

# Discussion of "An Extrapolative Model of House Price Dynamics"

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# Summary

- continuous time model with risk-neutral agents
- fixed supply of houses
- 1 house - 1 agent, exogenous moving shocks
- buyer  $i$  at time  $t$  needs to forecast future dividends & resale value

$$\text{observe dividend } D_t^i = D_t + a^i, \quad a^i \sim \text{iid } N(0, \sigma_a^2)$$

$$\begin{aligned} \text{do not observe common component } \quad dD_t &= g_t dt + \sigma_D dW_t^D \\ dg_t &= -\gamma g_t dt + \sigma_g dW_t^g \end{aligned}$$

- signals (from comparables)

$$D_t^s = D_t + s_t, \quad s_t \sim \text{iid } N(0, \sigma_s^2)$$

- equilibrium prices are linear in average  $D_t^i$  among time  $t$  buyers, perceived common component & its growth

## Summary ctd.

- two assumptions on how buyers interpret past prices:  
rational or naive learning
- both cases generate short run momentum,  
long-term reversal (predictability), excess volatility
- naive learning model is important to match empirical moments on  
house prices

## Comments

- well done, rigorous treatment of housing as cons good & asset
- endogenous beliefs = nice!
- survey evidence on house price expectations
- small vs large errors
- few vs many irrational investors
- cross sectional implications

# Endogenous beliefs

- nice!
- intuitive mechanism: iid dividends
- with perfect information: prices = PV of expected future dividends  
returns are iid, prices are not more volatile than fundamentals
- with Bayesian learning about the mean: prices = posterior means  
after high initial dividend realizations, posterior mean  $>$  true mean  
current high prices are followed by lower future prices

econometrician finds predictability, high volatility

- prevent learning from settling down:

(log) dividends are random walk with stochastic growth  
Lewellen & Shanken 2002, JF

## Michigan survey (all households)

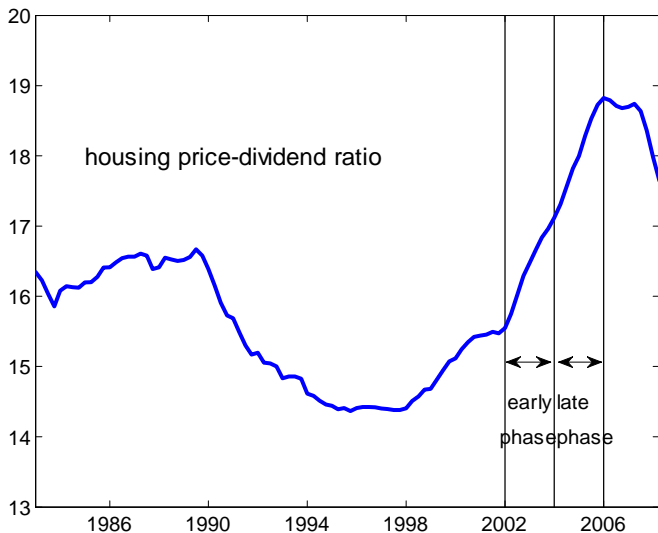
Q: "*Generally speaking, do you think now is a good time or a bad time to buy a house?*"

A: "good", "pro-con", "bad, "don't know"

Q: "*Why do you say so?*"

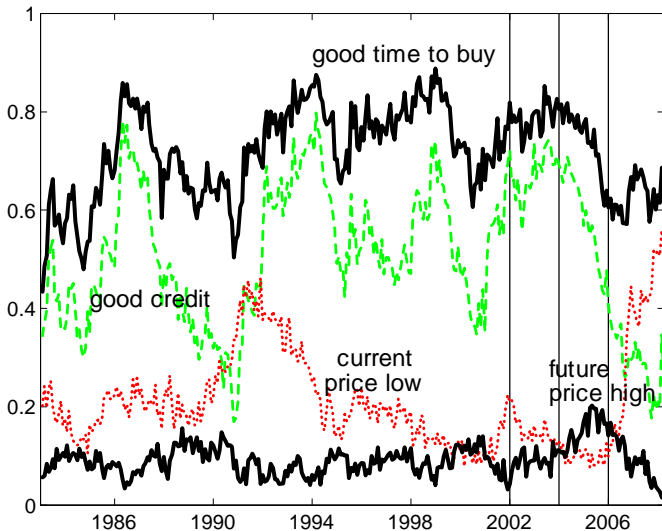
A: respondents give up to two reasons, group these.

# Michigan survey (all households) ctd



Piazzesi & Schneider 2009, Figure 1

# Michigan survey (all households) ctd



Piazzesi & Schneider 2009, Figure 2

## Michigan survey (all households) ctd

Early phase (2002 & 2003): enthusiasm about housing & credit

85% most say "*good time to buy a house*"

peaks earlier than house prices, enthusiasm not particularly high

why? 73% say "*good credit*"

which is always main reason for overall view of housing

Late phase (2004 & 2005): disagreement & momentum

fewer say "good time to buy a house", 60% in 2006

20% say "*house prices are going up*"

peaks with house prices, momentum at an all time high



# Case-Shiller surveys of homebuyers in 1988, 2003

**Table 9. Survey Responses on Price Expectations, Sense of Excitement, and Talk, 1988 and 2003**

Percent of responses except where stated otherwise

Question	Los Angeles		San Francisco		Boston		Milwaukee	
	1988	2003	1988	2003	1988	2003	1988	2003
	Do you think that housing prices in the [city] area will increase or decrease over the next several years?							
Increase	98.3	89.7	99.0	90.5	90.2	83.1	87.1	95.2
Decrease	1.7	10.3	1.0	9.5	9.8	16.9	12.9	4.8
No. of responses	240	145	199	158	194	201	233	187
How much of a change do you expect there to be in the value of your home over the next 12 months?								
Mean response (percent)	15.3	10.5	13.5	9.8	7.4	7.2	6.1	8.9
Standard error	0.8	0.6	0.6	0.6	0.6	0.4	0.5	1.0
No. of responses	217	139	185	147	176	179	217	160
On average over the next 10 years, how much do you expect the value of your property to change each year?								
Mean response (percent)	14.3	13.1	14.8	15.7	8.7	14.6	7.3	11.7
Standard error	1.2	1.2	1.4	1.8	0.6	1.8	0.5	1.3
No. of responses	208	137	181	152	177	186	211	169

## small versus large errors

- paper argues small, page 39: "[naive] homebuyers make a small error in filtering information out of past prices"
- initial dividends = \$10,000, expected growth rate is zero
- std price changes in data = \$16,000 in Table 4
- small? std dev of forecast error = \$22,000 in Table 6
- why care whether error is small or large?

survey evidence suggests huge errors

## many versus few

- paper argues many, page 4: "It seems incorrect to view housing markets in 2004-2006 as being dominated by a small number of highly irrational investors. Millions of Americans bought homes during that time period."
- housing markets have low turnover  
less than 10% of houses transact per year  
(for example, more than 100% of stocks transact per year)
- in the model, a small subset of all agents (= buyers) is marginal.  
1,130 buyers per period, 100,000 population
- Euler equations of marginal investors determine equilibrium prices

⇒ model is consistent with few irrational investors

## cross sectional implications

- 2000-2006 boom-bust episode in low quality homes:  
higher capital gains/losses on homes that were cheap in 2000  
Landvoigt, Piazzesi & Schneider 2015 AER
- learning in different segments: observe signals/comparables in segment

$$D_t^s = D_t + s_t, \quad s_t \sim \text{iid } N(0, \sigma_s^2)$$

- suppose low quality homes more standardized than high quality homes  
more precise signals/comparables, less volatility in low quality homes.
- more generally, cross sectional implications are interesting:  
segments can differ in many ways (e.g., sets of comparables, number of homes overall), also over time

## summary of comments

- endogenous beliefs
  - nice feature, generates momentum, predictability & volatility
- survey evidence on house price expectations
  - in the hot phase of the boom (2004 & 2005), fraction of momentum households doubled (10% → 20% of all households, all time high)
  - homebuyer surveys find exuberant expectations
- small vs large errors, few vs many irrational investors
  - model is consistent with few buyers who make large errors
- cross sectional implications – interesting avenue!