

# Discussion of “Investment Dynamics with Natural Expectations”\*

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In “Investment Dynamics with Natural Expectations,” Fuster, Hebert, and Laibson (hereafter, FHL) build a model of investment in which market participants, “tend to make forecasts based on statistical models or mental representations that tend to underestimate the degree of long-run mean reversion in fundamentals.” In other words, people mistake temporary changes in the economy for permanent changes. As the authors explain, the model is an attempt to formalize the “this time is different” and “new era” logic that often characterizes boom and bust cycles in markets. In my discussion, I will try to place this paper in the context of arguably the most destructive recent boom and bust cycle: U.S. residential real estate. I want to make two points. The first is that most theories of the crisis rely like FHL on irrational expectations. The second is that the question of whether rising house prices were a permanent or temporary phenomenon in the 2000s was the subject of some debate among economists. I will conclude with a brief discussion of how this fits with the analysis in FHL.

To illustrate my point that most theories of the crisis rely on irrational expectations, let me start with research by Favilukis, Ludvigson, and Nieuwerburgh (2010), who build a model to formalize the popular intuition that a change in credit availability drove the rapid appreciation of house prices in the period 2002–06. In their model, households face borrowing constraints when they buy homes and then a financial innovation is exogenously introduced which attenuates the borrowing limits leading to rapid house price appreciation and investment in residential real estate. To explain the subsequent

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bust, Favilukis, Ludvigson, and Nieuwerburgh impose a “presumed reversal of financial liberalization” in 2006. The idea that expectations are irrational never appears in the paper and the language of the paper suggests that the boom and bust were rational, but I think that, in many ways, Favilukis, Ludvigson, and Nieuwerburgh (2010) is, in fact, close in spirit to FHL. The reason is that the belief among market participants of the permanence of the financial liberalization underpins the boom in asset prices, an assumption that the authors then assume is wrong because the liberalization is removed after four years. Had the authors modeled the financial liberalization as temporary, which according to their own analysis, they believe it to be, then market participants would have rationally anticipated the subsequent fall in prices, essentially eliminating the boom and bust. In other words, Favilukis, Ludvigson, and Nieuwerburgh (2010) explain the boom and bust with a temporary change in fundamentals which market participants assume is permanent, exactly the mechanism in FHL.

But failures of rational expectations are really endemic in the analysis of the crisis, even for phenomena unrelated to asset pricing. For example, many have argued that the massive losses suffered by investors in mortgage-backed securities in the recent crisis resulted from the fact that the lenders who sold them loans had no incentive to screen the loans because the investors bore all the credit risk. While this appears, on the face of it, to be a simple application of the economics of incentives, failure of rational expectations plays a central role. In a rational expectations equilibrium, investors understand the incentives of the lender and thus realize that the lender has no incentive to screen and form their beliefs accordingly. In equilibrium, one could not attribute any of the investor losses to poor screening. Researchers who push the incentives theory of the crisis have attempted to prove its validity by showing that lenders who held loans screened better, but to explain the crisis, researchers would have to show that investors did not realize that lenders were screening poorly; in other words, they would have to show evidence of irrational expectations.

My colleagues and I have, in our work on the financial crisis, explicitly argued that market participants had irrational expectations. Our view is that the irrationality was not about whether lenders screened loans but rather about the evolution of house prices.

**Table 1. Conditional Forecasts of Mortgage Default and Losses**

Name	Scenario	Probability	Cum. Loss
(1) Aggressive	11% HPA over the life of the pool	15%	1.4%
(2) [No Name]	8% HPA for life	15%	3.2%
(3) Base	HPA slows to 5% by end-2005	50%	5.6%
(4) Pessimistic	0% HPA for the next three years, 5% thereafter	15%	11.1%
(5) Meltdown	-5% for the next three years, 5% thereafter	5%	17.1%

**Source:** Table entitled “HEL Bond Profile Across HPA Scenario” from Lehman Brothers “U.S. ABS Weekly Outlook,” August 15, 2005.

In Gerardi et al. (2008), we asked why so many investors bought mortgage-backed securities that ultimately turned out to be worthless. To do this, we looked at a large sample of analyst reports released and circulated by banks which discussed the pros and cons of investing in subprime asset-backed securities (ABS). What we showed was while investors had fairly accurate beliefs about the performance of the loans conditional on the evolution of house prices, their beliefs about house prices were highly optimistic. Table 1, from a 2005 Lehman Brothers analyst report, shows an illustrative example. The Lehman analysts considered five scenarios for house price appreciation ranging from 11 percent annualized positive returns to 5 percent negative returns. Conditional on the prices, the forecasts of losses on subprime ABS were remarkably accurate. In the “meltdown” scenario, which calls for 5 percent annualized falls in house prices, Lehman analysts forecast 17 percent losses on the deal. Actual losses on those deals, with house prices that fell twice as fast, were around 23 percent. If investors knew these deals could lose so much, why did they invest? The last column of the table shows why: they assigned very small probability to the worst outcomes. Indeed, the analysts assigned only a 5 percent probability to the meltdown scenario, which was considerably *better* than what actually occurred.

The question we turned to next is the obvious question of how market participants formed beliefs about prices. To address this, we first asked the question, what did economic science teach them was the right way to think about prices? And what we found was that economic research gave them no guidance at all. In Gerardi, Foote, and Willen (2010), we showed that there was no consensus among academic economists about whether residential real estate was overvalued, undervalued, or valued exactly right. Some argued that prices were going to crash and others argued that changes in fundamentals including lower long-term interest rates could explain much of the change. But most economists were basically agnostic. As the following quote from Gallin (2006) illustrates, serious scholars tended to qualify most of their predictions and took great pains to explain to their readers the limits of the analysis.

Because a low rent-price ratio has been a harbinger of sluggish price growth since 1970, it seems reasonable to treat the rent-price ratio as a measure of valuation in the housing market. Indeed, one might be tempted to cite the currently low level of the rent-price ratio as a sign that we are in a house price “bubble.” However, several important caveats argue against such a strong conclusion and in favor of future research.

With little guidance from academic researchers, market participants were similarly all over the map. Table 2 shows the titles of a monthly report called “HPA Update” and published by a major bank. It shows that analysts were looking for “stabilization signs” less than a year after house prices started falling nationwide and that even two years after prices had started falling and well after the collapse of the subprime lending market and the panic of the summer of 2007, researchers still believed that prices were about to hit bottom. What is also interesting is that sometime in fall of 2007, there was a major shift of beliefs as analysts recognized the gravity of the crisis, and by 2008, the same analysts who had seen stabilization signs in the fall of 2006 were predicting that house prices had much more to fall.

To be sure, there were pessimists. The most notable was John Paulson, whose now legendary bet against subprime mortgages transformed him from a minor player in the hedge fund industry into a titan. According to Zuckerman (2010, 104–105), Paulson’s

**Table 2. Selected Titles of “HPA Updates” Published by a Major U.S. Bank, 2006–07**

Date Of	Date From	Title
12/8/06	10/06	“More Widespread Declines with Early Stabilization Signs”
1/10/07	11/06	“Continuing Declines with Stronger Stabilization Signs”
2/6/07	12/06	“Tentative Stabilization in HPA”
3/12/07	1/07	“Continued Stabilization in HPA”
9/20/07	7/07	“Near Bottom on HPA”
11/2/07	9/07	“UGLY! Double Digit Declines in August and September”
<b>Note:</b> See Gerardi et al. (2008) for details.		

great insight was not about underwriting or securitization but about house prices:

Paulson . . . concluded that the only way their trades would work was if the U.S. real estate market had reached unsustainable levels and began to fall.

He based this on the following simple calculation:

Housing prices had climbed a puny 1.4 percent annually between 1975 and 2000, after inflation was taken into consideration. But they had soared over 7 percent in the following five years, until 2005. The upshot: U.S. home prices would have to drop by almost 40 percent to return to their historic trend line. (Zuckerman 2010, p. 107)

Whether he could have explained it as such, Paulson was assuming a strong form of mean reversion in prices—namely that there is some underlying stable trend growth in house prices to which they must return. Such strong mean reversion in prices is almost impossible to generate in theory and quite rare in practice, so it is hard to imagine a general equilibrium model in which an investor could hold Paulson’s, beliefs yet he apparently did.

To me, understanding the evolutions of beliefs is central to making sense of macroeconomic phenomena. As I argued above, I think

most economists agree with me, whether they realize it or not. As I see it, that implies two logical directions for research. The first is to study belief formation. This is, in a sense, challenging for economists because it means that we must abandon our behaviorist focus on what people *do* and also consider what they think and say. But the second direction is to continue to explore the implications of different sets of beliefs or belief formation mechanisms on equilibrium. In FHL, the authors argue that a simple issue in belief formation—the number of lags used in forecasting a variable—can have profound effects on the evolution of aggregate quantities in equilibrium. I look forward to more insights of this sort.

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