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Externalities of home-ownership on entrepreneurship: Empirical evidence

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Purpose - This study examines the externalities from regional home-ownership to individual-level entrepreneurship.

Design/methodology/approach - The article links individual-level data from the Finnish Income Distribution Statistics for years 1990–1992 to regional home-ownership proportions. Probit models of entrepreneurship with regional home-ownership and appropriate control variables as regressors are estimated. A rental housing market deregulation experiment which caused exogenous variation in regions' home-ownership is exploited to identify the causal effects on entrepreneurship.

Findings Results show that higher home-ownership in a region leads to greater entrepreneurship. Further analyses together with the fact that home-ownership tends to have detrimental labour market effects suggest that home-ownership encourages entrepreneurship by leading to less paid work opportunities. These results are in line with those of earlier literature that self-employment and entrepreneurship, especially during bad economic times, are partly motivated by bad employment opportunities.

Originality/value This study presents novel results on the externalities that home-ownership has on entrepreneurship. These externalities are shown to be important enough that they need to be considered when assessing the economic effects of various policies that affect the prevalence of owner-occupied housing. The instrumental variables estimates are the first causal estimates in the literature and the bias result from assuming exogeneity is shown to be nonnegligible.

Keywords Home-ownership, Entrepreneurship, Self-employment, Instrumental variables (IV) estimation, Externalities, Housing system reforms

Paper type Research paper

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1 Introduction

Home-ownership is associated with greater self-employment and entrepreneurship.^[1] This positive relationship has been found at the individual and regional levels. The most common explanation for the positive relationship between home-ownership and entrepreneurship is that home equity serves as a collateral and, therefore, facilitates owners' business activities. Indeed, the results from some studies point to the role of financing possibilities to home-owners created by the amount of home equity and house price increases.

Although home equity may be behind both the individual and regional relationship, another regional-level transmission mechanism is suggested by the empirical results on the labour market effects of home-ownership. Namely, starting from the contribution by Oswald (1996), higher regional home-ownership has been shown to be associated with, and actually cause, worse labour market conditions. Recently, it has been argued that home-owners themselves are not necessarily the most important group the labour market possibilities of which are worsened by the higher regional home-ownership. Instead, the effects of home-ownership may work through externalities on the regional labour market. Such adverse externalities may affect entrepreneurship as well as unemployment. The sign of this effect is of interest because earlier studies have produced mixed results on how labour market conditions

interact with entrepreneurship. The recent study of Svaleryd (2015) includes a review of results on the literature and a discussion of how the push effect of adverse labour market conditions encourages necessity entrepreneurship and how, in turn, the pull effect discourages opportunity entrepreneurship. The sign of the net effect of local labour market conditions, of course, depends on which of the two effects dominates. The effect of regional home-ownership on entrepreneurship through the labour market externalities likewise depends on the magnitude of the two effects that the externalities create.

This study examines the effects of home-ownership on self-employment and entrepreneurship. The focus is on the externalities of home-ownership, or the effects on others than the home-owners themselves. Finnish rental market deregulation reform in the early 1990s created exogenous variation in home-ownership rates between regions so that region-level externalities can be reliably estimated. As a by-product, estimates of the direct effects of personal home-ownership on home-owners themselves are produced. Moreover, the individual-level data used include information indicating whether the individuals have mortgage loans. Estimates on the relationship between a mortgage and entrepreneurship are also produced.

The results are in line with what is expected based on hypotheses and earlier empirical results. In a nutshell, home-owners are more likely to experience periods of

self-employment and entrepreneurship, on top of which others' home-ownership further increases self-employment and entrepreneurship. However, having a mortgage is associated with less entrepreneurship. Because both the individual-level effect and the externality are positive, earlier studies have unsurprisingly found a positive relationship between home-ownership and self-employment and entrepreneurship regardless of whether the analysis is conducted at the regional or individual level. The externalities can be argued to be caused by the negative labour market effects of regional home-ownership; as a result, given scarce paid work opportunities, people rely on self-employment and entrepreneurship. This argument is corroborated by the results from additional analyses showing that regional home-ownership increases the probability of experiencing entrepreneurship associated with relatively low income levels. However, it should be noted the home-ownership-induced entrepreneurship may yield higher returns in longer run and when compared to the generally relatively low incomes of entrepreneurs.

The rest of the paper is organised as follows. Section 2 presents the relevant background literature and theoretical ideas. The data are introduced and the empirical strategy is explained in the third section. The main results and the results on which types of entrepreneurship are affected are presented in Section 4. Further, Section 4 assesses the robustness of the results. Finally, Section 5 concludes.

2 Background and literature

Most individual-level studies regressing entrepreneurship on a set of personal characteristics that include a home-ownership variable report a positive association between home-ownership and entrepreneurship. Examples of such analyses include those of Bernhard (1994) for Canada, Johansson (2000a) and Tervo (2006) for Finland, Brown *et al.* (2006) for the UK, Skriabikova *et al.* (2014) for Ukraine and East Germany and Fairlie (2013) and Harding and Rosenthal (2017) for the US. Regional-level association has been studied and found to be positive by, for example, Fotopoulos (2014) for the UK and Lisi (2017) for Italy. Blanchflower and Oswald (2013), in turn, report that less business formation occurs in US states with higher home-ownership rates.

The positive association has been argued to be due to the fact that home-owners are able to use their homes as collateral to get funds for business activities. Indeed, Fairlie (2013) shows that, in the US, home values are positively associated with entrepreneurship. Harding and Rosenthal (2017) look at the effects of housing capital gains on self-employment and find them to be positive. Having a mortgage loan probably decreases the possibilities to use a home as a collateral. Bracke *et al.* examine the effect of mortgage debt on entrepreneurship and find that the effect is negative. It is to be noted, however, that there are reverse-causality reasons for why the statistical association between mortgage debt and entrepreneurship is neg-

ative. First, entrepreneurs, like the rich, tend to save more and accrue more wealth than others, one reason being that they often need to self-finance their businesses (Carroll, 2000; Carroll, 2002; Quadrini 1999; Quadrini, 2000). Second, and relatedly, entrepreneurs may find it hard to obtain credit due to their volatile incomes. For these reasons, entrepreneurs are less likely than others to have mortgage loans.^[2]

The literature on the labour market effects of home-ownership starting from Oswald's (1996) contribution offers another potential explanation for the relationship between home-ownership and entrepreneurship. It has been found that unemployment is higher in the regions with higher home-ownership. The most recent papers on such effects are those by Blanchflower and Oswald (2013) for the US, Isebaert *et al.* (2015) for Belgium, Wolf and Caruana-Galizia (2015) for Germany and Laamanen (2017) for Finland. Various studies examining the relationship between individual-level home-ownership and unemployment have found that home-owners are more successful than others in avoiding unemployment (Flatau *et al.*, 2003; Munch *et al.*, 2006; Leuvensteijn and Koning, 2004; Munch *et al.*, 2008; Coulson and Fisher, 2009). It has been speculated that home-owners are relatively active in (local) job search and have low reservation wages because they are reluctant to move to other regions and because they need to meet mortgage payments (Flatau *et al.*, 2003; Munch *et al.*, 2006; Laamanen, 2017). Because the positive regional-level association between

home-ownership and unemployment cannot be explained by the individual-level result, some of the recent studies argue that home-ownership affects labour markets through externalities (Isebaert *et al.*, 2015) and others present evidence for these externalities (Blanchflower and Oswald, 2013; Laamanen, 2017). The transmission mechanisms behind the labour market effects of home-ownership beyond the direct effects on owners themselves are not very well known. Oswald (1996) and Blanchflower and Oswald (2013) present the well-known hypothesis about lesser labour mobility but also discuss other possible transmission mechanisms: NIMBYism and changes in risk preferences associated with home-buying. Laamanen (2017) argues that mortgage loan payments encourage labour supply and discourage consumption at the individual level, and that these changes lead to displacement effects and less demand for labour at the regional level. He also presents evidence supporting these claims.

It is unlikely that entrepreneurship is unaffected by the abovementioned impacts of home-ownership on labour market behaviour and outcomes. Indeed, some recent studies have focused on the effects of negative labour market changes and found that entrepreneurship is positively associated with increases in unemployment at the regional level (Fairlie, 2013) and recent job loss at the individual level (e.g. von Greiff, 2009; Røed and Skogstrøm, 2014). Focusing on spin-off entrepreneurship, Eriksson

and Kuhn (2006) find that ‘push spin-offs’, businesses created by employees of a workplace which ceases operation, is a counter-cyclical phenomenon. Interestingly, Berglann *et al.* (2011) find that entering entrepreneurship depends positively on personal unemployment but negatively on the local unemployment rate.

By bringing together the above ideas and empirical results, hypotheses on the individual-level and regional-level home-ownership–entrepreneurship associations can be formulated. At the level of individuals and households, the association is predicted to be unambiguously positive. A home serves as collateral for business loans and home-owners, unwilling to move to other regions, resort to entrepreneurship when faced with bad job opportunities. Having a mortgage likely limits the use of collateral but amplifies the positive job search / labour supply effect. Because of these two reasons, and because entrepreneurs are less likely to take up mortgages, the statistical association between a mortgage and entrepreneurship is ambiguous. The regional-level relationship between home-ownership and entrepreneurship includes the above-mentioned individual-level relationship and the externalities. Based on earlier research, it is clear that home-ownerships’ externalities on regional labour markets are negative. How the negative labour market externalities affect entrepreneurship is not self-evident although most of the results listed above suggest that worse labour market conditions encourage entrepreneurship. Thus, it is important to empirically

examine the individual-level associations and related causal effects, and the externalities. This study specifically focuses on the externalities because an identification strategy for estimating causal external effects is available.

3 Data and empirical strategy

The individual-level data on self-employment, entrepreneurship and the background controls come from the service files of the annual Income Distribution Statistics (IDS) for years 1990–1992. The IDS includes a large set of variables based on information from different registers, including tax records, and survey answers. Importantly, the IDS includes two alternative sources of information on whether an individual is self-employed or an entrepreneur. First, one survey question asked about self-employment/entrepreneurship experience during the year. Second, a register-based socio-economic status information is available. Both of these variables are used in the analyses to demonstrate the robustness of the results and to estimate the effects separately on small and large businesses.

The microdata are linked to county-level home-ownership proportions calculated from population registers using information on county of residence included in the IDS. Estimate both the direct effect of an individual’s housing tenure and the indirect externality from regional home-ownership is therefore possible. Information on the

county of residence is also crucial because the rental housing market deregulation experiment was implemented in selected counties only, as described below in more detail.

All models to be estimated are probit models of the following type:

$$E_{ijt}^* = \alpha hor_{jt} + \beta' X_{ijt} + \gamma_j + \delta_t + \epsilon_{ijt}, \quad (1)$$

and

$$E_{ijt} = \begin{cases} 1, & \text{if } E_{ijt}^* > 0. \\ 0, & \text{otherwise.} \end{cases},$$

where E_{ijt} is an indicator variable for whether individual i residing in county j was self-employed or an entrepreneur during year t . Variable hor_{jt} is the proportion of home-ownership in county j in year t . Vector X is the vector of individual-level control variables. The control variables are mortgage dummy, home-ownership dummy, real wealth (in 1992 FIM), real wealth squared, real wealth cubed, gender, age (years plus months/12), age squared, age cubed, marital status (six categories), household size, number of children, education (seven categories) and the type of the municipality of residence (four categories). The home-owners who claim the mortgage interest deduction in year t are inferred to have a mortgage loan in that

year because information on mortgages is not, as such, included in the data. γ_j and δ_t are the county and year fixed-effects, respectively. Finally, the individual-level error term is ϵ_{ijt} .

We estimate model (1) by using the sample of non-institutionalised individuals aged 15-69. The age 15 is chosen because it is the minimum legal working age in Finland. The age 69 is the upper limit of the age range because although the retirement age is lower than this, some individuals in the data are either in paid work or are self-employed or entrepreneurs in later ages. Moreover, Zissimopoulos and Karoly (2007) argue that older individuals are an important group both being in and entering self-employment. The descriptive statistics on the variables used in the estimations for the sample are presented in Table I.

[Table I about here]

The main parameter of interest, α , may be biased because of endogeneity or omitted variable problems. These problems are caused because the changes in regions' self-employment and entrepreneurship may affect the prevalence of home-ownership, or some factors which cannot be controlled for may affect both self-employment/entrepreneurship and home-ownership. A Finnish policy experiment in

the early 1990s is used to construct instrumental variables for identifying the causal effect of regional home-ownership. The experiment used is the first, regional phase of the Finnish rental housing market deregulation. The experiment was the first phase of the process in which the rental market in the entire country was deregulated by the mid-1990s. The new rental market legislation removed rent ceilings and exact limits on rent increases. Evictions without landlords specifying their grounds were made easier as well. The opposition had worries that the new law would have an increasing effect on rents. As a result, the government decided to deregulate the markets in parts of the country where, as phrased in the associated committee report, ‘demand and supply of rental housing are in approximate balance’ first. On the basis of the presumption that the markets were closer to balance in the northern and central parts of the country, counties excluding the south were chosen as the experiment region. More specifically, the markets in the seven northernmost and central counties were deregulated, with the exception of the university cities, and the six southern counties were not. About one-third of all homes in the country were situated in the experiment regions. The experiment started in the beginning of 1991, when new (completed) apartments and houses were made free from the regulations. In the second phase, effective 1 February 1992 in the entire country, all new contracts for private rental dwellings were deregulated. Because the first phase of the

deregulation treated different regions differently during the 13-month period between 1 January 1991 and 1 February 1992, identifying variation in home-ownership between regions was created. The mechanism through which the experiment affected home-ownership rates is the change in landlords' behaviour as their activities became more profitable in the experiment counties. Rents could now be increased and non-profitable contracts could be terminated. As will be seen from the first-stage results of the instrumental variables analyses, the experiment indeed led to decreases in home-ownership in the experiment counties compared with the excluded counties. More information on the effects of the reform on home-ownership rates and a more detailed description of the experiment can be found in Laamanen (2017).

Four instrumental variables are constructed using the experiment. First, note that the experiment had potentially different effects on home-ownership in 1991 and 1992. This is because of the different legislation in the experiment counties and in the excluded counties for the entire 1991, but in 1992, the two groups of counties had a different legislation for one month only. Because of this, and because the legislation might have taken some time to take effect, differential effects in the two years are allowed for. Another source of effect heterogeneity is that the experiment treated the six counties with universities differently than the one county without. Therefore, differential effects in these two types of counties are allowed for. Let us

first construct four dummies to allow for the two dimensions described above:

Dummy $a = 1$ in 1991 for the county fully exposed (and 0 otherwise)

Dummy $b = 1$ in 1992 for the county fully exposed (and 0 otherwise)

Dummy $c = 1$ in 1991 for the counties partly exposed (and 0 otherwise)

Dummy $d = 1$ in 1992 for the counties partly exposed (and 0 otherwise)

It would be possible to use these dummies as the excluded instruments, in which case the first-stage would be a difference-in-differences model with two treatment groups and differential effects in the two different years. But only new housing units were deregulated in the experiment, so the strength of the instruments can be increased by interacting each dummy a , b , c , and d with the share of deregulated multifamily dwellings in the county in question. This is done, and the resulting instrumental variables used in the analyses are denoted by A , B , C and D . Multifamily houses instead of all dwellings are used to further increase the strength of the instruments. This is done because single-family houses are almost always owner-occupied and, therefore, irrelevant from the point of view of the experiment and its effects. The measure of the home-ownership proportion is the average of the previous year-end value and the coming year-end value. Thus, an approximation of the

number of dwellings completed by the midyear of 1991 is preferable. We use half the number of dwellings completed in 1991 and dwellings completed in January 1992 for the instruments of 1991 and 1992, respectively.^[3]

4 Results

4.1 *Home-ownership and entrepreneurship*

The results from estimating model (1) by using the two alternative dependent variables are presented in Table II. In the two leftmost columns, the exogeneity of regional home-ownership is assumed. In the two other columns, the instrumental variables are used to deal with endogeneity. The first thing that can be observed is that the results from the four models are very similar, especially when it comes to the individual-level variables. The estimated effect of regional home-ownership is positive and significant in all models. The coefficient of the county-level home-ownership proportion is higher when the exogeneity assumption is abandoned. This difference suggests that assuming exogeneity leads to downward-biased effect estimates. The results of the Wald tests of exogeneity not presented here suggest that the biases are not negligible. A potential explanation for the direction of the bias is based on how labour market conditions, home-ownership and self-employment /

entrepreneurship interact: self-employment and entrepreneurship are higher when the labour market conditions are worse. In such a situation, the ability of individuals and households to buy homes (and maintain ownership) is decreased because incomes are low. Therefore, changes in labour market conditions other than those caused by home-ownership itself drive self-employment and entrepreneurship up and home-ownership down. Such relationships contaminate the parameter estimates of the two leftmost columns of Table II. The first-stage results show that the signs of the coefficients of the excluded instruments are negative, as expected based on the discussion in the previous section. Furthermore, the instrument set works well in the sense that comparing the F-statistic on the excluded instruments with the critical values in Stock and Yogo (2002) suggests small second-stage bias and test size distortion.

[Table II about here]

Let us turn next to the results on the direct effects of individual-level home-ownership on self-employment and entrepreneurship. One should bear in mind that these results are associations and do not necessarily reflect causal effects. In line with most results in the earlier literature, home-owners are more likely to be self-

employed and entrepreneurs. This result is also in line with the discussion in Section 2 according to which home-owners more often have the needed collateral and resort to entrepreneurship to avoid following jobs to other regions. The positive association between home-ownership and entrepreneurship is more than offset by having a mortgage loan. Notice, however, that this is conditional on total wealth. Therefore, the correct interpretation of the results is that, first, individuals who own their homes are more likely to be entrepreneurs than individuals who do not own their home but, instead, have a corresponding amount of non-housing wealth. Second, home-owners with mortgage are less likely to be entrepreneurs than both outright owners and non-owners who have a corresponding amount of non-housing wealth. A possible interpretation of these results is that home equity serves as an important source of financing for those engaging in business activities. Having a mortgage means that the home-owner has less net wealth to base financing on. The positive association between having a mortgage and entrepreneurship can be partly due to reverse causality, that is, entrepreneurs have more savings and a more limited access to credit and are, therefore, less likely to take up a mortgage (see Section 2). Harding and Rosenthal (2017) also find that there is a negative association between having a mortgage and being self-employed in the US. They argue that this association should be positive if mortgages were used extensively to finance self-employment. However, they find

such a positive relationship between entrepreneurship and a specific type of mortgage loan which allows for easy access to home equity. The results presented in Table II of this study suggest that research on the effect of home-ownership should try to control for other wealth as well as having a mortgage rather than just the housing tenure status. When it comes to the effect of wealth itself, the marginal effect is positive but declining for almost all sample individuals.

The results on the other control variables are mostly in line with what has been found in earlier studies. Males are more likely to be entrepreneurs than females. The entrepreneurship probability increases rather rapidly with age until about age 40, after which it starts to decline. The decline is not as fast as the increase so that the oldest individuals in our sample are as likely to engage in entrepreneurship as the 20-year olds. No statistically significant differences exist between different marital statuses. Family size has a positive association and the number of children a negative association with the probability of entrepreneurship. Most Finnish families are nuclear families, so this result comes mostly from having a spouse having a positive association and children having a negative association with entrepreneurship. Education has a negative association with entrepreneurship but, interestingly, those having a higher university degree or a graduate school degree report experiencing entrepreneurship more than some of the less-educated groups; however, most of this

is not reflected in their socio-economic classification. The final result is that those living in urban areas are significantly less engaged in entrepreneurial activities than those living in rural areas. Such urban-rural difference in the prevalence of self-employment and entrepreneurship in Finland has been noticed by earlier studies, e.g. Haapanen and Tervo (2009). The estimates of the year fixed effects (not presented here) show a significant increase in entrepreneurship over time, especially from the year 1991 to the year 1992, conditional on the covariates.

4.2 Different types of entrepreneurship

It needs to be acknowledged that large-scale entrepreneurial activities may differ markedly from self-employment and entrepreneurship without employees. The motives behind activities of different scale can be different and, therefore, the impacts of home-ownership may also differ. In the IDS, those whose socio-economic classification is an entrepreneur are further classified as entrepreneurs with and without employees. The results from estimating model (1) with entrepreneurship without employees and entrepreneurship with employees as the dependent variables are presented in the first and second columns of Table III, respectively. The results presented in Table II for the entrepreneurship-encouraging effect of home-ownership mostly come from the effect on entrepreneurship without employees. In additional analyses

not presented here, it was noticed that the effect on entrepreneurs who employ more than four people is even smaller in magnitude than the effect on employers presented in the second column of Table III. This result means that the positive effect of regional home-ownership on entrepreneurship works through encouraging small-scale entrepreneurship. This is natural because building a large-scale business takes time. However, one should notice that the results partly reflect the effects on business closures. Therefore, home-ownership seemingly neither encourages the quick establishment of larger-scale businesses nor discourages the closure of such businesses. Instead, there are significant effects on small-scale entrepreneurship only.

[Table III about here]

The results for entrepreneurship without employees and entrepreneurship with employees have interesting differences when it comes to the individual-level control variables. First, the relationship between individual home-ownership and entrepreneurship is statistically significant only for entrepreneurship without employees. The coefficient estimate for having a mortgage is statistically significant in both columns of Table III but it is markedly smaller in the case of entrepreneurship with employees. Second, small-scale entrepreneurship increases in real wealth much faster

than large-scale entrepreneurship does. Similarly, small-scale entrepreneurship varies much more with age than large-scale entrepreneurship does. Finally, another interesting finding is that the probability of being an entrepreneur with employees does not vary significantly between rural and more urban regions whereas the probability of entrepreneurship without employees is more common in rural than in urban areas.

The hypothesis that home-ownership has externalities on entrepreneurship is based on the idea that the negative labour market effects of home-ownership affect entrepreneurship. The results thus far point to positive effects of home-ownership on entrepreneurship that can be explained by the lack of paid-work opportunities. If this were indeed the case, the resulting entrepreneurial activity would be inferior to its alternatives in terms of pay and perhaps other attributes. The data include individuals' tax-record information, so whether the data support this idea can be examined. On the basis of their real (in 1992 FIM) total taxable income (including business income, wages, benefits, capital income etc.), the entrepreneurs are classified into four groups. The real income categories are based on the 25th, the 50th and the 75th percentiles in the 15- to 69-year-old non-institutionalised population calculated from the sample. Table IV presents the results from estimating model (1) by instrumental variables and using entrepreneurship with different levels of income as the dependent variables. The sample sizes are a little smaller in the analyses

of entrepreneurship with below-median income. Such is the case because there are no entrepreneurs with below-median income who have completed graduate school. Therefore, those 192 individuals are dropped from the sample because of perfect prediction.

[Table IV about here]

Regional home-ownership has a positive effect on entrepreneurship with income in each of the four income categories. The effect pattern is very similar when the self-reported entrepreneurship variable or the variable based on socio-economic classification is used. Home-ownership only has a statistically significant effect on entrepreneurship with below-median incomes. The effect is slightly larger on entrepreneurship with income between the 25th percentile and the 50th percentile than on entrepreneurship with income below the 25th percentile. This exercise demonstrates that, indeed, home-ownership encourages entrepreneurship which does not help the entrepreneurs to earn high incomes. On the contrary, it seems that, at least when it comes to pay, the entrepreneurship resulting from a higher regional home-ownership seems to be, in terms of income, an inferior alternative to the activities of about half of the population. The percentiles are also calculated excluding

the unemployed, students, retired and other individuals who did not report any employment during the year to assess how entrepreneurship encouraged by regional home-ownership pays off compared to the activities of the part of population which experienced any type of employment. Naturally, the incomes of those who experienced any employment are higher than those of the entire population. The results in Table IV show that only entrepreneurship with income in the lowest quarter is statistically significantly affected by home-ownership. This result further supports the idea that home-ownership has negative effects on the local labour market and this is partly reflected as greater low-income entrepreneurship. However, two caveats are of order. First, although the home-ownership-induced entrepreneurship does not pay very well off in the short run (as shown by the results), the long-run pay-offs may be even much better. Second, entrepreneurs have been shown to earn less and to benefit less from wage work experience in terms of earnings than dependent workers. Much-cited works on the topic include Evans and Leighton (1989) and Hamilton (2000) and Johansson (2000b) presents Finnish evidence. This means that entrepreneurs with incomes low when compared to the general population or labour force may still be relatively high-ability among the labour force and successful among the group of entrepreneurs.

4.3 Robustness

A potential threat to the identification of causal effects using the deregulation experiment is that entrepreneurship developed differently in the experiment and the non-experiment counties for reasons other than the experiment itself. In such a case it is possible that the estimates presented above capture also the underlying trends in entrepreneurship instead of just the causal effects of home-ownership. Pre-experiment changes in entrepreneurship can, however, be estimated using the IDS data from the years 1989 and 1990. The estimation was conducted and the statistical significance of the ‘difference-in-differences’ was tested. It appeared that none of the dependent variables of this study changed statistically significantly differently in the experiment region when compared to the non-experiment region.

Including an explanatory variable together with a variable which can be thought of as an instrumented version of it in the same regression may lead to misleading results (see Angrist, 2014). In the case of this study, individual-level home-ownership dummy is a measure of home-ownership and the (instrumented or not) regional home-ownership variable can be thought of as an instrumented version of it. The potential problem is caused by the endogeneity of the non-instrumented variable. It can be argued that individual home-ownership is, indeed, endogenous. Therefore, robustness checks are needed to see whether the results are biased. Appropriate ro-

bustness checks can be conducted by re-estimating the models without the (endogenous) individual-level home-ownership dummy. The mortgage loan dummy is also left out because it measures housing tenure, especially in the absence of the home-ownership dummy. It is clear that the coefficient estimate of the (instrumented) regional home-ownership proportion now captures the effect of a change in regional home-ownership, including the direct effect which operates through individual home-ownership and having a mortgage loan. Therefore, the coefficient measures the total effect (the direct effect and the externality) of a change in regional home-ownership. All the estimations in this study were conducted without the two endogenous variables and the results remained qualitatively similar.

Yet another potential source of bias is ignoring the effect of regional unemployment on entrepreneurship. The combination of regional unemployment having an effect on entrepreneurship and being correlated with the instrumental variables would result in biases in the IV estimations. Such bias can be avoided by controlling for regional unemployment. However, the literature suggests that regional unemployment is an outcome affected by home-ownership and is, therefore, a ‘bad control’ (see Angrist and Pischke, 2009). Bearing this qualification in mind, all the IV models in this paper were re-run with county unemployment rate as an additional regressor to check robustness. When it comes to the estimated effects of regional home-ownership, there

were no significant differences between the results of these checks and the results presented in this paper. Therefore, it is safe to conclude that regional home-ownership has a positive causal effect on entrepreneurship and that this effect is at least partly an externality.^[4]

5 Conclusions

This study examines the effects of home-ownership on entrepreneurship. The focus is on the indirect effects beyond the effects on home-owners of their own housing tenure. The hypothesis is that, because home-ownership has been found to have negative externalities on local labour markets, higher regional home-ownership rates lead to changes in incentives for entrepreneurship. The results show that regional home-ownership has a positive effect on entrepreneurship, conditional on individuals' own home-ownership status, having (or not) a mortgage loan and other personal control variables. This result is robust to using alternative measures of entrepreneurship.

The additional analyses presented in this study suggest that small-scale entrepreneurship and entrepreneurship leading to a low level of income is encouraged by higher regional entrepreneurship. The result on the income level suggests that the negative effects of home-ownership on the local labour markets make paid work scarce which works as a push factor that pushes individuals to entrepreneurship.

This idea is in line with the results in earlier literature that a significant part of entrepreneurial activities is due to necessity rather than opportunity. However, the results of this study concern the short run and the pay-offs from entrepreneurship induced by regional home-ownership may be better in longer run and especially when compared to the group of entrepreneurs instead of the population or the labour force.

Earlier literature has demonstrated that home-ownership has detrimental effects on the labour market. Currently, these effects are understood to operate through externalities. This study shows that the externalities are not limited to higher unemployment and less employment. Instead, greater home-ownership, and, therefore, policies that favour home-ownership, push individuals into entrepreneurship as paid employment opportunities become more scarce. To better understand the transmission mechanisms behind the results, research directly studying these mechanisms is needed.

Notes

^[1]In this study, the term entrepreneurship is used to cover self-employment, as well. The variables in the data also cover both self-employment and entrepreneurship.

^[2]We would like to thank an anonymous referee for pointing out the reasons for which not only having a mortgage affects entrepreneurship but also *vice versa*.

^[3]The dwelling data are annual, but the data on buildings by building type are quarterly. The way to obtain a measure of the number of dwellings completed in January 1992 is to multiply one-third of the share of buildings completed in the first quarter by the number of dwellings completed during the entire year.

^[4]The results from all robustness checks are available from the author upon request.

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Table I
Descriptive statistics.

	<i>Mean</i>	<i>St. dev.</i>	<i>Min</i>	<i>Max</i>
<i>Dependent variables</i>				
Entrepreneur (self-reported)	0.164	0.370	0	1
in the 1st income quarter of the population	0.040	0.196	0	1
in the 2nd income quarter of the population	0.043	0.203	0	1
in the 3rd income quarter of the population	0.031	0.172	0	1
in the 4th income quarter of the population	0.050	0.218	0	1
in the 1st income quarter of those with employment experience	0.064	0.245	0	1
in the 2nd income quarter of those with employment experience	0.033	0.177	0	1
in the 3rd income quarter of those with employment experience	0.025	0.156	0	1
in the 4th income quarter of those with employment experience	0.042	0.201	0	1
Entrepreneur (socio-economic classification)	0.145	0.352	0	1
no employees	0.109	0.311	0	1
employees	0.036	0.186	0	1
in the 1st income quarter of the population	0.041	0.197	0	1
in the 2nd income quarter of the population	0.041	0.197	0	1
in the 3rd income quarter of the population	0.026	0.158	0	1
in the 4th income quarter of the population	0.038	0.191	0	1
in the 1st income quarter of those with employment experience	0.064	0.244	0	1
in the 2nd income quarter of those with employment experience	0.029	0.168	0	1
in the 3rd income quarter of those with employment experience	0.020	0.140	0	1
in the 4th income quarter of those with employment experience	0.032	0.176	0	1
<i>Explanatory variables</i>				
County home-ownership rate	0.668	0.035	0.603	0.718
Owner with mortgage	0.212	0.409	0	1
Owner	0.806	0.395	0	1
Real (1992 FIM) wealth in 100,000	1.202	2.367	0	90.390
Male	0.506	0.500	0	1
Age (year-end)	40.925	14.61	16	69.917
Marital status				
Single	0.295	0.456	0	1
Married	0.592	0.491	0	1
Separated	0.003	0.052	0	1
Widow	0.040	0.196	0	1
Divorced	0.028	0.166	0	1
Unknown	0.042	0.200	0	1
Household size	3.208	1.434	1	16
Number of children	0.861	1.179	0	13
Education				
Basic or no degree	0.435	0.496	0	1
Lower secondary	0.253	0.435	0	1
Higher secondary	0.189	0.391	0	1
Vocational college	0.045	0.208	0	1
Lower university	0.024	0.153	0	1
Higher University	0.048	0.213	0	1
Graduate school	0.006	0.077	0	1
Type of municipality				
Capital region	0.140	0.347	0	1
Urban	0.378	0.485	0	1
Semi-urban	0.166	0.372	0	1
Rural	0.316	0.465	0	1

Table II
Models of Entrepreneurship.

Entrepreneurship variable Method	Self-reported Probit		Socio-economic Probit		Self-reported IV Probit		Socio-economic IV Probit	
<i>Regional home-ownership</i>								
County home-ownership	2.51**	(1.10)	2.75***	(.83)	6.37**	(2.48)	5.50***	(1.92)
<i>Personal characteristics</i>								
Mortgage	-0.057***	(.004)	-0.060***	(.004)	-0.057***	(.004)	-0.060***	(.004)
Owner	0.024***	(.006)	0.027***	(.006)	0.024***	(.006)	0.027***	(.007)
Real wealth	0.044***	(.002)	0.034***	(.001)	0.044***	(.002)	0.034***	(.001)
Real wealth ²	-0.001***	(.000)	-0.001***	(.000)	-0.001***	(.000)	-0.001***	(.000)
Real wealth ³	0.000***	(.000)	0.000***	(.000)	0.000***	(.000)	0.000***	(.000)
Male	0.039***	(.004)	0.029***	(.003)	0.039***	(.004)	0.029***	(.003)
Age	0.045***	(.003)	0.035***	(.002)	0.045***	(.003)	0.035***	(.003)
Age ²	-0.001***	(.000)	-0.001***	(.000)	-0.001***	(.000)	-0.001***	(.000)
Age ³	0.000***	(.000)	0.000***	(.000)	0.000***	(.000)	0.000***	(.000)
Marital status								
Single	-0.013	(.012)	-0.010	(.011)	-0.012	(.012)	-0.009	(.011)
Married	-0.007	(.007)	-0.002	(.007)	-0.007	(.007)	-0.002	(.007)
Separated	-0.004	(.006)	-0.002	(.007)	-0.003	(.006)	-0.002	(.007)
Divorced	0.015	(.026)	-0.011	(.029)	0.015	(.026)	-0.011	(.029)
Unknown	-0.010	(.014)	-0.003	(.010)	-0.009	(.014)	-0.003	(.010)
Household size	0.015***	(.002)	0.017***	(.002)	0.015***	(.002)	0.017***	(.002)
Number of children	-0.014***	(.002)	-0.015***	(.002)	-0.014***	(.002)	-0.015***	(.002)
Education								
Lower secondary	-0.006*	(.003)	-0.008**	(.003)	-0.006*	(.003)	-0.008**	(.003)
Higher secondary	-0.030***	(.004)	-0.034***	(.004)	-0.030***	(.004)	-0.034***	(.004)
Vocational college	-0.034***	(.008)	-0.043***	(.007)	-0.034***	(.008)	-0.043***	(.007)
Lower University	-0.064***	(.012)	-0.056***	(.010)	-0.065***	(.012)	-0.056***	(.010)
Higher University	-0.024**	(.009)	-0.057***	(.011)	-0.024**	(.009)	-0.057***	(.011)
Graduate school	0.020	(.018)	-0.049**	(.019)	0.019	(.018)	-0.050**	(.019)
Type of municipality								
Capital region	-0.068***	(.004)	-0.049***	(.004)	-0.068***	(.004)	-0.049***	(.004)
Urban	-0.070***	(.004)	-0.059***	(.003)	-0.070***	(.004)	-0.059***	(.003)
Semi-urban	-0.038***	(.007)	-0.032***	(.005)	-0.038***	(.007)	-0.032***	(.005)
First-stage results: Excluded instruments								
Instrument <i>A</i>					-0.157***	(.002)	-0.157***	(.002)
Instrument <i>B</i>					-0.542***	(.008)	-0.542***	(.008)
Instrument <i>C</i>					-0.177***	(.001)	-0.177***	(.001)
Instrument <i>D</i>					-0.463***	(.005)	-0.463***	(.005)
F-statistic					26.38***		26.38***	

Marginal effects calculated at sample means from population-weighted regressions including county dummies and year dummies. N = 32,110. Robust clustered (county-year) standard errors in parentheses. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively. The omitted category is widowed females with a basic or no degree residing in a rural region.

Table III
Models of Entrepreneurship without and with Employees.

Entrepreneurship variable Method	Socio-economic, no employees IV Probit		Socio-economic, employees IV Probit	
<i>Regional home-ownership</i>				
County home-ownership	3.72***	(1.32)	0.90	(.61)
<i>Personal characteristics</i>				
Mortgage	-0.050***	(.003)	-0.004***	(.001)
Owner	0.023***	(.005)	0.002	(.001)
Real wealth	0.020***	(.001)	0.008***	(.000)
Real wealth ²	-0.001***	(.000)	-0.000***	(.000)
Real wealth ³	0.000***	(.000)	0.000***	(.000)
Male	0.018***	(.002)	0.008***	(.001)
Age	0.024***	(.002)	0.007***	(.001)
Age ²	-0.001***	(.000)	-0.000***	(.000)
Age ³	0.000***	(.000)	0.000**	(.000)
Marital status				
Single	-0.004	(.008)	-0.002	(.004)
Married	0.004	(.005)	-0.006	(.003)
Separated	-0.002	(.005)	0.002	(.003)
Divorced	-0.025	(.026)	0.009	(.008)
Unknown	0.005	(.008)	-0.008**	(.003)
Household size				
Number of children	0.014***	(.001)	0.000	(.000)
Education				
Lower secondary	-0.003	(.002)	-0.002*	(.001)
Higher secondary	-0.028***	(.004)	-0.003	(.001)
Vocational college	-0.025***	(.005)	-0.010***	(.002)
Lower University	-0.032***	(.008)	-0.013***	(.003)
Higher University	-0.035***	(.010)	-0.012***	(.002)
Graduate school	-0.015	(.016)	-0.021**	(.008)
Type of municipality				
Capital region	-0.042***	(.005)	-0.000	(.003)
Urban	-0.053***	(.003)	-0.000	(.001)
Semi-urban	-0.027***	(.004)	0.001	(.001)
First-stage results: Excluded instruments				
Instrument <i>A</i>	-0.157***	(.002)	-0.157***	(.002)
Instrument <i>B</i>	-0.542***	(.008)	-0.542***	(.008)
Instrument <i>C</i>	-0.177***	(.001)	-0.177***	(.001)
Instrument <i>D</i>	-0.463***	(.005)	-0.463***	(.005)
F-statistic	26.38***		26.38***	

Marginal effects calculated at sample means from population-weighted regressions including county dummies and year dummies. N = 32,110. Robust clustered (county-year) standard errors in parentheses. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively. The omitted category is widowed females with a basic or no degree residing in a rural region.

Table IV

The Effects of Regional Home-ownership on Entrepreneurship at Different Income Levels.

Entrepreneurship variable Method	Self-reported IV Probit		Socio-economic IV Probit		
<i>Population income quarters</i>					
1st quarter	2.02**	(1.02)	1.86**	(.86)	N = 31,918
2nd quarter	2.21**	(1.05)	2.03**	(.92)	N = 31,918
3rd quarter	0.74	(.60)	0.77	(.50)	N = 32,110
4th quarter	0.58	(.57)	0.18	(.41)	N = 32,110
<i>Income quarters of those who experienced any employment</i>					
1st quarter	4.17**	(1.81)	3.95**	(1.65)	N = 31,918
2nd quarter	0.90	(.64)	0.56	(.51)	N = 31,918
3rd quarter	0.15	(.48)	0.51	(.32)	N = 32,110
4th quarter	0.51	(.53)	-0.05	(.38)	N = 32,110

Marginal effects calculated at sample means from population-weighted regressions including the control variables as in Tables II and III. Robust clustered (county-year) standard errors in parentheses. *, ** and *** denote significance at 10%, 5% and 1% levels, respectively. The omitted category is widowed females with a basic or no degree residing in a rural region.