Journal of Monetary Economics 62 (2014) 1–22

Contents lists available at ScienceDirect

Journal of Monetary Economics

journal homepage: www.elsevier.com/locate/jme

Financial innovation, the discovery of risk, and the U.S. credit crisis ☆

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ARTICLE INFO

Article history:
Received 17 July 2012
Received in revised form
23 July 2013
Accepted 24 July 2013
Available online 28 August 2013

Keywords:
Credit crisis
Financial innovation
Imperfect information
Learning
Asset prices
Fisherian amplification
Anticipated utility

ABSTRACT

Financial innovation and overconfidence about the risk of new financial products were key factors behind the 2008 U.S. credit crisis. We show that a model with a collateral constraint in which learning about the risk of a new financial environment interacts with Fisherian amplification produces a boom–bust cycle in debt, asset prices and consumption. Early realizations of a high-borrowing-ability regime turn agents optimistic about the persistence probability of this regime. Conversely, the first realization of a low-borrowing-ability regime turns agents unduly pessimistic. The model predicts large increases in household debt, land prices and excess returns during 1998–2006 followed by a collapse.

> "*Booms become busts because justifiable confidence becomes foolish optimism.*" – Robert J. Samuelson, "Causes of the Crisis," *Washington Post*, 3/19/2012.

1. Introduction

The U.S. financial crisis was preceded by sharp increases in household credit, residential land prices, and leverage ratios (see Fig. 1).[1] Between 1997 and 2006, the year in which the crisis started as home prices began to decline nationwide, the

☆ We are grateful to Andrew Abel, Satyajit Chatterjee, Tim Cogley, Enrica Detragiache, Bora Durdu, George Evans, Martin Evans, Matteo Iacoviello, Urban Jermann, Robert Kollmann, Anton Korinek, Kevin Lansing, Mico Loretan, Agnieszka Markiewicz, Jim Nason, Paolo Pesenti, Vincenzo Quadrini, David Romer, Tom Sargent, and Stijn Van Nieuwerburgh for helpful comments. We are also grateful for comments by participants at the 2011 Philadelphia Macro Workshop, 2011 Midwest Macro Meetings, London Trio Seminar, the conference on "Expectations, Asset Bubbles and Financial Crises" at Erasmus University, NBER-CRIW Saving and Wealth Conference, 2011 AEA Meetings, 2009 and 2010 SED Meetings, the 2009 NBER-IFM Summer Institute, Spring 2010 Bundesbank Conference, the 12th Workshop of the Euro Area Business Cycle Network, and at seminars at Brown, UVA, Bank of Korea, Reserve Bank of New Zealand, Federal Reserve Board, World Bank, Wharton, San Francisco Fed, SUNY Albany, the IMF Research Department, and the IMF Institute. Part of this paper was written while Mendoza was a visiting scholar at the IMF Institute and Research Department, and he thanks both for their support. The views expressed in this paper are those of the authors and should not be attributed to the International Monetary Fund or the National Bureau of Economic Research.

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[1] High leverage in financial institutions also played a critical role. Still, understanding the mechanisms that drove household credit is critical, because household mortgage origination was the anchor of the housing-related securities driving the surge in leverage of financial institutions.

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http://dx.doi.org/10.1016/j.jmoneco.2013.07.001

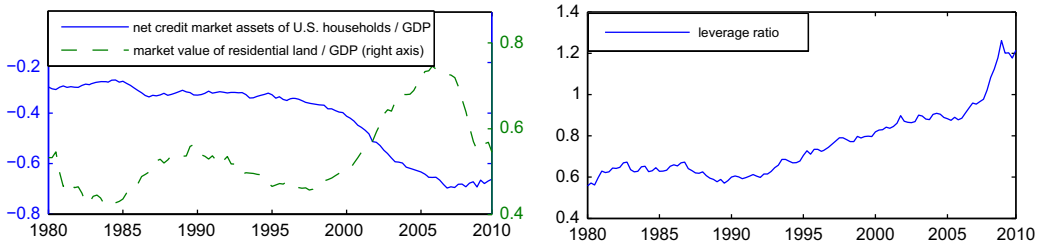

Fig. 1. Net credit market assets, value of residential land and leverage ratio.
Sources: Net Credit Market Assets: Flow of Funds Accounts of the United States, Board of Governors of the Federal Reserve System. Value of Residential Land: Davis and Heathcote (2007).

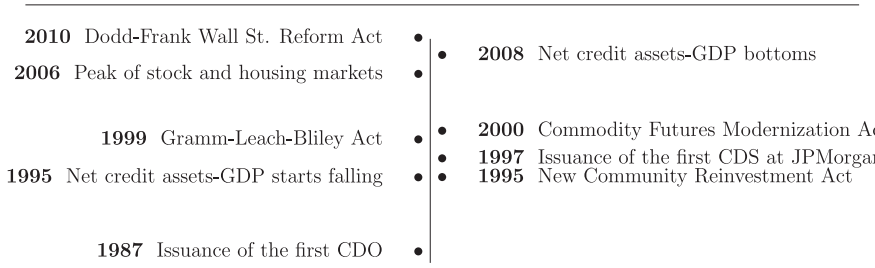

Fig. 2. Timeline of events during the run-up to the U.S. credit crisis.

net credit assets of U.S. households fell from −35 to −70% of GDP and the market value of residential land surged from 45% to nearly 75% of GDP.[2] By contrast, these ratios were quite stable in the previous two decades. Debt grew much faster than land values, however, because the ratio of the two, a macroeconomic measure of household leverage, rose from 0.68 in 1997 to 0.93 in 2006. The crisis then resulted in a sudden increase in leverage, as land prices fell faster than the ability to reduce debts, and leverage continued hovering around 1.2 after that.

As Fig. 2 shows, the U.S. credit boom started with a period of significant financial innovation characterized by new financial instruments that "securitized" the payment streams generated by a wide variety of assets, particularly home mortgages, and by far-reaching reforms that radically changed financial regulations. The gradual introduction of collateralized debt obligations (CDOs) dates back to the early 1980s, but the securitization boom that fueled the growth of household debt started in the mid 1990s with the introduction of residential mortgage backed securities (RMBSs) and collateralized mortgage obligations (CMOs). This process was greatly amplified by the introduction of credit default swaps (CDSs) on the payments of CMOs by the mid 2000s. By the end of 2007, the market of CDSs alone was worth about $45 trillion (or 3 times U.S. GDP). The financial reforms introduced in the 1990s were the most significant since the Great Depression, and in fact aimed at removing the barriers separating bank and non-bank financial intermediaries set in the 1933 Glass–Steagall Banking Act. Three Acts were particularly important for the housing boom: The 1995 New Community Reinvestment Act, which strengthened the role of Fannie Mae and Freddie Mac in mortgage markets and facilitated mortgage securitization; the 1999 Gramm–Leach–Bliley Act, which removed the prohibition on bank holding companies from owning other financial companies; and the 2000 Commodity Futures Modernization Act, which left over-the-counter financial derivatives beyond the reach of regulators.

The pattern linking financial innovation, booms in credit and asset prices, and financial crises is not unique to the recent U.S. experience. In fact, credit booms and busts are commonly associated with large changes in the financial environment. For instance, many of the countries to which the financial crisis spread after the U.S. crash in 2008 displayed similar pre-crisis features, in terms of a large expansion of the financial sector into new instruments under new regulations, and also experienced housing booms (e.g. the United Kingdom, Spain, Iceland, Ireland). Mendoza and Terrones (2012) provide more systematic evidence of this phenomenon. They found that 35% of the credit booms observed in the 1960–2010 period across developed and emerging economies occurred after surges in capital flows, which were largely driven by reforms that liberalized capital accounts, and 25% occurred after large financial reforms. They also found that credit booms are associated with sharp cycles in economic activity and housing prices.

This paper provides an explanation for the observed relationship between financial innovation and the credit cycle. In particular, we show that financial innovation, interacting with credit constraints, leads to a "natural" underpricing of the risk associated with a new financial environment, and that this produces a surge in credit and asset prices followed by a collapse.

[2] Following Davis and Heathcote (2007), we focus on residential land prices instead of housing prices. They showed that land prices are significantly more important than prices of residential dwellings for explaining the evolution of U.S. housing prices between 1975 and 2006.