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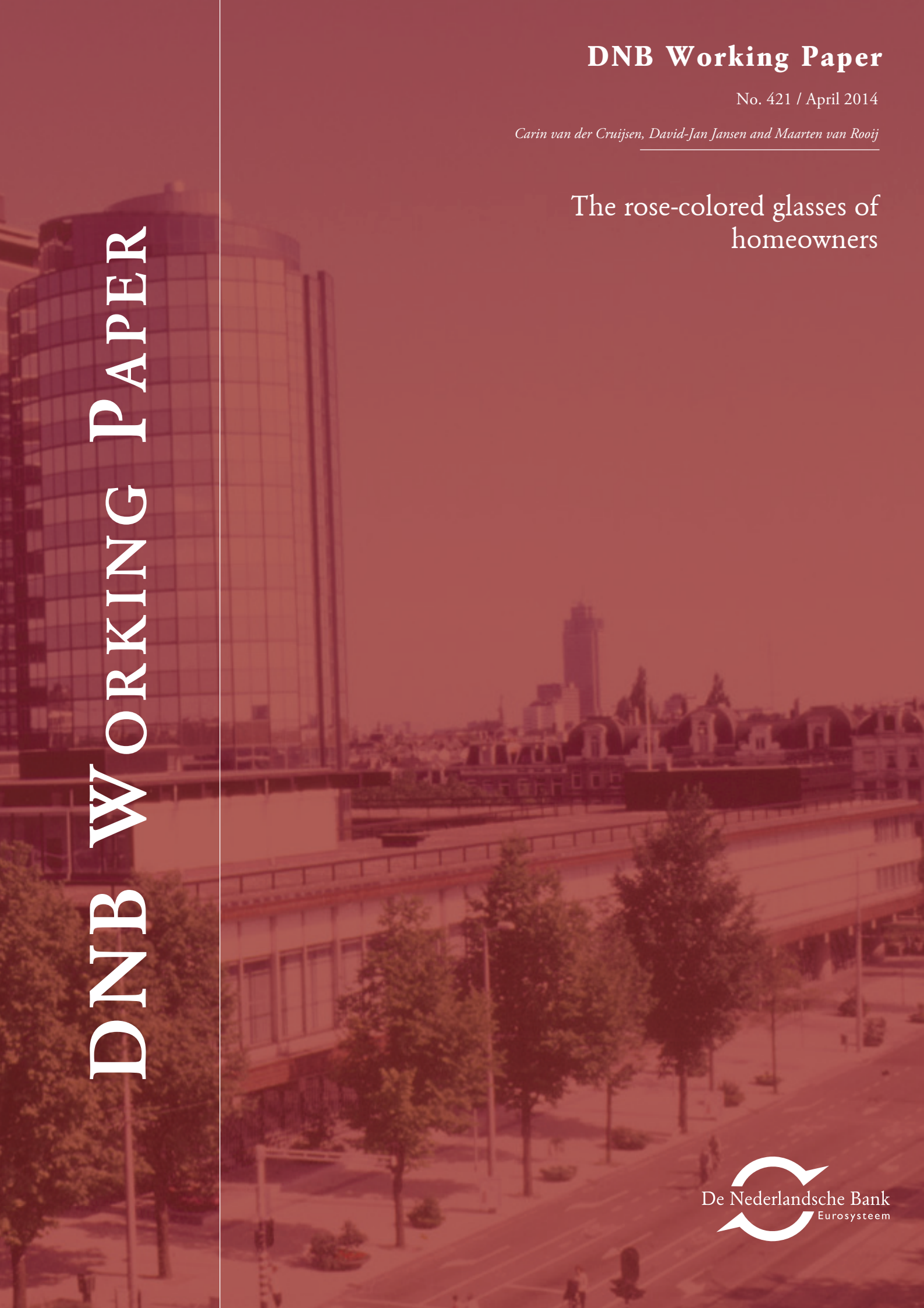

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The rose-colored glasses of homeowners

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Abstract

Based on annual household surveys between 2003 and 2012, we show that owners have a rosy picture of their current house value and hold optimistic views on the historical and expected change in house value compared to general price trends. Optimism is both driven by loss aversion and an endowment effect as overestimation of the house value is positively related to the mortgage loan-to-value ratio and tenure of the owner-occupier. After several years of national declines in house prices, the estimates in our sample have become more realistic but the glasses of homeowners remain rose-colored. Even groups of homeowners that are arguably well-informed, e.g. homeowners with moving plans and homeowners that are in charge of household finances, overestimate the value of their house.

JEL-codes: R31, D12

PsycINFO classification: 3920

Keywords: housing prices, endowment effect, loss aversion, households, survey data

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1. Introduction

As has been the case in many OECD countries, the Dutch housing market has gone through a prolonged period of declining prices and a low level of housing transactions during the global financial crisis. The housing bust has not gone unnoticed, with academics, policymakers, and the media discussing the causes and consequences of the standstill in great detail. However, a remarkable feature of the housing market remains that a majority of the population believes that house prices are too high, despite a price decline of 20% since the summer of 2008. Figure 1 shows the responses of a survey in 2012, where 54% of the respondents said that houses were still overvalued.

(Insert Figure 1 about here)

Yet, a popular explanation for the slow return of the housing market to a new equilibrium is that home sellers ask unrealistically high prices, which reduces the number of transactions and delays the adjustment process. At first sight, the difference between a widespread belief of an overvalued housing market and the unwillingness of many home sellers to settle with realistic prices seems puzzling. A possible explanation is that homeowners do not want to incur a loss on their house, which is rational when homeowners have the perception that they cannot take out a mortgage for a new house including the remaining debt from the current house. However, the government and banks actively communicate that this is possible. An alternative explanation for this puzzle is that homeowners truly believe that their house is more valuable than other, objectively comparable houses. In this paper, we study whether homeowners suffer from rose-colored glasses, i.e. whether they hold optimistic perceptions of their home value, and if so to what extent. Moreover, we explore the relation between rose-colored glasses and two psychological biases: loss aversion and endowment effects. These are

important questions from the perspective of household financial decision-making as housing represents a large share of household wealth and is a key factor in consumption, saving, and retirement decisions (see e.g. Browning et al. 2013, Agarwal 2007, and Lusardi and Mitchell 2007). Lusardi and Mitchell, for example, show that households may plan to use their home as a source of pension income.

The situation in the Netherlands provides an excellent opportunity to investigate these issues. When Dutch households buy a house, they typically take out a mortgage loan that exceeds the price paid for the house. Until recently it was custom that a large share of the mortgage was interest-only without a scheduled repayment of the principal. With increasing house prices, initial high loan-to-value ratios do not give rise to problems. But due to declining house prices, currently about one out of three homeowners face negative home equity (Statistics Netherlands). The annual DNB Household Survey includes detailed information on Dutch homeowners for the boom-bust period 2003-2012 which enables us to test the presence of rose-colored glasses in various ways, using perceptions about historical developments and expectations about price changes, yet to come.

We have three main sets of results. First, we present three pieces of evidence for the presence of rose-colored glasses. First, in the first years of the bust period a relevant share of homeowners thinks that the value of their home has increased, while it actually decreased. Second, three-quarters of homeowners overestimate the current value of their house. The median homeowner reports a price that is 13% above the actual value. Third, a substantial share of homeowners is more optimistic about the future price development of their own house than about general price developments.

Second, we find that the rose-colored glasses are related to psychological biases. We report a positive relationship between the perceived house values and measures for loss aversion and an endowment effect. Overestimation of the current home value is positively

related to the loan-to-value ratio and tenure. Third, we show that house price developments, individual-specific factors and house-characteristics matter for the size of the bias. The bias is larger in periods with strong housing price increases than in periods with low or decreasing housing prices. The bias is relatively low in the North of the Netherlands and in urbanized areas. There is some evidence of a negative relationship between the level of education and the bias. The bias is larger for males than for females. However, the degree of overestimation of the value of the house is unrelated to moving plans and responsibility for household finances. Homeowners in charge of household financial decisions and homeowners with moving plans, who arguably should be relatively well-informed, have an unrealistic view of their house value.

The remainder of the paper is structured as follows. In section 2, we discuss three strands of literature to clarify the contribution of our investigation vis-à-vis previous studies. In section 3, we discuss the data and report empirical evidence for the presence of rose-colored glasses. In section 4, we present random effects models to explore explanations for the size of the bias. In section 5, we conclude with a discussion and possible policy implications.

2. Rose-colored glasses: loss aversion and endowment effect

Our study fits into three strands of literature discussed below.

2.1 Strand 1: self-reported home values

Self-reported home values are widely used because of the ease of collection and wide availability. Therefore, it is important to know to what extent these measures are reliable. Studies in this field are scarce and mostly based on US data. Kish and Lansing (1954) compare estimates by homeowners in the 1950 Survey of Consumer Finances with estimates by professional appraisers. Estimates differ substantially. New homeowners make the best estimates. Only 37% of the estimates are within 10% of the appraisers' estimates. However, the

errors cancel out on average across households. This finding is confirmed by Kain and Quigley (1972), who also compare owner's estimates of house value and professional appraisals. They find a significant relationship with socioeconomic characteristics of homeowners. Depending on the specification, they find a significant negative relationship with education, and a significant positive relationship with tenure and the value of the house. In a more recent study based on data from the 1994-2002 US Health and Retirement Studies, Benítez-Silva et al. (2010) compare self-reported housing values with self-reported sale prices. They report that on average the degree of overestimation is between 6% and 10%. The accuracy is significantly related to the economic conditions at the time of the purchase. Homeowners that bought in good times provide better estimates than homeowners that bought in times with worse economic conditions.

Gonzalez-Navarro and Quintana-Domeque (2009) use Mexican survey data from the Acayucan Standards of Living Household Survey 2006, which they link to value assessments produced by a real estate agent. They find a significant relationship with tenure; homeowners with long tenure are much too optimistic about the value of their home. Both the bias and the lack of precision in the estimates are related with tenure. There is no link with socioeconomic characteristics. A paper closely related to ours is Galati et al. (2011), who use the DNB Household Survey to investigate the micro and macro drivers of self-reported home values and find that household-specific and house-specific factors matter as well as macro variables. We explore the DNB Household Survey further by constructing an actual house value measure and analyzing whether homeowners have rose-colored glasses.

A few other studies use the American Housing Survey to relate the reported home value to the reported sales price of the same property a year later (Goodman and Ittner 1992, DiPasquale and Somerville 1995, and Kiel and Zabel 1999). These studies find that on average

the valuations of homeowners are above the sales prices. For example, Goodman and Ittner (1992) find that the average homeowner in the US overestimates the value by 6%.

An alternative approach is to relate self-assessments to tax assessments made by local governments (e.g. David, 1968). A drawback is that these tax assessments may be biased either way. Governments could have an incentive to set values too high to get a lot of tax revenues or in contrast might update their estimates infrequently or provide conservative estimates to minimize the chances and costs of homeowners who object to the government estimates.

2.2 Strand 2: loss aversion

A first explanation for the presence of rose-colored glasses of homeowners is *loss aversion*. Tversky and Kahneman (1991) explain loss aversion with prospect theory. They show that three factors are important in explaining how individuals choose under uncertainty: (1) both losses and gains are judged relative to a reference point, (2) the value function for losses is steeper than for gains, and (3) for both gains and losses it holds that the marginal value diminishes with its size.

Genesove and Mayer (2001) show the importance of loss aversion in the housing market by analyzing the Boston condominium market. They present several interesting findings. First of all, homeowners subject to nominal losses ask higher prices than comparable homeowners that do not face such a loss. Listing prices are higher by 25-35% of the difference between the expected selling price and the price at which the house was bought. These sellers hope to find a buyer that values their home a lot. This practice is called *fishing* (Stein 1995). The effect on the listing price decreases with the size of the potential loss because otherwise sellers would price themselves out of the market. A second finding is that the selling prices attained by homeowners facing a loss are higher (3-18% of the previously mentioned difference). So in the end these sellers are rewarded with a higher transaction price. Third, for these sellers it takes longer to

sell their house. Sellers facing a 10% loss have a 3% to 6% lower probability of selling their house in any given week. Those people with the highest degree of loss aversion are most likely to have to wait the longest or even withdraw from the market. This holds especially when the loss to be led is high.

Genesove and Mayer (2001) also look at the effect of the loan-to-value (LTV) ratio on the listing and selling price. Sellers with a higher LTV ratio set a higher listing price and in the end also sell at a higher price. The LTV ratio has the same effect on the listing and the selling price. Genesove and Mayer argue that this is the case because the outstanding mortgage amount is an institutional constraint. We hypothesize that a high LTV ratio may also form a psychological reluctance to sell which feeds into perceived home values which are not affected by institutional constraints. Banks and government took several measures that make it possible to include residual debt from a sale in the mortgage for the new house (e.g. within the mortgages that qualify for the national mortgage guarantee program). Moreover, part of the homeowners may use their savings to close the gap. However, in both cases this is very likely to feel as a loss. Genesove and Mayer (2001, p.1248) do mention the possibility that *"Perhaps owner-occupants are overly optimistic in their listing behavior."* But they are unable to test for the presence of over optimism empirically.

The presence of loss aversion in the housing market is investigated in a few other studies. Like Genesove and Mayer (2001), Anenberg (2011) finds evidence that sellers facing nominal losses and sellers with high LTV ratios sell for higher prices. However, the effects found are stronger. This analysis is based on 1985-2005 panel data from the San Francisco Bay Area real estate market. Einiö et al. (2008) use transaction data of apartments in the greater Helsinki area in the period 1987-2003. The probability that an apartment is sold is lower when the estimated market value of the apartment is lower than the original purchase price. Small realized losses are less likely than small realized gains. For a disproportionate share of

transactions it holds that the apartment was sold for exactly the original purchase price. The loss aversion is weaker for more expensive apartments, seasoned sellers and apartments bought as investment. Eichholtz and Lindenthal (2013) provide insights into the long-term nature of loss aversion. Using 324 years of data on Amsterdam housing transactions, they show that the purchase price is a psychological anchor below which a homeowner prefers not to sell. Loss aversion gradually reduces as the time since the purchase increases. Over the centuries the importance of loss aversion increased.

Using US data from 1985-1996, Engelhardt (2003) shows that nominal loss aversion significantly reduces household mobility across multiple metropolitan areas. A loss of 5% of the home value reduces the probability to move by 30 to 44%. In contrast, he finds little evidence that low but positive equity *due to* fallen house prices restricts household mobility. Chan (2001) finds that a decline of house prices reduces residential mobility. She uses actual mortgage data for the New York metropolitan area and is thereby able to accurately calculate LTV ratios over time. The finding is confirmed by Ferreira et al. (2008), who use two decades of data from the American Housing Survey. They report mobility being almost 50% lower for homeowners with negative home equity.

2.3 Strand 3: endowment effect

Another reason why people are likely to have rose-colored glasses is the *endowment effect* (Thaler, 1980). People value objects almost instantly more once they own them; the willingness to accept exceeds the willingness to pay. Kahneman et al. (1990) call this the *instant endowment effect* and show that this effect persists even in markets with learning opportunities. Strahilevitz and Loewenstein (1998) extend the mug experiment of Kahneman et al. (1990) and show that the valuation of an object increases with the duration of the ownership, which they called the *duration-of-current-ownership effect*. Complete adaption of ownership takes some time. Although

the perceived attractiveness of objects is not instantly affected by the endowment, the perceived attractiveness increases with the duration of the ownership. To our knowledge, most studies are based on experiments and little is known about the duration-of-current-ownership effect in the housing market.

Shu and Peck (2011) show that emotional attachment plays a role in the explanation of the endowment effect. Specifically the independent constructs of psychological ownership and affective reaction matter. Psychological ownership and affect are higher for sellers than for buyers and significantly positively related to the valuation of an object. Because one's home is used intensively one can imagine that psychological ownership and affect are important for sellers on the housing market and therefore the endowment effect is likely to be strong. Based on an experiment with pens, Shu and Peck (2011) demonstrate that the average selling price is higher for long endowed participants than for short endowed participants. Long endowed participants felt stronger psychological ownership than short endowed participant, while the positive affective reaction towards the pen was not significantly related to the duration of the possession. List (2003) finds that experienced traders have weaker endowment effects. Shu and Peck (2011) replicate this finding and show that it is caused by the lower psychological ownership of experienced traders. We expect the endowment effect to be rather strong, as selling one's house is not a frequent event for most people.

3. Rose-colored glasses: past, present, and future

3.1 Data

The DNB Household Survey (DHS), administered by Tilburg University's CentERdata, provides valuable information that enables us to investigate whether and to what extent homeowners have rose-colored glasses. We use information from the module "accommodation and

mortgages" to study owners' perceptions of past, present, and future values of the home. The DHS comprises a wide variety of background information on panel members that report information on their work status, health condition, income, assets and liabilities, and economic and psychological concepts. We use this information to create a rich set of control variables for the regression analyses. DHS data is gathered annually from members of the CentERpanel, which is an internet panel that is a representative sample of the Dutch population.[4] In addition to annual sets of standard questions on the above-mentioned topics, participants of the CentERpanel regularly complete additional ad-hoc questionnaires. The DHS has been widely used by international researchers to study various topics. For instance, Van Rooij et al. (2012) studied financial literacy, retirement planning and household wealth, whereas Van der Cruijsen et al. (2012) investigated the impact of the financial crisis on saving behavior, and Jansen et al. (2013) study the determinants of trust in banks. We employ data from the DHS 2003-2012 waves to research views on historical and expected changes in house value compared to general price trends and to construct a bias measure based on current house value estimates.

3.2 The past

First, we investigate whether homeowners are optimistic about the *past* price development of their home. We use the results of the following question: *"In your opinion, has the value of your home increased, decreased or remained the same* ***in the past two years****?"* The responses are summarized in Figure 2, together with the actual house price developments. In 2010, 2011 and 2012, a large majority of homeowners is expected to answer *"decreased"*.[5] While for a small

4 Note that participants without internet access are provided with special terminals. For more information see http://www.centerdata.nl/en/TopMenu/Projecten/DNB_household_study/index.html.

5 Looking at all survey years, respondents typically answer these questions in May. Therefore, we take the house price development in the two years prior to the second quarter of the survey year. Note that no matter which quarter we would take in 2010, 2011 and 2012, actual house price have declined in the previous two years, both on a national and a regional level.

number of households, the actual value house value may – despite the overall decline in house prices - have increased due to for example a major reconstruction, the value has declined for a the large majority of houses.

(Insert Figure 2 about here)

Especially in the first years after the reversal of the housing market, just after prices started to decline, homeowners had a very optimistic view about the price development of their house. In 2010 as much as 67% of homeowners had rose-colored glasses. In 2010 only 29% of the respondents answered that the value of their home had decreased, 45% stated an unchanged value, while 22% still perceived an increased value. Although it could be that in individual cases the value of the house did not decrease, for example due to renovation of a home, it is unlikely that this holds for two-thirds of the homeowners.

In 2011 and 2012 there was still a remarkable share of homeowners who thought the value of their house was stable or increasing, while actual price levels were already declining for a few years in a row. In 2011 the percentage of homeowners with rose-colored glasses was 28%. Even years after house prices started to decline an important share of homeowners remains optimistic about the value development of their home. Compared to 2011 the share of homeowners with rose-colored glasses did not drop further; it was 29% in 2012.

3.3 The present

Second, the DHS data enable us to investigate whether and to what extent homeowners are overly optimistic on the *current* value of their property. We combine the responses of two survey questions and actual data on house price developments per province to construct a

measure of the bias in the self-reported estimates of the value of the home.[6] The survey questions are: *"In which year did you buy your **current** home?"* and *"How much did you pay for your **current** home (**not including** additional costs to the buyer)? Not including the business part of your house. Exclude costs of taking over moveable property."*[7] Note that although we have information on the purchase price and region specific price developments, we have no information on value changes due to improvements or depreciations of the physical condition of the home. Equation (1) explains the construction of the actual home value for homeowner i and survey year t (*actual home value*$_{it}$):

$$\textit{Actual home value}_{it} = \textit{original purchase price}_{iy} * (1+0.01*\textit{price development}_{tpy}) \quad (1)$$

Original purchase price$_{iy}$ is the price the current homeowner *i* paid for the house in purchase year *y*. *Price development*$_{tpy}$ is the cumulative province-specific price development in percentages since the purchase year y. The realization of the *price development*$_{tpy}$ variable varies a lot across individuals and over time. First, *price development* depends on *p*, which indicates in which province respondents live (out of 12 provinces). For example, in the survey year 2012 and for respondents that bought in 2005 *price development* is 0.2% if they live in the province Groningen and -1.7% if they live in the province Brabant. Secondly, the value of *price development* depends on the survey year *t*. For respondents that bought their home in 2006 and live in the province North-Holland *price development* is 12.5% for the survey year 2008 and 0.2% for the survey year 2012. Thirdly, *price development* depends on the purchase year *y*. For example, for the survey year 2011 and respondents that live in the province Utrecht, *price development* is 5% for respondents that bought in 2006 and -1.1% if they bought in 2010.

6 In the few cases that province information is missing, we use the general house price development.

7 Reported purchase prices below 20.000 euro or above 5.000.000 euro are set at missing. Similarly, constructed actual property values below 20.000 and above 5.000.000 are set at missing.

We define *home value bias*$_{it}$ as the perceived home value divided by the actual home value, see equation (2). A value larger than 1 indicates the presence of rose-colored glasses. As the homeowners' perceived home value (*perceived home value*$_{it}$*)* we take the answer to the question: *"About how much do you expect to get for your home if you sold it today? Only the part not including the business part and at empty acceptance."*[8]

Home value bias$_{it}$ *= perceived home value*$_{it}$ */ actual home value*$_{it}$ *(2)*

We dropped observations above 2 or below 0.5 as these outliers are probably due to mistakes by respondents in filling in the original purchase price, purchase year or perceived home value (e.g. reporting the original purchase price in Guilders instead of Euros) rather than due to an under or overestimation of the home value.

Figure 3 shows the median, 25th percentile and 75th percentile values of the home value bias over 2003-2012. Over this period the median homeowner had on average a bias of 1.13; i.e. the perceived home value was 13% higher than the actual value. The 25th percentile homeowner was about right with his judgment. While our constructed actual value may be too low in a number of individual cases, there are also homeowners who forego the usual maintenance which may cause mistakes in the other direction. In all, these cases cannot explain the fact that we find a bias for about three-quarters of homeowners.

(Insert Figure 3 about here)

3.4 The future

Third, we investigate to what extent homeowners are optimistic about the *future* value of their

8 Reported values below 20.000 euro or above 5.000.000 euro are set at missing.

home. We use the answers to the following two questions: (1) *"What kind of price movement do you expect on the housing market* ***in the next two years****? Will the housing prices increase, decrease or remain about the same?"*, and (2) *"What kind of price movement do you expect for your home in the next two years? Will the price of your home increase, decrease or remain about the same?"* These questions are filled in shortly after each other; there is only one question in between.[9] Figure 4a shows the answers to the first question, while Figure 4b portrays the answers to the second question.

(Insert Figure 4 about here)

Overall, homeowners are more optimistic about the future value of their own home than about the general price developments. For example, in 2009 – just after the reversal of the housing market in the year before – 53% of homeowners expected a further decline of housing prices, whereas only 30% of the homeowners foresaw a decline of the price of their own home.

We combine the responses of these two questions on future price developments to measure the share of homeowners with rose-colored glasses with respect to the future in Figure 4c.[10] The advantage of this approach to explore the presence of rose-colored glasses is that it is based on two survey questions that were asked at the same moment in time. This is an innovation in comparison to other studies that study optimism based on a simple comparison of survey data with judgments by experts, estimates of local governments, or official price statistics for the current situation.

The line in Figure 4c shows the share of people with a rosy picture about the future value of their home. The share of homeowners with rose-colored glasses with respect to future price

9 *"How much percentage points a year will they increase/decrease on average?"*
10 Note that homeowners that answered *"I don't know*" are not included in the analyses.

changes ranges from 4% in 2007, just before the market reversal, to 27% in 2009, directly after house prices started to decline.[11] The finding of the difference in expectations between future price developments of their own home and general house price developments is remarkable, as the questions are asked consecutively. So again, we find evidence for the presence of rose-colored glasses.

4. Rose-colored glasses: regression analysis

4.1 Method

Having established that homeowners tend to overestimate their house value, we now perform a multivariate regression analysis to investigate potential mechanisms behind this optimism. In particular, we explore evidence for the presence of a loss aversion and an endowment effect. We run random-effects generalized least squares (GLS) regressions to explain the variation in home value bias.[12] The dependent variable is the ratio of the perceived house value and the actual value as defined in equation (2).

Tenure and loan-to-value ratio

To test for the presence of an endowment effect, or more specifically the presence of a duration-of-current-ownership effect, we include tenure dummies in the regressions. By subtracting the reported purchase year y from the survey year t we know how long respondents are living in their home. On average the respondents in our sample are living 12.5 years in their current

11 2011 is not shown in the graph. Due to a routing error homeowners were at first not surveyed about the expected future price movements of their home. The question was asked later that year in December though. Although the 2011 results would further support the presence of rose-colored glasses, we did not include it because of the timing issue.

12 We calculate robust standard errors, clustered at the household level.

home (Table A1 in Appendix A). The average tenure has increased over the sample period (see Table A2 in Appendix A). This is in line with the prolonged period of few housing transactions. We divide tenure in five quintiles represented by four binary dummy variables in the regressions: *tenure_5-8*, *tenure_9-13*, *tenure_14-19* and *tenure_20+*. These dummy variables are 1 for respondents that are living in their home respectively 5 to 8 years, 9 to 13 years, 14 to 19 years, and at least 20 years, and 0 else.

Another key explanatory variable in our regression analysis is the loan-to-value ratio. The DHS includes detailed information on the value of current outstanding mortgage. We divide the mortgage value of homeowner *i* at survey year *t* by *actual home value*$_{it}$ (see section 3.3) and multiply by 100 to get the loan-to-value ratio. The regressions include dummy variables for five categories: (1) *loan-to-value_(0%, 25%)*, (2) *loan-to-value_[25%, 50%)*, (3) *loan-to-value_[50%, 75%)*, (4) *loan-to-value_[75%, 100%)*, and (5) *loan-to-value_100%+*. These variables are 1 for respondents that fall within the particular loan-to-value category and 0 else. In 2012 the percentage of respondents in these categories was respectively 11%, 17%, 16%, 11% and 14%. 3 out of 10 respondents had no mortgage. Conditional on having a mortgage, loan-to-value ratios have increased after the reversal of the market (see Figure A.1 in Appendix A). At the same time, a larger share of respondents has fully paid off their mortgage. This may represent an increased incentive to pay off mortgages as well as a better response rate among elder households in the last sample years.

We expect that the home value bias is positively related to the loan-to-value ratio. If homeowners with a high loan to value ratio would sell their home, they are likely to face a loss, i.e the sales price not being sufficient to pay off the mortgage. This may result in rose-colored glasses for respondents who are loss averse.

Control variables: basic set

Our primary focus in the regressions is on testing the presence of an endowment effect and loss aversion while controlling for a set of other individual-specific factors (summarized in Table A1 in Appendix A). We include: *age, male, income, education, handles finance*. *Age* is measured using 6 categories: (1) younger than 25, (2) between 25 and 35, (3) between 35 and 45, (4) between 45 and 55, (5) between 55 and 65, and (6) older than 65. *Male* is a binary dummy that is one if the respondent is male. Due to the selection of homeowners, the share of males is high: 75%. *Income* is the gross yearly personal income category, which ranges from 1 (10,000 euro or less) to 5 (40,000 euro or more). *Education* is a dummy that is 1 for respondents who successfully completed higher vocational education and/or university education, and 0 otherwise. 49% of the respondents have a high degree of education. *Handles finance* is a dummy variable that is 1 for respondents who are responsible for the financial administration of the household (e.g. making the payments for rent/mortgage, taking out loans, taking care of tax declarations) and 0 otherwise. In our sample 76% of the respondents are responsible for the financial administration of their household. *Δ house price* is the percentage change in the house price in the year prior to the survey.[13] *2004 dummy – 2012 dummy* are binary year dummies.

Control variables: extended set

Besides this basic set of control variables, we use an extended set of variables, including region variables, house type variables, house characteristic variables and a variable that measures the intention to move.

We have information on the region where respondents live. This allows us to include four binary region dummies: *west*, *north*, *east* and *south*. *West* is a dummy that is 1 for

13 As noted before, the mean and median week numbers in which the respondents answered the questions are in May. Therefore, we take the house price development in the year prior to the second quarter of the survey year.

respondents living in the west of the Netherlands (excluding the three largest cities), and 0 else. *North* is a binary dummy that is 1 for respondents living in the north of the Netherlands. *East* is a dummy that is 1 for respondents living in the east of the Netherlands, whereas *south* is 1 for respondents living in the South of the Netherlands. The reference group includes respondents living in the one of the three largest cities of the Netherlands: Amsterdam, Rotterdam or The Hague. *Urbanization* measures the degree of urbanization of the town/city of residence of the respondents. It ranges from 1 (very low degree of urbanization) to 5 (very high degree of urbanization).

DHS also includes information on the kind of house respondents live in.[14] Based on this information we constructed five binary dummies: *detached, corner, duplex, row and apartment/flat*. *Detached* is 1 for respondents living in a detached single-family-house, and 0 else. *Corner* is 1 for respondents living in a single-family-house that is an end terrace house (corner of row of houses), and 0 for other respondents. *Duplex* is 1 for respondents that live in a semi-detached (duplex) single-family house, and 0 else. *Row* is 1 for respondents living in a single-family terrace house (row house), and 0 else. *Apartment/flat* is 1 for respondents living in an apartment or an upstairs or ground-floor flat, and 0 else. 18% of the respondents live in a detached house, 14% in a corner of row house, 19% in a duplex single-family house, 30% in a row house, 16% in an apartment or flat and the remainder in another type of house.

In addition, we have information on other characteristics of the house, which we use to construct four other variables: *number of rooms*, *size of living room*, *garage*, and *outdoors*.

14 The relevant question is: "*What kind of house do you live in? If you live in more than one house, please report on the most important one."* The answer categories were: (1) single-family-house, detached, (2) single-family-house, end terrace house (corner of row of houses), (3) single-family-house, semi-detached (duplex), (4) single-family-house, terrace house (row house), (5) apartment, (upstairs or ground-floor) flat, (6) farm or gardener's house, (7) dwelling with shop or workshop, (8) other dwelling on business premises, (9) room, and (10) other sort of accommodation.

Number of rooms is a variable that measures the number of rooms of the house.[15] The average is 4.7 rooms. *Size of living room* is the size of the living room in square meters.[16] On average the size of the living room is 39.3 m^2. *Garage* is a dummy that is 1 if there is a garage belonging to the accommodation (not belonging to the business part), and 0 else. Half of the respondents own a home with a garage. *Outdoors* is a binary dummy variable that is 1 if there is a garden, (court)yard, or patio with the house (not belonging to the business part). This holds for 87% of the respondents.

Furthermore, *plans to move* is a dummy that is 1 for respondents that are actively looking for another accommodation, that consider to move or already found another home, and 0 for respondents not looking for other accommodation.[17] 14% of the respondents plan to move.

4.2 Results

Table 1 shows the regressions results, once we include tenure, loan-to-value and a basic set of control variables to explain the variation in home value bias.[18]

(Insert Table 1 about here)

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15 It is the answer to the question "*How many **rooms** does your accommodation include (not including those belonging to the business part of your house)? **Do include:** bedroom, hobby room, study, living room. **Do not include:** kitchen, bathroom, toilet, open attic, hall, corridor, storeroom."*

16 It is the answer to the question "*What is the area of your living room? If you have an open kitchen, do **not** include that area in this measurement. Fill the area in square meters (m2)."*

17 More specifically it is based on the question "*The following questions concern your **plans to move if any**. Are you, at the moment, looking for other accommodation (purchased or rental)?"* The answer categories were: (1) yes, actively looking for other accommodation, either to buy or to rent, (2) yes, actively looking for other accommodation to buy, (3) yes, actively looking for other accommodation to rent, (4) yes, considering buying other accommodation (5) yes, considering renting other accommodation, (6) no, have already found other accommodation, but have yet to move there, and (7) no, not looking for other accommodation.

18 Note that multicollinearity is not a problem in our regressions. The mean Variance Inflation Factor (VIF) ranges from 1.47 for the explanatory variables in the model presented in Table 1 column 4 to 2.49 for the explanatory variables in the model in Table 1 column 6. The minimum VIF found is 1.03 and the maximum is 7.45. As a rule of thumb a VIF smaller than 10 is fine.

The findings are supportive of the endowment effect and loss aversion contributing to rose-colored glasses of homeowners. First, the longer homeowners have been living in their home, the higher the bias is, which points to the presence of a duration-of-current-ownership effect. The tenure dummies in column 1 are positive and significant. Homeowners with a tenure between 5 and 8 years have a bias that is 4 percentage points higher than homeowners with a tenure of 4 years or less, which is the reference group. Homeowners with a tenure between 9 and 13 years have a bias that is 11 percentage points higher than the bias of the reference group. The bias difference is 21 percentage points between the reference group and homeowners with a tenure between 14 and 19 years and 32 percentage points for homeowners with a tenure of 20 years.

There is a significant negative relationship between the loan-to-value ratio and the home value bias (Table 1, column 1). Note that the reference group refers to homeowners without a mortgage. Homeowners with a mortgage smaller than 25% of the value of the house estimate the value of their house lower than otherwise similar households without a mortgage. Having a small mortgage may thus limit possible optimism over the home value. However, homeowners with a loan-to-value ratio of at least 50% have a significantly higher bias than the reference group. For homeowners with a loan-to-value ratio of at least 50% but less than 75% *home value bias* is 6 percentage points higher compared to the reference group. For homeowners with a loan-to-value ratio of at least 75% but less than 100% *home value bias* increases with 9 percentage points. The difference with the reference group is the highest for homeowners in the top loan-to-value category. Homeowners with a loan-to-value ratio above 100% have a *home value bias* that is 14 percentage points higher than similar homeowners without a mortgage.

The results for duration-of-current-ownership effect and loss aversion are robust to the inclusion of year dummies (Table 1 column 2)[19], and the inclusion of a basic set of personal characteristics: *male*, *age*, *education*, *income*, *handles finance* (see Table 1 column 3).

As the *income* variable is insignificant, we drop *income* to prevent the loss of observations due to missing values for this variables (Table 1 column 4). Males estimate house prices higher than females. This is in line with an increasing number of studies that show that males are more overconfident than females (see e.g. Barber and Odean 2001 and Bengstonn et al. 2005). There is no significant negative relationship between the bias and *handles finance*; thus even informed individuals in charge of household financial decisions have an unrealistic view of the value of their home. There is a significant positive relationship between the bias and age: ceteris paribus older homeowners hold more optimistic house value estimates than younger homeowners.

Next we add the variable *Δ house price*. Table 1 column 5 and 6 report the regression results of a specification without and with year dummies. There is a positive significant relationship with the general house price increase in the previous year: thus the optimism is larger in times that house prices are increasing rapidly. For every extra 1 percentage point house price increase, *home value bias* is 1 percentage points higher. Our finding that the bias is larger in good times is in line with Case and Shiller (1988) who find that housing booms are associated with very optimistic expectations of future house price developments. Note that in all variants discussed the coefficients on tenure and loan-to-value ratio are qualitatively unaffected.

[19] All the year dummies are significant, and except for 2012 all the coefficients are positive. The negative coefficient of the 2012 dummy indicates a significant decline of the home value bias a few years after the reversal of the market.

Robustness

To further investigate the robustness of the finding on the role of endowment and loss aversion in explaining the home value bias, we include a larger set of explanatory variables including house specific characteristics in the regressions (Table 2).

(insert Table 2 about here)

Column 1 repeats the findings of Table 1, column 6. In column 2 we have added region variables. Ceteris paribus, the home value bias is smaller for homeowners that live in the north of the Netherlands than for homeowners who live in one of the three largest cities of the Netherland (the reference group). The bias is smaller in relatively urbanized areas, which may suggest that it is easier to estimate the value of the house when there are more house sales in the direct neighborhood.

We find no significant relationship between the home value bias and house type, i.e. detached or not, (Table 2, column 3). Including other house specific characteristics (Table 2, column 4), we find that the bias increases with the number of rooms and the presence of a garden, (court)yard, or patio with the house. When homeowners have moving plans, it is important that they have a realistic view of the value of their home as the sales price has direct financial consequences and impacts the affordability of a new home. However, we do not find a different bias for respondents with and without moving plans (Table 2, column 5). Note that once we include all house specific characteristics and housing plans simultaneously, the house price specific characteristics turn insignificant except for the regional variable suggesting that households in the north display a lower bias (Table 2, column 6).

Note that in all specifications, the key findings of an endowment effect and loss aversion remains unaffected by the inclusion of additional explanatory variables. To further investigate

the robustness of these results, we tried several different ways to include the tenure of the homeowner and his loan-to-value ratio. Tables B1 and B2 show the results of the regressions with *tenure* and *loan-to-value* as explanatory variables instead of the binary tenure and loan-to-value dummies. *Tenure* is the number of years the respondent owns her house. *Loan-to-value* is a variable that ranges from 1 (a loan-to-value ratio smaller than 25%) to 5 (a loan-to-value ratio of at least 100%). Again we find a positive relation between the home value bias on the on the hand, and the tenure and loan to value ratio on the other hand.

5. Discussion

This paper presents three pieces of evidence that homeowners have a rosy picture of the value of their house. First, a sizeable share of homeowners thinks that the value of their home has increased in a period that it most likely did decrease. Second, three-quarters of homeowners have a rosy picture of the current value of their home. The median homeowner reports a perceived value that is 13% higher than the actual value. Third, a substantial share of homeowners is more optimistic about the future price development of their own house than about general price developments. The rose-colored glasses are blanched somewhat when house price developments deteriorate. However, the adjustment process appears to be slow. Even several years after the reversal in the housing market, a non-negligible share of homeowner remain fairly optimistic. Both homeowners with moving plans and homeowners that are in charge of household finances, groups that are supposedly well-informed, overestimate the value of their house. However, we do find a relation between the degree of overestimation and other individual-specific characteristics, such as gender and the level of education, and to house-specific characteristics.

The main finding of the empirical analysis based on a series of annual surveys is that homeowners have a rosy picture of the value of their house. To further explore the mechanics

behind this optimism, we have designed an additional questionnaire. In November 2013 we have asked members of the CentERpanel to compare the value, state of repair and expected selling time of their house with that of the average house in their street. Respondents were given a number of choice options, indicating that their house is in a better, the same or a worse position compared to other houses. On the question *"In your opinion, what is the value of your house when you compare it to the average owner-occupied property in your street? The value of my house is…"* 29% of the homeowners answered *"higher"* whereas only 13% answered *"lower"*. 31% of the homeowners believe that the state of repair of their home is better than that of the average house in the street, whereas only 5% think that it is worse. 17% of the homeowners report that in case they would sell their house the selling time would be shorter than for the average house in the street, whereas only 8% of the homeowners expect that it would take longer for them to sell their house. All in all, the results provide a consistent picture of homeowners believing that their house stands out favorably compared to other houses which attribute to the rosy picture of the house value.

The regression analysis has shown that rose-colored glasses are related to psychological phenomena. The endowment effect is a significant driver of rose-colored glasses. More specifically, we find support for the duration-of-current-ownership effect on the housing market. The longer one owns a home, the stronger the presence of rose-colored glasses is. Homeowners may become more and more emotionally attached to their house, e.g. because they have witnessed their children growing. With increasing tenure, the housing characteristics and furnishing is probably perfectly adapted to the homeowner's needs and taste which may be valued differently by potential buyers.

Loss aversion is also a significant factor in the regression analysis; the overestimation of the current value of the home is significantly positively related to the loan-to-value ratio. The responses in the November 2013 questionnaire support our finding of loss aversion in the

housing market. Both homeowner and renters were sketched the following situation: "*Imagine oneself in the following situation. Mr. and Ms. de Bruin have bought their house 10 years ago and financed it at the same time with a mortgage. Last year they used their savings to place a new kitchen. Because Mr. de Bruin has accepted a new job that is further away, Mr. and Ms. de Bruin want to sell their home. They discuss the minimum price they want to get. Imagine oneself in the situation of Mr. and Ms. de Bruin and indicate to what extent you agree with the below statements."* 74% of the respondents agree or strongly agree that it is important to get at least the purchase price. Moreover, 41% agree or strongly agree that it is important to sell for a price that covers both the original purchase price and the price of the kitchen. 85% of the people agree or strongly agree that it is important to prevent residual debt.

The occurrence of loss aversion can explain the typical positive correlation between price and volume in the residential housing market. In a boom period it is relatively easy to sell your house and sale prices are likely to be above the original purchase prices. In contrast, in busts it takes relatively long to sell a house and price bids may be below the price the owner paid himself when buying the house. In busts a lot of sellers end up withdrawing their house without a sale and several other agents, like mortgage lenders and decoration stores, suffer also from the low transaction volumes. Furthermore, a too rosy picture of the value of the house influences other important financial decisions, such as the decision how much to save for retirement.

Our results give rise to several possible policy implications. Promoting reasonable loan-to-value ratios may help blanching homeowners' rose-colored glasses as it reduces the likelihood of facing a loss when selling the property. Indeed, many countries have limits on the maximal LTV-ratio's that are below 100%. In turn, this may reduce selling times during housing market busts. Policies directed at increasing mobility reduce the average tenure of homeowners, and are likely to result in a more realistic view of the home value. Finally, one could think of

mechanisms to improve the knowledge of homeowners about the value of their home and the importance of a realistic view for the financial decisions that they make. Current plans by the Dutch government as to make the official housing value estimates used as a base for municipal taxation publicly accessible may contribute to an increase in knowledge about house values and how they compare to other houses.

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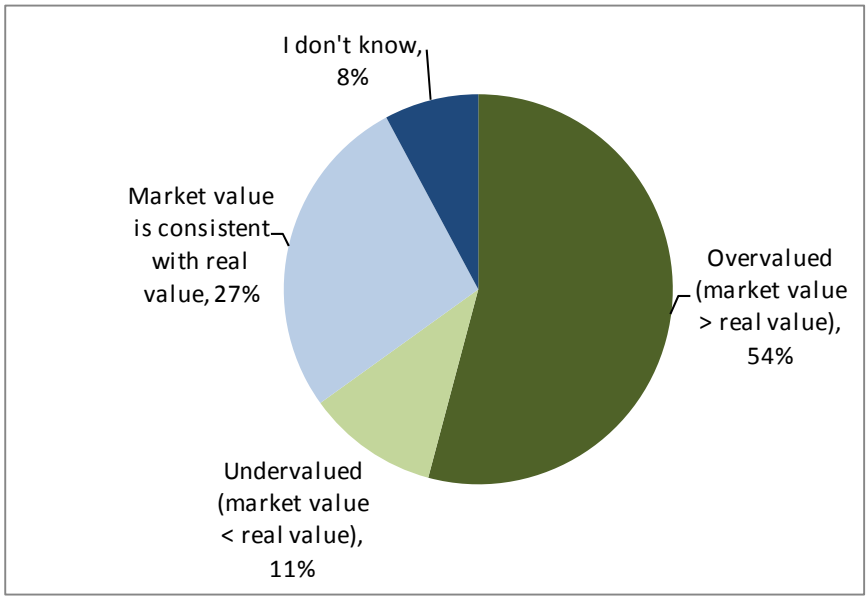
Figure and tables

Figure 1. Dutch houses: overvalued?

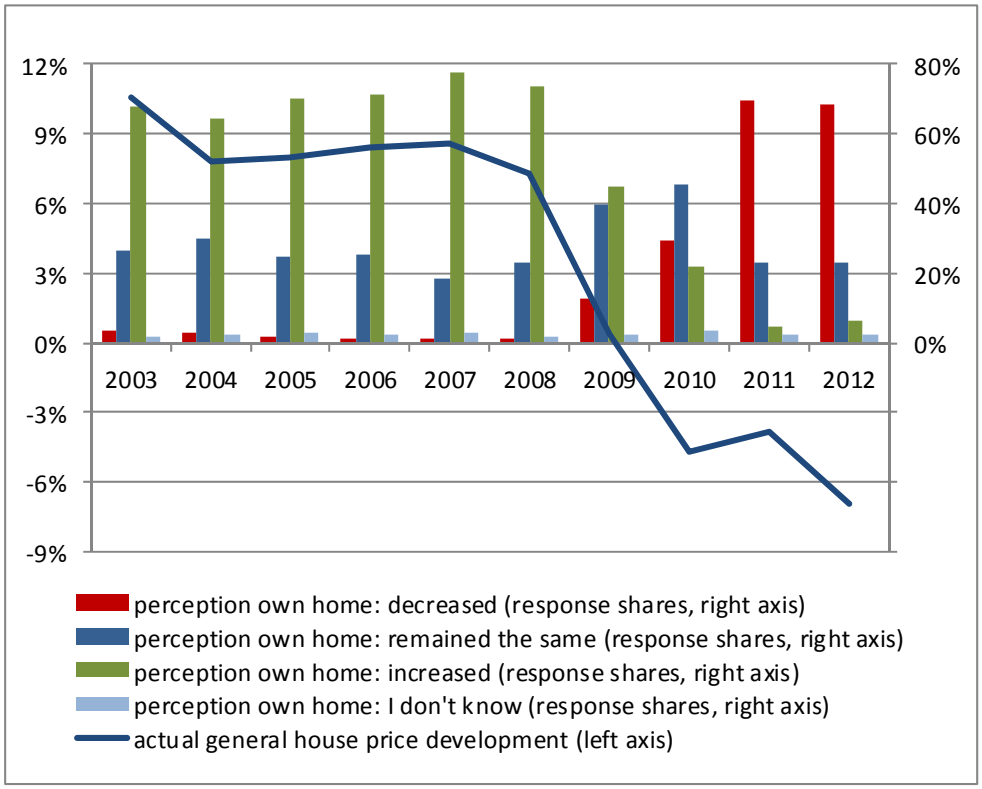
In your opinion, are the current prices on the housing market consistent with the value of houses?



Source : DHS.

Note: The figure shows 2012 outcomes.

Figure 2. Too rosy picture of past house price development

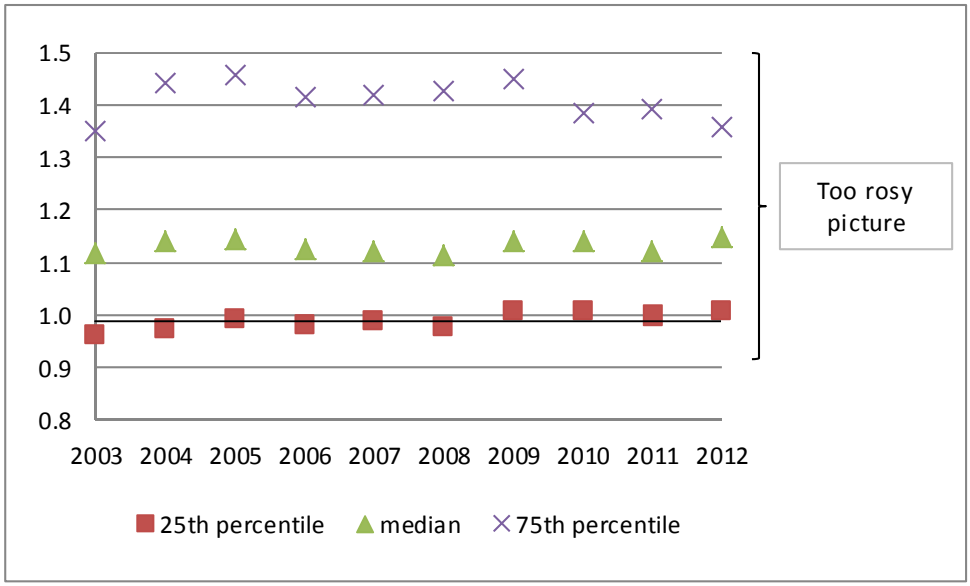


Source: DHS and Statistics Netherlands.

Note: The figure shows answers to the question *"In your opinion, has the value of your home increased, decreased or remained the same in the past two years?"* and the actual general house price developments in the past two years.

Figure 3. Too rosy picture of present home value

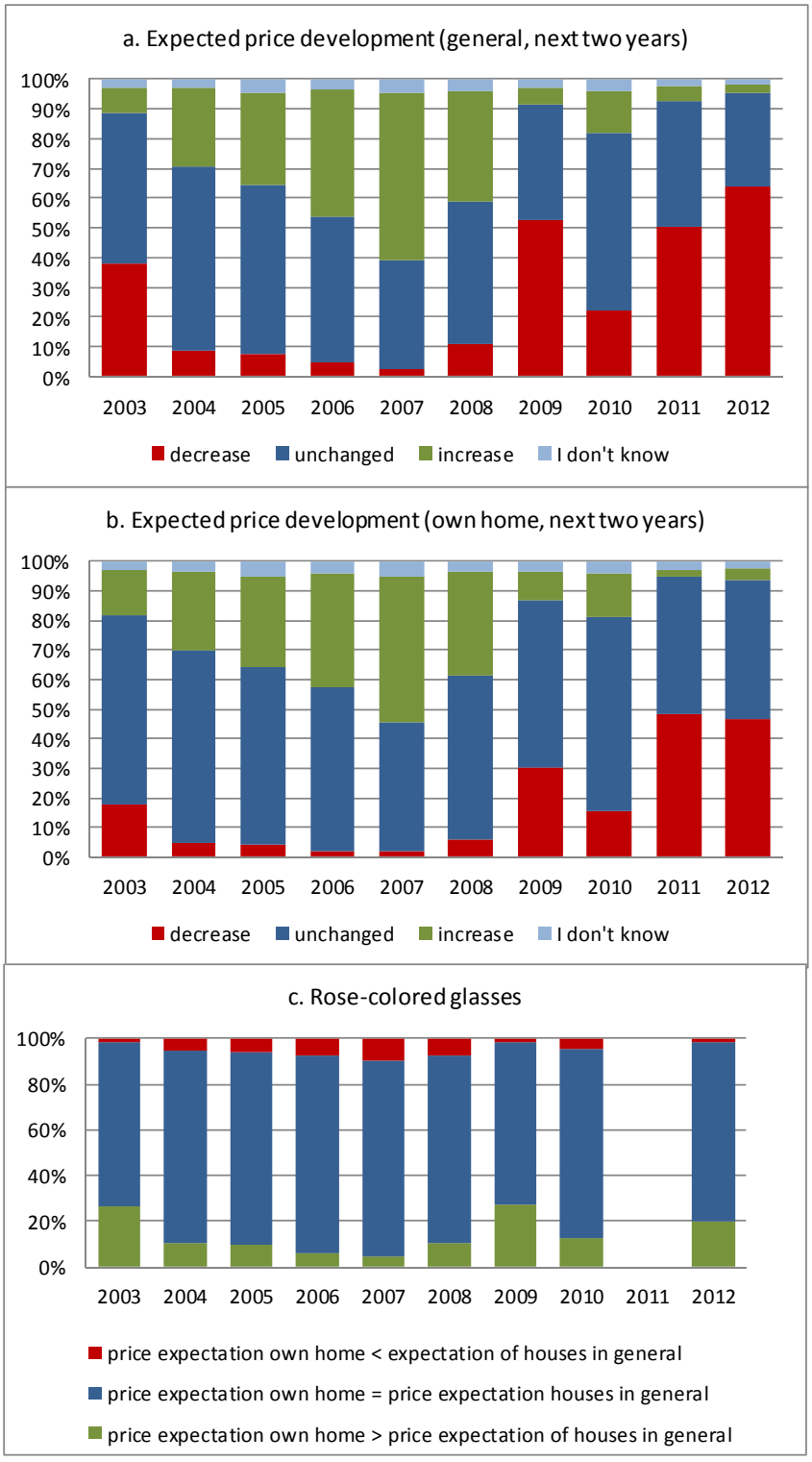
Perceived home value/actual home value



Source: DHS, Statistics Netherlands, DNB, and Ministry for Housing, Spatial Planning and the Environment.

Note: The perceived home value is the answer to the question: *"About how much do you expect to get for your home if you sold it today? Only the part not including the business part and at empty acceptance."* The actual home value is calculated using DHS-information on the purchase price and year, and the actual province-specific house price development since then.

Figure 4. Too rosy picture of future house price development



Source: DHS.

Note: The figures show response shares. 2011 is not included in figure c because the timing of the survey questions differed.

Table 1. Home value bias: baseline regressions

	(1)	(2)	(3)	(4)	(5)	(6)
tenure_5-8	0.04***	0.05***	0.05***	0.05***	0.04***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
tenure_9-13	0.11***	0.12***	0.12***	0.11***	0.11***	0.11***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
tenure_14_19	0.21***	0.22***	0.23***	0.21***	0.22***	0.21***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
tenure_20+	0.32***	0.34***	0.35***	0.33***	0.33***	0.33***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
loan-to-value_(0%, 25%)	-0.06***	-0.06***	-0.05***	-0.06***	-0.07***	-0.06***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
loan-to-value_[25%, 50%)	0.01	-0.00	-0.00	0.00	-0.00	0.00
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
loan-to-value_[50%, 75%)	0.06***	0.05***	0.05***	0.05***	0.05***	0.05***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
loan-to-value_[75%, 100%)	0.09***	0.08***	0.08***	0.08***	0.09***	0.08***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
loan-to-value_100%+	0.14***	0.14***	0.14***	0.14***	0.15***	0.14***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
male			0.05***	0.04***	0.04***	0.04***
			(0.01)	(0.01)	(0.01)	(0.01)
age			0.01	0.01**	0.01***	0.01**
			(0.01)	(0.00)	(0.00)	(0.00)
education			-0.02*	-0.01	-0.01	-0.01
			(0.01)	(0.01)	(0.01)	(0.01)
income			0.00			
			(0.00)			
handles finance			-0.02	-0.01	-0.01	-0.01
			(0.01)	(0.01)	(0.01)	(0.01)
Δ house price					0.01***	0.01***
					(0.00)	(0.00)
constant	1.03***	0.99***	0.94***	0.94***	0.96***	0.92***
	(0.01)	(0.01)	(0.03)	(0.02)	(0.02)	(0.02)
Year dummies	NO	YES	YES	YES	NO	YES
# observations	7174	7174	5194	7169	7169	7169
# individuals	2084	2084	1587	2084	2084	2084
R-squared	0.24	0.24	0.28	0.24	0.25	0.24

Note: *** p<0.01, ** p<0.05, * p<0.1 Table reports parameter estimates for Random-effects GLS regressions. Robust standard errors, clustered by household, are in parentheses.

Table 2. Home value bias: extended regressions

	(1)	(2)	(3)	(4)	(5)	(6)
tenure_5-8	0.05***	0.05***	0.05***	0.05***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
tenure_9-13	0.11***	0.11***	0.10***	0.11***	0.12***	0.12***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
tenure_14_19	0.21***	0.21***	0.20***	0.21***	0.24***	0.23***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
tenure_20+	0.33***	0.32***	0.32***	0.33***	0.36***	0.36***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
loan-to-value_(0%, 25%)	-0.06***	-0.06***	-0.06***	-0.06***	-0.05***	-0.06***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
loan-to-value_[25%, 50%)	0.00	-0.00	0.00	0.00	0.02	0.02
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
loan-to-value_[50%, 75%)	0.05***	0.06***	0.05***	0.06***	0.08***	0.08***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
loan-to-value_[75%, 100%)	0.08***	0.09***	0.08***	0.09***	0.09***	0.10***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
loan-to-value_100%+	0.14***	0.15***	0.14***	0.14***	0.15***	0.15***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
male	0.04***	0.04***	0.03***	0.03***	0.03**	0.02*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
age	0.01**	0.01**	0.01**	0.01*	0.01	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
education	-0.01	-0.01	-0.01	-0.01	-0.03**	-0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
account	-0.01	-0.01	-0.01	-0.01	-0.01	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Δ house price	0.01***	0.01***	0.01***	0.01***	0.00*	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
west		0.01				-0.01
		(0.02)				(0.02)
north		-0.06***				-0.08***
		(0.02)				(0.03)
east		0.00				-0.02
		(0.02)				(0.02)
south		0.02				0.01
		(0.02)				(0.02)
urbanization		-0.02***				-0.01
		(0.00)				(0.01)
detached			0.04			0.03
			(0.04)			(0.05)
corner			0.01			-0.03
			(0.04)			(0.05)
duplex			0.06			0.01
			(0.04)			(0.04)
row			0.01			-0.03

			(0.04)			(0.04)
apartment/flat			-0.03			-0.02
			(0.04)			(0.05)
number of rooms				0.01*		0.01
				(0.01)		(0.01)
size of living room				0.00		0.00
				(0.00)		(0.00)
garage				0.02		0.02
				(0.01)		(0.02)
outdoors				0.04**		0.02
				(0.02)		(0.03)
plans to move					0.01	0.02
					(0.01)	(0.01)
Constant	0.92***	0.97***	0.91***	0.82***	0.93***	0.93***
	(0.02)	(0.04)	(0.04)	(0.04)	(0.03)	(0.07)
Year dummies	YES	YES	YES	YES	YES	YES
# observations	7169	7147	7169	6972	4555	4451
# individuals	2084	2075	2084	2025	1617	1576
R-squared	0.24	0.25	0.25	0.25	0.25	0.26

Note: *** p<0.01, ** p<0.05, * p<0.1 Table reports parameter estimates for Random-effects GLS regressions. Robust standard errors, clustered by household, are in parentheses.

Appendix A. Variables

Table A1. Summary of explanatory variables

	Min	Max	Mean	Std. Dev.	N
tenure_5-8	0	1	0.20	0.40	7169
tenure_9-13	0	1	0.20	0.40	7169
tenure_14_19	0	1	0.19	0.39	7169
tenure_20+	0	1	0.22	0.41	7169
loan-to-value_(0%, 25%)	0	1	0.12	0.32	7169
loan-to-value_[25%, 50%)	0	1	0.20	0.40	7169
loan-to-value_[50%, 75%)	0	1	0.19	0.39	7169
loan-to-value_[75%, 100%)	0	1	0.15	0.36	7169
loan-to-value_100%+	0	1	0.12	0.32	7169
Male	0	1	0.75	0.43	7169
Age	1	6	4.16	1.31	7169
Education	0	1	0.49	0.50	7169
Income	1	5	3.43	1.07	5194
Handles finance	0	1	0.76	0.43	7169
Δ house price	-5	4.5	1.20	3.46	7169
West	0	1	0.30	0.46	7147
North	0	1	0.12	0.33	7147
East	0	1	0.22	0.41	7147
South	0	1	0.24	0.43	7147
Urbanization	1	5	2.94	1.28	7147
Detached	0	1	0.18	0.38	7169
Corner	0	1	0.14	0.34	7169
Duplex	0	1	0.19	0.39	7169
Row	0	1	0.30	0.46	7169
Apartment/flat	0	1	0.16	0.36	7169
Number of rooms	2	12	4.71	1.25	7163
Size of living room	3	100	39.26	13.57	6972
Garage	0	1	0.48	0.50	7163
Outdoors	0	1	0.87	0.34	7163
Plans to move	0	1	0.14	0.34	4555
Tenure	0	57	12.54	8.63	7169
Loan-to-value	1	5	2.50	1.39	7169

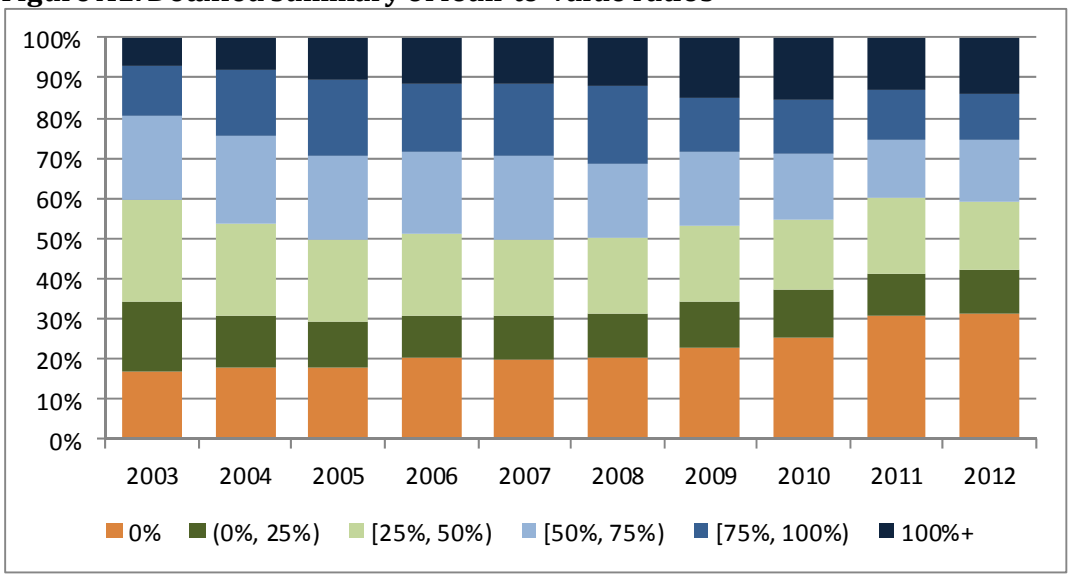
Note: This table summarizes the variables conditional on the fact that all the key explanatory variables, the basic control variables and the dependent variable are non-missing.

Table A2. Detailed summary of tenure

	Min	Max	Mean	Std. Dev.	Obs.
2003	0	42	11.5	8.2	786
2004	0	40	10.8	7.4	698
2005	0	57	11.1	7.8	745
2006	0	41	11.3	7.8	715
2007	0	43	11.6	8.1	689
2008	0	47	12.2	8.3	696
2009	0	48	13.2	8.8	622
2010	0	40	13.1	8.7	777
2011	0	41	14.4	9.0	674
2012	0	48	16.2	10.2	767
Total	**0**	**57**	**12.5**	**8.6**	**7169**

Note: This table summarizes tenure conditional on the fact that all the key explanatory variables, the basic control variables and the dependent variable are non-missing.

Figure A1. Detailed summary of loan-to-value ratios



Source: DHS.

Note: This figure summarizes loan-to-value ratios conditional on the fact that all the key explanatory variables, the basic control variables and the dependent variable are non-missing. The total number of observations is 7169.

Appendix B. Robustness

Table B1. Home value bias: baseline regressions

Including tenure and loan-to-value instead of dummy variables

	(1)	(2)	(3)	(4)	(5)	(6)
tenure	0.01***	0.01***	0.02***	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
loan-to-value	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
male			0.05***	0.04***	0.04***	0.04***
			(0.01)	(0.01)	(0.01)	(0.01)
age			0.00	0.00	0.01	0.00
			(0.01)	(0.00)	(0.00)	(0.00)
education			-0.02*	-0.02	-0.01	-0.02
			(0.01)	(0.01)	(0.01)	(0.01)
income			0.00			
			(0.00)			
handles finance			-0.02	-0.02	-0.02	-0.02
			(0.01)	(0.01)	(0.01)	(0.01)
Δ house price					0.01***	0.01***
					(0.00)	(0.00)
constant	0.94***	0.89***	0.85***	0.86***	0.88***	0.84***
	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)
Year dummies	NO	YES	YES	YES	NO	YES
# observations	7174	7174	5194	7169	7169	7169
# individuals	2084	2084	1587	2084	2084	2084
R-squared	0.21	0.22	0.25	0.22	0.22	0.22

Note: *** p<0.01, ** p<0.05, * p<0.1 Table reports parameter estimates for Random-effects GLS regressions. Robust standard errors, clustered by household, are in parentheses. *Tenure* is the number of years the respondent owns her house. *Loan-to-value* is measured using 5 categories: (1) < 25%, (2) ≥ 25% and < 50%, (3) ≥ 50% and < 75%, (4) ≥ 75% and < 100%, (5) ≥ 100%.

Table B2. Home value bias: extended regressions

Including tenure and loan-to-value instead of dummy variables

	(1)	(2)	(3)	(4)	(5)	(6)
tenure	0.01***	0.01***	0.01***	0.01***	0.02***	0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
loan-to-value	0.04***	0.04***	0.04***	0.04***	0.04***	0.04***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
male	0.04***	0.04***	0.04***	0.04***	0.04***	0.03*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
age	0.00	0.00	0.00	0.00	0.00	-0.00
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
education	-0.02	-0.02	-0.02	-0.02	-0.03**	-0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
account	-0.02	-0.01	-0.01	-0.01	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Δ house price	0.01***	0.01***	0.01***	0.01***	0.00*	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
west		0.00				-0.01
		(0.02)				(0.02)
north		-0.06***				-0.08***
		(0.02)				(0.03)
east		0.00				-0.02
		(0.02)				(0.02)
south		0.02				0.00
		(0.02)				(0.02)
urbanization		-0.01***				-0.01
		(0.00)				(0.01)
detached			0.05			0.03
			(0.04)			(0.05)
corner			0.01			-0.03
			(0.04)			(0.05)
duplex			0.06			0.01
			(0.04)			(0.04)
row			0.01			-0.03
			(0.04)			(0.04)
apartment/flat			-0.03			-0.03
			(0.04)			(0.05)
number of rooms				0.01		0.00
				(0.01)		(0.01)
size of living room				0.00		0.00
				(0.00)		(0.00)
garage				0.01		0.02
				(0.01)		(0.02)
outdoors				0.04**		0.01
				(0.02)		(0.03)
plans to move					0.01	0.02
					(0.01)	(0.01)
Constant	0.84***	0.88***	0.83***	0.74***	0.84***	0.85***

	(0.02)	(0.04)	(0.04)	(0.04)	(0.03)	(0.07)
Year dummies	YES	YES	YES	YES	YES	YES
# observations	7169	7147	7169	6972	4555	4451
# individuals	2084	2075	2084	2025	1617	1576
R-squared	0.22	0.23	0.23	0.23	0.22	0.23

Note: *** p<0.01, ** p<0.05, * p<0.1 Table reports parameter estimates for Random-effects GLS regressions. Robust standard errors, clustered by household, are in parentheses. *Tenure* is the number of years the respondent owns her house. *Loan-to-value* is measured using 5 categories: (1) < 25%, (2) ≥ 25% and < 50%, (3) ≥ 50% and < 75%, (4) ≥ 75% and < 100%, (5) ≥ 100%.

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