



# House price dynamics: Fundamentals and expectations



Eleonora Granziera\*, Sharon Kozicki

Bank of Canada, 234 Laurier Ave West, Ottawa, ON, Canada K1A 0G9

## ARTICLE INFO

### Article history:

Received 26 February 2015

Received in revised form

11 August 2015

Accepted 3 September 2015

Available online 10 September 2015

### JEL classification:

E

E3

E6

R21

### Keywords:

House prices

Lucas asset-pricing model

Rational expectations

Near rational expectations

## ABSTRACT

We investigate whether expectations that are not fully rational have the potential to explain the evolution of house prices and the price-to-rent ratio in the United States. First, a stylized asset-pricing model solved under rational expectations is used to derive a fundamental value for house prices and the price-rent ratio. Although the model can explain the sample average of the price-rent ratio, it does not generate the large and persistent fluctuations observed in the data. Then, we consider a rational bubble solution, an extrapolative expectations solution and a near rational bubble solution. In this last solution agents extrapolate the future from the latest realizations and the degree of extrapolation is stronger in good times than in bad times, generating waves of over-optimism. We show that under this solution the model not only is able to match key moments of the data but can also replicate the run up in the U.S. house prices observed over the 2000–2006 period and the subsequent sharp downturn.

© 2015 Elsevier B.V. All rights reserved.

## 1. Introduction

Fluctuations in house prices can have a strong impact on real economic activity. Because housing is typically the most important component of household wealth, changes in house prices affect household wealth and expenditure. Moreover movements in house prices can impact the real side of the economy through their effect on the financial system and household balance sheets: the rapid rise and subsequent collapse in U.S. residential housing prices is widely considered as one of the major determinants of the financial crisis of 2007–2009, which has in turn led to a deep recession and a protracted decline in employment (U.S. Financial Crisis Inquiry Commission, 2011). In light of these considerations it is important to identify the determinants of house prices dynamics.

Large movements in house prices, like the recent U.S. boom and bust episode, are hard to generate in standard macro-economic models with fully-rational expectations. One way to close the gap between the model and the data is to postulate extremely large and persistent shocks to household preferences for housing (Darracq Pariès and Notarpietro, 2008; Iacoviello and Neri, 2010; Justiniano et al., 2015). Besides being hard to motivate, these preference shocks imply a housing service flow, as measured by the imputed rent, that is too volatile compared to the data. Another way to obtain a substantial rise in prices relative to rents consists in assuming time varying risk aversion, for example via financial liberalization, as in Favilukis et al. (2010). Liberalization in housing finance and cyclical shocks endogenously determine the risk premium of the rational agents: episodes of easing lending standards and low mortgage costs decrease risk premia and determine an increase in house prices as well as a

\* Corresponding author. Tel.: +1 6132049270.

E-mail address: [eleonora.granziera@gmail.com](mailto:eleonora.granziera@gmail.com) (E. Granziera).

decrease in expected returns. This last prediction contradicts survey evidence suggesting that investors typically expect higher future returns after a protracted rise in prices (Case et al., 2012; Greenwood and Shleifer, 2014).

Given the shortfalls of these two explanations, in this paper we explore the role of an alternative driver of house price dynamics: expectations. In particular, we evaluate the ability of expectations that depart from full rationality to explain the recent evolution in the price-to-rent ratio and house prices in the United States. We apply, to the housing market, a stylized model in which households own an asset (house) that can be rented out in exchange for an exogenous and stochastic stream of dividends (rents) used for consumption. Houses are treated merely as a financial asset and agents are viewed as real estate investors; from their perspective, rents are analogous in cash flow terms to dividends that stock market investors receive from holding stocks. The choice of such a stylized model is justified by the fact that this framework allows us to clearly isolate the contribution of expectations alone from other mechanisms that could affect the dynamics of house prices.<sup>1</sup> Also, Lucas tree type models or simple present value models have been used extensively in the finance and real estate literature to characterize house price movements.<sup>2</sup>

We explore the ability of four solutions of this model to match the data. All solutions adopt the same stochastic structure of the dividend growth process and the same preferences but they differ in the way agents form their expectations. We view the model solved under rational expectations as the benchmark. As alternatives, we consider a solution that includes a rational bubble component and two solutions that feature extrapolative expectations. These three solutions have been developed for the analysis of the stock market to generate momentum and volatility, characteristics common also to the housing market.

Solving the model under rational expectations and assuming an autoregressive process for the growth rate of rents, we obtain a solution for the price–rent ratio that matches the average over the sample 1987–2011. Motivated by claims both in the media and in academic circles that the recent housing boom might in fact have been a bubble,<sup>3</sup> we relax the assumption of rational expectations and allow for a rational bubble solution of the model as in Froot and Obstfeld (1991).

Then, we abandon the assumption of rational expectations and we explore the implications of alternative expectation formation mechanisms. In particular we follow the approach developed in Lansing (2006, 2010) for the study of the stock market and assume that agents form expectations in an extrapolative fashion so that their conditional expectations of future values are based on past realizations of the variable to forecast. Although agents are not fully rational in forming their expectations, the solutions satisfy the agents' first order condition using subjective expectations in place of rational expectations.

The assumption of extrapolative behavior is supported by numerous microfunded studies: lab experiments showing that observed beliefs are well described by extrapolative or 'trend following' expectations (De Bondt, 1993; Hey, 1994), field data analysis documenting how extrapolation of the most recent price increase can determine asset allocation choices (Benartzi, 2001; Vissing-Jørgensen, 2004) and evidence from survey data suggesting that investor expectations of returns are positively correlated with past stock market returns (Greenwood and Shleifer, 2014). With regard to the housing market, Piazzesi and Schneider (2009) study household beliefs during the recent US housing boom, using data on house price expectations from the Michigan Survey of Consumers, and provide evidence that expectations of future increases in prices strengthen with the increase in prices, consistent with the extrapolative behavior analyzed in this study.

The solutions that assume extrapolative behavior of the agents are able to generate run-ups and sharp declines in house prices. In particular, they suggest a way to understand housing booms based on overoptimism, as they generate overreaction to fundamental rent growth, which is much less volatile than house prices. The extrapolative expectations considered in this paper amplify the volatility of the price–rent ratio and prices as they allow for a unit root in the variable to be forecasted, and the agent's expectations themselves affect the dynamics of the forecast variable, i.e. these solutions are self-referential. Expectations are related to lagged realizations through an extrapolation coefficient which represents the weight agents put on past observations to form their expectations. We consider an extrapolative expectations solution in which the extrapolation parameter is fixed and a near rational bubble solution in which the extrapolation parameter is an increasing function of the actual realization of the rent growth process. The mechanism in the second solution is consistent with the Amromin and Sharpe (2014) finding that household investors expect higher future returns during expansions. Under the near rational bubble solution, the model predicts that house prices should be more sensitive to increases in rents when rents are above their mean.

We compare the predictions from the different solutions of the model along many dimensions, through a long simulation exercise that explores the ability of the solutions to match some moments of the data and through a simulation of model trajectories to check whether the solutions can replicate the path of house prices over the sample. We find that only the near rational bubble solution can simultaneously match the volatility and persistence of the price–rent ratio and account for both the surge and drop in house prices and price–rent ratio observed over the sample.

We emphasize that, although we show that the near rational bubble solution is consistent with some key characteristics of the housing market, we do not claim that the data is *only* consistent with this model. Other factors, alone or in conjunction with non-fully rational expectations, might play a role in determining the evolution of house prices and price–rent series. In particular, many studies identify plausible drivers to the recent house price boom: low real interest rates (Adam et al., 2011), shifting lending standards (Duca et al., 2010; Favalukis et al., 2010; Gelain et al., 2015) and low elasticity of housing

<sup>1</sup> Recent macroeconomic studies are assessing the role of non-fully rational expectations in conjunction with other factors for the dynamics of housing prices. For example, see Adam et al. (2011) for an open economy asset pricing model, Burnside et al. (2015) for a matching model.

<sup>2</sup> See Gelain and Lansing (2014), Han (2013), Hott (2009), Piazzesi et al. (2007), and Poterba (1984).

<sup>3</sup> See for example Burnside et al. (2015), Galí (2014), and Nneji et al. (2013).

Download English Version:

<https://daneshyari.com/en/article/5098214>

Download Persian Version:

<https://daneshyari.com/article/5098214>

[Daneshyari.com](https://daneshyari.com)