

Homeownership and Entrepreneurship

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Abstract:

Previous research has investigated the relation between homeownership and unemployment. However, the link between homeownership and entrepreneurship has remained unexplored. In this paper, we aim at filling this gap. To start with, we use two different data sources – the European Community Household Panel (ECHP) and the British Household Panel Survey (BHPS) – to document a strong cross-sectional association between homeownership and various measures of entrepreneurial activities. However, this link might capture spurious effects driven by unobservables. To by-pass this issue, we exploit the longitudinal dimension of the BHPS to construct a detailed monthly dataset that tracks individuals' job history and tenure choice, coupled with information on people's time-varying background characteristics. We then use this data to estimate regressions that include individual fixed-effects to partial out time-invariant individual unobservables. Our panel results show that becoming a homeowner significantly *reduces* the probability of becoming an entrepreneur, and that this effect is much stronger for homeowners with a mortgage. We investigate the robustness of our finding along a number of dimensions and test some possible explanations. Our results suggest that this negative link can be rationalised by the presence of credit constraints in the entrepreneurial decision and portfolio-distortions due to large amounts of individuals' equity invested in houses.

Keywords: Entrepreneurship; Homeownership; Panel Estimation.

1. Introduction

The decision to purchase a house is one of the most challenging choices individuals have to make during the course of their life. First, this involves considering how the attributes and the location of the different properties suit their needs and characteristics, as well as their home-to-work commuting patterns. Next, given the presence of significant transaction costs in the process of buying and selling a property, the decision involves forming an expectation about the expected length of stay in the residence. Finally, once a suitable property has been identified, arrangements have to be made in order to finance the purchase. Indeed, buying a house involves significant amounts of money – in the order of some multiples of an individual's or a household's annual disposable income and cumulated wealth. As a result, most individuals will leverage their purchase by taking out a mortgage, and will be confronted with a number of choices regarding both the type and the amount of loan they want to obtain.

Unsurprisingly given the complexity of this decision, a vast academic literature has examined individuals' behaviour in relation to tenure choice. This includes, amongst others, Linneman and Wachter (1989), Rosenthal et al. (1991) and Genesove and Mayer (1997) and (2001) on the impact of borrowing constraints and loss aversion; Haurin and Gill (2002) on the effect of transaction costs and expected length of stay; and Hilber (2005) on link between tenure and the neighbourhood externality risk. In a related strand of literature, others have investigated the effect of amenities and dis-amenities on house prices to disentangle individuals' preferences for local attributes. Examples include school quality and resources (Black, 1999; Meyer and Hilber, 2004 and Gibbons et al., 2009), air pollution (Ridker and Henning, 1967) and proximity to churches (Carroll et al., 1996). Finally, a growing body of literature has studied the effects of being a homeowner. For example, Di Pasquale and Glaeser (1999) and Hilber (2010) investigate the impact of tenure choice on investment in local social capital and citizenship, and the literature review in Dietz and Haurin (2003) presents evidence that homeowners behave differently from renters in terms of portfolio choices, risk management, environmental issues as well as at educating their children and improving their educational outcomes. Against this backdrop, most OECD countries have set in place policies that tend to favour homeownership (see Havet and Penot, 2010). These include tax relief for mortgage interest payments, low or no tax on property values or on imputed rents, exemptions from capital gain taxation on houses and subsidies to low-income families to reduce the cost of homeownership.

However, in a series of articles, Oswald (1996, 1998, and 1999) challenged the wisdom of these policies suggesting that high rates of homeownership are associated to higher levels of unemployment. His conjecture was that, since homeowners are less mobile than renters, they are less likely to move to find an alternative occupation if they lose their current job because of geographically/sector asymmetric shocks. Thus, they remain idle and unemployed. These seminal articles remain highly controversial and have initiated a large body of literature that studies the impact of housing tenure on both unemployment incidence and unemployment duration. In two recent articles, Munch et al. (2006) and Battu et al (2008) use duration models applied to micro-level data for Denmark and the UK, respectively to investigate these issues. Although their evidence supports Oswald's conjecture that homeowners are less geographically mobile, the authors find no evidence that homeowners are more likely to become unemployed or have longer unemployment spells. While this set of findings is reassuring, the recent financial crisis (2007-2009) and housing bust that hit a number of OECD countries (in particular, the US) has reignited the debate. In a recent paper, Ferreira et al. (2010) show that owners in negative-equity are significantly less mobile, and suggest that this has significant implication for the design of public policies.

Despite the wide-ranging interest and academic research in the determinants and consequences of tenure choice, the link between homeownership and entrepreneurship has remained widely unexplored.¹ With this paper, we aim to fill this gap by studying how homeownership affects individuals' self-employment probability. Our interest in the link between homeownership and self-employment is motivated by two considerations. On the one hand, self-employment can be associated to the creation of new businesses and an acceleration of innovation (see Blanchflower and Oswald, 1998; Evans and Jovanovic, 1989; Holtz-Eakin et al. 1994a and 1994b; and Hurst and Lusardi, 2004), both of which are conducive to higher economic growth (see Acs et al. 2003 and Michelacci, 2003 for a formal analysis of the role of entrepreneurs in endogenous growth models, and Acs and Audretsch, 2004 for a review of the empirical literature). We call this phenomenon "entrepreneurship". On the other hand, self-employment has been also associated with unstable employment opportunities and last-resort decisions (see Alba-Ramirez, 1994, and Martinez-Granado, 2002). We refer to this employment outcome as "self-employment out of necessity". Both the bright and the dark sides of self-employment merit inspection, and we believe that their links with homeownership carries important policy implications.

¹ The only remarkable exception is Fairlie (2010) who presents cross-sectional evidence on the relation between tenure status and self-employment in the US.

In order to carry out our empirical investigation, we exploit information from two data sources, namely the European Consumer Household Panel (ECHP) and the British Household Panel Survey (BHPS). The ECHP is a yearly panel survey with limited information on housing and occupation. However, it covers 15 EU countries for the period 1994-2001, which allows us to perform some preliminary cross-country comparisons of the association between homeownership and entrepreneurship, as well as some simple individual-level cross-sectional regressions. The BHPS, instead, focuses on British households only, but comprises a long panel component covering the period 1991 to present, with specific information on individual housing choices, occupation and measures of entrepreneurship, as well as individuals' income, financial and wealth situation. Additionally, the structure of the BHPS allows us to construct a monthly dataset that tracks individuals' job history and tenure choice, coupled with information on people's time-varying background characteristics. We exploit this data to estimate regressions that include individual fixed-effects to partial out time-invariant individual unobservables that might simultaneously affect tenure and occupational choice. This allows us to tease out whether there is a causal relation between homeownership and entrepreneurship. We believe the use of panel techniques on monthly data to investigate the determinants of entrepreneurship and self-employment is an improvement over the previous literature. In our context this is particularly important in order to isolate the precise timing of individuals' transitions into homeownership and entrepreneurial jobs.

Our preliminary cross-country and cross-sectional analysis reveals a significant and positive correlation between homeownership and various measures of self-employment and entrepreneurship. To begin with, using aggregated data from the ECHP, we show that countries with high homeownership rates also have a high incidence of self-employment. Next, using individual-level cross-sectional regressions that exploit information from both the ECHP and BHPS, we still find evidence that homeowners are more likely to be self-employed even conditional on a detailed battery of individual and geographical controls. Importantly, both the aggregate and the individual correlations are robust to restricting the definition of self-employed to people with more entrepreneurial characteristics, such as self-employed that employ some dependent workers or those that perform professional and managerial tasks. Stated differently, homeownership seems to be positively associated with "entrepreneurship".

However, this type of analysis cannot control for individual unobservables that could simultaneously determine tenure status and occupational choice. These include for example 'drive', 'ambition' and 'risk tolerance', which might at the same time push people to try their

luck as entrepreneurs and to ‘climb on to the property ladder’. Similarly, cross-sectional results might be confounded by reverse causation, whereby successful entrepreneurs purchase a property by tapping into their cumulated wealth and resources. In a nutshell, cross-sectional results could be severely biased and lead to some spurious conclusions.

In fact, our panel regression analysis fully confirms this intuition: once we include individual fixed-effects to partial out people’s unobserved time-fixed characteristics, we find that becoming a homeowner significantly *reduces* the probability of becoming an entrepreneur. We also find that this effect is much stronger for homeowners with a mortgage, and remains unaffected whether we look at people who stay in the same residence throughout the period of our analysis or whether we compare homeowners – with and without a mortgage – to private and public renters. Importantly, our results are stronger if we focus on self-employed with dependent workers and self-employed in managerial and professional occupations, than if we look at all self-employed or just exclude those in elementary jobs. This suggests that our evidence predominantly capture a negative causal association between homeownership and “entrepreneurship”, and not “self-employment out-of-necessity”. Furthermore, we carefully study the timing of the relation between homeownership and entrepreneurship. Our results suggest that most of this negative effect takes place simultaneously, with little evidence that as time goes by since the date of the house purchase, homeowners become more entrepreneurial. Similarly, we find limited evidence that our results are fully explained by anticipation effects, whereby would-be homebuyers shy away from entrepreneurial occupations long time before actually becoming homeowners. However, there is some heterogeneity in our findings, with the effect of time-to-purchase and time-since-purchase being more significant for entrepreneurs with dependent workers, than for those in managerial and professional occupations (irrespective of whether they employ other people). Finally, we study whether there is any sectoral heterogeneity in our results and whether changes in local housing value affect homeowners’ chances of becoming entrepreneurs.

All in all, our results convincingly show that homeownership and entrepreneurship are *negatively* causally associated, and we speculate that our findings can be rationalised by the presences of credit constraints in the entrepreneurial decision – as well as portfolio-distortions – which are more acute for homeowners given the large amounts of equity they have to invest in purchasing a property. We believe these results are highly novel and carry profound implications for the role of housing markets and policies in shaping labour market outcomes and economic performance. Moreover, they are particularly relevant given the on-

going discussions about the long-lasting effects of recent financial crisis which originated in housing markets.

The rest of the paper is structured as follows. In Section 2 we present our preliminary analysis based on cross-country and cross-sectional regressions. Next, in Section 3 we describe how we use the BHPS to construct a monthly panel with detailed information on individuals' occupations and tenure choice, as well as background characteristics. Section 4 then discusses our main findings on the causal relation between homeownership and entrepreneurship. Finally, some concluding remarks are provided in Section 5.

2. Preliminary descriptive analysis

2.1 The cross-country correlation between homeownership and entrepreneurship

Following the spirit of the seminal work by Oswald (1996), we begin our analysis by studying whether countries with higher levels of homeownership also experience higher levels of self-employment and entrepreneurship. To do so, we use aggregated data from the European Community Household Panel (ECHP), which covers 15 European countries for the period 1994-2001. The main advantages of the ECHP are that it collects information using standardised questionnaires so that responses are comparable across countries, and that it interviewed annually a representative panel of households and individuals in each country. Information was collected on a wide range of topics, including income, education, demographics and – crucially for our analysis – housing and employment. In the first wave of the survey (1991), only those twelve states that were European members at that time were included, giving a sample of some more than 60,000 households and approximately 130,000 adults aged 16 years and over. Subsequently, data became available for Austria (1995), Finland (1996) and Sweden (1997) as well.

To start with, we calculate for each of the countries the fraction of workers who are self-employed – i.e. the share of self-employed people among those actively working at the time of the interview – and cross-plot this against the fraction of households who report that they own the property in which they live. Note that we do so by pooling all years together. At the same time, we also perform a simple cross-country regression analysis with 15 data points by regressing the incidence of self-employment on the incidence of homeownership. Our findings are displayed in Figure 1. The left panel presents un-weighted results, whereas the right panel shows our findings when we weight our analysis by country's population. Both

diagrams clearly show a positive association between homeownership and self-employment, although this relation is more pronounced and significant in the weighted analysis.

Nevertheless, these ‘first-pass’ results overlook a number of important issues. First, as already discussed in the Introduction, a higher incidence of self-employment does not necessarily mean more “entrepreneurship”, rather it could capture self-employment out of unemployment and necessity. Second, by considering every one employed at the time of the survey, our first set of results neglects important considerations regarding individuals’ decisions to participate in the labour markets, as opposed to engaging in education or provide unpaid home services. Given the markedly different culture and institutions across the countries considered by the ECHP, this might affect our results on the link between homeownership and self-employment.

In order to address the first issue, we create three further measures of self-employment, which are meant to narrow down our definition in ways that allow us to capture more properly defined entrepreneurial jobs. To start with, we consider only self-employed workers who employ other people, irrespective of their number. We label these as “Entrepreneurs with dependent employees”. Next, using the socio-economic classification of jobs provided by the ECHP (specifically we use the SOC2000 at the 1-digit level), we identify self-employed who are “Managers and senior officials”, or work in “Professional occupations”, or identify themselves as “Associate professional and technical occupations”. We label this group “Entrepreneurs in managerial and professional jobs”. Whereas the first definition is meant to capture “entrepreneurs who create jobs”, the second definition is more geared at identifying entrepreneurs who are potentially more creative and use higher levels of human capital. However, both definitions neglect some occupational categories, such “Skilled trades occupations” or “Personal service occupations”, where a high incidence of self-employment might still identify more intense entrepreneurship. Thus, we create one last category which only excludes self-employment in occupations labeled “Process, plant and machine operatives” and “Elementary occupation”.

To tackle the second issue, we follow previous research that has analyzed individual’s occupational choice and focus on head-of-households, aged between 18 and 65 who have completed their education. The notion of “head-of-household” conventionally refers to the individual within the household that manages its main financial aspects (such as paying the rent, managing the mortgage, etc.) and is considered the main economic actor. By focusing on these individuals, we limit the importance of issues related to labour market participation decisions, which would instead be exacerbated if we kept in our sample all spouses and

children living in the household. Similarly, by considering only people who have completed their education and are above 18 years of age (the cut-off for the “age of majority”) and below 65 (a common threshold for retirement), we minimize problems related to the decision to work or study, work or retire and finally work part-time or full-time.

Our second set of results based on this restricted sample and exploiting the four different definitions of entrepreneurs is presented in Figures 2.a and 2.b. The analysis follows the structure of Figure 1, and we present both scatter plots as well as simple cross-country regressions of the share of entrepreneurs on the incidence of homeownership, both unweighted (Figure 2.a) and weighting by country’s population (Figure 2.b). All panels document a significant and positive association between entrepreneurship and homeownership. In fact, the link is stronger and more significant than in Figure 1, and holds irrespective of whether we weight our analysis or not. Interestingly, the positive association between homeownership and self-employment remains positive and significant even when we concentrate on “entrepreneurs with dependent workers” and “entrepreneurs in managerial and professional jobs”. This would seem to suggest that homeownership stimulates real entrepreneurship, and not just “self-employment out-of-necessity”. Indeed, a ten percentage points increase in the homeownership rate would increase the share of entrepreneurs with employees by 2-2.5 percentage points (approximately 20% given the sample average), and the share of managerial entrepreneurs by with 1.3-2 percentage points (around 16-20% of the sample mean).

On close inspection, some countries look like outliers, in particular Greece. However, GDP growth rates in the United Kingdom, Spain, Portugal and in particular Ireland – identified as more entrepreneurial in our graphs – were higher during the period under analysis than for example in Germany and France, at the opposite end of the entrepreneurship spectrum. With hindsight and in the wake of the “Great Recession”, the solidity of the astonishing performance of these countries could easily be questioned. However, since the original writings of Schumpeter (1911), entrepreneurs have been identified with ‘creative destruction’ and thus the potential for significant cyclical fluctuations and booms-and-bus dynamics in the economic performance of countries.

Although these results depict an interesting pattern of correlations, they might still be driven by significant cross-country differences in the socio-economic characteristics and demographic composition of the underlying population. Furthermore, different countries have different institutional settings – e.g. taxation of self-employment income and public incentives to homeownership – which might affect individuals’ decisions to buy a house

and/or become entrepreneurs, and thus drive our findings. One possible solution would be to augment the cross-country analysis with a detailed set of country controls. Additionally, one could exploit the time dimension of the data to include country fixed-effects to net out aggregate unobservable factor. However, since we have access to micro-data, we take an alternative route and go on to perform individual-level regressions that study whether there is a positive correlation between individuals' tenure status and occupational choice, conditional on a detailed set of characteristics and country-by-year effects.

2.2 *The cross-sectional correlation between homeownership and entrepreneurship*

To begin our individual-level cross-sectional regression analysis, we still focus on the ECHP and consider only head-of-households aged between 18 and 65 who have completed their education and are currently working. This sample includes approximately 215,000 observations and descriptive statistics for the main variable of interest and a set of individual controls are reported in Table 1.

The top part of the panel shows the mean and standard deviation a set of dummy variables capturing: (i) whether the individual is simply self-employed (*entrepreneurs: all*), (ii) whether he/she is a self-employed with dependent workers (*entrepreneurs: dependent*); (iii) whether the person is a self-employed in a managerial and professional occupation (*entrepreneurs: managers*); and (iv) whether the individual is self-employed, but not in an elementary or machinery/plant operating occupation (*entrepreneurs: excl. elementary/machinery*). These definitions are the same we used in Section 2.1 to construct Figures 2.a and 2.b. Finally, we create a binary outcome for whether the household which the individuals belongs to owns the property in which they reside (*own*). The descriptive statistics in Panel A show that on average 20% of individuals are self-employed, but that the shares of entrepreneurs with dependent workers and entrepreneurs in managerial and professional jobs are much smaller, at 10% and 8% respectively. The same is true for self-employed not working in elementary occupations. As for the share of households who own the property they inhabit, this is on average 74%, although this figure hides substantial variation across countries.

In Panel B, we present descriptive statistics for a number of controls we have constructed from the ECHP. These include among others the individual's household size, his/her age, gender, marital status and education level, as well as some information regarding the year since he/she moved to the current location. Importantly, the data allows us to construct some measures for an individual's total income in year prior to the survey, as well

as the overall income of the household in that year. We use these variables in our regression analysis (in logs) to proxy for wealth and thus partly control for the presence of credit constraints in the decision to become entrepreneurs.

Using this data we run some simple cross-sectional linear-probability models where the dependent variable is one of the four binary outcomes proxying for entrepreneurial jobs described above, and the explanatory variable of interest is an individual's housing tenure status. More precisely, we estimate the following model:

$$Entrep_{ict} = \alpha_i + \beta * Home_{ict} + \mathbf{x}'_{ict} \gamma + \phi_{ct} + \varepsilon_{ict} \quad (1)$$

Where the subscript ict identifies individual i living in country c in year t ; and $Entrep_{ict}$ and $Home_{ict}$ respectively measure his/her occupational and tenure status in a given year (and a given country; note however that individuals sampled and retained in the ECHP do not change country of residence). Next, \mathbf{x}'_{it} is the set of controls discussed above and described in Table 1, whereas ϕ_{ct} is a set of country-by-year fixed-effects that allow us to control for country-specific time-varying unobservable features. These include fluctuations in economic performance as well as changes to political and institutional factors. Finally, α_i is an unobserved individual level effect, which we cannot control for in simple-cross sectional regressions. As already mentioned, this might capture factors such as 'drive', 'ambition' and 'risk tolerance', which could simultaneously determine occupational and tenure choice. While we hope to mitigate its effects by including a set of covariates, we know that cross-sectional regressions are plagued by endogeneity issues and present simple descriptive evidence. In fact, this justifies the panel-data fixed-effect approach that we take in the following sections of the paper. Note that the error term ε_{ict} is assumed to be uncorrelated with all the right hand side variables, although we allow for some correlation in residual shocks across individuals within the same country, and consistently cluster standard errors at the country level.

Our cross-sectional regression results using the EHCP are presented in Panel A of Table 3. Columns (1), (3), (5) and (7) present estimates of the partial correlation between homeownership and self-employment/entrepreneurship (i.e. β in Equation 1) unconditional on any controls. Columns (2), (4), (6) and (8) instead add to our specifications both the set of individual characteristics discussed above (\mathbf{x}'_{ict} in Equation 1) and country-by-year fixed effects. Unsurprisingly, unconditional regressions confirm the intuition we gathered from

Figures 2.a and 2.b, which were constructed by aggregating these individual-level data. The relation between homeownership and entrepreneurial jobs is positive and significant irrespective of the occupational definition that we use. More surprisingly, these associations remain positive and significant throughout the columns when we include the controls detailed in Equation (1). Although the coefficients drop by a factor of two to five, they still depict some significant relations. For example, homeowners are 29% more likely to be entrepreneurs with dependent workers and 10% more likely to have an entrepreneurial job in a professional and managerial occupation.

Once again, we emphasise that although these partial correlations depict some interesting and previously unexplored stylised-fact, they are also very likely to be biased by the presence of individual and household unobservables factors, i.e. α_i in Equation (1). In order to address this issue and identify the causal link between homeownership and entrepreneurship, we will use monthly panel data constructed from the BHPS and apply fixed-effect estimation techniques. Before doing so, however, we present some similar cross-sectional regression evidence using the British Household Panel Survey (BHPS) yearly surveys.

The BHPS is a long panel dataset covering the period 1991 to present and collecting detailed information on households' tenure choice and characteristics, as well as individual's current occupation and job-history between two interviews (i.e. over the course of the year), personal characteristics, income and financial situation/perceptions. The first wave of the panel consisted of approximately 5,500 households and more than 10,000 individuals living in the UK. Some booster samples were added in 1999 and 2001 to sample more individuals from Scotland and Wales and Northern Ireland, respectively. One of the significant advantages of the BHPS is that it is very successful in following the same representative sample of individuals over time even when they move residence, or they go on to form new households (e.g. the ageing children of the original families who move out to create their own household).

In our preliminary cross-sectional analysis, we exploit information collected during the BHPS yearly surveys and keep in our sample all individuals identified as the 'reference person' – the BHPS equivalent for the head of household – currently working and aged between 18 and 65. This is the same set of restrictions we applied to the ECHP here above. For these individuals we are able to construct the same variables of interest and background information that we constructed for people sampled in the European Panel. These are described in Table 2. Relative to the ECHP, fewer individuals are self-employed in the UK

(14% vs. 20%), and can be classified as entrepreneurs with dependent workers (5% vs. 10%) or entrepreneurs in managerial/professional occupations (6% vs. 10%) or self-employed in non-elementary occupations (7% vs. 10%). On the other hand, the share of individuals owning the property they live in is slightly higher in the BHPS (80% vs. 74%). As for the background characteristics, British head-of-households are slightly younger, more educated and less likely to be men. They also live in smaller families and are significantly less likely to be married.

Cross-sectional regression results using this sample are presented in Table 3, Panel B. As for the ECHP, Columns (1), (3), (5) and (7) present regression results unconditional on any control. Columns (2), (4), (6) and (8) add individual and household background characteristics, and region-by-year fixed effects (as opposed to country-by-year dummies) to account for macro-location and time specific unobserved factors. Throughout the columns, the association between homeownership and self-employment/entrepreneurship is positive and significant. This is true irrespective of the occupational definition we consider, and irrespective of whether we control for the set of covariates listed in Table 2. Using the estimates in Columns (4) and (6), we find that homeowners are 22% more likely to be entrepreneurs with dependent workers and approximately 8% more likely to be occupy an entrepreneurial job with a professional/managerial position.

In conclusion, both cross-country and individual-level cross-sectional regressions that exploit data from the ECHP and BHPS seem to provide evidence that homeowners are more likely to be self-employed. This is true even conditional on a detailed battery of individual and geographical controls, and if we focus on self-employed with some dependent workers or performing professional and managerial tasks. Stated differently, homeownership seems to be positively associated with “entrepreneurship”. However, this type of analysis cannot control for unobservables that could simultaneously determine tenure status and occupational choice, and could therefore lead us to severely biased conclusions. In order to address this issue, in the remainder of the paper we exploit the structure of the BHPS to construct a monthly dataset that tracks individuals’ job history and tenure choice, coupled with information on people’s time-varying background characteristics. We then exploit this data to estimate regressions that include individual fixed-effects to partial out time-invariant individual unobservables and tease out the causal relation between homeownership and entrepreneurship. To begin with, in the next section we discuss the complicated procedure we used to construct the dataset and provide some descriptive statistics of the variables we retain for our analysis.

3. A monthly panel dataset using the BHPS

2.2 Constructing the dataset

As already discussed, the first wave of the British Household Panel Survey (BHPS) was launched in 1991, and the original sample included approximately 5,500 households – corresponding to around 10,000 individuals – chosen to be representative of the UK population. Every year since the beginning of the survey, households are contacted in August and interviews arranged for September. When an interview cannot be arranged in September, it takes place in a subsequent month. Most interviews take place before the end of the year (by December), with a negligible number of interviews taking place in January or February.

At the time of the interview, respondents are asked – among other things – to describe their current labour force status. If they are working, detailed information about their occupation is collected. Moreover, survey respondents are asked whether their labour force status has changed since their last interview. If the answer is positive, a set of detailed questions is asked about all the labour force and occupational spells occurred between the interview taking place and September of the previous year. Note also that in the first wave (1991), respondents are asked whether their labour forces status has changed since 1st of September 1990, and – if so – precise information about their job history between then and the time of the current interview is collected. In this way, the BHPS manages to cover every month of the labour history of the respondents since one year before his/her first interview to present.

Unfortunately, the way in which the BHPS is structured makes it possible that some inconsistencies arise in the description of the same labour force spell provided by the same person in two different waves. In fact, many authors have discussed the fairly complicated task of reconstructing detailed monthly labour market spells from the BHPS (Upward, 1999; Halpin, 2000; Paull, 2002; Mare, 2006). In what follows, we provide a description of the way we have constructed these spells and tried to solve inconsistencies. In general, we follow the principle that the information recorded closest to the date of the beginning of the spell is the most accurate. A similar approach is used in Upward (1999) and Battu et al. (2008).

To begin with, consider that the BHPS contains a longitudinal file identifying every person that ever appeared in the survey, and indicating in which waves he or she was interviewed. From this file we construct the list of individuals that belong to our initial sample, i.e. those with a full interview in Wave 1. This subset of people is our starting point, since for these people we can construct a job-spell history stretching back to September 1990

and thus minimise any ‘initial condition’ issues (see Battu et al., 2008 and discussion here below). In some extension to our analysis, we will also consider a dataset that includes any person for whom we can reconstruct a consistent job-history file irrespective of when his/her first interview was.

Next, in every wave of the BHPS, interviewed individuals appear in a ‘*respondent file*’, which contains information on the current labour force and occupational status – and if they have changed their labour market status between two waves – in a ‘*job history file*’ that collects detailed information for every occupational spell (including unemployment and inactivity spells), such as job characteristics, starting date, ending date and sector of occupation. In order to construct labour market spells, we use the following iterative strategy for every wave of the BHPS, starting from Wave 1 (1991) and working towards to the most recent wave we use (namely Wave 18 in 2008):

- (i) We open the ‘*job history file*’ and the ‘*respondent file*’ and carry out some consistency checks in both of them separately (more details below);
- (ii) We append ‘*respondent file*’ on top of ‘*job history file*’ in order to check the consistency between the two – in particular regarding the starting date of the current job and the history of jobs reported in the history file. We name the resulting file ‘*wave w*’ file, where *w* simply indicated the wave under consideration;
- (iii) We append the file ‘*wave w*’ on top of the combined file from the pervious wave, that is ‘*wave w-1*’, and check the consistency of the information provided in the two files.
- (iv) Once we have appended all waves, we compute the duration in months of every spell and we expand the dataset so that every observation corresponds now to one specific month. We call the resulting file is the ‘*labour spell file*’.

In the original BHPS data, every labour market spells comes with a starting/ending date, and inconsistencies arise because of overlaps between starting/ending dates. In order to address possible inconsistencies, we take a double approach of looking for problematic cases both: (a) within-file, i.e. within the ‘*job history file*’ and ‘*respondent file*’ separately; and (b) within-wave, i.e. within the combined file obtained by appending the ‘*respondent*’ and ‘*job history*’ files. As already stated, the general idea is to resolve overlaps by preferring earliest answers (i.e. those recorded closest to the date of the beginning of the spell). Note that our ‘within-file’ and ‘within-wave’ approach also solves situations that could arise because of between-wave overlaps. In details, we proceed as follows:

Within-file checks: (a) Spells that display a starting date earlier than the interview of the previous year are recoded as starting on the day of the interview of the previous year. This is because, up to the date of the previous interview, we ‘trust’ information from the previous wave more than retrospective information²; (b) Spells starting after the current date of interview are considered as starting on the date of interview. Discrepancies of this type probably emerge as a coding error in the original data; (c) For the ‘*job history files*’ only, we check that the sequence of spell starting dates is increasing. If this is not the case, we drop the spells that cause the inconsistency.

Within-wave checks: (a) If a spell from the ‘*job history file*’ has the starting date missing, the starting date is imputed as the mean of starting dates of the two adjacent job history spells. Stated differently, we centre this job spell in the middle of the two adjacent ones. (b) If a spell from the ‘*respondent file*’ has the starting date missing, two possibilities arise. If there is no ‘*job history file*’ spell for the same individual, the starting date of this spell is imputed as the date of the previous interview. If instead there is a pre-dating spell in the ‘*job history file*’, the starting date of the current job is imputed as the date of current interview; (c) Next, we check that the sequence of starting dates in the combined ‘*respondent*’/‘*job history*’ file – i.e. the ‘*wave*’ file – is increasing. If not, we drop the spell that causes the inconsistency; (d) Finally, we check that point (c) holds true when we iteratively append ‘*wave files*’ from subsequent waves of BHPS (starting from Wave 1).

Obtaining detailed and consistent monthly information about individuals’ job-spell history is only part of our task. Our main aim is to identify the causal effect of homeownership and entrepreneurship, and therefore we need to be able to construct information about individuals’ tenure choice with some specific attention to the timing of this event. In our context, we need to be able to address as well possible concerns with reverse causality, whereby individuals first become ‘successful entrepreneurs’ and then purchase a property by tapping into their cumulated wealth and resources. To deal with these issues, we proceed as follows. First, we gather information about the respondents’ present tenure status. The possible categories are: homeowner with mortgage; homeowner without mortgage; private tenant; social tenant; and other very minor options, such as living in an accommodation paid by the employer, which we do not consider in our analysis. This

² For Wave 1, we can’t use the date of the previous interview as a reference point. Hence, we decide to consider only spells that started after 1 September 1990.

exclusion does not affect our findings. The BHPS also asks respondents to state the date in which they moved to their present address. We use this information to impute the timing of changes in individuals' tenure state. In particular, if the respondent changed his or her tenure status from one wave to another *and* there is a moving date (approximately 67% have a moving date among those changing tenure), we take this date as the transition date. If the respondent changes his or her tenure status but there is no moving date, the transition date is imputed as the date of the current interview.³ Once the transition dates between tenure statuses are ready, we expand the data to a monthly '*tenure spell*' file, which then merge using the BHPS individual identifiers – and by month and year – to the '*job spell file*' created using the procedure discussed above.

Finally, other individual variables that we construct and use as controls (such as education level, age, marital status and number of children; see next section for more details) are treated as constant between one wave and the other, and changes are assumed to take place at the date of the interview of every wave. This additional information is then added (merged) to the combined '*job spell*'/'*tenure spell*' dataset using the individual unique identifiers on a yearly basis.

To implement this approach, we begin with an initial sample including all respondents who gave a full interview in Wave 1 (9,892 individuals) and we follow them until they exit the survey for the first time (even though they might come back at a later stage). This is because we need to be able to construct a continuous account of individuals' labour force statuses for every month combined with precise information on their tenure status. So as soon as individuals skip an interview, we consider them as if they left the survey for good since it would not be possible to reconstruct in-between labour market spells and tenure choices for these people. In the last wave we use (Wave 18 in 2008) we still have 3,642 individuals from the initial sample. Even though we have a slightly larger number of dropped observations in the first couple of waves (the number of individuals declines to 8,553 and 7,609 in Waves 2 and 3, respectively), the observations decrease quite gradually (e.g. we still have 5,917, 5,668 and 5,396 individuals in Waves 8, 9 and 10 respectively, and 4,023 and 3823 people in Waves 16 and 17). This simply reflects the fact that as the original members of the BHPS become older, they either drop out of the labour market or are excluded from our analysis due to our age restrictions (capped at 65).

³ Note that it is possible to change tenure status without changing address. In the UK, for instance, the "Right-to-buy" program allows social tenants to buy their house or flat from the local authority (van Ham et al, 2010). Similarly, individuals could buy from their current private landlord. However, this does not seem widespread.

In total, this sample consists of more than 1,200,000 month-individual observations, including employment, unemployment and out-of-labor force spells. In our core analysis, we will focus on head-of-household and consider their employment spells only (as either workers or self-employed). Moreover, we will only analyse individuals with non-missing observations in our control variables and – crucially – in their housing tenure status at any point in time. These restrictions bring our sample to approximately 420,000. This large sample reduction is predominantly due to focussing on head-of-households, reducing the number of observations by around 480,000 individuals to approximately 780,000. As already mentioned this restriction helps us mitigating issues related to labour market participation, so we do not consider this as problematic. However, another 340,000 observation are neglected by focussing only on employment spells. We do so because we are more interested in the choice between entrepreneurship and normal employment rather than the one between unemployment and self-employment out of necessity. However, including unemployment observations in the fixed effect analysis does not alter the results, as we show in the robustness section (*to be added*).

In conclusion, we emphasise again that the richness and detail of our dataset is a crucial and novel element of our analysis. Most panel-data studies of entrepreneurship (e.g. Hurst and Lusardi, 2004; Disney and Gathergood, 2009) rely on annual observations. However, this tends to neglect employment and self-employment spells with duration below 1 year. More importantly, previous work that has looked at the effects of homeownership on job market outcomes (including the work by Battu et al, 2008 on the same data) has taken a much coarser measure of the timing of transition in and out of homeownership. Since we are interested in pinning down the causal relation running from changes in housing tenure to transitions into entrepreneurial occupations, a detailed and consistent set of monthly information on individuals' job and tenure spells is crucial to our analysis. In the next section, we provide descriptive statistics on the variables that we have created in our dataset.

2.2 *Descriptive statistics*

The descriptive statistics for the BHPS monthly dataset are presented in Table 4, Panel A and Panel B. The top panel focuses on the main variables of interest, namely individuals' occupational choice and their housing tenure status. The bottom panel instead describes a set of time-varying background characteristics that we include in our analysis. A discussion of the information contained in the table is interesting in two ways. First, this can be compared to the descriptive statistics from the 'standard' annual BHPS, revealing whether the

expansion of the number of observations has significantly altered the characteristics of the units of analysis. Second, the main features of the monthly BHPS data can be compared to some related statistics from other sources to check whether our numbers are consistent with previous academic work.

On the first point, Panel A shows that the percentages of entrepreneurs are similar to those presented in Table 4, irrespective of the definition we use. The same is true for the fraction of homeowners. Interestingly, we also find that 66% of the observations involve homeownership with a mortgage, whereas only 16% refer to owners with no mortgage. Finally, only 6% of the observations are from individuals renting a private property, whereas around 9.5% represent public renters. We will return to this distinction when discussing our results. By contrast, a comparison of the control variables in Panel B with those in Table 2 shows more differences: the monthly dataset contains older individuals, which leads to a higher average income and a higher percentage of married couples. This is not surprising: since the sample of the monthly dataset is made of the people that start in Wave 1 and does not contain any ‘new entry’, individuals get gradually older than the average BHPS member. Moreover, we are retaining individuals for whom we can reconstruct complete employment and unemployment histories, and dropping those who at some point abandon the survey, even though they come back at some stage. This suggests that we might be focussing on individuals with a higher labour market attachment, which could further explain their higher income levels. Nevertheless, the broad consistency of Table 4 and Table 2 is reassuring, and it indicates that small differences in controls do not significantly alter the composition of our main variables of interest, namely entrepreneurship and homeownership.

On the second point (comparability to other studies), the percentage of self-employment that we report (at 15%) is consistent with Blanchflower and Shadforth (2007) who use several years of quarterly data from the (cross-sectional) Labour Force Survey to document that UK self-employment has stayed between 12 and 15% in the period 1991-2007. Similarly, our percentage of homeowners at 82% is close to the one reported by Battu et al. (2008) which stands at 79%. Similarly, our shares of private and public renters (at 6% and 9.4%) are comparable to theirs (at 7.7% and 9.1%), with these small difference probably explained by the fact that, since our analysis stretches up 2008 (whereas they stop at 2003), our members of the panel are older on average. On the other hand, the share of married people and the fraction of households with cohabiting children under 16 in our study (at approximately 75% and 40%) are very close to those presented in Battu et al. (at around 75% and 46%). Finally,

the incidence of males in our study is substantially higher (66% vs. 44%), which is most likely explained by the fact that we focus on heads-of-household only.

Before moving on, we notice that the controls we present in Table 4 and use in the panel-analysis that follows are slightly different from those we tabulated in Table 2 and used in the cross-sectional analysis. This is dictated by the following reasons. First, in Table 2 we constructed background information from the BHPS in a way that would be consistent with the ECHP. On the other hand, in Table 4 we have broken down educational attainments into finer categories, but aggregated up information on marital status and substituted size of the household for number of children. The first change is due to the fact that we run some preliminary OLS regressions on the monthly dataset and we prefer to control for more detailed educational achievements, in particular since these have changed over time. On the other hand, education dummies will not be included in our panel analysis, since we focus on 18-65 year-old head-of-household who have left full time education and these do not vary within-individual. For similar reasons, we have aggregated information about marital status into a single dummy “Coupled: Yes/No” and decided to include a dummy for the presence of children under 16. These two variables display more within-person variation than the alternatives described in Table 2, and thus are more suitable for the panel analysis.

4. Panel results: the causal link between homeownership and entrepreneurship

4.1 Main findings

Our first set of results on the link between homeownership and entrepreneurship using the monthly-spell BHPS data is presented in Table 5. The four different panels present results for the different definition of entrepreneurs with: ‘Entrepreneur: All’ in Panel A; ‘Entrepreneur: Dependent’ in Panel B; ‘Entrepreneur: Manager’ in Panel C; and finally ‘Entrepreneur: excluding elementary/machinery’ in Panel D.

Columns (1) and (2) of the Table still present simple cross-sectional estimates (OLS) of Equation (1), where we include a detailed battery of individual and household characteristics to control for individual observable differences. In particular, in Column (1), we append year-of-interview, month-of-interview and region of residence dummies, whereas in Column (2) we further include the controls detailed in Table 4, as well as dummies for the sector of work (using the SIC92 classification at 1-digit level). The results we obtain are very similar to those presented in Table 5: we still find a positive, significant and sizeable association between homeownership and entrepreneurship. If anything, cross-sectional results are

stronger in the monthly dataset than using the ‘standard’ yearly BHPS, which could once more be explained by the way we have constructed the data (i.e. by focussing on slightly older people with a higher degree of labour market attachment).

However, as already mentioned, these findings cannot be taken as causal since cross-sectional results cannot control for individuals’ unobservables, i.e. α_i in Equation (1). In order to partial out these unobserved factors, we next go on to estimate fixed-effects models. These are presented in Columns (3) to (6) of Table 5. Estimates of the β -coefficients from models that exploit the panel component of our data allow us to pin down the causal effect of becoming a homeowner on the probability of becoming an entrepreneur.

Starting from Columns (3), we see that once we control for individual fixed-effects, becoming a homeowner is not significantly related to the probability of becoming a self-employed worker. However, becoming a homeowner significantly reduces the probability of becoming an entrepreneur with dependent worker or an entrepreneur in a managerial occupation. Similarly, there is a strong negative relation between becoming homeowner and starting an entrepreneurial job in a non-elementary occupation.

To assess the robustness of our findings to time-varying individual and household characteristics, in Column (4) we go on to add the control variables detailed in Table 4 (except for education and region dummies, as these do not substantially vary over time within individuals). Importantly, these control variables include both individual and household total income in the year prior to the survey. Conditional on individual fixed-effects, these capture changes in the financial situation of an individual and his/her household with respect to the previous year, and therefore act as strong proxies for individuals’ wealth. This is very important given the evidence on credit-constraints in the decision to become an entrepreneur (see among others Blanchflower and Oswald, 1998; Evans and Jovanovic, 1989; Holtz-Eakin et al. 1994a and 1994b; and Michelacci and Silva, 2007). Results in Column (4) fully confirm the intuition gathered from Column (3): there is no association between tenure status and the probability of self-employment, but there is a strong, negative and significant association between becoming a homeowner and becoming an entrepreneur. Once more, this negative relation is stronger when using definitions that we associate to more entrepreneurial spells, namely entrepreneurs with dependent workers and self-employed in managerial occupations. Moreover, our estimates represent a sizeable effect: given the mean probability of being an entrepreneur in these two categories, becoming a homeowner reduces the chances of starting-up an entrepreneurial activity by 15-30%.

In the remaining two columns of the table, we further test the robustness of our results against some important issues. First, in Column (5), we check that our results are not simply driven by short spells of employment and self-employment by excluding any job lasting less than six months. In particular, we are concerned that we might be misrepresenting some self-employment spells as ‘entrepreneurial’ even though they simply capture ‘stop-gap’ jobs. Note however that *a priori* we believe this issue should not be particularly important for those definitions of entrepreneurs that are more closely related to ‘job creation’ and ‘innovation’ (i.e. ‘Entrepreneur: dependent’ and ‘Entrepreneurs: manager’). The findings in Column (5) fully confirm our previous results: the negative association between homeownership and entrepreneurship now becomes negative even when we consider all self-employment spells. This result further supports our intuition that homeownership depresses the transition into entrepreneurial occupations, and this holds true even among all self-employed people when exclude the shorter spells. Put differently, our results are not driven by self-employment out of necessity. Note also that we tried alternative cut-offs, e.g. 3-months or one year, and we came to similar or even stronger conclusions.

Next, in Column (6), we split the baseline omitted category into ‘private renter’ and ‘public renter’. This is the approach taken by Battu et al. (2008), who are concerned with binding mobility constraints faced by public renters relative to private renters and homeowners. In our case, mobility is not a particularly worrying issue, although we will come back to this point in Table 7. However, we want to know whether our results are driven by the comparison of homeowners to private renters *only*, or to all renters’ categories. Importantly, it should be noted that ‘social housing’ in the UK did not always have a negative connotation, and was not always associated with poverty and disadvantage. As discussed in Weinhardt (2010) and Hills (2007), during the 1960s and 1970s, a move into social housing was considered as a ‘move up’ moving up from private renting, since most social houses had gardens and good amenities. Moreover, the public housing sector continued to expand till the early 1980s when it peaked at approximately 30% of the total English housing stock. It was only from the late 1980s that the importance of social housing started to decline as a result of the “right-to-buy” scheme introduced by Margaret Thatcher and public spending cuts on new construction. The “right-to-buy” policy also began to slowly alter the socio-economic composition of social tenants as it allowed those who could afford it switch into owner-occupation. As a result of these changes, in 2004 70% of social tenants belonged to the poorest two-fifth of the income distribution and hardly anyone to the richest fifth. This is in contrast to 1979, when 20% of the richest decile lived in social housing.

Given the time-window and the individuals considered in our analysis (i.e. head-of-households appearing in the first BHPS Wave in 1991), it is not clear whether we should expect public renters to be significantly more disadvantaged than private renters, and to behave in different ways in relation to entrepreneurial occupations. In fact, while some descriptive statistics show that private renters tend to be younger and more educated and have fewer children than public renters, the two groups have very similar individual and household income levels.

Our results are presented in Column (6) of Table 5, and broadly confirm our previous findings. For ‘Entrepreneur: manager’ and ‘Entrepreneur: excluding elementary/machinery’, we find no difference between private renters and public renters, and still a significant negative impact of becoming a homeowner. On the other hand, we find that public renters are significantly less likely than private renter to become entrepreneurs with dependent workers. However, homeowners are still the least likely group to become entrepreneurs, with a coefficient now as large as -0.022 (even though an F-test on the hypothesis that the two coefficients are the same marginally accepts the null with a p-value of 0.17). Before concluding, it should be noted that results where we break down public and private renters are based on very ‘thin’ comparisons, since these two groups together account for just around 15% of all the spells. In what follows, we will only report results where our omitted baseline category is all renters, but we will discuss some possible heterogeneity in relation to the private/public breakdown.

4.2 More results: homeowners with and without a mortgage

One issue we have brushed aside so far is whether homeownership depresses entrepreneurship across the board, or whether homeowners with and without a mortgage behave differently. As already discussed, approximately 66% of the observations in our data corresponds to homeownership with residential loans, whereas in only 16% of the cases individuals own their property outright. Moreover, we have not investigated whether homeownership has negative effect on entrepreneurship which is contemporaneous and everlasting, or whether this effect take some time to manifest itself or instead it dissipates over time. We address these issues in Tables 6.a and 6.b, where we present fixed-effects estimates that include the same controls as in Table 5, Column (4). Note that we have altered the order in which we present our results: Table 6.a focuses on entrepreneurs with dependent workers and entrepreneurs in managerial occupations, whereas Table 6.b tabulates results for

the two alternative definitions. This choice is dictated by the fact that we believe results obtained using ‘Entrepreneur: dependent’ and ‘Entrepreneur: manager’ capture more neatly the effect of homeownership on ‘really’ entrepreneurial jobs (as opposed to self-employed jobs out of necessity), and should therefore be given more prominence.

To begin with, in Column (1) of both Tables 6.a and 6.b, we include in the empirical model a count of the duration in months (in logs) since the individual became homeowner. In none of the panels, this variable displays a significant coefficient, even though the sign of the relation suggests that more time spent as homeowner increases the probability of becoming an entrepreneur. On the other hand, the simultaneous effect of homeownership on entrepreneurship remains negative and significant throughout. In fact, in all panels this effect is more precisely estimated and larger than in our baseline results in Table 5.

Next, in Column (2), we separate homeowners with a mortgage from homeowners without a loan. This set of findings presents some novel and interesting heterogeneity. Irrespective of the definition of entrepreneurs that we use, we find little evidence that homeowners without a loan are less entrepreneurial than renters. On the other hand, homeowners burdened by a mortgage are significantly less likely to become entrepreneurs. Once again, this is not driven by the fact that we bundle together public and private renters. Only when considering the specification where our dependent variable is ‘Entrepreneur: dependent’ (Panel A, Table 6.a), we found that public renters are significantly less likely to be entrepreneurs than private renters, with an estimated effect of -0.019 (s.e. 0.004). Still, the coefficient on homeowners with a mortgage was even larger at -0.024 (s.e. 0.003), and an F-test for the equality of the two effects rejected the null with a p-value of 0.067.

To further assess the robustness of this finding, in Column (3) we include once again the (log of the) duration in months since the individual became homeowner. This does not affect our results in any significant way. Next, in Column (4), we include the duration since becoming homeowner in interaction with whether the individual has a mortgage or owns the property outright. Once again, we find little evidence that duration matters and the inclusion of these additional controls does not affect our main finding. Note also that we have experimented with alternative measures of duration since time of purchase. For example, we tried including a linear count, as well as quadratic and cubic terms of the number of months since becoming homeowner. None of these variables turned out to be strongly significant and our main results remain unaffected.

In conclusion, the evidence gathered so far clearly shows that individuals who become homeowners with a mortgage are significantly less likely to become entrepreneurs. The estimated effect is not only significant, but also sizeable: leveraged homeownership (i.e. with a mortgage) reduces the probability of becoming an entrepreneur with dependent worker by more than 35-45%, and the probability of becoming a managerial entrepreneur by up to 20%. Moreover, these effects seem to be permanent and do not vanish with time. We believe these results can be rationalised by the presences of credit constraints in the entrepreneurial decision – as well as portfolio-distortions – which are more acute for homeowners with a mortgage. Indeed, these individuals will find it harder to obtain additional finance to start-up a business venture, since they are already burdened with one loan and cannot yet use the equity built into their home as collateral to finance their entrepreneurial activities. This intuition is consistent Blanchflower and Oswald (1998) Evans and Jovanovic (1989) Holtz-Eakin et al. (1994a) and (1994b); and Michelacci and Silva (2007). Moreover, these results are consistent with the idea that purchasing a house tends to concentrate an individual's wealth into one single asset class, and that this distorts the allocation of risk along an efficient frontier (in particular since it is impossible to perfectly edge housing-value risk in the absence of contracts that allow to 'short it'). Given that entrepreneurial ventures involve more risks than other dependent-worker occupations (see the seminal writings by Knight, 1921 and Schumpeter, 1911), over-exposed homeowners will shy away from starting-up a new company.

We think these findings are highly novel and extremely policy relevant. In particular, a large number of countries have set in place policies that favour homeownership, mostly by making it easier to finance home purchase with a loan. These include mortgage interest rate deductibility, but also – and more importantly – the creation of secondary mortgage markets and housing-finance giants Fannie Mae and Freddie Mac (see Frame and White, 2005). The evidence provided here – namely that access to homeownership using leverage significantly depresses entrepreneurial activities – carries profound implications for the role of housing policies in shaping economic performance, and provides some pessimistic insights about the long-lasting effects of the recent financial crisis which originated in over-leveraged housing markets.

4.3 Robustness checks: mobility, timing and sector of occupation

In this section, we assess the robustness of our results along a number of dimensions. Our results are presented in Table 7, where we focus on 'Entrepreneur: dependent' and

‘Entrepreneur: manager’. This choice is dictated by the idea that – as previously discussed – these variables capture more properly-defined entrepreneurial occupations. However, results using the two alternative definitions provided a consistent picture and are available upon request.

To begin with, in Column (1) we assess whether our results are dictated by residential mobility of workers upon/just before becoming homeowner. One concern is that individuals choosing to purchase a house might move out of urban areas, and that this might affect their chances of becoming entrepreneurs. Indeed, evidence shows both that more properties are rented as opposed to owner-occupied in riskier urban centres (Hilber, 2005), and that more entrepreneurs tend to cluster into denser cities because of agglomeration and localization economics (Glaeser and Kerr, 2009 and Glaeser, 2009). In order to by-pass these issues, in Column (1) we focus on individuals who live in the same Local Planning Authority (LPA) throughout the period under analysis. LPAs are the local authority or council empowered to exercise planning functions for a particular area in the UK, and there are approximately 350 LPAs over the national territory. When we do this, we find that our results are almost completely unaffected: the probability of becoming an entrepreneur is significantly lower for homeowners with a mortgage. The only remarkable difference is that the log of time since purchase has a positive and significant effect on the probability of becoming an entrepreneur with dependent worker. However, this effect is quite small, at 0.003 (s.e. 0.001), implying that the probability of being an ‘Entrepreneur: dependent’ would still be 1.8, 1.6, and 1.5 percentage points lower for homeowners with a mortgage after one, two and three years, respectively.

In the next two columns, we investigate whether *time-to* purchase affects the chances of becoming an entrepreneur. To measure this, we count for future homeowners the number of months still to pass before they actually purchase their property. We then include this term in logarithmic form to our specification, while controlling for the log of the duration since becoming homeowner (Column (2)) or the log of the duration since purchase in interaction with whether the owner has a mortgage or not (Column (3)). Once again, our results clearly show that becoming homeowner reduces the probability of starting-up a business. However, there is some heterogeneity in the effect of time-since and time-to purchase. Whereas none of the terms included in the regressions has an effect on the probability of becoming an ‘Entrepreneur: manager’, both terms enter significantly the regressions where the dependent variable is ‘Entrepreneur: dependent’. In particular, the effect of time-to-purchase is 0.004 (s.e. 0.001), whereas the effect of time-since purchase for homeowners with a mortgage *only*

is 0.003 (s.e. 0.001). On the other hand the effect of the duration in the property is not significant for homeowners without a loan. The results in Column (4) imply that for entrepreneurs with dependent workers the probability of starting-up a business venture is 1.5 percentage points lower on impact (i.e. approximately 30% evaluated at the sample mean), but this negative impact decreases to 0.75 and 0.55 percentage points one and two years *after* purchase, and to 0.7, 0.5 and 0.2 six months, one year and two years *before* purchase. While these results might suggest some small ‘anticipation effects’, the sharpness of this v-shaped pattern reinforces our causal interpretation of the contemporaneous negative link between homeownership and entrepreneurship.

To further assess this issue, in Columns (4) and (5) of Table 7 we append to our specifications some lags and lead in homeownership. In particular, in Column (4), we include variables capturing whether the individual was a homeowner (separately with/without mortgage) 12 and 24 months before the present moment. On the other hand, in Column (5) we control for leads that capture anticipation effects by considering whether the individuals will become homeowner 12 or 24 months after the current date. Although the coefficient on current homeownership are slightly attenuated in both Panel A and Panel B, they remain strongly significant and clearly negative, at around -0.012/-0.014 and -0.008/-0.009 for ‘Entrepreneur: dependent’ and ‘Entrepreneur: manager’, respectively. On the other hand, none of the leads and lags was strongly significant. Note that we also tried including leads and lags up to three year (36 months), with little effect on our results besides a small reduction in size and significance. For example, the negative effects of homeownership with a mortgage controlling for three-year lags or three-year leads were -0.011 (s.e. 0.004) and -0.012 (s.e. 0.004) for entrepreneurs with dependent workers. These same coefficients were instead -0.007 (s.e. 0.004) and -0.009 (s.e. 0.004) for entrepreneurs in managerial occupations. However, we prefer specifications that only consider a time-window of two years since every additional year of lead/lag implies a substantial loss of observations.

To conclude this section, we analyze whether our results only stem from a handful of sectors where individuals work, or whether they are economy-wide. Our evidence is presented in Table 8. To begin with, in Column (1), we use the SIC92 industrial classification at 1-digit level to exclude the following sectors: Agriculture; Fishing and Forestry; Electricity, Gas and Water; Public Administration; Private Households with Employees; and Workers of International Organizations/Bodies. This follows the work of Glaeser (2009) and Faggio and Silva (2011) who use self-employment data to match the spatial distribution of entrepreneurial activities in US cities and UK travel-to-work areas respectively. As shown

from the first column of the table, our results are even stronger when we exclude some sectors where some self-employment activities might not properly identify entrepreneurial ventures. This reinforces our intuition that homeownership reduces business start-ups, not self-employment out of necessity.

Furthermore, in the next two columns of Table 8, we go on to consider manufacturing only (Column (2)) and services only (Column (3)). Our estimates show that, with the sole exception of entrepreneurial managers in services, the conclusions we reached so far remain broadly valid. Moreover, although the effect of tenure choice on ‘Entrepreneur: manager’ is not significant at conventional level, it still implies that becoming a homeowner with a mortgage reduces the probability of becoming an entrepreneur in this category by 5%.

4.2 *Possible explanations: house price dynamics, time-till-end of mortgage and financial perceptions*

[VERY PRELIMINARY AND INCOMPLETE]

In Section 4.2, we rationalised our findings by suggesting that the presences of credit constraints in the entrepreneurial decision – as well as portfolio-distortions – makes it less likely that homeowners with a mortgage decide to start-up their own business venture. In this section, we investigate whether this intuition holds some water by presenting a set of regressions which exploit additional information contained in the BHPS or that we have matched to our data.

Our first (*and so far only*) set of results is presented in Table 9, where we investigate whether cumulative housing value changes since the time when individuals bought their property affect the chances of becoming an entrepreneur. In order to investigate this hypothesis, we match house price data at the Local Planning Authority on a yearly frequency to our monthly BHPS data. This information is obtained from the Land Registry, which collects information on the characteristics and sales prices of all houses sold in the UK at the level of the individual-transaction level. Using this data, we construct an index of real housing values deflating housing prices by the Retail Price Inflation (RPI), and adjusting for changes in houses ‘quality’ through a hedonic-type regression of house prices on house characteristics. We then go on to calculate the cumulative percentage change in housing values prevailing in the LPA of an individual’s residence between the time when he/she purchased the property and the present date.

Results in Column (1) show that consideration of this variable does not affect our main findings: homeowners with a mortgage are still significantly less likely to become

entrepreneurs, irrespective of the dynamics of house prices. Next, in Column (2), we investigate whether the effect of the cumulative changes in house values is different for homeowners with and without a mortgage. While our headline effect remains un-affected, we find that positive changes in house prices further reduce the chances that an individual becomes an entrepreneur with dependent worker if he/she owns the property outright, although this is not true for managerial entrepreneurs. This finding remains unaffected even when we focus on individuals who do not change residence in Column (3). More interestingly, in this case, we also find that house price appreciation since time-of-purchase *with a mortgage* positively affects the probability of becoming an entrepreneur, but only for those who hire some employees. Since these results control for time-since purchase, this finding seems to suggest that as more equity builds into an individual's home as a result of housing value appreciation, he/she is more likely to use it as collateral and become an entrepreneur. While this interpretation is reasonably intuitive, the opposite relation between entrepreneurship and house-price changes that we find for homeowners with and without a mortgage is difficult to rationalise. Nevertheless, our main finding that homeownership depresses entrepreneurship remains largely unaffected.

5. Concluding Remarks

In this paper, we have studied the previously unexplored link between homeownership and entrepreneurship. Our main interest in studying this relation rests on the notion that flourishing entrepreneurial activities can be associated to the creation of new businesses and an acceleration of innovation, both of which are conducive to higher economic growth. Previous analysis of the labour market effects of homeownership has only focussed on employment and unemployment opportunities, thus neglecting an important channel whereby housing policies might affect the country-wide economic performance.

In order to carry out our empirical investigation, we have used information from two data sources, namely the European Consumer Household Panel (ECHP) and the British Household Panel Survey (BHPS). The ECHP is a panel survey covering 15 EU countries for the period 1994-2001 which allows us to perform some preliminary cross-country comparisons of the association between homeownership and entrepreneurship, as well as some simple individual-level cross-sectional regressions. On the other hand, the BHPS focuses on British households, but has a long panel component and a particular structure that allows us to construct a monthly dataset that tracks individuals' job history and tenure choice. We have exploited this data to estimate regressions that include individual fixed-effects and

identify the causal relation between homeownership and entrepreneurship. The use of panel techniques on monthly data to investigate the determinants of entrepreneurship is an improvement over the previous literature, and in our context this is crucial to isolate the precise timing of individuals' transitions into homeownership and entrepreneurial jobs.

Our cross-country and cross-sectional analysis reveals a significant and positive correlation between homeownership and various measures of self-employment and entrepreneurship. Importantly, both the aggregate and the individual correlations are robust to restricting the definition of self-employed to people with more entrepreneurial characteristics, such as self-employed that employ some dependent workers or those that perform professional and managerial tasks. Stated differently, homeownership seems to be positively associated with 'entrepreneurship'.

However, this type of analysis could be severely biased by individual unobservables which make them more likely to be homeowners and entrepreneurs, with no causal link between the two variables. In fact, our panel regression analysis shows that, once we include individual fixed-effects to partial out unobserved time-fixed characteristics, becoming a homeowner significantly *reduces* the probability of becoming an entrepreneur. We also find that this effect is much stronger for homeowners with a mortgage, and remains unaffected if we look at people who stay in the same residence throughout the period of our analysis. Importantly, our results are also stronger if we focus on self-employed with dependent workers and self-employed in managerial and professional occupations. Once again, this suggests that our evidence predominantly capture a negative causal association between homeownership and 'entrepreneurship', and not 'self-employment out-of-necessity'. Furthermore, we carefully study the timing of the relation between homeownership and entrepreneurship, and the presence of any sector-specific heterogeneity in our results.

All in all, our results convincingly show that homeownership and entrepreneurship are *negatively* causally associated, and we speculate that our findings can be rationalised by the presences of credit constraints in the entrepreneurial decision – as well as portfolio-distortions – which are more acute for homeowners given the large amounts of equity they invest in purchasing a property. We believe these results are highly novel and carry profound implications for the role of housing markets and policies in shaping labour market outcomes and economic performance, in particular in light of the on-going debate about the effects of the recent financial crisis which originated in housing markets.

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[TO BE COMPLETED]

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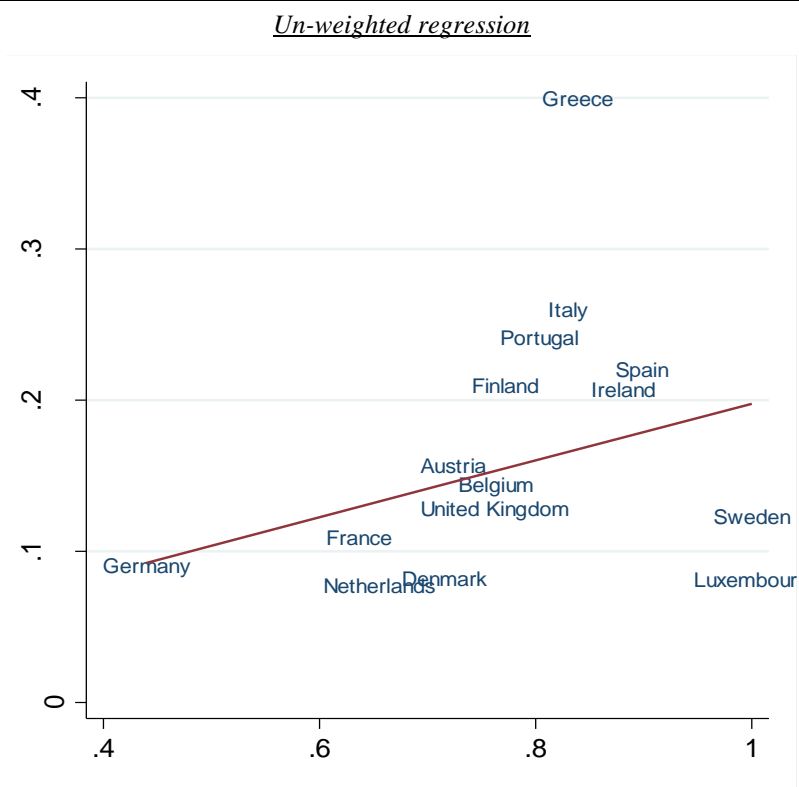
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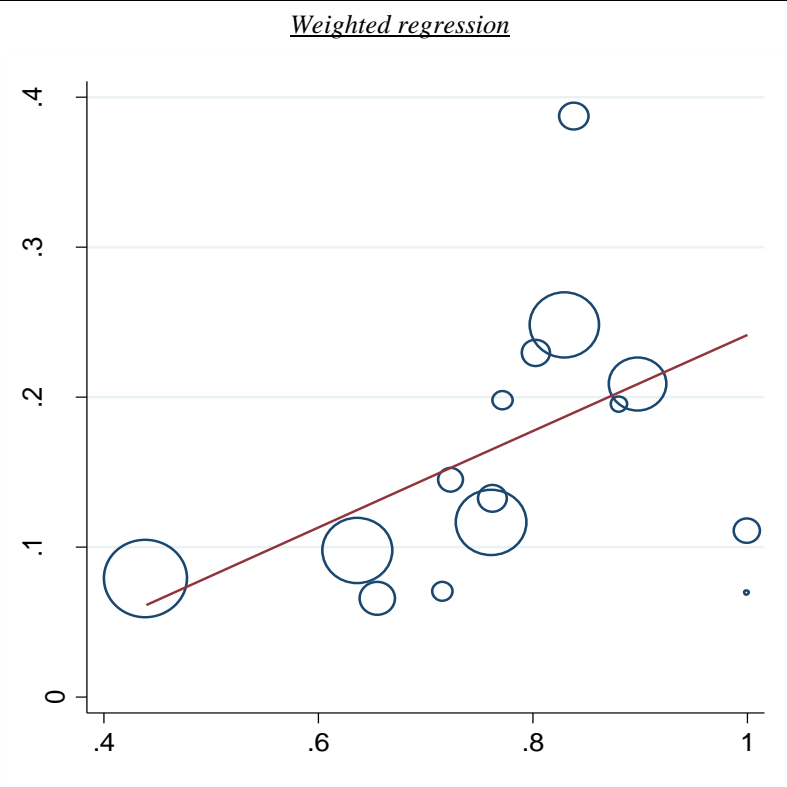
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Figure 1: Cross-country regressions; European Community Household Panel (ECHP) unrestricted dataset



$$\text{Entrepreneur} = .010 + .188 \text{ homeowner}$$

(.100) (.144)



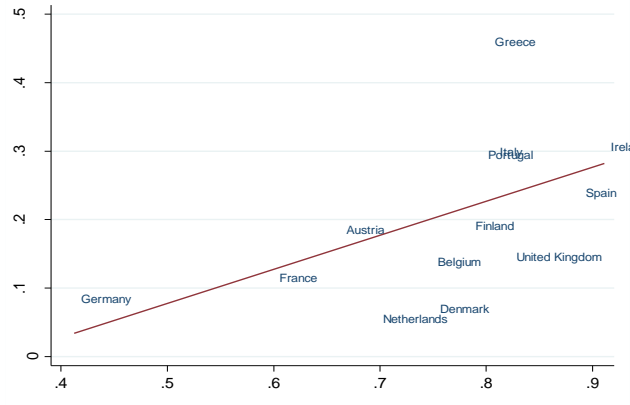
$$\text{Entrepreneur} = -.080 + .321 \text{ homeowner}$$

(.051) (.083)

Note: country's average rate of entrepreneurial activity (all self-employment) on the vertical axis and average rate of homeownership on the horizontal axis.

Figure 2.a: Un-weighted cross-country regressions and various definition of entrepreneurs; ECHP dataset, heads of household and 18-65 year old only

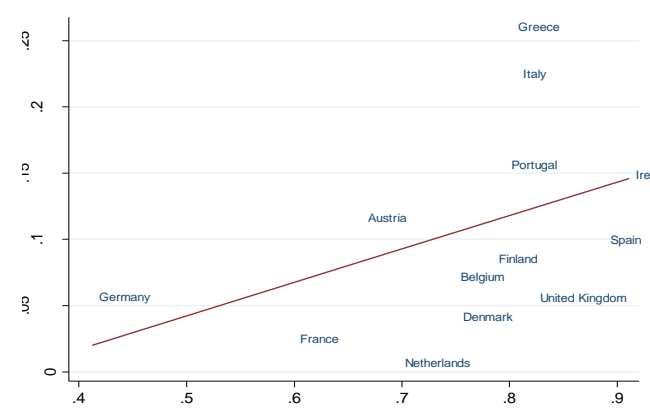
All Entrepreneurs



$$\text{Entrepreneur} = -.171 + .497 \text{ homeowner}$$

(.092) (.133)

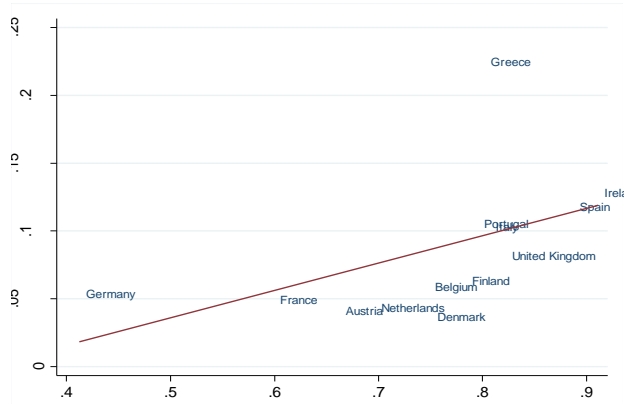
Entrepreneurs with dependent employees



$$\text{Entrepreneur} = -.084 + .252 \text{ homeowner}$$

(.073) (.103)

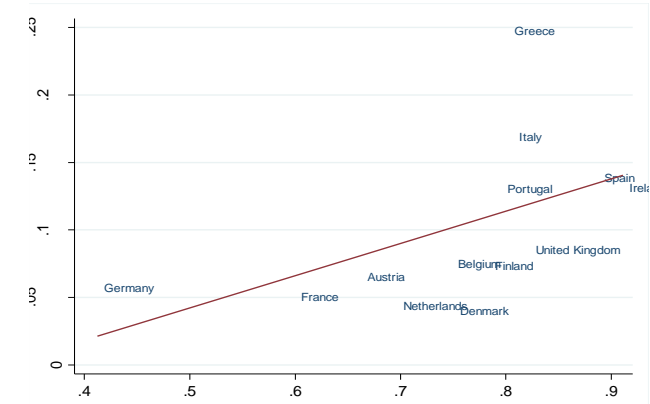
Entrepreneurs, managerial and professional jobs



$$\text{Entrepreneur} = -.065 + .202 \text{ homeowner}$$

(.055) (.076)

Entrepreneurs, excl. elementary and 'machinery' occupations



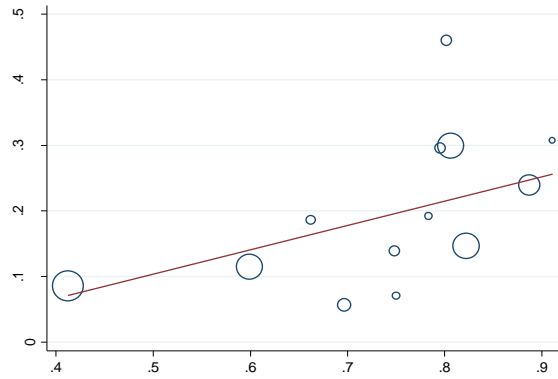
$$\text{Entrepreneur} = -.078 + .239 \text{ homeowner}$$

(.058) (.081)

Note: country's average rate of entrepreneurial activity on the vertical axis and average rate of homeownership on the horizontal axis.

Figure 3: Weighted cross-country regressions and various definition of entrepreneurs ECHP dataset, heads of household and 18-65 year old only

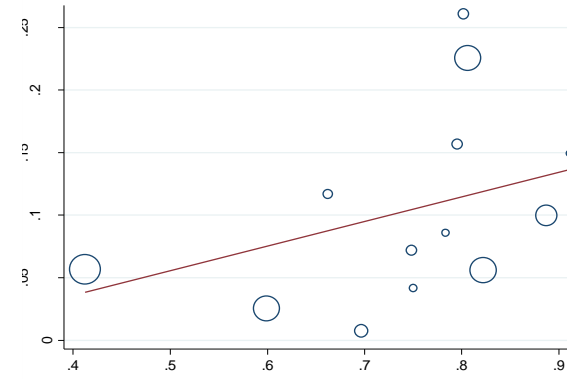
All Entrepreneurs



$$\text{Entrepreneur} = -.082 + .372 \text{ homeowner}$$

(.051) (.098)

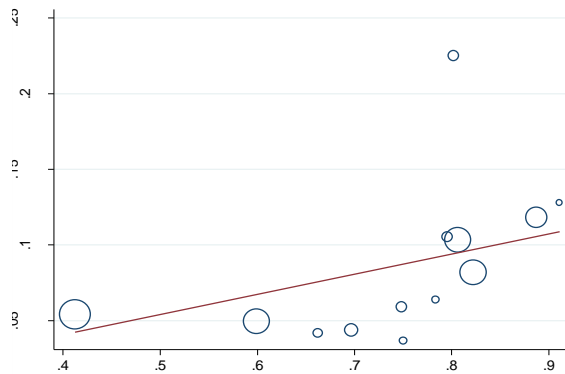
Entrepreneurs with dependent employees



$$\text{Entrepreneur} = -.043 + .197 \text{ homeowner}$$

(.062) (.110)

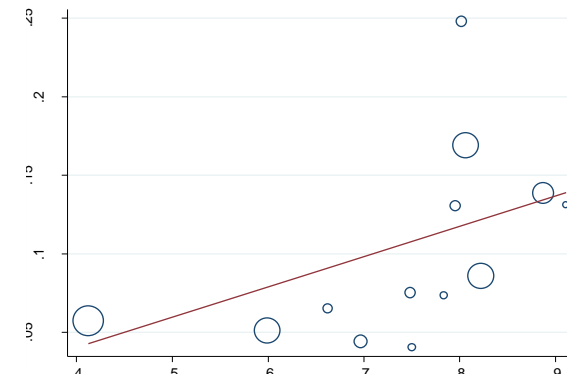
Entrepreneurs, managerial and professional jobs



$$\text{Entrepreneur} = -.013 + .133 \text{ homeowner}$$

(.026) (.037)

Entrepreneurs, excl. elementary and 'machinery' occupations



$$\text{Entrepreneur} = -.037 + .193 \text{ homeowner}$$

(.037) (.061)

Note: country's average rate of entrepreneurial activity on the vertical axis and average rate of homeownership on the horizontal axis.

Table 1: Summary statistics – ECHP Individual level dataset
Yearly Data on heads of household and 18-65 year old only

Variable	Mean	Std. Dev.
<i>Panel A: Entrepreneurs + Homeowners</i>		
Entrepreneurs: All	.20	.40
Entrepreneurs: Dependent	.10	.30
Entrepreneurs: Managers	.08	.28
Entrepreneurs, excl. elementary/machinery	.10	.30
Home owner	.74	.44
<i>Panel B: Controls</i>		
Household size	3.21	1.41
Age	42.4	10.2
Male	.81	.39
Household total income (previous year)	26,981	20,953
Individual total income (previous year)	18,413	17,365
Married	.72	.45
Separated	.02	.13
Divorced	.06	.24
Widowed	.02	.14
Never married	.18	.39
Education: 3rd level	.25	.43
Education: 2nd level	.34	.47
Education: <2nd level	.41	.49
Year of move to residence (if year \geq 1980)	1987.7	7.0
Year move to residence <1980 (dummy)	.27	.44

Note: The sample only includes heads of household aged between 18 and 65. Summary statistics of control variables refer to the sample where all controls are non-missing. Incomes are expressed in PPP Euros. Number of observations: 215,130.

Table 2: Summary statistics – BHPS Individual level dataset
Yearly data on heads of household and 18-65 year old only

Variable	Mean	Std. Dev.
<i>Panel A: Entrepreneurs + Homeowners</i>		
Entrepreneurs: All	.14	.34
Entrepreneurs: Dependent	.05	.22
Entrepreneurs: Managers	.06	.25
Entrepreneurs, excl. elementary/machinery	.07	.25
Home owner	.80	.40
<i>Panel B: Controls</i>		
Household size	2.76	1.29
Age	40.6	10.9
Male	.69	.46
Household total income (previous year)	32,122	22,525
Individual total income (previous year)	20,244	17,486
Married	.58	.49
Separated	.03	.18
Divorced	.12	.32
Widowed	.01	.12
Never married	.26	.44
Education: 3rd level	.28	.45
Education: 2nd level	.53	.50
Education: <2nd level	.19	.39

Note: The sample only includes heads of household aged between 18 and 65. Summary statistics of control variables refer to the sample where all controls are non-missing. Number of observations: 51,417.

Table 3: OLS regressions – ECHP and BHPS Individual level dataset – Yearly data on heads of household and 18-65 year old only

Dependent var.:	<i>Entrepreneur: all</i>		<i>Entrepreneur: dependent</i>		<i>Entrepreneur: Manager</i>		<i>Entrepreneur: excl. elementary/machinery</i>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Panel A: ECHP dataset</i>								
Own	0.128 (0.020)***	0.053 (0.012)***	0.071 (0.013)***	0.029 (0.008)***	0.042 (0.005)***	0.008 (0.003)**	0.049 (0.007)***	0.011 (0.005)**
R-squared	0.020	0.127	0.011	0.090	0.005	0.053	0.005	0.055
<i>Panel B: BHPS dataset (yearly)</i>								
Own	0.037 (0.003)***	0.025 (0.004)**	0.029 (0.002)***	0.011 (0.002)***	0.022 (0.003)***	0.005 (0.003)*	0.023 (0.003)***	0.008 (0.003)***
R-squared	0.002	0.054	0.003	0.032	0.001	0.042	0.003	0.039
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Year*Country/Region Dummies	No	Yes	No	Yes	No	Yes	No	Yes

Note: The sample only includes heads of household aged between 18 and 65. Robust standard errors in parentheses, clustered by country in Panel A and clustered by region in Panel B; *** p<0.01, ** p<0.05, * p<0.1. Controls as listed in Table 1. Income and household income are both included in logarithmic form. Year*Country Dummies included in Columns (2), (4), (6) and (8) of Panel A; Year*Region Dummies included in Columns (2), (4), (6) and (8) of Panel B (18 regions as reported in BHPS). ‘Entrepreneur: all’ include all entrepreneurs (self-employed); ‘Entrepreneur: dependent’ includes entrepreneurs with dependent employees; ‘Entrepreneur: manager’ includes entrepreneur in managerial and professional jobs; ‘Entrepreneur: excluding elementary/machinery’ excludes entrepreneurs working in elementary occupations or operating plants, machinery or processes. Number of observations as detailed in Tables 1 and 2.

**Table 4: Summary statistics – BHPS Individual level dataset –
Monthly dataset on heads of household and 18-65 year old only**

Variable	Mean	Std. Dev.
<i>Panel A: Entrepreneurs + Homeowners</i>		
Entrepreneurs: All	0.151	0.358
Entrepreneurs: Dependent	0.048	0.213
Entrepreneurs: Managers	0.079	0.269
Entrepreneurs, excl. elementary/machinery	0.084	0.277
Home owner	0.820	0.384
Home owner, with mortgage	0.660	0.474
Homeowners, outright (no mortgage)	0.160	0.367
Private renter	0.061	0.240
Public renter	0.094	0.292
<i>Panel B: Controls</i>		
Age	43.42	11.10
Age squared	2008.5	1005.2
Male	0.657	0.478
Household total income (previous year)	49,655.3	36,852.5
Individual total income (previous year)	30,154.4	26,727.1
Children under 16 (yes=1, no=0)	0.394	0.489
Coupled (yes=1, no=0)	0.748	0.434
Education: Higher Degree	0.036	0.186
Education: First Degree	0.138	0.345
Education: Higher Non Degree/Teaching Qual.	0.075	0.264
Education: A Level (or equiv.)	0.209	0.407
Education: O Level (or equiv.)	0.264	0.441
Education: CSE (or equiv.)	0.058	0.234
Education: None of these	0.219	0.414

Note: The sample only includes heads of household aged between 18 and 65. Summary statistics of control variables refer to the sample where all controls are non-missing. Number of observations: 419392 Number of individuals: 4295. Panel is unbalanced.

**Table 5: OLS and Fixed effects regressions – BHPS Individual level dataset
Monthly dataset on heads of household and 18-65 year old only**

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent var.:	OLS	OLS	FE	FE	FE No short spells	FE Pub./Priv. Renter
<i>Panel A: entrepreneur: all</i>						
Homeowner	0.037 (0.005)***	0.048 (0.005)***	-0.001 (0.004)	-0.006 (0.004)	-0.007 (0.004)*	-0.006 (0.005)
Public renter						0.000 (0.007)
<i>Panel B: entrepreneur: dependent</i>						
Homeowner	0.020 (0.002)***	0.019 (0.002)***	-0.010 (0.003)***	-0.017 (0.003)***	-0.017 (0.003)***	-0.022 (0.003)***
Public renter						-0.018 (0.004)***
<i>Panel C: entrepreneur: manager</i>						
Homeowner	0.023 (0.004)***	0.026 (0.004)***	-0.008 (0.003)**	-0.010 (0.003)***	-0.011 (0.003)***	-0.009 (0.004)**
Public renter						0.002 (0.005)
<i>Panel D: 'Entrepreneur: excluding elementary/machinery</i>						
Homeowner	0.026 (0.004)***	0.033 (0.004)***	-0.008 (0.003)**	-0.009 (0.003)***	-0.010 (0.003)***	-0.008 (0.004)**
Public renter						0.004 (0.005)
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Month dummies	Yes	Yes	Yes	Yes	Yes	Yes
Region dummies	Yes	Yes	No	No	No	No
SI92 1-digit dummies	No	Yes	No	Yes	Yes	Yes
Controls	No	Yes	No	Yes	Yes	Yes

Note: Regressions run on the monthly dataset. The sample only includes heads of household aged between 18 and 65. Number of observations: 419392 Number of individuals: 4295. Panel is unbalanced. Year dummies refer to the year when the BHPS interview was carried out. Month dummies refer to calendar months during which the employment spell under analysis took place. Region dummies refer to the region of residence (18 regions as reported in BHPS). Region dummies not include in fixed-effects models because too few people change region of residence over the period of the sample. Standard errors clustered at the year-by-region level. *** p<0.01, ** p<0.05, * p<0.1. Controls as listed in Table 4. 'Entrepreneur: all' include all entrepreneurs (self-employed); 'Entrepreneur: dependent' includes entrepreneurs with dependent employees; 'Entrepreneur: manager' includes entrepreneur in managerial and professional jobs; 'Entrepreneur: excluding elementary/machinery' excludes entrepreneurs working in elementary occupations or operating plants, machinery or processes. Column (5) excludes all employment and self-employment spells lasting less than 6 months. Number of observations: 418121. Number of individuals: 4227.

**Table 6 – Part a: Fixed effects regressions on main definition of entrepreneurs
Owners with and without mortgage and duration in tenure**

	(1)	(2)	(3)	(4)
Dependent var.:	FE	FE	FE	FE
<i>Panel A: entrepreneur: dependent</i>				
Homeowner	-0.022 (0.004)***			
Homeown., mortgage		-0.018 (0.003)***	-0.022 (0.005)***	-0.024 (0.004)***
Homeown., outright		-0.002 (0.004)	-0.007 (0.006)	0.006 (0.010)
Log of duration	0.002 (0.001)		0.001 (0.001)	
Log of duration × Homeown., mortgage				0.002 (0.001)
Log of duration × Homeown., outright				-0.001 (0.002)
<i>Panel B: entrepreneur: manager</i>				
Homeowner	-0.012 (0.005)**			
Homeown., mortgage		-0.010 (0.003)***	-0.012 (0.005)**	-0.014 (0.005)***
Homeown., outright		-0.004 (0.005)	-0.006 (0.006)	0.005 (0.012)
Log of duration	0.001 (0.001)		0.001 (0.001)	
Log of duration × Homeown., mortgage				0.001 (0.001)
Log of duration × Homeown., outright				-0.002 (0.003)

Note: Regressions run on the monthly dataset. The sample only includes heads of household aged between 18 and 65. Number of observations: 419392 Number of individuals: 4295. Panel is unbalanced. All regressions include Year dummies; Monthly Dummies; SIC92 1-digit sector dummies; and individual controls. Year dummies refer to the year when the BHPS interview was carried out. Month dummies refer to calendar months during which the employment spell under analysis took place. Region dummies not include in fixed-effects models because too few people change region of residence over the period of the sample. Standard errors clustered at the year-by-region level. *** p<0.01, ** p<0.05, * p<0.1. Controls as listed in Table 4. Definition of 'Entrepreneur' as in Table 5. Log of duration refers to the number of months since becoming homeowner. Duration des. stats.: mean: 69.61; std. dev.: 63.18.

**Table 6 – Part b: Fixed effects regressions on other definition of entrepreneurs
Owners with and without mortgage and duration in tenure**

	(1)	(2)	(3)	(4)
Dependent var.:	FE	FE	FE	FE
<i>Panel A: entrepreneur: all</i>				
Homeowner	-0.0133 (0.006)**			
Homeown., mortgage		-0.007 (0.004)	-0.013 (0.006)**	-0.012 (0.006)*
Homeown., outright		0.004 (0.006)	-0.002 (0.008)	-0.011 (0.013)
Log of duration	0.002 (0.002)		0.002 (0.002)	
Log of duration × Homeown., mortgage				0.002 (0.002)
Log of duration × Homeown., outright				0.004 (0.003)
<i>Panel B: 'Entrepreneur: excluding elementary/machinery</i>				
Homeowner	-0.013 (0.005)***			
Homeown., mortgage		-0.010 (0.003)***	-0.013 (0.005)***	-0.014 (0.005)***
Homeown., outright		-0.003 (0.005)	-0.007 (0.006)	-0.001 (0.011)
Log of duration	0.001 (0.001)		0.001 (0.001)	
Log of duration × Homeown., mortgage				0.001 (0.001)
Log of duration × Homeown., outright				-0.000 (0.002)

Note: Regressions run on the monthly dataset. The sample only includes heads of household aged between 18 and 65. Number of observations: 419392 Number of individuals: 4295. Panel is unbalanced. All regressions include Year dummies; Monthly Dummies; SIC92 1-digit sector dummies; and individual controls. Year dummies refer to the year when the BHPS interview was carried out. Month dummies refer to calendar months during which the employment spell under analysis took place. Region dummies not include in fixed-effects models because too few people change region of residence over the period of the sample. Standard errors clustered at the year-by-region level. *** p<0.01, ** p<0.05, * p<0.1. Controls as listed in Table 4. Definition of 'Entrepreneur' as in Table 5. Log of duration refers to the number of months since becoming homeowner. Duration des. stats.: mean: 69.61; std. dev.: 63.18.

**Table 7: Fixed effects regressions on main definition of entrepreneurs
Owners with and without mortgage, robustness checks on mobility and timing**

	(1)	(2)	(3)	(4)	(5)
Dependent var.:	FE Immobile workers	FE Time to purchase I	FE Time to purchase II	FE Including Lags	FE Including Leads
<i>Panel A: entrepreneur: dependent</i>					
Homeown., mortgage	-0.026 (0.005)***	-0.013 (0.005)**	-0.015 (0.005)***	-0.012 (0.003)***	-0.014 (0.003)***
Homeown., outright	-0.007 (0.006)	0.003 (0.006)	0.015 (0.010)	-0.001 (0.005)	-0.006 (0.005)
Log of duration	0.003 (0.001)**	0.003 (0.001)**			
Log of time till home-purchase		0.004 (0.001)***	0.004 (0.001)***		
Log of duration × Homeown., mortgage			0.003 (0.001)**		
Log of duration × Homeown., outright			-0.000 (0.002)		
<i>Panel B: entrepreneur: manager</i>					
Homeown., mortgage	-0.013 (0.005)***	-0.013 (0.005)**	-0.015 (0.006)***	-0.008 (0.004)**	-0.009 (0.004)**
Homeown., outright	-0.008 (0.006)	-0.007 (0.007)	0.004 (0.012)	-0.003 (0.006)	-0.008 (0.005)
Log of duration	0.001 (0.001)	0.000 (0.002)			
Log of time till home-purchase		-0.001 (0.001)	-0.000 (0.002)		
Log of duration × Homeown., mortgage			0.001 (0.002)		
Log of duration × Homeown., outright			-0.002 (0.003)		

Note: Regressions run on the monthly dataset. The sample only includes heads of household aged between 18 and 65. Number of observations: 419392 Number of individuals: 4295. Panel is unbalanced. All regressions include Year dummies; Monthly Dummies; SIC92 1-digit sector dummies; and individual controls. Year dummies refer to the year when the BHPS interview was carried out. Month dummies refer to calendar months during which the employment spell under analysis took place. Region dummies not include in fixed-effects models because too few people change region of residence over the period of the sample. Standard errors clustered at the year-by-region level. *** p<0.01, ** p<0.05, * p<0.1. Controls as listed in Table 4. Definition of 'Entrepreneur' as in Table 5. Log of duration refers to the number of months since becoming homeowner. Duration des. stats.: mean: 69.61; std. dev.: 63.18. Time till home-purchase refers to number of months till becoming homeowner. Time-to-purchase des. stats.: mean: 11.38; std. dev.: 33.55. Immobile workers account for approximately 71% of the observations. Lags indicate homeownership status 12 and 24 months ago. Lags included separately for owners with and without mortgage. Number of observations drops to 357977 (3810 individuals). Leads indicate homeownership status in 12 and 24 months. Leads included separately for owners with and without mortgage. Number of observations drops to 349519 (3439 individuals). None of the lags and leads was significant at the 10% level or better.

**Table 8: Fixed effects regressions on main definition of entrepreneurs
Owners with and without mortgage, robustness to sectoral breakdown**

Dependent var.:	(1) FE Excluding selected sectors	(2) FE Manufacturing only	(3) FE Services only
<i>Panel A: entrepreneur: dependent</i>			
Homeown., mortgage	-0.024 (0.005)***	-0.010 (0.005)**	-0.014 (0.006)**
Homeown., outright	0.008 (0.012)	0.013 (0.013)	0.024 (0.014)
<i>Panel B: entrepreneur: manager</i>			
Homeown., mortgage	-0.014 (0.005)***	-0.022 (0.007)***	-0.005 (0.007)
Homeown., outright	-0.001 (0.013)	-0.005 (0.015)	0.029 (0.018)

Note: Regressions run on the monthly dataset. The sample only includes heads of household aged between 18 and 65. Number of observations: 419392 Number of individuals: 4295. Panel is unbalanced. All regressions include interaction of log duration with homownership with and without mortgage separately (i.e. Log of duration \times Homeown., mortgage and Log of duration \times Homeown., outright). All regressions further include Year dummies; Monthly Dummies; SIC92 1-digit sector dummies; and individual controls. Year dummies refer to the year when the BHPS interview was carried out. Month dummies refer to calendar months during which the employment spell under analysis took place. Region dummies not include in fixed-effects models because too few people change region of residence over the period of the sample. Standard errors clustered at the year-by-region level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Controls as listed in Table 4. Definition of 'Entrepreneur' as in Table 5. Regressions in Colum (1) exclude the following sectors: Agriculture; Fishing and Forestry; Mining; Electricity, Gas and Water; Public Administration; Household with Employees; and International Organizations. Number of observations: 367370 (4029 individuals). Regressions in Column (2) only consider people employed in manufacturing. Number of observations: 87997 (1423 individuals). Regressions in Column (3) only consider people employed in services. Number of observations: 251964 (3190 individuals).

**Table 9: Fixed effects regressions on main definition of entrepreneurs
Owners with and without mortgage, house price dynamics and entrepreneurship**

Dependent var.:	(1)	(2)	(3)
	FE All individuals	FE All individuals	FE Immobile individuals
<i>Panel A: entrepreneur: dependent</i>			
Homeown., mortgage	-0.026 (0.005)***	-0.024 (0.004)***	-0.028 (0.006)***
Homeown., outright	0.001 (0.011)	-0.007 (0.010)	0.011 (0.011)
Cumulative gain	0.002 (0.003)		
Cumulative gain × Homeown., mortgage		0.006 (0.004)	0.017 (0.005)***
Cumulative gain × Homeown., outright		-0.013 (0.006)**	-0.016 (0.007)**
<i>Panel B: entrepreneur: manager</i>			
Homeown., mortgage	-0.017 (0.005)***	-0.019 (0.005)***	-0.019 (0.006)***
Homeown., outright	-0.000 (0.012)	0.005 (0.012)	0.027 (0.015)*
Cumulative gain	-0.002 (0.005)		
Cumulative gain × Homeown., mortgage		-0.004 (0.005)	0.005 (0.006)
Cumulative gain × Homeown., outright		0.007 (0.007)	0.012 (0.008)

Note: Regressions run on the monthly dataset. The sample only includes heads of household aged between 18 and 65. Number of observations: 419392 Number of individuals: 4295. Panel is unbalanced. All regressions include interaction of log duration with homeownership with and without mortgage separately (i.e. Log of duration × Homeown., mortgage and Log of duration × Homeown., outright). All regressions further include Year dummies; Monthly Dummies; SIC92 1-digit sector dummies; and individual controls. Year dummies refer to the year when the BHPS interview was carried out. Month dummies refer to calendar months during which the employment spell under analysis took place. Region dummies not include in fixed-effects models because too few people change region of residence over the period of the sample. Standard errors clustered at the year-by-region level. *** p<0.01, ** p<0.05, * p<0.1. Controls as listed in Table 4. Definition of ‘Entrepreneur’ as in Table 5. Cumulative gain refers to the cumulative house price percentage change from time of purchase up to that period for homeowners. Housing price series obtained from the Land Registry data and available on a yearly basis at the level of the Local Planning Authority of residence. The index of house prices used in the analysis is expressed in real values and adjusts for changes in characteristics of the housing stock. Cumulative gain des. stats.: mean: 0.180; std. dev.: 0.438.