Home Sweet Home: (Mis-)Beliefs About the Extent to Which Home Ownership Makes Happy [*]

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*** PRELIMINARY – COMMENTS WELCOME ***

Abstract

"Home sweet home" or the belief that home ownership makes people happy is probably one of the most widespread intuitive theories of happiness. However, whether home ownership delivers what it promises is an open question. Based on individual panel data, we explore whether homebuyers systematically overestimate the happiness associated with living in their privately owned property. To identify potential prediction errors, we compare people's forecasts of their life satisfaction in five years' time with their actual realisations. We find that while moving into a purchased dwelling is associated with higher life satisfaction, people systematically overestimate the long-term satisfaction gain. Moreover, misprediction seems most pronounced for people who follow extrinsically-oriented life goals. In sum, our results suggest that people, on average, hold inaccurate beliefs about the extent to which home ownership makes them happy.

Keywords: Home ownership, life satisfaction, subjective well-being, utility prediction, beliefs

JEL classification: D03, D12, D60, I31, R20

1 Introduction

Whether to acquire a home is a major life decision and for many people one of most substantial financial investments in their lives. The decision about whether to purchase a house or apartment is also a difficult one. It involves many trade-offs with significant long-term consequences that are difficult to revoke and few opportunities to learn from experience. In the decision-making process, people have to predict the utility of living in a privately owned home rather than in a rented one and have to balance this with potential negative aspects such as, for example, additional financial risk due to less diversified assets. While in traditional rational-agent models it is assumed that people, on average, hold accurate beliefs about the utility consequences of their actions, recent behavioural economic studies highlight the relevance of systematic biases in the decision-making process (for a review, see e.g., Kahneman 2003 or Kahneman and Thaler 2006). With respect to home ownership, inaccurate beliefs when trading off renting against tenure may result in suboptimal investment decisions. However, whether people overestimate the benefits of moving to a privately owned home and, thus, hold biased beliefs regarding the utility consequences of home ownership, is an open question.

There is a large literature that nurtures the idea of "home sweet home" by highlighting the benefits of home ownership. Studies report a positive relationship between home ownership and social commitment (DiPasquale and Glaeser 1999) or community interactions (Hoff and Sen 2005), local political participation (Manturuk et al. 2009), education of children (Green and White 1997), physical health (Pollack et al. 2010) or satisfaction with housing (Elsinga and Hoekstra 2005). However, there are also studies which emphasise the negative aspects of home ownership, such as greater immobility in the labour market or more investment risk due to a less diversified portfolio (see, e.g., Blanchflower and Oswald 2013; and Dietz and Haurin 2003 for a review of positive and negative micro-level consequences). Tumen and Zeydanli (2014) even find a negative relationship between the transition from non-ownership to ownership on self-reported job satisfaction scores, particularly in the long run due to reduced mobility. An appropriate weighting of the advantages and disadvantages of home ownership against each other is a challenge when assessing its consequences on individual welfare. Many studies use self-reported life satisfaction as a proxy measure for individual welfare to gauge the overall effects of home ownership on an individual level. In line with the belief that home ownership makes happy, studies typically find a positive correlation between home ownership and subjective well-being (see, e.g., Rossi and Weber 1996 for the United States, Stillman and Liang 2010 for Australia; Ruprah 2010 for Latin America, Hu 2013 for urban China, or Zumbro 2014 for Germany).

Consistent with the positive effects shown in the literature, people generally state a strong preference for owning.[1] They associate home ownership with greater control over their lives, less

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[1]Over 90 percent of the American population between the ages 18 and 44 aim to own a house at some point in the future. The actual home ownership rate, however, is much lower at between 65 and 70 percent (Belsky 2013). While in Europe the average home ownership rate is much lower (with the lowest value for Switzerland with 34 percent), still, the majority of people would prefer to live in a privately owned property (Bourassa and Hoesli 2010).

insecurity of tenure, and better communities (Belsky 2013). Such beliefs regarding the benefits of home ownership are important determinants of pre-purchase preferences for owning with regard to tenure decisions (Drew 2014). Cohen et al. (2009) even argue that the subjective perception about the preferability of home ownership is a stronger predictor of home purchase behaviour than socio-demographic and financial characteristics. However, it remains unclear whether people have accurate beliefs about the benefits of their housing decision - a prerequisite for utility-maximising behaviour. Studies in the field of affective forecasting suggest that this condition might very well not hold, as people have the tendency to overestimate the initial impact and duration of an emotional event (see, e.g., Wilson and Gilbert 2003 and Loewenstein and Schkade 1999 for reviews from a psychological and from an economic perspective, respectively). Accordingly, many studies reveal that people make prediction errors in various domains, generally discussed and referred to as utility misprediction (see e.g., Loewenstein et al. 2003, Kahneman and Thaler 2006, and Frey and Stutzer 2014). Odermatt and Stutzer (2015) show that this also applies after major changes in life circumstances due to widowhood, unemployment, marriage, and disability, where people tend to underestimate the degree to which the impact of the event on their life satisfaction declines over time. From an economic perspective, potential prediction errors are particularly relevant in the context of home ownership, where long-term decisions are involved. However, to what extent people hold mistaken beliefs about the satisfaction benefits when moving to a purchased dwelling is yet unanswered. This involves an investigation of how life satisfaction changes before and after the status change from renter to homeowner, a pattern that has, likewise, not yet been investigated.

The present study investigates the accuracy of people's beliefs about the well-being consequences of home ownership. First, we provide a conceptual framework that highlights the relevance of biased beliefs for decision-making. In the economic literature, so far the discussion about the role of biased beliefs is mainly limited to beliefs regarding the probability distribution for possible outcomes. We extend this view with the argument that people might misperceive the utility consequences of outcomes irrespective of given probabilities due to incomplete knowledge regarding their preferences. In line with this notion, we argue that the general belief about the preferability of living in one's privately owned property equates to an overestimation of the positive consequences of home ownership. Second, we empirically test this claim by assessing prediction errors around the buyers' relocation to their purchased house or apartment. We exploit large-scale long-run panel data of the German Socio-Economic Panel (SOEP). In this annual survey, participants are asked about their individual life satisfaction, as well as how satisfied they expect to be in five years' time. We use the predicted subjective well-being as a proxy for expected future utility, in the same way that life satisfaction serves as a proxy measure for current utility.

To empirically determine whether people commit prediction errors around the time when they move to their purchased property, we follow the identification strategy which was recently developed by Odermatt and Stutzer (2015) who study prediction errors with data on predicted and actual life satisfaction. Specifically, we capture prediction errors around the status change

from tenant to owner by estimating two regression models: The first estimates the impact of the status change on individuals' actual satisfaction over time, a strategy adapted from the literature that analyses well-being profiles around life events (e.g., Clark et al. 2008, or recently Clark and Georgellis 2013). This provides empirical evidence of how life satisfaction changes around the status change to home ownership. The second estimated profile shows the impact of this event on people's expectations of their satisfaction in five years time. The impact on expected life satisfaction can then be compared with the actual changes in life satisfaction. The difference between the predicted long-term impact of home ownership and its actual impact reflects the prediction error. Our control strategy allows us to statistically abstract from other sources of prediction errors, in particular individual-specific and age-specific effects, taking account of potential selection effects that are prevalent in the analysis of home ownership.

Our results reveal that moving as a result of property purchase is associated with higher life satisfaction. However, people, on average, are overly optimistic about the positive long-term satisfaction gains. This occurs when we consider the prediction in the first interview after people have moved from a rented to a privately owned property. The prediction error is more pronounced if we further restrict the sample to those who move to a house, instead of an apartment. The results suggest that people do not anticipate that the positive relationship between life satisfaction and moving to a privately owned dwelling declines in the years following the status change.

To assess the relevance of mispredicted future satisfaction changes in the decision-making process, we look at predictions prior to the move. People interviewed shortly before their move to their purchased dwelling have not yet experienced what it feels like to live in the privately owned property. Accordingly, prediction errors may result not only from unanticipated adaptation to living in a privately owned house, but also from wrong beliefs about the actual impact of the changing circumstances. It turns out that people in the three months preceding their change of residence overestimate their future satisfaction to the same extent as the people interviewed after their change of residence. This provides evidence that people in the decision-making process might suffer from biased beliefs about the extent to which home ownership provides long-term satisfaction gains.

In a last step, we assess the relevance of heterogeneity in the underlying beliefs and investigate whether relying on an extrinsic value orientation contributes to an overestimation of the positive consequences of home ownership. Based on recent findings in the literature, we hypothesise that for individuals with extrinsically-oriented values (beliefs) the prediction errors with respect to home ownership are more pronounced. Indeed, we find that individuals who value income, success, and the ability to buy things relatively high, commit significant errors, while the others do not. While the analysis provides evidence that home ownership is positively related to satisfaction, overall, people seem to hold biased beliefs about the extent to which home ownership makes them happy.

We organise the remainder of the paper as follows. Section 2 presents the conceptual framework,

a brief survey of the literature, and the hypotheses. The data and empirical strategy are described in Section 3, and the estimation results are presented in Section 4. Section 5 offers concluding remarks.

2   Role of Beliefs for Utility Misprediction

Decision-making processes require that people form expectations about the utility that will result from their decisions. To form an accurate expectation, it is crucial to appropriately estimate the probabilities of possible outcomes. In addition, one needs to accurately predict the potential impacts that these outcomes might have on current or future utility. In the standard economic model of rational expectations, we expect unbiased predictions, and errors that are hypothesised to be random (Muth 1961). This is a corner stone of expected utility theory and ensures utility-maximising decision-making. However, there are many systematic biases, which cause people's beliefs and choices to differ from the beliefs and choices that are predicted by rational-agent models (for reviews see, e.g., Rabin 1998, Rabin 2002, Kahneman 2003, or DellaVigna 2009). As a consequence of biased beliefs, people might not accurately form their expectations regarding the utility consequences of their decisions, and consequently fail to maximise expected utility as a result of making suboptimal decisions (for general accounts of utility misprediction see e.g., Kahneman and Thaler 2006 or Frey and Stutzer 2014).

This section provides an overview of the role that biased beliefs play in the formation of expectations in general, and, in particular, in housing decisions. In Section 2.1, we present a simple conceptual framework to categorise two different forms of biased beliefs from the perspective of expected utility theory. We show in Section 2.2 how biased beliefs might lead to systematic prediction errors with regard to home ownership. Section 2.3 discusses the extent to which belief systems, such as an extrinsic value orientation, are potentially related to misprediction.

2.1   Conceptual Framework

To illustrate the reference framework, we consider the stylised version of the standard model on individual choice, adapted from Rabin (2002):

$$\max_{x \in X} \sum_{s \in S} p(s) U(x|s), \tag{1}$$

where X is the choice set, S the universe of possible states of the world, and p the probability distribution of these states. The utility function U reflects the underlying preferences. In this classical formulation, expected utility is maximised subject to p(s), given the choice set X and the utility U(x|s) derived from good x conditional on the state s. Thereby, people behave

optimally given their beliefs, and correct beliefs are assumed, i.e., beliefs and resulting choices that maximize their well-being.[2]

We propose two main categories of how people's beliefs might deviate from the correct beliefs assumed in rational-agent models and classify the related behavioural economic literature accordingly. First, people might have biased beliefs about the probability of states of the world p(s). In this case, subjective beliefs about the probability $\tilde{p}$(s) are different from the objective probability (p(s)$\neq\tilde{p}$(s)). Second, people might have incomplete knowledge regarding their preferences. With a perceived utility function $\tilde{U}$(x|s) that differs from the actual utility function U(x|s), people hold biased beliefs about the utility consequences of certain goods or attributes of goods (U(x|s)$\neq\tilde{U}$(x|s)). As a result, people mispredict their utility and, in turn, maximise their perceived expected utility $\sum_{s \in S} \tilde{p}$(s)$\tilde{U}$(x|s) instead of the actual expected utility. Figure 1 provides an overview of the general framework that incorporates the two categories about the relevance of beliefs from an expected utility perspective that we elaborate subsequently.

Figure 1: Role of beliefs in an expected utility framework
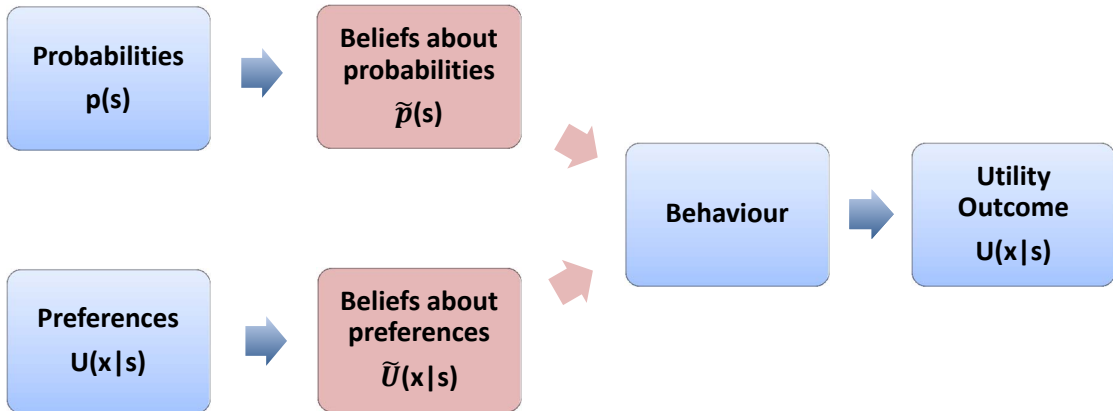
Note: Graphical representation of the conceptual framework described in Section 2.1. The blue boxes represent the standard economic approach where agents know about their preferences and, on average, assess the probabilities of possible future states s correctly. The red boxes indicate that the beliefs about preferences and probabilities might be biased, leading to suboptimal behaviour.

According to the first category, people mispredict the utility they derive from their choice if they base their decisions on subjective beliefs about the probability distribution $\tilde{p}$(s) that are different from the objective probabilities (p(s)$\neq\tilde{p}$(s)). In the recent economic literature, there are many studies that provide evidence for the discrepancy between objective and subjective

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[2]We refer to a simple form of the model where preferences are linear in p(s) and where no inter-temporal dimension (generally introduced in the models with a discount factor δ) is considered. However, our reasoning is not restricted to such a functional form or to any specific content of the utility function.

probabilities. Such a discrepancy reflects biased beliefs about the probability of states of the world or characteristics of goods.[3] A general finding is that agents tend to overestimate the probability of positive outcomes and underestimate it for negative outcomes (Weinstein 1980). This might be due to overoptimism (van den Steen 2004 or Sharot 2011 for a recent review), overconfidence (Barber and Odean 2001 or Malmendier and Tate 2005) or salience if decision makers overweight salient states (e.g., Bordalo et al. 2012). In addition, distortions in belief updating processes may occur, resulting from a failure in rationality in information processing (Brunnermeier et al. 2014). Or, contrary to the common prior assumption, people might hold personal prior beliefs, which cause them to deviate in their probability assessment from each other even with identical information and the same information processing (see Morris 1995 for a discussion). In sum, there are many mechanisms that may cause subjective probabilities to systematically differ from the objective or correct probabilities that one could obtain given the available information.[4]

Even when people, on average, have correct beliefs about the probabilities of the outcomes of their decisions, they still might systematically misperceive the utility they derive from these outcomes. According to our framework's second category, if people are not fully aware of their preferences, their perceived utility function $\tilde{U}(x|s)$ might not entirely reflect their actual utility function $U(x|s)$; i.e., they inappropriately evaluate the utility outcome of a good for which they have perfect information. In standard expected utility theory, this possibility is excluded by assumption, as stable preferences are assumed which the agents are fully aware of. We propose three reasons why $\tilde{U}(x|s)$ might deviate from $U(x|s)$:

(i) The weighting of different attributes of goods might be biased in the decision process. In many situations, the decision process involves trade-offs between goods that themselves have a variety of characteristics or attributes (Lancaster 1966).[5] Although people might be fully aware of their preferences regarding attributes of goods and know the probability distribution of the states, they might fail to apply appropriate weights to these attributes, which leads to mispredicted utility outcomes.[6] Again, salience might be a driver of this

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[3]p(s) captures risk or uncertainty in a decision-making process in two dimensions: regarding the future circumstances (for example, whether it will be a rainy summer or not when purchasing a convertible automobile), and also with regard to the characteristics of the good (e.g., whether the car is a lemon or not).

[4]The normative implications of biased beliefs are, however, not clear. The discrepancy does not necessarily lead to lower welfare. Brunnermeier and Parker (2005) provide a structural model of subjective beliefs in which forward-looking agents hold incorrect but optimal beliefs, as a small bias in beliefs leads to first-order gains due to increased anticipatory utility. Johnson and Fowler (2011) present an evolutionary model showing that overconfidence is beneficial for an individual's fitness, and Bénabou and Tirole (2006) model misbeliefs as a motivational factor for overcoming a tendency to underprovide effort due to limited willpower.

[5]In this sense, we can also think of x in equation (1) as reflecting a consumption bundle with different elements. A house might serve as an example for such a multi-attribute good. Approaches that try to provide the theory and methodology to analyse trade-offs of goods with multiple characteristics or objectives of their consumption are known under the concept of the *multi-attribute utility theory* (see Keeney and Raiffa 1993 for a review).

[6]Thereby, the weights are a feature of preferences and not a feature of beliefs regarding probabilities. Similar to the weighting function in prospect theory, where in the experiments that Kahneman and Tversky (1979) use to motivate probability weighting, participants are told the distributions of the gambles they are facing. Such weighting is, thus, a feature of preferences and not of beliefs regarding probabilities (for a recent discussion see Barberis 2013).

distortion, when, for example, the context draws the attention of consumers to certain attributes of goods (Bordalo et al. 2013 or Dietrich and List 2013). There are other biases reported in the literature which highlight that people apply heuristics to deal with complexity in the decision-making process which is caused by multiple attributes of goods. Examples are the *elimination-by-aspects theory of choice* (Tversky 1972) or *isolation effect* (Kahneman and Tversky 1979), where attributes that are shared across goods are disregarded to simplify decisions. Another example is *reason-based choice* (Shafir et al. 1993), where more weight is given to attributes that are commonly considered as beneficial (incorporating the possibility that preferences are sensitive to circumstances or framing).

(ii) People might not sufficiently take account of the fact that preferences might change (Loewenstein and Schkade 1999). Not only current tastes and preferences matter for decision-making. People additionally have to anticipate their future tastes and preferences of the point in time when the consequences of their decisions are experienced (Loewenstein and Angner 2003). A prominent cause of mispredicted utility occurs where individuals underestimate their capacity to adapt in the future to changing circumstances (manifested as an endogenous change in preferences). The emotional impact is often less harsh than predicted, because people adapt to the new circumstances more easily than they anticipated (Wilson and Gilbert 2003, Loewenstein et al. 2003 or Odermatt and Stutzer 2015). Consequently, people have biased expectations about the duration of their emotional responses.

(iii) Not only future preferences, but also current preferences can be misperceived. This is the least discussed issue in the economic literature so far. The claim is based on the simple notion that even if we take individual preferences as given, the question remains as to how one decides upon goods one has never consumed before. A person who never drove a convertible automobile might only have a limited perception of whether he or she likes it or not. We argue that such situations reflect not only uncertainty regarding the product's characteristics, but also uncertainty regarding a person's preferences for the particular combination of characteristics. In contrast to the standard model, this approach describes people as being engaged in a constant process of discovery to acquire knowledge, not only regarding characteristics of goods, but also regarding their personal tastes. In principle, consumers are unaware of the full set of their own tastes.[7] Consequently, on the one hand, they depend on experience to discover their preferences in a process of learning by consuming (see, Sobel and Clark 2014 or Lévy-Garboua and Montmarquette 1996 who apply this idea to model theater demand). On the other hand, besides experience, individuals' beliefs about their personal preferences are potentially influenced by many factors such as parenting, culture, advertisements, and recommendations from friends.

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[7]In the standard model, this violates the completeness assumption; i.e., that agents know about their preferences and have preference relations over all possible trade-offs. For a discussion about the consequences of this violation for expected utility theory, see e.g., Dubra et al. (2004).

The mentioned arguments suggest that beliefs are relevant not only as a basis for updating beliefs about probabilities regarding characteristics of goods or future circumstances but also regarding the discovery of personal preferences. Common beliefs about the favourability of a certain behaviour might therefore be suboptimal heuristics in the formation of expectations, leading to misprediction of the utility outcomes of choices.

2.2 Beliefs Regarding Home Ownership: Literature and Hypothesis

In this section, we give an overview about potentially biased beliefs regarding the benefits of home ownership and derive the general hypothesis for the subsequent empirical analysis. When people form predictions about their future well-being as homeowners, not only do they have to consider the possible states of the world they might live in, but they also have to anticipate the immediate as well as the long-term benefits resulting from the new circumstances. Accordingly, misprediction around the house purchase might occur due to wrong beliefs about future changes in circumstances (e.g., future financial situation or characteristics of the dwelling), as well as wrong beliefs about the extent to which home ownership satisfies their needs, given their preferences.

Studies which show biased beliefs regarding home ownership mostly relate to beliefs about the financial consequences of the house purchase. A claim by Glaeser et al. (2008) suggests that general findings regarding overoptimism about future prices can be applied to housing economics. They further argue that any biases have major consequences, because in the housing market transactions costs are higher and short-selling is more difficult than in almost any other asset market. Belsky (2013) refers to a survey by Case and Shiller (2003) which shows that expectations about the future growth in house prices are generally biased towards the present market environment, a potential driver of housing bubbles. Given this rationale, people tend to underestimate the costs of home ownership, revealing flawed reasoning in their judgment of the financial superiority of ownership over tenancy (Ben-Shahar 2007). In addition, Bucks and Pence (2008) find that borrowers with adjustable-rate mortgages are likely to underestimate or not to understand the extent of possible rate increases from year to year or over the life of their loan, implying that they underestimate the risk of higher future interest rates.

Misbeliefs about the favourability of home ownership might also occur when individuals have incomplete knowledge of their preferences.[8] A study by Dunn et al. (2003) investigates prediction errors of undergraduate students regarding their predicted happiness regarding the potential dormitories that they could be assigned to. They find that the students placed far greater

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[8]Simonsohn and Loewenstein (2006) support the argument that uncertainty about people's own preferences is relevant in the housing market. According to them, their finding of a *contrast effect* exemplifies that people draw upon a wide range of cues to help them resolve this uncertainty. They show that households which move away from expensive cities to less expensive ones spend more in their destination city, because their previous exposure to high prices makes prices in the new city seem cheaper. The authors see this as evidence that movers experience some uncertainty about how much they want to spend on housing. Alternative explanations, such as imperfect information, are ruled out.

weight on physical features than on social features when predicting their future happiness, although social features turned out to be more relevant for their happiness later on. The authors explain this result in part as an isolation effect, meaning that the students were focused too much on factors that distinguished the buildings and not enough on circumstantial factors, such as social features, which only varied slightly. This indicates that the distortion in the weighting of different attributes of housing might be relevant in the decision process, and thereby lead to unfavourable choices compared to decision outcomes resulting from unbiased weighting. Mispredicted adaptation might also play a role in the housing market. Hoelzl et al. (2009) conduct a survey of 117 homeowners at different stages of the loan process. They contrast the home-owner's experience of loan burden over time with their forecasts and recollections. They find that people erroneously expect that their negative emotional experience of the loan burden will decrease over time. This finding suggests that homeowners hold an incorrect belief about their capacity to adapt to a burdensome financial situation, thereby resulting in an overestimation of the long-term satisfaction benefits.

In sum, there is evidence supporting the behavioural economic conjecture that people might hold systematically wrong beliefs regarding the long-term benefits of home ownership: People are generally too optimistic about future circumstances in the housing market, tend to apply inappropriate weights to different attributes of housing, and underestimate the long-term negative impact of carrying a financial burden. In line with these findings, we postulate the following hypothesis:

Hypothesis 1: *People overestimate the long-run life satisfaction gains derived from moving from a rented home to a privately owned property.*

2.3 Extrinsic Belief System as a Source of Misprediction

People might hold general intuitive theories about the sources of utility, such as beliefs about what goals should be pursued in life to satisfy needs. If people are not fully aware of their preferences, their beliefs can be erroneous in the sense that the predicted utility does not materialise even if the specific goal is achieved. It follows that belief systems need not all be equally good at representing the extent to which certain goods are beneficial to individual welfare. A belief system widely discussed in the literature is the materialistic belief system, generally termed as an extrinsic belief system (e.g., see Tatzel 2002 for a discussion in the field of economics). With an extrinsic value system, financial success and material possession are pursued, while a non-materialistic or intrinsically oriented system promotes the satisfaction of personal, intrinsic values, such as social relationships, family, and experiences.

There are arguments in the literature on economics and psychology which claim that extrinsic belief systems generate false motivational goals. They lay too much weight on material goods and induce individuals to undervalue goods that provide non-material benefits (see Scitovsky 1976 or Frank 1999). Indeed, many studies report that people who follow materialistic or

extrinsic life goals report lower life satisfaction than those who follow intrinsic life goals (e.g., Sirgy 1998, Kasser 2002 or Sheldon et al. 2004). Sheldon et al. (2010) argue that this difference can be explained partly by suboptimal behaviour, because extrinsically oriented people are prone to overestimate the emotional benefits of consuming materialistic goods. Consequently, these people potentially misallocate their time, effort and money, and in turn derive a lower level of individual welfare. In their study, they randomly assigned participants to pursue either extrinsic goals or intrinsic goals for a 4-week period (e.g., either to earn some extra money or to promote social interaction). They show that extrinsically oriented people, who assign a relatively high value to money, success and image, overestimate the emotional benefits of achieving extrinsic goals. The group of more intrinsically oriented individuals were not prone to such misprediction.

Instead of comparing the difference between extrinsic and intrinsic values as a property of personality in driving human behavior, Frey and Stutzer (2014) highlight differences between these values as attributes of goods. They suggest that people tend to overvalue the characteristics of goods that relate to consumption which satisfies extrinsic desires, and that this leads to an overconsumption of goods with extrinsic attributes. As a reason, they posit that there is an asymmetry in the extent to which people adapt to these attributes: Adaptation is stronger for extrinsic than for intrinsic aspects of consumption and this stronger adaptation is underestimated. They back this argument with their empirical finding based on life satisfaction data which shows that people adapt to a higher level of labour income (strong extrinsic attributes), but are not able to adapt to the burden of commuting (strong intrinsic attributes). If adaptation to higher labour income is underestimated, the asymmetry is carried forward to the misprediction of utility in commuting choices, which then results in too much commuting, for which people are not compensated.

Extrinsic belief systems might be relevant to perceptions of home ownership from various perspectives. Housing in general can be seen as a multi-attribute good (in the sense of Lancaster 1966) that satisfies extrinsic as well as intrinsic needs. On the one hand, Elsinga and Hoekstra (2005), for example, provide a brief review of theories about the meaning of home ownership, which highlights the extrinsic dimension of home ownership. They quote Rohe and VanZandt (2001), who find that home ownership is related to perceived higher social status and that the purchase of property is regarded as a significant "achievement". Additionally, the preference for home ownership can partly be explained by the "possessive instinct" that people have and their desire to mark out their own territory (Saunders 1990). On the other hand, people also identify home ownership with intrinsic needs such as better communities, more control over living space, and living arrangements that are beneficial for one's family (Belsky 2013). The relevance of the domains might be differently weighted in the valuation of home ownership, depending on what life goals people pursue. Extrinsically oriented people might put more weight on the extrinsic aspects of a house purchase than intrinsically oriented people, and vice versa. If adaptation is more likely to be underestimated for extrinsic aspects than for intrinsic aspects, people with extrinsic life goals are particularly prone to mispredict the benefits of materialistic goods. Accordingly, we formulate following second hypothesis:

Hypothesis 2: People with extrinsically oriented life goals overestimate the long-run life satisfaction gains derived from moving from a rented home to a privately owned property to a larger extent than people with intrinsically oriented life goals.

3 Data Description and Methodology

3.1 Data and Empirical Strategy

We base the empirical analysis on individual-level panel data from the German Socio-Economic Panel (SOEP). This representative survey of the German population has been conducted annually since 1984 and contains a wide range of questions regarding socio-economic status and demographic characteristics. Importantly, every year respondents report their subjective well-being by answering the question: "How satisfied are you with your life, all things considered?". For thirteen consecutive years, between 1991 and 2004, people were then asked the question: "And how do you think you will feel in five years?". People answer both questions according to an eleven-point satisfaction scale from 0 meaning "completely dissatisfied" to 10 meaning "completely satisfied".[9] This provides the information to identify our key dependent variables in the subsequent empirical analysis.

In addition to querying people's predicted and actual satisfaction with life, it is necessary to investigate transitions to home ownership. To do so, we exploit the information in the SOEP regarding the tenure status of respondents. We consider the status change from tenant to owner across two surveys as indicating a person's transition from being a tenant to becoming homeowner.[10] We only consider the first time that the respective status change occurs for an individual within the sample period and exclude respondents who switched to home ownership before entering the survey (left-censored spells). We further require a full record of the tenure status without missing years, which ensures that we have observed all status changes. We use data from 1991 onwards and include observations up to and including 2004 for the analysis using predicted life satisfaction. For the analysis based on current life satisfaction, a measure which is reported for all the years, we use observations up to the end of the year 2009 in order to also observe the realised satisfaction of people who made their predictions between 2000 and 2004. However, we only consider those homeowners, whose status change occurred in the period between 1991 and 2004. Hence, we exclude transitions for which the predictions are missing owing to the restrictions on the sample period. Regarding age, we limit the sample to respondents who are 18 years of age or older and younger than 90 years of age. Given these restrictions, we observe in total 2,749 individuals who switch their status from tenant to homeowner.

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[9]Item non-response is less than half a percent for actual satisfaction and less than two percent for predicted satisfaction.

[10]This follows the approach of Clark et al. (2008), who apply this strategy to study satisfaction profiles around various life events such as unemployment or widowhood.

To identify potential prediction errors when people become homeowners, we apply the strategy proposed by Odermatt and Stutzer (2015) for identifying prediction errors around life events. In a regression with individual fixed effects, we include separate indicators for the years around the individual's status change to capture changes in current and predicted subjective well-being. Thereby, we compare the changes in predicted life satisfaction with the actual changes in life satisfaction five years later. The difference then reflects the prediction error.

Specifically, we estimate two models of the following form:

$$PS_{it} = \alpha_i + \sum_{j=-4}^{6} \theta_j \, Owner_{it}^j + \beta' \mathbf{X}_{it} + \varepsilon_{it} \tag{2}$$

$$LS_{it} = \alpha_i + \sum_{j=-4}^{6} \theta_j \, Owner_{it}^j + \beta' \mathbf{X}_{it} + \varepsilon_{it} \tag{3}$$

Predicted and current life satisfaction serve as dependent variables. PS_{it} stands for the predicted life satisfaction of individual i at time t, and LS_{it} stands for the realised actual life satisfaction of individual i at time t. $\mathbf{X}_{it}$ is a vector of individual controls indicated in Table 1. The main explanatory variables are given by the series of dummy variables $Owner_{it}^j$, indicating the number of years j before and after the status change to ownership. The first dummy captures observations three to four years before the status change. The last dummy captures the reports of people six or more years after they experienced the status change. This means that the reference category consists of all the years up until four years preceding the status change. The inclusion of individual fixed-effects α_i results in within-individual estimates. This controls for any time-invariant individual characteristics, and implies that the partial correlations are only based on variation within the same person over time. It first rules out that individual-specific optimism or pessimism drives the differences between predicted and experienced life satisfaction. Second, it takes account of potential selection that is due to homeowners sharing underlying characteristics associated with, for example, their higher satisfaction with life. In addition, the vector of control variables includes age-specific fixed effects that capture changes in our dependent variables which are common for a particular age group. Time-fixed effects are further included to control for systematic changes over time that are common to all individuals, and region-fixed effects control for regional characteristics that might be correlated with our variables of interest.

The empirical test of Hypothesis 1 is reflected by the difference between the coefficient θ_0 of model (2) and θ_5 of model (3), with H_0: $\theta_0^{PS} - \theta_5^{LS} = 0$ and the following test statistic[11]:

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[11]As the estimates are based on overlapping samples, the residuals or the two estimation models are likely to be correlated. This requires that the covariance of the two regressors is taken into account to thest the difference between the regressors. To obtain the covariance of the two models, we apply the stacking method described in Weesie (1999). It allows the parameter estimates and associated (co-)variance matrices to be stored in one parameter vector to obtain a simultaneous (co-)variance matrix of the sandwich/robust type. Applying this strategy, any difference in the effects between the estimations can then be derived by calculating the linear combination of the two coefficients shown in equation 4.

$$Z = \frac{\theta_0^{PS} - \theta_5^{LS}}{\sqrt{\sigma_{\theta_0^{PS}}^2 + \sigma_{\theta_5^{LS}}^2 + 2cov_{\theta_0^{PS}\theta_5^{LS}}}} \qquad (4)$$

The difference θ_0^{PS}–θ_5^{LS} reflects the average individual prediction error resulting from moving from a rented to a privately owned property. A significant difference (rejection of H_0) provides support of the hypothesis that people overestimate the long-run life satisfaction gains of the status change to homeowner, conditional on the average individual-specific errors four years or more before ownership. The identifying assumption is that people's interpretation of the scales does not change due to the status change and that there are no systematic effects of the status change in the data preceding the four-year period prior to the status change. This is a necessary condition so that the average prediction error of an individual in the period preceding the four years prior to status change of home ownership can serve as a valid counterfactual.

3.2 Sample Restrictions and Descriptive Statistics

Besides controlling for the potential selection of people with certain characteristics into home ownership, the analysis of the accuracy of people's predictions of the long-term benefits of home ownership presents two further challenges. First, one can think of renting and owning as being very close substitutes, e.g., in the case when people purchase the dwelling they have been living in so far. In such a case, many of the trade-offs and uncertainties usually involved in the house purchase decision are not important, and consequently, we do not expect prediction errors to be very distinct. In contrast, purchase decisions that require the relocation to another dwelling involve much more uncertainty and require that the decision maker has a capacity to visualize future circumstances. Hence, the empirical analysis should differentiate between non-movers and movers; whereby we expect more pronounced effects for the latter. In order to address this, we make use of information about people's relocation behaviour provided in the SOEP. Respondents are asked whether they lived in the same apartment or house when they were interviewed the previous time. This allows us to separately study the sample of those people, who's status change to owner actually involved moving, as well as the sample of those people for whom no relocations are observed around the status change.

A second challenge to the analysis is the fact that the point of time at which people purchase a house is endogenous to the experience of circumstances that potentially relate to subjective well-being. The reasons why people decide to purchase their own home are manifold, be it a change in the family situation or a new job. The status change to ownership is then more a by-product of another important (potentially omitted) life decision. Therefore, to capture status changes that are specifically related to the decision-making process involved in purchasing a dwelling, the analysis needs to abstract from other influencing factors. We do this by exploiting the question in the survey that queries the reason for the relocation. The survey participants have the option to indicate whether they moved because they bought a house or an apartment.

Additionally, they were able to state other reasons for their relocation, such as to being noticed, inheritance, job- or family-related reasons (e.g., marriage, divorce, children) or reasons related to the characteristics of the dwelling (e.g., size, cost, location). For our main analysis, we use this information to further restrict the sample to those homeowners who indicate the purchase of property as a main reason for moving, without mentioning job- or family- related reasons, inheritance, or whether they were given notice as motivations for relocation.

These restrictions leave us with 1,334 individuals who we classify as changing status from tenant to owner, providing us with 16,543 person-year observations around transitions to home ownership. In total, we use a sample of 85,600 observations for the estimation of equation (2) and 117,592 for the estimation of equation (3). These samples include both people who acquired property and tenants. By including tenants in the regressions, we have the advantage that we can estimate our time fixed effects and other control variables with people who are not recorded as having acquired property, but might have actually done so, i.e., the counterfactual situation to owning. In addition, the coefficients of our control variables are more precisely estimated, which in turn increases the efficiency of the estimation of our key coefficients.

Table 1 presents the descriptive statistics. It reports the mean values and standard deviations of variables involved in the empirical analysis. They are shown for the extended sample used for the analysis of life satisfaction. In addition, the characteristics of all observations of individuals who switch their status to homeowner within the sample period are indicated. The comparison of the mean values of the characteristics shows that homeowners differ with regard to some characteristics: Compared to the full sample, homeowners have a higher level of current and predicted life satisfaction, on average. They also differ regarding socio-demographic characteristics, as they tend to be younger, have more children, earn more, are more likely married, and are currently employed. These differences indicate that home ownership proxies for many unobservable characteristics that potentially relate to positive living prospects (e.g., stable job situation or marital situation) and highlight the importance of considering potential selection effects in the analysis of home ownership. We do so by including individual fixed effects and the socio-demographic characteristics as control variables.

Table 1: Descriptive statistics for the full sample and the sample of homeowners

| | Full sample | | Homeowners | |
	Mean	SD	Mean	SD
Well-being measures				
Life satisfaction	6.76	1.83	7.16	1.58
Predicted life satisfaction in 5 years	6.86	2.00	7.37	1.69
Demographics				
Female	0.52	0.50	0.48	0.50
Age	46.01	16.65	40.17	10.85
No. of years schooling	11.48	2.59	12.50	2.77
German	0.83	0.37	0.90	0.30
Marital status				
Single	0.23	0.42	0.14	0.35
Married	0.65	0.48	0.81	0.39
Separated	0.01	0.10	0.01	0.08
Divorced	0.05	0.22	0.03	0.18
Widowed	0.07	0.25	0.01	0.10
Labour force status				
Working	0.58	0.49	0.79	0.41
Unemployed	0.08	0.27	0.04	0.19
Not working	0.13	0.33	0.08	0.28
In education	0.02	0.14	0.01	0.12
Maternity leave	0.02	0.14	0.03	0.17
Some work	0.03	0.16	0.02	0.14
Pensioner	0.15	0.36	0.02	0.15
Household characteristics				
ln(household income after tax)	10.11	0.56	10.48	0.45
No. of children in household	0.59	0.93	0.99	1.06
Size of household	2.72	1.31	3.28	1.25
No. of observations	117,592		16,543	
No. of individuals	16,975		1,334	

Notes: The number of observations and individuals relate to the extended sample used for the analysis regarding actual life satisfaction in specification II of Table 2. The number of observations and individuals drawn from the full sample of the analysis regarding predicted life satisfaction is 86,503 and 14,405 respectively (which applies here for the variable *predicted life satisfaction in 5 years* as well).
Data source: SOEP.

4 Estimation Results

4.1 Predictions Following the Relocation to the Acquired Property

By studying the predictions that people made in the first interview after moving to their purchased dwelling, we are able to study whether they could correctly anticipate the adjustment or adaptation process to their new circumstances. Table 2 presents the results for the estimated models outlined in equation (2) and (3).[12] The columns labelled PS present estimates with predicted life satisfaction as the dependent variable. The columns labelled LS show the estimates with current life satisfaction as the dependent variable. Sample 1 represents our preferred sample specification, referred to in the descriptive statistics which is based on the restrictions outlined in Sections 3.1 and 3.2, and focuses on people for whom the purchase of the home is their reason for moving. The coefficients in column II show the changes in individual life satisfaction in the years around relocation due to the acquisition of a house or an apartment. The estimates reveal a significant positive effect on people's life satisfaction. Compared to their baseline level of subjective well-being four or more years prior to home ownership (i.e., the reference period), reported life satisfaction as indicated on the eleven-point satisfaction scale is 0.343 points higher in the year after the purchase. This indicates a substantial short-term satisfaction benefit that is comparable, for example, with the satisfaction increase when people get married (see e.g., Odermatt and Stutzer 2015).

Two further aspects stand out with regard to the effect on life satisfaction. First, the long-term impact of ownership on satisfaction five to six years after purchase is indicated as being 0.240 points higher than the initial value, and thus demonstrates that the positive effect only partially wears off. This highlights that people who acquire and move to their privately owned property are also better off in the long run compared to their prior satisfaction levels. Second, given that the responses record significant satisfaction increases already three to two years prior to the actual status change, there seem to be substantial anticipation effects, potentially reflecting beneficial living conditions which are potentially correlated with the imminent purchase. A similar profile is estimated for people's predicted life satisfaction in five years' time. In the first interview after the status change, our statistical analysis shows that people expect their long-term satisfaction levels to be 0.409 points higher compared the baseline predictions that they made four or more years earlier. Interestingly, the relocation has a stronger impact on predicted life satisfaction than it does on actual life satisfaction, suggesting that people, on average, expect their life satisfaction to increase even further over subsequent years.

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[12]A full estimation output that includes the control variables for the specifications I and II is reported in Table B.1.

Table 2: Regression of predicted (PS) and actual life satisfaction (LS) around home ownership: Prediction errors calculated for the predictions made in the first year after the status change

	Sample 1		Sample 2		Sample 3		Sample 4		Sample 5	
	PS I	LS II	PS III	LS IV	PS V	LS VI	PS VII	LS VIII	PS IX	LS X
Before ownership										
4-3 years hence	0.053	−0.006	0.072	0.008	−0.007	−0.013	−0.197	−0.188	−0.023	−0.054
	(0.06)	(0.06)	(0.07)	(0.07)	(0.04)	(0.04)	(0.13)	(0.12)	(0.05)	(0.05)
3-2 years hence	0.088	0.130**	0.119*	0.131*	0.061	0.079*	0.018	−0.185	0.047	0.029
	(0.06)	(0.06)	(0.07)	(0.07)	(0.05)	(0.04)	(0.13)	(0.13)	(0.06)	(0.05)
2-1 years hence	0.245***	0.139**	0.307***	0.161**	0.175***	0.103***	0.073	−0.123	0.157**	0.039
	(0.06)	(0.06)	(0.06)	(0.06)	(0.04)	(0.04)	(0.14)	(0.13)	(0.07)	(0.05)
Within the next year	0.282***	0.247***	0.307***	0.265***	0.199***	0.174***	0.027	0.062	0.189**	0.101*
	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.15)	(0.13)	(0.08)	(0.06)
After ownership										
0-1 year	0.409***	0.343***	0.442***	0.373***	0.297***	0.279***	0.042	0.045	0.282***	0.193***
	(0.06)	(0.06)	(0.06)	(0.07)	(0.05)	(0.05)	(0.14)	(0.13)	(0.09)	(0.07)
1-2 years	0.218***	0.238***	0.267***	0.284***	0.175***	0.195***	−0.072	−0.130	0.155	0.092
	(0.06)	(0.06)	(0.07)	(0.07)	(0.05)	(0.05)	(0.14)	(0.12)	(0.10)	(0.07)
2-3 years	0.215***	0.221***	0.263***	0.241***	0.160***	0.193***	−0.034	−0.003	0.136	0.082
	(0.07)	(0.06)	(0.08)	(0.07)	(0.05)	(0.05)	(0.15)	(0.13)	(0.12)	(0.08)
3-4 years	0.290***	0.283***	0.324***	0.285***	0.203***	0.225***	0.014	0.077	0.176	0.099
	(0.07)	(0.06)	(0.08)	(0.07)	(0.06)	(0.05)	(0.16)	(0.13)	(0.13)	(0.08)
4-5 years	0.316***	0.254***	0.317***	0.209***	0.215***	0.230***	0.002	0.138	0.185	0.086
	(0.07)	(0.06)	(0.08)	(0.07)	(0.06)	(0.05)	(0.18)	(0.14)	(0.14)	(0.09)
5-6 years	0.246***	0.240***	0.212**	0.216***	0.173***	0.208***	0.105	0.083	0.147	0.062
	(0.08)	(0.07)	(0.09)	(0.08)	(0.07)	(0.05)	(0.18)	(0.14)	(0.15)	(0.09)
6 or more years	0.342***	0.278***	0.356***	0.274***	0.224***	0.220***	0.207	0.162	0.197	0.034
	(0.08)	(0.06)	(0.09)	(0.07)	(0.07)	(0.05)	(0.17)	(0.13)	(0.18)	(0.11)
Difference: PS(0-1 year)−LS(5-6 years)	**0.170****		**0.225*****		**0.090***		**−0.041**		**0.221****	
	(0.070)		(0.080)		(0.054)		(0.144)		(0.100)	
No. of observations	85,600	117,592	83,068	114,321	97,697	133,912	76,059	105,094	24,615	32,863
No. of individuals	14,196	16,975	13,936	16,715	15,611	18,390	13,203	15,982	2,749	2,749
No. of homeowners	1,334	1,334	1,074	1,074	2,749	2,749	341	341	2,749	2,749
R^2	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.05	0.04	0.04

Notes: Standard errors in parentheses. Sample 1 is the preferred sample specification referred to in the descriptive statistics that is based on the restrictions outlined in Section 3.2. Sample 2 consists only of homeowners who acquired a house (and not an apartment). Sample 3 comprises all individuals for whom we observe a status change from tenant to owner. Sample 4 refers to all become owner without changing the dwelling in the previous, the current, or the upcoming year. In Sample 5 all who remain renters are dropped. Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $p < .01$. Significance levels of the prediction errors derived from a z-test described in equation (4).

Data source: SOEP.

Based on the coefficients in columns I and II, we can calculate whether people's predictions in the first interview after relocating is accurate or not. The potential prediction error in the first year after the status change is the difference that results when the actual impact (the coefficient *5-6 years* in specification II) is subtracted from the predicted impact (the coefficient *0-1 year* in specification I). In this case, the estimates indicate a statistically significant difference of 0.170. This reveals that people are, in line with Hypothesis 1, overly optimistic about the long-term consequences of home ownership, even after they have moved into their privately owned dwelling. This substantiates the supposition that people do not anticipate the partial adaptation to the new circumstances. On the contrary, people even expect their satisfaction to increase slightly over time.

In order to simplify the interpretation of the regression coefficients provided in columns I and II, we present the estimated coefficients graphically in Figure 2. The black solid line shows the effects on current satisfaction, while the red x-marks capture the effects on predicted satisfaction. In order to facilitate the approximation of the prediction error, a red dotted line is included to show the effect of the status change on the predictions right after the event (0-1 year after the event) across the time periods up to period five (5-6 years after the event). The difference between the red dotted line and the black solid line in period five thus reflects the prediction error.

Figure 2: Estimated patterns in actual and predicted life satisfaction around the status change
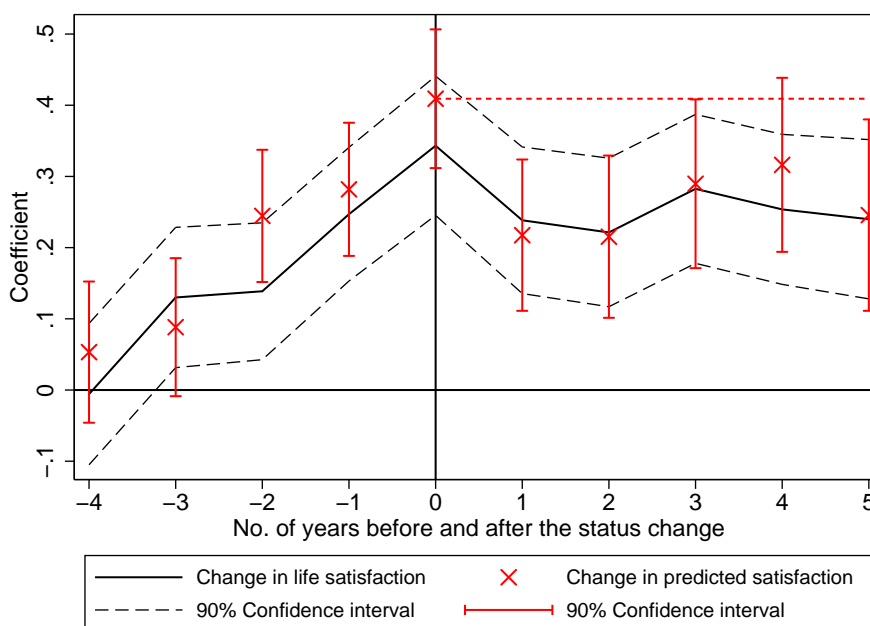
Note: This figure is based on the estimated coefficients of sample 1, specifications I and II in Table 2. The black solid line shows the coefficients of specification II and the red x-marks indicate the coefficients of specification I. The red dashed line is an auxiliary line that represents the effect of the status change on the expected satisfaction five years after the prediction. The prediction error is reflected in the difference between the red dashed line and the black solid line (capturing the effect on actual satisfaction) in period 5.
Data source: SOEP.

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To assess the sensitivity to the sample selection regarding homeowners as well as the heterogeneity in the potential prediction errors, we estimate the profiles using four other samples. Figure 3 presents the graphical representation of the estimated profiles. First, sample 2 includes only those homeowners who acquired a house, as opposed to an apartment. To acquire and move to a house instead of an apartment reflects more directly the dream of owning a house and likely involves a greater change in circumstances. We thus expect bigger prediction errors for this sample. This supposition is confirmed under specifications III and IV: Here, with the exclusion of the 260 individuals who acquired an apartment instead of a house, the calculated prediction error is even more pronounced and amounts to 0.225 points. The estimates further suggest that the effect on life satisfaction is slightly higher the year after the purchase compared to specification II. However, the effect diminishes increasingly over time, leading to a similar long-term benefit. This adaptation, again, is not anticipated.

Figure 3: Estimated patterns in actual and predicted life satisfaction around the status change for different samples
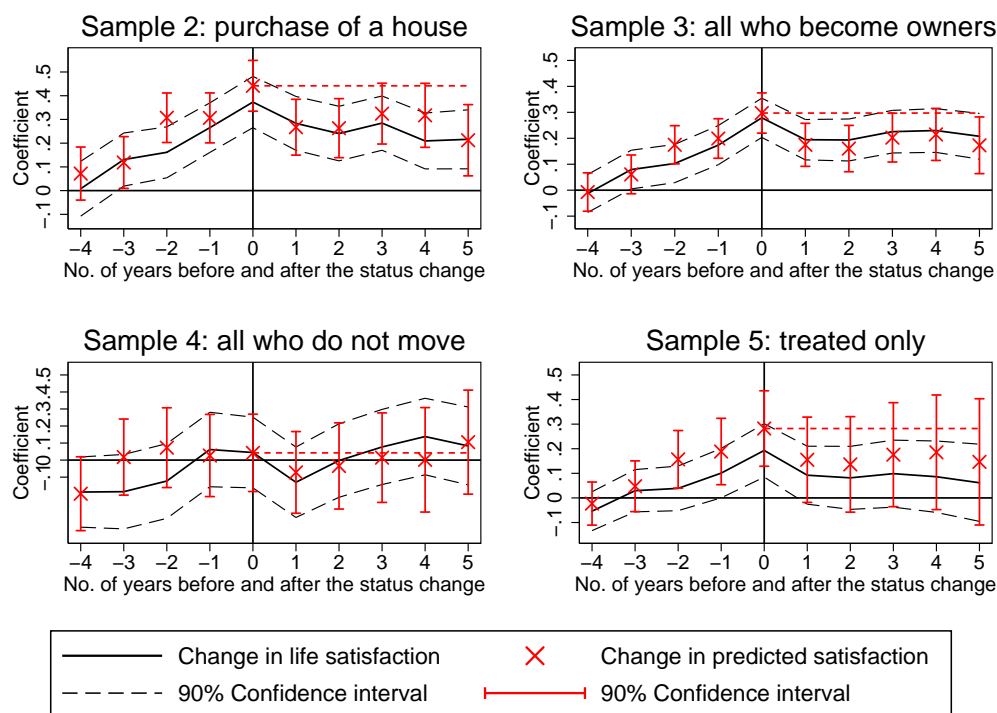
Note: This figure is based on the estimated coefficients of samples 2-5, specifications III-X in Table 2. For a description, see Figure 2.
Data source: SOEP.

Second, sample 3 comprises all individuals for whom we observe a status change from tenant to owner, irrespective of their relocation behaviour and the reasons for purchasing a home. These latter conditioning characteristics are the least restrictive with regard to the individuals' reasons

for changing their status to owner. The prediction error calculated based on the estimates of this broad sample of 2,749 homeowners is positive and significantly different from 0, but with 0.090 points less in magnitude compared to the errors in sample 1 and 2. Third, sample 4 estimates the profiles for all those homeowners who are not observed to have moved one survey prior to or within two surveys subsequent becoming homeowners. This approximately captures the group of individuals who purchased dwellings they were already living in. In reference to the discussion in Section 3.2 about the extent to which renting is a substitute for owning, we expect an accurate prediction of future satisfaction to be easier, the smaller the change in circumstances is that the purchase brings about, i.e., the more the acquired dwelling is a very close substitute for the previously rented dwelling. Thus, we do not expect prediction errors to be very distinct for the sample of those who do not relocate when becoming owner of their dwelling. This also provides some evidence regarding whether the benefits of home ownership are mainly driven by changes in circumstances (e.g., different housing characteristics or neighbourhood owing to the relocation) or, additionally, by personal importance of ownership (e.g., emotional attachment or the associated increase in autonomy) that does not require relocation. Specifications VII and VIII do not reveal a significant impact of the status change on life satisfaction that is specifically independent of relocation to another dwelling. Accordingly, no prediction errors are present. The explanatory factor of the relocation to an other dwelling therefore seems to be crucial for the positive effects of home ownership.

In a last robustness exercise (sample 5), we re-estimate specifications V and VI, and exclude all those people who do not experience the status change from tenant to owner. On the one hand, this has the advantage that the control variables are specifically estimated for the individuals who switch to being homeowners. On the other hand, it makes it harder to separate the impact of the status change from the systematic fluctuation in the satisfaction measures over time, which is captured by the year-specific time dummies. This particularly applies for the estimation of the post purchase life satisfaction changes (specification X), as all observations in the period 2005 – 2009 already experienced the transition from tenancy to ownership. It is thus possible that part of the positive correlation of home ownership with life satisfaction is captured by the time fixed effects. Additionally, in view of the smaller sample of observations, we expect the standard errors to increase compared to the specifications that include tenants. While the partial correlations of the dummies around the status change with predicted life satisfaction are similar to the ones estimated using sample 3, the effects of the status change on life satisfaction are smaller in magnitude. The coefficients are also less precisely estimated in both specifications. The resulting prediction error amounts to 0.221 points; however, due to the potential misspecification of specification X, this result should be interpreted with caution. In sum, the results suggest that people who become owners of their dwelling, on average, overestimate the positive long-term benefits of ownership.

4.2 Predictions Before Moving to the Acquired Property

So far, we have concentrated on whether people adequately anticipate the degree of their adaptation to the new status as homeowners once they are established in their new living circumstances for some time. This enquiry, however, does not adequately take account of the information that people have at their disposal when deciding whether to acquire property or not. As is usual in decision-making processes, people have to decide on options, without recourse to prior experience. They, consequently, have to rely on their predictions about the circumstantial conditions and potential outcomes of their decisions. It would therefore be interesting to assess whether people have biased beliefs about the long-term benefits of home ownership already prior to living in the new dwelling, but once they have decided to purchase the prospective property. Such a belief bias would be the result not only of wrong expectations regarding the adaptation process, but also of an incorrect assessment of the change's short-term impact. In order to approximately investigate decisions reached from this perspective, we look at people's predictions shortly before they are due to move to their new dwelling. At this point, they then know about the properties of the new dwelling and are aware that their future life will involve home ownership, which might not be the case when the purchase is in the distant future. This knowledge and salience of the status change are then likely to influence their predictions about their life satisfaction in five years' time. This, in turn, reveals people's expectations about the well-being consequences of their decision before experiencing them. With this exercise we aim to empirically test the accuracy of the beliefs about the total benefits of home ownership, discussed in the conceptual framework.[13]

To identify people interviewed shortly before moving to their new dwelling, we make use of the moving date provided in the SOEP which covers most of the people who relocated. Combining this information with the year and month of the interview, we can calculate the time span between the interview and the month when the interviewee moved in his or her acquired dwelling.[14] This allows us to include two further dummies in the empirical models (2) and (3). One dummy captures 187 people who are due to move within next three months. We assume that these people know about the destination of their relocation at least three months prior to moving; particularly, in view of the fact that the period of giving notice required by German law is three months. The other dummy is equal to one for the 286 individuals who are due to move within the next three to six months.

Table 3 provides the results for the estimations of the extended models. The estimates suggest there is a large anticipation effect, as the positive impact of a status change to home ownership on individual life satisfaction can already be observed in the months before the people move to their new dwellings. A similar result is found with regard to people's predictions. People

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[13]While our analysis in Section 4.1 only assesses misprediction regarding the durability of an emotional event (the so-called *durability bias* according to the literature on affective forecasting), the present section analyses misprediction regarding the duration and the initial impact of the event, i.e., the overall *impact bias*.

[14]We dropped individuals who either provided no information about the relocation- or interview date or who's statements about their relocation date is implausible (e.g., people who state that they had relocated since the previous year, but indicate a relocation date that is later than their interview date.)

expect a higher level of life satisfaction in five years time already in the months before they actually move to their purchased dwelling. Figure 4 presents the graphical representation of these patterns. Again, the black solid line shows the effects on current satisfaction, while the red x-marks capture the effects on predicted satisfaction. In addition, the green and blue x-marks symbolise the predictions of people who are due to relocate within the next six to three months, and within the next three months, respectively. The prediction errors are reflected in the difference between the coloured dashed line and the black solid line in period 4 for the predictions before the status change, and in period 5 for the predictions in the first interview after the status change. As illustrated, the change in the level of people's predicted satisfaction in the months prior to home ownership are higher than those for the actual long-term changes of life satisfaction.

Figure 4: Estimated patterns in actual and predicted life satisfaction before and after the status change
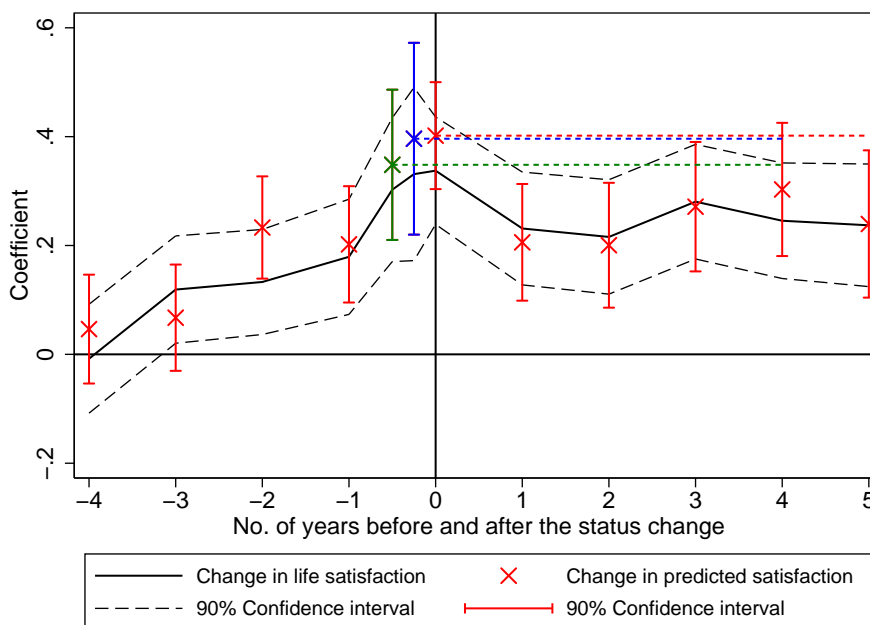
Note: This figure is based on the estimated coefficients in Table 3. The black solid line shows the coefficients of specification II, and the red x-marks indicate the coefficients of specification I. The green and blue x-marks are included for ease of interpretation to indicate the predictions of people in the last survey before the status change, who will move within the next six to three months and within three months, respectively. The coloured dashed lines are auxiliary lines that represent the effect of the status change on the expected satisfaction for five years after the prediction. The prediction errors are reflected in the difference between the level at the end of the coloured dashed lines and the black solid line (capturing the effect on actual satisfaction) in periods four and five.
Data source: SOEP.

To calculate the exact size of errors made in the months before the status change, we can look at the difference between the impact on predicted life satisfaction shortly before the event (the

Table 3: Regression of predicted (PS) and actual life satisfaction (LS) around home ownership: Prediction errors calculated for the predictions made in the months before and in the first year after the status change

| | Sample 1 | |
| | PS | LS |
	I	II
Before ownership		
4-3 years hence	0.046	–0.008
	(0.06)	(0.06)
3-2 years hence	0.067	0.119**
	(0.06)	(0.06)
2-1 years hence	0.233***	0.133**
	(0.06)	(0.06)
1 year - 6 months hence	0.202***	0.179***
	(0.06)	(0.06)
6-3 months hence	0.348***	0.303***
	(0.08)	(0.08)
3-0 months hence	0.396***	0.331***
	(0.11)	(0.10)
After ownership		
0-1 year	0.402***	0.338***
	(0.06)	(0.06)
1-2 years	0.206***	0.231***
	(0.06)	(0.06)
2-3 years	0.200***	0.216***
	(0.07)	(0.06)
3-4 years	0.271***	0.281***
	(0.07)	(0.06)
4-5 years	0.303***	0.246***
	(0.07)	(0.06)
5-6 years	0.240***	0.237***
	(0.08)	(0.07)
6 or more years	0.334***	0.271***
	(0.08)	(0.07)
Difference:		
PS(6-3months)–LS(4-5 years)	**0.100**	
	(0.090)	
PS(3-0 months)–LS(4-5 years)	**0.154**	
	(0.112)	
PS(0-1years)–LS(5-6years)	**0.166****	
	(0.070)	
Individual controls	Yes	Yes
Age fixed effects (FE)	Yes	Yes
Time and region FE	Yes	Yes
Individual FE	Yes	Yes
No. of observations	85,430	117,392
No. of individuals	14,176	16,955
No. of homeowners	1,314	1,314
R^2	0.04	0.04

Notes: Standard errors in parentheses. Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $p < .01$. Significance levels of the prediction errors derived from a z-test described in equation (4).
Data source: SOEP.

coefficients for *5-3 months hence* and *3-0 months hence* in specification I) and the impact on actual satisfaction five years later (i.e., the coefficient for *4-5 years* in specification II). Figure 5 provides a summary of the sizes and significance levels of the resulting prediction errors. Compared to the prediction error of 0.166 points made in the first interview after the relocation (that is very similar to the error in Sample 1 of Table 2), the prediction errors derived from this exercise show the same sign and are of similar size as well. The standard errors are slightly bigger and the prediction errors not statistically significantly different from zero, however. The wider confidence intervals might not come as a surprise, as the respective coefficients rely on fewer individuals. In sum, the results provide evidence that the increase in actual and predicted life satisfaction, and thus the prediction errors, appear already in the months before the actual status change. It is thus likely that prediction errors are already implicit in the decision-making process.

Figure 5: Graphical representation of the prediction errors before and after status change
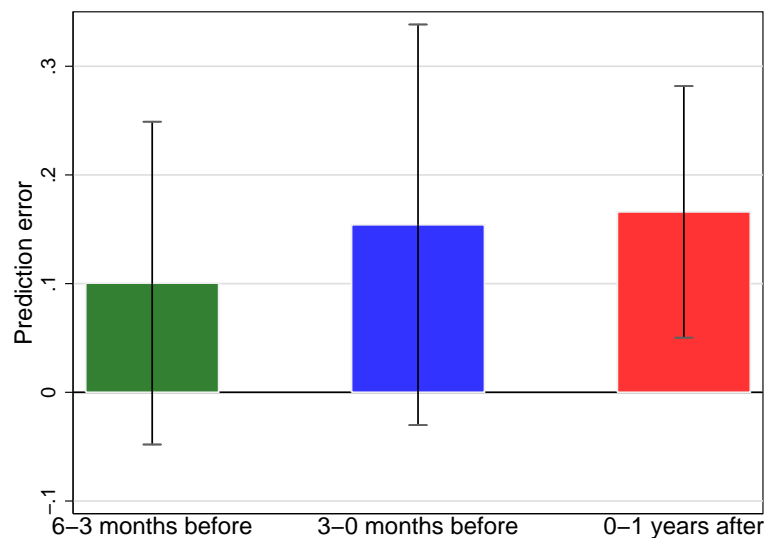
Note: 90 percent confidence intervals are indicated.
Data source: SOEP.

4.3   Heterogeneity: Extrinsic versus Intrinsic Belief System

In this section, we investigate the claim of Hypothesis 2 that the prediction errors are bigger for people with extrinsically oriented life goals than they are for people with intrinsic life goals. To test this hypothesis within our empirical approach, we assess whether the difference between predicted and realised satisfaction is systematically bigger for extrinsically oriented individuals. We therefore have to categorise the individuals with regard to their value orientation. To do so, we make use of a series of questions included in the SOEP which investigate the importance

of certain life areas to the individual. The questions are based on a classification of life goals, initially developed by Kluckhohn and Strodtbeck (1961) that aims at measuring three domains: materialism (as well as achievement and success), family life, and altruism (for a discussion of the development and the reliability of the measures, see Headey 2008). In the surveys, respondents are asked to rate the importance they attach to certain life areas on a 1–4 scale ranging from "not important" to "very important". Using principal component analysis, Headey (2008) and Headey et al. (2010) classify the importance of being able to buy things, being able to achieve one's potential, and being successful in the job relating to the success domain. We use this categorisation to classify the importance of these items as indicators of extrinsic value orientation. We further add the item regarding the importance of income to this group of extrinsically oriented life goals, an item that was not used in their analyses. For the indication of intrinsic value orientation, we use items relating to the domains of family life and altruism, namely the importance of family, friends, being there for others, and being politically/socially involved. Table B.2 provides an overview of the items and years that are used.[15]

To differentiate between people with an extrinsic versus those with an intrinsic value orientation, we focus on the relative importance that people attach to the respective type of values. Specifically, for every individual in the sample, we use the earliest observation per item and calculate the mean across all the intrinsic and extrinsic items. As we are interested in the value orientation that is expressed in the period around the decision and purchase process, we only include those homeowners whose importance measures are recorded up until the first year after the purchase. The ratio of the mean values of the extrinsic and intrinsic items thereby expresses the importance of extrinsic values relative to the intrinsic values. The median of this measure for the sample of homeowners serves as the threshold value to build two groups: We classify all individuals with a value higher or equal to the median as extrinsically oriented, and all those below the median value as intrinsically oriented.

Table B.3 presents the descriptive statistics for the two samples of extrinsically and intrinsically oriented individuals. When we compare the mean values of the socio-demographic characteristics, we see that extrinsically oriented people tend to have lower predicted and actual satisfaction with life. In addition, the extrinsic sample comprises more males, people of younger age, and more unmarried individuals with a slightly smaller number of children, on average. There are also more individuals currently working and fewer pensioners classified as extrinsic. This is not surprising, as the importance of success in a job is part of the extrinsic domain.[16] However, in the two samples, the average household income after tax is very similar, although the importance of income serves as an item corresponding to the extrinsic domain.

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[15]The items are measured intermittently and with slight variation in the wording. In the years 1991, 1994, 1998 and 1999, people are asked about the importance of the item for their satisfaction, and in the years 1992, 1995 and 2004 they are asked about the general importance of the item in their life today. In the year 1991, the question was only asked to people belonging to the sample of former East-German states.

[16]In a robustness check, we conduct the analysis by excluding pensioners. The estimates yield very similar results. We further checked the sensitivity of the results with respect to the classification of the groups, by simply classifying individuals as extrinsic when they indicate income as being very important. Again, the results are very similar (estimation outputs available upon request).

Table 4: Regression of predicted (PS) and actual life satisfaction (LS) around home ownership for the samples of extrinsically and intrinsically oriented people

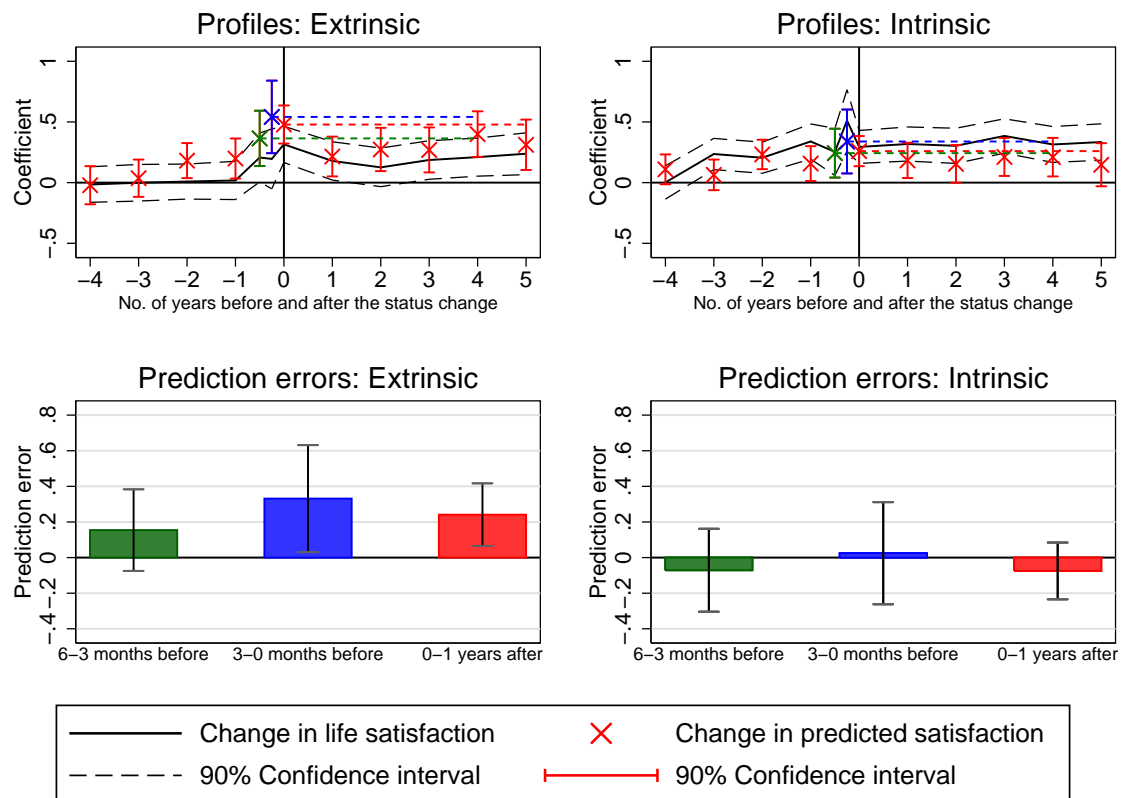|	Extrinsic (X)		Intrinsic (I)		Δ(X–I)	
	PS	LS	PS	LS	PS	LS
	I	II	III	IV	V	VI
Before ownership						
4-3 years hence	−0.021	−0.015	0.110	0.001	−0.131	−0.017
	(0.09)	(0.09)	(0.07)	(0.08)	(0.12)	(0.12)
3-2 years hence	0.037	−0.001	0.064	0.236***	−0.027	−0.237**
	(0.09)	(0.09)	(0.08)	(0.08)	(0.12)	(0.12)
2-1 years hence	0.182**	0.009	0.232***	0.205***	−0.051	−0.196*
	(0.09)	(0.09)	(0.07)	(0.08)	(0.11)	(0.12)
1 year - 6 month hence	0.199**	0.018	0.157*	0.339***	0.041	−0.321**
	(0.10)	(0.10)	(0.09)	(0.09)	(0.13)	(0.13)
6-3 month hence	0.365***	0.207*	0.243**	0.254**	0.121	−0.046
	(0.14)	(0.12)	(0.12)	(0.12)	(0.18)	(0.17)
3-0 month hence	0.542***	0.196	0.339**	0.512***	0.202	−0.317
	(0.18)	(0.15)	(0.16)	(0.15)	(0.24)	(0.21)
After ownership						
0-1 year	0.479***	0.316***	0.260***	0.294***	0.219*	0.021
	(0.09)	(0.09)	(0.08)	(0.08)	(0.12)	(0.12)
1-2 years	0.215**	0.179*	0.183**	0.319***	0.032	−0.140
	(0.10)	(0.10)	(0.09)	(0.08)	(0.13)	(0.13)
2-3 years	0.273**	0.126	0.155*	0.303***	0.119	−0.177
	(0.11)	(0.10)	(0.09)	(0.09)	(0.14)	(0.13)
3-4 years	0.270**	0.187*	0.212**	0.385***	0.058	−0.198
	(0.11)	(0.10)	(0.09)	(0.09)	(0.15)	(0.13)
4-5 years	0.400***	0.210**	0.210**	0.314***	0.190	−0.104
	(0.11)	(0.09)	(0.10)	(0.09)	(0.15)	(0.13)
5-6 years	0.312**	0.238**	0.147	0.335***	0.164	−0.097
	(0.13)	(0.10)	(0.11)	(0.09)	(0.16)	(0.14)
6 or more years	0.359***	0.176*	0.256**	0.417***	0.103	−0.241*
	(0.12)	(0.10)	(0.11)	(0.09)	(0.16)	(0.13)
Difference:						
PS(6-3months)–LS(4-5 years)	**0.154**		**−0.071**		**0.225**	
	(0.139)		**(0.141)**		**(0.199)**	
PS(3-0 months)–LS(4-5 years)	**0.331***		**0.025**		**0.306**	
	(0.183)		**(0.174)**		**(0.252)**	
PS(0-1years)–LS(5-6years)	**0.241****		**−0.075**		**0.316****	
	(0.107)		**(0.097)**		**(0.144)**	
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Age fixed effects (FE)	Yes	Yes	Yes	Yes	Yes	Yes
Time and region FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	42,932	59,988	37,192	49,679	80,124	109,667
No. of individuals	6,382	7,245	5,129	5,506	11,511	12,751
No. of homeowners	576	576	501	501	1,077	1,077
R^2	0.05	0.05	0.04	0.04	0.04	0.05

Notes: Standard errors in parentheses. Δ(X–I) indicates the specifications that show the difference in the coefficients between extrinsically and intrinsically oriented individuals. Specifications V and VI show the difference between specification I and III and between II and IV, respectively. These differences are estimated by including the interaction terms of all covariates with the dummy equal to one for the extrinsically oriented individuals in specifications V and VI (full interaction model).

Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $p < .01$. Significance levels of the prediction errors derived from a z-test described in equation (4).

Data source: SOEP.

Table 4 provides the results for the independent estimation of the profiles for the two groups. Columns I and II provide the estimates for individuals with an extrinsic value orientation, and columns III and IV provide those for individuals classified as intrinsically oriented. For ease of presentation, we plot the coefficients and the calculated prediction errors in Figure 6. The coefficients indicate that while the individuals who are classified as extrinsically oriented make systematic prediction errors in the months shortly before their status change, as well as in the first interview after their status change, the intrinsically oriented individuals do not. With errors of 0.331 and 0.241 points for extrinsically oriented people shortly before and after the status change, respectively, the magnitude of the errors are about double the size of the errors that we calculated in Table 3.

Figure 6: Graphical representation of the estimated patterns in actual and predicted life satisfaction and of the prediction errors around the status change for extrinsically and intrinsically oriented people

To test whether the errors differ systematically between extrinsically and intrinsically oriented people, as Hypothesis 2 suggests, we need to look at the differences in the errors across the two groups. They are indicated at the bottom of columns V and VI and show that only the 0.316

points difference in the errors made in the first survey after moving is statistically significant. The difference in the errors made within the three months before the status change is similar in size but not statistically significant, however (z-value=1.21).[17]

Columns V and VI show the difference between the actual life satisfaction profile and the predicted life satisfaction profile across the two groups. We estimate these differences by including the interaction terms of all covariates with a dummy equal to one for the extrinsically oriented individuals. The results show that the profiles of the two groups differ particularly with regard to their anticipation of the positive effect in the years before the house purchase and regarding the adaptation to the positive effect. For extrinsically oriented people, the increase in life satisfaction occurs only shortly before the status change, and they seem to adapt stronger to the positive impact. Interestingly, although extrinsically oriented people's life satisfaction increases less in the three months before the status change, they still report a bigger positive change in their predicted life satisfaction. However, the bigger positive change in predicted life satisfaction for the extrinsically oriented individuals is only marginally significant for the first survey after the status change.

In sum, the results provide first evidence that extrinsically oriented people make bigger prediction errors around their purchase of property compared to intrinsically oriented people. This is in line with Hypothesis 2 and indicates that an extrinsic belief system when facing home ownership might serve as a suboptimal heuristic, as it is related to a overestimation of the benefits of home ownership.

5   Conclusion

This study explores whether homeowners systematically overestimate the happiness derived from living in a privately owned house. It combines an analysis of the well-being consequences of home ownership with an investigation about how people's expectations regarding their future satisfaction change in the light of home ownership. This allows us to study whether people, on average, have accurate expectations when facing a house purchase. From a general perspective, unbiased expectations in decision-making are a cornerstone of traditional economics. Our analysis applies recent theoretical and empirical behavioural economic findings which question traditional assumptions about unbiased utility-maximising behavior and reveal the possibility of systematic misbeliefs about the utility consequences of people's decisions. "Home sweet home" or the belief that home ownership makes people happy might serve as a biased belief or even a suboptimal heuristic.

In a conceptual framework, we highlight, first, the impact that prediction errors have on decision-making, where there is limited information regarding future circumstances or characteristics of

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[17]To assess the significance of the differences of the errors across the two samples, we apply a z-test, a standard procedure to test the equality of regression coefficients across estimations that are based on independent samples (see e.g., Paternoster et al. 1998).

the goods (e.g., the quality of the dwelling or how well one gets along with the neighbours). Secondly, we point out the errors that potentially result from an individual's incomplete knowledge of his or her preferences. Consequently, contrary to assumptions in the standard models, people might hold biased beliefs about the consequences of their actions in terms of utility. In the empirical analysis, we use longitudinal data in a field setting to assess whether people commit prediction errors regarding a major life choice, namely the decision to relocate to a purchased property.

The results provide evidence in line with our hypothesis that people systematically overestimate their future life satisfaction after having relocated to their acquired dwelling. Our further analysis reveals that people make overly optimistic predictions already in the three-month period preceding their relocation. This provides support for the speculation that people potentially rely on biased expectations regarding the long-term benefits of home ownership in the decision-making process. It is, however, difficult to assess to what degree the prediction errors are driven by misbeliefs resulting from uncertainty regarding individual preferences and not by misperceived probabilities. We try to investigate the relevance of beliefs regarding individual preferences by analysing heterogeneity in the ability to accurately predict future satisfaction. We study differences across two groups categorised according to their beliefs about the preferability of extrinsic versus intrinsic life goals. We find that people with extrinsically oriented life goals compared to those with intrinsically oriented life goals tend to make bigger prediction errors. This result provides the first evidence that demonstrates the crucial role that (suboptimal) belief systems play in forming people's expectations regarding the utility outcome of certain decisions.

Our findings relate in several ways to previous research. The evidence for the general notion that people make systematic mistakes when predicting the overall impact of changing circumstances is in line with the insights from Odermatt and Stutzer (2015), who identify prediction errors made after marriage, widowhood, unemployment and disability. They suggest that people do not foresee the adaptation process they will go through when faced with changing circumstances. Our estimated satisfaction profiles show that people report positive long-term life satisfaction changes after moving to a purchased property, thereby conforming to the broad literature that generally finds positive effects of home ownership on life satisfaction. Our estimation strategy allows us to track the development of this positive effect over time. It reveals that the level of positive satisfaction change around home ownership diminishes slightly over time. Nevertheless, the long-term impact amounts to over two thirds of the short-term positive impact. This is contrary to the finding for many other life events where people tend to entirely adapt to the new circumstances (e.g., Clark et al. 2008). The positive impact on both predicted and current life satisfaction, observed already in the months and even years before the relocation, is a further indication that anticipation might play a role (e.g., Loewenstein 1987 for an early account of anticipation in economic theory). Recent studies which neglect the anticipation and estimate the effect of home ownership on life satisfaction by taking all observations before the status change as the counterfactual reference period may therefore underestimate the overall effect. However, the increase in happiness reported already two to three years before the house purchase might

also reflect the fact that home ownership potentially proxies other unobservable characteristics which might be related to positive living prospects. Further research is needed to identify in a more detailed manner the channels by which home ownership affects life satisfaction.

Future research also needs to clarify whether prediction errors around home ownership would be even stronger in the setting of other countries which have a higher proportion of owner-occupied properties and a tradition of valuing this status. From a general perspective, it is crucial that economic analysis gains a better understanding of the role of individual beliefs as a potential source of mispredicted utility and suboptimal behaviour. It is important that the conditions under which biased beliefs evolve and influence decision-making processes are identified. This would require a systematic way of predicting which beliefs agents might hold in various environments and how these beliefs guide observed behaviour, an account the economic theory does not offer so far.

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B Appendix D

Table B.1: Regression of predicted and actual life satisfaction around home ownership: Full estimation output of Table 2

	Sample 1	
	PS	LS
	I	II
Before ownership		
4-3 years hence	0.053	−0.006
	(0.06)	(0.06)
3-2 years hence	0.088	0.130**
	(0.06)	(0.06)
2-1 years hence	0.245***	0.139**
	(0.06)	(0.06)
Within the next year	0.282***	0.247***
	(0.06)	(0.06)
After ownership		
0-1 year	0.409***	0.343***
	(0.06)	(0.06)
1-2 years	0.218***	0.238***
	(0.06)	(0.06)
2-3 years	0.215***	0.221***
	(0.07)	(0.06)
3-4 years	0.290***	0.283***
	(0.07)	(0.06)
4-5 years	0.316***	0.254***
	(0.07)	(0.06)
5-6 years	0.246***	0.240***
	(0.08)	(0.07)
6 or more years	0.342***	0.278***
	(0.08)	(0.06)
Individual controls		
No. of years schooling	0.025**	0.003
	(0.01)	(0.01)
ln(household income after tax)	0.122***	0.310***
	(0.02)	(0.02)
German	0.034	−0.078
	(0.08)	(0.08)
No. of children in HH	0.007	0.055***
	(0.02)	(0.02)
Size of household	−0.012	−0.078***
	(0.02)	(0.01)
Married	ref.	ref.
Single	−0.028	−0.086**
	(0.05)	(0.04)

(Continued on next page)

Table B.1: (continued)

Widowed	0.086	–0.129*
	(0.11)	(0.08)
Separated	0.167**	–0.323***
	(0.08)	(0.07)
Divorced	–0.016	–0.093
	(0.08)	(0.06)
Working	ref.	ref.
Unemployed	–0.299***	–0.717***
	(0.03)	(0.03)
Pensioner	–0.116	–0.264***
	(0.08)	(0.05)
Not working	–0.117***	–0.251***
	(0.03)	(0.03)
In education	–0.023	–0.123***
	(0.05)	(0.04)
Maternity leave	–0.013	0.003
	(0.04)	(0.04)
Some work	–0.155***	–0.280***
	(0.04)	(0.03)
Individual controls	Yes	Yes
Age fixed effects (FE)	Yes	Yes
Time and region FE	Yes	Yes
Individual FE	Yes	Yes
No. of observations	85,600	117,592
No. of individuals	14,196	16,975
No. of homeowners	1,334	1,334

Notes: Standard errors in parentheses. Significance levels: * $.05 < p < .1$, ** $.01 < p < .05$, *** $< .01$. Significance levels of the prediction errors derived from a z-test described in equation (4).

Table B.2: Measurement of value orientation

	Survey Years	Obs.	Mean	SD
Extrinsic measures				
Importance of income/earnings	1991, 1994, 1998, 1999	81,177	3.48	0.57
Importance of job success	1991, 1992, 1994, 1995,			
	1998, 1999, 2004	110,360	2.78	0.95
Importance of fulfilling the own potential	1992, 1995, 2004	101,576	2.86	0.77
Importance of being able to afford sth.	1992, 1995, 2004	101,709	3.03	0.60
Mean over all items: extrinsic measure			3.04	0.52
Intrinsic measures				
Importance of family	1991, 1994, 1998, 1999	81,202	3.76	0.49
Importance of friends	1991, 1994, 1998, 1999	81,215	3.22	0.67
Importance of being together with friends often	1992, 1995	59,638	2.92	0.70
Importance of leading a happy partnership	1992, 1995, 2004	101,475	3.58	0.73
Importance of being there for others	1992, 1995, 2004	101,695	3.19	0.59
Importance of political/social participation	1992, 1995, 2004	101,534	1.86	0.75
Mean over all items: intrinsic measure			3.08	0.42

Notes: Across surveys, there is a slight variation in the wording of the questions asked. In the years 1991, 1994, 1998 and 1999, people are asked about the importance of the item for their satisfaction, and in the years 1992, 1995 and 2004 they are asked about its general importance in life today. In the year 1991, the question was only asked to people belonging to the sample of former East-German states. There are other items in the questionnaire which we do not use; i.e., importance of work, political influence, domicile, spare time, health, religion, neighbourhood, mobility, a house, environmental protection, having children, and travel.

Table B.3: Descriptive statistics for the samples of extrinsically and intrinsically oriented individuals

| | Extrinsic | | Intrinsic | |
	Mean	SD	Mean	SD
Well-being measures				
Life satisfaction	6.65	1.86	6.84	1.78
Predicted life satisfaction in 5 years	0.00	1.32	0.00	1.27
Demographics				
Female	0.47	0.50	0.59	0.49
Age	43.91	15.94	49.14	17.01
No. of years schooling	3.35	5.51	3.00	5.39
German	0.26	0.44	0.22	0.42
Marital status				
Single	0.09	0.30	0.04	0.21
Married	0.60	0.49	0.71	0.45
Separated	0.00	0.10	0.00	0.08
Divorced	0.02	0.17	0.01	0.13
Widowed	0.02	0.14	0.02	0.16
Labour force status				
Working	0.63	0.48	0.51	0.50
Unemployed	0.03	0.25	0.01	0.20
Not working	0.02	0.23	0.03	0.27
In education	0.01	0.12	0.00	0.10
Maternity leave	0.01	0.11	0.00	0.12
Some work	0.01	0.14	0.01	0.14
Pensioner	0.04	0.23	0.07	0.29
Household characteristics				
ln(household income after tax)	2.89	4.60	2.57	4.45
No. of children in HH	0.13	0.59	0.12	0.60
Size of household	0.70	1.36	0.64	1.35
No. of observations	59,988		49,679	
No. of individuals	7,254		5,506	
No. of homeowners	576		501	

Notes: The number of observations relate to the sample of the analysis with actual life satisfaction in specification II and IV of Table 4.