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Equity extraction and mortgage default ☆

Steven Laufer

Federal Reserve Board, United States

A B S T R A C T

Using a property-level data set of houses in Los Angeles County, I estimate that about 15% of the recent surge in mortgage defaults is attributable to early cohorts of homebuyers who would not have defaulted had they not borrowed against the rising value of their homes during the boom. I develop and estimate a structural model capable of explaining the patterns of both equity extraction and default observed among this group of homeowners. In the model, households who have taken out equity have both higher loan-to-value ratios and increased mortgage payments relative to their income, a combination that makes them more likely to default. Using this model to analyze a policy that limits the maximum size of cash-out refinances to 80% of the current house value, I find that this restriction would reduce defaults by 18%, partially by inducing households to purchase less expensive homes.

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1. Introduction

When house prices peaked and began to decline sharply in 2006, mortgage delinquencies surged, with the fraction of houses in some stage of foreclosure reaching 4 percent in 2010, almost eight times its historical average.[1] Investors' losses on these defaulted mortgages played a central role in the financial crisis, a consequence likely not internalized by the homeowners themselves in making borrowing and default decisions.

Focusing on a sample of homeowners from Los Angeles County, California, I show that almost half of these defaulting homeowners had purchased their homes before 2004. House price growth before the peak had been so strong that even after a 30% decline, prices remained higher than when these owners had first purchased their houses. For more than 90% of these defaulting homeowners, their original mortgage balances would have been less than the current value of their homes, leaving them with positive equity in their homes and little financial motivation to default. However, through cash-out refinances, second mortgages and home equity lines of credit, these homeowners had extracted much of the equity created

by the rising value of their homes. As a result, their loan-to-value (LTV) ratios were on average more than 50 percentage points higher than they would have been without this additional borrowing and the majority had mortgage balances that exceeded the value of their homes.

These facts suggest that equity extraction played an important role in the recent wave of defaults. Combining this conclusion with the important negative externalities associated with mortgage default, it then makes sense to consider policies that might limit the ability of homeowners to borrow against the equity in their homes. Clearly, the effects of such a policy would depend on the nature of the connection between the equity extraction of these homebuyers and their subsequent decision to default. Understanding this connection is the goal of the current paper.

Studying homeowners' decisions around mortgage borrowing and default is made more difficult by limitations of the data. This is because many state variables that we expect to be important factors in these choices (e.g. income, assets, the current house value, and expectations about future house prices) are absent from my mortgage data, as they are from most other mortgage data sets. To fill in these gaps, I construct a dynamic model of homeowners who face both income and house price shocks and make decisions each period regarding savings, their mortgage balance, whether to sell their house and whether to default. I estimate the parameters of the model by matching a set of moments computed from the borrowing and default outcomes recorded in a unique property-level dataset covering all housing sales and mortgage originations in Los Angeles County from 2000 to 2010. In addition, the estimation draws on other data sources with information about the relationship between the model's unobserved states and observable information such as location, time period and features of the mortgages. I then use this estimated model to evaluate a policy that would restrict homeowners' additional borrowing and estimate the effect of this policy on borrowing, default rates and homeowners' welfare.

To capture key aspects of the recent housing cycle, my model includes two important features that are novel relative to existing models of household mortgage choice.[2] First, in addition to permanent and transitory components, the income process includes a large discrete shock that I associate with unemployment and simulate to match the rising unemployment rates during the period. I find that these unemployment shocks are an important but not dominant driver of defaults. In the simulations, defaulters are three times more likely to be unemployed than the general population of homeowners but only 8% of defaulters are unemployed at the time of default. Second, the model allows for pronounced cycles in house prices, where households understand that prices are likely to continue rising during a boom and likely to continue falling during a bust. These large movements in prices turn out to be the primary driver of the dynamics being studied, explaining more than 80% of equity extraction during the boom and roughly two thirds of defaults during the bust.

In the model, homeowners are more likely to default when they have more negative equity, larger mortgage payments relative to their income, and less liquid wealth. These outcomes imply three key mechanisms that connect homeowners' equity extraction during the boom and their decision to default during the bust. First, homeowners who withdraw more equity end up with larger mortgage balances and are more likely to have negative equity after prices decline. Second, the increased mortgage payments from this additional debt reduce households' ability to avoid default when hit by a negative income shock. Finally, liquidity constrained households are more likely to extract equity in order to finance their consumption. This introduces a selection effect whereby those homeowners who take out larger mortgages are more likely to have begun with fewer liquid assets, a condition that in itself increases the risk of default. Quantitatively, I find that all three of these mechanisms are important. In particular, the combination of negative equity and increased mortgage payments makes households who have taken out equity more likely to default when they become unemployed. In the language of the "double trigger" view of mortgage defaults – that defaults are caused by a combination of two "triggers," negative equity and a second trigger such as a job loss – I conclude that equity extraction increases defaults by strengthening both triggers.

I use my estimated model to study a counterfactual policy that limits the amount of equity that homeowners can withdraw by prohibiting cash-out refinances from exceeding 80% of the current house value.[3] The most direct impact of this policy is to reduce by 23% the amount of equity that would be extracted during a boom similar to the one experienced in the early 2000's. Also, because housing is no longer as valuable as collateral, buyers purchase less expensive houses under this policy. The combination of smaller houses and the reduced ability to borrow causes households to take on less debt and therefore to default at a lower rate. Of the homeowners who default in the baseline model, 34% do not under this policy. However, the overall default rate is only 18% lower. This is because of an offsetting increase in defaults that arises from the reduced borrowing opportunities for homeowners with small but positive amounts of equity. The inability of these homeowners to access this equity closes a borrowing channel that could otherwise be used to prevent default in case of a negative income shock.

I estimate that the welfare loss associated with this restriction for new homeowners is equivalent to 3% of consumption. However, if I allow the decreased borrowing opportunities to be reflected in lower house prices, then the opportunity to purchase a house at a lower price provides an offsetting welfare gain.

Under a more extreme version of the policy that prohibits homeowners from extracting any equity at all, the default rate falls to 68% of its original value. I therefore conclude that equity extraction was responsible for 32% of defaults among these

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[2] For example, see Yao and Zhang (2005), Yao and Zhang (2008), Campbell and Cocco (2015), Li et al. (2016), Corbae and Quintin (2014).

[3] This restriction is similar to a key provision of refinance policies currently in effect in Texas. Kumar (2014) studies the effect of this policy as implemented in Texas by looking at discontinuities in the mortgage default rate around Texas's interstate borders.