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The Impact of Commitment on Pending Home Sales in Entrapping Situations

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This paper examines the decision-making processes of home buyers during the Global Financial Crisis, with a specific focus on passive coping mechanisms and the role of risk aversion. The study investigates how risk aversion influences the behavior of home buyers and highlights the disparities between high-income and low-income buyers. The findings reveal that high-income home buyers exhibit a risk aversion parameter that ranges from 1.74 to 1.99, while low-income home buyers have a parameter that ranges from 0.60 to 0.62, thus indicating different levels of risk tolerance and decision-making patterns among the income groups. These findings suggest that low-income home buyers are more likely to endure unfavorable situations or avoid making changes in periods of declining house prices than high-income home buyers. This behavior aligns with the concept of passive coping, where low-income home buyers choose to endure unfavorable situations rather than making changes because they fear the negative outcomes that may arise from taking a different course of action. They might worry that if they abandon the contract, they will miss out on the opportunity to own a home, live in a desirable neighborhood, or secure a specific property. This fear of potential losses leads them to choose passive coping, where they endure the current situation rather than making changes that could involve risks or uncertainties.

Keywords

Housing, Risk aversion

1. Introduction

This paper examines the decision-making processes of home buyers during the turbulent Global Financial Crisis, and explores their choices on whether to proceed with or withdraw from an offer-to-purchase contract. The Global Financial Crisis witnessed an extraordinary downturn in housing prices, with a historic decline of over 30 percent in the US, which surpassed the severity of the price plunge experienced even during the Great Depression. Against this backdrop, the home buyers in our sample, who had committed to purchasing a single- family home, including condos that were still under construction, and would remain under construction for several years, found themselves at a crossroads where they had to consider carefully whether it was better to proceed with the purchase or walk away.

There are two ways of viewing this situation. One is through the lens of the standard economic theory, which assumes that home buyers are utility maximizers. According to this perspective, home buyers should simply weigh the utility of not purchasing a home and investing the money in riskless assets, like Treasury bills, against the potential returns on housing if they proceed with the purchase. However, this approach has its assumptions and limitations, as it assumes rational decision-making and overlooks important psychological factors that can influence decision-making.

A second way of understanding the decision-making process is by considering the psychological factors that can significantly impact the choice to walk away from an offer-to-purchase. One such factor is “passive coping”, which refers to a mindset or approach where individuals are more inclined to endure challenging circumstances rather than actively seeking change or taking decisive action. In the psychology literature, it is well-established that feelings of passive coping can have a significant influence on various aspects of the decision-making process, including housing choices.

During periods of market volatility, such as the Global Financial Crisis, home buyers may initially consider walking away from an offer-to-purchase due to low or negative projected future returns on housing. However, the perceived challenges of re-entering the market and the effort required to restart the entire process can lead to passive coping. This psychological state influences buyers to proceed with the purchase despite potential challenges or risks, as they are more inclined to endure the current situation rather than actively seeking alternatives.

The concept of passive coping sheds light on the intricate decision-making dynamics observed during periods of market turbulence. Passive coping reveals the tendency to endure challenging or undesirable situations instead of actively seeking change. This inclination arises from concerns about starting anew, the fear of missing out on opportunities, and avoidance of potential losses. As a

result, passive coping significantly influences risk aversion patterns among home buyers. Those who lean towards passive coping exhibit lower risk aversion due to their willingness to confront the challenges associated with the home purchasing process.

Moreover, it is crucial to acknowledge that some home buyers may also worry about the consequences of walking away from a contract on their credit history and future mortgage approval. The possibility of defaulting on the contract or failing to follow through with the purchase could negatively impact their credit score, thereby making it more challenging to secure a mortgage in the future or obtain favorable lending terms. These concerns about credit history and mortgage approval can further complicate decision-making for low-income buyers.

If the concept of passive coping holds significant influence, it is expected to be linked to distinct risk aversion patterns among home buyers. For example, individuals who harbor concerns about reentering the housing market or missing out on desired properties are expected to show a higher inclination for risk-taking than their financially secure counterparts or those with less urgency, thus ultimately leading to a low risk aversion coefficient. In contrast, individuals who have ample resources and feel less bound by an offer-to-purchase contract due to their financial capacity to absorb any potential losses will generally exhibit a higher risk aversion coefficient. Their higher aversion to risk stems from the fact that they have the means to mitigate potential negative outcomes.

A number of studies in psychology have explored the impact of passive coping on behavior and well-being. Seligman (1975) emphasizes the extreme passivity shown by individuals trapped in undesirable jobs, which leads to the belief in limited alternatives and a sense of helplessness. This state of passive coping can have behavioral consequences, such as a lack of job search, avoidance of new challenges, and withdrawal in the workplace. Rubin and Brockner (1975) find that confirmation bias, where individuals seek information that confirms their beliefs while ignoring contradictory evidence, is associated with passive coping.[1] Sitkin and Weingart (1995) emphasize that individuals in a state of

[1] Staw (1976, 1981) also stresses this, and suggests that individuals may persist in their investments or decisions even when they are not yielding positive outcomes because they feel obligated to make their initial efforts worthwhile or due to social expectations. Teger (1980) finds that decision makers become entrapped because they have "too much invested to quit". This bias can lead individuals to persist with failing projects or decisions. See also Festinger (1957), who stresses the concept of cognitive dissonance. In the realm of decision-making processes associated with passive coping, the concept of cognitive dissonance can play a crucial role. When individuals find themselves confronted with conflicting beliefs or information that challenges their current situation or decisions, a sense of discomfort arises. This discomfort can create a resistance to change, as individuals tend to prioritize consistency and avoid the dissonance that comes with acknowledging alternative options. Integrating the concept of cognitive dissonance

passive coping are more likely to become even more committed to their course of action by investing more resources and dismissing negative information. Brockner et al. (1981) find that individuals often prioritize protecting their reputation and avoiding potential judgment or criticism over taking actions that could lead to better outcomes. As a result, they may refrain from confronting the situation directly or seeking solutions, and choose instead to maintain the appearance of being in control or competent. However, while this approach may shield them from immediate scrutiny, it can hinder their growth and prevent them from addressing the underlying causes of the problem. The point is that "face saving" can contribute to the adoption of passive coping mechanisms as a means to protect one's self-perception in social contexts.

A further issue worth considering is how the principles of the prospect theory shed light on the decision-making processes that underlie passive coping behaviors. According to the prospect theory, home buyers may exhibit certain behavioral tendencies in circumstances where housing prices have fallen significantly. The prospect theory suggests that individuals tend to be risk-averse when it comes to gains and risk-seeking when it comes to losses (see Kahneman and Tversky (1979)). In the context of falling housing prices, buyers may feel hesitant to take action or make changes because they fear the potential financial losses associated with selling the property at a lower price than they initially paid. They may worry about the negative impact on their investment and the possibility of not recouping their initial costs. Additionally, according to the loss aversion theory, they may fear the potential failure of finding a better alternative or missing out on potential future gains if they sell the property at a low price (see Tversky and Kahneman, 1991).

It is worth noting that neither the prospect theory nor the loss aversion theory provides a definitive prescription for how home buyers should behave in their decision-making processes. Instead, these theories shed light on common behavioral tendencies observed in individuals. In the context of passive coping, the prospect theory suggests that individuals may place greater weight on potential losses associated with taking action, rather than potential gains. The fear of exacerbating the situation or encountering additional challenges can lead to a preference for maintaining status quo, even if it is less than ideal. Additionally, the prospect theory highlights the influence of reference points in decision-making. Individuals often compare their present circumstances or outcomes to a reference point, such as past experiences or expectations. If the reference point is unfavorable, such as being in an undesirable job or facing difficulties, people tend to become more risk-averse and resistant to change. They may prioritize avoiding further losses over pursuing potential gains.

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in Festinger (1957) into the discussion sheds light on another influential factor that contributes to the inclination for passive coping and the resistance to actively address challenging circumstances.

It is important to emphasize that the impact of passive coping on home buyers during declining housing prices is specific to individuals who harbor concerns about re-entering the market or missing out on desired properties. While the prospect theory can account for the overall risk-averse behavior of home buyers, the theory does not capture the specific effects of passive coping. This distinction underscores the significance of considering individual differences in understanding decision-making dynamics within the housing market.

To determine the impact of these factors on home buyer behavior, empirical research is required. In the case of home buyers in distress, it is important to understand whether home buyers are more likely to walk away from offer-to-purchase contracts, thereby leading to an oversupply of homes on the market and causing prices to fall even further, or whether they feel that there is no other option but to continue with the purchase, thus resulting in a loss of wealth for the borrower and reduced consumer spending. If the former outweighs the latter, policy makers may need to consider measures that protect both the buyers and the sellers, and interventions that stimulate demand and encourage home purchases. For example, they may offer tax incentives or provide subsidies to first-time home buyers to increase demand and absorb the excess supply. If the latter outweighs the former, policy makers may need to consider implementing principal reduction programs that reduce the outstanding mortgage balance of homeowners or establish programs that provide financial assistance to homeowners who are struggling to make their mortgage payments.

Our study has three parts. First, we propose an empirical model for analyzing the decision to walk away from an offer-to-purchase contract on a single-family home as a way to avoid risk. Home buyers may walk away from an offer-to-purchase contract for a variety of idiosyncratic reasons. For example, the home inspection could show damage that the buyer is unwilling to absorb. The home also needs to be appraised at the price of the offer or higher, while the offer may come in at above or below market value. On the other hand, the buyer may or may not be able to qualify for financing. Home buyers may also walk away from an offer-to-purchase contract for more systematic reasons. For example, as house prices fall, buyers may opt to walk away from a purchase that they would otherwise make to limit their losses to what little they have put down toward the total price of the property prior to closing. We shall present a standard economic model of household behavior in which the basic assumption is the i-th buyer who will walk away from the purchase if the indirect utility from not purchasing is greater than that from purchasing. Based on this model, we estimate a logit model of the choice of which outcome is selected to derive an estimate of the value of the risk aversion coefficient for home buyers.

In the second part, we explore the dynamic behavior of the quitting point data on pending sales contracts on owner-occupied, single-family homes in the city of Chicago from January 2005 to December 2014. We document a significant increase in the fallout rates on pending home sales in the US as well as the

Chicago single-family home market over this time period. Fallout rates refer to the percentage of pending home sales that do not close, either due to the buyer backing out of the contract or the home not meeting the requirements of the lender. The increase in fallout rates is largely due to the housing market crash of 2007-2009, which resulted in a significant number of foreclosures and short-sales. As a result, lenders became more cautious about approving mortgages, and many buyers found it more difficult to obtain financing. Additionally, many buyers became hesitant about purchasing homes (which is our main focal point) due to concerns about the overall health of the housing market and economy.

In the third part, we shift the focus to using real-world data to estimate the coefficient of risk aversion for the home buyers in our sample. We show that fallout rates increase as the level of risk associated with a home purchase increases. This is because risk-averse buyers are more sensitive to potential losses than potential gains, and may be more likely to back out of a purchase if they perceive a high risk of financial loss. This finding is generally consistent with the results of studies on risk aversion in other domains, such as finance and health care, where risk-averse individuals tend to be more cautious in their decision-making and are more likely to avoid situations with a higher perceived risk of loss.

Our findings suggest a coefficient of risk aversion in the aggregate of no larger than 0.75 to 0.80. This finding has practical policy implications. Risk-taking individuals are generally comfortable with uncertainty and willing to take risks to pursue their goals, even proceeding with a pending home purchase when prices are falling. They are attracted to the upside potential of avoiding complete loss, often tolerating the downside potential of greater losses.

On the other hand, risk-averse individuals are more likely to avoid losses, potentially missing out on growth opportunities and success. They tend to approach decision-making in a deliberate and methodical manner, being more sensitive to failure and less likely to take risks due to fear of negative consequences. Additionally, their focus on loss avoidance can overshadow other factors.

Despite expectations of a strong positive correlation between home buyer fallout rates and economic uncertainty if distressed home buyers are extremely risk-averse, our study does not find such evidence. Moreover, we do not observe a structural change in risk aversion across the 2001-2006 and 2007-2011 periods. However, we identify a notable distinction in the risk aversion parameter between high-income and low-income home buyers. Specifically, the risk aversion parameter for high-income home buyers falls within the range of 1.74 to 1.99, whereas for low-income home buyers, the parameter ranges from 0.60 to 0.62.

Our paper contributes to several strands of the literature. First, we contribute to the literature on individual risk-taking behavior. Empirical studies have estimated the coefficient of risk aversion by using various methods, including surveys, experimental economics, and econometric models. These studies have found that the coefficient of risk aversion varies widely across individuals, which ranges from near-zero to very high levels of risk aversion. For older studies, see, in particular, Friend and Blume (1975), Weber (1975), Grossman and Shiller (1981), Brown and Gibbons (1985), Hansen and Singleton (1982), Litzenberger and Ronn (1986), Friedman (1973), Szpiro (1986), Gertner (1993), Metrick (1995), and Hersch and McDougall (1997).

This literature highlights the complex interplay of psychological, economic, and social factors that influence the willingness of individuals to take risk. A more recent assessment by Dohmen et al. (2011) finds that the risk preferences of individuals are significantly influenced by various factors, such as age, gender, education, and social background. The authors suggest that these factors may impact risk attitudes indirectly, by influencing factors such as self-confidence and cognitive abilities. Bouchouicha and Vieider (2019) explore the relationships among economic growth, entrepreneurship, and risk tolerance. They argue that risk-taking is an important factor in entrepreneurial success and ultimately contributes to economic growth. They find that those with higher risk tolerance are more likely to become entrepreneurs and more successful in their ventures. Furthermore, Bouchouicha and Vieider (2019) find that economic growth is positively associated with higher levels of risk tolerance, which suggests that policies aimed at increasing risk tolerance may be beneficial for promoting entrepreneurship and economic growth.

Dohmen et al. (2018) explore the relationship between cognitive ability and risk preference, including the role of information processing, perception of risk, and self-confidence. They suggest that individuals with higher cognitive ability may process information more efficiently and accurately, which suggests that these individuals may be more willing to take risks. Kameda and Davis (1990) find that individuals who have experienced a recent loss are more risk-seeking than individuals who have not suffered a similar loss before decision-making. Imas (2016) finds that individuals tend to take more risk when they experience realized losses (actual losses) compared to paper losses (unrealized losses). As our estimate of the coefficient of risk aversion is at the low end of the range of existing estimates, it is possible to conclude that home buyers who experience unrealized losses due to falling house prices and continue with their offer-to-purchase contracts may be influenced by factors such as sunk costs and emotional attachment to the property.

Second, we contribute to the psychology literature on the behavior of individuals in distress by examining the concept of passive coping in the context of home buying during a declining housing market. Our findings reveal that both low-income and high-income home buyers who have committed to

purchasing a home are likely to experience some degree of passive coping in the face of falling housing prices. However, there is a notable difference between these two groups in terms of the extent of passive coping. Low-income home buyers, in particular, tend to experience a higher level of passive coping compared to their high-income counterparts.

This disparity can be attributed to various factors. For instance, low-income home buyers often have a higher percentage of their income tied up in the home purchase, making it more challenging for them to recover losses if they decide to abandon their investment. The financial pressure they face reinforces the state of passive coping, as they perceive themselves as trapped and unable to escape the investment due to limited economic resources.

The study proceeds as follows. Section 2 presents an empirical model that helps to provide a better understanding of the variation in fallout rates on pending home sales from 2005 to 2014. The basic idea behind the model is that there is a probability that an individual will choose either one of two options: to go ahead and purchase the house or walk away. This probability is based on the actual utility that an individual derives from each alternative. The model allows us to include multiple variables in our analysis and identify which variables are the most influential in predicting the decision on whether to buy or not. Section 3 describes the data used in the study and introduces the empirical strategy. The data set includes time-series data that captures changes in home buyer fallout rates over time. This includes data on the number of buyers who initiate a home purchase and the number of home buyers who cancel their purchase contrast. The data set also includes property-level data, including the price of the property and the variation of residential real estate values that may influence home buyer fallout rates. Section 4 presents our empirical results. In our empirical work, we do not directly test the feeling of being trapped or stuck in a negative situation, but we do estimate a coefficient of risk aversion by analyzing data on choices under different levels of risk. Section 5 concludes.

2. Model

Our model examines the decision-making process of a home buyer when he or she is considering whether to walk away from an offer-to-purchase contract on a single-family house. In this model, the buyer evaluates the utility derived from not purchasing the house (net of the money that the buyer stands to lose if the purchase contract is cancelled for a reason that is not covered by a contract contingency) and instead investing the funds in risk-free assets, like Treasury bills, against the utility gained from the potential return on investment in housing. Each dollar invested in the riskless asset has an end of period value of $(1 + r_f)$ while that in housing has an end of period value of $(1 + r_a)$. The expected value of this uncertain end of period value is $(1 + \bar{r}_a)$ and its variance is σ^2. In the analysis that follows, we consider the general case in which the i-

th home buyer borrows the amount B_i, and the interest rate is r_d, and the asset price of housing is P_i. For simplicity, we assume that the mortgage has an infinite term. The initial equity investment required, E_i, is $E_i = P_i - B_i$. The buyer chooses to enter into a written agreement for the purchase of a single-family home. The contract requires an earnest money deposit of X from the buyer to evidence good faith in entering the agreement. This earnest money deposit is forfeited to the seller if the buyer walks away from the purchase during the period it takes to close on the sale.

The home buyer can choose to purchase or not purchase the house so as to maximize the expected utility of wealth at end of a single investment period.[2] We define W_{i0} and W_{i1} as the end-of-period wealth of the i-th buyer associated with purchasing and not purchasing the house, respectively. If the house is purchased, we assume that the investment will either succeed and yield an expected return of $\bar{r}_a$, or fail and yield a return of zero. More specifically, we assume that the home buyer will default on his or her loan and walk away scot-free if the return plus the collateral is insufficient to pay back the promised amount, i.e., if $(E_i + B_i) \times (1 + r_a) < B_i \times (1 + r_d)$. We let ρ represent the probability that the home buyer will default on the investment if the house is purchased. The expected end-of-the-period wealth of the home buyer, $E(W_{i0})$, in this case is $E(W_{i0}) = (1 - \rho)[(E_i + B_i) \times (1 + \bar{r}_a) - B_i \times (1 + r_d)]$.

An implicit assumption in the model is that someone who walks away from an offer-to-purchase contract on a single-family house becomes a renter. While giving up on ever becoming a home buyer in the future is a somewhat extreme assumption in the long run, it is a more reasonable approximation for the short-run, especially if the buyer is walking away from the offer-to-purchase contract because he or she is pessimistic about the near-term future of the market. The home buyer suffers a cost of X_1 upon walking away from the offer-to-purchase contract. If the home buyer does not purchase the house, he or she invests in the riskless asset with return r_f, and ends up with an end-of-period wealth of $E(W_{i1}) = (E_i - X_i) \times (1 + r_f)$.

We assume that the utility function of the home buyer is quadratic and focus on the role of uncertainty in the decision to walk away from an offer-to-purchase contract by assuming that all home buyers have exactly the same utility function.[3] The quadratic character of the utility function implies that the

[2] This assumption is consistent with rational, forward-looking economic behavior in which a rational individual facing alternative risk prospects will choose to maximize his/her expected utility.

[3] The quadratic utility function is chosen purely for mathematical convenience. The form of this utility function has, however, a number of undesirable features: for instance, as Pratt (1964) shows, the quadratic utility function implies that people become more averse to risk as they become wealthier, which of course is not generally true. We deal with this problem by selecting samples of home buyers matched on income level and

expected utility of owning a house can be written as a linear combination of the mean and variance of the end-of-period wealth, W_{i0}:

$$\begin{aligned} E[U(W_{i0})] &= E(W_{i0}) - 0.5\gamma \mathrm{var}(W_{i0}) \\ &= (1-\rho)[E_i + B_i) \times (1 + \bar{r}_a) - B_i \times (1 + r_d)] \\ &\quad - 0.5\gamma(1-\rho)^2(E_i + B_i)^2\sigma_\alpha^2 \end{aligned} \tag{1}$$

where $\gamma > 0$ is a measure of the risk aversion. The basic assumption is that the i-th home buyer will walk away from the purchase if $E[U(W_{i1})] > E[U(W_{i0})]$ and will purchase the house if $E[U(W_{i1})] < E[U(W_{i0})]$. There is indecision if $E[U(W_{i1})] = E[U(W_{i0})]$, but this happens with zero probability.

Defining $y_i = 1$ if the i-th buyer walks away from the purchase, we have

$$\begin{aligned} P(y_i = 1) &= P\big[E[U(W_{i1})] > E[U(W_{i0})]\big] \\ &= F\big[(E_i - X_i) \times \big(1 + r_f\big) \\ &\quad - (1-\rho)[(E_i + B_i) \times (1 + \bar{r}_a) - B_i \times (1 + r_d)] \\ &\quad + 0.5\gamma(1-\rho)^2(E_i + B_i)^2\sigma_\alpha^2\big] \\ &= F[(E_i - X_i) \times \big(1 + r_f\big) + (1-\rho)B_i \times (1 + r_d) \\ &\quad - (1-\rho)(E_i + B_i) \times (1 + \bar{r}_a) \\ &\quad + 0.5\gamma(1-\rho)^2(E_i + B_i)^2\sigma_\alpha^2 \end{aligned} \tag{2}$$

where F is a cumulative distribution function (cdf). We obtain a standard logit model by assuming F is a logistic cdf:

$$\begin{aligned} \ln\left(\frac{p_i}{(1-p_i)}\right) &= (E_i - X_i) \times \big(1 + r_f\big) + (1-\rho)B_i \times (1 + r_d) \\ &\quad - (1-\rho)(E_i + B_i) \times (1 + \bar{r}_a) \\ &\quad + 0.5\gamma(1-\rho)^2(E_i + B_i)^2\sigma_\alpha^2 \end{aligned} \tag{3}$$

where p_i denotes the probability of change from 0 to 1, that is, from $y_i = 0$ on the day the contract is signed to $y_i = 1$ on the day of closing or settlement.

Equation (3) requires estimates of the choice probabilities for which we use the observed frequencies for p_i. The probability that the typical home buyer will walk away from a purchase contract in period t is denoted as p_t. Let the number of cases in period t where home buyers choose to walk away from a purchase contract be N_t and the total number of agreed-upon sales contracts in period t be denoted as T_t. We approximate p_i as $p_t \equiv \frac{\mathrm{N}_t}{\mathrm{T}_t}$.We can then estimate Equation (3) by using p_t to approximate p_i and assuming that $r_{dt} \equiv r_{ft}$, so that

estimating separate regressions for each sample. In this way, we do not have to worry about imposing a particular structure on the data.

$$\ln\left(\frac{p_t}{(1-p_t)}\right) \approx (\bar{\mathrm{E}} - \bar{X} + (1-\rho)\bar{B}) \times \left(1 + r_{fT}\right) - (1-\rho)(\bar{\mathrm{E}} + \bar{B}) \times (1 + \bar{r}_{at}) + 0.5\gamma(1-\rho)^2(\bar{\mathrm{E}} + \bar{B})^2\sigma_{at}^2 = \beta_0 + \beta_1 r_{ft} - \beta_2 \bar{r}_{at} + \beta_3 \sigma_{at}^2 \quad (4)$$

where $\beta_0 \equiv \rho\bar{E} - \bar{X}$,$\beta_1 \equiv \bar{E} - \bar{X} + (1-\rho)\bar{B}$,$\beta_2 \equiv (1-\rho)(\bar{E} + \bar{B})$, and $\beta_3 \equiv 0.5\gamma(1-\rho)^2(\bar{E} + \bar{B})^2$.[4]

3. Data and Empirical Strategy

3.1 Data Source

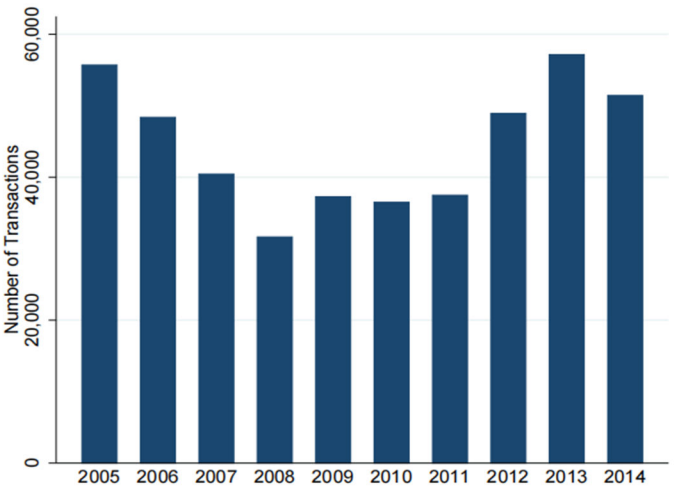
The data source for this analysis is a sample of pending sales contracts on owner-occupied, single-family homes in the city of Chicago in the state of Illinois, U.S., from January 2005 to December 2014. This data source has the strong advantage of being micro in nature. Here, we track each and every pending home sale that occurred over the entire sample period; the source is the Chicago MLS of northern Illinois, the third largest MLS service in the U.S. The data include home sales in both the condominium and single-family markets. In most respects, the purchase of a condominium is like the purchase of a traditional single-family house; both need a reasonable period of time to arrange for financing, conduct inspections, obtain appraisals, and have the legal title transferred. However, there are differences. For condominium units to be built or under construction, the closing date originally contemplated by the parties and reflected in the offer-to-purchase can range from two to five years after the offer is formally accepted. Delays in the closing of condominiums are typically expected. These delays can be caused by the market, as the sale of units in a new development dictates the availability of financing, by the vagaries in the construction process, and complexities associated with the registration process required by the State of Illinois Condominium Act. Among condominium buyers, Agarwal et al. (2016) find evidence that condominium borrowers have higher average Fair Isaac Corporation (FICO) credit scores than single-family borrowers, but are far more likely to have unconventional and riskier loan terms, such as interest-only mortgage or mortgages that require little or no documentation, than single-family borrowers.

The pending home sales in Chicago are matched with data on completed home sales collected by the Cook County Recorder of Deeds. The Cook County

[4] There is another issue here. The assumption of quadratic utility implies ultimate satiation with respect to risk taking when the distribution of returns is unbounded from above. But as chance has it, in the estimation of Equation (4), we are not worried about instances where the distribution of housing returns is unbounded from above, but instances where returns are expected to be negative.

Recorder of Deeds records all documents that deal with land transactions, including deeds and mortgages, in the Cook County. These records have been kept since the Great Fire of 1871. The Great Fire, which started in Mrs. O'Leary's barn, destroyed all of the official Cook County real estate records stored in the office of the county recorder. The records that post-date the Great Fire of 1871 are based on the independently salvaged title records of three title abstract firms, Chase Brothers & Co, Jones & Sellars, and Shortall & Hoard. The State of Illinois gave the abstracted land titles the status of law in all courts by passing the Burnt Records Act of 1872. Figure 1 plots the total number of transactions over the period of 2005-2014. In 2005, the annualized sales pace in Chicago was 55,710 units. In 2006, the sales pace fell to 48,381 units, and fell again to 40,446 in 2007 and then to 31,645 units in 2008. From their peak of 55,710 units in 2005, the number of transactions reached a trough of 37,275 in 2009.

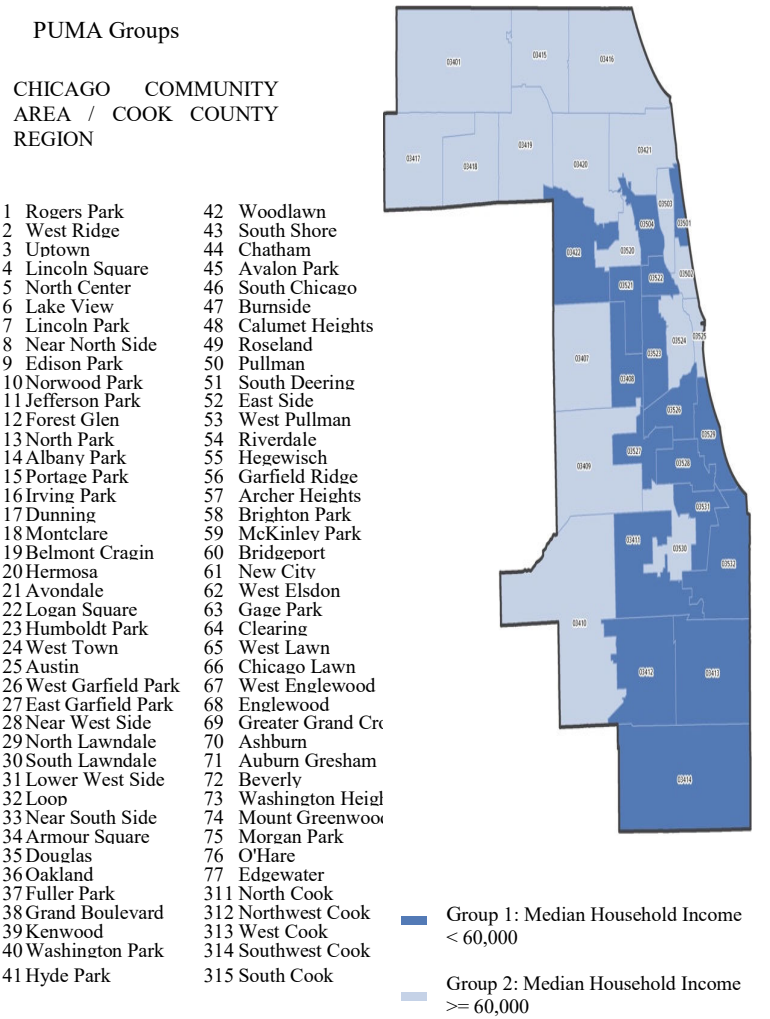
Figure 1 Existing Single Home Sales in Chicago



We match this data to information on local house price returns and volatility, where localities are the so-called Public Use Microdata Areas (PUMAs), which have about 100,000 inhabitants on average. We then aggregate the 34 PUMAs in Cook County into two areas (the number of PUMAs is given in parentheses), which represent: 1) low income areas (22), where the median household income is less than or equal to US$60,000; and 2) high income areas (12), where the median household income is higher than US$60,000. Figure 2 shows a map of Cook County with the 34 different PUMAs, which are identified on the map with numbers. The two income areas are identified by different shades. If, as is perhaps reasonable to suppose, the preference function common to all households exhibits decreasing absolute risk aversion, then wealthier

households (i.e., households with higher incomes) should be willing to take larger risks with their investments, that is, their risk aversion coefficient ought to be lower.[5] Furthermore, because relatively lower priced houses often appreciate faster than higher priced houses during boom periods, and subsequently decline faster in bust periods (see Guerrieri et al., 2013), categorizing areas by their household income level seems to be appropriate.

Figure 2 34 Public Use Microdata Areas in Cook County by Income



[5]This suggestion is generally consistent with everyday experience.

We construct a separate house price index for each subarea as identified in Figure 2 as well as for the entire market as a whole. The indices are derived from hedonic regressions of price, in logarithmic form, on physical characteristics, including square feet of living area, number of bedrooms and bathrooms, and age of the building, as well as geographic variables, including distance from properties to the Chicago Transit Authority (CTA) rail stations, to Lake Michigan, and to the Metra rail station, and fixed effects. The method of construction is basically that of the Institute of Housing Studies (IHS) at DePaul University (see IHS technical paper for a description of the methodology from its website[6]). Each index is quarterly, which covers the period from the first quarter of 2005 through to the fourth quarter of 2014. The base quarter for each index, at which the index equals 100, is the first quarter of 2000. The data source is the Cook County Recorder of Deeds. The house price indices are plotted in Figure 3. In general, we see that house prices rose strongly through 2007 and then dropped sharply, especially in low-income areas. From the second quarter of 2007 to the third quarter of 2012, house prices in high-income areas dropped by about 28 percent, while house prices in low-income areas fell by more than 40 percent.

Figure 3 House Price Indices in Chicago by Income Area

[6] http://www.housingstudies.org/media/filer public/2015/05/12/puma hedonic model technical paper d7kh29N.pdf

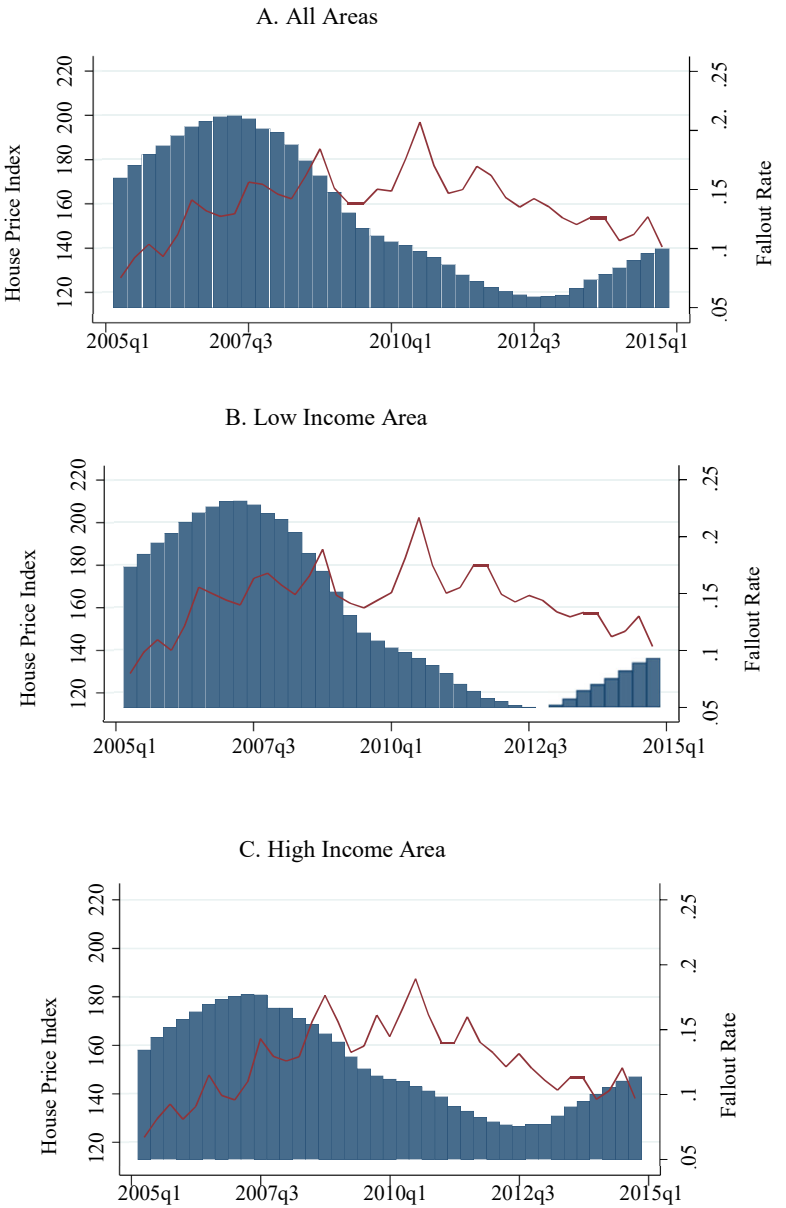
We calculate the return on each of our three house price indices over the previous month to measure the return to holding housing. We use the sample variance of the house price changes to estimate the variance rate for each house price index by month. We use the returns on 10-year treasuries to measure the return on the riskless asset and approximate the cost of debt financing.

Figures 4a-4c report the annualized fall-out rates for each subarea as well as for the entire market as a whole. These estimates are constructed by dividing the number of home buyers in a given quarter with pending sāles contracts who are observed to have never fulfilled the terms of their contracts by the total number of pending contracts in that quarter. To calculate fallout rates on pending home sales, real estate professionals typically track the number of homes that are listed as "pending" in a given period. These pending sales represent transactions that are in progress and have not yet been completed. At the end of the tracking period, the number of pending sales that failed to close or fell through is counted. The fallout rate is then calculated by dividing the number of pending sales that failed to close by the total number of pending sales during the tracking period. The fall-out rates vary greatly over time. The rates are low early in the period (in the vicinity of 5 percent), rise from the first quarter of 2005 through to the third quarter of 2010 (to a peak of around 20 percent), and then fall dramatically at the end of the period (to around 10 percent). The variation in the fall-out rate over time appears to be related to declining house prices; this is especially evident in the 2007 to 2010 period, where, as house prices decreased, fall-out rates increased significantly. Furthermore, we observe that the movements in fall-out rates across the two areas are positively correlated at a relatively high level.

3.2 Empirical Strategy

Estimating Equation (4) provides us with empirical estimates of the value of the risk aversion coefficient for households and investors with respect to the odds (or, more precisely, the logarithm of the odds), $lnp_t/(1-p_t))$, of falling out over falling prices in the housing market. The first thing to note here is that Equation (4) is a commonly employed form of the logit model. The model transforms the 0-1 variable – whether to walk away from an offer-to-purchase contract – into a log-odds ratio, which takes on values that range from minus to positive infinity. With a logarithmically transformed dependent variable, Equation (4) can be estimated by using ordinary least square (OLS) because the log-odds function avoids the problems of out-of-range predictions and lack of variance that OLS encounters with binary variables. Note that all of the predicted log-odds values, when retransformed, will fall within [0, 1] and that the OLS estimated parameters in Equation (4) are consistent when the number of agreed-upon purchase contracts in each period t becomes arbitrarily large (which is generally true for our data).

Figure 4 House Price Indices vs. Fall-Out Rates in Chicago by Income Area



The second thing to say, however, is that the intercept term in Equation (4) is assumed to capture the idiosyncratic reasons for walking away from an offer-to-purchase contract – like when the home inspection shows damage that the buyer is unwilling to absorb, or the buyer may not be able to qualify for financing – as well as other unmeasured effects. Furthermore, this intercept may vary greatly across PUMAs, which captures the effects of omitted variables that are specific to individual PUMAs. In such a scenario, panel estimation is standard (see Greene, 1993). Finally, Equation (4) is estimated for all 34 PUMAs combined and separately for the three PUMA categories grouped by income level. The approach of estimating Equation (4) for different areas grouped by income level provides a check on whether the estimated coefficient of risk aversion is robust to controls for income.

4. Main Results

4.1 Risk Aversion Coefficient

Table 1 reports the main results of the paper. The table shows the OLS estimates of Equation (4) for the "all PUMA" sample for the first quarter of 2005 to the fourth quarter of 2014. Later, we will consider the estimates by income area. The results in Table 1 provide an overall test of the validity of the model in Equation (4). The table reports the results from between-effects, fixed-effects, and random-effects panel regressions to overcome the shortcomings of cross-section empirics and control for any individual heterogeneity across the different PUMAs within each of the three areas (e.g., differences in age, education, martial status, etc.) that we are unable to measure with the set of variables included in Equation (4). Each of these panel data techniques has both strengths and weaknesses. The between-effects model averages the data for each PUMA into one observation and exploits the variation between each PUMA to estimate the time-invariant part of the variation between PUMAs. In our case, the between-effects specifications are not expected to achieve statistically significant results due in part to the small number of PUMAs within each area and partly to the fact that the three areas considered in this study have been chosen to be relatively homogeneous in their characteristics (at least with respect to household income). The fixed-effects specifications allow us to control for variation between the PUMAs as well as variation over time within the PUMAs by allowing the regression intercept to vary by PUMA in each of the three areas. The only difficulty here is that the fixed-effects model reduces the degrees of freedom and power of the test. The random-effects model is the most general specification. The model not only allows us to control for fixed effects across each PUMA, but also for random effects that might explain for the variance across panels.

In the regressions that report a key response variable of σ^2, the sample variance of house price changes. An estimate of the value of the risk aversion coefficient [a]

for households and investors can be determined from the estimates of β_3. If we assume that the value of the risk aversion coefficient for households and investors is constant over the estimating period for each area, then the estimates of β_3 can be interpreted as$\beta_3 \equiv 0.5\gamma(1-\rho)^2$, where $(\bar{E}+\bar{B})^2 = 1.0$, which is the usual case when dealing with price indices, and the coefficient of risk aversion for each area is $\gamma = 2(\beta_3/(1-\rho)^2)$. Assuming this specification, and assuming an average default rate on single-family residential mortgages of 4.3% over the period of January 2001 to June 2011, the last row of Table 1 sets out this estimated coefficient.

Table 1 Determinants of Aggregate Fall-Out Rates

The table presents a logistic regression equation in which the dependent variable is the aggregate log-odds of falling out: that a home buyer does not proceed with the sale as agreed. In the log-odds form, the estimated equation is as follows:

$$\ln(p_t/(1-p_t)) = \beta_0 + \beta_1 r_{ft} - \beta_2 \bar{r}_{at} + \beta_3 \sigma_{at}^2 + \varepsilon_t$$

is the sample variance of the house price changes, and $\varepsilon_t$is a normal error term. ll is the log likelihood, ρ_{eu} is the intraclass correlation, σ_e is the standard deviation of the residuals, σ_u is the standard deviation of residuals within group, and $\gamma = (\beta_3/(1\,\rho)^2)$ is the coefficient of risk aversion. The mortgage default rate, ρ, is assumed to be 4.3%, which is the average default rate on single-family residential mortgages from January 2001 to June 2011. The coefficients are estimated with panel data techniques. The data range from the first quarter of 2005 *t*-statistics.

	(1) **Between Effect**	(2) **Fixed Effect**	(3) **Random Effect**
r_{ft}		4.694**	4.753**
		(6.52)	(6.61)
r_{at}	-11.710**	-3.837**	-3.900**
	(-2.52)	(-13.70)	(-13.98)
σ_{at}^2	0.360	0.342**	0.366**
	(1.65)	(7.03)	(7.87)
constant	-1.996**	-2.036**	-2.040**
	(-63.17)	(-113.50)	(-77.64)
N	1326	1326	1326
R^2	0.474	0.201	
ll	24.65	-248.4	
ρ_{eu}		0.161	0.128
σ_e		0.296	0.296
σ_u	0.79	0.130	0.113
γ		0.75	0.80

Notes: * *denotes* $p < 0.1$, *and* ** *denotes* $p < 0.05$

The results in Table 1 tell a coherent story. The estimates indicate that the opportunity cost of not acquiring the house (i.e., the yield foregone if the buyer would have invested instead in the riskless asset) is significant in explaining the fall-out rate at the 95 percent level in the fixed-effects and random-effects models (t-statistics are over 6.5). Other things being equal, if the opportunity cost of not acquiring a house – the return on the riskless asset – is high, home buyers will generally take more chances and walk away. This result strongly supports the appropriateness of our model.

The results also indicate that the effect of the "own" rate of return on housing, which may vary from period to period, is to decrease the log-odds of falling out. For a given rate of return on the riskless asset, the increase in the own rate of return on housing raises the relative attractiveness of investing in housing and will on the whole lead to a decrease in the log-odds of falling out. The relationship between the log-odds ratio and the return on housing is significant and negative in all three panel regression models. These results are in line with the predictions of the pull-push theory of attraction in which high own rates of return attract investment dollars, while high rates of return elsewhere pull investment dollars away.

As for the coefficient estimates of β_3, the point estimates are between 0.34 and 0.37 across the three panel regression models. These coefficients are significant in the fixed-effects and random-effects models (the t-statistics are over 7.0). Proceeding from these coefficients, it is possible to calculate the risk aversion coefficients in this table (shown in the last row). The risk aversion coefficients are within a similar magnitude (between 0.75 and 0.80) even though there is a large standard error on the accuracy of the coefficient estimate of β_3 in the between-effects model.

These results provide support for the influence of passive coping in the decision-making process of home buyers. When individuals invest a significant amount of effort into the process of finding a home, they may experience feelings of being trapped and unable to abandon their investment due to various constraints. This passive coping mechanism becomes apparent when home buyers consider backing out of an offer-to-purchase, even in the face of falling housing prices.

To alleviate the discomfort associated with potential losses and desire to maintain a consistent self-image, home buyers may rationalize their decision to proceed with the purchase. They convince themselves that the investment is still worthwhile, despite changing market conditions. This justification is often driven by the perception of having invested too much time, money, and emotional energy to back out at that point.

Moreover, social pressure and external influences further compound the passive coping tendencies of home buyers. Expectations from family, peers,

and societal norms can create additional pressure to proceed with the purchase, even when it may not be the most financially prudent decision. Real estate agents, motivated by closing sales and earning commissions, may also contribute to the reinforcement of passive coping behaviors by encouraging buyers to move forward with the purchase.
The manifestation of passive coping mechanisms leads to an increased commitment to the course of action and a higher willingness to take risks, which ultimately result in a low coefficient of risk aversion. These findings highlight the interplay between passive coping and risk-taking behavior, and shed light on the decision-making dynamics within the context of declining housing markets.

Overall, the results in Table 1 hold up under the different estimation methods. Both the fixed-effects and random-effects estimates and estimated standard errors are quite similar and lead to qualitatively identical conclusions. The between-effects estimation does not produce a significant coefficient estimate for β_1 or β_3. However, we must stress that the sign and magnitude of the coefficient of the house price variance variable are similar to the fixed- and random-effects estimates.

4.2 Robustness Analysis

We conduct additional analyses to confirm the robustness of our conclusions. Specifically, we examine whether high-income home buyers in distress behave differently than their low- income counterparts. Testing is done by splitting the data into two subsamples (grouped by household income) and estimating the model for each subsample separately, then comparing the results.

The results are reported in Tables 2 and 3. Table 2 contains the results of estimating the model separately for selected low-income areas, while Table 3 shows what happens when the model is estimated separately for selected high-income areas. The two tables are organized in a similar fashion to Table 1 in order to facilitate comparison. Again, we report the results of estimating the between-effects, fixed-effects, and random-effects panel regressions of the fall-out decision.

The main takeaway here is that the estimates in Tables 2 and 3 are very similar to the estimates reported in Table 1. There continues to be a positive and statistically significant association between the opportunity cost of not acquiring the house and the log-odds that the home buyer will walk away in the fixed-effects and random-effects models for both subsamples. There also continues to be evidence to support the contention that the own rate of return on housing increases the relative attractiveness of investing in housing and reduces the log-odds that the home buyer will walk away in both subsamples.

Table 2 Determinants of Aggregate Fall-Out Rates for Low-Income Areas

The table presents a logistic regression equation in which the dependent variable is the aggregate log-odds of falling out: that a home buyer does not proceed with the sale as agreed. In the log-odds form, the estimated equation is as follows:

$$\ln\left(p_t/(1-p_t)\right) = \beta_0 + \beta_1 r_{ft} - \beta_2 \bar{r}_{at} + \beta_3 \sigma_{at}^2 + \boldsymbol{\varepsilon}_t$$

variance of the house price changes, and $\boldsymbol{\varepsilon}_t$ is a normal error term. ll is the log likelihood, ρ_{eu} is the intraclass correlation, σ_e is the standard deviation of the residuals, σ_u is the standard deviation of residuals within group, and $\gamma = (\beta_3/(1\ \rho)^2)$ is the coefficient of risk aversion. The mortgage default rate, ρ, is assumed to be 4.3%, which is the average default rate on single-family residential mortgages from January 2001 to June 2011. The coefficients are estimated with panel data techniques. Low-income PUMAs are defined as PUMAs where the median household income less than or equal to US$60,000, which includes 22 of the 34 PUMAs in Cook County. The data span is the first quarter of 2005 to the fourth quarter of 2014. The numbers in parentheses are *t*-statistics.

	(1) **Between Effect**	(2) **Fixed Effect**	(3) **Random Effect**
r_{ft}		2.179**	2.214**
		(2.26)	(2.30)
r_{at}	-9.134	-3.575**	-3.615**
	(-1.67)	(-10.36)	(-10.52)
σ_{at}^2	0.300	0.275**	0.286**
	(1.16)	(5.24)	(5.62)
constant	-1.954**	-1.947**	-1.950**
	(-37.80)	(-78.38)	(-54.47)
N	858	858	858
R^2	0.342	0.153	
ll	14.93	-198.4	
ρ_{eu}		0.153	0.135
σ_e		0.309	0.309
σ_u		0.131	0.122
γ	0.66	0.60	0.62

Notes: * *denotes p < 0.1, and* ** *denotes p < 0.05*

The most important coefficient estimate is the positive coefficient estimate of the sample variance of house price changes. This coefficient shows that an increase in house price volatility leads to an increase in log-odds of falling out in both subsamples. Significant changes in household income do lead, however, to significant changes in this coefficient estimate. For example, when the model is estimated for low-income areas, the coefficient estimates are between 0.28 and 0.30 (t-statistics are over 5.0 in the fixed-effects and random-effects models). In contrast, when the model is estimated for high-income areas, the coefficient estimates are larger, between 0.80 and 2.01 (t-statistics are over 2.6 in the fixed-effects and random-effects models). Here, the implication is that

higher income home buyers are more risk averse than lower income home buyers, and significantly so, as there are very clear differences in the coefficient estimates for the two subsamples at the 95 percent level (at least for the fixed-effects and random-effects models).

Table 3 Determinants of Aggregate Fall-Out Rates for High-Income Areas

The table presents a logistic regression equation in which the dependent variable is the aggregate log-odds of falling out: that a home buyer does not proceed with the sale as agreed. In the log-odds form, the estimated equation is as follows:

$$\ln\left(p_t/(1-p_t)\right) = \beta_0 + \beta_1 r_{ft} - \beta_2 \bar{r}_{at} + \beta_3 \sigma_{at}^2 + \boldsymbol{\varepsilon}_t$$

where r_{ft} is the riskless rate of return, r_{at} is the rate of return on housing, σ_{at}^2 is the sample variance of house price changes, and $\boldsymbol{\varepsilon}_t$ is a normal error term. ll is the log likelihood, ρ_{eu} is the intraclass correlation, σ_e is the standard deviation of the residuals, σ_u is the standard deviation of residuals within group, and $= (\beta_3/(1\ \rho)^2)$ is the coefficient of risk aversion. The mortgage default rate, ρ, is assumed to be 4.3%, which is the average default rate on single-family residential mortgages from January 2001 to June 2011. The coefficients are estimated with panel data techniques. High-income PUMAs are defined as PUMAs where the median household income exceeds US$60,000, which includes 12 of the 34 PUMAs in Cook County. The numbers in parentheses are t-statistics. The data span is the first quarter of 2005 to the fourth quarter of 2014. The numbers in parentheses are *t*-statistics.

	(1) **Between Effect**	(2) **Fixed Effect**	(3) **Random Effect**
r_{ft}		8.777**	8.867**
		(8.51)	(8.61)
r_{at}	-10.49	-4.879**	-4.921**
	(-0.55)	(-10.45)	(-10.56)
σ_{at}^2	2.014	0.798**	0.913**
	(0.74)	(2.69)	(3.17)
constant	-2.093**	-2.182**	-2.189**
	(-19.00)	(-77.56)	(-55.72)
N	468	468	468
R^2	0.482	0.356	
ll	11.78	-24.07	
ρ_{eu}		0.149	0.121
σ_e		0.259	0.259
σ_u		0.108	0.0961
γ	4.40	1.74	1.99

Notes: * *denotes* $p < 0.1$, *and* ** *denotes* $p < 0.05$

When comparing the coefficient of risk aversion across different income groups, our findings indicate that the low-income home buyers exhibit a lower coefficient of risk aversion, which ranges from 0.60 to 0.62, compared to the high-income buyers, who have a higher coefficient that ranges from 1.74 to 1.99. The presence of varying risk aversion coefficients between low- and high-income home buyers aligns with the predictions of the passive coping theory. When individuals, particularly low-income buyers, invest a significant portion of their resources in a home purchase, they are more likely to feel entrapped and obligated to honor the contract, even in the face of associated risks. This sense of entrapment arises due to a higher percentage of their income tied to the purchase, which makes it challenging for them to walk away. Low-income buyers may also worry about the impact of walking away from a contract on their credit history and future mortgage approval. Defaulting on the contract or failing to follow through with the purchase could negatively affect their credit score, which makes it more challenging to secure a mortgage in the future or obtain favorable lending terms. Abandoning the contract may also mean losing these financial investments and facing difficulties in recovering or reallocating those funds.

In contrast, high-income buyers, with greater financial means and lower financial constraints, tend to exhibit a reduced sense of commitment and more willingness to walk away from the offer-to-purchase contract. High-income home buyers often face fewer challenges related to limited alternative housing options, financial constraints, and credit and mortgage approval concerns. They have more flexibility and resources to explore other housing options or absorb potential losses. Additionally, their financial stability and access to resources allow them to consider a broader range of possibilities and make decisions with less perceived risk. Therefore, high-income buyers are less likely to struggle with passive coping compared to low-income buyers.

It should be emphasized that our data set has certain limitations. First, there is no information on other factors, like age, level of education, personality traits, and past experience with risk-taking, which can influence the coefficient of risk aversion. Second, we do not have data on neighborhood-level socioeconomic conditions. Neighborhood characteristics can put pressure on a home buyer to continue with an offer-to-purchase contract. If the buyer is interested in a home in a highly desirable neighborhood where homes are not often available, for example, they may feel pressure to continue with the purchase to avoid missing out on the opportunity to live in that neighborhood. Moreover, if the buyer has developed an emotional attachment to the neighborhood or the home of interest, they may feel pressured to continue with the purchase to fulfill their desire to live in that area or specific home.

Next, we find little evidence of a structural change in the risk aversion parameter across the 2001-2006 and 2007-2011 periods (results not reported). It is natural to inquire into the possibility of a structural change in the risk

aversion across these two periods. We conduct several hypothesis tests on this issue. Our first test is of the null hypothesis that the coefficient β_3 in Equation (4) rose discretely over the 2001-2006 and 2007-2011 periods. This test is conducted with a t-test by adding an explanatory variable $D_t\sigma_{at}$ to Equation (4). We also test the null hypothesis that the coefficient β_3 in Equation (4) changed between 2001-2006 and 2007-2011 by performing a Chow test. The sample is split into two subperiods: 2001 to 2006 and 2007 to 2011. The coefficient of β_3 is estimated in the entire sample, and then tested for compatibility with the data in the two subperiods. The two tests fail to reject the null hypothesis of no structural change across 2001-2006 and 2007-2011.

Failure to reject the null hypothesis of no structural change can occur for a variety of reasons. Our test for structural change may not be able to reject the null hypothesis of no structural change because the limited data before and after the change point may not provide enough statistical power to detect a significant difference. Additionally, the nature of the structural change may also play a role. With the structural change occurring over 2007 to 2009 (and possibly beyond), the test for structural change may automatically fail to reject the null hypothesis of no structural break. This is because the test for structural change is designed to detect sudden shifts in the data, rather than gradual changes.

For our latest results, we conduct random exclusion tests to account for potential heterogeneity in buyer behavior and housing market dynamics over time. This procedure involves randomly excluding 20 percent of the observations from our total sample, while estimating Equation (4) with the remaining data. The process is repeated 20 times with replacement, which produces a range of coefficient estimates for r_{ft}, r_{at}, and σ_{at}^2. To assess the significance of these results, we employ t-tests on the mean values of these coefficients. These tests allow us to determine whether the mean coefficient estimates on r_{ft}, r_{at}, and σ_{at}^2 significantly deviate from their previously estimated values.

Table 4 presents the results of our random exclusion procedure. The table is organized based on three samples: the entire sample, and low-income and high-income households. Additionally, three models are considered: between effect, fixed effect, and random effect models. In Table 4, all of the reported t-tests focus on whether the coefficient estimates significantly deviate from their original values estimated in the previous tables. These t-tests serve as a crucial assessment of the significance and reliability of the relationship between house price volatility and probability of falling out, thus further strengthening the validity of our conclusions.

The results in Table 4 can be summarized concisely. First, the t-tests conducted on the mean values of the estimated coefficients for house price volatility do not yield statistically significant deviations from their previously estimated

values. This indicates the consistent relationship between house price volatility and the likelihood of falling out, which is unaffected by the random exclusion procedure. These findings support the robustness and reliability of our conclusions. Secondly, the results reaffirm that house price volatility increases the log-odds of falling out for all three samples, with a relatively smaller impact observed among the low-income buyers. This highlights the resilience of low-income buyers in navigating market fluctuations, even with the random exclusion procedure. Overall, the findings underscore the prevalence of passive coping strategies among low-income buyers who face financial setbacks and emphasize the importance of supportive measures to address housing market challenges.

Table 4 Robustness Checks on the Main Results

The table presents robustness checks on the main results by using a random exclusion procedure, where 20 percent of the observations are randomly excluded from each sample. Equation (4) is then estimated by using the remaining 80 percent of the observations, to produce new coefficient estimates. This process is repeated 20 times, with replacement, thus creating a sampling distribution of coefficient estimates for the variance of house prices (σ_{at}^2). The table reports the mean values of these estimated coefficients, which provides an average measure of the relationship between house price variance and the likelihood of falling out. T-tests are conducted to compare the mean coefficient values for σ^2 with the original parameters estimated in Tables 1-3, with *p*-values reported in parentheses.

Sample	(1) Regression Model	(2) σ_{at}^2	(3) *t*-tests
Entire Sample			
	Between Effect	0.347	-1.58
			(0.12)
	Fixed Effect	0.348	1.51
			(0.13)
	Random Effect	0.372	1.67
			(0.10)
Low-Income			
	Between Effect	0.290	-1.16
			(0.25)
	Fixed Effect	0.282	1.42
			(0.16)
	Random Effect	0.293	1.52
			(0.13)
High-Income			
	Between Effect	1.959	-0.97
			(0.33)
	Fixed Effect	0.828	1.34
			(0.19)
	Random Effect	0.946	1.53
			(0.13)

5. Concluding Remarks

In this study, we have specifically chosen to examine the quitting point data for home buyers who, during the Global Financial Crisis, committed to buying a single-family home but then had to make the decision to walk away or not from the offer-to-purchase contract. This situation represents a natural experiment and an ideal way to study whether individuals stay or divert from the course when matters have turned from good to worse. A simple model of buyer fall-out in which home buyers choose to purchase or not purchase a house so as to maximize the expected utility of wealth at the end of a single investment period is then developed to measure the extent to which potential home buyers become increasingly risk averse or not. We find that the opportunity cost of not acquiring a house, own rate of return on housing, and sample variance of house price changes are significant determinants of the decision to walk away from an offer-to-purchase contract on a single-family house. Estimates of the coefficient of risk aversion are obtained that put the parameter estimate in the range of 0.75 to 0.80, which is lower than the typical range of 1 to 5 found in the macroeconomics literature.

Our evidence also shows that the coefficient of risk aversion for low-income home buyers in our sample ranges from 0.60 to 0.62, whereas for high-income home buyers, the range is from 1.74 to 1.99. These findings align with the concept of passive coping, which suggests that individuals tend to persist with a task or goal when they feel they have invested resources into it, even when faced with obstacles.

In the context of home buying during a financial crisis, low-income buyers, who have limited financial resources, may perceive abandoning an offer-to-purchase contract to have significant financial losses and hardships. Consequently, they may be more willing to take on risks and maintain their commitment to the contract, in the hopes of achieving their goals and overcoming their financial challenges. Low-income buyers may also worry about the impact of walking away from a contract on their credit history and future mortgage approval. Defaulting on the contract or failing to follow through with the purchase could negatively affect their credit score, which makes it more challenging to secure a mortgage in the future or obtain favorable lending terms.

Conversely, high-income home buyers generally have greater financial stability and more resources to rely on, which make it easier for them to walk away from an offer-to-purchase contract if circumstances become too uncertain or risky. They have more options available to secure alternative housing arrangements and more potential to accumulate savings and resources after walking away. This is because their larger disposable income can be used to build up savings and investments, and they may have access to well-funded emergency funds or other forms of credit. On the contrary, low-income buyers may face more

financial difficulties and have limited resources after a failed home purchase, which makes re-entering the housing market challenging and necessitates the accumulation of additional savings and resources.

Therefore, the observed differences in risk aversion between low-income and high-income home buyers, as well as their corresponding behaviors, support the idea of passive coping. Low-income buyers, driven by their scarcity of resources and concerns about long-term financial repercussions, are more inclined to persist and remain committed to an offer-to-purchase contract despite the associated risks. In contrast, high-income buyers, with their larger financial capacity and more alternatives, may be more inclined to walk away from a contract when confronted with heightened uncertainty or risk.

Lessons for theory and practice can be drawn from the findings. Overall, as some potential buyers become hesitant to invest in an unstable market, this can lead to an oversupply of homes on the market as more properties become available for sale. The oversupply of homes on the market can lead to an increased level of competition among sellers, as they try to attract buyers with lower prices. This can result in a decrease in housing prices, as sellers compete with each other to make their properties more attractive to potential buyers. An oversupply of homes on the market means that properties require more time to sell, which can result in longer listing times on the market, and cause financial stress for homeowners who need to sell quickly. An oversupply of homes can have a negative impact on the overall economy, as the oversupply can lead to reduced demand for new constructions and home improvement projects. Furthermore, as would-be home buyers in general become deterred by the perceived risk of purchasing a home during a financial downturn, they may delay or avoid purchasing a home altogether. The combined impact of escalating fallout rates and potential home buyers deferring their purchase can first lead to job losses in the construction sector, followed by reduced consumer spending on goods and services related to the sector. This cumulative effect can then ultimately result in an economic growth slowdown.

In contrast, when home buyers are deeply committed to an offer-to-purchase contract in a period when housing prices are falling, this can have significant consequences on the overall economy. In this situation, home buyers may find themselves with a property that is worth less than their initial investment, which can result in negative equity and potential loss of wealth. In turn, the potential loss of wealth from investing in housing could have negative effects on consumer spending and confidence. If homeowners see the value of their largest asset decline rapidly, they may cut back on spending in other areas or become more risk-averse in their other financial decisions. This can lead to a decrease in overall economic activity and contribute to a slowdown in economic growth, reduced job creation, eroded consumer confidence and spending, and potential negative impacts on the banking and financial sectors.

A full understanding of this process reveals how policy makers ought to respond. Policy makers should respond to home buyers in distress by offering support mechanisms that address both scenarios. In the case where home buyers choose to walk away from offer-to-purchase contracts as housing prices decline, policy makers should consider measures that protect both the buyers and sellers, which could include the provision of legal and financial counseling services to help buyers make informed decisions, and incentives to encourage sellers to offer more favorable terms or agreements. In the second scenario, where home buyers choose to continue with the offer-to-purchase contract but suffer a loss of wealth, policy makers should consider measures that help to alleviate the financial burden of the loss, such as mortgage modification programs, refinancing options, or targeted financial assistance. Additionally, policy makers could encourage the development of stronger consumer protection laws and regulations to ensure that unscrupulous lenders or brokers do not take advantage of buyers.

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