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How does statutory redemption affect a buyer's decision at the foreclosure sale?

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ABSTRACT

About one third of states in the U.S. offer the right of statutory redemption to a defaulting mortgagor who can reclaim his/her foreclosed property within a certain period of time, usually lasting for one month to one year. We derive a closed-form solution of a buyer's decision at the foreclosure sale, which predicts that the buyer is less likely to purchase in states with statutory redemption than in states without it. In states with statutory redemption, a buyer is less likely to purchase if the redemption period lasts longer or housing price inflation fluctuates more severely because the buyer will then be hurt more by the mortgagor who owns more valuable repurchasing option.

1. Introduction

Foreclosure takes place when a mortgagor fails to make the required payments, and thus defaults on a mortgage loan. In the U.S. after foreclosing a mortgage, the mortgagee may or may not sell the collateralized property through a foreclosure sale because the mortgagor has the equitable right of redemption, and thus can prevent the sale by paying off the outstanding debt. Even if the foreclosure sale takes place, the mortgagor may still have a statutory right to redeem the property by paying the price set at the foreclosure sale. About one third of states in the U.S. provide for statutory redemption, with the period ranging from one month to one year (Baker, Miceli, & Sirmans, 2008).

Previous work such as Clauretie (1987) argues that statutory redemption will drive down the price for the foreclosed property because the defaulting mortgagor has the option to reclaim it. This seems to be reasonable if a buyer attending the foreclosure sale decides whether to purchase the foreclosed property based on the net present value (NPV) rule. As such, the buyer is only willing to pay the property value at the date of foreclosure sale net of the option value owned by the mortgagor. This article, which allows the buyer to postpone the purchase by employing a real options model (Dixit & Pindyck, 1994), will investigate two issues. The first one, which is related to the issue argued by Clauretie (1987), asks: How do statutory redemption laws affect a buyer's incentive to purchase? The second one asks: In those states with statutory redemption, how do both the length of redemption and fluctuations of housing price inflation affect a buyer's incentive to purchase?

There are two common types of foreclosure sale, including judicial sale supervised by a court and power-of-sale supervised usually by banks or attorney of the mortgagee. Both usually sell a property through auctions to the buyer who bids the highest price. In this article, we focus on interactions between a buyer and the mortgagor rather than between a buyer and the auctioneer at a foreclosure sale. To this end, we follow the standard real options literature to focus on a buyer who has the privileged right to

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purchase a foreclosed property. We assume that the value of the foreclosed property evolves stochastically over time as a geometric Brownian motion. We also assume that the buyer can enhance the value of the foreclosed property, which is plausible because those who seek to make profits at the foreclosure sale usually have more sophisticated knowledge about the real estate market than both the mortgagor and the auctioneer. The buyer, however, will incur some unrecoverable costs other than the purchased price.

We model the game played by the mortgagor and the buyer as a sequential one and solve it backward. After the buyer purchases a foreclosed property, the mortgagor has the option to choose any date during the redemption period to reclaim it at the price paid by the buyer. When deciding whether to make an immediate purchase, the buyer will rationally anticipate the path of the property value over the redemption period that triggers the mortgagor to reclaim it. As such, the buyer can calculate the potential loss resulting from the option exercised by the mortgagor. Given this potential cost, the standard real options theory suggests that the buyer will wait for a better state of nature to make an immediate purchase, which in turn, reduces the probability for the mortgagor to reclaim the property during the redemption period. Our result thus suggests that the existence of a statutory right of redemption leads a buyer to be less likely to make an immediate purchase. This complements that of Clauretie (1987), which argues that the existence of that right will lead a buyer to bid a lower price, and thus the mortgage loan lender may not utilize a foreclosure in the first place. Furthermore, we derive a closed-form solution for a buyer's decision rule, which predicts that in states with statutory redemption, the buyer is less likely to purchase if the redemption period lasts longer or housing price inflation fluctuates more severely because the buyer will then be hurt more by the mortgagor who owns more valuable option to reclaim the foreclosed property.

Previous literature on foreclosure focuses on issues different from what we focus on. For example, Asabere and Huffman (1992) find that the price of the foreclosed property is determined by the same factors as the non-foreclosed property. Clauretie (1987) argues that both the values of the mortgage and legal foreclosure costs affect the foreclosure rate. Clauretie and Herzog (1990) investigate how state foreclosure laws affect losses of mortgage insurers. Meador (1982) and Jaffee (1985) find that, in general mortgage loan rates were higher in states where the law extended the length and expense of the foreclosure process. Phillips and Vanderhoff (2004) find that the repeal of statutory redemption could increase the probability of foreclosure by 20%. All the above papers do not explicitly value the option associated with the right of statutory redemption nor relate this option value to a buyer's decision at the foreclosure sale.[1]

This paper is related to the literature on the pricing of American options. The mortgagor in our framework decides the date at which to exercise an American-type call option with a finite maturity, where the pricing formula has been provided by Barone-Adesi and Whalley (1987), Carr (1995), and Lee and Paxson (2003).[2] In addition, Jou and Lee (2009) have applied this pricing formula to investigate how a development moratorium affects a landowner's incentive to develop his/her vacant land.

The remaining sections are organized as follows. The second section presents the assumptions of the model, and solve for the path of the property value over the redemption period that triggers the mortgagor to reclaim the foreclosed property. The third section solves for the critical level of the property value that triggers a buyer to make an immediate purchase at the foreclosure sale. This section also investigates how various exogenous factors affect the date at which the buyer decides to purchase and the associated gain from the purchase. The fourth section presents the simulation analysis by employing plausible parameter values. The last section concludes and offers suggestions for future research.

2. Basic assumptions

Previous literature (see, e.g., Kau, Keenan, & Smurov, 2011) has extensively investigated the default decision made by a mortgagor. We abstract from this decision, and instead, focus on a defaulting mortgagor whose collateralized property is subject to a judicial foreclosure sale or power-of-sale. Suppose that the value of this property, denoted by $V(t)$, evolves as:

$$\frac{dV(t)}{V(t)} = \alpha dt + \sigma dZ(t), \tag{1}$$

where α is the expected inflation rate of the property value, σ is the instantaneous volatility of that inflation rate, and $Z(t)$ is a standard Wiener process. We assume that the mortgagor and a buyer at the foreclosure sale are both risk-neutral and face a constant risk-less rate, r, which is required to be greater than α. As is well known in the real estate literature (see, e.g., Kau, Keenan, & Kim, 1993), the total return from holding the property is equal to r, which is equal to $\alpha+\delta$, where δ is the convenience yield, i.e., the implicit rental rate from holding the property because the property provides housing services to the property owner.[3] We can generalize our model to the case of risk aversion in the manner of Cox and Ross (1976). Our result, however,

[1] Two recent papers by Miceli and Sirmans (2005) and Baker et al. (2008) do not distinguish equitable redemption from statutory redemption. Both papers build a static model and find that an increase in the length of redemption period will reduce a mortgagor's incentive to devote efforts to avoid default. The latter paper also investigates the issue regarding the optimal redemption period.

[2] See also Geske and Johnson (1984) and Fischer (1993), both of which provide the pricing formula for the American put option with a finite maturity.

[3] As explained in Dixit and Pindyck (1994, chapter 5) the convenience yield δ resembles the dividend rate on a common stock, and thus will affect the buyer's purchase timing decision. If $\delta=0$, then the buyer will always hold the call option on purchasing the property to maturity. By contrast, if $\delta>0$, then there is an opportunity cost to keeping the option alive, which is the housing services foregone by holding the option rather than the property. Since δ is proportional to the property price, the higher is the property price, the greater is the value of housing services. At some sufficiently high price, the opportunity cost of forgone housing services becomes great enough for the buyer to exercise the option.