Asset pledgeability and endogenously leveraged bubbles

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Abstract

We develop a simple model of defaultable debt and rational bubbles in the price of an asset, which can be pledged as collateral in a competitive credit pool. When the asset pledgeability is low, the down payment is high, and bubble investment is unleveraged, as in a standard rational bubble model. When the pledgeability is high, the down payment is low, making it easier for leveraged borrowers to invest in the bubbly asset. As loans are packaged together into a competitive pool, the pricing of individual default risk may facilitate risk-taking. In equilibrium, credit-constrained borrowers may optimally choose a risky leveraged investment strategy – borrow to invest in the bubbly asset and default if the bubble bursts. The model predicts joint boom-bust cycles in asset prices and securitized credit.
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1. Introduction

This paper develops a tractable model of *endogenously* leveraged asset bubbles. The model aims to address several policy-relevant question for economic theory: Under what conditions might risky asset bubbles and risky debt end up on the balance sheets of agents who are more likely to default? Under what conditions do asset bubbles become leveraged (i.e., investment in

the bubbly asset is financed by credit)? How do leveraged bubbly episodes differ from unleveraged ones? These questions are motivated by a concern among economists and policymakers that the boom and bust of leveraged asset bubbles can have serious macroeconomic consequences (see, e.g., Mishkin, 2008, 2009; Rajan, 2011; Greenspan, 2013; Mian and Sufi, 2014; also see Jordà et al., 2015 for historical evidence supporting this notion).

To address these questions, we develop a simple model of leveraged bubbles, based on the rational bubble framework à la Samuelson (1958), Diamond (1965), and Tirole (1985). We introduce two types of households: borrowers and lenders. Households can extend credit to each other. However, borrowers cannot commit to future repayment and thus need to post collateral. If a borrower defaults, she loses a fraction ϕ of the holding of the bubbly asset that she pledged as collateral and a fraction of her endowment (as in the case of recourse loans). Following many papers in the recent macro-finance literature (e.g., Boz and Mendoza, 2014 and Caballero and Farhi, 2015), we view an exogenous increase in this fraction ϕ as a parsimonious representation of the consequence of the recent financial developments that increased households' ability to borrow against their housing wealth.

To capture the main features of a securitized debt market, we impose an assumption that the borrowing and lending takes place via a competitive credit pool (Dubey et al., 2005). Debt issued by different borrowers is pooled together and sold as shares to lenders. By buying shares of the pool, lenders receive a pro rata share of the aggregated repayments (or garnishments in the case of default) by borrowers, in a manner similar to an investor in the securitized mortgage market. We assume that the pool is large so that individual borrowers and lenders take the debt price and delivery rate as given.

Our results point to a strong role of asset pledgeability and credit pooling in shaping the existence and characteristics of bubbly equilibria. When asset pledgeability is limited (ϕ is small), any equilibrium bubble is unleveraged: lenders buy the bubbly asset using their own funds, and the bubbly episode is not associated with a credit boom, as in a standard rational bubble model. Fig. 1a illustrates an unleveraged bubbly equilibrium.

A contrasting set of results prevails when the bubbly asset is highly pledgeable (ϕ is high). In that scenario, any equilibrium bubble must be *leveraged,* as borrowers find an attractive return from leveraged investment (i.e., buying the bubbly asset using debt that is backed by the asset itself). The high pledgeability reduces the down payment for borrowers and the opportunity to default when the bubble bursts allows borrowers to shift some of the downside risk of bubble investment to lenders. In a standard bilateral loan contract, the price of debt (or equivalently, the interest rate) would internalize this shifting of risk. However, when loans are packaged together into a competitive credit pool, individual default risks are also pooled together, facilitating the shifting of risk from borrowers to lenders. In fact, we show that when the pledgeability of the bubbly asset is high, any bubbly episode in equilibrium must be associated with leveraged investment and an expansion of lending in the credit pool. Hence, a distinguishing characteristic of leveraged bubbly episodes is that they come with default risk: when the bubble collapses, it is optimal for debtors to default, because then the value of their collateral falls below the face value of their debt. Fig. 1b illustrates a leveraged bubbly equilibrium.

Our results also imply that the upper bound on the risk of bursting for a bubble to exist in equilibrium is more relaxed when the asset pledgeability is high. In other words, our model predicts that leveraged bubbles can be riskier than unleveraged ones. It also predicts that very risky bubbles can only exist if they are leveraged.

Our theory thus predicts that the combination of credit pools and a high degree of bubbly asset pledgeability can facilitate the emergence of highly risky bubble episodes. One interpretation of