The Great Housing Boom of China

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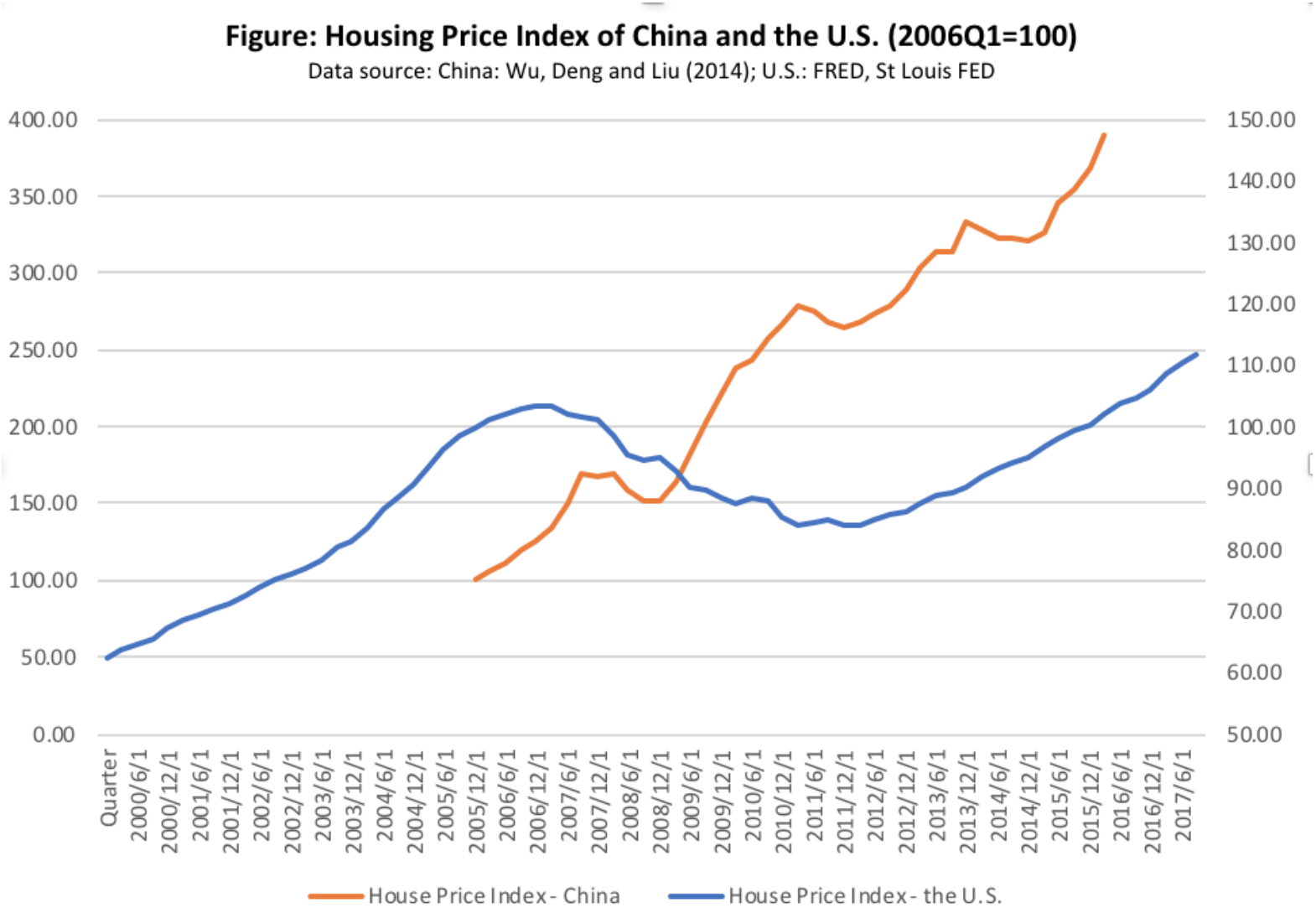
[1] Chen, K., & Wen, Y. (2017). The great housing boom of China. American Economic Journal: Macroeconomics, 9(2), 73-114.

Housing Booms in the 21st Century



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- A High Vacancy Rate:
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$\Rightarrow$ This paper proposes a theory to explain the paradoxical housing boom in China.

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Highlight of The Paper

China as a transition economy:

- Explaining High Capital Return[7]: Massive Labor Reallocation
  a. less productive sector $\rightarrow$ more productive emerging sector
  b. reallocation-driven high capital return is unsustainable in L-R
- Explaining Housing Price Boom: Expectation-Driven Bubble
  expected capital return in the future $\downarrow \Rightarrow$ housing demand in the future $\uparrow \Rightarrow$ housing price in the future $\uparrow \Rightarrow$ housing price now $\uparrow$
- Consistency with Salient Features of the Chinese Economy
  a. high vacancy rate today;
  b. bubble growing in transition stage;
  c. bubble unsustainable at Lewis turning point.

[7] Capital return from a typical production function: $R = AK^{-\alpha}L^{\beta}$, $\alpha, \beta > 0$
$\rightarrow$the higher capital stock, the lower rate of capital return (given labor)
$\rightarrow$the higher labor input, the higher rate of capital return (given capital)

Outline

- Introduction
- Literature Review
- Stylized Facts
- Benchmark Model
- Extended Model: Implications
- Concluding Remarks

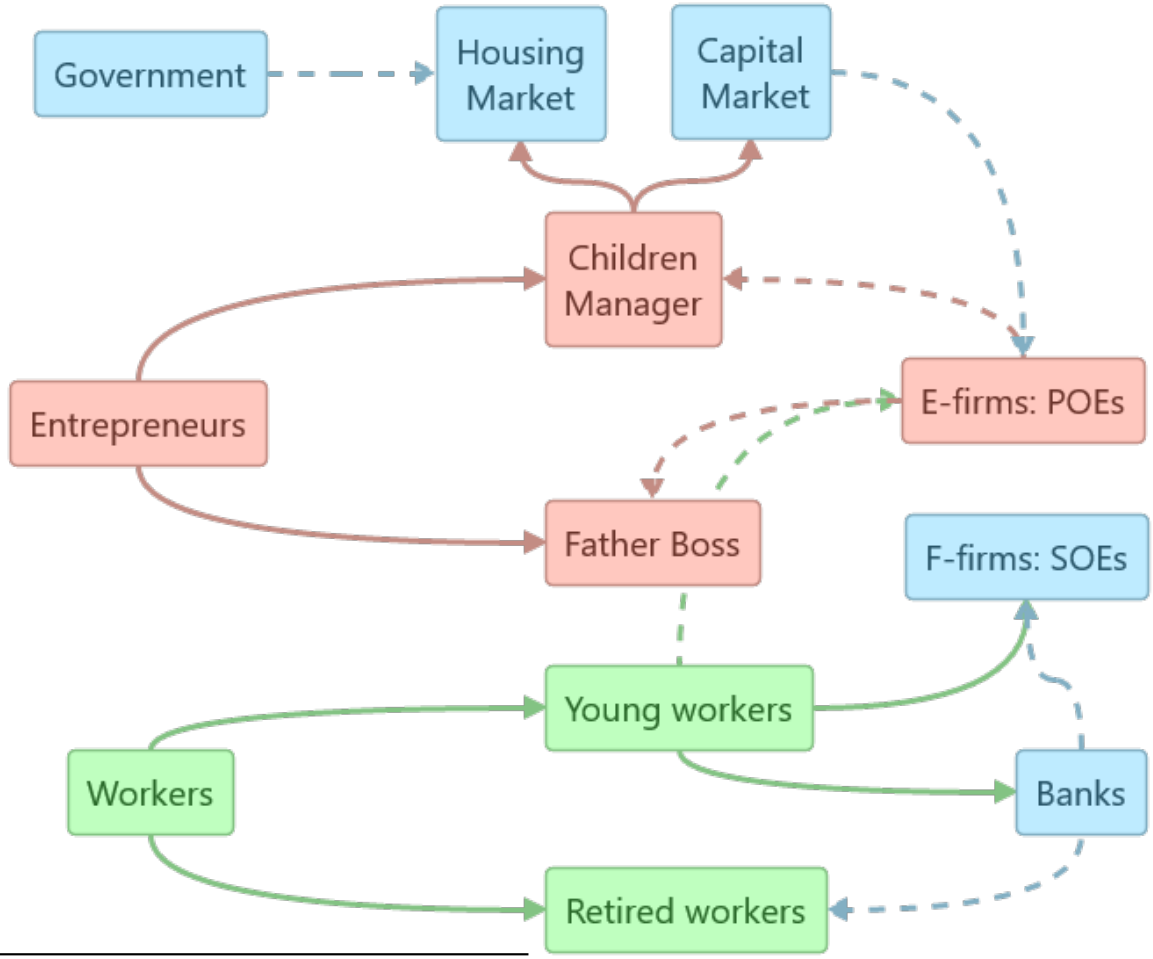
Literature Review

- **Bubbles**
  - *Static/Non-growth Bubbles:* **Martin & Ventura (12); Gali (14); Burnside, Eichenbaum & Rebelo (16); Miao & Wang (18)**
    $>$ Welfare-improving Bubbles (due to dynamic inefficiency)
  - *Growing Bubbles:* **Farhi & Tirole (12); Chen & Wen (17)**
    $>$ Welfare-reducing Bubbles (crowding out investment)
- **Econ Development w. Financial Frictions**
  - *Resource Misallocation:* **Song et al.(11); Moll(14); Buera et al. (11, 13); Midrigan & Xu (14)**
    $>$ Resource reallocation $\rightarrow$ allocative efficiency
  - *Economic Transition:* **Chen & Wen (17)**
    $>$ Resource reallocation $\rightarrow$ asset bubble
- **Housing Price Puzzle in China**
  - *Level:* **Wei, Zhang & Liu (12); Garriga, Tang & Wang (14)**
  - *Relative Growth Rate:* **Hurst (16); Chen & Wen (17)**

Stylized Facts

- Housing Market detail
- Capital Return and Resource Allocation detail
- Marginal Investor detail
- Housing vs. Capital Investment detail
- Land Supply detail
- Financial Underdevelopment detail
- SOE Reform detail

Sketch of the Economy[8]



[8]No difference between the solid line and the dash line, both just mean a connection.

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- The occupation is inherited from parents, the total population grows at a constant rate of ν.

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- E-firms are more productive than F-firms: $y_t^F = (k_t^F)^\alpha (A_t n_t^F)^{1-\alpha}$ vs $y_t^E = (k_t^E)^\alpha (A_t \chi n_t^E)^{1-\alpha}$, where $\chi > 1$ and technology A_t grows at rate z;

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- While E-firms are borrowing constrained: F-firms could rent capital via state-owned banking system under a fixed interest rate R, but E-firms have to finance themselves via capital accumulation. There are no foreign investment.

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- $max_{\{c_{1t}^W, c_{2,t+1}^W\}} \; log c_{1t}^W + \beta log c_{2,t+1}^W$
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[9] Allowing them to borrow does nothing but complicate our analysis, in that we do not want to study the consumption behavior in our simple model.

[10] Open the housing market for workers can be proved to only influence the level of the housing price, but not the growth rate of the housing price.

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- Capital return $\rho_t^E \equiv MPk_t^E = (1-\psi)^{\frac{1}{\alpha}} \chi^{\frac{1-\alpha}{\alpha}} R$, constant during transition;
- Non-arbitrage principle requires that the return of housing investment equal to capital return: $\frac{P_{t+1}^H}{P_t^H} = \rho_{t+1}^E$.

Young Entrepreneur's Problem Cont'd

"How much do I consume and save?"

- First stage optimization: $max_{\{s_t^E\}} log(m_t - s_t^E) + \beta log \rho^E s_t^E$;
- Optimal saving is proportional to the "heritage":
- $s_t^E = \frac{m_t}{(1+\beta^{-1})}$.

Young Entrepreneur's Problem Cont'd

"How much of my savings should go to housing investment?"

- The portion of capital investment in saving: ϕ_t^E, portion of housing: $h_t^E \equiv 1 - \phi_t^E$;
- Two conditions for deriving the dynamics of ϕ_t^E in equilibrium:

  1. E-firms are self-financing in capital:
     $K_{t+1}^E = \phi_t^E \frac{\rho_t^E \psi}{(1-\psi)\alpha} \frac{1}{1+\beta^{-1}} K_t^E$
  2. land market clearing condition, fixed supply:
     $P_t^H \bar{H} = (1 - \phi_t^E) \frac{\rho_t^E \psi}{(1-\psi)\alpha} \frac{1}{1+\beta^{-1}} K_t^E$

- So we get the difference equation for h_t^E:
- $h_{t+1}^E = \frac{h_t^E}{1-h_t^E} \frac{(1-\psi)\alpha(1+\beta^{-1})}{\psi}$.

The Steady State

- In the long run, after the transition is finished, there will be only one type of firms–E-firms;
- We can show that there is a steady state, i.e. a time invariant value towards which the variable is converging, for house price growth;
- Using non-arbitrage principle, the steady state of E-firms' capital return should equal to housing price growth, which gives us the steady state of capital investment share: $\phi^{E*} = \alpha(1-\psi)(1+\beta^{-1})/\psi$.

Conditions for a Housing Bubble to Exist [11]

- The bubble in the steady state requires the housing investment > 0, which means we should have: $\phi^{E*} < 1$;
- The equivalent restriction on parameters:

$$\psi > \underline{\psi} \equiv \frac{\alpha(1+\beta^{-1})}{1+\alpha(1+\beta^{-1})}$$

- Intuition:
  1. α(*productivity parameter*) $\uparrow$, capital return $\rho_t^E \uparrow$. Thus, harder to maintain a housing bubble; β(*utility discount factor*) $\uparrow$, more patient, $s_t^E \uparrow$, tends to accumulate more in capital, $\rho_t^E \downarrow$;
  2. ψ(*the management fee*) $\uparrow$, $\rho_t^E \downarrow$ directly, and "legacy" $m_t \uparrow$ $\Rightarrow s_t^E \uparrow$, a bubble more likely to occur.

[11] Of course there are other necessary conditions which work together to ensure a bubbly equilibrium to exist, but somehow they are not the most intuitive ones that we would like to share with you. Please refer to the paper for more details if you are interested.

Main Results

Lemma (Lemma 1)

The growth rate of housing prices is equal to the growth rate of E-firm output in both the transition and post-transition stages;

Intuition:

- In both the transition and post-transition stages, entrepreneurs‘ optimal portfolio choices will equalize the rate of return to capital investment and the rate of return to bubbles according to the no-arbitrage condition.
- In this toy model, the growth rate of E-firm output equals the rate of return to capital for entrepreneurs.

Main Results Cont'd

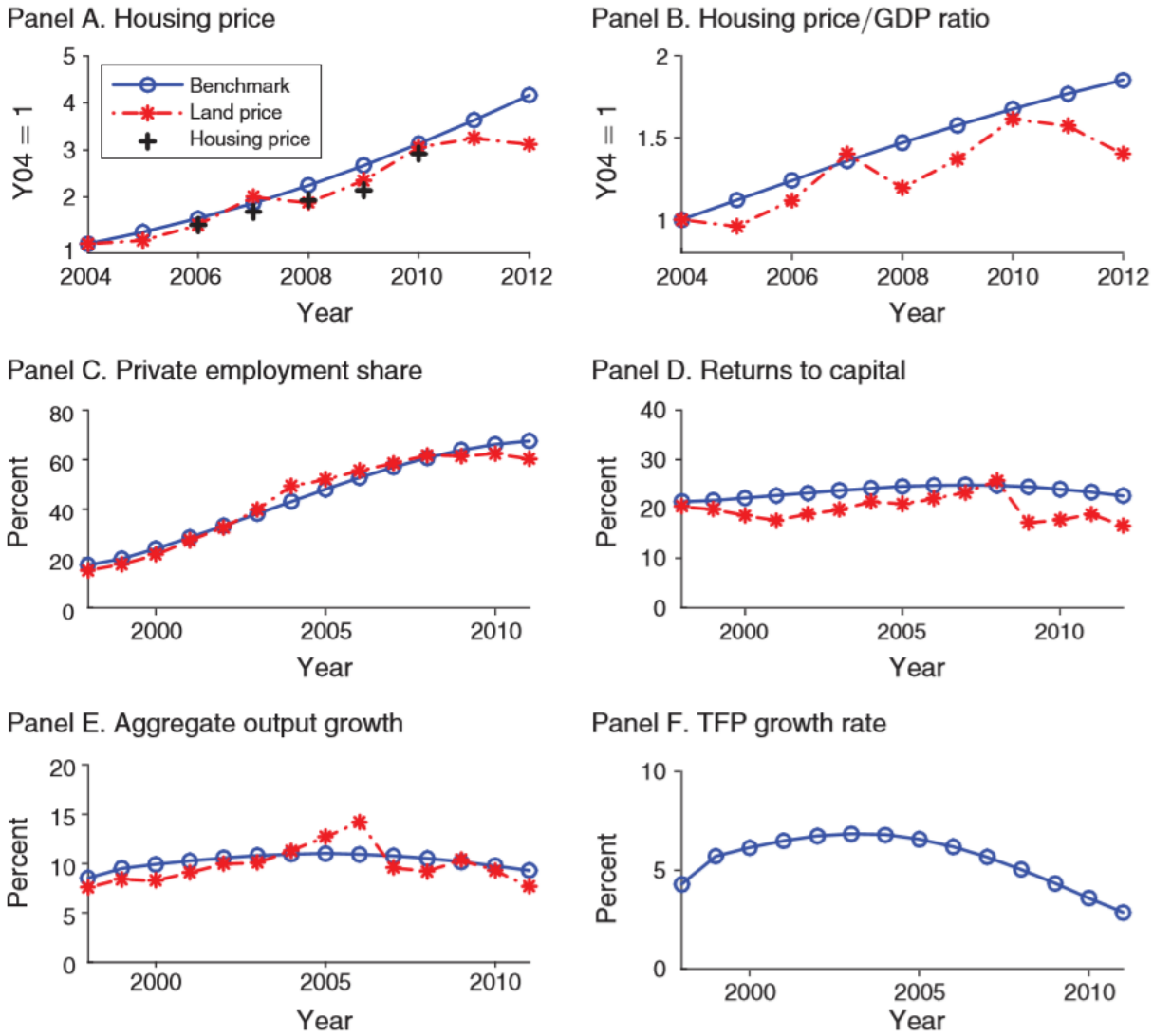
- Proposition 1:
  the growth rate of housing prices exceeds that of aggregate output during the transition and converges to that of aggregate output when the transition ends;
- Intuition:
  - house price growth=E's output growth (*lemma1*)
  - total output growth=(E's +F's output growth)/2;
  - E's output growth $>$ F's output growth;
  - In transition: E- and F- firms co-exit
    $\Rightarrow$ house price growth $>$ total output growth
  - Post transition: only E-firm exists
    house price growth=E's output growth=total output growth

Main Results Cont'd

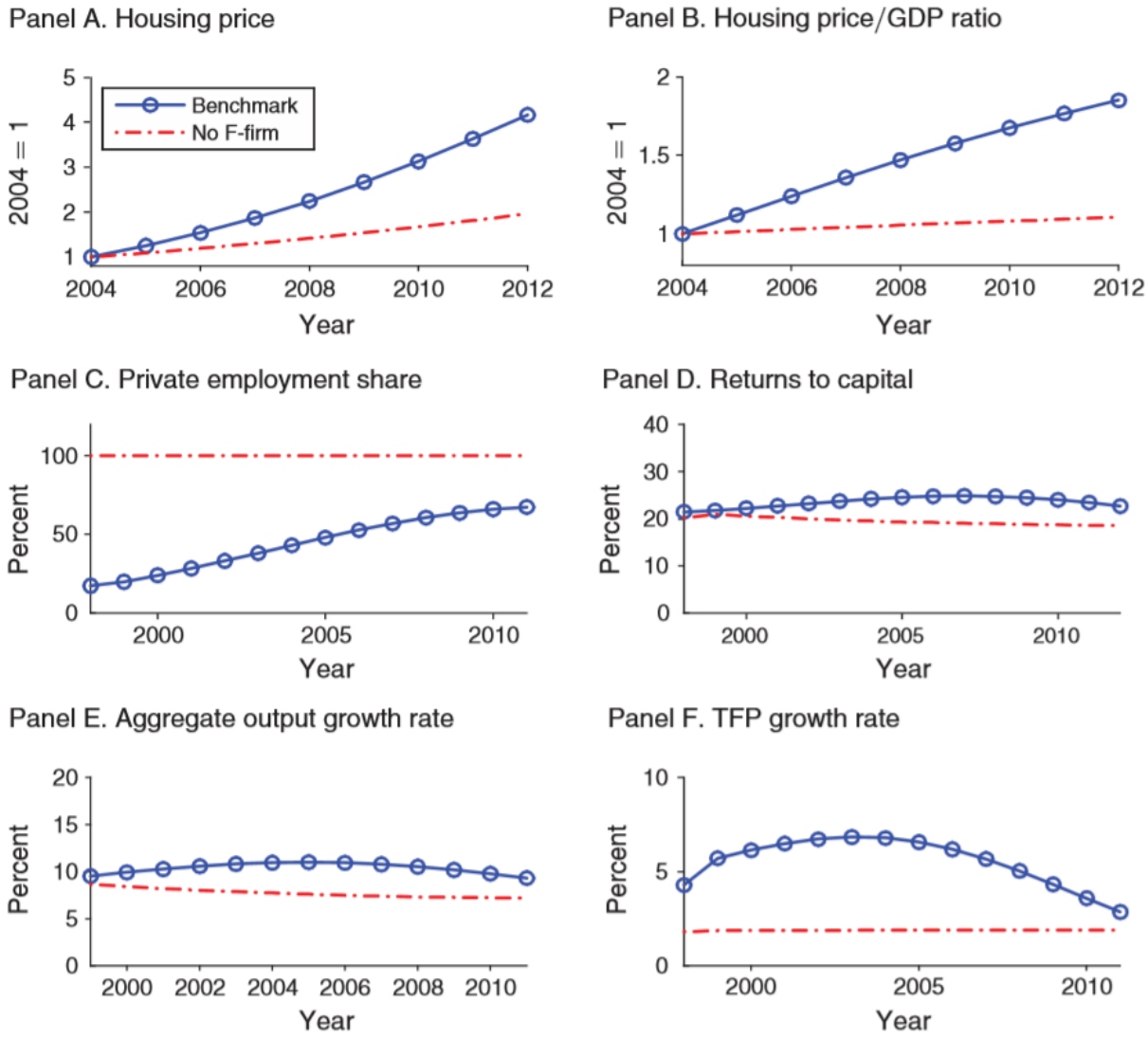
Proposition 2:
a housing bubble reduces aggregate consumption and the welfare of both entrepreneurs and workers.
Intuition:

- Reduces aggregate consumption by crowding out productive investment in capital;
- Reduces the marginal product of labor and thus reduces wage income of workers;
- Also reduces the lifetime income of future entrepreneurs and, thus, negatively impacts their consumption.

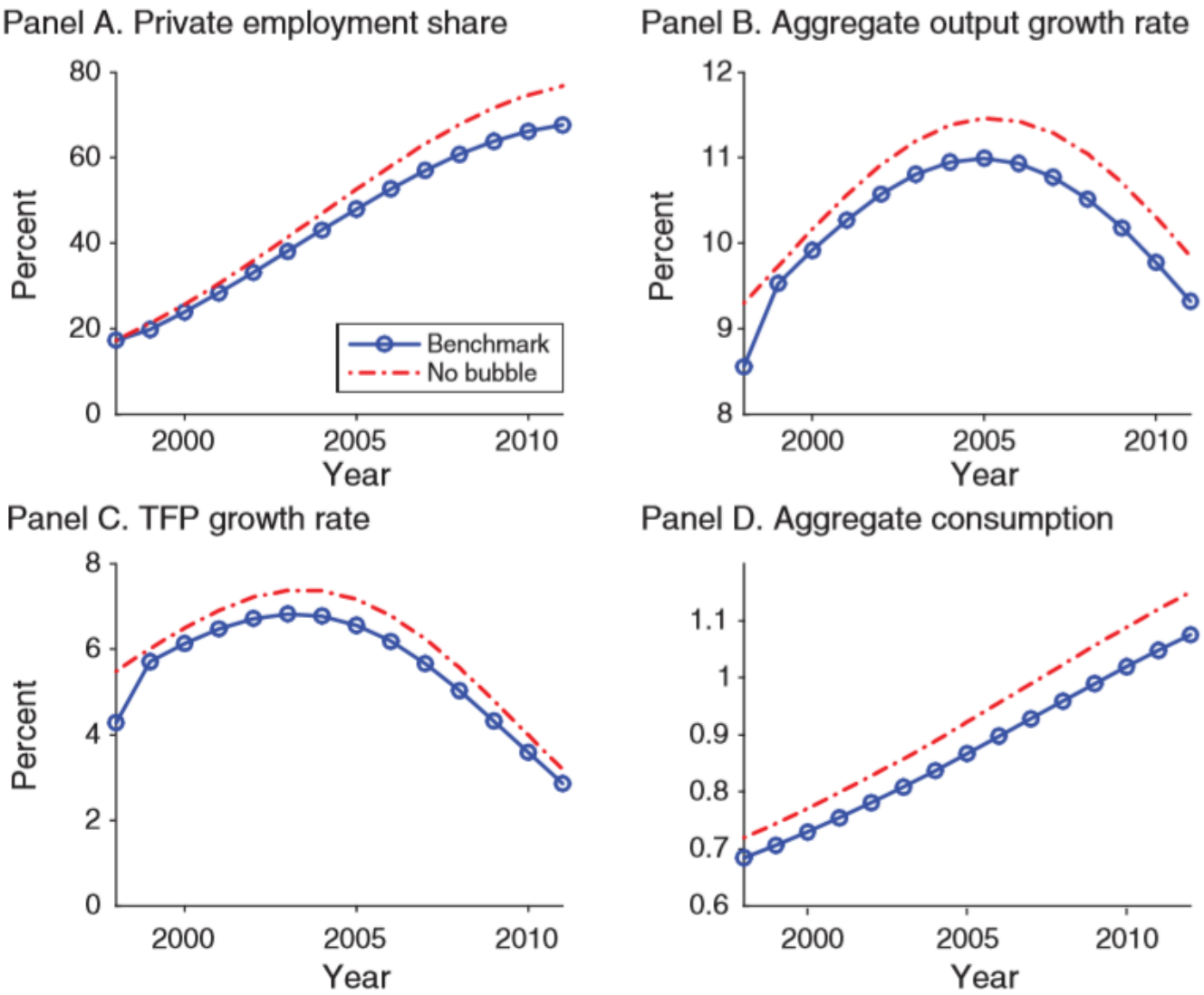
Model Performance



Counterfactual: Firms' Heterogeneity



Welfare Analysis



Conclusion

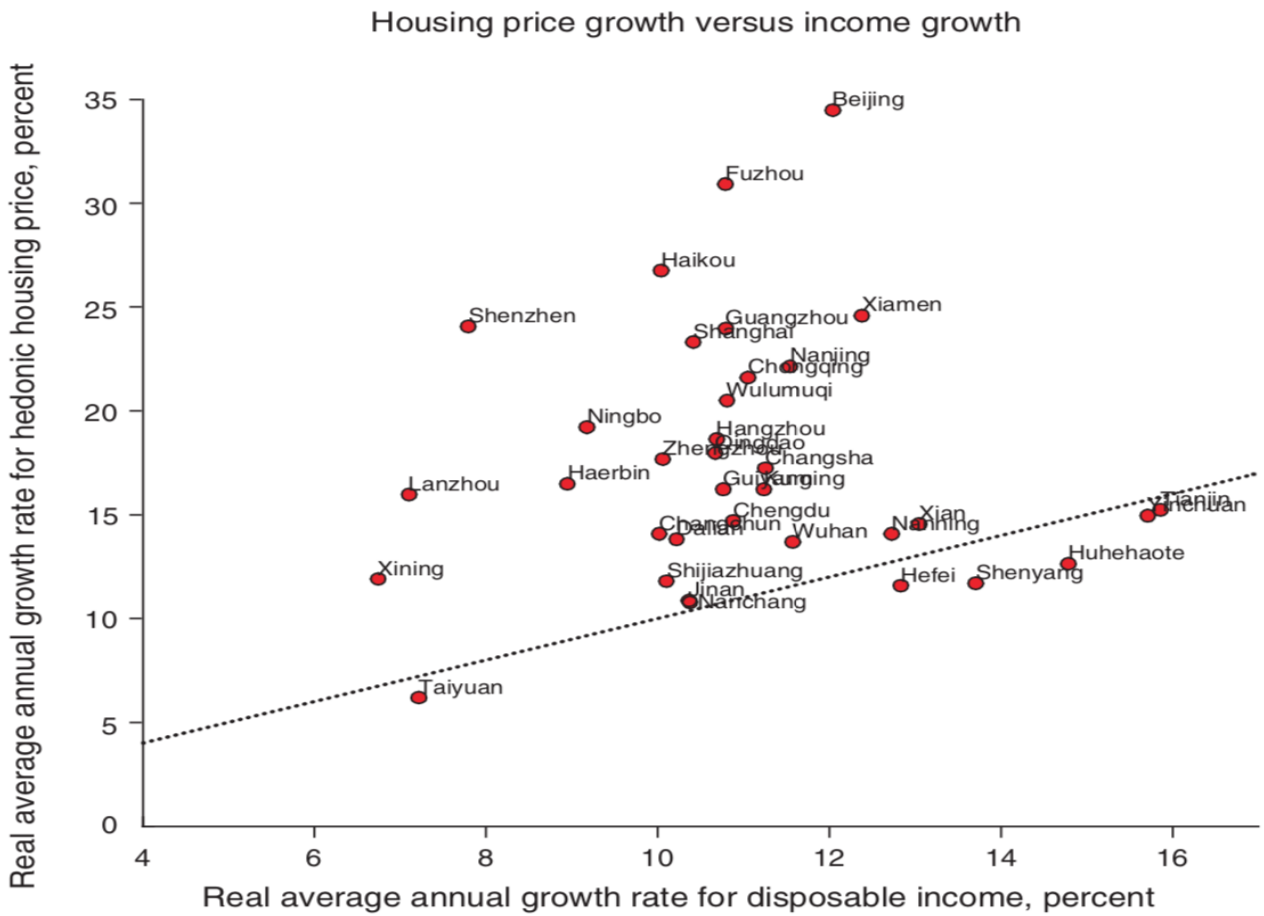
What we do in this paper?

- We start from the confusing relationships between the higher growth rate of the housing price compared to the GDP growth, the high vacancy rate in housing market, and the high rate of return to capital over the past decades;
- We build up a simple model demonstrating the confusing phenomenon and it works well;
- Take away of the paper:
  - the great boom is driven by entrepreneurs during the economy transition period in that people tend to believe a drop of the rate of return to capital in the future.
  - Limited asset market makes housing a tool of value-storing.

Finished

Thank you for coming!

Housing Market



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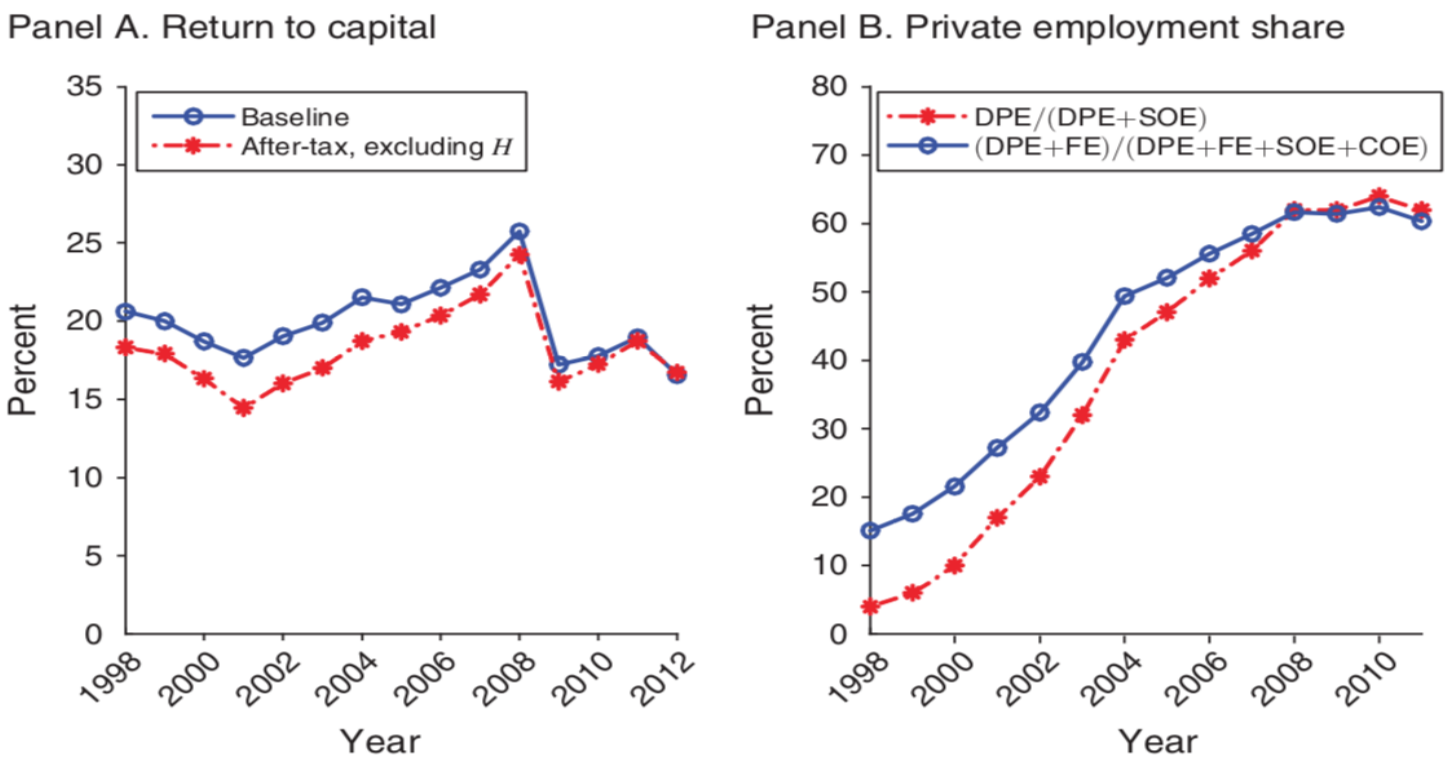
Capital Return and Recourse Allocation



$\Rightarrow$ Question: How does capital return affect housing price?

back

Marginal Investor Hypothesis: Housing price and Capital Return

- Entrepreneurs or productive firms are extensively involved in the housing market;
- Entrepreneurs or productive firms are an important determinant of Chinas high vacancy rate;
- Capital returns of private firms increases $\Rightarrow$ housing price increases (across major cities in China);
- The returns to capital of SOEs $\not\succ$ Housing price growth $\Rightarrow$ private firms tend to be the marginal investors.

Question: How does housing price affect capital investment? back

Crowding-out Effect: Housing price and Capital Investment

TABLE 4—CORRELATION BETWEEN HOUSING PRICE GROWTH AND FIXED INVESTMENT GROWTH

	Nationwide	
Time	Real estate investment	Other investment
Current	0.5255	−0.3212
$t-1$	0.4765	−0.4046
$t-2$	0.4115	−0.4499
$t-3$	0.3320	−0.5025
$t-4$	0.2710	−0.5467
$t-5$	0.2025	−0.5438
$t-6$	0.1288	−0.5171

Source: The aggregate monthly housing price data are for January 2006 to December 2011 and from Wu, Deng, and Liu (2014). The corresponding monthly investment data are from the CSY (various issues). To remove seasonality, the growth rates for housing prices and investment are year-over-year growth rate at monthly frequency.

housing price $\uparrow \Rightarrow$ Housing investment $\uparrow$
housing price $\uparrow \Rightarrow$ Current business investment $\downarrow$
housing price $\uparrow \Rightarrow$ Future business investment $\downarrow$ back

Land Supply

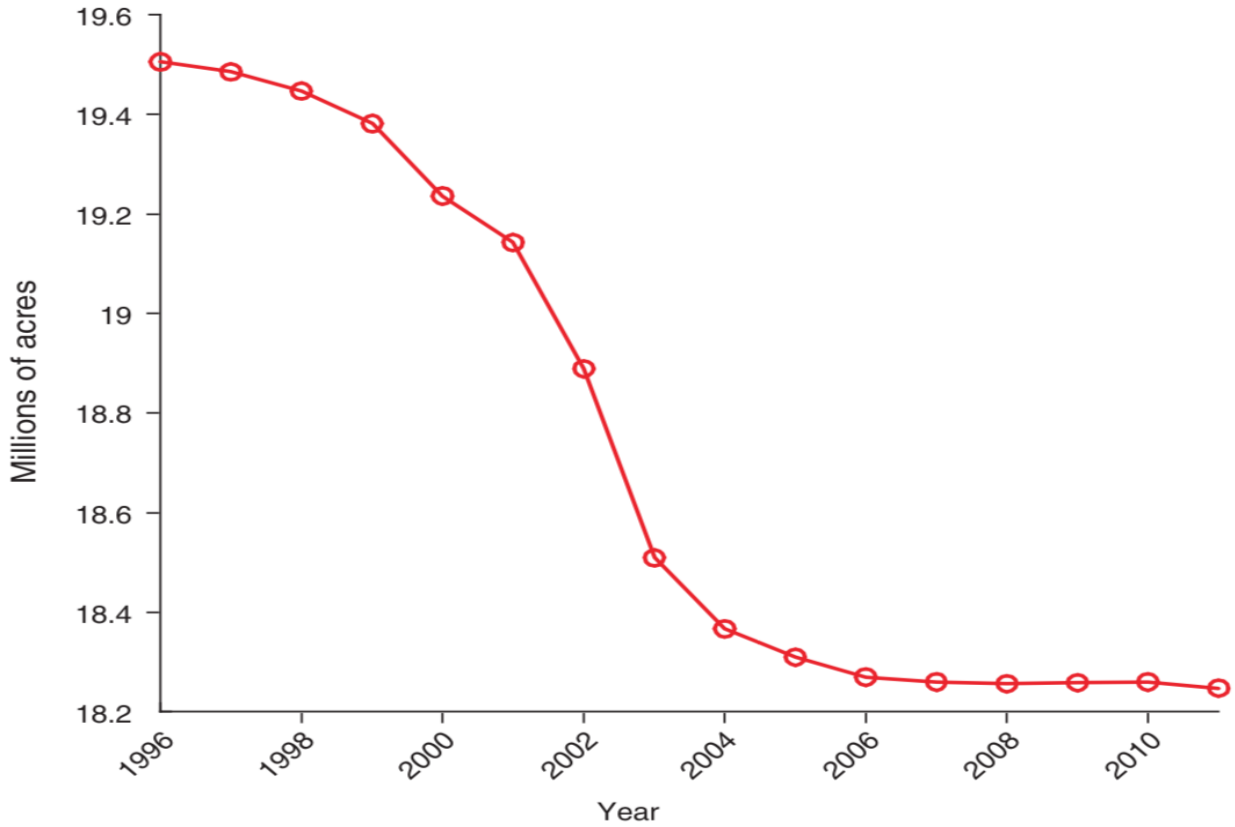


FIGURE 4. TOTAL AMOUNT OF ARABLE LAND

$\Rightarrow$ Assumption: Land supply is fixed in the model. back

Financial Underdevelopment

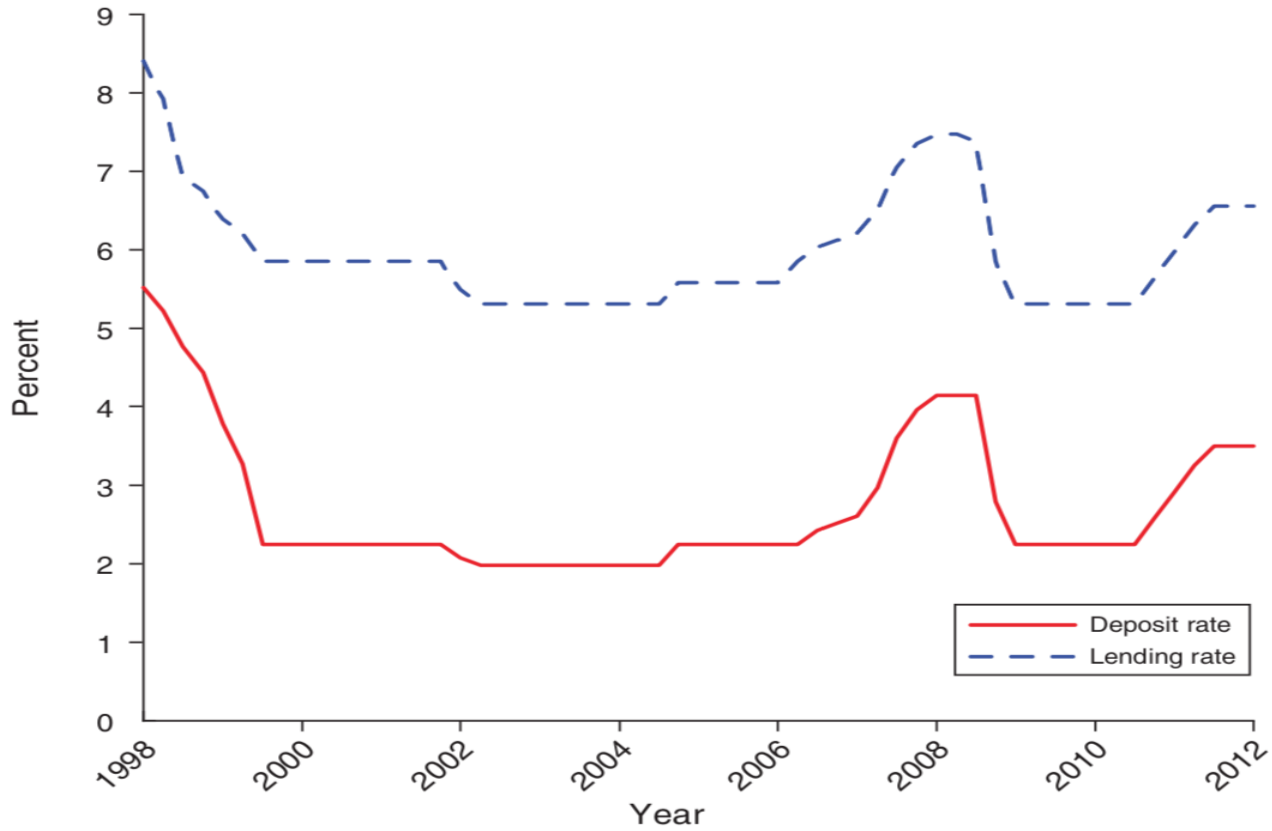


FIGURE 5. CHINA'S ONE-YEAR BENCHMARK NOMINAL INTEREST RATES

$\Rightarrow$ Assumption: Workers can save their income only at the bank

back

SOE Reform[12]

- Aggressive restructuring of large SOE and large-scale privatization since 1997;
- Release cheap labor from the state sector to the private sector;
- Sustain the high private returns to capital;
- Various support to private firms for fast growth (i.e., by tax reduction), in the early stage.
- Preferential policies being replaced later: *'Guo Jin Min Tui'*.
- A key source of productivity growth in the past decade.

$\Rightarrow$ Assumption: Two types of firms as cornerstone of the model

back

[12] See Week 10, SOSC5720. DON'T MISS IT.