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ABSTRACT

Homeownership and the Perception of Material Security in Old Age*

Homeownership has been shown to be related to various aspects of well-being, although both the causal nature of this relationship and the possible channels behind it have been difficult to identify. We focus on one of the most often quoted mechanisms which could be responsible for the positive effects of homeownership, namely its role in providing material security in old age. Using data from 15 European countries collected in wave 2 of the Survey of Health, Ageing and Retirement in Europe (SHARE), we analyse the relationship between homeownership and material security, as measured through subjective expectations of being better or worse off in the future. We find that homeowners have a higher level of material security than renters, and this association is especially strong for those living in big cities. For this subsample, in comparison to renters, owning a property in the top quartile of the home value distribution is associated with an increase in the probability of expecting to be better off in the future by as much as 43%. With respect to our measure of material security we find no such correlations with education, income or financial assets. We interpret the results as support for the argument that homeownership offers a very particular form of material security, which may be behind its positivse implications for well-being.

JEL Classification:	I31, J14, D84
Keywords:	homeownership, well-being, material security, old age, expectations

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1. Introduction

Material security is an important aspect of well-being, facilitating longer-term planning of financial decisions, smoothing of expenditures across periods of lower contemporaneous incomes and allowing exceptional spending requirements in case of various negative shocks to be met. Material security seems particularly important in old age when on the one hand, people's ability to adjust their current income to their specific needs is significantly reduced, and on the other, their material needs increasingly depend on their health, as well as physical and mental agility. As people age and as their ability to maintain labour market activity diminishes, the material resources available to them, and the security they can provide, are increasingly composed of pensions and accumulated assets. Among the latter, fixed assets, and in particular ownership of one's home, play a very special role, as on the one hand they represent accumulated wealth that can provide some financial backup and on the other, they represent a flow of regular consumption in the form of accommodation.[1]

Housing wealth makes up the largest proportion of the asset portfolio among many older people in developed countries (Angelini *et al.*, 2013; Venti & Wise, 1990) and homeownership has been shown to offer substantial advantages to owners as compared to renters (Dunn, 2000). The first and most important is through capital appreciation, which at times and in regions of rapid growth of property values offers owners substantial wealth gains (Di *et al.*, 2007; Pahl, 1975; Turner & Luea, 2009), while at the same time subjecting renters to the risk of growing rent values (Sinai & Souleles, 2005). Moreover, homeownership might constitute a reflection of opportunities for asset diversification which are not available for renters, with the implied inability to gain from property market trends and a need to rely on liquid and/or more risky forms of wealth (Fratantoni, 1998; Zanetti, 2014). Furthermore, in numerous countries the tax system favours owner occupiers over renters by explicit or implicit advantages. While explicit tax advantages for owners usually apply at the time of purchase and mortgage repayment (e.g. mortgage interest deductions, tax incentives, etc.; Bourassa & Grigsby, 2000; Hendershott & White, 2000; Poterba & Sinai, 2008), the fact that the consumption flow from homeownership is not taxed represents a clear tax advantage over gains from other forms of assets which are often subject to different forms of the capital gains tax (Figari *et al.*, 2019; Johannesson Linden & Gayer, 2012; Skinner, 1996). On the other hand, it has been pointed out that the usually heavy concentration of wealth among homeowners in fixed assets may be far from optimal (Brueckner, 1997; Meyer & Wieand, 1996), with greater flexibility and ability to adjust portfolio composition among renters.

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[1] The theoretical model on the dual-dimensional aspect of housing demand is due to Henderson & Ioannides (1983); for empirical applications see for example: Ioannides & Rosenthal (1994) and Arrondel & Lefebvre (2001).

Vast empirical literature links homeownership to numerous outcomes, such as well-being, health or mobility. Renters have been shown to be more likely to move than owners, given the high transaction costs for owners (Haurin & Gill, 2002; Rohe & Stewart, 1996), and the relationship between mobility and homeownership has been one of the least ambiguous. For other outcomes the evidence is mixed and the specific causal link with homeownership *per se* is often difficult to demonstrate. This is because homeownership, especially in old age, usually reflects the financial resources accumulated over the life course through the labour market history, as well as health and family developments (Angelini *et al.*, 2013). This means that many unobservable characteristics can obscure the relationship between homeownership and welfare outcomes and bias the estimated parameters. Dietz & Haurin (2003) provide a detailed discussion supported with numerous examples from the literature on the econometric issues that impede the analysis of the consequences of homeownership. They point out that oftentimes studies either fail to disentangle the direct effect of homeownership and income or wealth, or they omit the issue of self-selection, whereby potentially better off individuals may be more likely to become homeowners.

Additionally, what is particularly hard to identify, is the specific mechanism behind the examined relationships. For example, while homeownership has been shown to correlate with physical health (Costa-Font, 2008; Macintyre *et al.*, 1998) or even mortality (Filakti & Fox, 1995; Laaksonen *et al.*, 2009), it is debatable why the legal status of the place where someone lives would affect health status in another way than through other correlates, such as education or generally better material conditions, and various other, often unobservable, characteristics. By exploring a housing policy in the UK aimed at affordable housing, Munford *et al.* (2020) find that homeownership improves physical health and point towards two mechanisms that stand behind this relation – less time spent by homeowners on commuting and more time and resources spent on leisure. Howden-Chapman *et al.* (2011) point out that homeownership may influence mental health through housing quality and the household's ability to deal with financial problems. Hamoudi & Dowd (2014) report that a positive effect on the mental health of homeowners is driven by rising prices in the regional housing market.

With respect to other outcomes such as overall well-being and life satisfaction, the causal link might be easier to justify. In a longitudinal study of low-income US renters who transitioned from renting to owning compared with continued renters, Rohe & Basolo (1997) find a long-term pattern of higher levels of life satisfaction among the first group. Similarly, for older individuals aged 50 and over in the US, Courtin *et al.* (2018) find small mental health improvements after becoming a homeowner. In another longitudinal study in Germany which controlled for an extensive set of confounders, Zumbro (2014) confirms the above effects for low-income households, arguing at the same time that in general the impact of homeownership on life satisfaction is marginal, and the relation is positive as long as the financial burden is low. Again based on the German longitudinal data, Stotz (2019) states that short run effects of ownership are greater than in a longer-term perspective, attributing this to an adaptation

affect, while Will & Renz (2022) emphasize that for debt-financing owners the overall effect of acquiring a real estate may be even negative in the short term. Based on a broader sample of European countries, Herbers & Mulder (2017) report that the difference in subjective well-being between homeowners and renters is bigger in 'home-owning' societies, where homeownership is promoted by the government (as opposed to 'cost-rental' societies, where tenants are protected and rent is regulated; the definition following Kemeny, 2001). This is confirmed by Foye *et al.* (2018), who state that homeownership should be perceived as a social norm, since the impact of homeownership on well-being is related to homeownership among one's acquaintances and neighbours. Burland (2019) demonstrated the importance of controlling for income and other assets when examining the relation between housing wealth and satisfaction with life.

Homeownership, apart from its financial implications, its proven impact on financial satisfaction (Tharp *et al.*, 2020), and the relation with perceptions of opportunity (Rohe *et al.*, 2002), represents a certain level of material security which renting generally cannot provide (Howden-Chapman *et al.*, 2011). This could plausibly be an important mechanism behind homeownership's influence on well-being, particularly in old age. Surprisingly, so far, the findings in the literature directly exploring this mechanism are scarce. We address this gap using data from the Survey of Health, Ageing and Retirement in Europe (SHARE), an international, longitudinal study focused on people aged 50 years and older, collected since 2004. Based on the data from 15 European countries collected in wave 2 of the study in 2006-2007, we focus on the relationship between homeownership and the perception of material security. To measure the latter, we construct a subjective indicator based on an evaluation of the expected change in the ensuing standard of living. We find that homeownership does indeed provide a perception of security in old age, with the strongest relations observed among individuals living in big cities. We find that owners of properties from the higher segments of the property value distribution are more optimistic about their material prospects in the future. Such feeling of security for the coming years may contribute to a more general positive outlook, and consequently to the higher levels reported well-being and life-satisfaction observed in the literature.

This paper is organised as follows. First, in Section 2 we describe the SHARE data and the sample of individuals selected for further analysis. We provide a detailed description of how we categorize ownership information together with a number of technical details on the data structure and survey design. This is followed by the description of the measure of perceived material security, our key variable of interest. In Section 3 we present the results of our analysis, focusing on the relation between the perception of future material security and homeownership as well as home value, and the heterogeneity in this relation conditional on the location of residence. Section 4 concludes the paper and provides a brief discussion on the implications of the study in the context of the existing literature on the effects of homeownership for well-being.

2. Data and methods

We use the data collected in the Survey of Health, Ageing and Retirement in Europe (SHARE), a longitudinal study focused on people aged 50 years and older from 28 European countries and Israel. The survey is conducted biennially since 2004, with nine waves of data collection completed until 2022. In SHARE a wide range of information is collected in every wave about each participant's current living situation and different aspects of their everyday life, such as health and health care utilisation, material conditions, financial and labour market status, and family relations. The survey also includes an extensive set of questions reflecting subjective evaluations of various spheres of respondents' lives. In this paper we take advantage of two of such items which were collected in wave 2 of the survey, conducted in years 2006-2007 in 15 countries. Altogether, over 37 thousand interviews were collected, of which we exploit 29,812 observations in the main part of this analysis. The difference between the surveyed respondents and our sample primarily results from the basic sample selection criteria, as we exclude persons below age 50 or living in nursing homes. In the main specification we also exclude those who indicated that they are not homeowners according to the legal status of their home, but they live rent free (they are included in the renters category for one of the robustness checks). Secondly, the sample is reduced due to item non-response in the key variables of interest – the two evaluation questions which we use to compute our measure of perceived material security (see Section 2.2).

In Table 1 we provide some basic descriptive statistics of the sample used in the main analysis in our study (mean values and numbers of observations with proportions weighted with population weights). The mean age in the sample is 65 years, and 53% of the respondents are women. Almost half of the respondents have education not exceeding lower secondary (46%), while 18% have at least tertiary education. The majority of respondents are still married, with 13% either never married or divorced, and another 17% widowed. Every second respondent is retired, though over 27% are employed or self-employed. Almost half of the participants indicate they experience difficulties with performing at least one mobility activity (from a list of 10 activities, such as walking 100m, climbing stairs or lifting objects), and one fourth reports 4 or more items in the EURO-D list of depression symptoms. On average 17% of respondents live in big cities (as opposed to a category combining rural areas, small/large towns and suburbs of a big city).

Table 1 Descriptive statistics

	Mean (weighted)	SD
Age	64.65	0.00
Number of years of ownership	25.68	0.00
Net value of home among owners, EUR	162 958.20	921.11
Household income, EUR	19 917.46	568.12
Net financial assets, EUR	35 626.18	314.07

Table 1 Descriptive statistics *(cont.)*

	N. obs.	Proportion (weighted)
Total sample	29 812	100.00%
Men	13 699	46.65%
Education:		
- Primary, lower secondary	13 934	45.65%
- Upper secondary, non-tertiary	9 827	36.23%
- Tertiary	6 051	18.11%
Marital status:		
- Married	22 533	69.79%
- Never married, divorced	3284	13.20%
- Widowed	3995	17.00%
Labour market status:		
- (Self-)employed	8728	27.14%
- Retired	14 936	51.16%
- Unemployed	763	3.29%
- Disabled	1164	3.57%
- Homemaker	3880	13.46%
- Other	341	1.39%
1+ Mobility difficulties	13 878	48.16%
4+ Depression symptoms	7102	26.85%
Living in a big city	5045	16.80%
Homeowner	24 096	77.91%
Perception of material security (full sample):		
- A: v.likely worse off	4814	21.37%
- B: rather likely worse off	7050	26.70%
- C: equally likely	10255	29.51%
- D: rather likely better off	5171	15.49%
- E: v.likely better off	2522	6.92%
Perception of material security (big city dwellers):		
- A: v.likely worse off	787	22.58%
- B: rather likely worse off	1044	23.06%
- C: equally likely	1748	28.35%
- D: rather likely better off	945	17.47%
- E: v.likely better off	521	8.54%

Source: own calculation based on SHARE wave 2 data, release 7-1-0.
Note: Household income equivalised using square root scale. Mean values of monetary outcomes calculated with multiple imputations estimation. Mean values and proportions weighted.

Homeownership and imputations is SHARE

Homeownership is clearly one of our main variables of interest. In Figure A1 in the Supplementary Material we provide a detailed split of the SHARE wave 2 sample by the type of tenure of the main place of living. We code tenants and subtenants as renters, while outright owners and members of cooperatives are considered owner occupiers. As mentioned above, this definition means that in the main analysis we leave out respondents who live rent free in their apartment/house, who constitute less than 7% of the whole SHARE wave 2 sample, though this proportion varies by country and is as high as 13% in Austria and Poland (see Figure A1; our sensitivity tests show that the results are robust to alternative sample specifications and definitions of homeownership, for details see Table A1). While

on average in the whole sample around 80% of respondents owned their homes and a majority of them bought their properties many years earlier (on average 26 years of ownership; Table 1), in Figure A1 one can observe substantial differences in ownership across countries. An important regional dimension is clearly distinguishable. In Southern European countries like Greece or Spain as many as 90% of the respondents are owner occupiers. In Central European, German speaking countries: Austria, Germany and Switzerland, this share drops to 60%. In Scandinavian countries, but also in post-communist Czech Republic and Poland, another non-negligible category arises: members of cooperatives, who for our main specifications are considered owner occupiers, though some country specificities in the definition of this term need to be acknowledged (Hegedüs *et al.*, 2017; Silver, 1991).

An important feature of the SHARE dataset is the provision of generated multiple imputations of selected variables, for which item non-response or response with a low degree of detail is non-negligible. Imputations are estimated values in cases of missing observations, and they have been computed using a complex algorithm (MEA, 2020). If the fraction of missing information is smaller than 5% hot deck imputation is used. For larger fractions of missing values the fully conditional specification method is applied. In both cases five imputations are provided for each variable. In social surveys imputations are particularly useful in case of monetary outcomes, which may suffer from a relatively high incidence of 'don't know' answers and refusals. Previous studies expressed concerns that missing information may not be random (Rubin, 1976), and simple methods of handling missing values, like listwise deletion, were shown to be inadequate (Raaijmakers, 1999; Schafer & Graham, 2002), while multiple imputations have become a well-established method commonly used in different fields (Sterne *et al.*, 2009).

With the use of imputed information, we further employ our homeownership variable to construct a measure that combines information on being a renter or an owner occupier with the net value of owned property (reported or imputed if missing). For this purpose, we take the net home value defined as reported value minus mortgage on the main residence, which we divide into quartiles. To account for significant country differences in the property values, quartile thresholds are country specific. In that way, within one categorical variable we split respondents between renters and owners, with the latter ones divided further based on the quartiles of their home value.

Among other covariates, in our analysis we control for two other monetary measures provided in SHARE (also including imputations where necessary): household income equivalized using a square root scale and total value of financial assets. Here again we stress the importance of country variation in these values, to account for which, in the analysis we divide the sample into quartiles based on the country-specific quartile thresholds.

Measuring perception of material security

Our main outcome of interest is a measure of perceived future material security. The measure is developed using two questions related to respondents' expectations of their future standard of living. Respondents expressed these expectations in two consecutive questions during the SHARE interview. First, they evaluated the chances that 'five years from now' their standard of living would be better than today, and next, they gave an estimate of the chances that 'five years from now' their standard of living would be worse. These two questions were part of a questionnaire section devoted to expectations in general, where respondents were asked to provide answers on a scale from 0 to 100, where 0 meant 'absolutely no chance' and a 100 – 'absolutely certain' (they were also shown a linear visual scale, which is recommended in survey design studies like Bruine de Bruin & Carman, 2018).

Figure 1 Distribution of answers in questions used for measuring the perception of material security
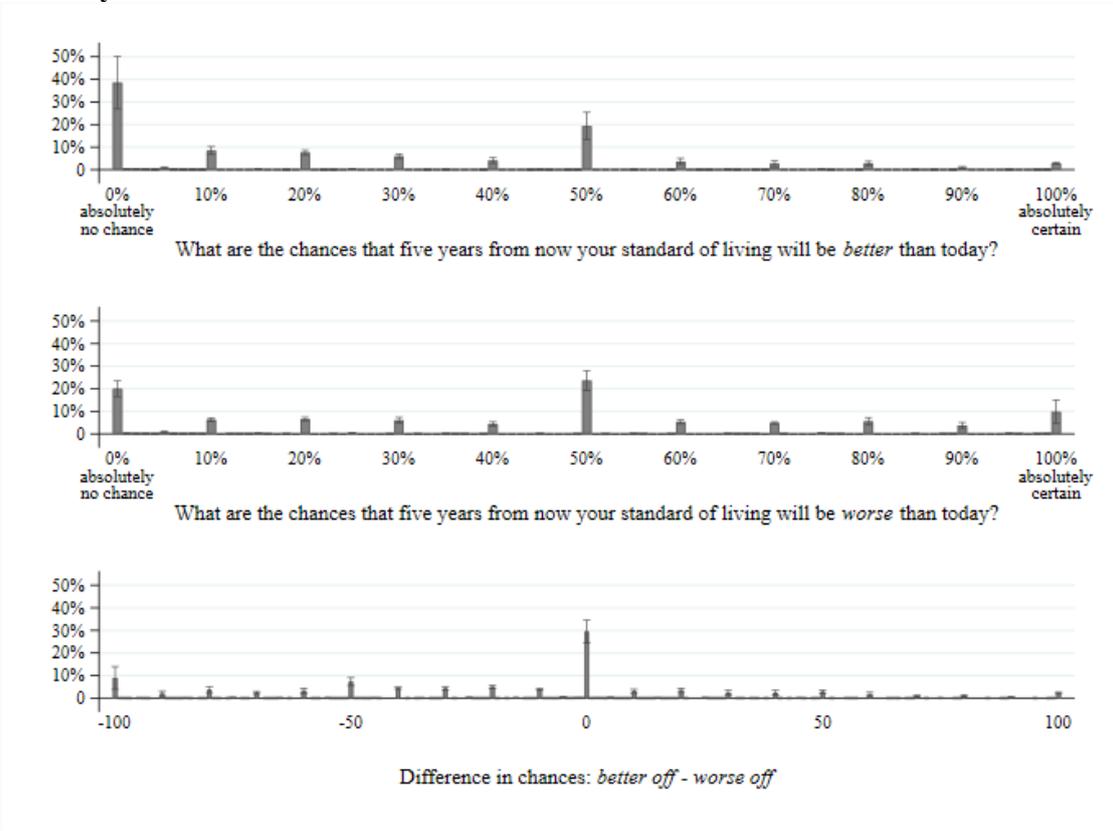
Source: own calculation based on SHARE wave 2 data, release 7-1-0.
Notes: 'Don't know' answers and refusals excluded. Proportions estimated with multiple imputation estimation, weighted. 95% confidence intervals, clustered at country level.

When assessing probabilistic expectations of personal events, using a continuous scale rather than a verbalised one is recommended in the literature (Manski, 2004). Respondents could also have chosen a 'don't know' option or could have refused to answer. Of the whole sample of 37 thousand SHARE wave 2 participants, approx. 8% opted for either of these two options (2830 'don't know's' and 191

refusals in at least one of the two analysed questions). Since these options cannot be meaningfully accounted for in the analysis, we exclude them in the paper.[2]

The distribution of answers to these two questions is presented in the two top panels of Figure 1. Consistent with observations reported earlier in the literature, most respondents indicated a value rounded to the nearest step of 10, with the highest bunches at 0 and 50 (Dominitz & Manski, 1997). In the case of the question on chances of being better off (first panel of Figure 1) 38% of respondents reported a 0% chance, and 20% reported a 50% chance. In the question on the chances of being worse off, slightly more participants chose 50% chance (25%) than 0% chance (20%), with another significant spike of answers, though much smaller, at 100% (10% of respondents).

It is important to stress that the two questions on the probability of being better and worse off were asked independently, in consecutive order, which means that while giving an answer to the first, participants didn't know they will be asked the second question. This design of the questionnaire has important consequences for the consistency of both answers. Theoretically, since in the future one can either be (1) equally well off, (2) better off or (3) worse off, the sum of the two given probabilities should be less than or equal to a 100. However, as the questions were asked independently, some reported a sum of probabilities that exceeded 100 (2039 individuals, approx. 7% of the sample). Given the scope of the problem and the design of the survey, we chose not to exclude these respondents from the analysis. As indicated in the literature, analysis of a joint distribution of two dependent variables expressed as probabilities ought to be conducted in one of three ways: as a ratio of the two probabilities, a mean probability or a difference between the two (Garthwaite *et al.*, 2005). To account for the issue of inconsistency in the answers we combined the two questions using the third method by computing the difference between the two given probabilities (probability of being worse off subtracted from the probability of being better off). Thus, the positive value of the difference indicates that a respondent expects it is more likely he/she will be better off, while the negative value means the opposite. Consistently, a value of 0 corresponds to an equal probability of both developments (or to an expectation of no change in the future). The third panel in Figure 1 displays the distribution of the computed difference, with the biggest spike at 0. 30% of respondents either expect no change in their standard of living or suppose that a change for better or for worse is equally likely. Since the bars for

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[2] A relatively high share of 'don't know' answers when estimating probabilities is a phenomenon reported earlier in the literature, which actually prizes an application of a response scale with explicit response options ('don't know') over an open-ended probability scale, demonstrating better accuracy of the first. Using data from studies of relatively unlikely events, Fischhoff & Bruine De Bruin (1999) argue that the latter scale results in a disproportionate spike at 50% chances, which in the absence of a 'don't know' option is regarded by some respondents as 'fifty-fifty' – an expression meaning 'no idea'. This is further proven by Bruine de Bruin & Carman (2012) who find that as opposed to other point estimates, an excessive use of 50% is associated with lower education, poorer numerical literacy and an increased level of insecurity towards future events. In general, in probabilistic questions, providing an answer option that reflects uncertainty, like 'don't know', improves the validity of point estimate answers.

negative values of the difference are on the whole higher than for the positive ones, a deterioration in the standard of living is expected more often.

Figure 2 Categories of the measure of perceived material security (main variable of interest)
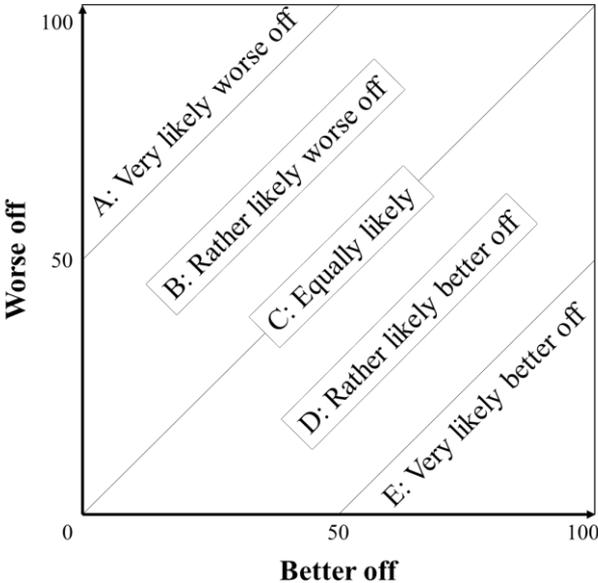
Source: own compilation.

Figure 3 Distribution of the measure of perceived material security for the whole sample and by country
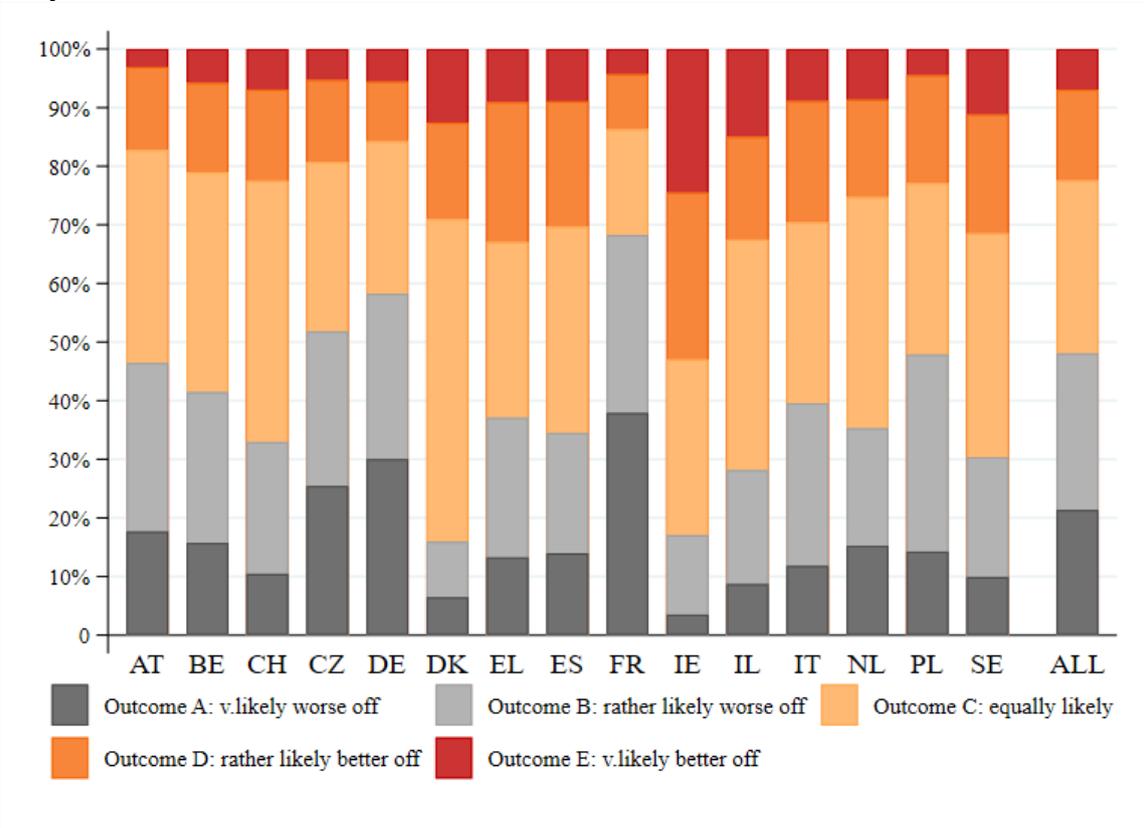
Source: own calculation based on SHARE wave 2 data, release 7-1-0.
Note: Proportions estimated with multiple imputation estimation, weighted. N. obs.: AT 967; BE 2814; CH 1273; CZ 1987; DE 2199; DK 2322; EL 2823; ES 1768; FR 2252; IE 916; IL 1420; IT 2420; NL 2361; PL 1888; SE 2402; All: 29 812.

The spikes at rounded numbers, as well as the biggest peak at 0, suggest that the computed measure is not equidistant. We therefore divide the continuous scale of differences into five categories. Differences smaller than -50 are recorded as 'very likely worse off' (further on called outcome A, see Figure 2) while differences between -50 and -1 – as 'rather likely worse off' (outcome B), and we refer to these categories as reflecting pessimistic expectations of the future. Similarly, differences from 1 to 50 and differences larger than 50 are recorded as, respectively, 'rather likely better off' (outcome D) and 'very likely better off' (outcome E) and we treat those as capturing an optimistic outlook. 0 is registered as 'equally likely' (outcome C). A schematic illustration of the design of our main variable of interest is presented in Figure 2, while its distribution in the whole sample and in country samples (weighted with population weights) is shown in Figure 3.

Of all 10 201 combinations (squared 101 possible answers to both questions), only 101 combinations were translated into the 'equally likely' category, whereas 1 275 combinations were converted into 'very likely better off/worse off' and as many as 3 775 were coded as 'rather likely better off/worse off'. Still, 'equally likely' is the most frequent category (30% of total responses, the last bar in Figure 3). As mentioned already for the distribution of differences between probabilities, being either 'very' or 'rather likely worse off' was more frequently reported than being better off (48% of total responses coded as either category for being worse off as compared to 22% for the two categories of being better off). Figure 3 also shows some interesting country differences in the distribution of the measure of perceived material security. For example, as compared to the average, French respondents seem to be much more often pessimistic, while Irish respondents are far more often optimistic than respondents in any other country. In all countries except Germany, France, and Poland the most frequently observed category was 'equally likely'. For Germany and France most responses were coded as 'very likely worse off', while for Poland – 'rather likely worse off'. The shares of respondents identified in the 'very likely better off' category vary between 3% in Austria and 25% in Ireland, while the shares for the 'very likely worse off' category between 4% in Ireland and 37% in France.

We conducted a simple, descriptive exercise to show that the computed measure of perceived material security reflects a general level of well-being of the respondents, while at the same time providing a new, interesting angle on top of the information contained in other standard measures. First, in Figure 4 we show the correlation of the developed measure with a common indicator of well-being – life satisfaction. We split respondents within each level of life satisfaction (from 0 to 10) into the five categories of perception of material security. Overall, this allows us to observe a rather consistent pattern where with increasing levels of life satisfaction the proportions of respondents in the two 'worse off' categories are decreasing, while the proportions of those included in the two 'better off' categories are increasing. The only break in the pattern appears for the level '1' of life satisfaction, and is related to a particularly low number of respondents included in this category (approx. 0.3% of the sample). Further, in Figure 5 we report the correlation of the computed measure with two items taken

from the CASP indicator of well-being designed specifically for the older population (Hyde *et al.*, 2003; Knesebeck *et al.*, 2007; Wiggins *et al.*, 2008). Items included in the CASP scale are deemed to measure quality of life in older age in a more thorough way, taking into account the four most important aspects of daily life: control, autonomy, self-realization and pleasure. We selected two items of the CASP scale included in the SHARE survey that can be regarded as related to one's general perceptions of the future: how often one looks forward to each day (the first panel in Figure 5) and how often one feels that the future looks good to her/him (the second panel). While, as we could expect, it seems that in the latter case there is some consistence in the relation between our measure of perceived material security and the individual viewpoint about the future, the correlation in the first case is much more noisy. This shows that while maintaining a very strong link with some other indicators of well-being, the computed measure of perceived material security offers some additional information with respect to one's future financial standing, on top of what we could capture using well-being measures already available in the SHARE questionnaire.

Figure 4 Correlation of the measure of perceived material security and life satisfaction
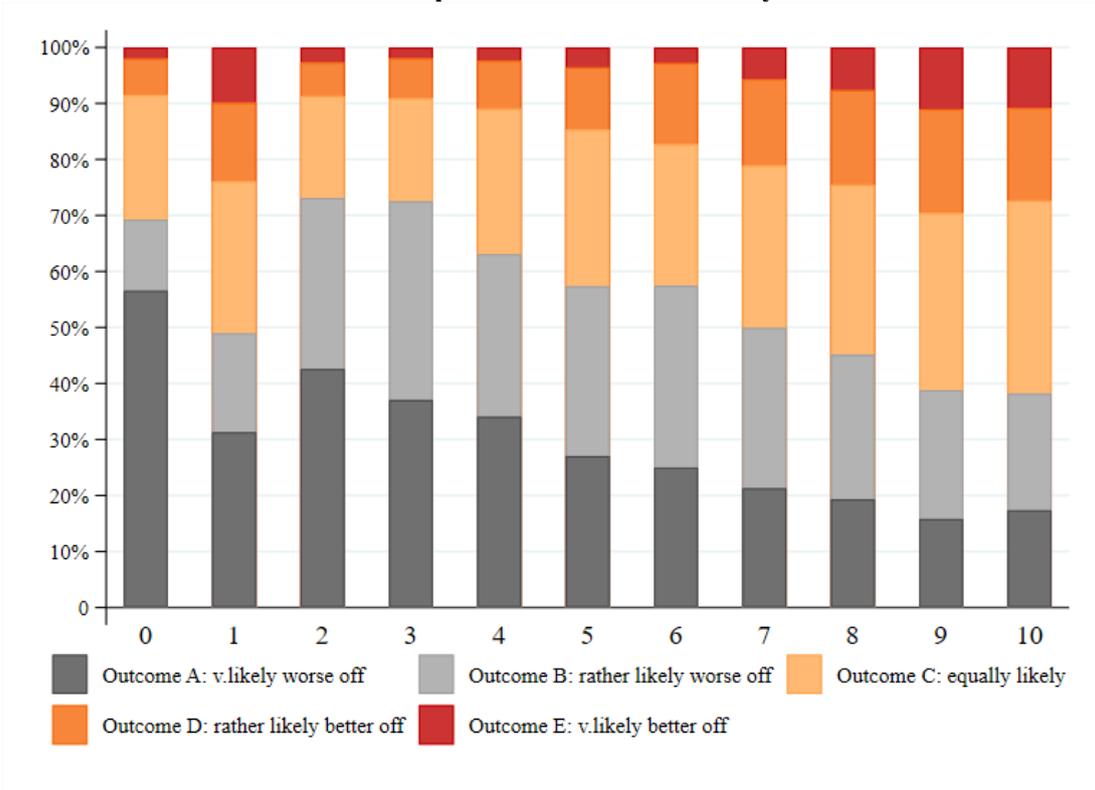
Source: own calculation based on SHARE wave 2 data, release 7-1-0.
Notes: Life satisfaction measured on a 0-10 scale. Each level of life satisfaction split by proportion of respondents with outcomes A-E in the measure of perceived material security. Proportions estimated with multiple imputation estimation, weighted.

Figure 5 Correlation between selected well-being items and the measure of material security

A) Look forward to each day
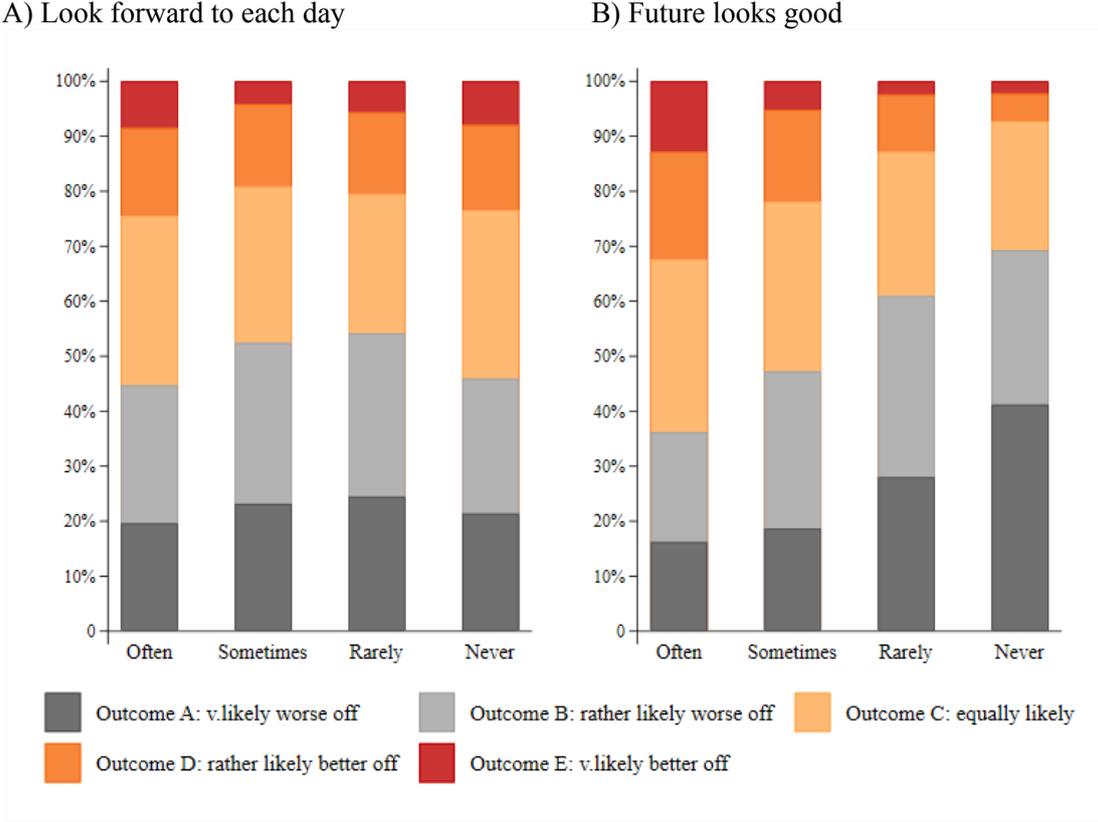
B) Future looks good

Source: own calculation based on SHARE wave 2 data, release 7-1-0.
Note: Exact questions: Fig. 5A: 'How often do you look forward to each day?'; Fig. 5B: 'How often do you think future looks good for you?'. Each answer category split by proportions of respondents who selected outcomes A-E in material security measure. Proportions estimated with multiple imputation estimation, weighted.

In Figure 6 we provide a first glance on the relation between homeownership, urbanization and perception of material security. Each category of our computed measure of homeownership and home value is divided between respondents living in big cities and other areas, and then each subsample is split into the categories of the measure of perceived material security. Two interesting observations can be derived from this simple cross-distribution. Regardless of the home value, owner occupiers from areas other than big cities are more often placed in the two bottom categories of perception of material security (being very or rather likely worse off) than those who live in big cities. Conversely, the latter group seems to be more often located in the two top categories of perception of material security than owners from other areas. Renters from big cities are more often identified in the two extreme categories of perception of material security than renters from other areas, and the difference is especially high for those very likely worse off.

14

Figure 6 Distribution of the measure of homeownership in big cities and other areas by the measure of perceived material security
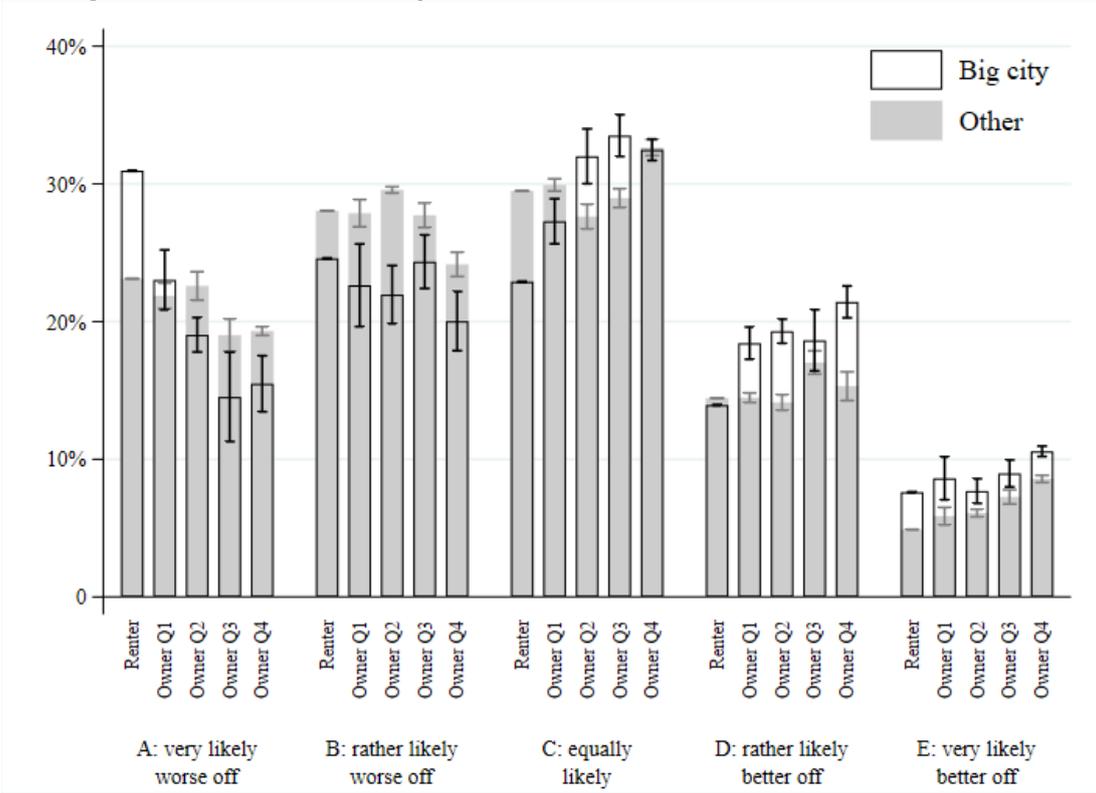
Source: own calculation based on SHARE wave 2 data, release 7-1-0.
Note: Proportions estimated with multiple imputation estimation, weighted. 95% confidence intervals.

3.   Results

Given the nature of our dependent variable we run the ordered probit model on the measure of perceived material security in four specifications, each controlling for a different vector of characteristics, and in each case accounting for multiple imputations. Results are reported in Table 2.

We begin with Specification 0 where perception of material security is regressed only on the basic demographic characteristics: gender, age, age squared, as well as country and month of interview (the latter two not reported in Table 2). Men seem more likely to be optimistic about their material conditions in the future, more often expecting an improvement. The likelihood of an optimistic perception of material security falls nonlinearly with age. These results consistently carry through all other specifications of the model.

Table 2 Main results: ordered probit regression coefficients on perception of material security

	Specification 0		Specification 1		Specification 2		Specification 3	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
Age	-0.021***	(0.003)	-0.020***	(0.002)	-0.022***	(0.003)	-0.020***	(0.003)
Age # Age	0.001***	(0.000)	0.001***	(0.000)	0.001***	(0.000)	0.001***	(0.000)
Male	0.089***	(0.019)	0.086***	(0.018)	0.083***	(0.017)	0.036*	(0.019)
Home value (ref. Renter):								
- Q1			0.023	(0.032)	0.012	(0.034)	0.004	(0.035)
- Q2			0.012	(0.026)	-0.011	(0.026)	-0.025	(0.027)
- Q3			0.066*	(0.038)	0.031	(0.031)	0.011	(0.031)
- Q4			0.166***	(0.038)	0.118***	(0.031)	0.097***	(0.030)
Big city			-0.034	(0.046)	-0.044	(0.048)	-0.048	(0.046)
Home value Q1 # Big city			0.008	(0.072)	0.015	(0.073)	0.019	(0.072)
Home value Q2 # Big city			0.154**	(0.076)	0.153**	(0.075)	0.154**	(0.068)
Home value Q3 # Big city			0.136**	(0.066)	0.138**	(0.065)	0.138**	(0.060)
Home value Q4 # Big city			0.160**	(0.076)	0.154**	(0.073)	0.138**	(0.070)
Education (ref. Primary, lower secondary):								
- Upper secondary, non-tertiary					0.019	(0.028)	0.006	(0.028)
- Tertiary					0.040	(0.047)	0.024	(0.047)
Marital status (ref. married):								
- Never married, divorced					-0.007	(0.027)	-0.003	(0.027)
- Widowed					0.008	(0.024)	0.016	(0.022)
Labour market status (ref. (self-)employed)								
- Retired					0.051	(0.038)	0.074*	(0.038)
- Unemployed					-0.016	(0.039)	0.023	(0.039)
- Disabled					-0.135***	(0.051)	-0.014	(0.042)
- Homemaker					0.041	(0.035)	0.062*	(0.035)
- Other					0.137	(0.084)	0.158*	(0.085)
Household income (ref. Q1):								
- Q2					-0.021	(0.026)	-0.021	(0.026)
- Q3					0.029	(0.031)	0.024	(0.030)
- Q4					0.049	(0.032)	0.042	(0.031)
Net financial assets (ref. Q1):								
- Q2					0.012	(0.032)	-0.000	(0.033)
- Q3					0.021	(0.032)	-0.001	(0.032)
- Q4					0.090**	(0.044)	0.063	(0.044)
1+ Mobility difficulties							-0.150***	(0.020)
4+ Depression symptoms							-0.213***	(0.025)
Cutoff outcomes A/B	-0.749***	(0.024)	-0.706***	(0.027)	-0.622***	(0.056)	-0.781***	(0.071)
Cutoff outcomes B/C	0.028	(0.020)	0.074**	(0.034)	0.159***	(0.043)	0.008	(0.055)
Cutoff outcomes C/D	0.996***	(0.051)	1.045***	(0.051)	1.132***	(0.083)	0.987***	(0.092)
Cutoff outcomes D/E	1.768***	(0.044)	1.819***	(0.052)	1.908***	(0.076)	1.766***	(0.081)

Source: own calculation based on SHARE wave 2 data, release 7-1-0.

Note: Standard errors clustered at country level. Perception of material security measured in 5 categories, from outcome 'A: very likely worse off', through 'B: rather likely worse off', 'C: equally likely', 'D: rather likely better off' to 'E: very likely better off'. All regressions include country fixed effects and month of interview. N obs = 29 812. Estimations using multiple imputation ordered probit. Household income equivalised using square root scale. Thresholds for quartiles of home value, income, and financial assets are country-specific, calculated with multiple imputations estimation.

In Specification 1 we extend the model with controls for the measure of homeownership, living in a big city, and an interaction between the two. As compared to renters, owner occupiers are more likely to optimistically perceive their future material security, regardless of the value of their home, however the relation is only statistically significant for the owners located in the upper half of the home value distribution. While in general living in a big city seems to be negatively related to an optimistic perception of material security (though it is not statistically significant), the opposite is true when living in a big city is interacted with the value of the home. The results suggest that owner occupiers living in big cities with homes of relatively higher values are much more likely to be optimistic about their material security.

These effects decrease slightly, but stay statistically significant, when we extend the vector of controls to education, marital status, labour market status and the relative position in the distributions of income and financial assets in Specification 2. The relation is almost unchanged when we further control for physical and mental health status in Specification 3. Relative to still being employed, retired individuals are more likely to look optimistically towards their future standard of living, with disabled individuals being most pessimistic. In the last specification the latter observation is 'picked up' by problems with physical health and symptoms of depression, which significantly reduce the likelihood of an optimistic perception of future material security. Moreover, conditional on all other covariates, household income seems to be unrelated to the perception of material security, but having financial assets in the top quartile of the distribution correlates positively with material optimism, though the effect is mitigated by health outcomes added in the last specification.

In Figure 7 we report marginal effects from Specification 3 with the full set of control variables for each outcome of perception of material security for owner occupiers depending on the value of their home as compared to renters, separately by the place of residence (Figure 7A for other areas and 7B for big cities). As identified with the coefficients recorded in Table 2, the latter characteristic seems to be of crucial importance. For respondents living in other areas than big cities the lower (higher) probability of being pessimistic (optimistic) about future material security is statistically different from renters only for owners of properties in the top quartile of the home value distribution. For big city dwellers the differences are already statistically significant for owners with home values in the second quartile of the distribution, and the effects carry through to higher quartiles. The differences for selected perceptions of material security are not only statistically significant but also large in magnitude in the case of city dwellers who own the most expensive properties. As compared to renters they are 3.7 percentage points (p.p.) more likely to expect that their future situation will be either 'rather' or 'very likely' better. Given that 17.5% and 8.5% of those living in a big city select into these categories (see Table 1), these results correspond to an increase of 21.2% and 43.3%, respectively. Similarly, big city homeowners from the fourth quartile of the home value distribution are by 3.3 and

5.1 p.p. less likely to worry that their future situation will 'rather' or 'very likely' be worse, which represents a decrease of 14.3% and 22.6%, respectively.

Figure 7 Marginal effects of homeownership for outcomes of perception of material security
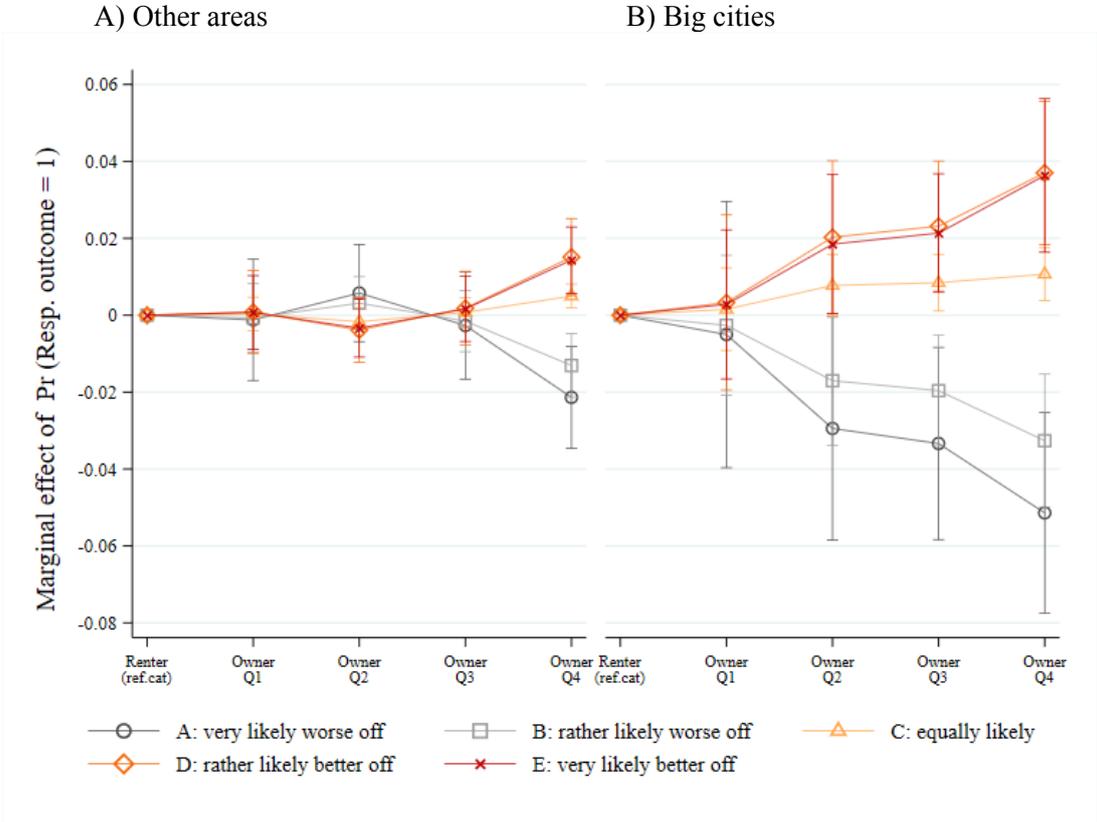
Source: own calculation based on SHARE wave 2 data, release 7-1-0.
Note: 95% confidence intervals. Marginal effects calculated in the model's main specification 3. More details in the note to Table 2.

The relevance of these differences is best demonstrated in comparison to the variation in expectations of future material conditions across other characteristics. In Figure 8 we relate the marginal effect of owning a property in the top quartile of the home value distribution as compared to owners with properties in the bottom quartile or renters to the effect resulting from (1) higher education, (2) being in the top income quartile or (3) in the top assets quartile. We show the marginal effect of the probability of reporting either of the two extreme outcomes in the five-point scale of material security: being very likely worse off (Figure 8A) or very likely better off (Figure 8B). As we can see in Figure 8, while education, income and financial assets seem to affect the perception of the future material situation in the expected direction, the estimated relationships are statistically insignificant, and their magnitude is lower in comparison to the estimated relationship with homeownership. Owners of properties in the top quartile of the distribution are significantly less likely to have a negative perception of their future material situation as compared to both owners from the lowest quartile of the

18

distribution (by 2.5 p.p.) as well as renters (by 2.7 p.p., see Figure 8A). Looking at the relationship of homeownership with the expectation of being very likely better off (Figure 8B), owners from the top quartile as compared to those from the bottom quartile and renters are respectively 1.8 p.p. and 1.9 p.p. more likely to declare such optimistic perceptions.

Figure 8 Marginal effects of the selected independent variables for the probability of two most extreme outcomes of perception of material security
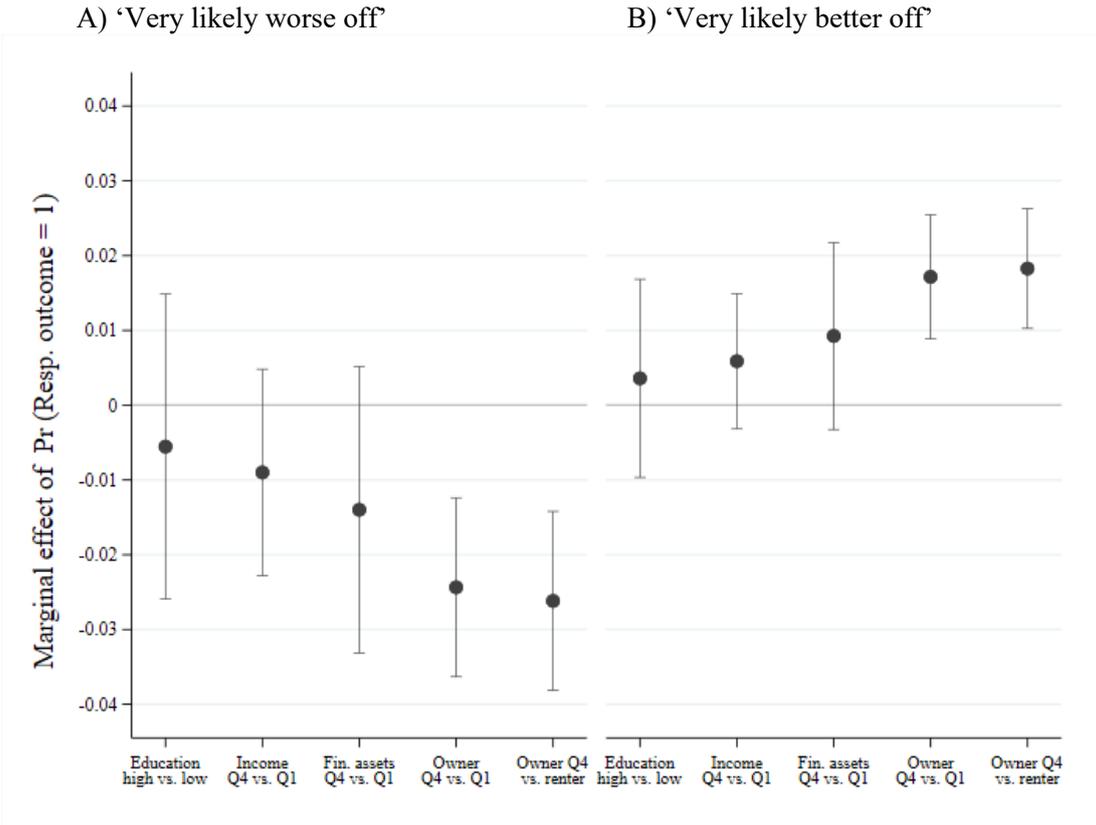
A) 'Very likely worse off'   B) 'Very likely better off'

Source: own calculation based on SHARE wave 2 data, release 7-1-0.
Note: 95% confidence intervals. Marginal effects calculated in the model's main specification 3. Figure A: outcome A of the measure of perceived material security: 'very likely worse off'. Figure B: outcome E of the measure of perceived material security: 'very likely better off'

Robustness analysis

We conducted several robustness tests to confirm the stability of our main results, and their sensitivity to different approaches to data selection and model specifications. The results are presented in Tables A1 and A2 in the Supplementary Material. We first rerun our main Specification 3 adding life satisfaction (measured on a scale from 0 to 10) to the covariates (Specification R1). Robustness of the results to this extension reflects the fact that the nature of our measure of material stability is distinct from general well-being and – as suggested by the descriptive analysis in Section 2 – captures a particular aspect of quality of life. Next, we confirm the results by using a different definition of household income and using an income measure provided in the SHARE data based on a one-off

question on the total average monthly household income, as opposed to the version used in the main results which derives from aggregating household incomes from different sources (Specification R2). In Specification R3 within the definition of a big city we include not only respondents who live in a big city, but also those who reported living in the suburbs of a big city. This turns out to be the only specification in the robustness analysis where the coefficients on the interaction between homeownership and 'big city' are not statistically significant (and lower in magnitude) pointing towards a very specific role of homeownership for material security among those living within the bounds of big cities.

Further we modify the definitions of ownership and home value. In Specification R4 we include respondents who live rent free in their home within the category of 'Renters'. In Specification R5 we keep members of cooperatives out of the sample, which narrows the category of 'Owners' to owner occupiers only. In Specification R6, on top of the net value of the primary property we include the value of other properties the respondents may own (*nota bene*, SHARE collects information on the value of remaining mortgage payments only for the primary property, so other mortgages cannot be accounted for). In Specification 7 reported in Table A2, we incorporate a simple owner dummy instead of including more detailed information on the value of property to prove the stability of our main results. Interacted with living in a big city it is highly statistically significant, although as compared to our main Specification 3, this approach provides less insight into the key examined relationship.

4.   **Conclusion**

Relative to renters, individuals owning their homes tend to have higher levels of well-being across numerous dimensions (Burland, 2019; Courtin *et al.*, 2018; Foye *et al.*, 2018; Herbers & Mulder, 2017; Rohe & Basolo, 1997; Stotz, 2019; Zumbro, 2014), though the complex nature of the accumulation of wealth and its interaction with different spheres of life over the life cycle make the identification of the causal character of this relationship a nearly impossible task. Although many mechanisms behind this relationship have been suggested, few have actually been put to the test against real-life data. Clearly therefore, better understanding of these mechanisms might be a way to verify the hypothesis that homeownership actually matters for well-being.

In this paper we examined one of the key channels through which individuals might enjoy higher well-being as a result of being homeowners as opposed to renting, namely the higher level of material security resulting from owning one's home. The analysis was based on data from wave 2 of the Survey of Health, Ageing and Retirement in Europe (SHARE) collected in 2006/07. Our sample included nearly 30 thousand individuals aged 50 and over from fourteen European countries and Israel. SHARE seems to be particularly well suited for the analysis of the examined channel as material security

offered by homeownership might be of particular importance to older individuals who to a much larger extent rely on accumulated wealth and to a lesser extent on contemporaneous income from work.

Our analysis was based on a combination of rich data on individual circumstances available in SHARE with two unique questions focused on expectations of the future development of one's material conditions, which were implemented in wave 2 of the survey. Respondents were asked to evaluate the probability of their living standard being better or worse in five years' time. The results confirmed that homeowners – in particular those living in big cities – enjoy a higher level of material security and are more likely to express optimism about their material standard of living in the future as compared to renters. We demonstrated that the examined relationship is especially strong among those in the top quartile of the distribution of property values, although for dwellers in big cities the effect is also strong and statistically significant for those in the second and third quartile of the distribution. This suggests that the relative material conditions of renters versus owners who live in cities may deserve particular attention.

The positive relationship between material security and homeownership was confirmed despite controlling for an extensive set of characteristics including physical and mental health as well as overall subjective well-being. Interestingly, we could not confirm statistically significant correlations with expectations of material security of such characteristics as higher education or being placed in the top quartile of the income or financial assets distribution.

Naturally, just as in most other studies on the effects of homeownership, we cannot interpret the identified relationship as strictly causal. It might be for example, that individuals with a generally more positive outlook on the future are more likely to invest their resources in housing. Several aspects of the results, however, point towards the causal nature of the examined mechanism. These include the stability of the results when accounting for an extensive set of controls, including income and financial assets, and their robustness to inclusion of subjective well-being among the regressors. Moreover, the respondents expressed their view of the future many years after becoming homeowners (on average 26 years, see Table 1), at a very different stage of their lives and most likely in very different financial and living conditions. Given this evidence we would therefore argue that owning a home offers a very particular type of material security in old age and this security might be an important mechanism which leads to the observed positive relationship between homeownership and overall well-being.

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Supplementary material

Figure A1 Distribution of type of tenure by country – whole SHARE wave 2 sample
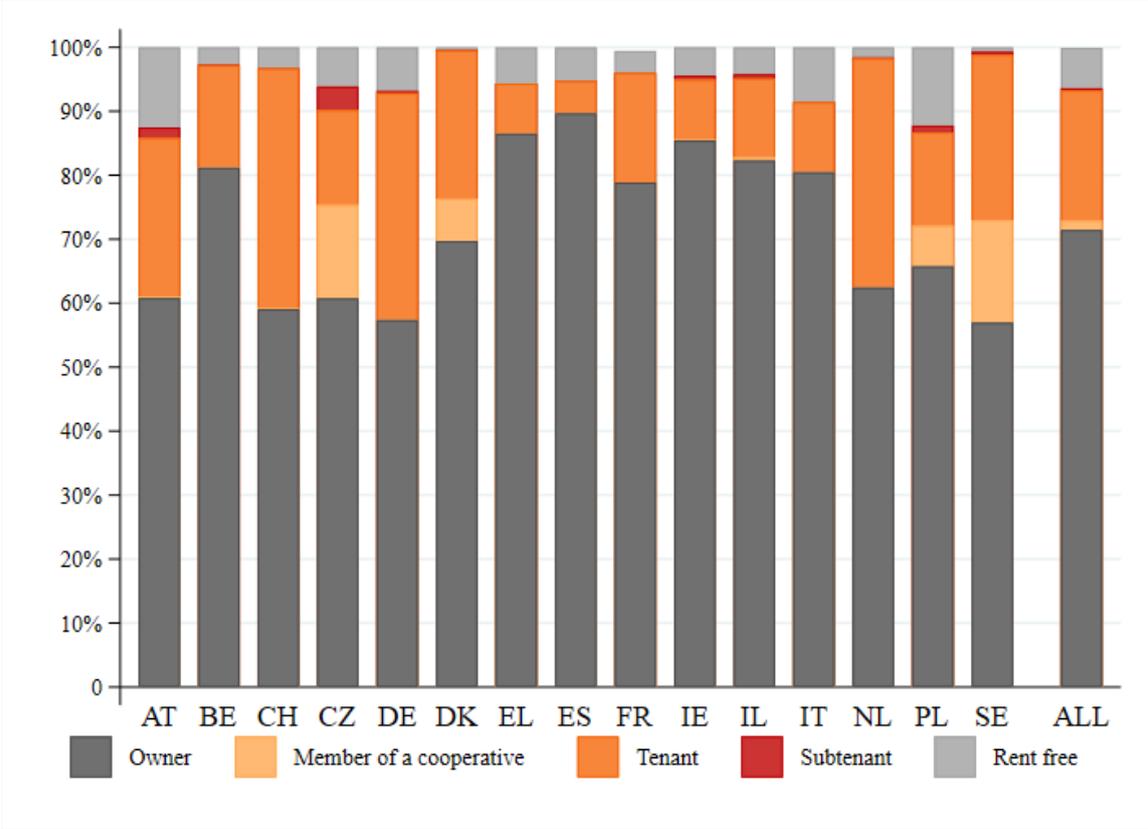
Source: own calculation based on SHARE wave 2 data, release 7-1-0.

Note: N obs = 31 233. Data weighted. The sample in the Figure differs from the sample used in the main analysis because of the 'Rent free' category, excluded in the latter.

Table A1 Robustness checks

	Specification R1		Specification R2		Specification R3		Specification R4		Specification R5		Specification R6	
	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE	Coeff	SE
Age	-0.020***	(0.003)	-0.020***	(0.003)	-0.020***	(0.003)	-0.019***	(0.003)	-0.020***	(0.003)	-0.020***	(0.003)
Age # Age	0.001***	(0.000)	0.001***	(0.000)	0.001***	(0.000)	0.001***	(0.000)	0.001***	(0.000)	0.001***	(0.000)
Male	0.049***	(0.019)	0.036*	(0.019)	0.036*	(0.018)	0.032*	(0.019)	0.036*	(0.018)	0.036*	(0.019)
Home value (ref. Renter):												
- Q1	0.004	(0.036)	0.004	(0.034)	0.022	(0.037)	-0.006	(0.034)	0.000	(0.034)	-0.013	(0.033)
- Q2	-0.038	(0.028)	-0.024	(0.026)	-0.011	(0.029)	-0.037	(0.029)	-0.026	(0.027)	-0.024	(0.025)
- Q3	-0.004	(0.031)	0.013	(0.031)	0.018	(0.036)	-0.000	(0.035)	0.011	(0.032)	0.020	(0.034)
- Q4	0.078***	(0.030)	0.099***	(0.030)	0.106***	(0.035)	0.083***	(0.031)	0.099***	(0.030)	0.117***	(0.035)
Big city	-0.045	(0.048)	-0.048	(0.046)	-0.001	(0.038)	-0.059	(0.051)	-0.050	(0.046)	-0.047	(0.046)
Home value Q1 # Big city	0.014	(0.072)	0.018	(0.071)	-0.048	(0.061)	0.030	(0.069)	0.023	(0.074)	0.020	(0.067)
Home value Q2 # Big city	0.149**	(0.073)	0.155**	(0.068)	0.048	(0.069)	0.167**	(0.071)	0.143**	(0.068)	0.138**	(0.069)
Home value Q3 # Big city	0.127**	(0.060)	0.139**	(0.061)	0.063	(0.058)	0.151**	(0.065)	0.149**	(0.062)	0.158***	(0.055)
Home value Q4 # Big city	0.130*	(0.069)	0.138**	(0.070)	0.056	(0.065)	0.150**	(0.073)	0.156***	(0.058)	0.122*	(0.073)
Education (ref. Primary, lower secondary):												
- Upper secondary, non-tertiary	0.001	(0.025)	0.007	(0.028)	0.008	(0.028)	0.012	(0.028)	0.009	(0.028)	0.003	(0.027)
- Tertiary	0.019	(0.043)	0.026	(0.046)	0.025	(0.046)	0.033	(0.048)	0.032	(0.048)	0.019	(0.045)
Marital status (ref. married):												
- Never married, divorced	0.039	(0.024)	-0.007	(0.027)	-0.005	(0.026)	-0.010	(0.027)	-0.006	(0.028)	0.001	(0.027)
- Widowed	0.044**	(0.021)	0.012	(0.022)	0.013	(0.022)	0.015	(0.020)	0.019	(0.022)	0.019	(0.022)
Labour market status (ref. (self-)employed)												
- Retired	0.082**	(0.039)	0.076**	(0.038)	0.077**	(0.038)	0.066*	(0.039)	0.070*	(0.038)	0.074*	(0.039)
- Unemployed	0.084**	(0.036)	0.023	(0.040)	0.023	(0.041)	0.013	(0.042)	0.034	(0.037)	0.024	(0.039)
- Disabled	0.043	(0.036)	-0.012	(0.041)	-0.012	(0.041)	-0.021	(0.042)	-0.018	(0.042)	-0.013	(0.042)
- Homemaker	0.069*	(0.035)	0.062*	(0.033)	0.063*	(0.033)	0.053	(0.036)	0.060*	(0.035)	0.061*	(0.035)
- Other	0.185**	(0.080)	0.158*	(0.084)	0.158*	(0.083)	0.154*	(0.090)	0.168**	(0.083)	0.157*	(0.084)
Household income (ref. Q1):												
- Q2	-0.025	(0.027)	0.015	(0.018)	0.015	(0.018)	-0.023	(0.024)	-0.023	(0.027)	-0.020	(0.026)

- Q3	0.009	(0.031)	0.024	(0.032)	0.025	(0.032)	0.016	(0.029)	0.014	(0.029)	0.023	(0.030)
- Q4	0.023	(0.031)	0.047*	(0.027)	0.047*	(0.027)	0.038	(0.029)	0.038	(0.032)	0.038	(0.031)
Net financial assets (ref. Q1):												
- Q2	-0.019	(0.032)	-0.001	(0.033)	-0.003	(0.033)	0.012	(0.033)	-0.002	(0.034)	0.000	(0.033)
- Q3	-0.022	(0.032)	-0.000	(0.032)	-0.002	(0.032)	0.008	(0.032)	-0.002	(0.033)	-0.004	(0.032)
- Q4	0.025	(0.043)	0.066	(0.043)	0.065	(0.043)	0.075*	(0.043)	0.063	(0.043)	0.054	(0.044)
1+ Mobility difficulties	-0.113***	(0.018)	-0.150***	(0.020)	-0.150***	(0.020)	-0.145***	(0.020)	-0.152***	(0.021)	-0.149***	(0.020)
4+ Depression symptoms	-0.105***	(0.018)	-0.213***	(0.025)	-0.214***	(0.025)	-0.215***	(0.027)	-0.211***	(0.025)	-0.213***	(0.025)
Life satisfaction (0-10)	0.097***	(0.011)										
Cutoff outcomes A/B	-0.023	(0.105)	-0.769***	(0.058)	-0.755***	(0.057)	-0.792***	(0.066)	-0.790***	(0.068)	-0.782***	(0.072)
Cutoff outcomes B/C	0.775***	(0.101)	0.020	(0.044)	0.034	(0.045)	0.003	(0.052)	-0.001	(0.052)	0.007	(0.055)
Cutoff outcomes C/D	1.763***	(0.126)	0.999***	(0.082)	1.013***	(0.081)	0.984***	(0.088)	0.979***	(0.091)	0.986***	(0.092)
Cutoff outcomes D/E	2.549***	(0.132)	1.778***	(0.072)	1.792***	(0.073)	1.760***	(0.079)	1.757***	(0.081)	1.766***	(0.082)
N obs	29718		29 812		29 812		31279		28946		29 812	

Source: own calculation based on SHARE wave 2 data, release 7-1-0.

Note: see Table 2. All robustness specifications use Specification 3 from Table 2 as base specification with one minor modification each: R1 – life satisfaction added in controls; R2 – different income definition used; R3 – 'Big city' includes big city and suburbs; R4 – 'Renters' includes rent free; R5 – members of cooperative excluded from 'Owners'; R6 – value of secondary properties included in 'Home value'.

Table A2 Robustness checks

	Specification R7	
	Coeff	SE
Age	-0.020***	(0.003)
Age # Age	0.001***	(0.000)
Male	0.034*	(0.019)
Owner	0.017	(0.026)
Big city	-0.050	(0.046)
Owner # Big city	0.128**	(0.052)
Education (ref. Primary, lower secondary):		
- Upper secondary, non-tertiary	0.012	(0.029)
- Tertiary	0.036	(0.049)
Marital status (ref. married):		
- Never married, divorced	-0.009	(0.028)
- Widowed	0.013	(0.023)
Labour market status (ref. (self-)employed)		
- Retired	0.074**	(0.038)
- Unemployed	0.020	(0.040)
- Disabled	-0.012	(0.042)
- Homemaker	0.064*	(0.035)
- Other	0.160*	(0.086)
Household income (ref. Q1):		
- Q2	-0.024	(0.026)
- Q3	0.023	(0.030)
- Q4	0.047	(0.031)
Net financial assets (ref. Q1):		
- Q2	-0.000	(0.034)
- Q3	0.001	(0.034)
- Q4	0.077*	(0.045)
1+ Mobility difficulties	-0.153***	(0.021)
4+ Depression symptoms	-0.215***	(0.025)
Cutoff outcomes A/B	-0.775***	(0.070)
Cutoff outcomes B/C	0.013	(0.053)
Cutoff outcomes C/D	0.991***	(0.090)
Cutoff outcomes D/E	1.770***	(0.081)

Source: own calculation based on SHARE wave 2 data, release 7-1-0.
Note: see Table 2. N obs = 29 812. Specification R7 – Specification 3 from Table 2 with an owner dummy in controls instead of a detailed measure of homeownership with home values.