# Consumption Dynamics, Housing Collateral and Stabilisation Policies

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

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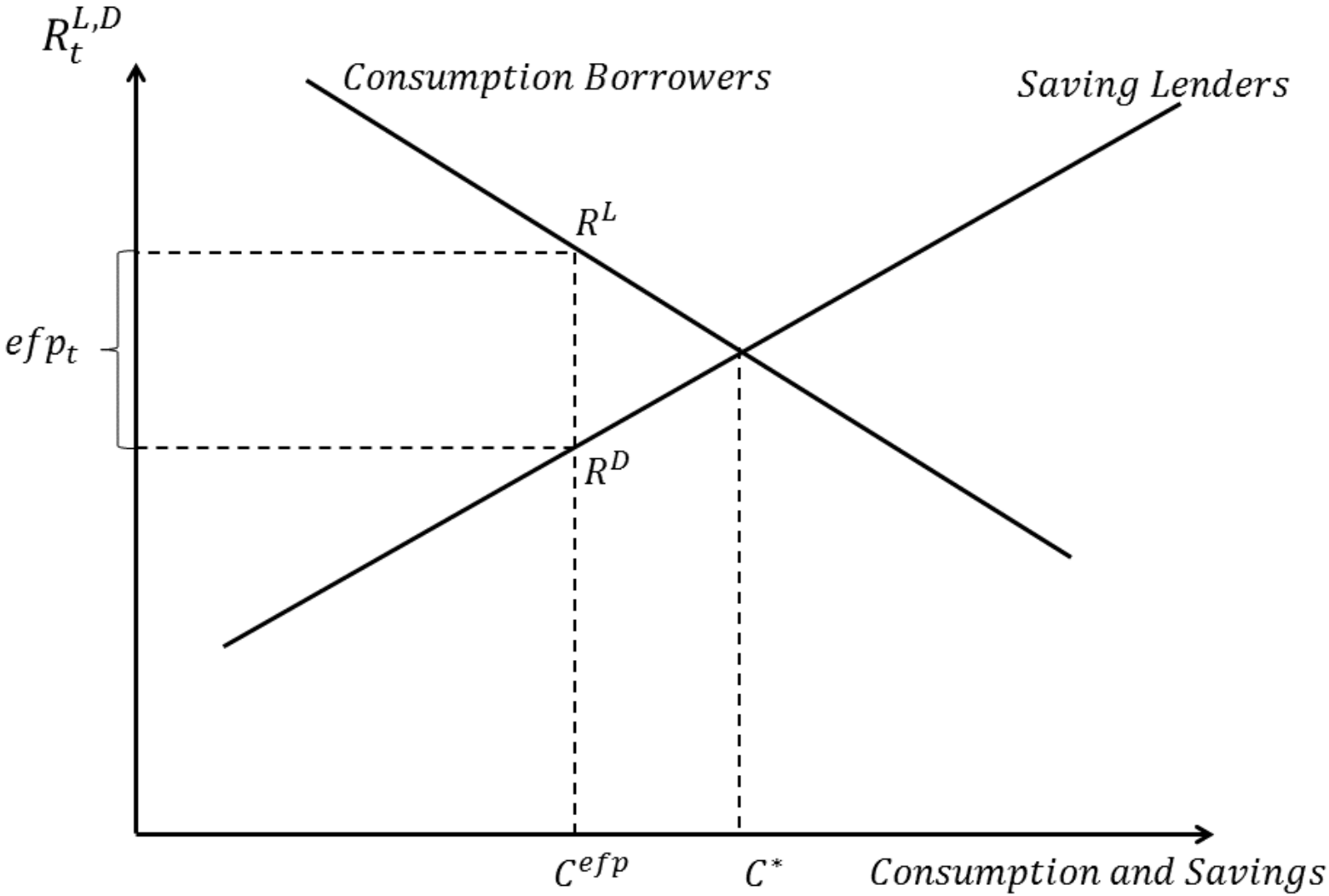
1 June 2018

# Overview

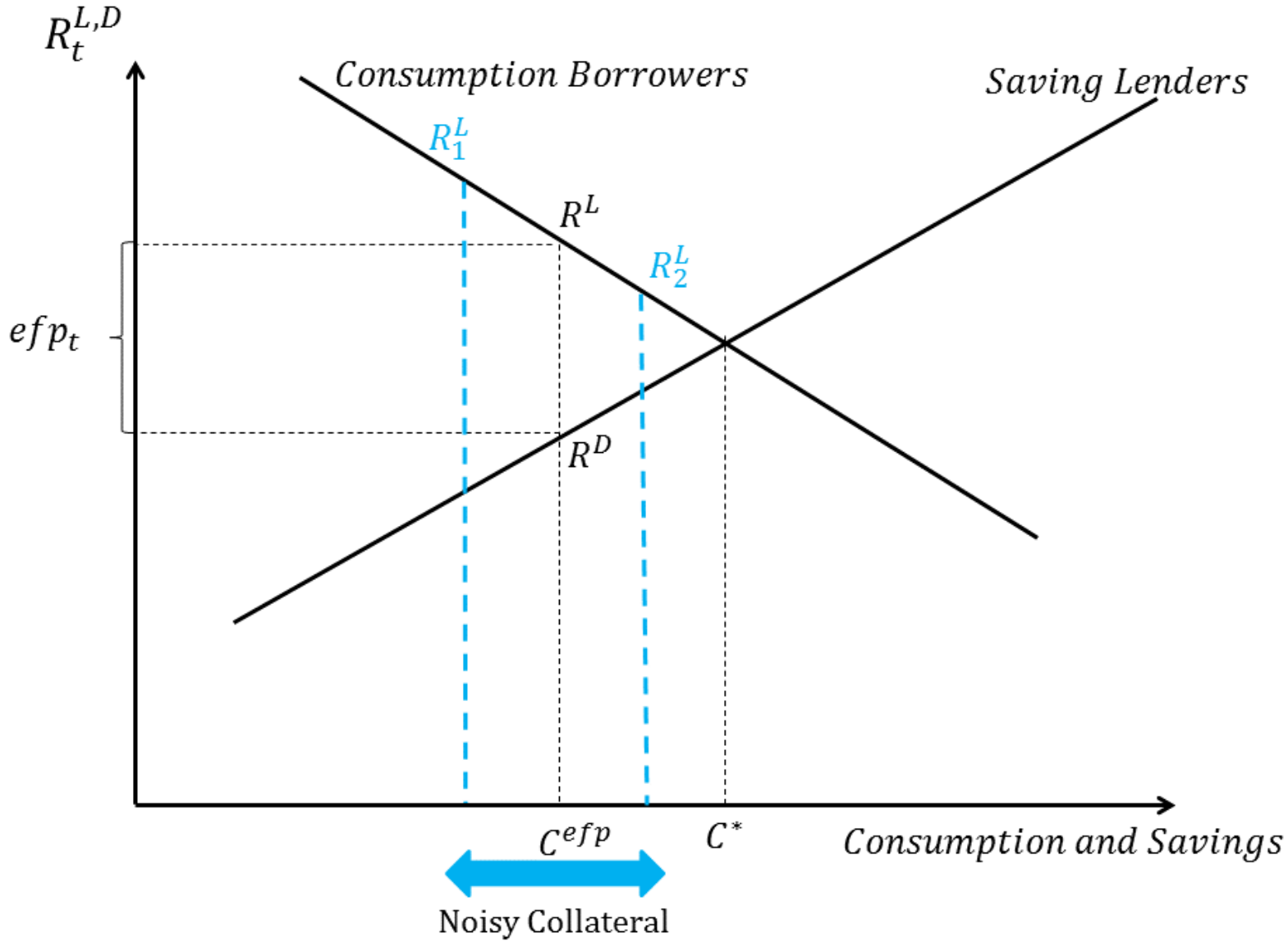
- We explore the link between house prices, borrower consumption, LTVs and the lending rate.
- House prices are a function of credit constraints and affects consumption of borrowers (Muellbauer and Murphy 1997; Cameron et al. 2006).
- We match key facts on the house price-consumption relationship.
- 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

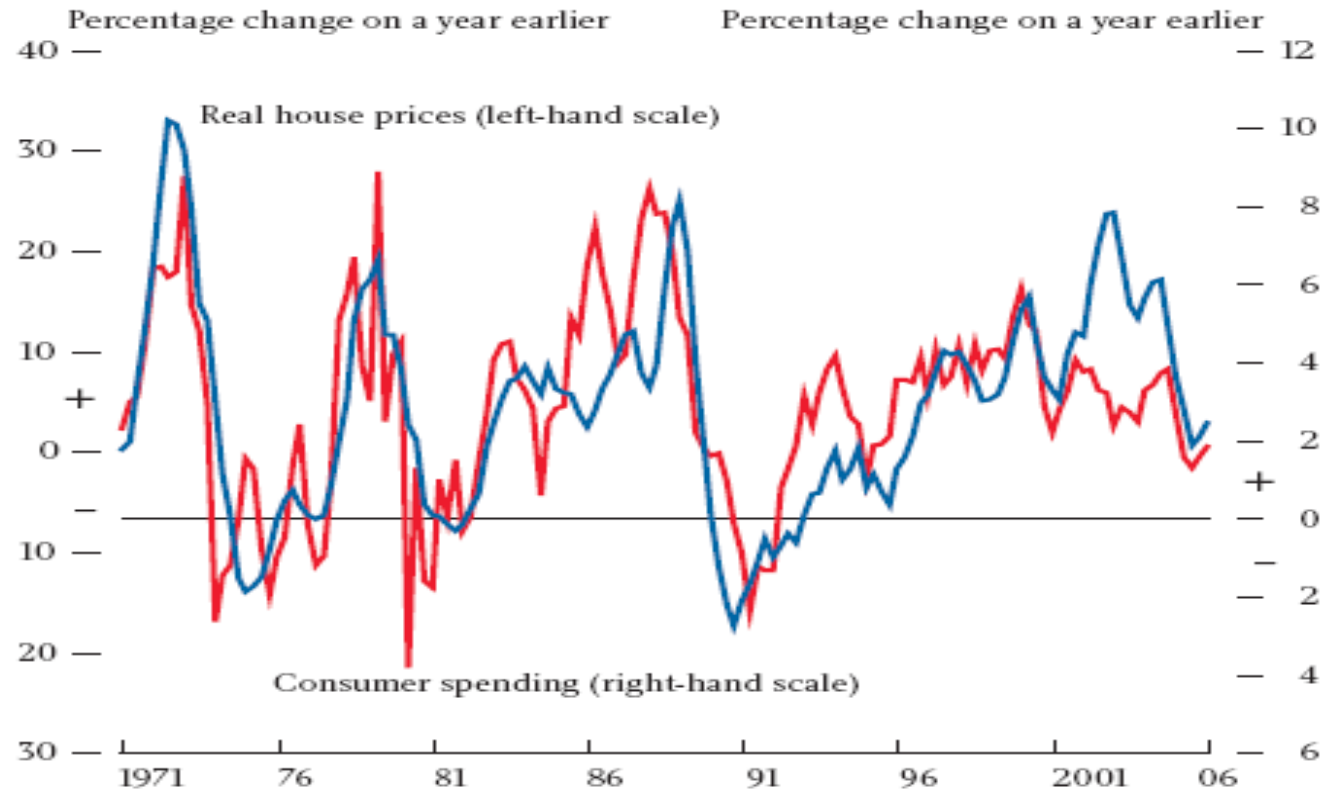


# Noisy Collateral: MPI as a function of collateral?



# Real House Prices and Consumption (BoE-UK)

**Chart 1**
**Real house prices(a) and consumer spending**




Sources: Nationwide and ONS.

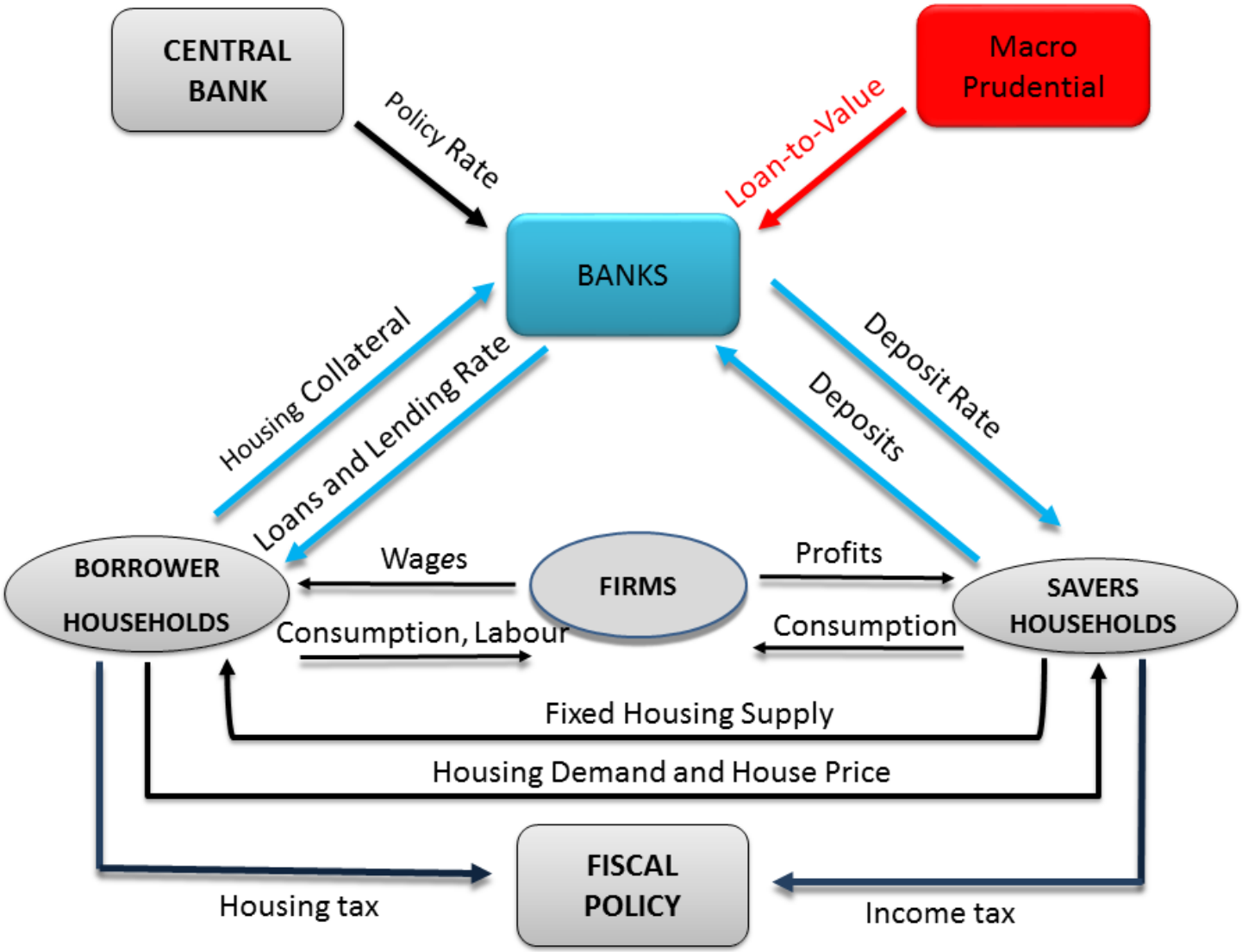
(a) Nationwide house price index deflated by the consumer expenditure deflator.

# Real House Prices and Total Consumption (BHPS-UK)

| D.lnConsumption | Borrower | Saver | All |
|---|---|---|---|
| D.lnHousePrice | 0.148** (0.07) | -0.154 (0.17) | 0.054 (0.08) |
| D. ln Income | 0.130** (0.06) | 0.002 (0.02) | 0.104** (0.05) |
| Other Controls | Yes | Yes | Yes |
| Year,Region dummies | Yes | Yes | Yes |
| N | 23457 | 5664 | 28020 |
| Hansen Test | 21.93 (0.145) | 14.24 (0.581) | 26.17 (0.052) |

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



# Optimal Decisions: Households and Banks

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

$$c_t^s = F\left(\underset{-}{R_t^D},\ \underset{+}{\mathbb{E}_t c_{t+1}^s}\right)$$

$$c_t^b = F\left(\underset{-}{R_t^L},\ \underset{+}{\mathbb{E}_t c_{t+1}^b},\ \underset{-}{\nu_t}\right) \quad l_t \leq \kappa_t \frac{H_t\ \mathbb{E}_t q_{t+1}}{R_t^L}$$

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

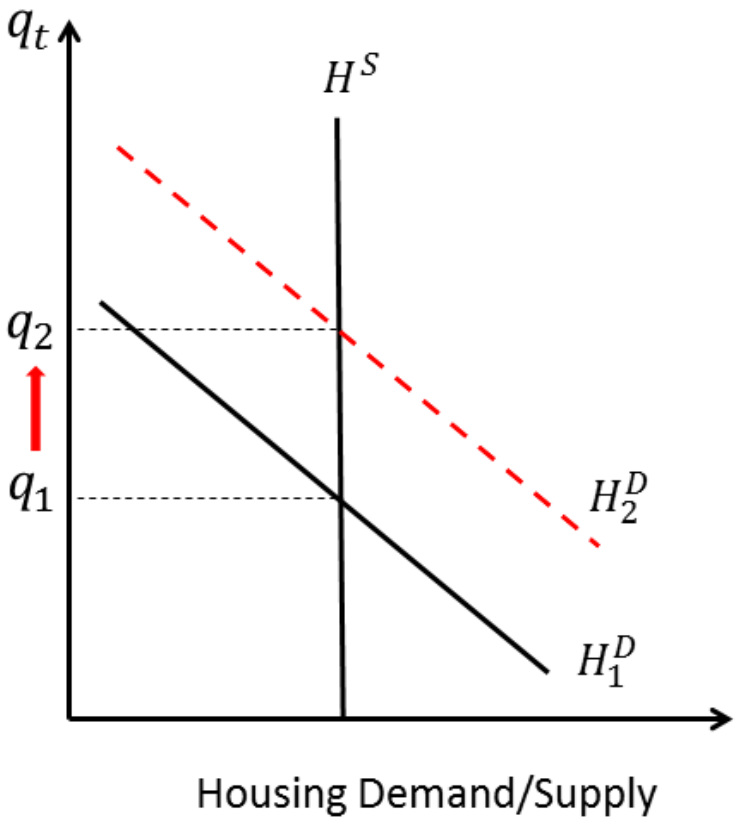
$$q_t = F\left(\underbrace{\nu_t\ \kappa_t \frac{\mathbb{E}_t\ q_{t+1}}{R_t^L}}_{+ \text{ if constraint binds}},\ \underset{-}{H_t},\ \underset{+}{c_t^b},\ \underset{-}{\mathbb{E}_t c_{t+1}^b}\right)$$

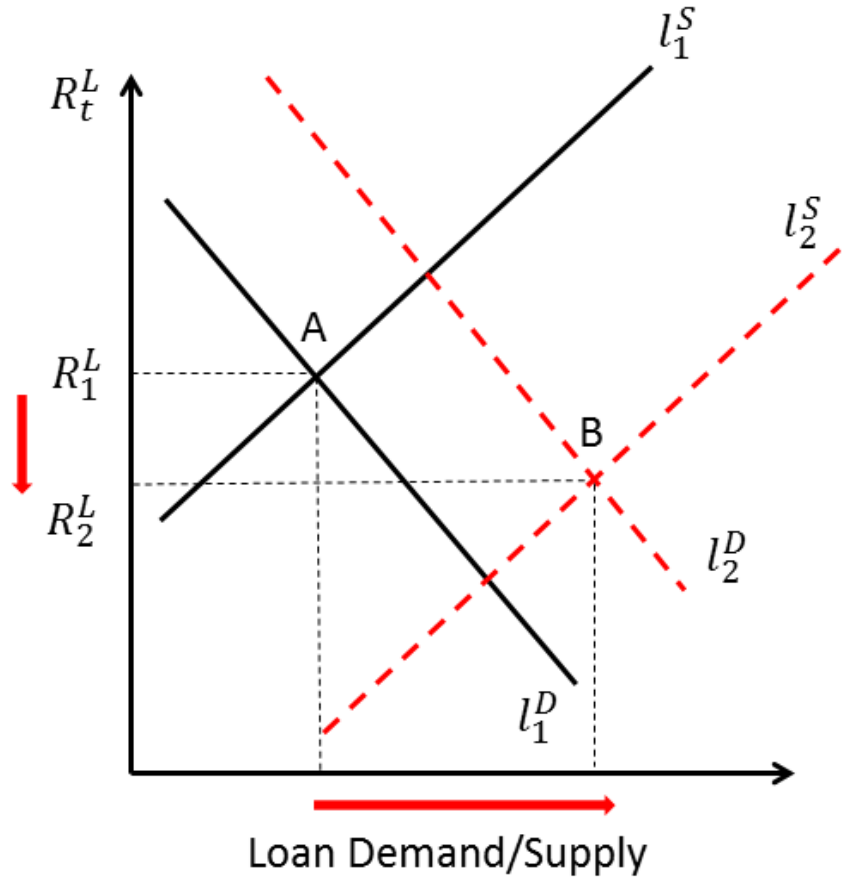
Bank Lending Rate ($\lambda$ is the failure rate priced into loans):

$$efp_t = \frac{R_t^L}{R_t^M} = F\left(\underset{+}{\lambda \frac{l_t}{k_t q_t H_t}}\right)$$

# House Price and Borrowing

$$\mathbb{E}_t q_{t+1} \uparrow \rightarrow \left\{ \begin{array}{ll} & I_t^D \uparrow \rightarrow R_t^L \uparrow \\ q_t \uparrow \rightarrow & I_t^S \uparrow \rightarrow R_t^L \downarrow\downarrow \end{array} \right\} \rightarrow R_t^L \downarrow \quad \text{Accelerator Effect}$$



# Stabilisation Policies

- **Monetary Policy**:

$$R_t^M = \rho R_{t-1}^M + (1-\rho)\left(\phi_\pi \pi_t + \phi_y Y_t\right) + \xi_{m,t}$$

- **Government Budget:**

$$b_t = \frac{R_{t-1}^B b_{t-1}}{\pi_t} + (g_t - tax_t) + \xi_{b,t}$$

- **Optimal Fiscal Policy**: government spending $g_t$ and $tax_t$:

$$g_t = -f_y Y_t + f_T tax_t + \xi_{g,t}$$

$$tax_t \equiv \tau_h q_t H_t^b + \tau_y Y_t$$

- **Optimal Macro-Prudential**:

$$\kappa_t = -f_k \left(l_t - l_{t-1}\right) + \xi_{k,t}$$

# Model Moments: Benchmark Model

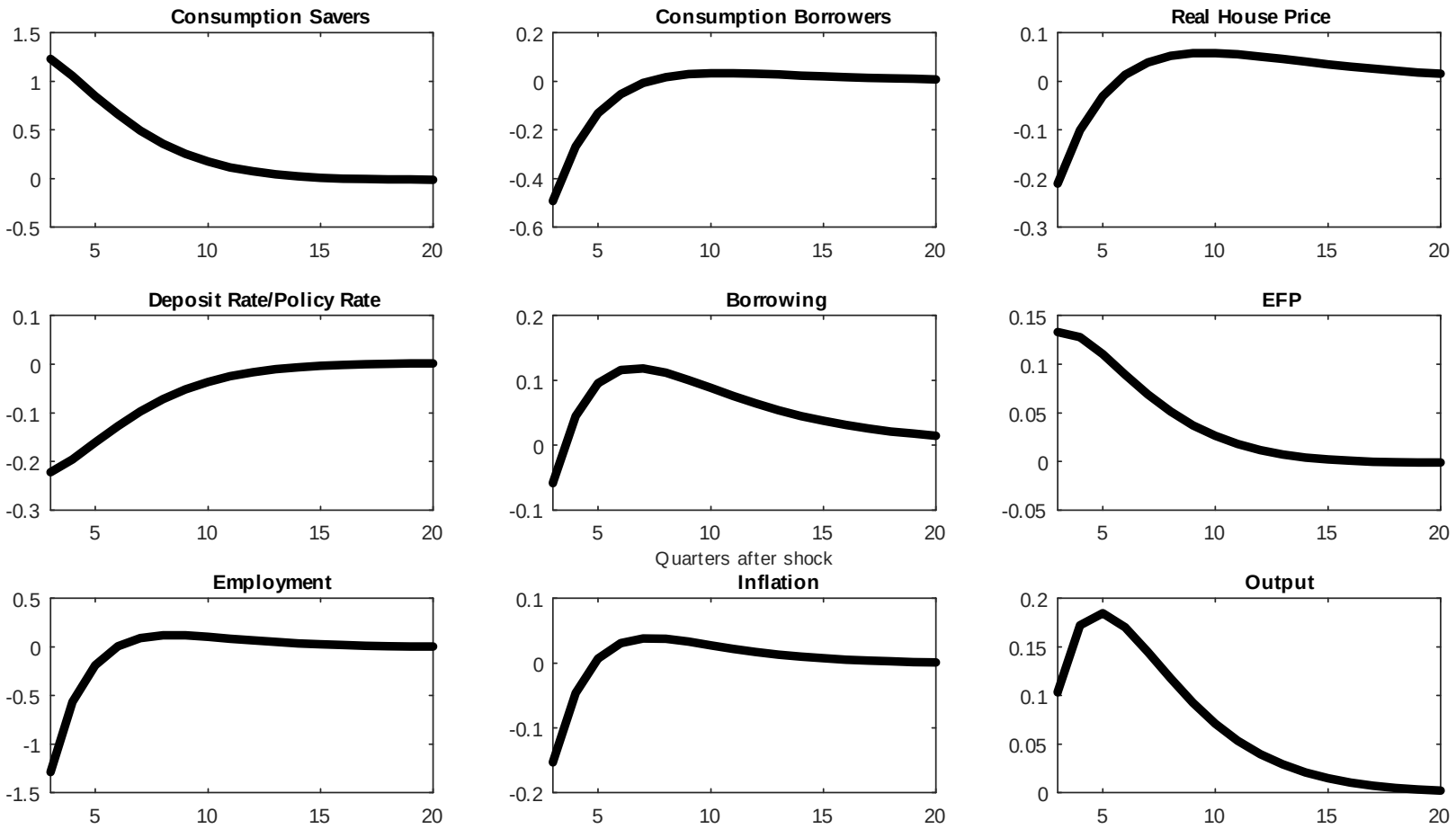
$C$ : aggregate consumption

| Moments w.r.t. $Y$ | | |
|---|---|---|
| | Rel stdev ($Y$) | Corr ($Y$) |
| $C$ | 1.13 | 0.96 |
| $\mathbf{C}^s$ | **2.49** | **-0.13** |
| $\mathbf{C}^b$ | **2.85** | **0.77** |
| $I$ | 5.52 | 0.36 |
| $R^L$ | 0.28 | 0.35 |
| $efp$ | 0.34 | 0.27 |
| $q$ | 3.95 | 0.40 |
| $\pi$ | 1.11 | 0.81 |

| Moments w.r.t. $q$ | | |
|---|---|---|
| | Rel stdev ($q$) | Corr ($q$) |
| $C$ | 0.28 | 0.41 |
| $\mathbf{C}^s$ | **0.72** | **-0.30** |
| $\mathbf{C}^b$ | **0.63** | **0.48** |
| $I$ | 1.39 | 0.99 |
| $R^L$ | 0.07 | -0.12 |
| $efp$ | 0.08 | -0.53 |
| $q$ | 1 | 1 |
| $\pi$ | 0.28 | 0.36 |

- Note procyclical EFP. High volatility of households consumption c.f. aggregate

# Productivity



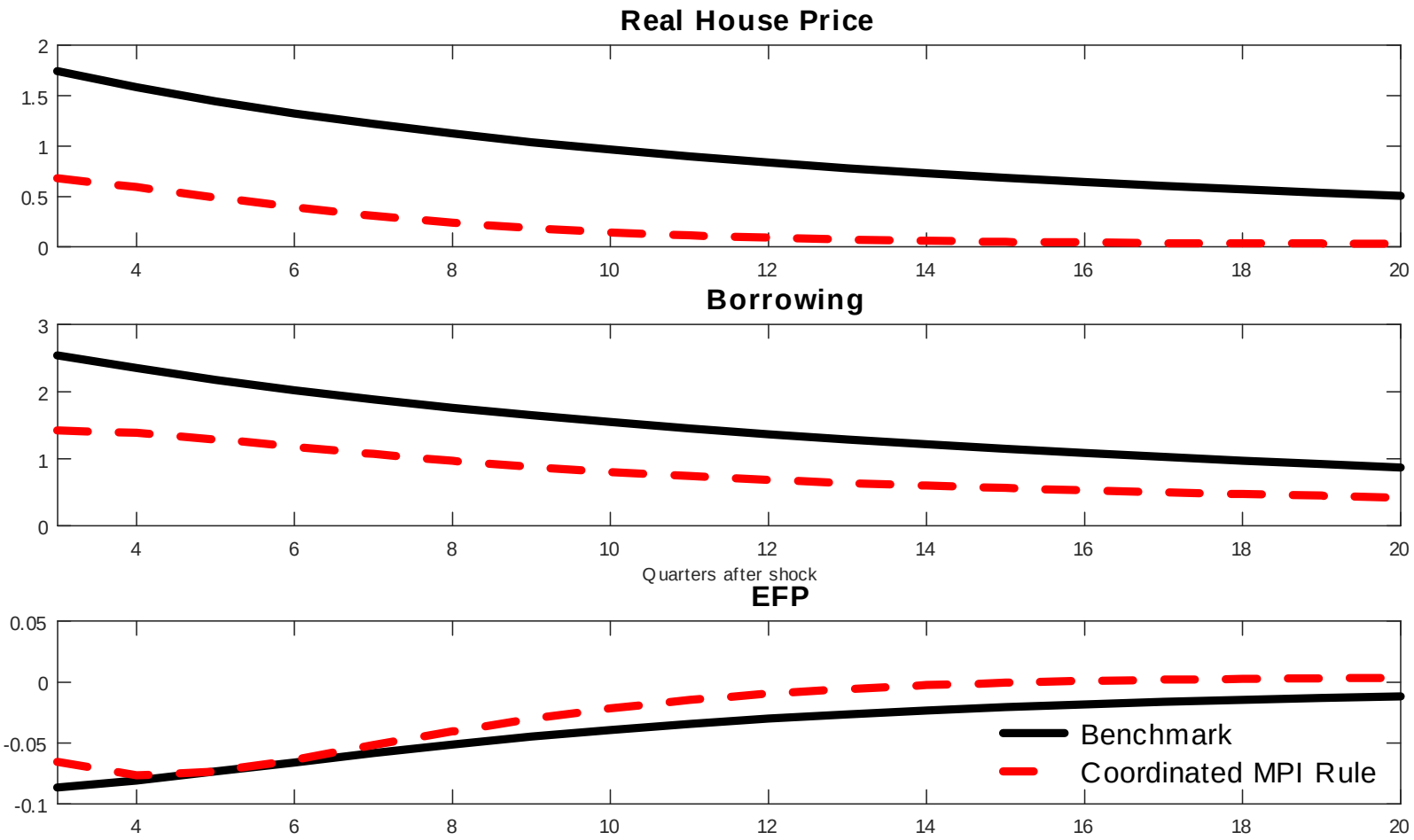
# Welfare Criterion and Optimal Policy

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

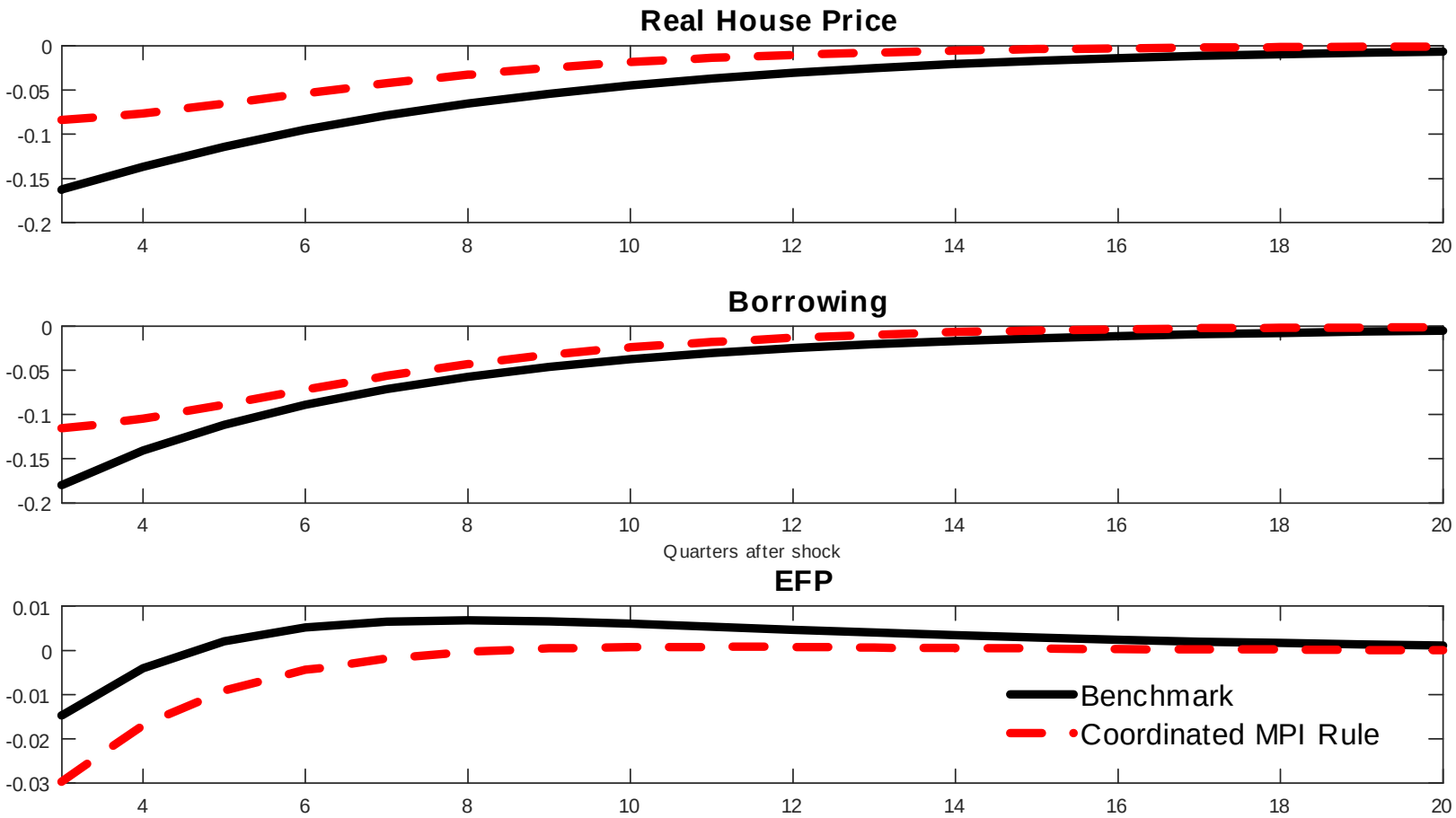
Table 5. Optimal Policy Parameters

| | Government Spending | | Tax | | MPI |
|---|---|---|---|---|---|
| | $f_y$ | $f_T$ | $\tau_y$ | $\tau_h$ | $f_k$ |
| Fiscal Policy | 0.40 | 0.10 | 0.10 | 0.04 | – |
| Coordinated MPI | 0.59 | 0.10 | 0.15 | 0.10 | 0.79 |

# Collateral (LTV)



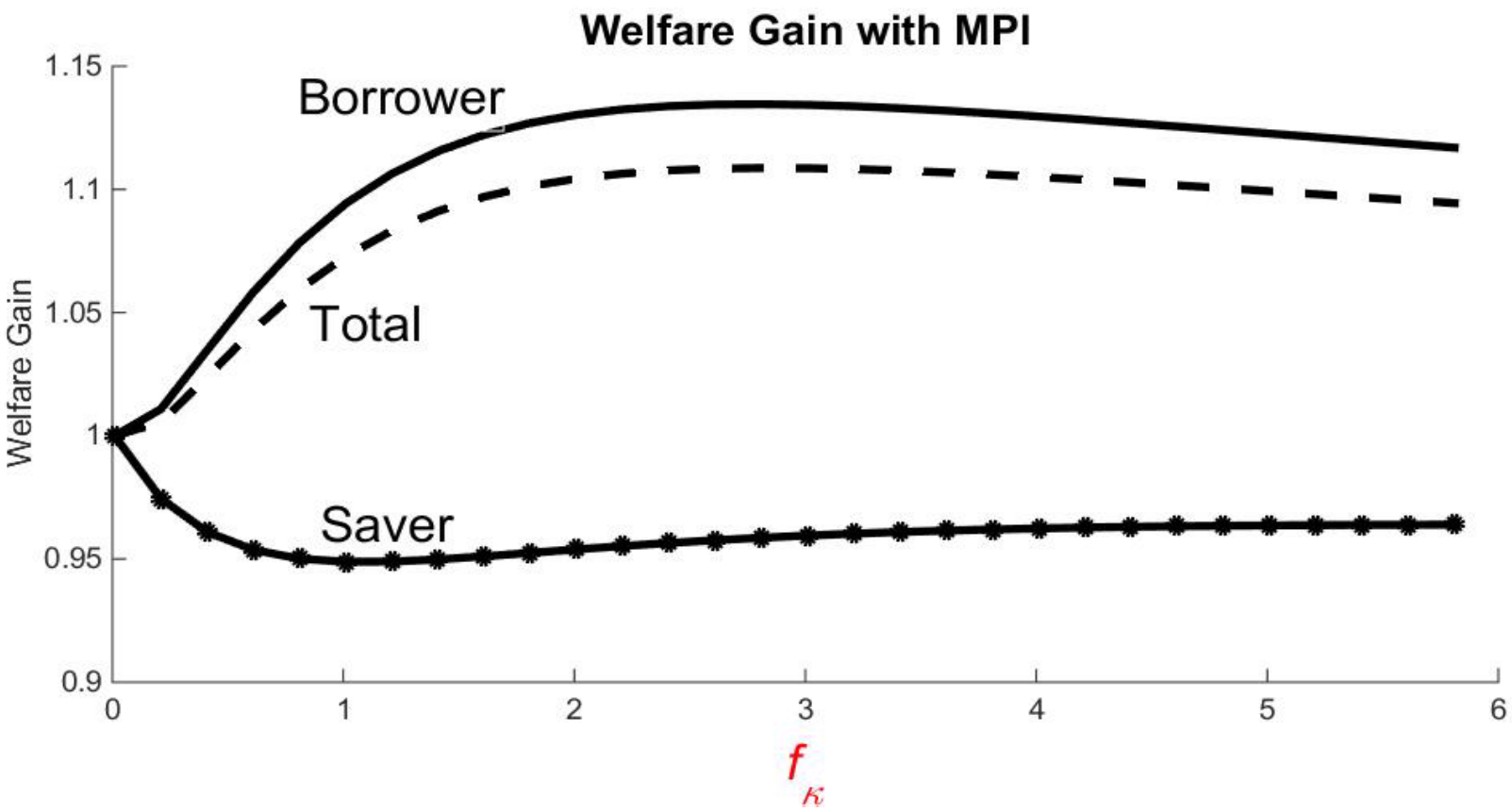
# Monetary Policy



# Utility Borrower and Saver and MPI

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

$$\kappa_t = -f_k (l_t - l_{t-1}) + \xi_{k,t}$$



# 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.

# Bibliography

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