respondent in 1995 between 18 and 39 years (11 years older in 2006); 0 otherwise
40–54	0/1 variable: 1 if age of respondent in 1995 between 40 and 54 years (11 years older in 2006); 0 otherwise
55–70	0/1 variable: 1 if age of respondent in 1995 between 55 and 70 years (11 years older in 2006); 0 otherwise
Immigration cohorts	
1948–73	0/1 variable: 1 if year of migration between 1948 and 1973; 0 otherwise
1974–83	0/1 variable: 1 if year of migration between 1974 and 1983; 0 otherwise
1984–94	0/1 variable: 1 if year of migration between 1984 and 1994; 0 otherwise
Ageing effect	Age group × period
Duration effect	Immigration cohort × period

Table A2. Descriptive statistics, 2006

	Germans (n = 6036)		*Immigrants (n = 624)*	
Variable	*Mean*	*S.D.*	*Mean*	*S.D.*
Individual-specific characteristics				
Age	46.3	13.4	48.4	12.2
Education	12.4	2.8	11.1	2.7
Employed	0.692	0.462	0.611	0.488
Female	0.417	0.493	0.303	0.460
Married	0.500	0.500	0.746	0.436
Household-specific characteristics				
Owner of house, apartment	0.445	0.497	0.297	0.457
Monthly income	2924.77	3044.92	2529.90	2661.22
Permanent income	3282.45	941.55	2753.09	876.01
Number of children	0.4	0.7	0.7	1.0
Price/rent level				
Price index	103.4	2.2	103.7	2.1
Average rent level	380.68	202.20	354.81	189.97
District size				
≥ 500 000	0.164	0.370	0.196	0.397
≥ 100 000 < 500 000	0.187	0.390	0.237	0.426
≥ 20 000 < 100 000	0.294	0.456	0.298	0.458
< 20 000	0.355	0.479	0.270	0.444
Immigration cohort				
1948–73			0.399	0.490
1974–83			0.244	0.430
1984+			0.357	0.479
Region of origin				
OECD			0.315	0.465
CEE			0.107	0.309
Turkey			0.285	0.452
Ex-Yugoslavia			0.143	0.351
Other			0.150	0.357