Bubbles, banks and financial stability ☆

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ABSTRACT

The macroeconomic impact of rational bubbles in a limited commitment economy crucially depends on whether banks or ordinary savers hold the bubble. Banks hold the bubble asset when their leverage is high, when long-term real interest rates are low or when lax supervision allows them to enjoy high deposit insurance subsidies. When banks are the bubble-holders, this amplifies the output boom by reducing loan–deposit rate spreads while the bubble survives but also deepens the recession when the bubble bursts. In contrast, the real impact of bubbles held by ordinary savers is more muted.

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1. Introduction

The interaction of asset price bubbles with the banking system and the real economy is important for understanding boom–bust cycles. The current financial crisis is the most immediate motivation for studying this interaction. Losses from subprime mortgage defaults depleted bank capital positions and led to a severe credit crunch and the deepest recession since the 1930s. This episode is not unique in history. In Japan, during the 1980s, real estate prices grew rapidly, allowing property developers to borrow from banks using real estate as collateral. When property prices collapsed in the 1990s, Japan went through a protracted banking crisis and a 'lost decade' of low economic growth. In all of these historical episodes, the banking system was exposed to a bursting housing bubble through a higher incidence of household default. As Reinhart and Rogoff (2014) show, using their rich time-series and cross-country data set, the resulting insolvency of the financial system leads to a deep downturn in real activity.

However, not all boom–bust episodes end in a financial collapse. For example during the 1998–2000 'technology bubble', stock prices rose and fell dramatically without triggering a banking crisis or a deep recession. This paper seeks to understand the reasons why some asset price busts lead to banking crises while others do not. The model we develop focuses on bank exposures to the asset price collapse as an important determinant of the financial stability implications of asset bubbles. Then the model is used to analyse the factors that drive the banking system to become highly exposed to bubbles such as the subprime housing one in 2003–2006.

Our framework is based on rational bubbles. Similar to other recent papers in this literature (Caballero and Krishnamurthy, 2006; Kocherlakota, 2009; Ventura, 2012; Martin and Ventura, 2012; Farhi and Tirole, 2012), credit frictions lead to a shortage of means of saving and the use of dynamically inefficient production technologies.[1] This creates the conditions for bubbles to circulate and expand economic activity by reducing the severity of credit constraints.

☆ The views expressed here are those of the authors and should not be interpreted as those of the European Central Bank.

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[1] Other recent contributions include Hirano and Yanagawa (2010), Arce and Lopez-Salido (2011), Miao and Wang (2011), and Basco (2014).

Our innovation relative to the rest of the rational bubbles literature is to model financial intermediation explicitly. This realistic feature of our environment has the implication, overlooked by the rest of the literature, that asset price bubbles can be held by a variety of agents with different economic roles.[2] It is shown that the real effect of bubbles crucially depends on who holds them in equilibrium. Bubbles held by banks lead to a larger boom–bust cycle in credit and output compared to bubbles held by ordinary savers.

Bank bubbles have larger real effects due to the way the identity of the bubble holder affects the wealth distribution in equilibrium. Bubbles are risky assets which deliver a higher return compared to safe assets in order to compensate investors for losses in the bust. The bubble holder experiences strong growth of net worth while the bubble survives and then a sharp fall when the bubble bursts. When capital-constrained intermediaries hold the bubble, they expand credit supply and reduce lending spreads during the boom. In the crash, banks make large losses and inflict a credit crunch on the rest of the economy. This 'credit supply effect' of the bubble is unique to our model and it contributes significantly to the bubble's impact on the real economy. In contrast, ordinary savers are credit unconstrained and their net worth does not play the same role in the credit intermediation mechanism. When savers hold the bubble, their wealth also fluctuates but this has a very limited impact on the credit constraints faced by other agents in the economy.

The paper also studies the conditions under which banks buy the bubble asset in equilibrium. This is in many respects the most important policy question of the paper. Why did banks choose to remain exposed to the collapse of the subprime bubble despite the possibility to shed this risk via securitization markets?

Interestingly, in the baseline calibrated version of the model without government intervention, savers are the natural holders of bubbles. This is because their opportunity cost of funds is the deposit rate, while banks' opportunity cost is the loan rate which is in general higher. Banks start to buy the bubble under a number of conditions which fit well the experiences during historical boom–bust cycles. First of all, lax supervision under the presence of deposit insurance creates a risk-taking subsidy that gives banks an advantage in holding the bubbly assets. Second, high bank leverage plays an important role by expanding credit supply and reducing the spread between lending and deposit rates. A lower wedge between the opportunity cost of funds for banks and savers results in higher financial institutions' exposure to the bubble. Third, low real interest rates expand the size of the bubble and, as a result, more of it ends up on bank balance sheets.

Our paper supports the view that well supervised and highly profitable banks should not be exposed to asset bubbles. The model suggests a number of reasons why the exposure of the banking system to the subprime bubble was large. The creation of complex structured products facilitated regulatory arbitrage (Acharya et al., 2013), making effective supervision more difficult and increasing banks' ability to leverage up and hold risky assets. In addition, the rapid growth of the broker–dealer sector in the 2000s increased the importance of these lightly regulated and highly leveraged entities in the financial system. In this paper, we implement these important developments through movements in parameters that govern bank leverage and supervision quality. It is shown that these developments, as well as the well-documented decline in real interest rates, can lead to large banking system exposure to the bubble asset and a more amplified boom–bust cycle for the real economy.

Our findings are in line with several important stylized facts uncovered by the literature on the empirical regularities around financial crises. Our focus on rational bubbles that only occur in a low interest rate environment is consistent with Jorda et al. (2012) who report that growth adjusted real interest rates are very low for several years in the run up to global crises.

The finding that bank exposure amplifies the real effects of asset price bubbles is also consistent with the work of Claessens et al. (2012) who show that housing boom–bust cycles lead to larger output fluctuations compared to equity cycles. Since real estate related loans occupy 55% of bank balance sheets and commercial and industrial loans less than 20%,[3] bank bubble exposures are more likely to arise during booms and busts in the housing market than during equity boom–bust episodes.

Finally, our model also has the novel implication that credit spreads are low during bubbly episodes and then rise sharply as the bubble collapses. This theoretical prediction is in line with the empirical evidence in Gilchrist and Zakrajsek (2012) who show that bond risk premia are strongly related to the health of financial institutions.

The rest of the paper is structured as follows. Section 2 introduces the economic environment, Section 3 describes the main equilibrium conditions. Section 4 outlines the model calibration. Section 5 discusses the conditions for bubble existence and the determinants of who owns the bubble in equilibrium before analysing the implications of bubble ownership for the real effects of bubbly episodes. Section 6 concludes.

2. The model

The economy is populated with three kinds of agents. There is a continuum of infinitely lived entrepreneurs and a continuum of infinitely lived workers both of measure 1. There is also a continuum of bankers who have finite lives and can die stochastically. There is also the government which provides deposit insurance.

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[2] An independent recent work by Miao and Wang (2015) constructs a model of rational bubbles with a banking sector. However, they do not analyse the implications of different bubble ownership.
[3] *Source*: FDIC Statistics on Banking.