Understanding BER’s “Understanding Booms and Busts in Housing Market”

Franck Portier
Toulouse School of Economics

Rome Conference
"The Future of Monetary Policy”,

September 2010
1. For Kids

Hard to generate observed protracted booms and busts in house prices. Assume that the proportion of optimistic agents in the economy moves up and down in a protracted way. This is done in a very innovative and clean way by mixing some social interactions that endogenize beliefs with matching model of the housing market.

I have a set of comments.
1. For Kids

- Hard to generate observed *protracted* booms and busts in house prices.
1. For Kids

- Hard to generate observed protracted booms and busts in house prices.

- Assume that the proportion of “optimistic agents” in the economy moves up and down in a protracted way \( \rightsquigarrow \) protracted boom-bust dynamics.
1. For Kids

- Hard to generate observed protracted booms and busts in house prices.

- Assume that the proportion of “optimistic agents” in the economy moves up and down in a protracted way \( \rightsquigarrow \) protracted boom-bust dynamics.

- This is done in a very innovative and clean way by mixing some social interactions that endogenize believes with matching model of the housing market.
1. For Kids

- Hard to generate observed protracted booms and busts in house prices.

- Assume that the proportion of “optimistic agents” in the economy moves up and down in a protracted way $\Rightarrow$ protracted boom-bust dynamics.

- This is done in a very innovative and clean way by mixing some social interactions that endogenize believes with matching model of the housing market.

- I have a set of comments.
2. Where Does the Volatility of Housing Prices Come From?

A housing price is an asset price:

\[ P_t = E^{t+\delta} X_j = 0: \]

- \( S_t \): value of house services ("fundamentals")
- \( R(t; t+\delta) \): discount factor between \( t \) and \( t+\delta \)
- \( t \): information set of period \( t \)

These three objects fluctuate to explain fluctuations in \( P_t \).

BER aim at explaining fluctuations in \( P_t \) without changes in \( S_t \) or \( R(t; t+\delta) \).
2. Where Does the Volatility of Housing Prices Come From?

- A House price is an asset price:

\[ P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t, t+j)}. \]
2. Where Does the Volatility of Housing Prices Come From?

- A House price is an asset price:

\[ P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t, t+j)}. \]

\( S_t \): value of house services ("fundamentals"),
2. Where Does the Volatility of Housing Prices Come From?

- A House price is an asset price:
  \[
  P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t, t+j)}.
  \]

  \(S_t\): value of house services ("fundamentals"),

  \(R(t, t+j)\): discount factor between \(t\) and \(t+j\),
2. Where Does the Volatility of Housing Prices Come From?

- A House price is an asset price:

\[ P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t, t+j)}. \]

\( S_t \): value of house services ("fundamentals"),

\( R(t, t+j) \): discount factor between \( t \) and \( t+j \),

\( \Omega_t \): information set of period \( t \).
2. Where Does the Volatility of Housing Prices Come From?

- A House price is an asset price:

\[ P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t, t+j)}. \]

- \( S_t \): value of house services (“fundamentals”),

- \( R(t, t+j) \): discount factor between \( t \) and \( t+j \),

- \( \Omega_t \): information set of period \( t \).

- Those three objects fluctuate to explain fluctuations in \( P_t \).
2. Where Does the Volatility of Housing Prices Come From?

- A House price is an asset price:

\[ P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t, t+j)}. \]

- Those three objects fluctuate to explain fluctuations in \( P_t \).

- BER explain boom-bust fluctuations in \( P_t \) without changes in \( S \) nor \( R \).
2.1. Fluctuations in $S_t$

$$P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}.$$

Obviously, if one assumes (say) predictable protracted fluctuations for $S_t$, we'll have protracted boom-bust cycles for $P_t$.

BER: for many episodes it is difficult to find observable fundamentals that are correlated with home price movements.

What about other shocks that impact $S_t$?
2.1. Fluctuations in $S_t$ 

$$P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}.$$ 

- Obviously, if one assumes (say) predictable protracted fluctuations for $S_t$, we’ll have protracted boom-bust cycles for $P_t$. 

BER: for many episodes it is difficult to find observable fundamentals that are correlated with home price movements.” 

Well, $S_t$ is (really) not an exogenous object (contrarily to a firm dividend), so that it is unlikely to find any observable (of the type of a TFP-like non embodied increase in houses “comfort”). 

What about other shocks that impact $S_t$?
2.1. Fluctuations in $S_t$ \[ P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}. \]

- Obviously, if one assumes (say) predictable protracted fluctuations for $S_t$, we’ll have protracted boom-bust cycles for $P_t$.

- BER: “for many episodes it is difficult to find observable fundamentals that are correlated with home price movements.”
2.1. Fluctuations in $S_t$

$$P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}.$$

- Obviously, if one assumes (say) predictable protracted fluctuations for $S_t$, we’ll have protracted boom-bust cycles for $P_t$.

- BER: “for many episodes it is difficult to find observable fundamentals that are correlated with home price movements.”

- Well, $S_t$ is (really) not an exogenous object (contrarily to a firm dividend), so that it is unlikely to find any observable (of the type of a TFP-like non embodied increase in houses “comfort”).
2.1. Fluctuations in $S_t$

$$P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}.$$ 

- Obviously, if one assumes (say) predictable protracted fluctuations for $S_t$, we’ll have protracted boom-bust cycles for $P_t$.

- BER: “for many episodes it is difficult to find observable fundamentals that are correlated with home price movements.”

- Well, $S_t$ is (really) not an exogenous object (contrarily to a firm dividend), so that it is unlikely to find any observable (of the type of a TFP-like non embodied increase in houses “comfort”).

- What about other shocks that impact $S_t$?
Think of model in which

\[ U = U(c_t, s_t), \]

and budget constraint is

\[ c_t + w_t s_t = y_t \]
Think of model in which

\[ U = U(c_t, s_t), \]

and budget constraint is

\[ c_t + w_t s_t = y_t \]

c_t: consumption, s_t: house services, w_t: price of house services, y_t: income;
Think of model in which

\[ U = U(c_t, s_t), \]

and budget constraint is

\[ c_t + w_t s_t = y_t \]

c\(_t\) : consumption, s\(_t\) : house services, w\(_t\) : price of house services, y\(_t\) : income;

Solve for optimal behavior:

\[ S(w_t, Y_t) = \frac{U'_s}{U'_c} s_t^* \]
• Think of model in which

\[ U = U(c_t, s_t), \]

and budget constraint is

\[ c_t + w_t s_t = y_t \]

\( c_t \): consumption, \( s_t \): house services, \( w_t \): price of house services, \( y_t \): income;

• Solve for optimal behavior:

\[ S(w_t, Y_t) = \frac{U_s^t}{U_c^t} s_t^* \]

• Therefore

\[ P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S(w_{t+j}, Y_{t+j})}{R(t, t+j)}, \]

any protracted fluctuation in \( Y \) will create protracted fluctuations in \( P \).
• Let’s take two real examples:
Index of House Price

Finland

[Graph showing the index of house price in Finland over the years 70 to 10, with a peak in the 90s and a steady rise towards the 10s.]
Index of House Price

Finland
Index of House Price

France

The graph shows the index of house price in France over time. The data starts around 1970 and spans to 2010. The graph indicates a general upward trend with some fluctuations. The year 1990 is highlighted with a blue oval, possibly indicating a significant event or data point in that year.
2.2. Fluctuations in $R_t$

$$P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}.$$
2.2. Fluctuations in $R_t$

$$P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}.$$ 

- How much can be explained by fluctuations in the interest rate?
2.2. Fluctuations in $R_t$

$$P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}.$$

- How much can be explained by fluctuations in the interest rate?
- Different asset prices are pretty much correlated (Stocks, Houses, Art).
2.2. Fluctuations in $R_t$

\[ P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}. \]

- How much can be explained by fluctuations in the interest rate?

- Different asset prices are pretty much correlated (Stocks, Houses, Art).

- This could indicate that it is a non negligible source of fluctuations in $P$. 
2.2. Fluctuations in $R_t$

$$P_t = E \Omega_t \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}.$$

- How much can be explained by fluctuations in the interest rate?
- Different asset prices are pretty much correlated (Stocks, Houses, Art).
- This could indicate that it is a non negligible source of fluctuations in $P$.
- Harder to explain protracted booms and busts in $P_t$. 
2.3. Fluctuations in $\Omega_t$

$$P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}.$$
2.3. Fluctuations in $\Omega_t$

$$P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t, t+j)}.$$  

- Last piece of explanation is in “fluctuations of expectations”
2.3. Fluctuations in $\Omega_t$ \[ P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t, t+j)}. \]

- Last piece of explanation is in “fluctuations of expectations”
- Finding observable is clearly an issue.
2.3. Fluctuations in $\Omega_t$

\[ P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}. \]

- Last piece of explanation is in “fluctuations of expectations”

- Finding observable is clearly an issue.

- Shocks could be news, learning, revisions, surprises, etc...
2.3. Fluctuations in $Ω_t$

$$P_t = E_{Ω_t} \sum_{j=0}^{∞} \frac{S_{t+j}}{R(t,t+j)}.$$ 

- Last piece of explanation is in “fluctuations of expectations”

- Finding observable is clearly an issue.

- Shocks could be news, learning, revisions, surprises, etc...

- It is hard to generate protracted movements in $P$ with rational expectations (surprises/revisions/news are not serially correlated)
2.3. Fluctuations in $\Omega_t$ 

\[ P_t = E_{\Omega_t} \sum_{j=0}^{\infty} \frac{S_{t+j}}{R(t,t+j)}. \]

- Last piece of explanation is in “fluctuations of expectations”

- Finding observable is clearly an issue.

- Shocks could be news, learning, revisions, surprises, etc...

- It is hard to generate protracted movements in $P$ with rational expectations (surprises/revisions/news are not serially correlated)

- BER has chosen another route: agents have different priors, do not learn but “convince” each others
2.4. Bottom Line

It would be nice to know how much is left to be explained by changes in expectations once changes in $R$ and $S$ are accounted for. Not an obvious question as those different explanations need not to be orthogonal.
2.4. Bottom Line

- It would be nice to know how much is left to be explained by “changes in expectations” once changes in $R$ and $S$ are accounted for.
2.4. Bottom Line

- It would be nice to know how much is left to be explained by “changes in expectations” once changes in $R$ and $S$ are accounted for.

- Not an obvious question as those different explanations need not to be orthogonal.
3. Boom-Bust cycles or Bust-Booms?
3. Boom-Bust cycles or Bust-Booms?

- The model assumes that infected are more optimistic than the others.
3. Boom-Bust cycles or Bust-Booms?

- The model assumes that infected are more optimistic than the others.
- As their proportion goes up and down, prices go up and down.
A Boom–Bust Cycle
Assume now that infected are less optimistic than the others.
• Assume now that infected are less optimistic than the others.

• As their proportion goes up and down, prices go down and up.
A Bust–Boom Cycle

House price

Years

0 5 10 15 20 25

1650
1700
1750
1800
1850
1900

Years

0 5 10 15 20 25

1650
1700
1750
1800
1850
1900

1900
4. Two More Comments
4. Two More Comments

4.1 Make social interactions and trade meetings interrelated
4. Two More Comments

4.2. Aggregation
4. Two More Comments

4.2. Aggregation

- The housing price index is an aggregate object.
4. Two More Comments

4.2. Aggregation

- The housing price index is an aggregate object.
- It is smooth mainly by aggregation.
4. Two More Comments

4.2. Aggregation

- The housing price index is an aggregate object.
- It is smooth mainly by aggregation
- It is not such a big problem if the model is delivering jumpy price path (after the shock is realized), as it can be smoothed by aggregation.
4. Two More Comments

4.2. Aggregation

- The housing price index is an aggregate object.
- It is smooth mainly by aggregation.
- It is not such a big problem if the model is delivering jumpy price path (after the shock is realized), as it can be smoothed by aggregation.
- One might think that fluctuations are partially granular.
4. Two More Comments

4.2. Aggregation

- The housing price index is an aggregate object.

- It is smooth mainly by aggregation

- It is not such a big problem if the model is delivering jumpy price path (after the shock is realized), as it can be smoothed by aggregation.

- One might think that fluctuations are partially granular.

- The 1990 (?) Los Angeles riots are likely to have caused a decrease of housing prices in LA (in California?).
4. Two More Comments

4.2. Aggregation

- The housing price index is an aggregate object.
- It is smooth mainly by aggregation
- It is not such a big problem if the model is delivering jumpy price path (after the shock is realized), as it can be smoothed by aggregation.
- One might think that fluctuations are partially granular.
- The 1990 (?) Los Angeles riots are likely to have caused a decrease of housing prices in LA (in California?).
- Such a local shock might not be washed out by aggregation.
4. Two More Comments

4.2. Aggregation

- The housing price index is an aggregate object.

- It is smooth mainly by aggregation

- It is not such a big problem if the model is delivering jumpy price path (after the shock is realized), as it can be smoothed by aggregation.

- One might think that fluctuations are partially granular.

- The 1990 (?) Los Angeles riots are likely to have caused a decrease of housing prices in LA (in California?).

- Such a local shock might not be washed out by aggregation

- It would be nice to make a variance decomposition of housing price into a local and a national component.