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“Disentangling the Housing Satisfaction Puzzle: Does  
Homeownership Really Matter?”

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Document de treball nº -16- 2009

**DEPARTAMENT D’ECONOMIA**  
**Facultat de Ciències Econòmiques i Empresariales**



UNIVERSITAT  
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*Edita:*

Departament d'Economia

[http://www.fcee.urv.es/departaments/economia/public\\_html/index.html](http://www.fcee.urv.es/departaments/economia/public_html/index.html)

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*Dirigir comentaris al Departament d'Economia.*

Dipòsit Legal: T - 1286 - 2009

ISSN 1988 - 0812

**DEPARTAMENT D'ECONOMIA**  
**Facultat de Ciències Econòmiques i Empresariales**

# Disentangling the Housing Satisfaction Puzzle: Does Homeownership Really Matter?

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## Abstract

There is a general consensus that homeownership has beneficial effects for both individuals and society in many outcomes. However, research regarding the effect of homeownership on individuals' subjective well-being remains inconclusive. In this paper, for the first time, we provide empirical evidence for the link between homeownership and housing satisfaction using panel data. We use the eight waves of the European Community Household Panel (ECHP) covering the period 1994-2001. We observe that renters who become homeowners not only experience a significant increase in housing satisfaction, but also after changing their tenure status, they obtain a different utility from the same housing context. This evidence might provide support to the hypothesis that a share of the differences in the perceived utility derived from housing can be attributed to (un)fulfilled expectations or aspirations regarding homeownership.

*Keywords:* Housing satisfaction, subjective well-being, homeownership, fixed-effects, housing aspirations

*JEL classification:* D1, R2.

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The author would like to acknowledge the financial support of the Spanish Ministry of Education (grant number SEJ2007-66318).

## 1. Introduction

Self-reported satisfaction with various aspects of individuals' lives has been the focus of many psychological and sociological studies. Only recently has the subject figured on the research agenda of economists. This interest stems from the fact that many individuals' economic decisions are aimed at maximising well-being,<sup>1,2</sup> which in turn is determined by the level of satisfaction in certain life domains (among other reasons). Given this interest, there has been an increase in the literature on the analysis of the determinants of subjective well-being (SWB) or happiness.<sup>3</sup> Using German data, Van Praag and Frijters (1999), Van Praag et al. (2003) and Ferrer-i-Carbonell and Frijters (2004) studied the determinants of SWB, but with emphasis on measurement and econometric aspects. Van Praag et al. (2003) found empirical evidence that self-reported satisfaction in different domains (i.e. job, financial situation, housing, health, leisure and the environment) are important in explaining individuals' SWB.

Using US data, Easterlin (2006) found that life-cycle happiness is mostly determined by an individual's satisfaction in the main domains. He observed that satisfaction in each domain depends not only on objective conditions but also on individuals' goals and aspirations in each domain. In this paper, we focus on one of the most important satisfaction domains: housing satisfaction.<sup>4</sup> In a broader context, although there is a vast literature that shows the private and social benefits of homeownership,<sup>5</sup> the research regarding the link between housing satisfaction, happiness and psychological outcomes is more limited and produces ambiguous

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<sup>1</sup> Using Russian and German data, Frijters (2000) tested whether individuals try to maximise self-reported levels of satisfaction. His results provided some support for this hypothesis.

<sup>2</sup> Using EU data, Diaz-Serrano and Stoyanova (2008) found strong support for the relationship between self-reported housing satisfaction and residential mobility. Using German and UK data Clark et al. (1998) and Clark (2001) found evidence that job satisfaction is a good predictor of job quits.

<sup>3</sup> In the literature, the terms *subjective well-being*, *life satisfaction* and *self-reported happiness* are often interchangeable.

<sup>4</sup> Van Praag et al. (2003) found that housing satisfaction exerts a positive effect on SWB, though the effect is greater for job and financial satisfaction.

<sup>5</sup> See Dietz and Haurin (2003) for an extensive overview and references.

results. Using three different datasets Rossi and Weber (1996) only found weak support for the positive link between happiness and homeownership.<sup>6</sup> Bucchianeri (2009) matched three different datasets in her study of the link between homeownership and individuals' well-being. She found that homeowners were not happier than renters in a number of psychological outcomes.<sup>7</sup> However, using two-period data on the same individuals, Rohe and Basolo (1997) observed that renters who became owners significantly differed in their level of housing satisfaction compared with those who remained as renters during the same period.<sup>8</sup>

The main shortcoming in these studies in particular, and in earlier literature in general, is the fact that the data used does not allow to control for individual heterogeneity. Rossi and Weber (1996) and Bucchianeri (2009) used cross-section data, while the dynamic approach in Rohe and Basolo (1997) only considers two periods and the regression analysis is based on single OLS. An additional problem in the latter study is that they compare a group of renters that rent for a period of 18 months, with a group of renters that not only become homeowners but also move to new dwellings. This analysis design does not make it possible to disentangle to what extent the satisfaction gap between groups comes from changing the tenure status or from improving the housing context.

In this paper, we propose a stronger test based on panel data, which allows us i) to control for individual fixed-effects, and ii) to construct alternative samples to separate the impact of dwelling mobility from the change of tenure status in the housing satisfaction gap between tenures. Controlling for individuals fixed-effects is a relevant feature in our study since it accounts for the non-observed individual

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<sup>6</sup> These datasets are the National Survey of Families and Households (NSFH), the General Social Survey (GSS) and the American National Election Studies (ANES).

<sup>7</sup> This author matches the Day Reconstruction Method Survey (DMR) with property tax records and the 2000 US census.

<sup>8</sup> These authors use quasi experimental data coming from about 200 interviews of low-income households.

heterogeneity that may arise from non-observed individual characteristics or from the fact that different individuals may have a different perception of the same scale.<sup>9</sup>

The main goal of this study is not only to estimate the direct impact of homeownership on housing satisfaction, but also to ascertain whether identical residential characteristics provide, on average, different utility to dwellers once they become homeowners. We hypothesize that a different perception of the same housing context might exist as a result of unachieved aspirations or expectations regarding homeownership. To test these hypotheses, we estimate the determinants of housing satisfaction using panel data from the European Community Housing Panel (ECHP). Instead of simply comparing homeowners with renters, we focus on a sample of individuals that change their tenure status during the sample period. Finally, we decompose the satisfaction gap between tenures. This decomposition allows us to decompose the housing satisfaction gap between tenures into two components. The first is attributable to differences in the housing and household characteristics between tenures. The second picks up the effect of changing the tenure status, holding the housing context constant. We find this analysis is important because residential satisfaction is a suitable variable to be used as a barometer to assess the performance of housing programmes and policies.<sup>10</sup>

The remainder of this paper is organised as follows. Section 2 describes the theoretical framework. Section 3 describes the empirical strategy used in this study.

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<sup>9</sup> The potential bias caused by unobserved individual characteristics and data limitations in estimating the link between residential satisfaction and homeownership is already pointed out in Galster (1987).

<sup>10</sup> Since 1999, under the US Department of Housing and Urban Development's (HUD's), a Real Estate Assessment Center (REAC) has conducted physical inspections and reviewed financial management operations, and resident satisfaction for individual local housing authorities (LHAs). The level of residents' satisfaction is included in a survey (initiated in late 1999) whose findings are used by the public housing authorities to determine follow-up actions based on the survey results. Housing authorities that consistently perform poorly may be taken over by HUD. In the construction of the performance index, 10 out of 100 points correspond to residents' satisfaction. See Varady and Carrozza (2000) for further details and results derived from the analysis of this data for Cincinnati. Carswell and James (2008) provide an example about the use of housing satisfaction to evaluate housing counselling agencies in the US.

Section 4 describes the data used in the empirical analysis. Section 5 presents the results and the main empirical findings. Finally, Section 6 summarizes and concludes.

## **2. Conceptual framework**

The balance between individuals' aspirations and their achievements as a determinant of individuals' happiness has its origin in psychology. However, this issue has also become relevant in economics research and studies aiming at estimating the determinants of individuals' well-being (see e.g. Campbell et al., 1976; Frey and Stutzer, 2002; Stutzer, 2004; Easterlin, 2006). This approach has also been taken as a baseline in studies dealing with housing satisfaction (see e.g. Campbell et al., 1976; Michelson, 1977; and Weidemann and Anderson, 1985; Galster, 1987). In the context of housing, the aspirational approach implies that individuals cognitively construct a reference condition for all important features of their residential situation. The quantity or quality of the given feature will depend on individual needs and aspirations (Campbell et al., 1976 and Michelson, 1977). If the perceived actual situation coincides or is fairly closed to the reference situation, individuals should manifest satisfaction, while if there exist is a non negligible gap between both situations individuals will feel dissatisfied with their residential situation.

Unsatisfied dwellers have two mechanisms by which to reach the desired housing situation. On the one hand, individuals may adapt to the current housing context. Such a process can be done by redefining needs or lowering aspirations, and consequently this should lead to a change in the evaluation of the current housing situation (Campbell et al. 1976). This adaptation process should increase the residential satisfaction experienced. On the other hand, individuals unable to adapt to their current housing context, will try to alter the conditions of their dwelling or to move to another one (Rosi, 1980). However, the ability to alter features of the current dwelling or mobility can be constrained, especially if the salient feature that causes

dissatisfaction is the tenure status, since the transition from renting to owning is very costly. Nevertheless, individuals might reduce search costs if they buy the dwelling in which they already live.

All these analyses regarding aspirations, satisfaction and housing hinge on estimating the determinants of housing satisfaction. One of the most interesting features of this variable is that it captures aspects of the housing situation that cannot be captured by other observable variables. Residential satisfaction, like many other satisfaction variables, is the result of both objective and subjective factors and is more complex than standard economic variables. Housing satisfaction is the result of how individuals perceive salient attributes of their physical environment and their consequent evaluation according to certain standards of comparison. Thus, the determinants of housing satisfaction can be divided into three groups of factors: i) objective characteristics of the housing context; ii) objective characteristics of the residents, and; iii) subjective factors such as beliefs, perceptions and aspirations (Weidemann and Anderson, 1985).

The most difficult issue in the treatment of housing satisfaction originates in the fact that dwellers' perception of the physical attributes is subject to a large degree of heterogeneity, which in turn is mainly determined (among others) by the group of subjective factors mentioned in iii). This way of linking aspirations and perceptions to self-reported levels of satisfaction is the conceptual approach employed in most of the studies aimed at estimating the determinants of residential satisfaction. However, the conventional cross-sectional framework used in earlier empirical studies does not allow the separation of the effect of the subjective factors mentioned above from the objective ones. Therefore, in this context, controlling for individual fixed-effects becomes crucial.

In line with Campbell et al. 1976 and Michelson (1977), we conceptualise self-reported housing satisfaction as a variable reflecting the gap between an individual's



actual and desired housing situation.<sup>11</sup> Since housing satisfaction is commonly measured on an ordinal scale, an individual enjoying his/her desired housing situation will feel fully satisfied, and hence, it is expected he/she will report the highest value on the scale. However, individuals may also experience dissatisfaction with aspects of their current residential situation, and this, in turn, will probably have an impact on their overall residential satisfaction. Our key assumption is that homeownership is the most salient feature of the current housing situation. That is, at some stage of his/her life-course, the average adult dweller aspires to own his/her dwelling. This implies that i) homeownership is in itself a very important source of utility, and ii) homeownership will interact with the remaining housing characteristics in determining housing satisfaction. In this setting, our hypothesis is that renters will value, *ceteris paribus*, identical residential characteristics differently from the way that homeowners do.

There is no doubt that in developed economies homeownership is not only one of the most important ways of accumulating wealth, but also a sign of personal success. In addition, homeowners have more freedom to alter those features of the dwelling that dissatisfy them. Most rental contracts do now allow altering dwelling conditions. However, while tenants may have this freedom, they are usually reluctant to spend large amounts of money on a rented dwelling.

Although one might question our key aspirational assumption regarding homeownership, there is strong evidence to support it. For example, in 2007, 78 percent of the British adults aspired to be homeowners within two years time while this percentage rises to 84 percent in the case of a time span of ten years (CML, 2007). Merlo and MacDonald (2002) observed that in 1997 becoming a homeowner within three years was important or very important for 72 percent of Australian adults. In 2003 Fannie Mae carried out a national survey in the US, in which 65 percent of the

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<sup>11</sup> See Weidemann and Anderson (1985) for an extensive overview.

respondents cited the “dream” as the main reason for becoming a homeowner (Buchianeri, 2009). Furthermore, with a few exceptions in Central and Northern Europe, the observed homeownership rates are above 70 percent in most of the western economies. Naturally, this tenure imbalance also probably has to do with inefficiencies in the rental market. Nevertheless, it undoubtedly indicates a clear preference for homeownership.

The theoretical framework of this paper is simple. We follow the model of product differentiation presented in Rosen (1974) (i.e. goods are valued for their utility-bearing characteristics). In our case, we assume that the individual’s utility,  $U(\cdot)$ , derived from a given residential situation  $j$  depends on a set of  $k$  residential attributes,  $w_{kj}$ , and a set of  $g$  individual characteristics,  $y_{gi}$ :

$$U_{ij} = U(w_{kj}; y_{gi}); \quad k = 1, 2, \dots, K; \quad g = 1, 2, \dots, G \quad (1)$$

In equation (1) users have the same attributes to value in each alternative  $j$  and the scales of measurement are identical. However, individuals may differ in how they value these characteristics. We assume that there are only two alternative residential situations (i.e. being a homeowner ( $j=0$ ) or a renter ( $j=r$ )), whose utility functions can be defined as:

$$\begin{aligned} U_{io} &= f(\gamma_{ok} w_{iok}; \delta_{og} y_{iog}) \\ U_{ir} &= f(\gamma_{rk} w_{irk}; \delta_{rg} y_{irg}) \end{aligned} \quad (2)$$

where  $\gamma_{jk}$  and  $\delta_{jg}$  are the contribution of residential and individual characteristics to the individual’s utility. Individual  $i$  is indifferent between the two alternative residential situations if  $U_{io} = U_{ir}$ . It should be remembered that our hypothesis is that identical housing attributes will provide different utility to dwellers depending on their

tenure stations. If the hypothesis is true, in equation (2) it will be  $\gamma_{ok} \neq \gamma_{rk}$  for all or some  $k$ . The utilities expressed in equation (2) can be approached using a satisfaction function  $S_{ij}$ , for which  $S_{io} > S_{ir}$  only if  $U_{io} > U_{ir}$ .

### 3. Empirical framework

Housing satisfaction is usually measured on an ordinal scale. Therefore, the propensity of an individual  $i$  to report a certain level of satisfaction is driven by the following linear relationship:  $S_i^* = \beta' X_i + e_i$ , where  $S_i^*$  is a latent outcome,  $X_i$  are the determinants of the outcome, and  $e_i$  is a random error term. The matrix  $X_i = [W_i, Y_i]$  contains the set of salient characteristics of the dwelling and the residential environment ( $W_i$ ), as well as the set of individual and household characteristics ( $Y_i$ ). We do not observe  $S_i^*$  but instead an indicator variable of the type  $S_i = j$  if  $\mu_{j-1} < S_i^* \leq \mu_j$  ( $j=1, \dots, J$ ). Based on this observability rule, we obtain  $P(S_i = j) = F(\mu_j - \beta' X_i) - F(\mu_{j-1} - \beta' X_i)$ , where  $F(\bullet)$  can be either the cumulative normal or cumulative logistic distribution.

As we stated in the previous section, besides the objective characteristics contained in  $W_i$  and  $Y_i$ , there is a third group of non-observable variables that might be important in determining individuals' utility. These factors are a major source of individual heterogeneity, which makes the utility function expressed in equation (2), among others, vary across individuals. An additional shortcoming is the fact that, in ordinal scales, surveyed individuals may have a different perception of the same scale. As a result, cross-sectional estimates of the traditional ordered probit/logit models described above are likely to be biased.

In a panel-data framework, the relationship between the latent outcome and the set of covariates can be redefined as follows:  $S_{it}^* = \beta' X_{it} + u_i + \varepsilon_{it}$ , where  $u_i$  is a time-

constant individual-specific effect, which is expected to absorb, at least partially, individual heterogeneity.<sup>12</sup> Hence, we obtain  $P(S_{it} = j) = F(\mu_j - u_i - \beta' X_{it}) - F(\mu_{j-1} - u_i - \beta' X_{it})$ . A natural candidate for model  $S_{it}^*$  is the random-effects ordered probit.<sup>13</sup> However, this model may lead to inconsistent estimates if the covariates  $X_{it}$  and the individual-specific effect  $u_i$  are correlated. The fixed-effects model can solve this problem, but the fixed-effects ordered model is computationally unfeasible.<sup>14</sup> One simple alternative is the Probit Ordinary Least Squares model (POLS), proposed by Van Praag and Ferrer-i-Carbonell (2006). Their approach consists in transforming the ordinal outcome variable  $S_{it}=j$  to  $\ln(Z_{ijt})$  as follows:

$$\ln(Z_{ijt}) = \frac{\phi(\mu_{j-1,t}) - \phi(\mu_{j,t})}{\Phi(\mu_{j,t}) - \Phi(\mu_{j-1,t})} \quad (3)$$

where  $\phi(\bullet)$  and  $\Phi(\bullet)$  are the normal density function and the cumulative normal distribution, respectively. They show that the transformation presented in equation (3) enables moving from the ordinal probit framework to the simple OLS approach without any loss of efficiency. This method can be generalized to the panel data framework, which makes feasible the estimation of the panel fixed-effects model by estimating a panel data linear model. Thus, our empirical model is the following:

$$\ln(Z_{it}) = \beta' X_{it} + u_i + \varepsilon_{it} \quad (4)$$

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<sup>12</sup> This specification considers heterogeneity in the intercept but not in the slopes.

<sup>13</sup> The log-likelihood for this model can be generalised as specified by Butler and Moffit (1982). One difficulty of this model is the treatment of the individual-specific effect,  $u_i$ , which is handled by using the Gauss-Hermite quadrature to integrate out the joint density (see Frechette, 2001). The main inconvenience of the random-effects ordered probit model is that it is computationally very demanding.

<sup>14</sup> Ferrer-i-Carbonell and Frijters (2004) provide an alternative approach consisting in a variant of the conditional logit model (Chamberlain, 1980). Their approach consists in collapsing the ordinal response into a binary outcome variable using a barrier,  $h_i$ , which is individual-specific. They show that their approach is a straightforward reformulation of the fixed-effects ordered logit model into a fixed-effects binomial logit model. However, this approach still implies a high cost in terms of lost observations.

One interesting feature of the POLS model expressed in equation (4) is that avoids the high computational costs of the random-effects ordinal probit model and some technical difficulties in the estimation of the marginal effects.

With the estimated coefficients of our model we apply the conventional Oaxaca-Blinder's (1973) decomposition method to decompose the housing satisfaction gap between homeowners and renters as follows:

$$Ln(\tilde{Z}_o) - Ln(\tilde{Z}_r) = (\bar{X}_o - \bar{X}_r)\hat{\beta}_r + \bar{X}_r(\hat{\beta}_o - \hat{\beta}_r), \quad (5)$$

where  $Ln(\tilde{Z})$  is the outcome variable, as defined in equation (3), purged from the individual fixed-effects, and the subscripts  $o$  and  $r$  refer to homeowners and renters, respectively. The left-hand side measures the estimated housing satisfaction gap between both groups. The first term of the right-hand side represents the part of the difference attributed to differences in observed characteristics (*endowments*), and the second term shows the part of the difference that is due to the differences in the obtained rewards in satisfaction, namely perceived utility, for those characteristics (*perception*).<sup>15</sup> In practice, the interpretation would be the following: the larger the proportion of the gap explained by the *perception* component, the larger the difference in the utility derived from the set of neighbourhood/dwelling characteristics between owners and renters. However, as we mention in the introduction, if a change in the tenure status is simultaneous with a change in the dwelling, the change in housing satisfaction will be caused by both events, i.e. becoming a homeowner and improving the housing context. To disentangle the contribution of each of these events, we propose the following double decomposition:

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<sup>15</sup> The most usual application of the Oaxaca-Blinder decomposition is to measure wage gaps. Originally, the method was created to study the level of discrimination in gender wage gaps. Therefore, what we label as *perception*, in the labour economics literature is commonly considered as a measure of *discrimination*.

$$\begin{aligned}
Ln(\tilde{Z}_o^m) - Ln(\tilde{Z}_r^m) &= [Ln(\tilde{Z}_o^m) - Ln(\tilde{Z}_o^s)] + [Ln(\tilde{Z}_o^s) - Ln(\tilde{Z}_r^m)] = \\
&= [\hat{\beta}_o^m(\bar{X}_o^m - \bar{X}_o^s) + \bar{X}_o^s(\hat{\beta}_o^m - \hat{\beta}_o^s)] + [\hat{\beta}_o^s(\bar{X}_o^s - \bar{X}_r^m) + \bar{X}_r^m(\hat{\beta}_o^s - \hat{\beta}_r^m)]', \quad (6)
\end{aligned}$$

where the superscripts  $m$  and  $s$  refer to *movers* and *stayers*, respectively.<sup>16</sup> The first term in the first summand refers to the contribution to the satisfaction gap of changing the dwelling, while the second term in the second summand corresponds to the contribution of homeownership. The remaining terms are mobility-homeownership mixed effects.

## 4. Data and variables

### 4.1. The ECHP and selected variables

The data used in this paper come from the European Community Household Panel (ECHP), a yearly panel of the EU-15 countries that ran from 1994 to 2001.<sup>17</sup> The ECHP contains information about households and all members over age 16. The individual variables cover numerous characteristics, such as socio-economic and demographic information, health, migration, labour situation and income. The ECHP also includes information on certain satisfaction domains. Individuals are asked to rate their satisfaction with their housing situation on a six-point scale ranging from ‘not satisfied at all’ (1) to ‘fully satisfied’ (6). This is our outcome variable ( $S_{it}$ ). In our analysis, we focus on household heads and their partners, since generally it is they who make choices regarding housing.

The survey also provides detailed information on the dwelling and the neighbourhood characteristics which are important for the present study. Our vector of explanatory variables ( $X_{it}$ ) accounts for various types of determinants of housing satisfaction: individual characteristics (i.e. self-reported health status, age, gender,

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<sup>16</sup> The term *stayers* refers to individuals that change tenure status but not the dwelling, while the term *movers* refers to individuals that change both tenure status and dwelling. The construction of the samples is explained in section 4.2.

<sup>17</sup> EU-15 refers to the fifteen EU countries prior to the 2004 enlargement.

education, and marital status); dwelling characteristics (i.e. type of dwelling -flat or house-, number of rooms, existence of indoor flushing toilet, hot running water, terrace or garden, shortage of space, inadequate heating facilities, leaky roof and damp walls or floors); neighbourhood/environment characteristics (i.e. noise, pollution and environmental problems, and crime or vandalism in the neighbourhood); household characteristics (i.e. duration of residence, annual income, household size, housing costs and variables regarding how households feel about their financial situation). Housing costs are considered in two ways: i) a relative measure comprising the percentage of income devoted to paying the monthly rent/mortgage<sup>18</sup> and ii) an indicator referring to whether households consider that housing costs are or not a financial burden.<sup>19</sup> In addition to the set of variables mentioned above, we also consider some controls to capture part of the effect of individual's unobserved heterogeneity, namely mood. These are individual's self-reported health status and the answers to a question referring to whether the household's financial situation has deteriorated or improved compared with the previous year.

Typically, a number of the housing amenities/deprivations are part of the same housing package. Therefore, they could be correlated and the effect of some of them could overlap the effect of the others. If they are considered together in regression analysis, this might lead to implausible estimated effects or cause some of the coefficients to be not statistically significant when they should be. To overcome this problem, we use principal components analysis to collapse the set of dwelling and neighbourhood characteristics into four orthogonal factors. We run factor analysis separately for each tenure status and sample. In all cases, the set of residential characteristics are clustered into the same factors. The resulting factors are the

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<sup>18</sup> The survey does not provide information about neither the size of the dwelling nor the total homeownership costs. However, interviewed individuals report information about the mortgage monthly payments, which allows us to estimate relative measure. We think that our relative measure on income is reliable, since absolute measures such as cost/m<sup>2</sup> will be more dependent on income.

<sup>19</sup> It is plausible to expect that housing costs will affect housing satisfaction negatively if dwellers perceive them as a financial burden.

following: *FACTOR1* (dwelling has bath/shower, indoor flushing toilet and hot running water); *FACTOR2* (dwelling has a leaky roof, damp walls and floors, rot in window frames and floors, and lack of heating facilities); *FACTOR3* (there is noise from neighbours or outside, pollution/grime or other environmental problems, and crime or vandalism in the neighbourhood), and; *FACTOR4* (number of rooms, no-shortage of space, and the dwelling has terrace or garden).

#### ***4.2. Selected samples***

It should be remembered that the purpose of this paper is to evaluate the effect of tenure status on housing satisfaction, and whether renters perceive their housing context differently when they become homeowners. We acknowledge that the most suitable data to carry out this test would be that obtained by eliciting responses about individuals' aspirations regarding homeownership. The main problem in this respect is that this information is rarely available and the ECHP is not an exception. However, the panel structure of our data allows us to select from the sample those households that changed their tenure status during the sample period. We consider those households that change their tenure status only once.<sup>20</sup> Within this restricted sample, we distinguish two groups. The first is composed of those households that change both tenure status and dwelling (*movers*). The second groups those households that change their tenure status but not their dwelling, i.e, hold their housing context constant (*stayers*). This distinction is relevant, since it allows us to isolate the "pure" effect of homeownership from the mobility effect in determining housing satisfaction.

In table 1 we show summary statistics of the variables included in our analysis for selected population groups. *Movers* tend to have higher incomes than *stayers*, however, for both groups the share of household income devoted to housing

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<sup>20</sup> We discard those household that report repeated changes in the tenure status, though its consideration in the regression analysis does not cause any qualitative change in the results.



represents the same percentage, which increases after becoming a homeowner. Among *movers*, the percentage of individuals who declare that their financial situation has improved compared with the previous year is considerably higher than among *stayers*. For both groups, the percentage of individuals that consider housing costs as a burden significantly increases after becoming homeowners. There are also notable differences between the selected groups regarding the housing context. For *movers*, housing conditions clearly improve after becoming homeowners. As we will see in the empirical analysis, this improvement in the housing conditions explain some of the increase in housing satisfaction after changing their tenure status.

Insert Table 1 about here

Finally, in table 2 we show summary statistics of our outcome variable ( $S_{it}$ ), i.e. housing satisfaction as originally elicited in the survey. For both *stayers* and *movers*, the gap in housing satisfaction is statistically significant in favour of homeownership, although the gap is substantially larger for *movers*. The latter group not only report a higher satisfaction level as homeowners but also lower satisfaction as renters. It is worth mentioning that housing satisfaction is probably right-censored for movers-owners. This is supported by the skewness measures, which reveal that for this group housing satisfaction exhibits a pronounced left-asymmetry. This circumstance would explain why the distribution of self-reported housing satisfaction for this group is less disperse. In contrast, for stayers the distribution of self-reported housing satisfaction between tenures is just moderately different.

Insert Table 2 about here

## **5. Empirical results**

In this section we report the regression results of our analysis. In order to determine which model is the most suitable, we first tested the pooled model vs. the individual-effects model. Where the latter model performed better, we carried out a Hausman test in order to discriminate between the random and the fixed-effects model. Our results indicate that for all alternative samples and models, the individual-effects are statistically significant<sup>21</sup>, while the Hausman tests support the use of the fixed-effects model instead of a random-effects model.<sup>22</sup> In table 3 we show the results of the estimates of the POLS fixed-effects models for the full and selected samples. We estimate four different models. In all models we include dummies for homeownership and its interaction with the factors regarding the housing characteristics.

### ***5.1. Full sample***

In Model 1 we estimate the determinants of housing satisfaction for the full sample. This model is merely used as an initial approach to determine the effect of the set of variables on housing satisfaction and to detect potential differences between tenures. We observe that the majority of the variables behave according to expectations. Homeowners, income and improvements in income are significant and exert a positive effect on satisfaction. In contrast, for household size, housing costs as a financial burden and deterioration of income the effect is negative. Housing costs display different effects by tenure status. For homeowners, the percentage of income devoted to paying the mortgage is inverted U-shaped, while for renters the percentage of income devoted to paying the rent is linear and positive. Duration of residence is U-shaped, which might indicate residents' adaptation to their housing context.

Individual characteristics were found to have a limited effect on satisfaction. Only self-reported health status and age produced a significant effect; positive for

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<sup>21</sup> This result is derived from the F-test ( $H_0: u_i=0$ ) in the fixed-effects model in table 3.

<sup>22</sup> See the row labelled as "Hausman" in table 3.

health, while inverted U-shaped for age. We found here that the effect of age contrasts with the commonly observed U-shaped effect of age on happiness/SWB (see e.g. Clark et. al., 1996; Blanchflower and Oswald, 2008).<sup>23</sup> Dwelling characteristics also behave as expected. Enjoying the basic amenities (factor1) and do not experiencing housing space restrictions (factor4) provide positive utility to dwellers. In contrast, the effect on satisfaction is negative for bad housing conditions and deprivations (factor2), and a bad neighbourhood environment (factor3). We also observe that dwellers that live in houses tend to feel more satisfied than their counterparts living in flats.

When housing conditions are interacted with the tenure status, we obtain quite revealing results. Perceived utility from the housing context significantly varies between homeowners and renters. For three of the four factors (2, 3 and 4), homeowners tend to experience a smoother effect of the housing characteristics on satisfaction than renters do. That is, for homeowners the negative impacts on utility are less negative and the positive ones are less positive. This result does not hold for factor1, since the observed effects are quantitatively not different between owners and renters. Another significant difference between homeowners and renters in the perceived utility from housing concerns the type of dwelling. We observe that for homeowners the positive effect of living in a house is more than twice the estimated effect for renters.

Insert table 3 about here

## **5.2. Selected samples**

Regression results for the selected samples are also reported in table 3. In Model 2 we estimate the determinants of housing satisfaction, pooling both *movers* and *stayers*,

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<sup>23</sup> We will comment on this result in more detail below.

while in Model 3 and 4 we carry out separate estimates for each group. In all models, the variable homeownership is a dummy variable that takes the value one once dwellers have become homeowners and zero before changing tenure status. Therefore, its associated coefficient picks up the increase in housing satisfaction due to the change in tenure status. Comparing across alternative models, we do not observe significant qualitative changes in the effects of the majority of the variables on housing satisfaction. Therefore, for the sake of brevity, we will focus on the results regarding the effect of a change in the tenure status and its interaction with the housing characteristics.

. According to Model 2, after controlling for a number of covariates, the transition from renting to homeownership increases housing satisfaction significantly, around 0,317 points in the transformed satisfaction scale. However, results derived from interacting homeownership with the housing context variables are fairly similar in both Models 1 and 2. The only exceptions are the interaction of homeownership with the variables “dwelling is a house” and the factor associated with basic amenities (factor1). In contrast with Model 1, in Model 2 these two interactions are not statistically significant. These results confirm our hypothesis that after becoming homeowners, dwellers not only increase their housing satisfaction but also perceive different (dis)utilities from the same housing (dis)amenities.

For a more accurate examination of the above conclusion, we now look at Model 3 and 4. Once more, both models lead to the same conclusion. However, in terms of utility, both models provided different returns to homeownership. The effect is considerably greater for *movers* than for *stayers*, 0,446 vs. 0,237, respectively. This differential is due to the fact that in the sample of *movers* (Model 4), the homeownership variable is not only picking up the effect of homeownership, but also the effect of improving the housing characteristics. However, in Model 3 the effect of improving the housing context on housing satisfaction is discounted. Interestingly,

both models provide practically the same results regarding the interaction between homeownership and the dwelling characteristics.

A direct comparison between the coefficients of both models, indicate that before becoming homeowners, both *stayers* and *movers* perceive the same (dis)utility from basic housing amenities and deprivations (factor 1 and 2). In contrast, a bad neighbourhood environment (factor3) and the housing space (factor4) provide greater (dis)utility to *movers* than to *stayers*. Once individuals become homeowners, the (dis)utility caused by housing deprivations (factor2), bad neighbourhood environment (factor3) and the housing space (factor4) decrease, while the effect of basic amenities (factor1) remains apparently constant. This result remains for both *movers* and *stayers*, and nor do we observe substantial differences in the magnitude of the coefficients between both groups. The latter result is also quite revealing. Once renters become homeowners, perceive the same utility from their housing context, independently if they move to a better dwelling or stay in the same dwelling.

### ***5.3. Decomposition of the satisfaction gap***

Results from the Oaxaca-Blinder's decomposition expressed in equation (5) are reported in table 4. We focus on restricted samples. In Model 2, we estimate a "perception effect" of around 85 percent. In terms of utility, this implies that if we endow the average renter with the average owned dwelling, the increase in housing satisfaction will be substantially smaller than if he/she change his/her tenure status, holding the remaining characteristics constant. Consistent with our hypothesis, we observe that the "perception effect" is notably greater for the sample of *stayers* than for the sample of *movers*, 92.4 vs. 65.6 percent, respectively. This result indicates that becoming homeowners totally explains the change in housing satisfaction for *stayers*. In contrast, after changing their tenure status, the "endowment effect" (i.e. changes in

the housing context and household characteristics) explain almost 35 percent of the increase in housing satisfaction for the sample of *movers*.

Insert table 4 about here

Results of the single decompositions reported in table 4 indicate that both endowments and homeownership are important in explaining satisfaction gaps between tenures. In order to disentangle the role of these effects in explaining satisfactions gaps, we now look at the results of the double decomposition proposed in equation (6). These are reported in table 5. In this decomposition the pure “mobility effect” is retained by the component referring to differences in the endowments between homeowners-movers and homeowners-stayers (component a). In contrast, the pure “homeownership effect” is picked up by the difference in coefficients between homeowners-stayers and renters-movers (component b). We obtain that both components account for practically the same proportion of the satisfaction gap, i.e. about 40 percent. The remaining 20 percent can be attributed to an interacted effect of both endowments and tenure status. This result indicates that homeownership is at least as important as improving the housing characteristics in determining housing satisfaction.

Insert table 5 about here

#### **5.4. Robustness tests**

In the estimation of our empirical models one may fear the potential endogeneity of the variable duration of residence. This situation might arise from the fact that if people are not satisfied with their housing context, they are more likely to move. Hence, they are also less likely to experience a longer duration in the same dwelling.

In order to test whether this has an effect on our estimates, we ran all the regressions excluding duration of residence. We observed that the effect of the remaining covariates was not different across alternative samples and models: the only exception is the effect of the individual's age. In the regressions which included duration of residence, age is inverted U-shaped on housing satisfaction. However, when duration was removed, the effect became linear and negative.

Another potential econometric shortcoming may arise from separating homeowners and renters when estimating the decomposition of the housing satisfaction gap. The problem here is that the same individual can be simultaneously in both equations if during the sample period he/she changes his/her the tenure status. This means that the errors terms for some individuals in both equations will be correlated. This potential problem would be more important in the restricted samples, since renters and homeowners are the same individuals. To test whether this has an effect on the decomposition of the satisfaction gaps, we did the following. First, we experimented with the full sample, leaving out all the individuals that changed their tenure status during sample period. By doing this, we ensured that there were no repeated individuals in both equations. The results of the decomposition were the same with and without repeated individuals in both equations. In Model 2, we carried out 100 replications of the decomposition using random samples that excluded repeated individuals in both equations. We found that deviations from the decomposition reported in table 4 were fairly modest.

## **6. Summary and concluding remarks**

There is evidence which reports on the determinants of utility received from housing with different characteristics, and on the social and individual benefits of homeownership. However, nothing has yet been done with regard to the real utility provided by homeownership and its “cognitive” effects on perceived housing utility.

This paper presents a more direct and stronger test of the effects of homeownership on housing satisfaction. We are the first to use panel data in the empirical analysis of this issue. Our panel data approach not only allows us to control for individual heterogeneity, but also, to isolate the effect of homeownership from the effect of the contextual housing variables. We admit that elicited responses to direct questions regarding homeownership aspirations would be the most proper form of data. However, this information is not available. We find that renters who become homeowners not only significantly increase housing satisfaction, but also, after changing tenure status, they obtain a different utility from the same housing context. These results even hold true for those dwellers that change their tenure status but not their dwellings. It is also interesting the fact that after becoming homeowners, both *movers* and *stayers* perceive the same utility from housing characteristics, which are shown to be different. These results might provide support to the hypothesis that part of the differences in the perceived utilities derived from housing can be attributed to (un)fulfilled expectations or aspirations regarding homeownership.

The evidence reported by the decomposition of the satisfaction gaps allows us to determine that homeownership is, in itself, at least as important as improving the residential context in determining housing satisfaction. Another more general finding that holds true across alternative samples and models is that homeowners tend to perceive a lower (dis)utility from the same housing context than renters do. That is, homeownership smoothes the impact of the housing characteristics on satisfaction.

While there is consensus on the view that both society and individuals benefit from homeownership in a number of outcomes, the literature provides sparse and inconclusive results regarding the link between homeownership and many aspects of individuals' lives. We think the empirical evidence provided in this paper sheds some light on this issue. Knowing dwellers' housing aspirations and the effects on the derived utility from housing might allow for more sensitive responses to demand in



public/private housing markets. Given the empirical results obtained in this paper, a natural (and by no means new) policy implication, would be that promoting homeownership will raise satisfaction within the population. However, another policy implication derived from our results is that if governments wish to implement policies aimed at promoting rental of private/public housing without a loss in individuals' and collective subjective well-being, then it will be necessary to equip such a program with measures intended for first change social and individual beliefs regarding homeownership.

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**Table 1**

		Stayers		Movers			
				<i>Befote moving</i>		<i>After moving</i>	
		Mean	s.d.	Mean	s.d.	Mean	s.d.
<i>Individual</i>	Self-reported health status	3.680	0.97	3.964	0.86	3.908	0.85
	Age	48.778	16.78	38.409	13.11	41.324	12.84
	Woman	0.537	0.50	0.532	0.50	0.530	0.50
	Married	0.755	0.43	0.649	0.48	0.741	0.44
	Higher education	0.641	0.48	0.350	0.48	0.474	0.50
	Secondary education	0.239	0.43	0.368	0.48	0.272	0.45
	Primary education or lower	0.104	0.31	0.248	0.43	0.240	0.43
<i>Household</i>	Duration of residence	12.578	6.17	7.212	5.50	4.439	4.69
	log(Income)	7.799	3.12	9.033	2.47	9.175	2.53
	HC as % of household income <sup>(1)</sup>	0.209	0.17	0.191	0.20	0.232	0.21
	HC as % of household income <sup>(2)</sup>	0.247	0.141				
	Household size	3.100	1.38	2.843	1.28	3.202	1.27
	Financial situation improved last year	0.166	0.37	0.283	0.45	0.287	0.45
	Financial situation remained the same	0.547	0.50	0.454	0.50	0.505	0.50
	Financial situation deteriorated	0.287	0.45	0.263	0.44	0.208	0.41
	Housing costs are heavy burden <sup>(1)</sup>	0.159	0.36	0.157	0.36	0.172	0.38
	Housing costs are heavy burden <sup>(2)</sup>	0.232	0.42				
	Housing Costs are somewhat a burden <sup>(1)</sup>	0.237	0.42	0.282	0.45	0.386	0.49
	Housing Costs are somewhat a burden <sup>(2)</sup>	0.458	0.50				
	Housing Costs are not a problem <sup>(1)</sup>	0.604	0.49	0.560	0.50	0.442	0.50
	Housing Costs are not a problem <sup>(2)</sup>	0.310	0.46				
<i>Dwelling</i>	Dwelling is a house	0.520	0.50	0.430	0.50	0.701	0.46
<i>Factor 1</i>	Bath/shower	0.966	0.18	0.962	0.19	0.985	0.12
	Indoor flushing toilet	0.971	0.17	0.973	0.16	0.985	0.12
	Hot running water	0.874	0.33	0.943	0.23	0.938	0.24
<i>Factor 2</i>	Leaky roof	0.169	0.38	0.185	0.39	0.057	0.23
	Damp walls. floors. etc ...	0.106	0.31	0.115	0.32	0.037	0.19
	Rot in window frames or floors	0.177	0.38	0.221	0.42	0.087	0.28
<i>Factor 3</i>	Lack of adequate heating	0.105	0.31	0.152	0.36	0.046	0.21
	Noise neighbours or outside	0.275	0.45	0.348	0.48	0.195	0.40
	Pollution/grime. env. problems	0.153	0.36	0.169	0.38	0.100	0.30
	Crime or vandalism in the area	0.155	0.36	0.201	0.40	0.122	0.33
<i>Factor4</i>	Number of rooms	3.793	1.22	3.592	1.22	4.339	1.22
	Terrace or garden	0.869	0.34	0.804	0.40	0.918	0.27
	Shortage of space	0.235	0.42	0.369	0.48	0.140	0.35
	Number of observations		14,074		3,555		5,557

**Table 2:** Descriptive statistics and frequency distribution for housing satisfaction

	<b>Full sample</b>		<b>Transition Renter - Homeowner</b>			
	Renters	Owners	<b>Stayers</b>		<b>Movers</b>	
			Before	After	Befote	After
1.00	4.78	1.20	4.89	1.82	5.83	0.86
2.00	7.74	2.99	8.93	5.27	10.81	1.77
3.00	15.40	9.00	19.1	14.83	21.88	6.55
4.00	24.47	21.31	26.82	26.71	27.71	18.78
5.00	30.07	37.30	26.24	32.06	23.29	41.35
6.00	17.54	28.20	14.02	19.3	10.47	30.7
Mean	4.199	4.751	4.027	4.398	3.830	4.901
Difference		0.552		0.372		1.069
t-value		170.03		17.06		42.79
s.d.	1.362	1.120	1.346	1.207	1.34	1.021
1 <sup>st</sup> quartile	3	4	3	4	3.00	4
2 <sup>nd</sup> quartile	4	5	4	5	4.00	5
3 <sup>rd</sup> quartile	5	6	5	5	5.00	6
Skewness	-0.584	-0.907	-0.404	-0.569	-0.28	-1.051
N	190,126	471,509	8,057	5,847	3,533	5,485

**Table 3:** POLS fixed-effects estimates of the housing satisfaction equation

	Full sample				Transition Renter - Homeowner			
	Model 1		Pooled sample		Stayers		Movers	
			Model 2		Model 3		Model 4	
	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat	Coeff.	t-stat
Constant	2.6449	47.46	2.2521	7.70	-3.7022	-2.26	2.5710	5.40
<i>Household characteristics</i>								
Homeownership	0.5298	66.45	0.3169	12.05	0.2545	7.87	0.4464	9.12
Duration of residence	-0.0615	-56.07	-0.0757	-12.97	-0.1973	-4.35	-0.0865	-9.72
Duration of residence squared	0.0014	26.25	0.0019	6.79	0.0007	1.73	0.0031	6.44
log(income)	0.0425	14.10	0.0338	1.95	0.0270	1.31	0.0717	2.21
HC as % income	0.8984	26.05	1.8353	11.17	1.4894	6.45	1.8680	7.77
HC as % income squared	-0.7413	-17.40	-1.6601	-7.32	-1.4220	-4.3	-1.5548	-4.90
HC as % income x renter	-0.8591	-15.38	-2.8909	-12.52	-2.6112	-8.54	-2.4792	-6.76
HC as % income squared x renter	0.9089	14.58	2.9962	9.86	2.4653	5.88	2.9013	6.33
Household size	-0.0270	-10.02	-0.0135	-0.96	-0.0209	-1.05	-0.0179	-0.88
HC a heavy burden	-0.0858	-18.95	-0.0767	-3.10	-0.0788	-2.47	-0.0830	-2.10
HC somewhat a burden	-0.0434	-13.04	-0.0471	-2.53	-0.0448	-1.81	-0.0477	-1.70
Financial situation improved	0.0167	4.91	-0.0191	-1.08	-0.0432	-1.73	-0.0027	-0.11
Financial situation deteriorated	-0.0178	-6.11	-0.0015	-0.09	0.0025	0.12	-0.0096	-0.38
<i>Individual characteristics</i>								
Self-reported health status	0.0786	40.38	0.0872	8.08	0.0861	6.25	0.0923	5.35
Age	0.0178	8.96	0.0412	3.74	0.1983	4.3	0.0056	0.31
Age squared	-0.0001	-5.33	-0.0004	-3.29	-0.0003	-2.16	-0.0001	-0.50
Married	-0.0048	-0.61	0.0214	0.56	0.0293	0.48	0.0259	0.52
Secondary education	0.0255	3.06	-0.0336	-0.79	-0.0689	-1.03	0.0021	0.04
Primary education or lower	0.0158	1.79	-0.0765	-1.75	-0.1543	-2.24	0.0077	0.14
<i>Dwelling characteristics</i>								
Dwelling is a house	0.0602	5.66	0.1159	3.33	0.4486	2.68	0.0137	0.37
Dwelling is a house x owner	0.0937	7.71	0.0004	0.01	0.0230	0.57	-0.0117	-0.20
Bath/toilet/water (Factor1)	0.1177	30.29	0.1602	10.66	0.1743	9.01	0.1370	5.69
Damp/leaky/rot (Factor2)	-0.2475	-82.48	-0.2692	-23.31	-0.2557	-16.67	-0.2834	-16.16
Neighbourhood problems (Factor3)	-0.1182	-40.94	-0.1202	-10.54	-0.0685	-4.47	-0.1765	-10.31
Dwelling space stress (Factor4)	0.3386	93.01	0.3714	28.63	0.2916	16.33	0.4351	22.85
Factor1 x owner	-0.0349	-7.92	-0.0197	-1.15	-0.0358	-1.68	0.0043	0.15
Factor2 x owner	0.1329	38.61	0.1100	7.55	0.0972	5.35	0.1300	5.14
Factor3 x owner	0.0846	25.29	0.0667	4.85	0.0545	3.11	0.0667	2.98
Factor4 x owner	-0.1572	-38.00	-0.1088	-7.11	-0.0877	-4.48	-0.1074	-4.33
F-test $u_i=0$		3.58		3.31		3.50		2.92
Hausman ( $\chi^2$ ) fixed vs. random ef.		12,011.56		304.65		244.57		76.46
$\rho$		0.5302		0.4362		0.9005		0.3817
corr( $u_i$ , $X\beta$ )		0.0716		-0.0597		-0.9218		-0.1592
R <sup>2</sup> overall		0.2696		0.3020		0.0261		0.3701
# individuals		594,320		21,755		12,956		8,796
# households		125,489		3,791		2,366		1,424

**Table 4:** Interaction between the countries and the homeowner coefficient in table 3

		<i>Pooled sample</i>		<i>Stayers</i>		<i>Movers</i>	
		<i>Model 2</i>		<i>Model 3</i>		<i>Model 4</i>	
		<i>Coeff.</i>	<i>t-stat</i>	<i>Coeff.</i>	<i>t-stat</i>	<i>Coeff.</i>	<i>t-stat</i>
<i>Decomposition</i>							
Diference	(a)+(b)	0.593	46.20	0.300	1.98	1.022	48.23
Endowments	(a)	0.088	5.22	0.023	0.04	0.351	10.51
Perception	(b)	0.505	43.22	0.278	1.95	0.670	31.69
<i>% explained</i>							
	Perception	85.13%		92.41%		65.61%	
	Endowments	14.87%		7.59%		34.39%	



**Table 5: Double decomposition of the Homeowner-renter gap**

		<i>Coeff.</i>	<i>z-value</i>
Total gap	(1)+(2)	1.022	33.90
(1) Movers - Stayers gap	(a)+(b)	0.483 47.3%	25.80
(a) Differences in movers - stayers endowments		0.407 39.8%	11.42
(b) Differences in movers - stayers coefficients		0.077 7.5%	3.68
(2) Homeowners - renters gap	(c)+(d)	0.539 52.7%	22.81
(c) Differences in homeowners - renters endowments		0.130 12.7%	3.00
(d) Differences in homeowners - renters coefficients		0.409 40.0%	16.00