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# Rental prices in Germany: A comparison between migrants and natives

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## Abstract

This paper deals with the question of whether migrants pay a rent premium for apartments of comparable quality and neighborhood characteristics. We use a two-step selection-correction model augmented by a control function to account for nonrandom neighborhood choice. The estimation sample is a uniquely assembled panel comprising the Socio-Economic Panel (SOEP), information on household and apartment characteristics, as well as georeferenced data describing neighborhood quality. Our estimates reveal that people with migration backgrounds are not penalized in the German local rental market in terms of higher rental payments.

## KEYWORDS

migrants, discrimination, housing market

## 1 | INTRODUCTION

This paper is concerned with the welfare of migrants within the context of the rental housing market in Germany. In particular, we examine whether people with a migration background pay a comparatively higher rent in Germany than those without a migration background. Consistently estimating this rental differential is nontrivial when we allow for selection into renting and when we acknowledge that individuals choose their neighborhoods based on observable and unobservable housing features and neighborhood amenities. Our principal contribution is to estimate this rental premium while controlling for endogeneity arising out of selection into renting as well as housing segregation (i.e., nonrandom sorting into neighborhoods). To accomplish this, we construct a unique dataset by

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combining information across many different data sources that allows us to characterize the renter, the rental unit, and the neighborhood simultaneously.

The rental housing market in Germany is especially important for a number of reasons. First, a large share of residents of Germany live in a rented or a sublet dwelling. While the European Union average for homeownership is about 70 percent, the equivalent share in Germany is only about 53 percent—the lowest among the 27 of the 28 EU countries.<sup>1</sup> Second, once a rental contract has commenced, it is very difficult to evict a tenant because of the strong protections for tenants that exist in the German legal system. In many circumstances, a landlord cannot evict a tenant even when the latter has refused to pay rent, for instance. Third, there is excess demand in the rental housing market, especially in larger cities (Auspurg et al., 2017; Fitzenberger & Fuchs, 2017). In this sense, landlords and real estate agents have a strong gatekeeper role to play in deciding who can rent an apartment (Auspurg et al., 2017). In conjunction with the fact that tenants are almost always never evicted, landlords are especially careful in commencing a tenancy relationship. Landlords can indeed exercise significant market power in these bilateral negotiations, including, of course, the potential to unjustifiably discriminate against “undesirable” tenants based on ethnic origin or migration background.

Current evidence indicates that people with a migration background are paying a rental premium (Winke, 2016).<sup>2</sup> It has been suggested that this rental premium may be due to prejudicial (price) discrimination exhibited by landlords over migrant renters (Kilic, 2008). Indeed, most migrants self-report being discriminated against when seeking housing.<sup>3</sup> This action goes against most laws requiring equal treatment of different ethnic groups.<sup>4</sup> Thus, determining whether there truly is a payment differential between migrants—including people with a migration background—and comparable natives becomes an important social investigation. This is especially true for a country such as Germany, where the atmosphere has been characterized as welcoming to migrants by the Expert Council of German Foundations on Integration and Migration (Sachverständigenrat deutscher Stiftungen für Integration und Migration, 2014).

However, the observed empirical pattern in the rental market may be caused by a number of factors that have little to do with prejudice. For instance, migrants may self-select into neighborhoods that are more expensive because of network effects (Borjas, 2000), or migrants may be in certain properties because of other characteristics that correlate with having a migration background, such as a higher likelihood of being a smoker.<sup>5</sup> As such, any ostensible discrimination in rental payments may be generated by benign determinants that should not necessarily invite a policy response to correct a purported social injustice.

We extend the previous literature by making the following contributions. First, we estimate the difference in rental payments between migrants and natives while simultaneously accounting for endogenous neighborhood choice and selection bias arising out of the characteristics of renters. In particular, we use a two-step Heckman selection model (Heckman, 1979), which we augment with a control function approach (Bayer & Ross, 2006) to account for selection on the basis of unobserved neighborhood characteristics. The first step of our selection model is to estimate the likelihood of being a renter since about 46 percent of our sample are either tenants or sublessees. Second, we estimate the main outcome equation using a uniquely assembled panel dataset that draws from the German Socio-economic Panel (SOEP), the DIW-IAB-RWI Neighborhood Panel, the RWI-GEO-Grid, the Federal Statistical Office of Germany (Destatis), and the RWI-GEO-RED.<sup>6</sup> Thus, we are also able to control for a

<sup>1</sup>See <https://goo.gl/5Xq0PP>. No information is provided for Estonia.

<sup>2</sup>In a correspondence study published recently, Auspurg, Hinz and Schmid (2017) demonstrate that Turkish applicants for a rental properties in Munich are less likely to receive a response from a landlord.

<sup>3</sup>See “Foreigners not welcome: racism in Germany’s housing market” in <https://goo.gl/9CLZMt>.

<sup>4</sup>Particularly in Germany, the General Act on Equal Treatment proscribes discrimination on the basis of, *inter alia*, ethnic origin. (AGG 2006).

<sup>5</sup>In our sample, 37 percent of non-natives are smokers compared to only 31 percent of the natives, with the difference being statistically significant.

<sup>6</sup>These datasets are explained in more detail in Section 3.

long vector of determinants that were unaccounted for in the previous literature, thereby further reducing the bias arising out of omitted relevant variables.

Our estimates indicate that migrants are not charged higher rental payments relative to their native counterparts. This is true both in the differences in raw means across different years (2007–2012), and when we control for selection into renting and nonrandom neighborhood sorting. Taken together, our estimates do not lend support to the idea that prejudice treatment of migrants is driving a rent differential between migrants and natives.<sup>7</sup> To the extent that we are able to account for other sources of bias in estimating rental price differentials, we observe no statistically significant difference between migrants and natives in Germany. We therefore conclude that price discrimination in this market should not be of particular concern for policymakers seeking to deliver social justice.<sup>8</sup> However, it is worth noting that we have not—and, as of yet, cannot—take into account the recent influx of refugees and migrants into Germany, and how this may impact the dynamics of price-setting in the domestic real estate market. This issue, of course, is widely seen to be a primary driver of integration policy in an increasingly diversified Germany.

The remainder of this paper is structured as follows. Section 2 present a description of the methodology. Section 3 describes the data construction and provides descriptive statistics. Estimation results are presented in Section 4. We conclude in Section 5.

## 2 | EMPIRICAL STRATEGY

Considering that almost half of our sample are homeowners (i.e., zero rental payments), we conceptualize the rent paid as a two-stage decision-making process where the agent is first deciding whether to rent and, conditional on having rented, deciding how much rent is paid. It is necessary to account for the selection into renting if the observed and unobserved characteristics of renters that make them different from non-renters, including their migration background, also influence the rental price.

To empirically implement this, we use the two-step Heckman (1979) selection model in which the first stage is used to estimate the probability of being a renter:

$$\Pr [y_{ijt} = 1 | \mathbf{z}] = \Phi (\mathbf{z}'_{ijt} \boldsymbol{\beta}), \quad (1)$$

where  $y_{ijt}$  is an indicator variable for renting an apartment for person  $i$  in neighborhood  $j$  at time  $t$ , while the vector  $\mathbf{z}_{ijt}$  includes variables that we use to predict the decision to rent, such as smoking status, age, educational attainment, and others.<sup>9</sup> The parameter vector  $\boldsymbol{\beta}$  is to be estimated. For the probit case, we take the index function  $\Phi(\cdot)$  to be the cumulative distribution function of the standard Normal distribution. As conventional in the literature, we call Equation (1) the selection or participation equation.

After estimating  $\boldsymbol{\beta}$  from Equation (1) via probit, we obtain the nonselection hazard,

$$\lambda (\mathbf{z}'_{ijt} \hat{\boldsymbol{\beta}}) = \frac{\phi (\mathbf{z}'_{ijt} \hat{\boldsymbol{\beta}})}{\Phi (\mathbf{z}'_{ijt} \hat{\boldsymbol{\beta}})},$$

<sup>7</sup>Admittedly, we are limited to examining price discrimination. Whether there exists access discrimination—that is, whether migrants are disproportionately declined rental properties—is beyond the scope of this paper, although there is some evidence of that phenomenon in Auspurg, Hinz and Schmid (2017), at least for Turkish renters in Munich.

<sup>8</sup>Apparently, the segment needing more policy attention is the initial point of contact between the renter and the landlord, where the former may not even get a response after indicating his or her interest in a property.

<sup>9</sup>Tables with the complete list of covariates are presented in the Appendix.

where  $\hat{\beta}$  is the estimated parameter vector and  $\phi(\cdot)$  is the standard Normal density function. We henceforth refer to  $\lambda_{ijt} \equiv \lambda(\mathbf{z}'_{ijt}\hat{\beta})$  as the inverse Mills ratio.

In the second stage (i.e., the outcome equation), we specify the rent paid as a function of vectors of explanatory variables augmented by the inverse Mills ratio,  $\lambda_{ijt}$ :

$$w_{ijt} = \mathbf{x}'_{ijt}\xi + \mathbf{h}'_{ijt}\delta + \mathbf{n}'_{jt}\gamma + \mu\lambda_{ijt} + \varepsilon_{ijt},$$

where the vector  $\mathbf{x}_{ijt}$  is a constant plus a collection of individual and household characteristics, such as income, employment status, civil status, age, and the number of children living in the household;  $\mathbf{h}_{ijt}$  is a vector of apartment characteristics, such as size, condition, and amenities (e.g., having a garden or balcony);  $\mathbf{n}_{jt}$  is a vector of observable neighborhood characteristics, such as the share of migrants, share of families and couples, and the unemployment rate; and  $\varepsilon_{ijt}$  is the idiosyncratic error term. The parameters and vectors of parameters  $\xi$ ,  $\delta$ ,  $\gamma$ , and  $\mu$  are estimated via ordinary least squares. The inverse Mills ratio is included to account for the selection bias that arises from differences in the characteristics of renters and non-renters. We specify that being a smoker and having a partner who is a smoker are likely going to affect the probability of being a renter, but it has no impact on the rent charged by the landlord.

While the selection model outlined above can account for differences in the renters and non-renters, we have yet to address the bias arising out of nonrandom neighborhood sorting. We can allow for this unobserved neighborhood effect by augmenting the estimation equation with the variable  $v_{jt}$ , which represents unobservable factors that drive endogenous location choice (Bayer and Ross 2006):

$$w_{ijt} = \mathbf{x}'_{ijt}\xi + \mathbf{h}'_{ijt}\delta + \mathbf{n}'_{jt}\gamma + \mu\lambda_{ijt} + \kappa v_{jt} + \varepsilon_{ijt}. \quad (2)$$

Although  $v_{jt}$  is ultimately unobserved, Epple and Platt (1998) have shown that as neighborhood quality increases, we can expect that average house prices will increase in concert. We assume that this relationship is true for rental payments as well. We can thus use a function of house prices as a proxy for neighborhood characteristics. Specifically, we can estimate a hedonic house price model as follows:

$$\log(p_{2mjt}) = \mathbf{h}'_{2mjt}\eta + \mathbf{n}'_{2jt}\zeta + \tau_{2t} + v_{2mjt}, \quad (3)$$

where  $p_{2mjt}$  is the price of house  $m$  in neighborhood  $j$  at time  $t$ . The vector  $\mathbf{h}_{2mjt}$  contains the constituent characteristics of the housing unit, the vector  $\mathbf{n}_{2jt}$  is a collection of observable neighborhood characteristics, and  $\tau_{2t}$  represents a vector of period fixed effects, with  $\eta$  and  $\zeta$  representing vectors of parameters to be estimated.

The error term,  $v_{2mjt}$ , represents unobserved, time-varying factors that influence average house prices. After estimation of Equation (3) via OLS, we calculate the residuals, and then take the average per year-neighborhood combination:

$$\bar{v}_{jt} = \left(\frac{1}{M}\right) \sum_{m=1}^M \hat{v}_{2mjt},$$

where  $\hat{v}_{2mjt}$  are the post-estimation residuals from Equation (3). We use  $\bar{v}_{jt}$  as a proxy for  $v_{jt}$  in Equation (2), resulting in our final outcome equation:

$$w_{ijt} = \mathbf{x}'_{ijt}\xi + \mathbf{h}'_{ijt}\delta + \mathbf{n}'_{jt}\gamma + \mu\lambda_{ijt} + \kappa\bar{v}_{jt} + \varepsilon_{ijt}. \quad (4)$$

Note that the unobservable factors that drive neighborhood choice are allowed to vary over time. Equation (4) is estimated using pooled OLS, and the reported standard errors take into account the generated regressors.

Since our constructed dataset includes an extensive list of potential determinants of rental payments, we can progressively include covariates that capture various aspects of the individual, the rental unit, and the neighborhood. This allows us to examine how the estimated migrant premium (or penalty) from our baseline specification changes as we include additional control variables, particularly when we control for selection based on being a renter or non-renter and on endogenous neighborhood choice.

### 3 | DATA DESCRIPTION

The empirical analysis is based on a unique dataset which combines longitudinal household data from the German Socio-Economic Panel (SOEP) and postcode-level geographic data from the RWI-GEO-Grid (Budde & Eilers, 2014; RWI, 2016a, 2016b, 2016c). We are able to merge the latter geocoded data to the SOEP using the DIW-IAB-RWI Neighborhood Panel (Bügelmeier et al., 2015; DIW & RWI, 2016) on the basis of postcode areas. We also use house prices and house characteristics from the RWI-GEO-RED (an de Meulen et al., 2014), a dataset that contains information from the largest real estate platform in Germany, *ImmobilienScout24*.

The SOEP, which started in 1984 and is managed by the German Institute of Economic Research (DIW), is a representative household panel study in which annual personal interviews are conducted with all adult household members to obtain information on a host of socioeconomic, demographic, and health characteristics of household members, including some information on the characteristics of the dwelling (Schupp et al., 2015). About 11,000 households consisting of around 20,000 persons are surveyed annually. These individuals provide information on socioeconomic, demographic, geographic, and other characteristics, such as household composition, family background, as well as information on being a tenant or homeowner, apartment quality, and rental payments. The information on being a tenant or owner ( $y_{ijt}$ ) and the real net basic rent ( $w_{ijt}$ ) are used as dependent variables in the participation and outcome equations, respectively, of the two-step Heckman (1979) selection model.<sup>10</sup>

We have individual-level data on the household head, his or her partner, and information that pertains to the whole household. Information about the household head and the partner includes age, sex, civil status, and an indicator for having a migration background. We also control for employment (full time, part time, and no employment) and educational attainment (ISCED classification). We create income tertiles (low, medium, high income) to account for differing economic status. Moreover, we consider the household composition by including the number of persons living in the household and the number of children. We also have information on the dwelling characteristics, such as whether it has a balcony or garden.

Our primary variable of interest is the migration background of the household head and his or her partner as it appears in the outcome equation. Using information on nationality, country of origin, and country of origin of the parents, the SOEP distinguishes between first- and second-generation migrants from those with no migration background. This differentiation is possible for around 90 percent of the participants with a migration background.<sup>11</sup> In our sample, about 18 percent are first- or second-generation migrants and about 10 percent have a partner who is either a first- or second-generation migrant. For completeness, we also construct an interaction term between the indicators for having a migration background for the household head and the partner.

For our exclusion restriction, we use information on whether the household head is a smoker and whether the partner of the household head is a smoker. For unpartnered individuals, the variable indicating the smoker status of the partner is set equal to 0. Whether the individual is a smoker, however, is only asked every two years in the SOEP. To fill in the missing information, we set the variable equal to the value the year before and the year after if the values of the indicator match. If the information the year before and the year after do not match, then we

<sup>10</sup>The net basic rent is the self-reported net rent deflated using the consumer price index provided by DESTATIS (2015).

<sup>11</sup>For a more detailed description, see Scheller (2011).

predict the probability of being a smoker based on observable characteristics using the whole sample and set the variable to indicate a smoker if the predicted probability is greater than 0.5.<sup>12</sup>

We note that a smoking household head rents an apartment more often (61 percent) than a non-smoking household head (38 percent) as shown in Table B1 for West Germany; the corresponding numbers for East Germany are 65 percent and 49 percent, respectively (Table B2). Conceivably, smokers would have less objections to damaging a rented property than their own place. Our maintained assumption is that being a smoker is independent of the rent paid. Although landlords would sometimes explicitly prefer nonsmokers, smoking status is neither observed directly by the landlord nor asked in the self-reported tenant information (*Mieterselbstauskunft*).

The SOEP contains information on apartment quality, amenities, and size. These variables comprise the vector  $\mathbf{h}_{ijt}$ . As can be seen for West Germany from Table B3, migrants live in smaller apartments with more people and children. They are also more likely to live in urban areas relative to native Germans. In terms of the amenities and whether the apartment is in a “good” condition; however, there is no clear pattern that we can observe regarding which housing units are better. These differences, however, are not statistically significant in East Germany as shown in Table B4.

Neighborhood information is obtained from the RWI-GEO-Grid data, and this includes the share of foreigners in a postcode area, the unemployment rate, as well as the share of couples and families. We also include the vacancy rate to capture the supply side of the market, and this state-level variable is obtained from Destatis for the period 1998–2014. Referring to Tables B3 and B4, people with a migration background tend to live in areas where there is a higher share of foreigners. This may indicate that migrants self-select into neighborhoods where they can potentially enjoy the benefits of having a local immigrant network of people coming from their own countries of origin, although we do not directly observe their countries of origin in the variable used to capture the share of foreigners in a postcode area.

We can also visually verify this by examining Figure A1, which is a map of Germany where darker areas represent higher foreigner shares. The first thing to note is that there are very few foreigners living in former East Germany save for Berlin. More importantly, a number of factors make the private market for rental housing in former East Germany particularly special. As noted by Fitzenberger and Fuchs (2017), East Germany is essentially still in transition, and the rental market there was strongly regulated in earlier periods. Second, cities tend to have higher immigrant shares: Berlin, Hamburg, Munich, Stuttgart, Frankfurt, and the Ruhr Area (comprising a number of major cities) stand out. Again, this suggests that migrants self-select into these neighborhoods, and the factors that determine their location choice may not always be observable to the econometrician.

In the context of the hedonic pricing model, the estimation sample consists only of houses for sale, but we assume that the rental prices would move along the same direction in terms of how residuals proxy for neighborhood amenities. The variables that we use to explain the selling price of the housing unit are the age of the house in years, its size, as well as a set of categorical variables indicating its type and state. Regarding the type, housing units are differentiated between (a) single detached, (b) multi-storey, (c) farmhouse, bungalow, villa, special, (d) terrace, terrace-middle, (e) terrace-end, (f) semi-detached, and (g) other. The state or condition of the unit falls into one of four categories: (a) new, like new, or just-renovated; (b) completely renovated or renovated (but not necessarily the first occupant post-renovation); (c) modernized or well-kept; and (d) in need of renovation, needs a discussion, or no description. Descriptive statistics can be found in Table B5. These variables constitute the vector  $\mathbf{h}_{2mjt}$  and are used as covariates in Equation (3) to predict house prices.

<sup>12</sup>To empirically interpolate smoker status for the years with missing observations, a probit model of the following form is separately estimated for the household head and the partner:

$$\Pr [s_{ijt} = 1|k] = \Phi \left( \mathbf{k}'_{ijt} \boldsymbol{\theta} \right),$$

where  $s_{ijt}$  is an indicator variable for smoking for person  $i$  in neighborhood  $j$  at time  $t$ , while the vector  $\mathbf{k}_{ijt}$  includes socioeconomic variables that we use to predict the decision to smoke. The parameter vector  $\boldsymbol{\theta}$  is to be estimated. Control variables are the same as in Equation (1), but we additionally control for the health status of the individual using self-assessed health in the equation to predict smoking status.

For the empirical analysis, the neighborhood characteristics are merged with the household SOEP data at the level of about 2,900 postcode areas for West Germany and about 650 postcode areas for East Germany. Furthermore, the information on the vacancy rate is merged at the level of the 16 federal states in Germany (ten states from former West Germany plus Berlin and five federal states from the former East Germany). Households living in price-reduced (i.e., socialized or social) dwellings are dropped.<sup>13</sup> Our analysis focuses on the period 2007–2012 since the real estate data are available from 2007 onwards and the DIW-IAB-RWI Neighborhood Panel ceases in 2012. The resulting sample is an unbalanced panel with 23,685 observations consisting of 9,760 households for West Germany and 2,804 observations consisting of 6,960 households for East Germany.

## 4 | RESULTS

Our main results are based on the estimation of Equation (4) in Section 2, where we model the rental price as a function of observable characteristics and including a proxy for unobserved neighborhood characteristics. As a preview, we mention at the outset that none of our variables that indicate having a migration background—being a first- or second-generation migrant, having a partner who is a first- or second-generation migrant, and the interaction of these two variables—show up as significant after we control for selection and nonrandom location choice. Indeed, even without controlling for potential sources of bias, we find that migration background does not play a significant role in determining rental payments.

### 4.1 | Auxiliary regressions

First, we briefly discuss the results of our auxiliary regressions, specifically the OLS regression of the outcome equation without the inverse Mills ratio and the probit estimation results of our selection equation.<sup>14</sup> For West Germany, these are presented in Tables 1 and 3, respectively; for East Germany, the corresponding tables are Tables 2 and 4. There are four models: Model (1) corresponds to the most parsimonious specification; Model (2) adds the proxy variable for time-varying, unobserved neighborhood amenities or characteristics that drive location choice,  $\bar{v}_{jt}$ ; Model (3) includes the observable neighborhood characteristics obtained from Destatis and the RWI-GEO-Grid dataset but without the proxy for unobservable characteristics,  $\mathbf{n}_{jt}$ ; and, finally, Model (4), which is our preferred model, includes both the augmenters in Models (2) and (3).<sup>15</sup>

Without taking into account selection into renting, the OLS estimates of the model for rental payments are provided in Tables 1 and 2, where we only report the coefficients for the variables of particular interest.<sup>16</sup> None of the variables that indicate having a migration background for the household head or the partner (or their interaction) are statistically significant. However, unobserved neighborhood characteristics are associated with higher rental payments. This is consistent with the model of Epple and Platt (1998), where the constructed proxy variable is construed to capture neighborhood amenities that drive location choice but are not reflected in variables that are observable to the econometrician. Higher values of this proxy variable would reflect unobservable features of the neighborhood that drive up rental prices.

<sup>13</sup>Households stated in the SOEP as tenants but paying no rent are excluded. Moreover, households paying a reduced rent or living in government subsidized apartments (*Sozialwohnungen mit Wohnberechtigungsschein nach §§ 5*) are excluded, since these rents are independent from the local reference rent. These observations comprise about 11 percent of the original sample.

<sup>14</sup>The estimation results from the hedonic pricing model are available in the Appendix.

<sup>15</sup>These model labels apply similarly for the corresponding results in subsequent estimations.

<sup>16</sup>The full list of estimated coefficients is available in the Appendix.



**TABLE 1** OLS, West Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
First- or second-generation migrant	0.0934 (0.0591)	0.00240 (0.0565)	-0.0589 (0.0598)	-0.0583 (0.0561)
Interaction: Migration background	-0.138 (0.133)	-0.00135 (0.128)	-0.0552 (0.129)	0.0293 (0.125)
Partner: First- or second-generation migrant	0.0343 (0.112)	-0.0902 (0.102)	-0.143 (0.103)	-0.138 (0.100)
Share foreigner			0.0733*** (0.00587)	0.112*** (0.00602)
$\bar{v}_{jt}$		2.132*** (0.0694)		1.913*** (0.0793)
Neighborhood characteristics	N	N	Y	Y
Observations	26,591	10,488	16,083	10,488
R-squared	0.257	0.414	0.344	0.425

Note: Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source: Authors' calculations based on SOEP, Destatis and RWI-GEO-Grid.

**TABLE 2** OLS, East Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
First- or second-generation migrant	-0.113 (0.107)	-0.0921 (0.105)	-0.104 (0.108)	-0.0998 (0.103)
Interaction: Migration background	-0.0268 (0.315)	-0.198 (0.325)	0.0759 (0.335)	-0.0980 (0.309)
Partner: First- or second-generation migrant	0.0130 (0.160)	-0.0428 (0.182)	-0.0228 (0.178)	-0.0553 (0.179)
Share foreigner			0.119*** (0.0424)	0.0938** (0.0444)
$\bar{v}_{jt}$		0.735*** (0.0857)		0.597*** (0.0842)
Neighborhood characteristics	N	N	Y	Y
Observations	8,924	3,677	5,544	3,677
R-squared	0.187	0.224	0.209	0.236

Notes: Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source: Authors' calculations based on SOEP, Destatis and RWI-GEO-Grid.

One observable neighborhood feature that is significantly related to rental prices is the share of foreigners, as can be seen in Models (3) and (4) in Tables 1 and 2. Areas with a higher share of foreigners are associated with higher rental prices. This can already be seen in Figure A1, where one can verify that foreigners tend to live in

**TABLE 3** Probit, West Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
Smoker	0.291*** (0.0261)	0.287*** (0.0320)	0.277*** (0.0273)	0.287*** (0.0320)
Partner: Smoker	0.0723*** (0.0248)	0.0931*** (0.0340)	0.142*** (0.0257)	0.0931*** (0.0340)
First- or second-generation migrant	0.243*** (0.0438)	0.245*** (0.0498)	0.232*** (0.0453)	0.245*** (0.0498)
Interaction: Migration background	0.0923 (0.0855)	-0.0554 (0.100)	0.00149 (0.0888)	-0.0554 (0.100)
Partner: First- or second-generation migrant	0.298*** (0.0621)	0.272*** (0.0721)	0.283*** (0.0638)	0.272*** (0.0721)
Neighborhood characteristics	N	N	Y	Y
$\bar{v}_{jt}$	N	Y	N	Y
Observations	57,422	23,685	46,912	23,685

Notes: Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source: Authors' calculations based on SOEP.

**TABLE 4** Probit, East Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
Smoker	0.224*** (0.0505)	0.215*** (0.0612)	0.222*** (0.0526)	0.215*** (0.0612)
Partner: Smoker	0.127*** (0.0467)	0.243*** (0.0621)	0.213*** (0.0477)	0.243*** (0.0621)
First- or second-generation migrant	0.225** (0.103)	0.249** (0.116)	0.251** (0.109)	0.249** (0.116)
Interaction: Migration background	0.108 (0.331)	0.337 (0.384)	0.181 (0.321)	0.337 (0.384)
Partner: First- or second-generation migrant	0.141 (0.137)	0.0699 (0.158)	0.133 (0.139)	0.0699 (0.158)
Neighborhood characteristics	N	N	Y	Y
$\bar{v}_{jt}$	N	Y	N	Y
Observations	16,944	6,960	13,564	6,960

Notes: Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source: Authors' calculations based on SOEP.

cities where the rental prices are substantially higher than elsewhere in the country. Where they appear, the coefficients for both the observed and the proxy for the unobserved neighborhood characteristics are highly significant, and the estimates do not vary in any meaningful way.

Tables 3 and 4 show the abbreviated results of the probit estimates of Equation (1) for West and East Germany, respectively, where we examine the determinants of being a renter. Household heads with a migration background are more likely to be a renter than a homeowner. Indeed, they are between 23 to 25 percent more likely not to own the property where they live. Having a partner with a migration background also increases the likelihood of being a renter for West Germany. The estimates are highly significant except for the interaction between the migration background indicators and, at least for East Germany, the indicator for having a partner with a migration background. The model estimates are robust to the inclusion of observed and unobserved neighborhood characteristics.

The coefficients for being a smoker and for having a partner who smokes are both statistically significant across all models. In fact, for West Germany, the estimated coefficient on the household head being a smoker is even larger (though not by much) than the corresponding estimates for the migrant indicators, suggesting that smoking status is an even more relevant determinant for the probability of being a renter.

## 4.2 | Do migrants pay higher rent?

The results from estimating Equation (4) are presented in Tables 5 and 6. We focus on the indicators for having a migration background. The conclusion derived from Tables 1 and 2 does not change when we use a more nuanced estimation approach which simultaneously controls for nonrandom location choice and selection into being a renter. Having a migration background both for the household head and the partner do not significantly explain any differential in rental payments between migrants and natives.

The coefficient of the inverse Mills ratio is not statistically significant in Models (2), (3), and (4), which could indicate that what drives selection into being a renter is correlated with unobserved neighborhood characteristics

**TABLE 5** OLS including IMR, West Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
First- or second-generation migrant	0.138** (0.0632)	0.00935 (0.0631)	-0.0541 (0.0637)	-0.0492 (0.0627)
Interaction: Migration background	-0.115 (0.133)	-0.00236 (0.128)	-0.0549 (0.129)	0.0280 (0.125)
Partner: First- or second-generation migrant	0.0969 (0.115)	-0.0821 (0.106)	-0.137 (0.106)	-0.127 (0.104)
Inverse Mill Ratio, $\lambda_{ijt}$	0.358** (0.182)	0.0530 (0.204)	0.0355 (0.152)	0.0696 (0.202)
Share foreigner			0.0733*** (0.00586)	0.112*** (0.00603)
$\bar{v}_{jt}$		2.132*** (0.0694)		1.912*** (0.0793)
Neighborhood characteristics	N	N	Y	Y
Observations	26,605	10,490	16,095	10,490
R-squared	0.258	0.414	0.344	0.425

Notes: Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source: Authors' calculations based on SOEP, Destatis and RWI-GEO-Grid.

**TABLE 6** OLS including IMR, East Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
First- or second-generation migrant	-0.179 (0.110)	-0.141 (0.106)	-0.125 (0.110)	-0.143 (0.104)
Interaction: Migration background	-0.0669 (0.317)	-0.274 (0.329)	0.0559 (0.337)	-0.166 (0.314)
Partner: First- or second-generation migrant	-0.0246 (0.168)	-0.0484 (0.188)	-0.0310 (0.181)	-0.0602 (0.183)
Inverse Mill Ratio, $\lambda_{ijt}$	-0.533** (0.257)	-0.343 (0.256)	-0.140 (0.199)	-0.307 (0.254)
Share foreigner			0.118*** (0.0425)	0.0914** (0.0445)
$\bar{v}_{jt}$		0.735*** (0.0856)		0.598*** (0.0841)
Neighborhood characteristics	N	N	Y	Y
Observations	8,924	3,677	5,544	3,677
R-squared	0.188	0.225	0.209	0.237

Notes: Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source: Authors' calculations based on SOEP, Destatis and RWI-GEO-Grid.

that influence location choice. As one can see, the estimated coefficients in Tables 5 and 6 do not vary much from the corresponding estimates in Tables 1 and 2, and if one takes into account the standard errors, the estimates do indeed overlap in most cases.

What remains highly significant are the neighborhood amenities that are used to account for location choice,  $\bar{v}_{jt}$ . In terms of the observed characteristics, areas where there are larger shares of foreigners are associated with higher rental prices even when controlling for a long vector of covariates. In addition, if we take the proxy variable to be an index for the quality of unobserved amenities, then neighborhoods of higher quality, unsurprisingly, is shown to be associated with higher rental payments.

At this point, it would be useful to compare our results to those reported in Winke (2016), where there is a statistically significant rental price differential between migrants and natives in Germany, albeit at the 10 percent significance level only. In contrast to the results we obtained and presented in Tables 1 and 5 and in Tables 2 and 6 in the present paper, he finds that tenants with a migration background tend to pay about 11 more per month than those without a migration background or about 2.7 percent higher than the average rent of the latter group. Based on a decomposition analysis, he additionally estimates that about 63 percent of the differential is "unexplained" and may be attributed to unequal treatment.

Our approach is different in a number of ways which may explain the contrasting conclusions. First, we use data for the period 2007–2012, whereas Winke (2016) relies only on cross-sectional data from 2013. Second, we have much more information on observable and unobservable neighborhood characteristics that drive rental prices and could be correlated with how migrants select into neighborhoods. While some observable neighborhood characteristics are included in his estimates as well, we are able to control for a longer vector of such variables. More importantly, we acknowledge the possibility of endogenous location choice based on unobservable factors, and we explicitly control for this using a proxy for these unobservable factors based on a hedonic pricing

model. This is possible because of our uniquely assembled dataset, which offers far more information on important individual, rental unit, and neighborhood features.<sup>17</sup>

Our position is that including the sample of people living in social housing is not helpful in achieving our primary goal of estimating differences in the treatment of migrants and non-migrants in the rental market, but these social housing units remain in the operational sample of Winke (2016). Social housing is an entity outside the market where the State is almost fully in control. This is in contrast to the market for non-social housing, which—while regulated—is exactly the market where the majority of the population transact and where instances of prejudicial discrimination can put groups of people at a serious disadvantage.

Our study is limited by the fact that we are unable to observe the migration background of the property owner or indeed any of his or her characteristics. It is plausible that prejudicial discrimination occurs when there is a mismatch between the background of the landlord and the renter. That is, we may expect a white, German landlord to give preferential rental rates to a white, German renter, but to levy a migrant penalty on someone who is non-white; conversely, a Turkish landlord may give preferential treatment to Turkish renters. Information on landlord characteristics, however, is not available in our dataset, and we are consequently unable to test how this mechanism influences our results.

We ran additional regressions to demonstrate the robustness of our results. First, we estimated our models for East and West Germany simultaneously. Second, we trim the rental payment variable by dropping the highest and lowest 2 percent per year for each household instead of dropping rents higher than 200 per sqm. Third, we bootstrap our regressions to obtain alternative standard errors. Fourth, we use postal code fixed effects to account for time-invariant unobserved characteristics that may affect the outcome. Finally, we consider neighborhood-year interactions as a way to account for time-varying, unobserved effects which our proxy variable would pick up. In all specifications, none of these regressions show that being first- or second-generation migrant, having a partner who is a first- or second-generation migrant, and the interaction of these two indicators show statistically significant results in the specifications which account for selection biases. Moreover, the neighborhood characteristics—share of foreigners and  $\bar{v}_{jt}$ —are significantly related to the rental prices except for the specification which includes postal code fixed effects.<sup>18</sup>

## 5 | CONCLUSION

Our results do not support the claim that people with a migration background in Germany are charged a higher rent than native Germans. Rent, it would seem, is determined by more traditional factors that are associated with the quality of the dwelling and the socioeconomic standing of the tenant.<sup>19</sup> Although there is previous evidence in the literature that conclude the opposite, our nuanced approach based on more extensive information leads us to conclude that price discrimination based on migration background does not manifest itself in the rental housing market in Germany. In our view, the results do not engender a public policy response to the situation of people with a migration background when it comes to the rent paid.

However, this is not to say that there is no discrimination in the rental market. As we have mentioned early on, access discrimination may be a significant problem for migrants. There is evidence—both anecdotal and based

<sup>17</sup>We also additionally take into account the possibility that selection into being a renter could bias the estimation of the rental price differential. However, considering that the inverse Mills ratio is not robustly significant in our models, we do not believe that this issue would present itself as a problem in studies that do not account for it.

<sup>18</sup>Results for all of these regressions are available upon request.

<sup>19</sup>These coefficient estimates for these variables are available in the Appendix. Factors such as the size of the dwelling, the included amenities (e.g., garden, balcony, central heating), the educational achievement and income of the tenant, and whether the unit is in a good neighborhood are all statistically significant in explaining rent.

on a correspondence study (Auspurg et al., 2017)— that migrants are immediately declined when they apply for a rental property. The key challenge is for the State to ensure that certain groups of people, particularly those with a migration background, are not disadvantaged when they are seeking to rent property. Ensuring equal access is likely to prevent other problems from materializing, such as the ghettoization of certain neighborhoods and the social exclusion of migrants living in these ghettos.

We note as well that we are only able to control for the migration background of the tenant, and that we do not have information on whether the landlord has a migration background, too. As pointed out earlier in the paper, when the ethnic origins of the landlord and the tenant match, we are less likely to expect instances of negative discrimination to occur. However, when the landlord does not have a migration background while the tenant does (and, in addition, is of a different “color”), the likelihood of mistreatment can be reasonably expected to increase. Relatedly, we have thus far only recorded whether people have a migration background, but not exactly their specific origin. This may matter as one news article,<sup>20</sup> citing a member of an advice center for victims of discrimination, indicates “that Muslim women with headscarves and black Africans ... are most likely to be confronted with discrimination.” This is an important avenue to pursue when new datasets with more detailed information allow for this kind of undertaking.

The issues associated with housing migrants is expected to feature even more prominently in the public sphere as refugees or asylum seekers transition into the regular housing market and away from the temporary accommodation provided to them by the State. While we do not observe that migrants are charged a higher rent just because they are migrants, the new residents in Germany comprise a different group from the sort of people with a migration background that we have thus far observed in our dataset. Future work on this issue would be critical to ensure that these people are afforded equal treatment as guaranteed by the laws of the land.

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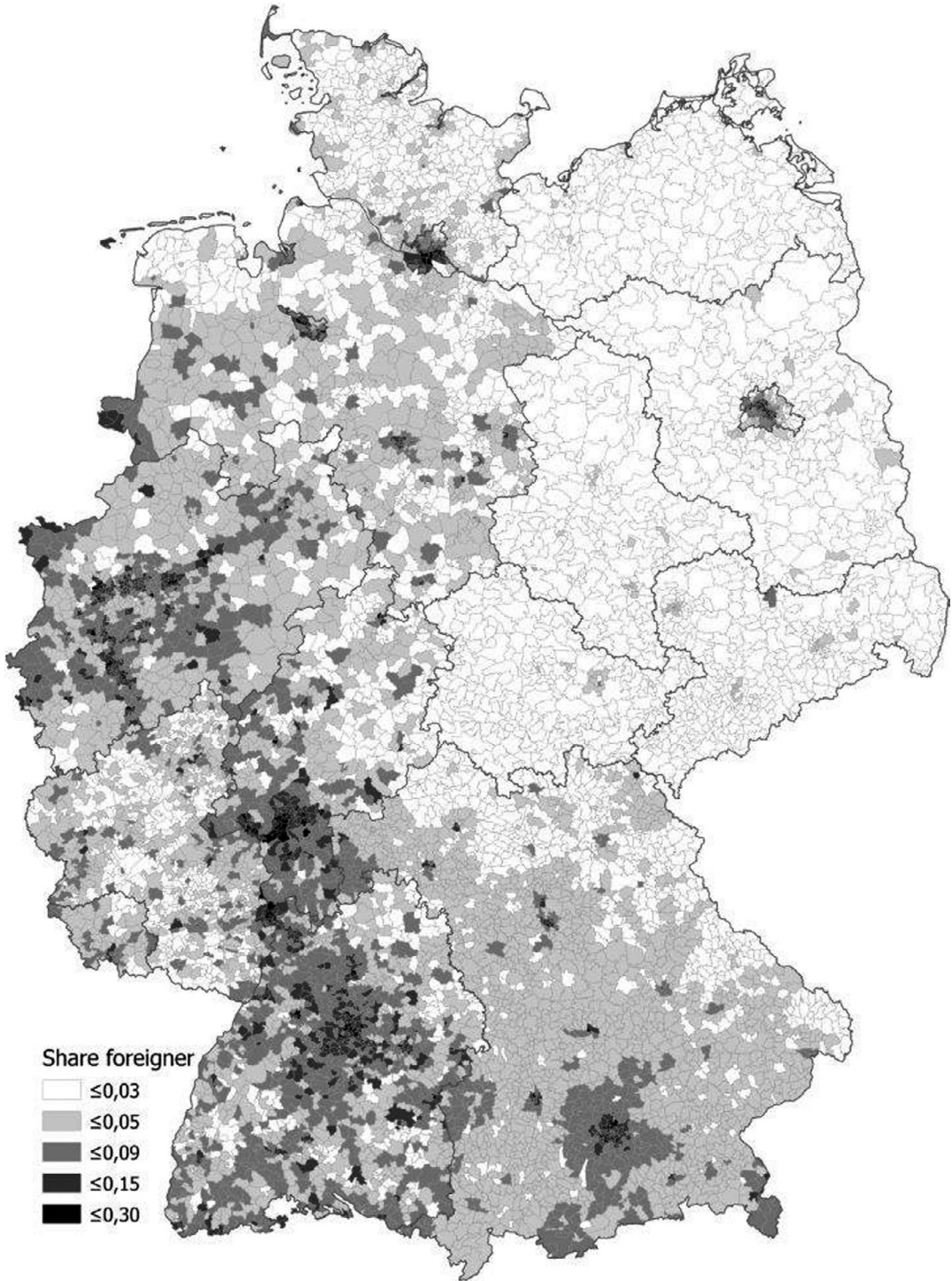
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<sup>20</sup>See “Foreigners not welcome: racism in Germany’s housing market” in <https://goo.gl/9CLZMt>.

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## APPENDIX A



**FIGURE A1** Share foreigner (2012) *Source.* Authors' calculations based on RWI-GEO-Grid 2012. The share is presented at the postal code level



## APPENDIX B

## SUMMARY STATISTICS

TABLE B1 T test, West Germany

	Non-Smoker	Smoker	Difference	Std. Err.
Number of persons in HH	2.12	2.04	0.082	0.016***
No. of children (aged 0–3)	0.05	0.04	0.005	0.003*
No. of children (aged 3–6)	0.05	0.06	–0.008	0.003**
No. of children (aged 6–14)	0.17	0.20	–0.039	0.007***
Age	59.08	47.62	11.463	0.217***
Age, squared/1,000	3.77	2.44	1.326	0.024***
Married	0.54	0.40	0.137	0.007***
Sex	0.56	0.57	–0.009	0.007
Medium education	0.48	0.61	–0.130	0.007***
High education	0.37	0.22	0.144	0.006***
Full time	0.38	0.57	–0.195	0.007***
Part time	0.12	0.16	–0.038	0.005***
Interaction: Migration background	0.06	0.06	0.004	0.003
Partner: First- or second-generation migrant	0.11	0.09	0.018	0.004***
No partner	0.43	0.60	–0.170	0.007***
Partner: Full time	0.17	0.15	0.021	0.005***
Partner: Part time	0.15	0.11	0.034	0.005***
Either Main tenant or Sub-tenant	0.38	0.61	–0.235	0.007***
Medium real household income	0.29	0.27	0.018	0.006***
High real household income	0.28	0.17	0.106	0.006***
Size (sq.m.)	106.64	92.84	13.800	0.537***
Size (sq.m.) squared	12,945.23	9,960.03	2,985.204	128.777***
Has cellar	0.95	0.93	0.025	0.003***
Has garden	0.69	0.56	0.124	0.007***
Has central heating	0.96	0.96	0.008	0.003***
Has balcony	0.88	0.79	0.085	0.005***
In a good condition	0.76	0.64	0.114	0.006***
Partial renovation	0.23	0.32	–0.096	0.006***
Year moved into dwelling	1989.67	1998.41	–8.746	0.228***
Share empty apartments (state level)	6.45	6.48	–0.028	0.013**
Urban regions	0.76	0.75	0.009	0.006
Share families	31.36	31.21	0.149	0.177
Share couples	31.23	29.90	1.331	0.146***
Share foreigner	7.35	7.75	–0.401	0.060***
Unemployment rate	6.33	6.90	–0.566	0.052***

Notes.: T test based on full sample. 16,018 observations for Non-Smoker and 7,674 observation for smoker. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source. Authors' calculations based on SOEP and RWI-GEO-Grid.

**TABLE B2** T test, East Germany

	Non-Smoker	Smoker	Difference	Std. Err.
Either Main tenant or Sub-tenant	0.49	0.65	-0.161	0.013***
Number of persons	2.05	2.01	0.037	0.028
No. of children (aged 0-3)	0.04	0.07	-0.028	0.006***
No. of children (aged 3-6)	0.05	0.08	-0.033	0.006***
No. of children (aged 6-14)	0.13	0.16	-0.025	0.011**
Age	59.42	46.50	12.926	0.389***
Age, squared/1,000	3.79	2.33	1.451	0.043***
Married	0.52	0.34	0.183	0.013***
Sex	0.48	0.54	-0.064	0.013***
Low education	0.08	0.10	-0.020	0.007***
Medium education	0.48	0.68	-0.201	0.013***
High education	0.44	0.22	0.220	0.012***
Full time	0.35	0.50	-0.147	0.012***
Part time	0.10	0.13	-0.032	0.008***
Non-working	0.50	0.18	0.320	0.012***
Unemployed	0.04	0.19	-0.141	0.007***
First- or second-generation migrant	0.07	0.06	0.007	0.006
Interaction: Migration background	0.01	0.00	0.004	0.002**
Partner: First- or second-generation migrant	0.04	0.02	0.018	0.005***
No partner	0.41	0.61	-0.200	0.013***
Partner: Full time	0.23	0.20	0.031	0.011***
Partner: Part time	0.09	0.05	0.034	0.007***
Partner: Non-working	0.24	0.08	0.162	0.010***
Partner: Unemployed	0.02	0.05	-0.027	0.005***
Low real household income	0.62	0.73	-0.111	0.012***
Medium real household income	0.25	0.20	0.052	0.011***
High real household income	0.13	0.07	0.059	0.008***

Notes.: T test based on full sample. 4,755 observations for Non-Smoker and 2,205 observation for smoker \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source. Authors' calculations based on SOEP and RWI-GEO-Grid.

**TABLE B3** T test conditional on being tenant, West Germany

	Natives	Foreigners	Difference	Std. Err.
Smoker	0.44	0.46	-0.266	0.12**
Partner smoker	0.33	0.34	-0.008	0.11
Number of persons in HH	1.77	2.19	-0.419	0.025***
No. of children (aged 0-3)	0.05	0.08	-0.025	0.006***
No. of children (aged 3-6)	0.05	0.07	-0.024	0.006***
No. of children (aged 6-14)	0.13	0.23	-0.101	0.011***
Age	50.25	49.43	0.820	0.399**
Age, squared/1,000	2.82	2.71	0.110	0.043**
Married	0.31	0.45	-0.135	0.011***
Sex	0.46	0.50	-0.032	0.012***
Low education	0.14	0.26	-0.124	0.009***
Medium education	0.58	0.51	0.066	0.012***
High education	0.29	0.23	0.058	0.010***
Full time	0.49	0.44	0.050	0.012***
Part time	0.14	0.16	-0.017	0.008**
Interaction: Migration background	0.00	0.30	-0.296	0.005***
Partner: First- or second-generation migrant	0.05	0.30	-0.248	0.007***
No partner	0.65	0.56	0.091	0.011***
Partner: Full time	0.15	0.15	0.003	0.008
Partner: Part time	0.07	0.10	-0.026	0.006***
Low real household income	0.60	0.65	-0.048	0.011***
Medium real household income	0.27	0.26	0.011	0.010
High real household income	0.13	0.09	0.037	0.008***
Size (sq.m.)	79.14	75.74	3.399	0.600***
Size (sq.m.) squared	6,953.29	6,298.90	654.398	120.063***
Has cellar	0.92	0.93	-0.011	0.006*
Has garden	0.38	0.30	0.082	0.011***
Has central heating	0.96	0.94	0.013	0.005***
Has balcony	0.76	0.74	0.020	0.010**
In a good condition	0.63	0.65	-0.016	0.011
Partial renovation	0.33	0.31	0.021	0.011*
Year moved into dwelling	1999.72	2001.04	-1.322	0.272***
Real net basic rent (sq.m.)	6.50	6.55	-0.048	0.046
Real net basic rent	505.11	485.03	20.086	4.880***
Share empty apartments (state level)	6.54	6.47	0.067	0.024***
Urban regions	0.80	0.82	-0.021	0.009**
Share families	27.95	28.90	-0.948	0.311***
Share couples	28.84	28.44	0.403	0.261
Share foreigner	8.21	9.45	-1.239	0.111***
Unemployment rate	7.67	7.14	0.538	0.098***

Notes: T test is based on the model 4 and conditional on being tenant with 8,118 observations for natives and 2,377 observations for migrants. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source: Authors' calculations based on SOEP, Destatis, RWI-GEO-Grid and DIW-IAB-RWI Neighborhood Panel

**TABLE B4** T test conditional on being tenant, East Germany

	Natives	Foreigners	Difference	Std. Err.
Smoker	0.39	0.37	0.019	0.030
Partner: Smoker	0.30	0.29	0.014	0.028
Number of persons in HH	1.82	1.61	0.207	0.060***
No. of children (aged 0–3)	0.07	0.04	0.027	0.017*
No. of children (aged 3–6)	0.07	0.02	0.050	0.016***
No. of children (aged 6–14)	0.13	0.03	0.101	0.025***
Age	53.45	59.25	-5.793	1.102***
Age, squared/1,000	3.19	3.73	-0.540	0.120***
Married	0.32	0.36	-0.034	0.029
Sex	0.43	0.47	-0.042	0.030
Low education	0.11	0.12	-0.013	0.019
Medium education	0.56	0.52	0.037	0.031
High education	0.34	0.36	-0.024	0.029
Full time	0.35	0.30	0.052	0.029*
Part time	0.12	0.11	0.002	0.020
Non-working	0.41	0.43	-0.020	0.030
Unemployed	0.12	0.16	-0.034	0.020*
Interaction: Migration background	0.00	0.10	-0.101	0.005***
Partner: First- or second-generation migrant	0.02	0.10	-0.079	0.010***
No partner	0.62	0.63	-0.010	0.030
Partner: Full time	0.14	0.07	0.068	0.021***
Partner: Part time	0.05	0.07	-0.026	0.013**
Partner: Non-working	0.16	0.18	-0.025	0.023
Partner: Unemployed	0.04	0.05	-0.007	0.012
Low real household income	0.78	0.81	-0.031	0.025
Medium real household income	0.17	0.13	0.040	0.023*
High real household income	0.05	0.06	-0.009	0.013
Size (sq.m.)	67.22	65.91	1.313	1.180
Size (sq.m.) squared	4,875.58	4,838.31	37.274	207.077
Has cellar	0.96	0.94	0.013	0.013
Has garden	0.24	0.23	0.014	0.026
Has central heating	0.97	0.98	-0.001	0.010
Has balcony	0.65	0.73	-0.078	0.029***
In a good condition	0.69	0.66	0.032	0.028
Partial renovation	0.27	0.32	-0.049	0.027*
Year moved into dwelling	1997.41	1995.82	1.589	0.847*
Real net basic rent (sq.m.)	5.76	5.65	0.110	0.077
Real net basic rent	382.43	366.63	15.792	7.615**
Share empty apartments (state level)	14.09	14.06	0.033	0.179
Urban regions	0.40	0.40	-0.002	0.030

(Continues)

**TABLE B4** (Continued)

	Natives	Foreigners	Difference	Std. Err.
Share families	25.09	25.57	-0.487	0.599
Share couples	31.11	32.88	-1.776	0.740**
Share foreigner	2.84	2.84	0.005	0.051
Unemployment rate	11.97	12.11	-0.139	0.208

Notes.: T test is based on the model 4 and conditional on being tenant with 3,390 observations for natives and 287 observations for migrants. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source. Authors' calculations based on SOEP, Destatis, RWI-GEO-Grid and DIW-IAB-RWI Neighborhood Panel.

**TABLE B5** Summary statistics property data, West Germany

Variable	Mean	Std. Dev.	Min.	Max.
ln(Price)	12.4	0.64	9.21	25.33
Age	40.26	32.42	0	142
Age sq. (1,000)	2.67	3.63	0	20.16
Age cub. (1,000)	218.89	408.42	0	2,863.29
ln(Area)	5.08	0.44	3.22	18.42
Number of Rooms	6.33	4.01	0.5	100
State: Like New/ First move in	0.17			
State: Renovated	0.05			
State: Modernized, well-kept	0.33			
State: Not Renovated or not stated	0.44			
Type: Single detached	0.41			
Type: Multi-storey	0.1			
Type: Farmhouse, Bungalow, Villa, Special	0.08			
Type: Terrace, Terrace-middle	0.09			
Type: Terrace-end	0.04			
Type: Semi-detached	0.15			
Type: Other	0.13			
Has cellar	0.52			
Share empty apartments (state level)	7.19	2.59	4.2	17.5
Urban Area	0.77			
Share family	31.11	10.26	0.02	82.51
Share couple	34.61	10.3	0.09	85.10
Share ethno	6.75	3.74	0.3	32.72
Unemployment rate	6.69	3.5	0	23.8

Notes.: The number of observations is 696,519. The standard deviation and minimum and maximum values of binary indicators are not presented.

Source. Authors' calculations based on RWI-GEO-RED and RWI-GEO-Grid.

## APPENDIX C

## REGRESSION TABLES

**TABLE C6** House price regressions

	Model 1	Model 2
	(1)	(2)
Age	-0.00697*** (0.000528)	-0.00588*** (0.000457)
Age squared (/1,000)	0.0277** (0.0121)	0.00303 (0.0107)
Age cubed (/1,000)	-0.0000901 (0.0000716)	0.0000610 (0.0000637)
log(Area)	0.911*** (0.0103)	0.845*** (0.00800)
State: Renovated	0.0445*** (0.00858)	0.0574*** (0.00767)
State: Modernized, well-kept	-0.0670*** (0.00618)	-0.0415*** (0.00525)
State: Not Renovated or not stated	-0.141*** (0.00611)	-0.134*** (0.00529)
Type: Single detached	0.0329*** (0.00595)	0.0718*** (0.00433)
Type: Multi-storey	-0.202*** (0.0104)	-0.155*** (0.00767)
Type: Farmhouse, Bungalow, Villa, Special	0.204*** (0.0111)	0.224*** (0.00842)
Type: Terrace, Terrace-middle	-0.0711*** (0.00583)	-0.0901*** (0.00452)
Type: Terrace-end	-0.0241*** (0.00662)	-0.0380*** (0.00482)
Type: Other	-0.0866*** (0.00697)	-0.0508*** (0.00536)
Has Cellar	0.0656*** (0.00468)	0.0407*** (0.00368)
Share empty apartments (state level)	-0.0276*** (0.00264)	0.000603 (0.00249)
Urban area	0.325*** (0.0163)	0.231*** (0.0138)
Share family		-0.0137*** (0.000502)
Share couple		0.00108** (0.000486)

(Continues)

**TABLE C6** (Continued)

	Model 1	Model 2
	(1)	(2)
Share foreigner		0.0318*** (0.00186)
Unemployment rate		-0.0460*** (0.00190)
Observations	696,519	696,519
R <sup>2</sup> adjusted	0.546	0.639

Notes.: The reference category for the state indicators is “like new / first move in”; for the type indicators, it is “multi-detached.” Standard errors are robust to clustering at the postcode level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source. Authors' calculations based on RWI-GEO-RED and RWI-GEO-Grid.

**TABLE C7** Probit, West Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
Smoker	0.291*** (0.0261)	0.287*** (0.0320)	0.277*** (0.0273)	0.287*** (0.0320)
Partner: Smoker	0.0723*** (0.0248)	0.0931*** (0.0340)	0.142*** (0.0257)	0.0931*** (0.0340)
Number of persons in HH	-0.108*** (0.0184)	-0.110*** (0.0235)	-0.110*** (0.0199)	-0.110*** (0.0235)
No. of children (aged 0–3)	-0.0698* (0.0372)	0.0433 (0.0557)	-0.0147 (0.0410)	0.0433 (0.0557)
No. of children (aged 3–6)	-0.145*** (0.0330)	-0.0573 (0.0522)	-0.140*** (0.0381)	-0.0573 (0.0522)
No. of children (aged 6–14)	-0.0909*** (0.0235)	-0.114*** (0.0348)	-0.0963*** (0.0268)	-0.114*** (0.0348)
Age	-0.0825*** (0.00556)	-0.0849*** (0.00672)	-0.0830*** (0.00573)	-0.0849*** (0.00672)
Age, squared/1000	0.499*** (0.0507)	0.509*** (0.0597)	0.514*** (0.0522)	0.509*** (0.0597)
Married	-0.294*** (0.0361)	-0.258*** (0.0482)	-0.281*** (0.0400)	-0.258*** (0.0482)
Sex	-0.122*** (0.0348)	-0.129*** (0.0400)	-0.138*** (0.0360)	-0.129*** (0.0400)
Medium education	-0.0480 (0.0383)	-0.0540 (0.0451)	-0.0400 (0.0400)	-0.0540 (0.0451)
High education	0.000883 (0.0434)	-0.00448 (0.0516)	0.0432 (0.0452)	-0.00448 (0.0516)

(Continues)

**TABLE C7** (Continued)

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
Full time	-0.0593* (0.0348)	-0.0825* (0.0445)	-0.163*** (0.0373)	-0.0825* (0.0445)
Part time	-0.0849** (0.0401)	-0.0626 (0.0502)	-0.123*** (0.0420)	-0.0626 (0.0502)
First- or second-generation migrant	0.243*** (0.0438)	0.245*** (0.0498)	0.232*** (0.0453)	0.245*** (0.0498)
Interaction: Migration background	0.0923 (0.0855)	-0.0554 (0.100)	0.00149 (0.0888)	-0.0554 (0.100)
Partner: First- or second-generation migrant	0.298*** (0.0621)	0.272*** (0.0721)	0.283*** (0.0638)	0.272*** (0.0721)
No partner	0.0695 (0.0492)	0.0808 (0.0628)	0.106** (0.0526)	0.0808 (0.0628)
Partner: Full time	0.00239 (0.0404)	-0.0199 (0.0514)	-0.0750* (0.0431)	-0.0199 (0.0514)
Partner: Part time	-0.0956*** (0.0370)	-0.115** (0.0487)	-0.153*** (0.0405)	-0.115** (0.0487)
Medium real household income	-0.330*** (0.0284)	-0.321*** (0.0361)	-0.336*** (0.0302)	-0.321*** (0.0361)
High real household income	-0.655*** (0.0364)	-0.698*** (0.0467)	-0.657*** (0.0386)	-0.698*** (0.0467)
Observations	57,422	23,685	46,912	23,685

Notes.: Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source. Authors' calculations based on SOEP.



**TABLE C8** OLS, West Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
Number of persons	0.000963 (0.0344)	0.0846** (0.0423)	0.0677 (0.0416)	0.0820* (0.0422)
No. of children (aged 0–3)	0.229*** (0.0712)	0.109 (0.0828)	0.170** (0.0806)	0.102 (0.0817)
No. of children (aged 3–6)	0.0538 (0.0614)	–0.0688 (0.0806)	0.000890 (0.0756)	–0.0570 (0.0798)
No. of children (aged 6–14)	0.0549 (0.0416)	–0.0291 (0.0568)	0.0254 (0.0517)	–0.0277 (0.0565)
Age	–0.0216*** (0.00796)	–0.0209** (0.00921)	–0.0237*** (0.00845)	–0.0210** (0.00906)
Age, squared/1000	0.296*** (0.0811)	0.301*** (0.0955)	0.315*** (0.0853)	0.297*** (0.0939)
Married	–0.0735 (0.0544)	–0.126** (0.0538)	–0.0746 (0.0545)	–0.121** (0.0536)
Sex	–0.121** (0.0501)	–0.114** (0.0496)	–0.100** (0.0509)	–0.115** (0.0492)
Medium education	0.233*** (0.0492)	0.147*** (0.0522)	0.250*** (0.0511)	0.168*** (0.0513)
High education	0.703*** (0.0648)	0.420*** (0.0661)	0.618*** (0.0669)	0.442*** (0.0653)
Full time	0.355*** (0.0510)	0.198*** (0.0572)	0.178*** (0.0551)	0.174*** (0.0569)
Part time	0.0928* (0.0554)	0.00722 (0.0625)	–0.0237 (0.0600)	–0.0101 (0.0619)
First- or second-generation migrant	0.0934 (0.0591)	0.00240 (0.0565)	–0.0589 (0.0598)	–0.0583 (0.0561)
Interaction: Migration background	–0.138 (0.133)	–0.00135 (0.128)	–0.0552 (0.129)	0.0293 (0.125)
Partner: First- or second-generation migrant	0.0343 (0.112)	–0.0902 (0.102)	–0.143 (0.103)	–0.138 (0.100)
No partner	–0.120 (0.0791)	–0.160* (0.0883)	–0.175** (0.0861)	–0.192** (0.0882)
Partner: Full time	–0.0998 (0.0717)	–0.155** (0.0769)	–0.108 (0.0761)	–0.152** (0.0761)
Partner: Part time	–0.0609 (0.0671)	–0.0662 (0.0772)	–0.0236 (0.0741)	–0.0698 (0.0758)
Medium real household income	0.693*** (0.0521)	0.583*** (0.0627)	0.623*** (0.0579)	0.561*** (0.0620)

(Continues)

TABLE C8 (Continued)

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
High real household income	1.453*** (0.0842)	1.094*** (0.0927)	1.229*** (0.0899)	1.038*** (0.0915)
Size (sq.m.)	-0.0469*** (0.00406)	-0.0370*** (0.00466)	-0.0440*** (0.00439)	-0.0379*** (0.00461)
Size (sq.m.) squared	0.000108*** (2.00e-05)	8.11e-05*** (2.36e-05)	9.91e-05*** (2.18e-05)	8.55e-05*** (2.32e-05)
Has cellar	0.217*** (0.0598)	0.0830 (0.0682)	0.138** (0.0633)	0.0660 (0.0686)
Has garden	-0.197*** (0.0408)	-0.00736 (0.0428)	-0.0971** (0.0424)	-0.0131 (0.0426)
Has central heating	0.597*** (0.0738)	0.576*** (0.0899)	0.607*** (0.0814)	0.593*** (0.0876)
Has balcony	0.568*** (0.0421)	0.542*** (0.0444)	0.584*** (0.0445)	0.559*** (0.0442)
In a good condition	0.430*** (0.0856)	0.385*** (0.0919)	0.396*** (0.0918)	0.405*** (0.0918)
Partial renovation	0.191** (0.0818)	0.126 (0.0889)	0.141 (0.0886)	0.141 (0.0889)
Year moved into dwelling	0.0238*** (0.00228)	0.0285*** (0.00265)	0.0266*** (0.00241)	0.0289*** (0.00266)
Share empty apartments (state level)	-0.232*** (0.0171)	-0.232*** (0.0206)	-0.0322 (0.0204)	-0.0942*** (0.0218)
Urban regions	1.121*** (0.0499)	1.103*** (0.0511)	0.813*** (0.0567)	0.727*** (0.0545)
Share families			-0.0323*** (0.00199)	-0.0300*** (0.00179)
Share couples			0.0101*** (0.00259)	0.0151*** (0.00235)
Share foreigner			0.0733*** (0.00587)	0.112*** (0.00602)
Unemployment rate			-0.109*** (0.00677)	-0.117*** (0.00672)
$\bar{v}_{jt}$		2.132*** (0.0694)		1.913*** (0.0793)
Observations	26,591	10,488	16,083	10,488
R-squared	0.257	0.414	0.344	0.425

Notes.: Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source. Authors' calculations based on SOEP, Destatis and RWI-GEO-Grid.

**TABLE C9** OLS including IMR, West Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
Number of persons	-0.0210 (0.0362)	0.0814* (0.0443)	0.0654 (0.0428)	0.0777* (0.0442)
No. of children (aged 0–3)	0.230*** (0.0711)	0.112 (0.0848)	0.171** (0.0809)	0.106 (0.0837)
No. of children (aged 3–6)	0.0365 (0.0610)	-0.0685 (0.0807)	-0.000938 (0.0754)	-0.0566 (0.0799)
No. of children (aged 6–14)	0.0434 (0.0416)	-0.0314 (0.0569)	0.0236 (0.0517)	-0.0307 (0.0566)
Age	-0.0309*** (0.00895)	-0.0223** (0.0102)	-0.0249*** (0.00956)	-0.0229** (0.0101)
Age, squared/1000	0.330*** (0.0818)	0.306*** (0.0956)	0.321*** (0.0869)	0.304*** (0.0941)
Married	-0.139** (0.0629)	-0.134** (0.0623)	-0.0813 (0.0595)	-0.133** (0.0617)
Sex	-0.141*** (0.0508)	-0.118** (0.0516)	-0.103** (0.0521)	-0.119** (0.0512)
Medium education	0.220*** (0.0497)	0.145*** (0.0526)	0.249*** (0.0513)	0.165*** (0.0516)
High education	0.689*** (0.0651)	0.417*** (0.0666)	0.618*** (0.0669)	0.439*** (0.0658)
Full time	0.349*** (0.0512)	0.196*** (0.0575)	0.176*** (0.0564)	0.173*** (0.0572)
Part time	0.0794 (0.0557)	0.00580 (0.0626)	-0.0257 (0.0603)	-0.0119 (0.0620)
First- or second-generation migrant	0.138** (0.0632)	0.00935 (0.0631)	-0.0541 (0.0637)	-0.0492 (0.0627)
Interaction: Migration background	-0.115 (0.133)	-0.00236 (0.128)	-0.0549 (0.129)	0.0280 (0.125)
Partner: First- or second-generation migrant	0.0969 (0.115)	-0.0821 (0.106)	-0.137 (0.106)	-0.127 (0.104)
No partner	-0.0934 (0.0800)	-0.156* (0.0885)	-0.172** (0.0869)	-0.188** (0.0884)
Partner: Full time	-0.0815 (0.0724)	-0.153** (0.0776)	-0.109 (0.0761)	-0.149* (0.0769)
Partner: Part time	-0.0797 (0.0673)	-0.0701 (0.0777)	-0.0273 (0.0747)	-0.0748 (0.0763)
Medium real household income	0.629*** (0.0630)	0.573*** (0.0751)	0.616*** (0.0671)	0.548*** (0.0744)

(Continues)

TABLE C9 (Continued)

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
High real household income	1.303*** (0.115)	1.069*** (0.136)	1.212*** (0.117)	1.006*** (0.134)
Size (sq.m.)	-0.0465*** (0.00407)	-0.0370*** (0.00467)	-0.0439*** (0.00439)	-0.0378*** (0.00462)
Size (sq.m.) squared	0.000106*** (2.00e-05)	8.07e-05*** (2.36e-05)	9.88e-05*** (2.18e-05)	8.50e-05*** (2.32e-05)
Has cellar	0.217*** (0.0600)	0.0831 (0.0682)	0.138** (0.0633)	0.0660 (0.0686)
Has garden	-0.196*** (0.0408)	-0.00738 (0.0428)	-0.0970** (0.0424)	-0.0130 (0.0426)
Has central heating	0.595*** (0.0737)	0.576*** (0.0899)	0.607*** (0.0814)	0.592*** (0.0875)
Has balcony	0.567*** (0.0421)	0.542*** (0.0444)	0.583*** (0.0445)	0.559*** (0.0442)
In a good condition	0.427*** (0.0855)	0.384*** (0.0920)	0.396*** (0.0918)	0.405*** (0.0919)
Partial renovation	0.190** (0.0817)	0.126 (0.0889)	0.140 (0.0886)	0.141 (0.0889)
Year moved into dwelling	0.0239*** (0.00228)	0.0285*** (0.00265)	0.0266*** (0.00241)	0.0289*** (0.00265)
Share empty apartments (state level)	-0.232*** (0.0171)	-0.232*** (0.0206)	-0.0323 (0.0204)	-0.0943*** (0.0218)
Urban regions	1.120*** (0.0499)	1.103*** (0.0512)	0.813*** (0.0567)	0.726*** (0.0545)
Share families			-0.0323*** (0.00199)	-0.0300*** (0.00179)
Share couples			0.0101*** (0.00259)	0.0150*** (0.00235)
Share foreigner			0.0733*** (0.00586)	0.112*** (0.00603)
Unemployment rate			-0.109*** (0.00677)	-0.117*** (0.00672)
Inverse Mill Ratio, $\lambda_{ijt}$	0.358** (0.182)	0.0530 (0.204)	0.0355 (0.152)	0.0696 (0.202)
$\bar{v}_{jt}$		2.132*** (0.0694)		1.912*** (0.0793)
Observations	26,605	10,490	16,095	10,490
R-squared	0.258	0.414	0.344	0.425

Notes.: Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source. Authors' calculations based on SOEP, Destatis and RWI-GEO-Grid.

**TABLE C10** Probit, East Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
Smoker	0.224*** (0.0505)	0.215*** (0.0612)	0.222*** (0.0526)	0.215*** (0.0612)
Partner: Smoker	0.127*** (0.0467)	0.243*** (0.0621)	0.213*** (0.0477)	0.243*** (0.0621)
Number of persons	-0.229*** (0.0362)	-0.218*** (0.0492)	-0.225*** (0.0408)	-0.218*** (0.0492)
No. of children (aged 0–3)	0.0890 (0.0690)	0.0893 (0.106)	0.204*** (0.0770)	0.0893 (0.106)
No. of children (aged 3–6)	0.0706 (0.0668)	0.201** (0.0976)	0.169** (0.0758)	0.201** (0.0976)
No. of children (aged 6–14)	0.0609 (0.0478)	0.117 (0.0768)	0.0543 (0.0585)	0.117 (0.0768)
Age	-0.0944*** (0.0103)	-0.109*** (0.0128)	-0.0946*** (0.0108)	-0.109*** (0.0128)
Age, squared/1000	0.728*** (0.0965)	0.835*** (0.117)	0.741*** (0.101)	0.835*** (0.117)
Married	-0.183*** (0.0629)	-0.231*** (0.0854)	-0.248*** (0.0680)	-0.231*** (0.0854)
Sex	-0.181*** (0.0549)	-0.167*** (0.0640)	-0.177*** (0.0572)	-0.167*** (0.0640)
Medium education	-0.161* (0.0965)	-0.203* (0.114)	-0.169* (0.102)	-0.203* (0.114)
High education	-0.0907 (0.101)	-0.113 (0.119)	-0.108 (0.107)	-0.113 (0.119)
Full time	-0.247*** (0.0583)	-0.253*** (0.0772)	-0.336*** (0.0635)	-0.253*** (0.0772)
Part time	-0.0750 (0.0701)	-0.124 (0.0899)	-0.0941 (0.0768)	-0.124 (0.0899)
First- or second-generation migrant	0.225** (0.103)	0.249** (0.116)	0.251** (0.109)	0.249** (0.116)
Interaction: Migration background	0.108 (0.331)	0.337 (0.384)	0.181 (0.321)	0.337 (0.384)
Partner: First- or second-generation migrant	0.141 (0.137)	0.0699 (0.158)	0.133 (0.139)	0.0699 (0.158)
No partner	0.000228 (0.0821)	-0.0106 (0.109)	0.0565 (0.0881)	-0.0106 (0.109)
Partner: Full time	-0.210*** (0.0641)	-0.335*** (0.0851)	-0.339*** (0.0693)	-0.335*** (0.0851)

(Continues)

**TABLE C10** (Continued)

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
Partner: Part time	-0.133* (0.0801)	-0.153 (0.103)	-0.131 (0.0843)	-0.153 (0.103)
Medium real household income	-0.201*** (0.0505)	-0.278*** (0.0652)	-0.229*** (0.0538)	-0.278*** (0.0652)
High real household income	-0.447*** (0.0744)	-0.522*** (0.100)	-0.444*** (0.0812)	-0.522*** (0.100)
Neighborhood characteristics	N	N	Y	Y
$\bar{v}_{jt}$	N	Y	N	Y
Observations	16,944	6,960	13,564	6,960

*Note:* Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

*Source.* Authors' calculations based on SOEP.

**TABLE C11** OLS, East Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
Number of persons	0.0545 (0.0435)	0.0693 (0.0502)	0.0357 (0.0474)	0.0736 (0.0491)
No. of children (aged 0–3)	-0.0635 (0.0738)	-0.0477 (0.0982)	0.0426 (0.0821)	-0.0345 (0.0955)
No. of children (aged 3–6)	-0.132* (0.0731)	-0.159* (0.0960)	-0.115 (0.0875)	-0.144 (0.0958)
No. of children (aged 6–14)	-0.0271 (0.0574)	-0.0739 (0.0725)	0.0295 (0.0668)	-0.0777 (0.0722)
Age	-0.0227*** (0.00833)	-0.0258** (0.0100)	-0.0195** (0.00922)	-0.0237** (0.00995)
Age, squared/1000	0.300*** (0.0803)	0.326*** (0.0940)	0.267*** (0.0884)	0.302*** (0.0936)
Married	0.0829 (0.0680)	0.157* (0.0864)	0.0893 (0.0763)	0.164* (0.0853)
Sex	-0.0210 (0.0512)	-0.0650 (0.0592)	-0.0426 (0.0558)	-0.0661 (0.0586)
Medium education	0.0630 (0.0829)	0.0603 (0.0978)	0.0264 (0.0909)	0.0472 (0.0991)
High education	0.293*** (0.0932)	0.225** (0.109)	0.247** (0.103)	0.210* (0.110)
Full time	0.0951* (0.0522)	0.0439 (0.0662)	0.0933 (0.0608)	0.0268 (0.0657)
Part time	0.113* (0.0661)	0.0473 (0.0751)	0.110 (0.0697)	0.0410 (0.0741)
First- or second-generation migrant	-0.113 (0.107)	-0.0921 (0.105)	-0.104 (0.108)	-0.0998 (0.103)
Interaction: Migration background	-0.0268 (0.315)	-0.198 (0.325)	0.0759 (0.335)	-0.0980 (0.309)
Partner: First- or second-generation migrant	0.0130 (0.160)	-0.0428 (0.182)	-0.0228 (0.178)	-0.0553 (0.179)
No partner	0.0127 (0.0900)	0.0348 (0.110)	-0.0127 (0.101)	0.0409 (0.109)
Partner: Full time	0.0713 (0.0792)	-0.0324 (0.0957)	-0.0188 (0.0916)	-0.0563 (0.0949)
Partner: Part time	0.0311 (0.0968)	-0.00683 (0.116)	0.0445 (0.114)	-0.00404 (0.113)
Medium real household income	0.229*** (0.0589)	0.333*** (0.0706)	0.261*** (0.0664)	0.319*** (0.0700)

(Continues)

TABLE C11 (Continued)

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
High real household income	0.680*** (0.119)	0.695*** (0.146)	0.592*** (0.132)	0.676*** (0.143)
Size (sq.m.)	-0.0169*** (0.00579)	-0.0260*** (0.00627)	-0.0222*** (0.00599)	-0.0274*** (0.00626)
Size (sq.m.) squared	7.82e-06 (3.26e-05)	4.39e-05 (3.45e-05)	2.63e-05 (3.31e-05)	4.95e-05 (3.46e-05)
Has cellar	-0.00211 (0.100)	0.0135 (0.100)	0.0978 (0.0963)	0.0302 (0.0970)
Has garden	-0.0530 (0.0530)	-0.0475 (0.0604)	-0.0967* (0.0557)	-0.0617 (0.0604)
Has central heating	0.539*** (0.110)	0.206 (0.168)	0.379*** (0.138)	0.198 (0.167)
Has balcony	0.237*** (0.0447)	0.255*** (0.0527)	0.261*** (0.0489)	0.270*** (0.0521)
In a good condition	0.934*** (0.0811)	0.798*** (0.124)	0.776*** (0.100)	0.781*** (0.123)
Partial renovation	0.445*** (0.0797)	0.601*** (0.124)	0.516*** (0.0994)	0.595*** (0.123)
Year moved into dwelling	0.0188*** (0.00224)	0.0174*** (0.00244)	0.0147*** (0.00244)	0.0162*** (0.00244)
Share empty apartments (state level)	-0.0379*** (0.00912)	-0.0489*** (0.00981)	-0.0294*** (0.0108)	-0.0312*** (0.0109)
Urban regions	0.338*** (0.0513)	0.403*** (0.0578)	0.235*** (0.0671)	0.241*** (0.0689)
Share families			-0.00817*** (0.00296)	-0.0128*** (0.00307)
Share couples			0.000431 (0.00266)	0.00195 (0.00275)
Share foreigner			0.119*** (0.0424)	0.0938** (0.0444)
Unemployment rate			-0.0646*** (0.00858)	-0.0725*** (0.00983)
$\bar{v}_{jt}$		0.735*** (0.0857)		0.597*** (0.0842)
Observations	8,924	3,677	5,544	3,677
R-squared	0.187	0.224	0.209	0.236

Notes.: Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. . \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source. Authors' calculations based on SOEP, Destatis and RWI-GEO-Grid.



**TABLE C12** OLS including IMR, East Germany

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
Number of persons	0.122** (0.0513)	0.108* (0.0574)	0.0539 (0.0528)	0.108* (0.0565)
No. of children (aged 0–3)	–0.101 (0.0742)	–0.0700 (0.0988)	0.0265 (0.0842)	–0.0545 (0.0963)
No. of children (aged 3–6)	–0.165** (0.0745)	–0.199** (0.0993)	–0.129 (0.0897)	–0.179* (0.0995)
No. of children (aged 6–14)	–0.0563 (0.0585)	–0.102 (0.0752)	0.0219 (0.0675)	–0.103 (0.0748)
Age	–0.00249 (0.0125)	–0.0117 (0.0144)	–0.0137 (0.0119)	–0.0111 (0.0143)
Age, squared/1000	0.156 (0.105)	0.226* (0.120)	0.225** (0.104)	0.213* (0.119)
Married	0.154** (0.0770)	0.220** (0.0979)	0.116 (0.0863)	0.220** (0.0966)
Sex	0.0261 (0.0557)	–0.0356 (0.0642)	–0.0294 (0.0591)	–0.0399 (0.0635)
Medium education	0.101 (0.0840)	0.0869 (0.0985)	0.0364 (0.0912)	0.0708 (0.0998)
High education	0.322*** (0.0934)	0.242** (0.110)	0.255** (0.103)	0.225** (0.111)
Full time	0.158*** (0.0601)	0.0811 (0.0723)	0.117* (0.0691)	0.0602 (0.0716)
Part time	0.130* (0.0666)	0.0639 (0.0750)	0.116* (0.0696)	0.0557 (0.0738)
First- or second-generation migrant	–0.179 (0.110)	–0.141 (0.106)	–0.125 (0.110)	–0.143 (0.104)
Interaction: Migration background	–0.0669 (0.317)	–0.274 (0.329)	0.0559 (0.337)	–0.166 (0.314)
Partner: First- or second-generation migrant	–0.0246 (0.168)	–0.0484 (0.188)	–0.0310 (0.181)	–0.0602 (0.183)
No partner	0.0237 (0.0901)	0.0608 (0.111)	–0.0116 (0.101)	0.0643 (0.109)
Partner: Full time	0.140* (0.0829)	0.0381 (0.0994)	0.0138 (0.0965)	0.00669 (0.0982)
Partner: Part time	0.0869 (0.101)	0.0360 (0.119)	0.0615 (0.116)	0.0340 (0.116)
Medium real household income	0.298*** (0.0697)	0.396*** (0.0849)	0.284*** (0.0742)	0.375*** (0.0842)

(Continues)

**TABLE C12** (Continued)

	Model 1	Model 2	Model 3	Model 4
	(1)	(2)	(3)	(4)
High real household income	0.858*** (0.157)	0.833*** (0.174)	0.646*** (0.155)	0.799*** (0.172)
Size (sq.m.)	-0.0172*** (0.00582)	-0.0257*** (0.00626)	-0.0222*** (0.00600)	-0.0271*** (0.00625)
Size (sq.m.) squared	9.17e-06 (3.28e-05)	4.20e-05 (3.44e-05)	2.59e-05 (3.31e-05)	4.78e-05 (3.45e-05)
Has cellar	-0.000864 (0.100)	0.0133 (0.100)	0.0986 (0.0963)	0.0301 (0.0969)
Has garden	-0.0496 (0.0530)	-0.0471 (0.0603)	-0.0965* (0.0557)	-0.0615 (0.0604)
Has central heating	0.548*** (0.110)	0.214 (0.167)	0.384*** (0.138)	0.205 (0.166)
Has balcony	0.238*** (0.0446)	0.256*** (0.0527)	0.262*** (0.0489)	0.271*** (0.0522)
In a good condition	0.934*** (0.0806)	0.798*** (0.123)	0.776*** (0.100)	0.782*** (0.122)
Partial renovation	0.445*** (0.0792)	0.600*** (0.123)	0.516*** (0.0991)	0.594*** (0.122)
Year moved into dwelling	0.0187*** (0.00223)	0.0174*** (0.00243)	0.0147*** (0.00244)	0.0162*** (0.00244)
Share empty apartments (state level)	-0.0374*** (0.00909)	-0.0485*** (0.00979)	-0.0291*** (0.0108)	-0.0306*** (0.0109)
Urban regions	0.343*** (0.0511)	0.405*** (0.0577)	0.236*** (0.0671)	0.244*** (0.0689)
Share families			-0.00817*** (0.00296)	-0.0128*** (0.00307)
Share couples			0.000378 (0.00267)	0.00183 (0.00276)
Share foreigner			0.118*** (0.0425)	0.0914** (0.0445)
Unemployment rate			-0.0646*** (0.00857)	-0.0724*** (0.00982)
Inverse Mill Ratio, $\lambda_{ijt}$	-0.533** (0.257)	-0.343 (0.256)	-0.140 (0.199)	-0.307 (0.254)
$\bar{v}_{jt}$		0.735*** (0.0856)		0.598*** (0.0841)
Observations	8,924	3,677	5,544	3,677
R-squared	0.188	0.225	0.209	0.237

Notes.: Indicators for the observation year are included. The constant is not reported. Standard errors are robust to clustering at the household level and are presented in parentheses. \* $p < .1$ , \*\* $p < .05$ , \*\*\* $p < .01$ .

Source. Authors' calculations based on SOEP, Destatis and RWI-GEO-Grid.