Consumption Dynamics, Housing Collateral and Stabilisation Policies

NIESR/RICS/CaCHE Conference
"The Broken Housing Market"

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NIESR

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Overview

- We explore the link between house prices, borrower consumption, LTVs and the lending rate.
- House prices are a function of credit constraints and affects consumption of borrowers (Muellbauer and Murphy 1997; Cameron et al. 2006).
- We match key facts on the house price-consumption relationship.
- Borrower lending cycle has spillovers for savers over time.
- Lending based on the value of the collateral accelerates borrowing and tends to exacerbate consumption volatility.
The Bank Problem

\[ R^L_t, D \]

\[ efp_t \]

Consumption Borrowers

Saving Lenders

\[ R^L \]

\[ R^D \]

\[ C^{efp} \]

\[ C^* \]

Consumption and Savings

Chadha Corrado Corrado (NIESR)
Noisy Collateral: MPI as a function of collateral?
Chart 1
Real house prices\(^{(a)}\) and consumer spending

Percentage change on a year earlier

Real house prices (left-hand scale)

Consumer spending (right-hand scale)

Sources: Nationwide and ONS.

\(^{(a)}\) Nationwide house price index deflated by the consumer expenditure deflator.
### Real House Prices and Total Consumption (BHPS-UK)

<table>
<thead>
<tr>
<th></th>
<th>Borrower</th>
<th>Saver</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.lnConsumption</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D.lnHousePrice</td>
<td>0.148**</td>
<td>-0.154</td>
<td>0.054</td>
</tr>
<tr>
<td>D.lnIncome</td>
<td>0.130**</td>
<td>0.002</td>
<td>0.104**</td>
</tr>
<tr>
<td>Other Controls</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year,Region dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>23457</td>
<td>5664</td>
<td>28020</td>
</tr>
<tr>
<td>Hansen Test</td>
<td>21.93 (0.145)</td>
<td>14.24 (0.581)</td>
<td>26.17 (0.052)</td>
</tr>
</tbody>
</table>

Notes: Standard errors in parentheses. Other controls include gender, race, self-employment, age, marital status, number of children. PANEL IV-GMM (D.lnIncome and D.lnHousePrice instrumented with lags 2 to 12). Years: 1997-2008.
Model Structure

- **Central Bank**
  - Policy Rate

- **Banks**
  - Loan-to-Value
  - Deposits
  - Deposit Rate
  - Loans and Lending Rate

- **Borrower Households**
  - Wages
  - Consumption, Labour

- **Firms**
  - Profits
  - Consumption

- **Savers Households**
  - Fixed Housing Supply
  - Housing Demand and House Price

- **Fiscal Policy**
  - Housing tax
  - Income tax

**Macro Prudential**
Optimal Decisions: Households and Banks

Saver and Borrower Household Consumption and Borrower’s demand for loans:

\[
c_s^t = F \left( R^D_t, \mathbb{E}_t c^s_{t+1} \right)
\]

\[
c^b_t = F \left( R^L_t, \mathbb{E}_t c^b_{t+1}, \nu_t \right) \quad l_t \leq \kappa_t \frac{H_t}{R^L_t} \frac{\mathbb{E}_t q_{t+1}}{\nu_t \kappa_t}
\]

House Price: function of LTV \((\kappa_t)\) and binding loan demand \((\nu_t > 0)\).

\[
qu_t = F \left( \nu_t \kappa_t \frac{\mathbb{E}_t q_{t+1}}{R^L_t} + H_t, c^b_t, \mathbb{E}_t c^b_{t+1} \right) + \text{if constraint binds}
\]

Bank Lending Rate \((\lambda \text{ is the failure rate priced into loans})\):

\[
efp_t = \frac{R^L_t}{R^M_t} = F \left( \lambda \frac{l_t}{k_t q_t H_t} \right)
\]
House Price and Borrowing

\[ \mathbb{E}_t q_{t+1} \uparrow \rightarrow \begin{cases} l_t^D \uparrow \rightarrow R_t^L \uparrow \\ q_t \uparrow \rightarrow l_t^S \uparrow \rightarrow R_t^L \downarrow \downarrow \end{cases} \rightarrow R_t^L \downarrow \text{ Accelerator Effect} \]
Stabilisation Policies

- **Monetary Policy:**
  \[ R_t^M = \rho R_{t-1}^M + (1 - \rho) \left( \phi_\pi \pi_t + \phi_y Y_t \right) + \zeta_{m,t} \]

- **Government Budget:**
  \[ b_t = \frac{R_{t-1}^B b_{t-1}}{\pi_t} + (g_t - \text{tax}_t) + \zeta_{b,t} \]

- **Optimal Fiscal Policy:** government spending \( g_t \) and \( \text{tax}_t \):
  \[ g_t = -f_y Y_t + f_T \text{tax}_t + \zeta_{g,t} \]

  \[ \text{tax}_t \equiv \tau_h q_t H^b_t + \tau_y Y_t \]

- **Optimal Macro-Prudential:**
  \[ \kappa_t = -f_k (l_t - l_{t-1}) + \zeta_{k,t} \]
Model Moments: Benchmark Model

C : aggregate consumption

<table>
<thead>
<tr>
<th></th>
<th>Moments w.r.t. Y</th>
<th></th>
<th>Moments w.r.t. q</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Rel stdev (Y)</td>
<td>Corr (Y)</td>
<td>Rel stdev (q)</td>
</tr>
<tr>
<td>C</td>
<td>1.13</td>
<td>0.96</td>
<td>0.28</td>
</tr>
<tr>
<td>C_s</td>
<td>2.49</td>
<td>-0.13</td>
<td>0.72</td>
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<tr>
<td>C_b</td>
<td>2.85</td>
<td>0.77</td>
<td>0.63</td>
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<tr>
<td>L</td>
<td>5.52</td>
<td>0.36</td>
<td>1.39</td>
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<tr>
<td>R^L</td>
<td>0.28</td>
<td>0.35</td>
<td>0.07</td>
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<tr>
<td>efp</td>
<td>0.34</td>
<td>0.27</td>
<td>0.08</td>
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<tr>
<td>q</td>
<td>3.95</td>
<td>0.40</td>
<td>1</td>
</tr>
<tr>
<td>\pi</td>
<td>1.11</td>
<td>0.81</td>
<td>0.28</td>
</tr>
</tbody>
</table>

- Note procyclical EFP. High volatility of households consumption c.f. aggregate.
Welfare Criterion and Optimal Policy

\[ [f_y, f_t, \tau_h, \tau_y, f_k] = \arg \max \text{Welfare} \]

<table>
<thead>
<tr>
<th>Table 5. Optimal Policy Parameters</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>Government Spending</td>
</tr>
<tr>
<td>( f_y )</td>
</tr>
<tr>
<td>Fiscal Policy</td>
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<tr>
<td>Coordinated MPI</td>
</tr>
</tbody>
</table>
Utility Borrower and Saver and MPI

Corr_{MPI} (q, C^b) = 0.39 \downarrow, \text{Corr} (q, C^s) = -0.29 \uparrow.

\[ \kappa_t = -f_k (l_t - l_{t-1}) + \zeta_k,t \]
Main Results

- Splitting consumption into saver and borrower households - illustrates consumption cycles.
- Borrowers use noisy collateral to fund consumption plans in response to shocks.
- Savers follow standard Euler equations but also face spillovers as they fund borrower demand.
- With MPI there are welfare gains for borrowers as house prices are less correlated with consumption.

