Housing and liquidity ☆

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A R T I C L E   I N F O

A B S T R A C T

Coinciding with the start of the housing boom were large increases in home-equity lending and loan-to-equity ratios. We study this in models where housing bears a liquidity premium because it collateralizes loans. Even with fundamentals constant, since liquidity depends on beliefs, self-fulfilling prophecies allow prices to be cyclic, chaotic or stochastic. With changing fundamentals – financial innovation – we can account for half of the empirical price boom, suggesting there may well be room for self-fulfilling prophecies. Since liquidity premia are nonmonotone in loan-to-equity ratios, continuing financial innovation generates a price boom and bust. Finally, we study the impact of monetary policy.

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1. Introduction

Housing plays multiple roles: (i) it provides direct utility as a consumer durable; (ii) it yields capital gains or losses as an asset; and (iii) it can facilitate intertemporal transactions when credit markets are imperfect. As regards (iii), in the presence of limited commitment, it can be difficult for consumers to get unsecured loans, and this generates a role for home equity as collateral. The fact that housing is *pledgeable* – i.e., it can be used to secure consumer credit – implies that equilibrium house prices can bear a *liquidity premium*. Thus, one may be willing to pay more for a house than its fundamental value, as precisely defined below, because home ownership conveys security in the event that one needs a loan. Since liquidity depends at least partly on beliefs, even when fundamentals are deterministic and time invariant, this
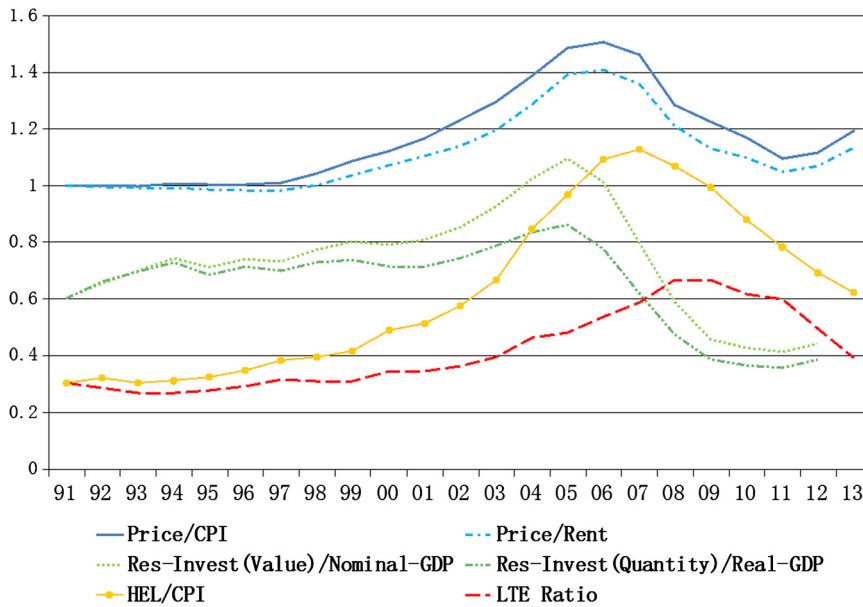
Fig. 1. US housing-market experience, 1991–2012.

suggests that equilibrium house prices might display complicated patterns, including cyclic, chaotic and stochastic paths that emerge as self-fulfilling prophecies.

Our goal is to make these ideas precise and study their implications for the US housing-market experience since the turn of the millennium. A common notion is that there was a *bubble* over this period, that eventually burst, leading to all kinds of problems.[1] It has also been noted that over the period there were important financial developments and regulatory changes. Holmstrom and Tirole (2011) say that "In the runup to the subprime crisis, securitization of mortgages played a major role ... by making nontradable mortgages tradable [and this] led to a dramatic growth in the US volume of mortgages, home equity loans, and mortgage-backed securities in 2000 to 2008." Concerning home-equity loans, in particular, Reinhart and Rogoff (2009) claim financial innovation allowed people to "turn their previously illiquid housing assets into ATM machines," while Ferguson (2008) similarly says they began to "treat their homes as cash machines."

We address this quantitatively below, but want to motivate the general idea up front with some data.[2] Fig. 1 shows house prices divided by the CPI, to correct for the effect of inflation, and divided by a rent index to additionally correct for changes in relative demand for shelter, both normalized to 1 in 1991 (our normalizations are made merely to fit different series in the same chart; the focus should be on the patterns and not units). It is clear from this what people mean by a bubble: a dramatic price increase, in real terms, followed by collapse. To indicate what happened to supply, which helps discipline the quantitative work below, Fig. 1 also shows nominal residential investment over nominal GDP, and a real residential investment index over real GDP. These are flows, not stocks of houses, and differ due to measurement methods, but both move more or less with prices. We also show HEL (home-equity loans) over the CPI, and what we call the LTE (loan-to-equity) ratio. These increase considerably, then fall off, with the increase in HEL due to greater home equity and higher LTE ratios. Higher LTE ratios represent financial innovation: the same loan requires less collateral.

Summarizing the facts, in the late 1990's, house prices, quantities, HEL and LTE ratios all began to increase; then prices and quantities fell, as did HEL and LTE ratios, but the latter fell later and less. Once one takes liquidity into account, is it possible to generate equilibria consistent with this experience? Our idea is that housing has a certain *moneyness*, in that like currency it ameliorates intertemporal frictions, and it is known that some models where liquidity matters can have complicated equilibria. While somewhat like currency, houses are also different, and hence need to be modeled explicitly. On the supply side, houses unlike cash are produced by the private sector. On the demand side, houses unlike cash yield direct utility, which rules out equilibria where the price is 0 or goes to 0. In our model, steady state is unique, and that makes it more challenging to generate interesting dynamics.[3] We also show how houses differ from other assets, and present an extension that incorporates genuine currency as well as banking.

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[1] The notion there was a housing bubble is based on many factors, including the price boom and bust, plus increases in trading volume, real-estate flipping and mortgage default. To maintain focus, we concentrate mainly on prices, home-equity borrowing and construction.

[2] Data sources are in Appendix A. In Section 2 we mention some other facts to help motivate the exercise.

[3] Most monetary models have a steady state where currency is valued and another where it is not, and it is easy to construct equilibria that transit from one to the other. That does not work here because house prices are bounded away from 0.