

Who buys homes when prices fall? ¹

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Abstract

Who buys homes when prices fall?

We study the transition to and from homeownership under the recent housing market bust using detailed micro-level data covering the entire Danish population. We document that after controlling for various sociodemographic and market characteristics, younger households reduced their likelihood to acquire homeownership during the bust more than other households. Similarly, younger households increased their likelihood to abandon homeownership during the bust more than other households. This pattern is likely to have contributed to a significant inter-generational shift in homeownership from younger to older households.

JEL Classification Codes: D12, D14, D91, E21, E32, G11, R21

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1 Introduction

The recent housing market boom and bust dramatically illustrates the need for a better understanding of how households decide on homeownership and whether differences in households' sociodemographic characteristics lead to differential behavior over the housing market cycle. Case and Shiller (1989) document that returns on residential homes are highly positively autocorrelated. That is, lagged housing market returns partly predict present ones. In particular, house prices are more likely to decline if house prices in the previous period declined significantly. Despite significant transaction costs for trading owner-occupied homes, households should take this autocorrelation into account when deciding about homeownership (Fischer and Stamos, 2013; Corradin et al., 2014).

Intuitively, homeownership decisions should be more sensitive to past decreases in house prices. Increases in house prices primarily result in a positive wealth effect for homeowners. With falling house prices, however, there is a much higher degree of dispersion in how households are affected. Some households may be able to bear the negative wealth effect, others may run the risk of getting overindebted. In particular, younger households with low savings and income could be more sensitive to large drops than other households. Hence, the incentives to become a homeowner in a market with falling prices should be lower for younger households and households with low savings and income.

Our work tests these hypotheses using a large high-quality dataset covering all trades of owner-occupied homes in Denmark. Our main finding is that the propensity to acquire homeownership during the recent bust varied significantly with household characteristics. In particular, under the bust, younger households reduced their propensity to acquire homeownership more. Similarly, households with lower income, short education, and singles reduced their propensity to become homeowners more. Similarly, households without significant savings that were already indebted reduced their propensity to acquire homeownership, at least partly reflecting tightening credit conditions. Households with children reduced their propensity less, suggesting that the elasticity for the demand for owner-occupied homes decreases once children live in the household. Other household characteristics vary less with the state of the housing market cycle and seem to play a less important role in explaining differences between

30 the propensity to acquire homeownership under the bust and during other periods.

31 Macroeconomic factors such as interest rates (e.g., Landvoigt et al., 2015) as well as new
32 types of mortgages and relaxed borrowing standards (e.g., Chambers et al., 2009; Amromin
33 et al., 2018) have contributed to the recent housing market boom and bust. Less is known about
34 the groups of households that were most affected by these macroeconomic changes. Notable
35 exemptions are the works of Adelino et al. (2016) and Foote et al. (2016), which focus on inves-
36 tigating the distribution of mortgage debt among US households before and during the financial
37 crisis. When house prices have declined significantly, such as during the bust, homeownership
38 should be an option for a larger number of households. However, the high degree of autocor-
39 relation in residential house prices implies a second effect, namely negative expectations on
40 house price changes in the near future. When house prices have been depreciating a lot, the
41 high degree of autocorrelation in residential house prices implies that a further decline in house
42 prices is likely. In that situation, it may be rational to defer the purchase of a home until house
43 prices have bottomed out. Many countries, including the US, Great Britain, and China, expe-
44 rienced a massive decline in house prices. Denmark experienced a housing market boom and
45 bust that is remarkably similar to its US counterpart. Using big data on Danish households, we
46 investigate the propensity to acquire homeownership.

47 Complementing the work of Andersen et al. (2016) that focuses on homeowners and stud-
48 ies the correlation between consumption expenditure and leverage during the recent bust, we
49 focus on households living in rented places and study their decisions to acquire homeown-
50 ership during the bust. Understanding the purchases of these households is key to understanding
51 household behavior during housing market busts for four reasons. First, Abel (2019) documents
52 that the behavior of sellers can only explain a small proportion of the decline in aggregate sales.
53 Second, market entrants typically buy smaller homes whereas the sellers of these homes mostly
54 move to larger homes. That is, market entrants do not only affect the relatively cheap market
55 segment they buy in, but also more expensive market segments (Ortalo-Magné and Rady, 1999,
56 2006). In our data, these spillover effects are reflected in a positive correlation between pur-
57 chases of market entrants and repeated buyers. Third, market entrants do not have to sell their
58 current home before acquiring a new one. Their market entries should therefore better reveal the

59 exact point in time at which they want to acquire a home. Fourth, in our robustness analysis, we
60 document that the purchases of new homes by households that already live in owner-occupied
61 places is driven by similar household characteristics as those of market entrants.

62 Our work contributes to a growing literature on the implications of housing market cycles
63 and their causes. Departing from the pioneering work of Case and Shiller (1989), that was the
64 first to document autocorrelation in residential house prices, one strand of this literature investi-
65 gates the impact of these cycles on unemployment (Mian and Sufi, 2014) and entrepreneurship
66 (Corradin and Poppov, 2015). Similarly, the dramatic consequences of the recent housing mar-
67 ket bust for the values of mortgage-backed securities is well-documented. Yet, little is known
68 about the extent to which sociodemographic characteristics affect the propensity to acquire a
69 home in different stages of the housing market cycle.

70 Another strand of literature tries to rationalize autocorrelation in residential house prices via
71 search frictions (Head et al., 2014), biased expectations of homebuyers (Glaeser and Nathanson,
72 2017), or pro-cyclical behavior of short-term buyers (DeFusco et al., 2018) and investigates the
73 implications of the high degree of autocorrelation. Despite high transaction costs, this literature
74 finds it rational to time market entries and exits (Fischer and Stamos, 2013). Empirically, in
75 areas with high past house price appreciations, individuals buy at earlier ages than in areas with
76 low past house price appreciations (Agarwal et al., 2016). We contribute to this line of literature
77 by focusing on the bust period during which heterogeneity among household decisions should
78 be highest. Complementing the work of Agarwal et al. (2016) that focuses on trades during the
79 boom, we find that younger households acquire homeownership significantly less frequently
80 once house prices start tumbling. Similarly, younger households showed a higher likelihood to
81 abandon homeownership than other households during such periods.

82 On the aggregate level, these differences lead to a remarkable shift in homeownership
83 among different age groups. The homeownership rate of younger households in which the
84 oldest member is younger than 30 years showed a remarkable drop from about 22% before
85 house prices started falling dramatically to less than 18% in 2010. Similarly, the homeown-
86 ership rates among households with the oldest member being 30 to 39 also decreased. During
87 the same time, the homeownership rate among older households slightly increased, while the

88 homeownership rate in the total population remained fairly stable at around 55%.

89 This paper proceeds as follows: Section 2 motivates why the impact of household char-
90 acteristics on the decision to acquire a home should vary over the housing market cycle in a
91 simple stylized two-date model. Section 3 presents our data and our empirical framework. In
92 section 4, we discuss our main results, section 5 documents the robustness of our results to
93 trades of current owners. Section 6 concludes.

94 2 A simple two-date model

95 To motivate our empirical analysis, we present a simple two-date model, in which households
96 derive utility from consuming a non-durable good and living in an owner-occupied home. For
97 the purpose of our motivating model, we abstract away from modeling borrowing constraints.
98 Initially, at time $t = 0$, a household is endowed with net worth W_0 and decides how much
99 to spend on non-durable consumption and whether to acquire a home. At time $t = 1$, the
100 household derives utility from its remaining net worth, W_1 , including the value of the home.¹

101 With a time preference parameter of β , a household's expected lifetime utility could be
102 written as

$$U_0(C_0) + x\chi_H + \beta\mathbb{E}[U_1(W_1)], \quad (1)$$

103 in which U_0 is the household's utility function defined over non-durable consumption at time
104 $t = 0$, U_1 is a strictly concave utility function over consumption of terminal net worth at
105 time $t = 1$, x measures the utility gain from living in an owner-occupied home, and χ_H is an
106 indicator variable that takes the value one if the household lives in an owner-occupied home,
107 i.e., acquires a home at time $t = 0$, and zero otherwise. The price of the home is normalized
108 to one. Denoting the household's labor income at time t by Y_t , the budget constraint can be
109 written as

$$W_1 = (W_0 + Y_0 - C_0 - \chi_H)R + \chi_H R_H + Y_1, \quad (2)$$

¹In a two-period setting, the remaining net worth, W_1 is consumed. In a setting with more than two dates, the remaining wealth, W_1 , could also be used to finance consumption at time $t = 1$ and reinvested for future periods. Irrespective of whether we focus on a model with two or more dates, a higher level of W_1 is associated with a higher level of lifetime utility. For the purpose of motivating our empirical approach, it is therefore sufficient to work in a two-date model.

110 in which R denotes the gross return on the household's financial investments, and R_H is the
 111 gross return on the owner-occupied home that consists of an expected constant drift, c_H , an
 112 expected cyclical drift, r_H , that depends on the state of the housing market cycle, and an error
 113 term, ϵ_H , that accounts for the unpredictable component in the evolution of residential house
 114 prices. That is,

$$R_H = 1 + c_H + r_H + \epsilon_H. \quad (3)$$

115 The household chooses current consumption, C_0 , and homeownership status, χ_H , to maximize
 116 utility from Equation (1) subject to budget equation (2).

117 We let C_0^N and W_1^N denote the household's levels of consumption and net worth, respec-
 118 tively, when the household does not invest in an owner-occupied home. C_0^H and W_1^H denote
 119 their counterparts when the household does invest in an owner-occupied home, respectively. It
 120 is then optimal to acquire a home if

$$U^H = U_0(C_0^H) + x + \beta \mathbb{E} [U_1(W_1^H)] > U^N = U_0(C_0^N) + \beta \mathbb{E} [U_1(W_1^N)]. \quad (4)$$

121 From Equation (2),

$$W_1^H = (W_0 + Y_0 - C_0^H) R + \chi_H (R_H - R) + Y_1. \quad (5)$$

122 Whether an investment into an owner-occupied home is desirable depends on whether $U^H >$
 123 U^N or not. From Equations (4) and (5), this in turn depends on the cyclical housing premium
 124 r_H . With the envelope condition, it holds that

$$\frac{\partial (U^H - U^N)}{\partial r_H} = \beta \mathbb{E} \left[\frac{\partial U_1(W_1^H)}{\partial r_H} \right] = \beta \mathbb{E} \left[\frac{\partial U_1(W_1^H)}{\partial W_1^H} \right] > 0 \quad (6)$$

125 That is, low values of r_H , i.e., bad states of the housing market cycle, make an investment into
 126 an owner-occupied home less attractive.

127 We want to investigate whether households' sensitivity to changes in r_H is related to other

128 sociodemographic characteristics, $X_{i,0}$, i.e., whether

$$\frac{\partial^2 (U^H - U^N)}{\partial r_H \partial X_{i,0}} = \beta \mathbb{E} \left[\frac{\partial^2 U_1 (W_1^H)}{\partial W_1^H \partial X_{i,0}} \right] = \beta \mathbb{E} \left[\frac{\partial U_1 (W_1^H)}{\partial W_1^H} \cdot \frac{dW_1^H}{dX_{i,0}} \right] \quad (7)$$

129 is positive, negative, or zero for a given (continuous) characteristic $X_{i,0}$ at time $t = 0$. From
 130 Equation (7), the first factor measuring the marginal utility of wealth is positive. Understanding
 131 how a characteristic affects the propensity to acquire homeownership is then largely associated
 132 with understanding how it affects the second factor, $\frac{dW_1^H}{dX_{i,0}}$.

We begin our analysis by asking whether the household's initial wealth level, W_0 , affects the desirability of acquiring homeownership. It holds that

$$\frac{\partial U_1 (W_1^H)}{\partial W_1^H} \frac{dW_1^H}{dW_0} = \frac{\partial U_1 (W_1^H)}{\partial W_1^H} \left(\frac{\partial W_1^H}{\partial W_0} + \frac{\partial W_1^H}{\partial C_0} \frac{\partial C_0}{\partial W_0} \right) \quad (8)$$

$$= \frac{\partial U_1 (W_1^H)}{\partial W_1^H} \left(1 - \frac{\partial C_0}{\partial W_0} \right) R \quad (9)$$

133 For reasonably-behaved utility functions, households aim at smoothing their consumption over
 134 the life cycle. In other words, households do not consume the entire increase in W_0 immedi-
 135 ately, but save part of it for future consumption. That is, the term $1 - \frac{\partial C_0}{\partial W_0}$ is generally positive.
 136 Hence, households with higher wealth levels have lower marginal utilities of wealth at time
 137 $t = 1$ and are therefore less sensitive to bad states of the housing market cycle. In other words,
 138 households with lower wealth levels should shy more away from acquiring homeownership in
 139 bad states of the housing market cycle.

140 From the work of Cocco et al. (2005), other household characteristics, such as age, educa-
 141 tion, or marital status, are important drivers of household income when regressing the log of
 142 household income on a set of household characteristics:

$$\ln (Y_t) = \sum_{i=1}^n \alpha_i X_{it} + v_t + \epsilon_t, \quad (10)$$

in which $v_t = v_{t-1} + u_t$ with u_t is normally distributed with mean zero and variance σ_u^2 accounts for the persistence in labor income. We next turn to investigating how the level of the investor's permanent component, v_t of labor income affects the propensity to acquire homeownership in

bad states of the housing market cycle. For that purpose, we ask how varying v_0 affects the demand for homeownership. It holds that

$$\begin{aligned}
\frac{dW_1^H}{dv_0} &= \frac{\partial W_1^H}{Y_0} \frac{\partial Y_0}{\partial v_0} + \frac{\partial W_1^H}{\partial C_0} \frac{\partial C_0}{\partial Y_0} \frac{\partial Y_0}{\partial v_0} + \frac{\partial W_1^H}{\partial Y_1} \frac{\partial Y_1}{\partial v_0} + \frac{\partial W_1^H}{\partial C_0} \frac{\partial C_0}{\partial Y_1} \frac{\partial Y_1}{\partial v_0} \\
&= RY_0 - RY_0 \frac{\partial C_0}{\partial Y_0} + Y_1 - RY_1 \frac{\partial C_0}{\partial Y_1} \\
&= RY_0 \left(1 - \frac{\partial C_0}{\partial Y_0}\right) + Y_1 \left(1 - R \frac{\partial C_0}{\partial Y_1}\right)
\end{aligned} \tag{11}$$

143 Due to the consumption-smoothing motive, $1 - \frac{\partial C_0}{\partial Y_0}$, is positive. Likewise, an increase in
144 future labor income should again lead to a consumption-smoothing policy. That is, part of the
145 future increase will be spend on future and part on present consumption. That is, $1 - R \frac{\partial C_0}{\partial Y_1}$
146 should be positive. Hence, an increase in permanent labor income increases future wealth and
147 thus decreases the marginal utility of future wealth. In other words, the marginal utility of
148 future wealth should be less sensitive to the state of the housing market cycle for households
149 with higher income, and households with lower income should shy more away from acquiring
150 homeownership in bad states of the housing market cycle.

From Equation (10), in addition to v_t , other household characteristics affect the household's labor income stream. Via labor income, household characteristics thus affect household wealth W_1^H and thus, ultimately, the marginal utility of wealth in Equation (7). For a given characteristic $X_{i,0}$, it holds that

$$\begin{aligned}
\frac{dW_1^H}{dX_{i,0}} &= \frac{\partial W_1^H}{\partial Y_0} \frac{\partial Y_0}{\partial X_{i,0}} + \frac{\partial W_1^H}{\partial C_0} \frac{\partial C_0}{\partial Y_0} \frac{\partial Y_0}{\partial X_{i,0}} + \frac{\partial W_1^H}{\partial Y_1} \frac{\partial Y_1}{\partial X_{i,0}} + \frac{\partial W_1^H}{\partial C_0} \frac{\partial C_0}{\partial Y_1} \frac{\partial Y_1}{\partial X_{i,0}} \\
&= RY_0 \alpha_i - R \frac{\partial C_0}{\partial Y_0} Y_0 \alpha_i + Y_1 \alpha_i \frac{\partial X_{i,1}}{\partial X_{i,0}} - R \frac{\partial C_0}{\partial Y_1} Y_1 \alpha_i \frac{\partial X_{i,1}}{\partial X_{i,0}} \\
&= RY_0 \alpha_i \left(1 - \frac{\partial C_0}{\partial Y_0}\right) + Y_1 \alpha_i \frac{\partial X_{i,1}}{\partial X_{i,0}} \left(1 - R \frac{\partial C_0}{\partial Y_1}\right)
\end{aligned} \tag{12}$$

151 From above, both $1 - \frac{\partial C_0}{\partial Y_0}$ and $1 - R \frac{\partial C_0}{\partial Y_1}$ should be positive. Whether the entire expression is
152 positive or negative then depends on the signs of α_i and $\frac{\partial X_{i,1}}{\partial X_{i,0}}$.

153 If $X_{i,t}$ measures the length of an individual's education, then $\frac{\partial X_{i,1}}{\partial X_{i,0}}$ is either one (if the indi-
154 vidual is finished with its longest education) or positive (if the individual is still in progress with
155 the education). Income generally increases in the level of an individual's education. Higher in-

156 come in turn leads to higher future wealth. Hence, our theoretical model predicts that the
157 marginal utility of wealth at time $t = 1$ is lower for individuals with a longer education. That
158 is, individuals with a shorter education should shy more away from acquiring homeownership
159 in bad states of the housing market cycle.

160 From Table 1 in Love (2010) and Table 1 in Fischer and Khorunzhina (2019), married indi-
161 viduals with highschool degree have a higher level of household income and a lower volatility
162 of their income. More technically, this empirical observation translates into the α_i from be-
163 ing married exceeding its counterpart for being single in Equation (12). With both the level
164 of household income being higher and the volatility being lower for married individuals, the
165 (average) marginal utility of wealth is lower for married than for singles. Hence, singles that
166 do not change their marital status should shy more away from acquiring homeownership in bad
167 states of the housing market cycle than richer households.

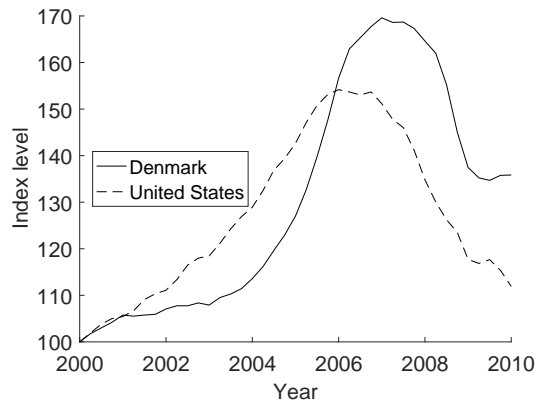
168 From Figure 1 in Cocco et al. (2005), household income generally increases with the age
169 of the head of household – particularly prior to age 40. If $X_{i,t}$ is the individual’s age, then
170 $\frac{\partial X_{i,1}}{\partial X_{i,0}} = 1$ and $\alpha_i > 0$ at younger age. That is, since younger households’ labor income
171 is typically lower than older households’, younger households should shy more away from
172 acquiring homeownership in bad states of the housing market cycle than older households.

173 In total, from our theoretical model, we conjecture that households with lower income,
174 households with lower net worth, shorter education, singles, and younger households are less
175 likely to acquire homeownership in bad states of the housing market cycle.

176 **3 Data**

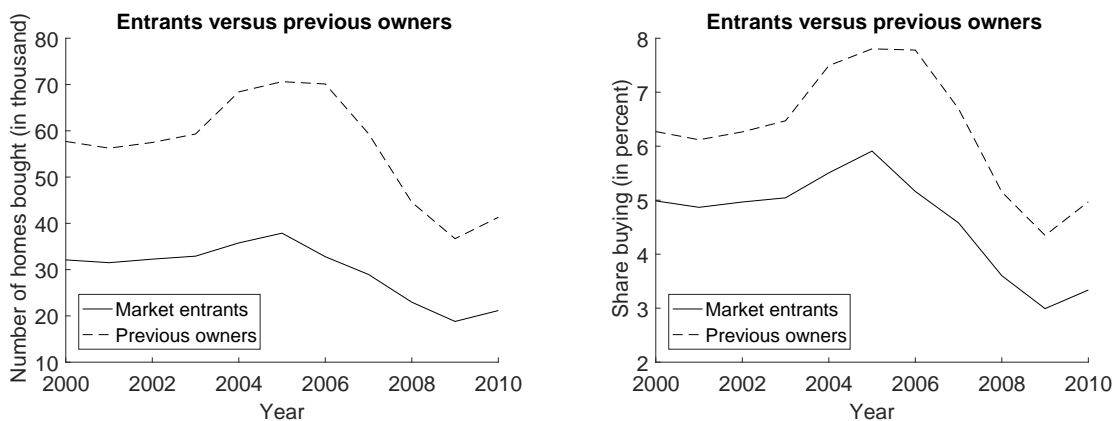
177 Similar to the United States and several other countries, Denmark experienced a sharp increase
178 in residential house prices followed by a rapid decline between 2000 and 2010. From Figure 1,
179 the evolution of house prices in Denmark is similar to its US counterpart. Yet, rapid increases
180 and declines in house prices seem even more pronounced. From Figure 2 and in line with the
181 prediction from the model of Stein (1995), the sharp decline of house prices is closely related
182 to a sharp decline in the number of households acquiring homeownership. Using data covering

Figure 1
Evolution of house prices over time



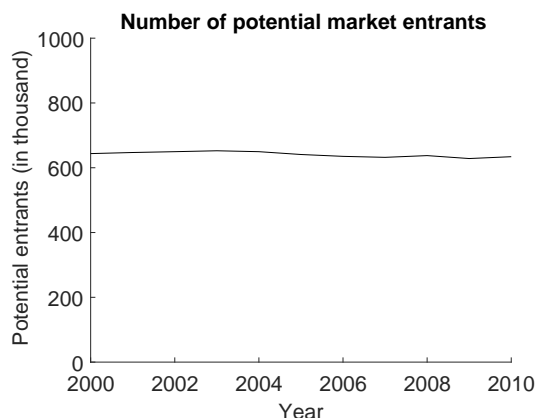
This figure depicts the evolution of house prices in Denmark (solid line, data from the OECD) and the United States (dashed line, Case Shiller house price index) from 2000 to 2010. The indices are normalized to 100 in the first quarter of 2000.

Figure 2
Market entrants versus previous owners



This figure depicts the evolution of the absolute number of homes bought (left panel) and the share of individuals acquiring a home (right panel) between 2000 and 2010. The solid lines show results for market entrants; the dashed lines for previous owners.

Figure 3
Potential market entrants



This figure depicts the number of potential market entrants between 2000 and 2010.

183 the entire population of Denmark, i.e., all Danish households, we investigate which groups of
184 households altered their propensity to acquire homeownership most and are therefore likely to
185 have played an important role in the housing market bust.

186 We focus on market entrants, i.e., households that change their homeownership status from
187 renter to owner, for two reasons.² First, market entrants' decisions are subject to less frictions,
188 such as the necessity to sell the current home before acquiring a new one. The timing of the
189 acquisition of market entrants should therefore better reflect their true preferences. Second,
190 market entrants do not only affect the market via their own trade, but – via spillover effects –
191 also other market segments (e.g., Ortalo-Magné and Rady, 1999, 2006). From Figure 2, the
192 number of homes bought by previous homeowners is closely related to that of market entrants.
193 The same is true for the share of previous homeowners acquiring homeownership.³

194 From Figure 3, the number of potential market entrants is remarkably stable over time,
195 indicating that the impact of potential market entrants on house prices should not primarily
196 be driven by a change in their number, but instead by changes in their propensity to acquire a
197 home. For all those reasons, we focus our empirical analysis on the behavior of market entrants
198 throughout. In robustness checks in section 5.1, we document that current owners' decisions

²We deliberately only consider households as market entrants if they have been living in a rented place for at least a full year to avoid capturing cases that only temporarily live in a rented place, because they managed to sell their old home, but have not yet finalized the purchase of a new one.

³In section 5.1, we document that the characteristics driving purchases of homes during bust periods of market entrants and current owners are remarkably similar.

199 to acquire a new home are related to sociodemographic characteristics in a qualitatively similar
200 fashion as those of potential market entrants.

201 Similar to the United States, where living in an owner-occupied home is part of the Ameri-
202 can Dream, a strong preference for living in an owner-occupied home is also deeply rooted in
203 the Danish society. Danish households rarely abandon homeownership unless adverse events,
204 such as a divorce or physical conditions at old age, force them to do so.⁴ The trades of house-
205 holds abandoning homeownership are therefore often more driven by an exogenous need than
206 by household preferences. Simultaneously, markets with falling house prices are typically
207 buyers-markets in which a large number of homes on the market meets a small number of po-
208 tential buyers. For all those reasons, we mainly focus on households' decisions to purchase
209 owner-occupied homes in our empirical analysis. In section 5.2, we also explore the decision
210 to abandon homeownership.

211 Our analysis is conducted with Danish Registry Data (DRD) that is mostly third-party re-
212 ported and covers the entire Danish population. Property transaction records contain informa-
213 tion about all home sales and purchases in Denmark from 1993 through 2010 linked to detailed
214 background information on the individuals involved in a trade. We defined a household as
215 acquiring a home the moment the purchase agreement is signed.⁵

216 From the various registers we get basic demographics such as age, gender, education, num-
217 ber of children, and employment status for each individual living in Denmark. We then use
218 the unique household ID to make households our unit of investigation. We use the beginning-
219 of-year observations at time $t + 1$ to define the "acting households" that jointly make housing
220 decisions. For households in our sample we collect information about household income, sav-
221 ings, and debt, which is normalized to 2015 Danish Kroner using the Danish Consumer Price
222 Index. The DRD has, among others, been used in previous work to investigate whether house-
223 hold consumption expenditure is correlated with changes in house prices (Browning et al.,
224 2013), to explore how households decide about mortgage refinancing (Andersen et al., 2015),

⁴The share of households in which the oldest member is not exceeding the age of 60 that abandon homeown-
ership is only at around 1% to 1.5% per year.

⁵To account for a few cases in which, despite a signed agreement, a households did not gain ownership, we
additionally require households to own the home in the following or (to account for delayed legal transfers) next-
following year to classify the signed contract as a trade.

225 and to study the impact of forced sales on house prices (Andersen and Nielsen, 2017).

226 **3.1 Data selection and cleaning**

227 We restrict our data to the calendar years 2004 to 2010 for two reasons. First, the housing
228 market boom and bust in Denmark was most pronounced in these years. Second, similar to the
229 United States, where the share of interest-only (IO) mortgages was less than 2% until 2003,
230 but 30% two years later (Amromin et al., 2018), a reform allowed IO mortgages from 2004
231 onwards in Denmark. This reform is generally believed to have significantly altered the Danish
232 housing market. To avoid a structural break in our data, we therefore focus on the years from
233 2004 onwards.

234 We define the years 2008 and 2009, in which real house prices fell by more than 6% each
235 as the bust years. In 2007 and 2010 real house prices changed only little, whereas the years
236 2004 to 2006, in which house prices rose by more than 9% in real terms each year, account for
237 the housing market boom.⁶

238 In our base case setting, we focus on market entrants and remove households that live in an
239 owner-occupied home at the beginning of the current or the previous period.⁷ We also remove
240 observations of households that live in cooperative housing at the beginning of the current or
241 the previous year.⁸ We keep households between ages 22 and 60.⁹ We exclude households
242 with very unstable or unpredictable labor income, i.e., households that only consist of students,
243 and households in which all adults receive public welfare benefits (Danish kontanthjælp). We
244 further exclude households with at least one self-employed adult. Lastly, we exclude outliers,

⁶We also considered a setting with local busts, in which we define a trade as occurring in a bust market if real house prices fell by more than 6% in the home's municipality. Our key findings reported throughout are structurally robust to this change in the definition of a bust.

⁷We investigate the behavior of current owners in section 5.1.

⁸In addition to living in an owner-occupied or a rented home, the Danish housing market offers a third type of homeownership status that is primarily found in larger cities: cooperative housing. In cooperative housing, a larger number of individuals jointly owns one or more building blocks through a cooperation. Each individual that is a member of the cooperation owns a share that simultaneously entitles it to live in a specific entity of the cooperation and makes it one of the owners of the cooperation. Despite legal constraints on the prices at which these shares may be traded, some trade at prices close to the values of comparable owner-occupied places. Cooperative housing is thus in some regards similar to living in an owner-occupied home and more similar to living in a rented place in other regards. We do not investigate purchases of shares in cooperative housing, because they only account for a small share of the housing market and this data is not publicly available, because these trades are not registered in court.

⁹We also considered a setting, in which we only removed households younger than 18 years. Our results are robust to this change and are therefore not reported here.

245 such as the top and bottom 0.5% of household net worth. We define net worth as the sum
246 of net wealth in bank accounts, the market value of equity, bonds and t-bills plus the value
247 of a possibly existing owner-occupied home minus the sum of all household debt. Pension
248 savings are neither available in our data, nor can these savings under Danish law be liquidated
249 without paying tremendous penalty taxes. We therefore do not include them in our definition
250 of household net worth.

251 Some sample cleaning is related to home trades. We remove trades between family mem-
252 bers and trades in relation to the owners' death. Both types of trades are likely to be heavily
253 affected by favorable tax treatment. We further remove trades of households that acquire more
254 than two homes in a single year and trades that Statistics Denmark marks as having a price
255 clause or an extreme price.

256 Our final cleaned data set then consists of 4,457,768 household observations for the years
257 2004 to 2010.

258 **3.2 Control variables**

259 Homeownership is empirically significantly less widespread among singles than among cou-
260 ples. We therefore control for whether a household has a single female/male head or two
261 adults. An important question in this regard is whether causality goes from becoming a couple
262 to homeownership or vice versa. Fisher and Gervais (2011) document that becoming a couple
263 drives homeownership, but not the other way around. Hence, it is important to control for the
264 number of heads of household and changes in it. Given that cohabitation without marriage is
265 very common in Denmark and cohabiting partners are treated similarly to married couples in
266 many regards under Danish law, we deal with cohabiting adults like married ones.

267 We use a dummy for whether the adult household members have children.¹⁰ We use dum-
268 mies for whether the household member with the longest education has no highschool degree, a
269 highschool education, or a college degree.¹¹ Age is the age of the oldest member in the house-

¹⁰In the data, there is a significant difference between the market entry behavior of households with and without children. However, conditional on having children, the exact number does not play a major role.

¹¹More technically, we define the household member with the longest education as having no highschool degree, if his or her education does not extend beyond the ten years of schooling that are mandatory in Denmark. The household member with the longest education is classified as having a high school degree if it graduated from a

270 hold. Other control variables in our regression framework are the log of household income,
271 a dummy for whether household income per adult increased by more than 10% over the past
272 year, year-fixed-effects, and municipality-fixed-effects. We also include a dummy for whether
273 at least one family member has owned a property between 1993, the earliest observation that
274 we have information about homeownership for, and the period under consideration.

275 Information about house prices is easy to obtain in the Danish housing market. Actual trad-
276 ing prices are published online. To control for the price expectations implied by autocorrelation
277 in residential house prices, we include the lagged local house price growth in the housing mar-
278 ket. Given the documented importance of past local house price changes (e.g., Guerrieri et al.,
279 2013; Agarwal et al., 2016), we compute the house price growth for each of the 98 Danish
280 municipalities separately using a transaction-based hedonic price index.

281 **3.3 Summary Statistics**

282 In this section, we discuss key properties of our data in more detail. We begin by providing
283 summary statistics in Table 1. Table 1 reports means and standard deviations (in parentheses)
284 for our potential market entrants (Panel A) and actual market entrants (Panel B). *Acquiring*
285 denotes the share of potential market entrants that acquire homeownership, *Age* is the age of
286 the oldest member in the household, *Net worth* is the total amount of the households' net worth.
287 *Income* is total household income. *Single female (male)* is a dummy for whether the household
288 has a single female (male) adult as head. *Kids* is an indicator for whether children are living in
289 a household. *No highschool*, *Highschool*, and *College* are dummies for whether the household
290 member with the longest education has no highschool degree, a highschool degree, or a college
291 degree, respectively. *Experience* is a dummy indicating whether one of the adult household
292 members has owned a home in the past. *Lag ΔHPI* is the lagged real annual growth rate of
293 house prices in the household's municipality.

294 From Panel A of Table 1, the share of potential market entrants buying an owner-occupied
295 home is only 3.3% in the bust years versus 4.9% in the other years. That is, in the bust years,
highschool, a technical highschool or passed a (Danish) applied academy education, which is more applied than
a highschool education, but typically takes a similar number of years to complete. If the household member with
the longest education has a bachelor's degree or higher, we classify it as having a college degree.

Table 1
Summary statistics

Variable	Panel A: Potential entrants			Panel B: Actual entrants		
	All years	Bust-years	Other years	All years	Bust-years	Other years
Acquiring	0.044 (0.206)	0.033 (0.179)	0.049 (0.216)	1 (0)	1 (0)	1 (0)
Age	38.380 (11.259)	38.441 (11.282)	38.356 (11.250)	34.469 (9.265)	35.005 (9.493)	34.325 (9.198)
Net worth	-41,532 (316,296)	-45,379 (327,656)	-40,006 (311,664)	-29,048 (519,942)	-3,883 (578,601)	-35,761 (502,928)
Income	223,106 (112,475)	227,636 (117,580)	221,309 (110,334)	281,848 (128,647)	292,152 (151,711)	279,099 (121,610)
Single female	0.349 (0.477)	0.353 (0.478)	0.348 (0.476)	0.239 (0.426)	0.242 (0.429)	0.237 (0.426)
Single male	0.350 (0.477)	0.358 (0.479)	0.347 (0.476)	0.183 (0.387)	0.184 (0.387)	0.183 (0.387)
Kids	0.260 (0.439)	0.256 (0.437)	0.262 (0.440)	0.349 (0.477)	0.355 (0.479)	0.348 (0.476)
No highschool	0.294 (0.455)	0.292 (0.454)	0.295 (0.456)	0.119 (0.324)	0.121 (0.326)	0.119 (0.324)
Highschool	0.432 (0.495)	0.420 (0.494)	0.437 (0.496)	0.536 (0.499)	0.520 (0.500)	0.541 (0.498)
College	0.144 (0.351)	0.144 (0.351)	0.144 (0.351)	0.292 (0.455)	0.296 (0.457)	0.291 (0.454)
Experience	0.166 (0.373)	0.173 (0.379)	0.164 (0.370)	0.263 (0.440)	0.282 (0.450)	0.258 (0.437)
Lag Δ HPI	0.040 (0.102)	-0.019 (0.071)	0.063 (0.103)	0.050 (0.090)	-0.001 (0.072)	0.064 (0.089)
N	4,457,768	1,265,893	3,191,875	198,303	41,761	156,542

This table reports means and standard deviations (in parentheses) for our potential market entrants (Panel A) and actual market entrants (Panel B). *Acquiring* denotes the share of potential market entrants that acquire homeownership, *Age* is the age of the oldest member in the household, *Net worth* is the total amount of the households' net worth. *Income* is total household income. *Single female (male)* is a dummy for whether the household has a single female (male) adult as head. *Kids* is an indicator for whether children are living in a household. *No highschool*, *Highschool*, and *College* are dummies for whether the household member with the longest education has no highschool degree, a highschool degree, or a college degree, respectively. *Experience* is a dummy indicating whether one of the adult household members has owned a home in the past. *Lag Δ HPI* is the lagged real annual growth rate of house prices in the household's municipality.

296 potential market entrants' likelihood of acquiring homeownership decreases by more than 30%.
297 From Panel B, market entries during the bust are more likely in states with less extreme past
298 local price movements. The average lagged local house price growth of actual entrants in bust-
299 years is only -0.1% compared to -1.9% for potential entrants in bust-years.

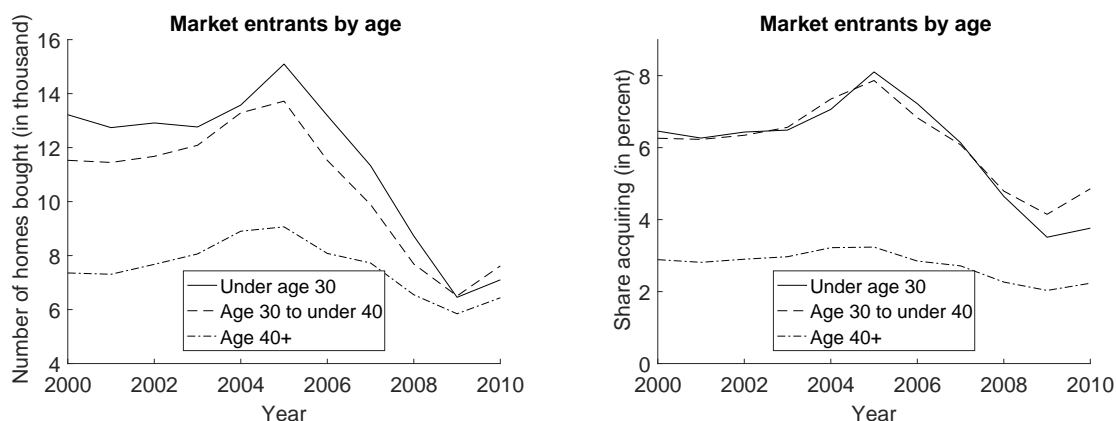
300 It is worth noting that potential market entrants in Denmark typically have negative levels
301 of household net worth – and the same even applies for actual entrants. In Denmark, it is
302 quite common to take out consumption loans to finance durable consumption, such as cars or
303 furniture, but also non-durable consumption, such as holiday travels. In addition, household
304 debt is subsidized in the sense that all household interest expenses – not only mortgage interest
305 expenses – are tax-deductible. It is thus not surprising that Danish household debt is among the
306 highest in Europe (OECD, 2017).

307 For Danish banks, pre-existing household debt is generally not an obstacle for providing
308 households with a mortgage as well as a secondary loan, provided household income is suffi-
309 ciently high to convince the bank that the household is able to serve the debt. Unlike in some
310 states in the United States, under Danish law it is not possible to solely default on a mort-
311 gage without declaring personal bankruptcy. That is, under Danish law, homeowners whose
312 mortgage exceeds the value of their home cannot strategically default on their mortgage whilst
313 keeping their other savings.

314 In the Danish mortgage system, homeowners can take out a mortgage not exceeding 80%
315 of the home's value. In addition, Danish households acquiring homeownership often take out a
316 secondary loan, that comes as a bank loan, to debt-finance an even higher share of the home's
317 purchase price. Danish real estate agents even commonly advertise with the amount in cash that
318 potential new homeowners have to come up with on their own to make a typical bank willing
319 to grant a mortgage as well as a secondary loan. This amount is typically 5% of the home's
320 value. Households with negative levels of net worth are typically endowed with some form of
321 household debt and a certain level of liquid savings, implying that these households are often
322 able to finance the required minimum downpayment and can acquire homeownership if granted
323 a loan. Similar to other countries, Danish banks tightened the requirements for granting loans
324 under the housing market bust. It is therefore important to control for the differential impact
325 of household net worth on the potential to acquire homeownership during the bust and other
326 periods.

327 Despite the huge difference in the likelihood of acquiring homeownership, from Table 1,
328 Panel A and similar to the key finding of Gabriel and Rosenthal (2015), potential market en-

Figure 4
Market entrants by age



This figure depicts the absolute number (left panel) and share of potential market entrants (right panel) acquiring homeownership by age of the oldest member of the household. The solid lines show results for households in which the oldest member is younger than 30, the dashed lines results in which it is 30 to under 40, and the dash-dotted lines results when it is at least 40.

329 trants do not differ much in terms of characteristics in bust and other years. In those two
 330 periods, they are similar in terms of age, have similar levels of assets, debt, and income, and
 331 have about the same number of children.

332 Changes in the composition in the group of market entrants are therefore unlikely to offer
 333 an explanation for the huge changes in the likelihood of acquiring homeownership. Instead
 334 these households with largely unaltered characteristics seem to have changed their propensity
 335 to acquire homeownership. From Table 1, Panel B, during bust periods, actual market entrants
 336 differ especially along two characteristics compared to other stages of the housing market cycle.
 337 First, during bust periods, market entrants are on average almost a year older. Second, during
 338 bust periods, actual market entrants are on average endowed with higher levels of net worth.
 339 Other household characteristics of market entrants are very similar in bust and other periods
 340 and thus unlikely to help understand the dramatic decrease in market entries during the bust
 341 period.

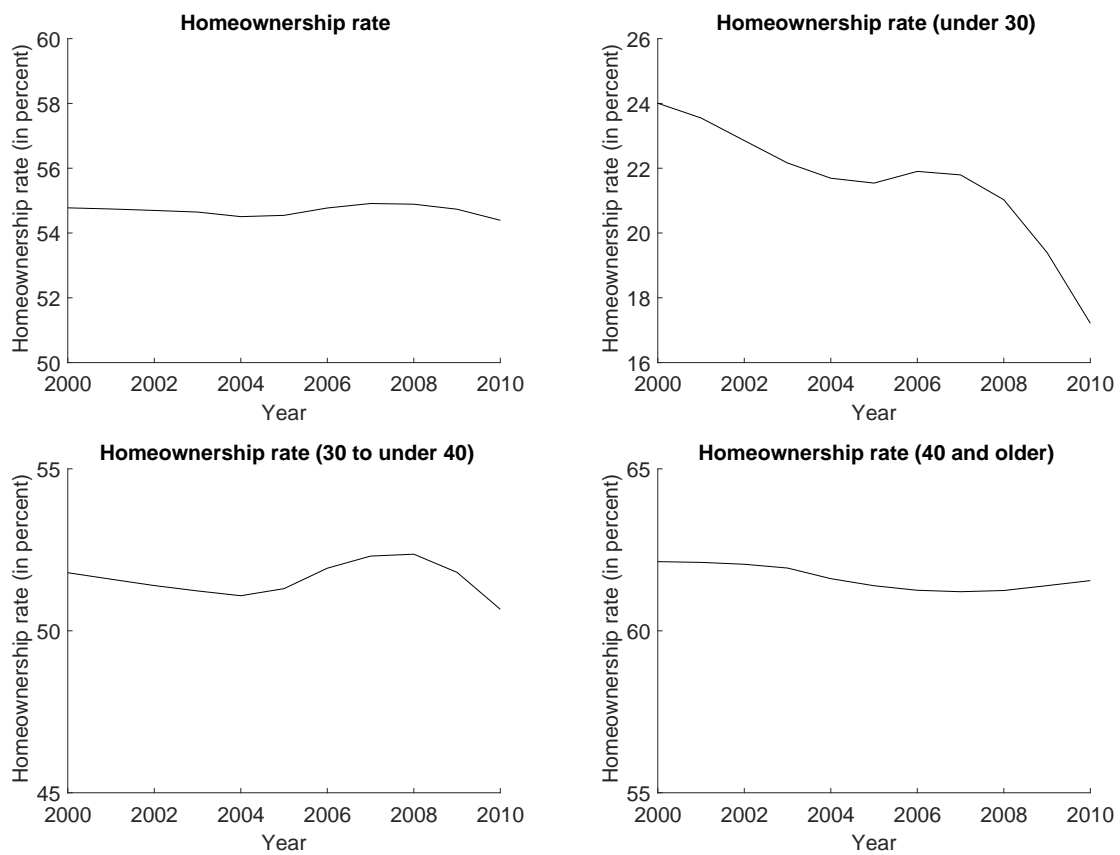
342 From our simple two-date model in section 2, we expect the impact of age, net worth,
 343 income, education, and marital status on the propensity to acquire homeownership to vary over
 344 the housing market cycle. We first turn to illustrating the impact of age on the number of market
 345 entries as well as the propensity to acquire homeownership graphically. Figure 4 depicts the
 346 number of (left panel) and the share of potential market entrants (right panel) that acquire

347 homeownership by the age of the oldest member of the household. Both the absolute number
348 of market entries as well as the shares of individuals acquiring homeownership is highest for
349 households where the oldest member is younger than 40 years, reflecting the high social value
350 of living in an owner-occupied home in Denmark. Given the spillover effects from the market
351 segment they trade in to other market segments, these young households play a key role in
352 generating liquidity in the market for owner-occupied homes. Consistent with our model's
353 predictions from section 2, Figure 4 shows that under the recent housing market bust this group
354 of households reduced its market entries more than older households – both in absolute and in
355 relative terms.¹² As a matter of fact, already before the bust, households reduce their propensity
356 to acquire homeownership, and younger households reduce their propensity more. Within the
357 group of households above the age of 40, the share of households acquiring a home is fairly
358 homogeneous and does not vary much with age.

359 The change in younger households' propensity to acquire homeownership has had impor-
360 tant implications for homeownership among different age groups. Whereas the upper left panel
361 in Figure 5 shows that the homeownership rate in the population remained fairly stable at
362 around 55%, the upper right panel shows that the change of younger households' propensity
363 to acquire homeownership has led to a significant change in the homeownership rate among
364 different age groups. In particular, during the bust and the preceding years, homeownership
365 rates among households in which the oldest member was younger than 30 dropped signifi-
366 cantly, whereas changes for other age groups were more modest. The only age group for which
367 homeownership rates increased during the bust are older households. Complementing the work
368 of Gabriel and Rosenthal (2015) that investigates the determinants of changes in the aggregate
369 homeownership rate under the recent boom and bust in the US, our work documents huge inter-
370 generational shifts in homeownership, particularly a massive decline in younger households'
371 homeownership rates.

¹²Further supporting our model's predictions, we also find households with low income or net worth to shy more away from entering the housing market under the bust than other households. The corresponding graphs are available upon request.

Figure 5
Homeownership rate



This figure depicts the evolution of the homeownership rate on household level for the total population of at least age 22 in the upper left panel as well as for households in which the oldest family member is younger than 30 years (upper right panel), 30 to less than 40 years (lower left panel) or at least 40 years (lower right panel) between 2000 and 2010.

372 **3.4 Empirical framework**

373 We assume that the tendency to become a homeowner, y_{ikt}^* , is related to a vector of exogenous
 374 socio-economic and demographic variables as well as a stochastic error term:

$$y_{ikt}^* = \theta_1 X_{it} + \theta_2 X_{it} BUST_t + \theta_3 Z_{kt} + \eta_t + \lambda_k + \varepsilon_{ikt} \quad (13)$$

$$y_{ikt} = \begin{cases} 1, & \text{if } y_{ikt}^* > 0 \\ 0, & \text{otherwise,} \end{cases}$$

375 in which i indexes individual, k indexes municipality, t indexes year, and $BUST_t$ is an in-
 376 dicator for whether the housing market was in a bust period in year t ($BUST_t = 1$) or not
 377 ($BUST_t = 0$). Market entries occur when y_{ikt}^* exceeds a critical value (normalized to 0).
 378 The model includes household characteristics, X_{it} , such as age, income, net worth, educa-
 379 tion, or family composition. X_{it} also includes a one to account for state-dependent constants.
 380 Given the importance of the evolution of the local housing market, we also include the lagged
 381 municipality-specific housing market return, Z_{kt} . To account for time-varying differences in
 382 the macroeconomic environment, such as the general level of the interest rate or the general
 383 availability of loans, we include year-fixed effects, η_t . We include municipality-fixed effects,
 384 λ_k , to account for local factors, such as differences in unemployment rates through municipali-
 385 ties. We assume that the random error term ε_{ikt} has a normal distribution. We let P_{it} denote the
 386 probability that the household i becomes a homeowner in period t . The probability of first-time
 387 homeownership is then characterized by $P_{it} = P(y_{ikt}^* > 0)$. We estimate Equation (13), using
 388 a Probit model and data on the binary outcome of the decision to acquire homeownership to
 389 access the statistical significance of our regressors.¹³

390 A direct assessment of the economic significance is not straightforward since in the non-
 391 linear Probit model the effect of any regressor on the decision to acquire a home depends on
 392 the numerical values the other regressors take. To nevertheless investigate the economic sig-
 393 nificance of our regressors, we ask how a change in a given regressor affects the probability of
 394 entering the housing market. Using the estimated model, we compute average marginal effects

¹³We also ran results using a Hazard model to account for a possible sample selection bias, which does not change our key findings.

395 for the covariates included in our model. These marginal effects use the actual observed values
396 for the variables whose values are not exogenously fixed. The marginal effects of categorical
397 variables are calculated using discrete first-differences. For example, since the children-dummy
398 is a binary variable, its marginal effect is the difference between the predicted probabilities of
399 buying in bust and non-bust states. Similarly, again using the actual observed values for the
400 variables whose values are not fixed exogenously, we compute model-implied probabilities of
401 buying in bust states and other states of the housing market cycle.

402 **4 Empirical Results**

403 In the previous sections, we illustrated that potential market entrants dramatically reduced their
404 likelihood of acquiring homeownership after controlling for other factors. Simultaneously, the
405 number of potential market entrants as well as their characteristics remained stable over time,
406 indicating that changes in the composition of this group of households are unlikely to explain
407 the massive decline in market entries under the housing market bust. Instead, these households
408 postponed or gave up acquiring homes.

409 Households with certain characteristics may have had stronger incentives to postpone the
410 acquisition of a home. From our theoretical model in section 2, among others, younger house-
411 holds as well as households with lower income or net worth should reduce their likelihood of
412 acquiring a home more than others. In this section, we run regressions and compute (aver-
413 age) marginal effects to investigate whether these predictions are backed up by the data after
414 controlling for other household characteristics as well as other exogenous factors motivated in
415 section 3.4.

416 Table 2 depicts results from a Probit regression of the likelihood of a potential market en-
417 trant acquiring homeownership as a function of household characteristics and other exogenous
418 controls. *Age* is the age of the oldest member in the household. *Second/fifth/tenth net worth*
419 *decile* is an indicator for whether the households' net worth is in the second/fifth/tenth decile
420 of the net worth distribution in the total population. *Single female (male)* is an indicator for
421 whether the household only has one female (male) adult household member. *Kids* is an indica-

Table 2
Regression results for potential market entrants

Regressor	(1)	(2)	(3)	(4)	(5)
Age	-0.0170*** (-15.44)	-0.0216*** (-18.97)	-0.0197*** (-20.09)	-0.0212*** (-40.16)	-0.0211*** (-40.97)
Age, bust	0.00393*** (11.35)	0.00367*** (9.27)	0.00275*** (5.65)	0.00284*** (5.85)	0.00290*** (5.65)
Second net worth decile		-0.165*** (-13.92)	-0.238*** (-12.90)	-0.280*** (-19.08)	-0.287*** (-19.30)
Second net worth decile, bust		-0.188*** (-14.65)	-0.160*** (-11.62)	-0.151*** (-11.62)	-0.139*** (-10.76)
Fifth net worth decile		-0.342*** (-38.19)	-0.232*** (-28.18)	-0.239*** (-28.29)	-0.240*** (-27.67)
Fifth net worth decile, bust		0.00710 (0.72)	-0.00913 (-0.89)	-0.00561 (-0.55)	-0.00258 (-0.25)
Tenth net worth decile		0.525*** (18.17)	0.357*** (12.09)	0.391*** (15.34)	0.382*** (14.56)
Tenth net worth decile, bust		0.0197 (0.60)	0.0720* (2.00)	0.0680 (1.83)	0.0695 (1.88)
Logincome			0.0818*** (7.44)	0.0760*** (6.84)	0.0767*** (6.67)
Logincome, bust			-0.00884 (-1.45)	-0.00839 (-1.36)	-0.00808 (-1.27)
Single male			-0.629*** (-18.22)	-0.652*** (-16.21)	-0.653*** (-16.12)
Single male, bust			0.0159 (1.75)	0.00963 (1.19)	0.0126 (1.65)
Single female			-0.661*** (-19.70)	-0.670*** (-16.46)	-0.670*** (-16.38)
Single female, bust			0.0279*** (3.97)	0.0188** (2.79)	0.0201** (2.91)
Kids			0.0225 (1.70)	0.00160 (0.12)	0.00128 (0.10)
Kids, bust			0.0287*** (4.05)	0.0298*** (3.93)	0.0307*** (3.62)
No highschool			-0.318*** (-20.60)	-0.380*** (-50.71)	-0.382*** (-50.88)
No highschool, bust			0.00552 (0.47)	0.0175* (1.99)	0.0237** (2.75)
College			0.223*** (10.22)	0.304*** (33.46)	0.311*** (36.24)
College, bust			0.000112 (0.01)	-0.0195* (-2.23)	-0.0325*** (-3.53)
Bust	-0.326*** (-20.30)	-0.178*** (-8.21)	-0.0551 (-0.79)	-0.0544 (-0.71)	-0.193* (-2.39)
Other controls	NO	NO	YES	YES	YES
Municipality-fixed-effects	NO	NO	NO	YES	YES
Year-fixed-effects	NO	NO	NO	NO	YES
Observations	4,444,948	4,444,948	4,437,380	4,437,380	4,437,380

This table depicts results from a Probit regression of the likelihood of a potential market entrant acquiring home-ownership. *Age* is the age of the oldest member in the household. *Second/fifth/tenth net worth decile* is an indicator for whether the households' net worth is in the second/fifth/tenth decile of the net worth distribution in the total population. *Single female (male)* is an indicator for whether the household only has one female (male) adult household member. *Kids* is an indicator for whether children below the age of 18 are living in the household. *No highschool* is an indicator for whether the household member with the longest education has no highschool education. *College* is an indicator for whether the household member with the longest education has a bachelor's degree. Right handside variables interacted with an indicator for bust-years are marked with the word bust. *Other controls* are the other net worth deciles, a missing education dummy, an indicator for whether a household was newly formed, an indicator for whether a household was newly formed interacted with whether the household is two-headed, an indicator for whether at least one family member has owned an owner-occupied home in the past, and an indicator for whether household income grew by more than 10% in the previous period. The constant is not reported for brevity. t-statistics are reported in parentheses. *, **, and *** denotes significance at the 5%, 1% and 0.1% level, respectively. Standard errors are clustered on the municipality level.

422 tor for whether children below the age of 18 are living in the household. *No highschool* is an
423 indicator for whether the household member with the longest education has no highschool ed-
424 ucation. *College* is an indicator for whether the household member with the longest education
425 has a bachelor's degree. Right handside variables interacted with an indicator for bust-years
426 are marked with the word *bust*. *Other controls* are the remaining net worth deciles, a missing
427 education dummy, an indicator for whether a household was newly formed, an indicator for
428 whether a household was newly formed interacted with whether the household is two-headed,
429 an indicator for whether at least one family member has owned an owner-occupied home in the
430 past, and an indicator for whether household income grew by more than 10% in the previous
431 period. The constant is not reported for brevity. t-statistics are reported in parentheses. *, **,
432 and *** denotes significance at the 5%, 1% and 0.1% level, respectively. Standard errors are
433 clustered on the municipality level.

434 From Table 2, household characteristics, such as age, income, net worth, education, or mar-
435 tial status have a statistically significant impact on the likelihood to enter the housing market.
436 In particular, from a comparison of the five columns, these effects are robust to adding fixed
437 effects and other control variables. A direct assessment of the economic effects based on the
438 regression coefficients from Table 2 is difficult due to the non-linearity of the Probit model as
439 well as the possibility of correlation between the bust-dummy and other variables, it is inter-
440 acted with. To assess the economic importance of our explanatory variables, we therefore report
441 average marginal effects of our explanatory variables in Table 3. These effects can be directly
442 interpreted as the average change in the probability to enter the housing market in response to
443 a change in the corresponding explanatory variable by one unit.

444 From Table 3, household characteristics do not only have a statistically, but also economi-
445 cally significant impact on market entires. For instance, after controlling for other characteris-
446 tics the propensity to acquire homeownership decreases on average with about 0.16 percentage
447 points for every year an individual gets older. Singles are about six percentage points less likely
448 to become market entrants than married individuals.

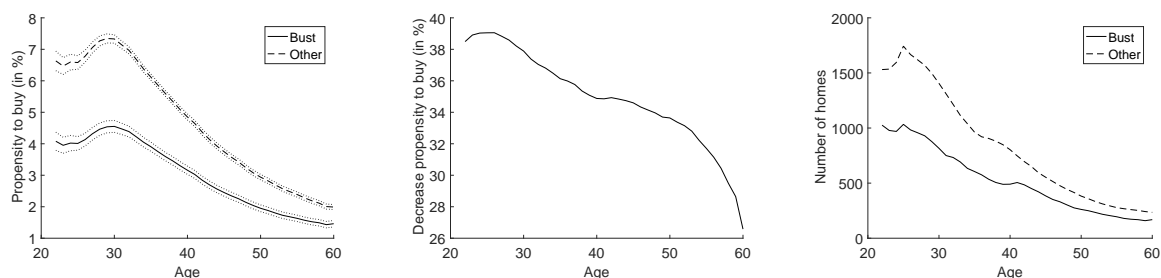
449 Whereas the results in Table 3 stress the general importance of household characteristics
450 for potential market entrants' propensity to become homeowners, they do not allow for a direct

Table 3
Average marginal effects for potential market entrants

Regressor	(1)	(2)	(3)	(4)	(5)
Age	-0.00149*** (-7.52)	-0.00186*** (-8.49)	-0.00157*** (-9.89)	-0.00165*** (-41.54)	-0.00164*** (-41.61)
Second net worth decile		-0.0239*** (-9.13)	-0.0258*** (-8.49)	-0.0289*** (-20.56)	-0.0293*** (-20.39)
Fifth net worth decile		-0.0351*** (-11.24)	-0.0226*** (-11.12)	-0.0232*** (-27.00)	-0.0232*** (-26.43)
Tenth net worth decile		0.0999*** (11.74)	0.0543*** (8.23)	0.0596*** (11.60)	0.0579*** (11.23)
Logincome			0.00656*** (6.33)	0.00594*** (7.37)	0.00598*** (7.22)
Single male			-0.0596*** (-8.86)	-0.0603*** (-15.77)	-0.0601*** (-15.68)
Single female			-0.0612*** (-9.17)	-0.0611*** (-16.18)	-0.0609*** (-16.10)
Kids			0.00240* (2.31)	0.000671 (0.67)	0.000662 (0.66)
No highschool			-0.0225*** (-10.54)	-0.0251*** (-57.32)	-0.0250*** (-56.94)
College			0.0238*** (7.32)	0.0328*** (33.40)	0.0330*** (34.60)
Bust	-0.0161*** (-18.14)	-0.0139*** (-20.92)	-0.00300 (-0.90)	-0.0106*** (-30.63)	-0.0186*** (-27.41)
Other controls	NO	NO	YES	YES	YES
Municipality-fixed-effects	NO	NO	NO	YES	YES
Year-fixed-effects	NO	NO	NO	NO	YES
Observations	4,444,948	4,444,948	4,437,380	4,437,380	4,437,380

This table depicts average marginal effects for the likelihood of a potential market entrant acquiring homeownership. *Age* is the age of the oldest member in the household. *Second/fifth/tenth net worth decile* is an indicator for whether the households' net worth is in the second/fifth/tenth decile of the net worth distribution in the total population. *Single female (male)* is an indicator for whether the household only has one female (male) adult household member. *Kids* is an indicator for whether children below the age of 18 are living in the household. *No highschool* is an indicator for whether the household member with the longest education has no highschool education. *College* is an indicator for whether the household member with the longest education has a bachelor's degree. *Other controls* are the remaining net worth deciles, a missing education dummy, an indicator for whether a household was newly formed, the indicator for whether a household was newly formed interacted with whether the household is two-headed, an indicator for whether at least one family member has owned an owner-occupied home in the past, and an indicator for whether household income grew by more than 10% in the previous period. The constant is not reported for brevity. t-statistics are reported in parentheses. *, **, and *** denotes significance at the 5%, 1% and 0.1% level, respectively. Standard errors are clustered on the municipality level.

Figure 6
Market entries by age



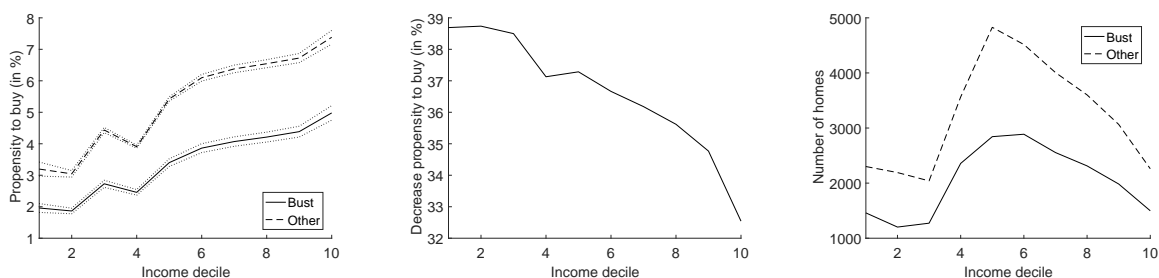
This figure summarizes the impact of age on market entries. The left panel depicts the average model-implied probability to acquire homeownership by age (Propensity to buy). The middle panel depicts the relative decrease in the model-implied probability to acquire homeownership under the bust relative to other states of the housing market cycle (Decrease propensity to buy). The right panel depicts the predicted number of homes bought (Number of homes). The solid lines in the left and right panels show results during the bust, the dashed lines during other periods. The dotted lines in the left panel depict 95% confidence intervals.

451 assessment of the question which households changed their behavior most under the housing
 452 market bust. In contrast to our regression results from Table 2, Table 3 does not report results
 453 on interactions between the bust-dummy and other regressors, reflecting that a change in such
 454 an interacted term would simultaneously require a change in either the bust-dummy or the
 455 corresponding other regressor.

456 To investigate how the bust affected potential market entrants' propensity to become home-
 457 owners, we therefore next ask how potential market entrants' propensity to acquire homeown-
 458 ership varies with sociodemographic characteristics during the bust and other states of the hous-
 459 ing market cycle and what the implications for the trading volume measured by the implied
 460 number of homes purchased by market entrants are. We begin this investigation in Figure 6,
 461 in which we depict the model-implied probability to acquire a home (Propensity to buy) by
 462 age, the relative decrease in this propensity under the bust, and the predicted number of homes
 463 traded (Number of homes), computed as the number of potential market entrants and the prob-
 464 ability to acquire. All margins reported throughout are based on our full model specification
 465 (5).

466 In line with the predictions from our model in section 2 and the suggestive evidence in the
 467 raw data from Figure 4, Figure 6 illustrates that also after controlling for all other character-
 468 istics, younger households shied more away from becoming homeowners under the bust than

Figure 7
Market entries by income deciles

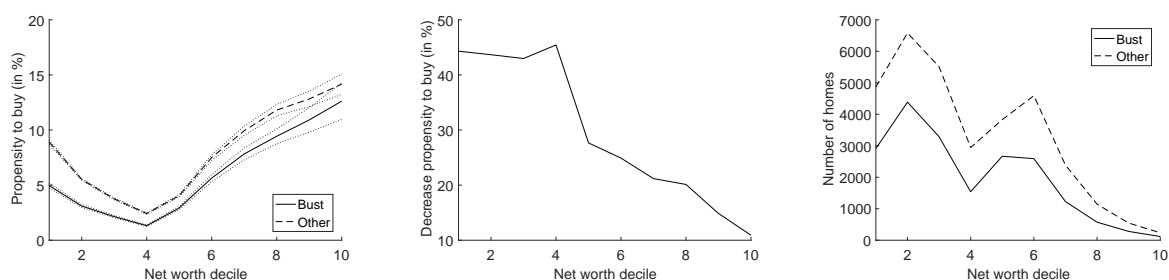


This figure summarizes the impact of income on market entries. The left panel depicts the average model-implied probability to acquire homeownership by income deciles. The middle panel depicts the relative decrease in the model-implied probability to acquire homeownership under the bust relative to other states of the housing market cycle (Decrease propensity to buy). The right panel depicts the predicted number of homes bought (Number of homes). The solid lines in the left and right panels show results during the bust, the dashed lines during other periods. The dotted lines in the left panel depict 95% confidence intervals.

469 other households. Changes in the predicted propensity to acquire homeownership are higher
 470 for younger households. Households below the age of 30 reduced their propensity to acquire
 471 homeownership by about 2.5 percentage points, corresponding to a decrease by more than 35%.
 472 Older households beyond the age of 50 on the other hand only reduced their propensity to ac-
 473 quire by less than one percentage point, corresponding to a decrease of only about 27% to 33%.
 474 Simultaneously, the number of potential market entrants generally decreases with age beyond
 475 the age of 26. Consequently, the reduction in the number of homes traded for younger house-
 476 holds below the age of 30 is about 500 to 700 for every age, while it is below 150 for every age
 477 beyond the age of 50. In other words, age is an important factor explaining the differential be-
 478 havior of households under the recent housing market bust, and younger households' decrease
 479 in their propensity to acquire homeownership has led to a much larger decrease in the number
 480 of market entries than among older households.

481 Our theoretical model from section 2 proposes that the propensity to acquire homeown-
 482 ership declines more during bust periods for households with lower income, because for these
 483 households making up for large losses on their homes is more difficult. Figure 7 illustrates
 484 that in absolute terms, households in lower income deciles reduce their propensity to acquire
 485 homeownership less. For instance, in the lowest income decile, the propensity to buy only de-
 486 creases by about one percentage point, whereas in the highest deciles, it decreases by around

Figure 8
Market entries by net worth



This figure summarizes the impact of net worth on market entries. The left panel depicts the average model-implied probability to acquire homeownership by net worth deciles. The middle panel depicts the relative decrease in the model-implied probability to acquire homeownership under the bust relative to other states of the housing market cycle (Decrease propensity to buy). The right panel depicts the predicted number of homes bought (Number of homes). The solid lines in the left and right panels show results during the bust, the dashed lines during other periods. The dotted lines in the left panel depict 95% confidence intervals.

487 three percentage points. Whereas these absolute changes in percentage points are, e.g., impor-
 488 tant for understanding the aggregate demand for homeownership, exploring relative changes
 489 (in percent) allows for a better assessment of the question which households shied more away
 490 from acquiring homeownership under the bust relative to the boom.

491 From the middle panel of Figure 7, relative decreases in the propensity to acquire home-
 492 ownership are highest in the lowest income deciles and decline almost monotonically to the
 493 highest ones. In the first income deciles, households reduce their propensity to acquire home-
 494 ownership by around 40%, whereas in the highest income decile, this value decreases to only
 495 33%.

496 For the model-implied reductions in the number of homes traded, the lowest income deciles
 497 play a less important role, reflecting that the propensity to acquire a home is relatively low
 498 in both bust and other periods. Similarly, the behavior of households in the highest income
 499 deciles is less important, reflecting that the absolute number of households in the highest in-
 500 come deciles that do not yet own a home is smaller than in other income deciles.

501 Similar to labor income, from our theoretical model from section 2, households with lower
 502 levels of net worth should shy more away from acquiring homeownership than households with
 503 higher levels. We investigate the impact of household net worth on the propensity to acquire a
 504 home conditional on all other household characteristics in Figure 8. From the left panel, house-

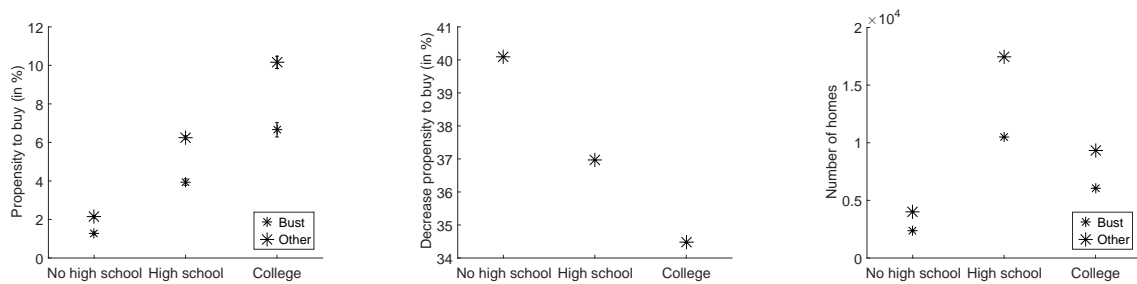
505 holds in the lower net worth deciles are more likely to acquire homeownership than households
506 in the fourth net worth decile, in which the propensity to acquire homeownership is lowest. This
507 may seem counterintuitive at first glance, since intuitively, the propensity to acquire homeown-
508 ership should increase with household net worth. However, households in the lowest net worth
509 deciles are often households with high levels of income and debt. That is, backed up by their
510 high income, these households have taken out high loans. Households in the fourth net worth
511 decile, on the other hand, are often characterized by a low level of household income and thus
512 a lower ability to take out larger loans. In line with economic intuition, households falling into
513 the highest net worth deciles, i.e., households that are least financially constrained, have the
514 highest propensity to acquire homeownership.

515 From the middle panel of Figure 8, relative decreases in the propensity to buy are highest
516 in the lowest four net worth deciles with around 45% and decline monotonically to only about
517 10% for the highest net worth decile. That is, in line with the prediction of our model from
518 section 2, richer households decreased their propensity to acquire homeownership under the
519 boom less than poorer households.

520 For households with sufficient savings, the consequences of falling house prices only result
521 in a reduction of their savings and are thus primarily financial. For homeowners with smaller
522 or even no savings, falling house prices have consequences extending beyond the financial
523 ones. In particular, households with smaller savings face a risk that their mortgages exceed
524 the values of their homes after price drops. In that case, these households cannot sell their
525 homes without being left with a sizable amount of debt that – in the absence of the home as a
526 collateral – is subject to a much higher interest rate than a mortgage. Hence, such households
527 are tied to their home and may be unable to, e.g., accept attractive job offers if these offers
528 would require the households to relocate. In addition to the consequences for the individual
529 households, the inability to relocate should also have negative macroeconomic consequences,
530 since the reduction in the mobility of the labor force bears the risk of a less efficient allocation
531 of labor on the macro level.

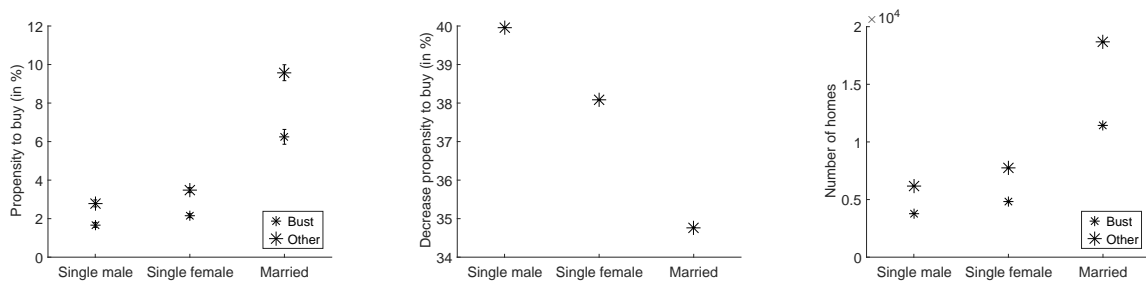
532 From the right panel of Figure 8, the richest households are only responsible for a very small
533 number of market entries, reflecting that many of these households already own homeownership

Figure 9
Market entries by education



This figures summarizes the impact of education on market entries. The left panel depicts the average model-implied probability to acquire homeownership by education with 95% confidence intervals. The middle panel depicts the relative decrease in the model-implied probability to acquire homeownership under the bust relative to other states of the housing market cycle (Decrease propensity to buy). The right panel depicts the predicted number of homes bought (Number of homes). The small stars depict results during the bust, the large during other periods.

Figure 10
Market entries by marital status



This figures summarizes the impact of the marital status on market entries. The left panel depicts the average model-implied probability to acquire homeownership by marital status with 95% confidence intervals. The middle panel depicts the relative decrease in the model-implied probability to acquire homeownership under the bust relative to other states of the housing market cycle (Decrease propensity to buy). The right panel depicts the predicted number of homes bought (Number of homes). The small stars depict results during the bust, the large during other periods.

534 and thus do not qualify as potential market entrants.

535 Our stylized model from section 2 further suggests that households with higher levels of
 536 labor income risk should reduce their propensity to acquire homeownership during the bust
 537 more than other households. Households with lower education face higher unemployment risk.
 538 These households should therefore reduce their propensity to acquire homeownership more
 539 than households with higher levels of education. Likewise, singles face higher labor income

540 risk than married individuals for whom the partner’s labor income stream provides a certain
541 protection against huge losses in household income.

542 Consistent with the generally higher level of background labor income risk, from the left
543 panels from Figures 9 and 10, households with lower education and singles are less likely
544 to acquire homeownership. Matching our model’s predictions, the middle panels of Figures
545 9 and 10 reveal that households with lower levels of education as well as singles decrease
546 their propensity to acquire homeownership under the bust more than households with higher
547 education and married households, respectively.

548 For the absolute number of market entries by education, the change in the propensity to
549 acquire homeownership of households in which the member with the longest education has a
550 highschool degree is most important, reflecting that from Table 1 this type of education is most
551 widespread. Even though the share of potential market entrants being married is smaller than
552 that of both single males and single females, their generally substantially higher propensity to
553 acquire homeownership implies that their decrease in market entries leads to a relatively high
554 reduction in the number of homes traded.

555 Households with children reduce their propensity to acquire homewonership during bust-
556 years less than their counterparts without children (not shown in graphical form). This result
557 may reflect that the demand of housing becomes more inelastic once children live in the house-
558 hold. Consequently, households with children may be less able to time the market and may
559 therefore potentially be hurt more by falling house prices.

560 **5 Robustness**

561 **5.1 Current owners**

562 Having illustrated in section 4 how potential market entrants alter their behavior to acquire
563 homeownership with sociodemographic characteristics, we next turn our focus on current own-
564 ers. That is, we focus on households that already own a home and ask how the propensity to
565 acquire a new home varies with sociodemographic characteristics for these households between
566 the bust and other periods of the housing market cycle.

567 Compared to market entrants, current owners should be more constrained in their decision
568 to acquire a new home, because in contrast to market entrants, current owners typically need to
569 time the sale of their pre-existing home with the purchase of a new one. Similarly, in contrast
570 to potential market entrants potential current owners are already exposed to house price risk
571 prior to deciding about the acquisition of a new home. Hence, when moving to a new home,
572 they typically change their exposure to house price risk less than market entrants. For all those
573 reasons, we expect the impact of sociodemographic characteristics on the propensity to acquire
574 a new home to be weaker for current owners than for market entrants.

575 Table 4 summarizes in a similar fashion as Table 3 the average marginal effects of the
576 households' sociodemographic characteristics to acquire a new home. In line with economic
577 intuition, average marginal effects for current owners from Table 4 bear the same signs, but
578 tend to be of a smaller order of magnitude than those for potential market entrants from Table
579 3. In other words, sociodemographic characteristics affect the propensity to acquire a home
580 for current owners in a qualitatively similar way as for potential market entrants. Yet, the
581 strength of the effects is dampened, which makes intuitive sense, since current owners typically
582 change their exposure to house price risk less when acquiring a new home than potential market
583 entrants do.

584 Having established that average marginal effects of sociodemographic characteristics of
585 current owners are qualitatively similar to those of potential market entrants, we next turn to
586 investigating the average model-implied probabilities to acquire homeownership by various
587 sociodemographic characteristics. Figure 11 summarizes in a similar fashion as Figures 6 to
588 10 the impact of sociodemographic characteristics on the propensity to acquire a new home.
589 The left panels depict the average model-implied probability to acquire a new home with 95%
590 confidence intervals. The middle panels depict the relative decrease in the model-implied prob-
591 ability to acquire a new home under the bust relative to other states of the housing market cycle
592 (Decrease propensity to buy). The right panels report the predicted numbers of homes acquired
593 (Number of homes). Panel A reports results by age, Panel B by income, Panel C by net worth,
594 Panel D by education, and Panel E by marital status.

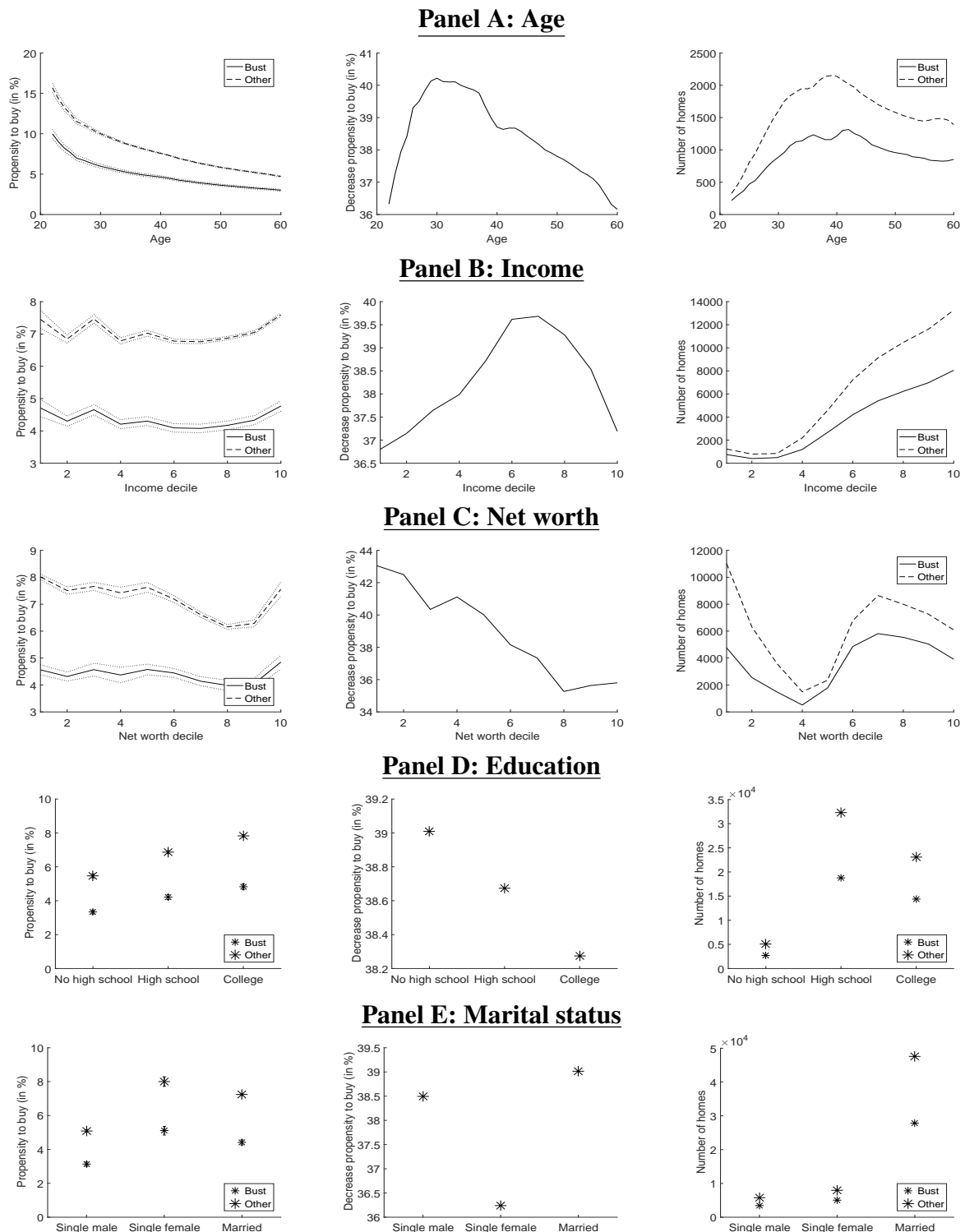
595 Our results from Figure 11 show that similar to the behavior of potential market entrants,

Table 4
Average marginal effects for current owners

Regressor	(1)	(2)	(3)	(4)	(5)
Age	-0.00158*** (-47.15)	-0.00170*** (-46.32)	-0.00115*** (-22.80)	-0.00119*** (-45.76)	-0.00118*** (-44.64)
Second net worth decile		-0.00235*** (-4.26)	-0.00419*** (-10.19)	-0.00450*** (-10.32)	-0.00389*** (-9.11)
Fifth net worth decile		0.00102 (1.60)	-0.000894 (-1.53)	-0.00105 (-1.83)	-0.00128* (-2.26)
Tenth net worth decile		0.0189*** (10.20)	0.0200*** (10.90)	0.0201*** (10.96)	0.0201*** (10.82)
Logincome			0.00137*** (7.68)	0.00139*** (7.53)	0.00145*** (7.67)
Single male			-0.0136*** (-28.09)	-0.0133*** (-28.07)	-0.0127*** (-27.07)
Single female			-0.00743*** (-7.43)	-0.00684*** (-9.78)	-0.00640*** (-8.87)
Kids			-0.00354*** (-4.19)	-0.00409*** (-6.95)	-0.00364*** (-6.31)
No highschool			-0.0122*** (-25.38)	-0.0124*** (-29.07)	-0.0128*** (-29.82)
College			0.0108*** (21.36)	0.0111*** (26.21)	0.0116*** (26.55)
Bust	-0.0223*** (-36.54)	-0.0224*** (-35.87)	-0.0191*** (-24.09)	-0.0197*** (-39.76)	-0.0272*** (-28.88)
Other controls	NO	NO	YES	YES	YES
Municipality-fixed-effects	NO	NO	NO	YES	YES
Year-fixed-effects	NO	NO	NO	NO	YES
Observations	6,031,626	6,031,626	6,011,743	6,011,743	6,011,743

This table depicts average marginal effects for the likelihood of a homeowner purchasing a new home. *Age* is the age of the oldest member in the household. *Second/fifth/tenth net worth decile* is an indicator for whether the households' net worth is in the second/fifth/tenth decile of the net worth distribution in the total population. *Single female (male)* is an indicator for whether the household only has one female (male) adult household member. *Kids* is an indicator for whether children below the age of 18 are living in the household. *No highschool* is an indicator for whether the household member with the longest education has no highschool education. *College* is an indicator for whether the household member with the longest education has a bachelor's degree. *Other controls* are the remaining net worth deciles, a missing education dummy, an indicator for whether a household was newly formed, the indicator for whether a household was newly formed interacted with whether the household is two-headed, an indicator for whether at least one family member has owned an owner-occupied home in the past, and an indicator for whether household income grew by more than 10% in the previous period. The constant is not reported for brevity. t-statistics are reported in parentheses. *, **, and *** denotes significance at the 5%, 1% and 0.1% level, respectively. Standard errors are clustered on the municipality level.

Figure 11
Purchases of current owners



This figure impact of various sociodemographic characteristics on current owners' impact to acquire a new home. The left panels depict the average model-implied probability to acquire a new home with 95% confidence intervals. The middle panels depict the relative decrease in the model-implied probability to acquire a new home under the bust relative to other states of the housing market cycle (Decrease propensity to buy). The right panels report the predicted numbers of homes acquired (Number of homes). Panel A reports results by age, Panel B by income, Panel C by net worth, Panel D by education, and Panel E by marital status.

596 current owners decrease their propensity to acquire a new home more under the bust when en-
597 dowed with low net worth (Panel C) and when having a shorter education (Panel D). Likewise,
598 the propensity to acquire a home under the bust is reduced less at older age (Panel A). Prior to
599 the age of 30, we observe a lower decrease in the propensity to acquire homeownership than at
600 the age of 30. As can be seen from the right graph in Panel A, a home-owner acquiring a new
601 owner-occupied home at young age is a relatively rare event and likely to be affected by special
602 circumstances that extend beyond the scope of our work.

603 From the middle graph of Panel B and in contrast to the behavior of potential market en-
604 trants, households in the lower income deciles reduce their propensity to acquire homeown-
605 ership less than households in the sixth net worth decile. Yet, quantitatively, the effects are very
606 small and the implied number of trades is low – particularly for the first three net worth deciles.

607 From the middle graph of Panel E and again in contrast to the results for potential market
608 entrants, married owners reduce their propensity to acquire a new home under the bust more
609 than singles. Married individuals that already live in an owner-occupied home are typically
610 more rooted to their local environment than singles. Hence, for married households, postponing
611 the move to another owner-occupied home in presumably the same local environment until the
612 market has stabilized, is generally easier than for singles that are more likely to relocate over
613 larger distances.

614 **5.2 Abandoning homeownership**

615 Having established that market entrants' behavior varies remarkably with sociodemographic
616 characteristics between bust and other periods, we next turn our focus to current owners. That
617 is, in contrast to our analysis in section 4, in this section we focus on households that already
618 own an owner-occupied home and investigate in how current owners' decision to leave the
619 housing market by changing homeownership status from being a home-owner to being a renter.

620 Even though it is natural to also investigate the supply-side of the housing market under
621 the bust, it is important to note that the housing market bust period was a buyers' market in
622 which a relatively small number of households interested in acquiring homeownership met
623 a relatively large number of households wishing to sell their home. Hence, the impact of

624 households wishing to leave the housing market (potential exiters) on the evolution of house
625 prices is likely to have been smaller under the bust than that of market entrants.

626 Again, we want to exclude cases in which households are only temporarily moving to a
627 rented place between the sale of their old home and moving into their new home. Consistent
628 with our proceeding for market entrants, we therefore require potential exiters to be homeowners
629 at time t , but not at time $t + 1$ and neither at time $t + 2$ where this information is available
630 in the data. In contrast to our proceeds for market entrants, we have to omit the last year in our
631 sample for which no information about the homeownership status at time $t + 1$ is available.

632 Similar to our results for market entrants from Table 2, our sociodemographic variables
633 again affect the propensity to leave the housing market in a statistically significant way (results
634 now shown here).¹⁴ Table 5 depicts in a similar manner as Table 3 the average marginal effects
635 of our sociodemographic variables on the propensity to abandon homeownership.

636 As for market entrants, Table 5 documents that the propensity to abandon homeownership
637 decreases with age, reflecting that older households are generally less likely to move. Other-
638 wise, the marginal effects for abandoning homeownership from Table 5 typically switch signs
639 compared to the results for market entrants from Table 3. Poorer households are less likely to
640 acquire homeownership, but more likely to abandon it. Similarly, households with higher in-
641 come are more likely to acquire homeownership and less likely to abandon it. Likewise, singles
642 acquire homeownership less often, but revert their homeownership status to becoming renters
643 more often. Finally, the propensity to acquire homeownership increases with education, while
644 the propensity to abandon homeownership decreases with education.

645 While the results in Table 5 stress the general economic relevance of sociodemographic
646 characteristics for the propensity to abandon homeownership, they do not allow us to address
647 the question whether the propensity to abandon homeownership in different states of the hous-
648 ing market cycle varies with household characteristics. We investigate this question in Figure
649 12 that depicts in a similar fashion as Figures 6 to 10 the average model-implied probabilities
650 to abandon homeownership.

651 From the middle graph of Panel A, younger households decrease their relative propensity to

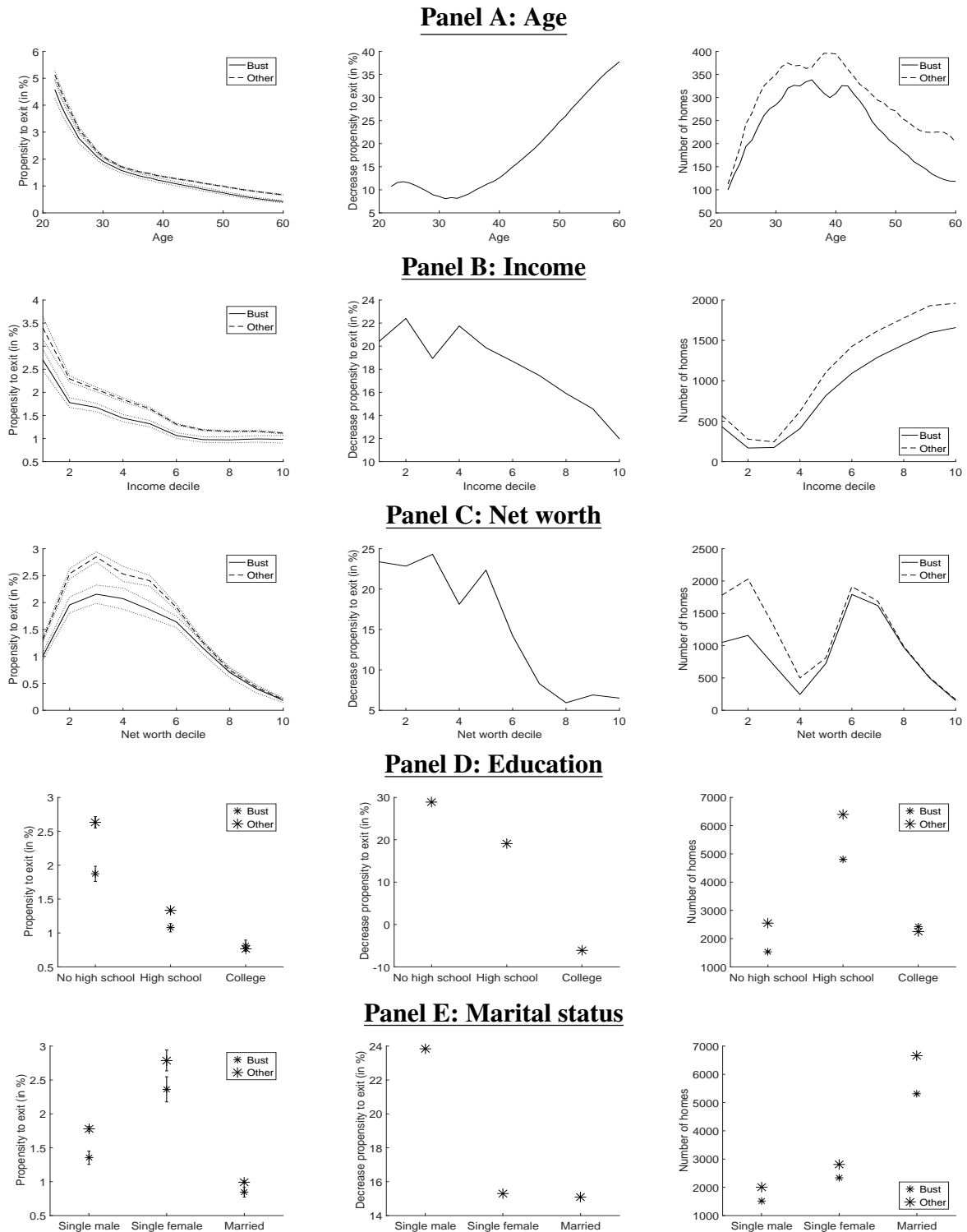
¹⁴The corresponding table is available from the authors upon request.

Table 5
Average marginal effects for abandoning homeownership

Regressor	(1)	(2)	(3)	(4)	(5)
Age	-0.000554*** (-17.62)	-0.000339*** (-9.27)	-0.000132*** (-6.66)	-0.0000742*** (-8.27)	-0.0000748*** (-8.27)
Second net worth decile		0.00366*** (5.88)	0.00406*** (7.90)	0.00511*** (9.64)	0.00502*** (9.43)
Fifth net worth decile		0.00333*** (6.44)	0.00194*** (5.28)	0.00244*** (6.39)	0.00246*** (6.40)
Tenth net worth decile		-0.0148*** (-21.48)	-0.0111*** (-23.05)	-0.0122*** (-51.26)	-0.0122*** (-51.16)
Logincome			-0.000679*** (-22.43)	-0.000685*** (-11.96)	-0.000692*** (-12.11)
Single male			0.0160*** (40.49)	0.0158*** (20.74)	0.0158*** (20.74)
Single female			0.0282*** (27.46)	0.0268*** (13.96)	0.0268*** (13.96)
Kids			0.000512* (2.03)	0.00104*** (5.50)	0.00104*** (5.50)
No highschool			0.00321*** (18.15)	0.00392*** (27.59)	0.00391*** (27.46)
College			-0.00163*** (-6.36)	-0.00253*** (-18.76)	-0.00252*** (-18.62)
Bust	-0.00169*** (-9.08)	-0.00134*** (-6.81)	-0.00331*** (-8.02)	-0.00248*** (-11.97)	-0.00217*** (-5.23)
Other controls	NO	NO	YES	YES	YES
Municipality-fixed-effects	NO	NO	NO	YES	YES
Year-fixed-effects	NO	NO	NO	NO	YES
Observations	5,213,226	5,213,226	5,193,350	5,193,350	5,193,350

This table depicts average marginal effects for the likelihood of a homeowner abandoning homeownership. *Age* is the age of the oldest member in the household. *Second/fifth/tenth net worth decile* is an indicator for whether the households' net worth is in the second/fifth/tenth decile of the net worth distribution in the total population. *Single female (male)* is an indicator for whether the household only has one female (male) adult household member. *Kids* is an indicator for whether children below the age of 18 are living in the household. *No highschool* is an indicator for whether the household member with the longest education has no highschool education. *College* is an indicator for whether the household member with the longest education has a bachelor's degree. *Other controls* are the remaining net worth deciles, a missing education dummy, an indicator for whether a household was newly formed, the indicator for whether a household was newly formed interacted with whether the household is two-headed, an indicator for whether at least one family member has owned an owner-occupied home in the past, and an indicator for whether household income grew by more than 10% in the previous period. The constant is not reported for brevity. t-statistics are reported in parentheses. *, **, and *** denotes significance at the 5%, 1% and 0.1% level, respectively. Standard errors are clustered on the municipality level.

Figure 12
Market exits



This figure summarizes the impact of various sociodemographic characteristics on current owners' impact to abandon homeownership by moving from an owner-occupied to a rented place. The left panels depict the average model-implied probability to abandon homeownership with 95% confidence intervals. The middle panels depict the relative decrease in the model-implied probability to leave the housing market under the bust relative to other states of the housing market cycle (Decrease propensity to buy). The right panels report the predicted numbers of homes acquired (Number of homes). Panel A reports results by age, Panel B by income, Panel C by net worth, Panel D by education, and Panel E by marital status. 37

652 abandon homeownership less than older households. In other words, the decrease in homeown-
653 ership among younger households from Figure 5 is not only driven by the decrease in demand
654 for homeownership from Figure 6, but simultaneously by an increase in the supply of homes of
655 younger households that want to abandon homeownership.

656 The middle graph of Panel B indicates, that households with lower income decrease their
657 propensity to exit the market less during the bust. At first glance, this result may seem sur-
658 prising, since low-income households should be more affected by losses in the values of their
659 homes than high-income households. However, low-income households are more likely to have
660 the value of their mortgage to exceed the remaining value of their home – particularly during
661 the bust. That is, low-income households are more likely to be locked into their homes and
662 cannot sell them without ending up with a substantial amount of bank debt that – in contrast to
663 a mortgage – is not collateralized and thus subject to a substantially higher interest rate. Such
664 households therefore have a strong incentive not to sell their homes.

665 Panel C indicates that under the bust, households in the lowest net worth deciles decreased
666 their propensity to abandon homeownership more than richer households. Similar to low-
667 income households, households with low net worth are more likely to be locked into their
668 homes – particularly during the bust. Hence, households in the lowest net worth deciles also
669 have a strong incentive not sell their homes.

670 From panel D, households with lower levels of education reduce their propensity to exit
671 the market more often. Households with lower levels of education are typically low-income
672 households and more likely to be locked into their homes – particularly during the bust. Hence,
673 these households have a stronger incentive not to sell their homes.

674 From Panel E, single males reduce their propensity to abandon homeownership under the
675 bust less than single females and married. This results reflects that single male homeowners
676 are on average endowed with lower levels of net worth than single females and married. Si-
677 multaneously, the share of single males with a negative level of household net worth is higher
678 than for single females, suggesting that they are more likely to be locked into their homes and
679 therefore refrain from selling it.

680 **6 Conclusion**

681 We exploit a large high-quality data set covering the entire Danish population to investigate
682 the micro-level behavior of households under the recent housing market bust. The Danish data
683 seems ideally suited for such an investigation, because it contains detailed background level
684 information about all Danish households and Denmark experienced a housing market bubble
685 that is remarkably similar to its US counterpart.

686 Our results show that in bust periods, younger households and households with lower in-
687 come and education as well as singles reduced their likelihood of acquiring homeownership
688 more than other households. Simultaneously, younger households are more likely abandon
689 homeownership during bust periods. These effects remain valid after controlling for various
690 other household characteristics, the state of the local housing market cycle, year-fixed effects,
691 and municipality-fixed effects.

692 The reduction in younger households' willingness to acquire homeownership and their
693 higher willingness abandon it under the recent housing market bust is likely to have played
694 a major role in explaining the huge inter-generational shift in homeownership from younger
695 to older households during the bust and its aftermath. Whereas homeownership in the general
696 population remained fairly stable at around 55%, the homeownership rate of younger house-
697 holds with the oldest member being less than 30 years showed a remarkable decline from about
698 22% before house prices fell dramatically to less than 18% in 2010. Similarly, the homeown-
699 ship rate among households with the oldest member being 30 to 39 also decreased. During the
700 same time, the homeownership rate of older households slightly increased.

701 Our work can be extended in multiple directions. For example, in a couple of decades
702 when sufficient data is available, it would be interesting to explore the long-run consequences
703 of mortgage debt significantly exceeding the value of the home for the micro-level behavior of
704 these technically insolvent households. Similarly, it would be interesting to explore the long-
705 run macroeconomic consequences of a significant share of technically insolvent households.

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