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journal homepage: www.elsevier.com/locate/jfecSpeculating on home improvements[☆]Hyun-Soo Choi^{a,*}, Harrison Hong^{b,d,e}, Jose Scheinkman^{b,d,c}^a Lee Kong Chian School of Business, Singapore Management University, 178899, Singapore^b Department of Economics, Princeton University, NJ 08540, USA^c Department of Economics, Columbia University, NY 10027, USA^d The National Bureau of Economic Research, MA 02138, USA^e China Academy of Financial Research, Shanghai, China

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ABSTRACT

We develop a speculation-based theory of home improvements. Housing services are produced from a mix of land and structures. Homeowners optimistic about future prices for these services speculate by making improvements, which we model as them increasing their structures holding fixed their land. The recoup value (the difference between the resale value of improvements and construction costs) is simultaneously increasing in home price appreciation and falls with construction cost growth. This prediction stands in contrast to a consumption-cum-financial constraints motive in which rising home prices loosen financial constraints and lead to lower recoup values. We provide evidence consistent with a speculative motive using data on the costs and recoup values of remodeling projects across US cities.

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1. Introduction

We seek to develop a theory of home improvements—a little-studied but important economic activity. While the significance of new home constructions for economic growth during the housing bubble years of 2003–2007 is well documented, the contributions of home remodeling expenditures, though less heralded, are no less impressive. The [Joint Center for Housing Studies \(2009\)](#) of Harvard University reports that home improvement expenditures on, for instance, a new bathroom or a new deck jumped from around 1% of gross domestic product (GDP) (\$229

billion) in 2003 to 2% of GDP (\$326 billion) in 2007.¹ Spending on remodeling projects then dropped precipitously after 2007 with falling home prices, thereby exacerbating the Great Recession of 2008. These figures suggest that home remodeling is an important industry for the US economy and that the pro-cyclicality of these expenditures contributes to business cycle fluctuations.

A consumption-cum-financial constraints motive is a natural way to rationalize remodeling activity. Rising home values loosen financial constraints as banks are more apt to lend to homeowners who might want to indulge in home improvements as a form of pleasure. Remodeling as consumption is consistent with the prevailing professional view that such activities are typically not profitable as the value-added of the improvements is

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¹ These figures include professional remodeling projects and do-it-yourself (DIY) jobs. The purchase of raw materials from companies such as Home Depot for DIY jobs are accounted for in these GDP figures but not the opportunity costs of DIY labor.

often less than the construction cost. For instance, homeowners who install pink tile in their bathrooms to satisfy their idiosyncratic tastes decrease the recoup value of their improvements. An eminently reasonable additional assumption of moving costs would reinforce the consumption motive as remodeling becomes a substitute for moving to a newer or nicer place.

However, a number of other stylized patterns regarding remodeling suggests that speculation in addition to consumption could be an important economic force behind home improvements. First, significant anecdotal evidence exists that homeowners think of improvements as an investment in the same way they think about the purchase of a home. For instance, “fix it and flip it” is a phrase often associated with real estate investing in which it is thought that the completion of a few choice remodeling projects adds significant value to the price of a home.² Thus homeowners undertake major renovation projects with the mistaken belief that improving the place will result in big profits. Instead, they often end up not realizing these gains. Second, home improvements are more likely to be undertaken by sellers or households planning to move (see [Joint Center for Housing Studies, 2009](#)) and remodeling activity picks up when moving costs are low as opposed to being high in the time series.

And, third, rapid price appreciation during the recent housing bubble years and the potential for quick capital gains no doubt reinforced the “fix it and flip it” mentality. The forces driving home improvements during the previous housing boom decade could not be more different than the ones driving home improvements after the collapse of home prices: “Back then, people wanted to renovate their places so that they could trade up to bigger homes, or because their home equity was soaring and they wanted to reinvest some of the spoils. Now, the opposite is happening: Many people who bought during the boom years are accepting the reality that they won’t soon be swapping up for a sybaritic spread. Their mortgages may remain above water, but after years of falling home prices, their equity is so low that the transaction costs of buying a new house would leave little for a down payment” ([The Wall Street Journal, 2010](#)).

As such, we pursue in this paper a speculation-based theory of home improvements. We develop a model with a pure speculative motive for home improvements and then expand it to also account for a consumption-cum-financial constraints motive to highlight a key testable prediction that differs across these two motives. Our model has the following features. A unit of housing services is given by a Cobb-Douglas production function of land and structures with constant returns to scale. We fix the supply of land but assume that there is an upward-sloping supply curve for structures. Homeowners have an option to build additional structures.

Housing unit prices are determined by the beliefs of the homeowners regarding the level of future prices. Homeowners have an equal chance of becoming optimistic

or pessimistic. In other words, homeowners are hit by a sentiment shock. When homeowners receive the positive shock, they undertake home remodeling. When they receive a negative shock, they do not.

We derive three key results. The first result is that a larger growth in home prices is correlated with home improvement activity. To the extent home prices are correlated with optimism among homeowners, this naturally increases the optimal amount of structures in a given plot of land. This effect is partially moderated by an increase in the cost of structures. Our model generates the exaggerated pro-cyclical pattern in remodeling expenditures with home prices. The reason is that home improvement is a homogeneous function of degree larger than one in the beliefs of the optimistic homeowners. We perform a simple calibration that shows that the kind of mistakes we attribute to homeowners can explain in part the high level of improvements relative to GDP during the main bubble years of 2003–2007 in contrast to the relatively low levels over the previous decade (1993–2003), when prices grew just as much in total but over a longer period of time.

The second result is that there is on average excessive investment in improvements by optimistic homeowners, which can be measured by either the recoup value, defined as the difference between resale value of improvements and construct costs, or the recoup ratio, which is the resale value over the construction costs. We show that the expected recoup ratio is less than one on average and the expected recoup ratio is lower the higher the level of home improvements. This result is consistent with the view among professionals that such activities are on average not profitable. The prevailing view is that this is because home improvements are consumption. But this second result suggests that it might also be driven by speculative forces.

The third result is that the realized recoup ratio is positively correlated with realized home price appreciation, controlling for construction cost growth. Even though homeowners are too optimistic about future home prices and do too much remodeling, this speculation can be profitable when realized home prices meet or exceed these expectations. But their optimism leads to losses when construction cost growth is high, controlling for home price appreciation. Hence, the recoup ratio increases with home price growth, controlling for construction cost growth, and decreases with construction cost growth, controlling for home price appreciation.

The third result is particularly interesting because it cuts against the consumption-cum-financial-constraints motive. To see why, we extend our pure speculation model to allow for a consumption-cum-financial-constraints motive. A bank with rational beliefs (which we assume to be perfect foresight on the path of home prices) lends to homeowners who are financially constrained. The key assumption is that financial constraints are always binding for homeowners. As such, homeowners’ recoup values are too high because they would like to indulge in more pink tile but cannot. But higher home prices, which banks can rationally anticipate, loosen financial constraints and allow homeowners to borrow and, hence, consume more pink

² The results of a Google search for “fix it and flip it” and many housing sites discuss this phenomenon.

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