

## Systemic Risk and the Refinancing Ratchet Effect

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The confluence of three trends in the U.S. residential housing market - rising home prices, declining interest rates, and near-frictionless refinancing opportunities - led to vastly increased systemic risk in the financial system. Individually, each of these trends is benign, but when they occur simultaneously, as they did over the past decade, they impose an unintentional synchronization of homeowner leverage. This synchronization, coupled with the indivisibility of residential real estate that prevents homeowners from deleveraging when property values decline and homeowner equity deteriorates, conspire to create a "ratchet" effect in which homeowner leverage is maintained or increased during good times without the ability to decrease leverage during bad times. If refinancing-facilitated homeowner-equity extraction is sufficiently widespread - as it was during the years leading up to the peak of the U.S. residential real-estate market - the inadvertent coordination of leverage during a market rise implies higher correlation of defaults during a market drop. To measure the systemic impact of this ratchet effect, we simulate the U.S. housing market with and without equity extractions, and estimate the losses absorbed by mortgage lenders by valuing the embedded put-option in non-recourse mortgages. Our simulations generate loss estimates of \$1.5 trillion from June 2006 to December 2008 under historical market conditions, compared to simulated losses of \$280 billion in the absence of equity extractions.