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Housing equity dynamics and home improvements

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ABSTRACT

In this study, we examine the effect of housing equity position, measured using the loan-to-value (LTV) ratio, on the probability of home improvements. Using 2001–2011 data from the Panel Study of Income Dynamics (PSID), we find that a higher LTV ratio, in general, reduces the probability of home improvements. We also find that the probability of home improvements depends on the recent change of housing equity position and, more importantly, on the causes of the change. Probability of home improvements decreases more when a high LTV ratio is caused by falling house prices than when it is caused by equity extraction.

1. Introduction

During the 2007–2009 U.S. housing crisis, many homeowners witnessed a considerable shrink of their housing equity. A significant percentage of households even had negative equity – owing more on their home than what the house is worth. In this study, we examine the relation between housing equity position, measured using the loan-to-value (LTV) ratio, and a household's decision to make home improvements. Over time, home improvement expenditure exhibits a strong correlation with housing market cycles. Against the backdrop of the 2007–2009 U.S. housing crisis, aggregate home improvement spending sharply plummeted from $145.6 billion in 2006 to $112 billion in 2010 (Haughwout et al., 2013). What explains this substantial decline in home expenditures? Understanding the relationship between housing equity dynamics and home improvements is crucial for several reasons. First, home improvement spending is an important part of the U.S. economy. Home improvement expenditure accounts for roughly one-third of total housing investments.[1] Therefore, examining the determinants of home improvements helps us gain new knowledge of housing investments in particular and the overall economy in general. Second, home improvements are closely tied to the well-being of homeowners and their communities. Without making up-to-date maintenance and improvements, the flow of service provided by one's residence will diminish and, as a result, reduce quality of life. Underinvestment may also generate negative externality depressing neighboring property prices and causing more nearby defaults and foreclosures (Li, 2016). Furthermore, homeowners who do not improve their homes are probably also less motivated to invest in neighborhood social capital.[2]

In this study, we attempt to answer two important questions. The first question is how do housing equity positions influence homeowners' decisions to invest in their homes? High LTV ratios may reduce home improvements through two distinctive channels. First, housing equity is a potential funding source for making home improvements. A high LTV ratio implies such funding source is unavailable or, at least, limited. In other words, a household with a high LTV ratio is more likely financially constrained. Additionally, low levels of housing equity create the debt overhang problem.[3] In the case of mortgage default, the capitalization of any home improvements first goes to the lender. Consequently, negative equity or even low levels of positive equity diminishes incentive to make home improvements. In this study, we quantify the impact of housing equity positions on home improvements. We find a higher LTV ratio decreases the probability of home improvements.

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[1] Melzer (2017) reports that annual home improvement spending averaged $142 billion (measured in 2009 dollars) during the 1993–2007 period. During the same period, new home construction averaged roughly $300 billion per year.

[2] DiPasquale and Glaeser (1999) find that relative to non-owners, homeowners are 15% more likely to vote in local elections and 6% more likely to solve local problems.

[3] The notion of debt overhang originates from corporate finance literature. Myers (1977) first introduces the idea of corporate debt overhang, suggesting that the owner of a levered asset may choose to forgo economically efficient investments.

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Furthermore, we explore the economic mechanisms behind such a relationship and find evidence of both financial constraint and debt overhang.

The second question concerns the source of leverage. There are two separate paths to reach a high LTV ratio: falling property value and equity extraction. While falling property price reduces wealth, equity extraction transforms housing equity into cash and produces no wealth effect. Thus, one would expect a high LTV ratio caused mostly by declining house value to have a stronger effect on reducing home improvements than the same level of LTV ratio generated primarily by equity extraction. In other words, the causes of the LTV ratio matters, and the effect of housing equity positions is path-dependent. This is a dimension that has not been explored in previous studies. We are the first to test this hypothesis, and we find strong evidence that *not* all leverage is created equal. Probability of home improvements decreases more when a high LTV ratio is caused by falling house prices than it does when it is caused by equity extraction.

The remainder of the paper proceeds as follows: Section 2 reviews previous literature that is related to our study; Section 3 provides an overview of the sample used for our analysis; Section 4 describes our empirical approach; Section 5 presents the results, and Section 6 offers concluding remarks.

2. Related literature

Two theories exist about why a high LTV ratio leads to reduced investments in one's home. The debt overhang theory speaks to the incentive of making home improvements. Under a high LTV ratio, especially when greater than one, default risk becomes a major concern. Consumption benefits and property value appreciation generated by home improvements are lost if the owner defaults. As a result, homeowners with highly leveraged houses tend to underinvest (Melzer, 2017). In contrast, the financial constraint theory posits that homeowners are unable to make home improvements if they are financial constrained. Higher LTV ratios may correlate with greater financial constraints for several reasons. Major home improvements are expensive and often require financing through housing equity extraction. This funding option is more limited for homeowners with little housing equity. Furthermore, the unemployment risk is greater in housing markets with a larger price decline. Households in those markets may postpone home improvements in order to create precautionary savings (Haughwout et al., 2013).

Empirical investigations on the connection between home improvements and housing equity position have been scarce. Using 1979 American Housing Survey data, Reschovsky (1992) includes a control variable for housing equity position and finds no significant effect of it on home improvements. Melzer (2017) and Haughwout et al. (2013) are the most relevant studies to our research. Melzer (2017) finds that homeowners with negative equity substantially reduce home improvements and mortgage principal payments. However, their spending on other consumer durables, such as vehicles, appliances, and furniture, remains unchanged. These results support the debt overhang theory. Similarly, Haughwout et al. (2013) finds that homeowners with negative equity reduce their housing investment by approximately 75%.

There are two motivating factors behind our attempt to move beyond previous studies. First, instead of only examining the effect of negative equity, we wish to study the influence of housing equity level on home improvements for the whole spectrum of LTV ratios. Although homeowners with negative equity are probably affected the most by falling house prices, virtually all households suffered a considerable decrease of housing equity during the 2007–2009 housing crisis. We want to know whether the reduction of investment is more general than what Melzer (2017) and Haughwout et al. (2013) identified. Furthermore, our analysis will isolate the debt overhang effect and test the financial constraint theory. Melzer (2017) suggests that households with negative equity are potentially subject to both debt overhang and financial constraints. In contrast, homeowners with a significant amount of positive equity may not perceive foreclosure as a real threat and are more likely to base their home improvement decisions on financial constraints. Analyzing the home improvement decisions of those homeowners tests the financial constraint theory.

Second, we examine the impact of recent LTV ratio changes. Neither Melzer (2017) nor Haughwout et al. (2013) was able to do that. In order to more fully understand the effect of housing equity on housing investments, it is important to study the change of LTV ratio and, more importantly, why the change occurred. There are several reasons for that. First, the level of LTV ratio is jointly determined by two factors: the change of remaining mortgage principal and the fluctuations of property value. The change of remaining principal represents a transformation of wealth. A homeowner may wish to extract housing equity and convert it into cash through originating a new mortgage, refinancing his or her current mortgage, or borrowing additional funding through an existing home equality line of credit (HELOC). Conversely, a homeowner converts cash into housing equity by making scheduled amortization payments and prepayments. In contrast, the fluctuation of home prices leads to a gain or loss of wealth, which causes a wealth effect on consumption. Rising house prices make homeowners feel wealthier and often leads to demand for a greater level of housing services. As a result, home improvements increase. Another reason is if financial constraints explain, at least partly, the negative correlation between LTV ratios and home improvements, then it is essential to control for housing equity extraction. A higher LTV ratio created by recent equity extraction likely represents a lower degree of financial constraint as opposed to the same level of LTV ratio caused by falling property value. Therefore, we expect homeowners who recently "levered up" to behave differently from the ones whose equity levels were "beaten down" by a depressed housing market.

We contribute to existing literature in two ways. First, we extend the literature examining consequences of the recent housing crisis. Most previous studies focus on adverse impacts of negative equity, such as mortgage defaults,[4] foreclosures and neighborhood spillover effects,[5] limited household mobility,[6] and reduced housing investments.[7] We show that falling house prices also affected households who were not "underwater" and caused them to change their behavior. Even households with a significant amount of housing equity (LTV ratio between 50% and 80%) reduced home improvements.

We also contribute to the literature that seeks to understand the economic factors that influence home improvement decisions. Montgomery (1992) models the consumption-motive of home improvements by analyzing the trade-off between consumption benefits and moving costs. Cho et al. (2014) propose a speculation-based theory which suggests that overconfident homeowners over-invest in home remodeling when house prices rise and reduce improvements when house prices fall. Our empirical results are consistent with their theory. We find self-reported house price appreciation, which may reflect a homeowner's optimism or pessimism regarding the housing market condition, predicts the probability of home improvements.

[4] See Foote et al. (2008).

[5] See Harding et al. (2009), Lin et al. (2009), Campbell et al. (2011), Daneshvary et al. (2011), and Anenberg and Kung (2014) .

[6] See Chan (2001), Ferreira et al. (2010) , and Coulson and Grieco (2013).

[7] See Melzer (2017) and Haughwout et al. (2013).