

# Discussion of DSGE Modeling of China's Macroeconomy and Housing Cycle

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Disclaimer: The views expressed in this presentation are those of the author and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System

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# Premise

Starting on a personal note, last spring I was a guest of the PBOC research bureau and had a chance to discuss ongoing research projects with Ma Jun and his team

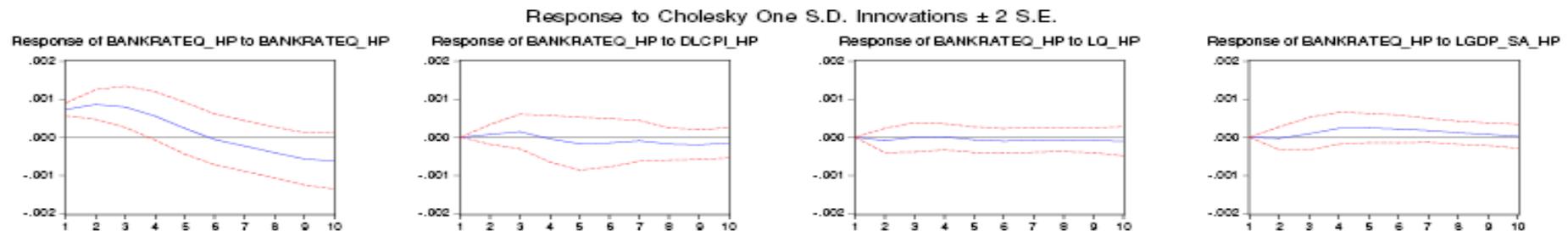
- Heartfelt gratitude for warm hospitality and insightful conversations!
- Among others, we talked about modeling the Chinese economy through the lens of a Dynamic Stochastic General Equilibrium approach
- It is a pleasure to be here today and comment on their findings

# Modeling the Chinese economy: Stylized facts and motivation for the project

- Recall points made in the presentation
  - real estate investment more volatile than non-real estate investment, housing prices more volatile than CPI, property sales lead property investment
- Movements in Chinese housing prices affect fixed investment, leading or magnifying business cycle fluctuations
  - Need to model explicitly real estate sector and transmission of housing prices to macroeconomy
  - Otherwise macroeconomic forecasts underestimate cyclical fluctuations
- Two kinds of policy implications
  - If property cycles are not accounted for, policy response is underwhelming
  - Need to understand how policy tools can stabilize the real estate cycle, thus the broader economy
    - Note: policy tools include variables that would be considered market-determined in Western economies (mortgage rates, down-payments, land supply...)

# Modeling the Chinese economy: VAR evidence

- Sample 2006Q4 to 2015Q4. Inflation, house prices and GDP fall in response to exogenous policy rate hikes
  - Technical quibbles:
    - Super-short sample possibly exhibiting instability
    - Variables ordered as policy rate R, inflation, house price, GDP. Why is policy rate R first in the VAR ordering?
    - Related: flat impulse responses for R suggest monetary policy does not react to inflation or output gap, quite implausible



- Sample 1999M2 to 2015M12. Boom in house prices raises housing starts

# Modeling the Chinese economy: Methodological considerations

- Everywhere in the world, policy evaluation at central banks requires development of quantitative tools for forecasting and scenario analysis
- DSGE models provide most comprehensive approach currently available to research departments to model macroeconomic interactions and policy transmission
- Pros
  - choice-theoretic micro-foundations to derive description of households' and firms' behaviors from first principles in a transparent way
    - reduce risk of arbitrariness
    - help to link positive description of economy to normative policy implications
  - quantitative projections account for intratemporal and intertemporal budget and resource constraints
- Cons
  - analytical complexity, relative inflexibility to deal with "unconventional" scenarios
  - resource-intensive, require specialized teams of researchers with advanced backgrounds in economics and statistics
- International research community, both in academia and policy institutions, available to provide technical assistance, support projects, and exchange know-how

# Modeling the Chinese economy: DSGE model

- Incorporates housing and nondurable goods
- Heterogeneity in preferences (patient lenders vs impatient borrowers)
- Large menu of shocks, both unanticipated innovations and “news” about future changes (which *ex post* can materialize or not)
- Nominal rigidities supporting role of monetary policy
- Inertial Taylor rule in monetary policy

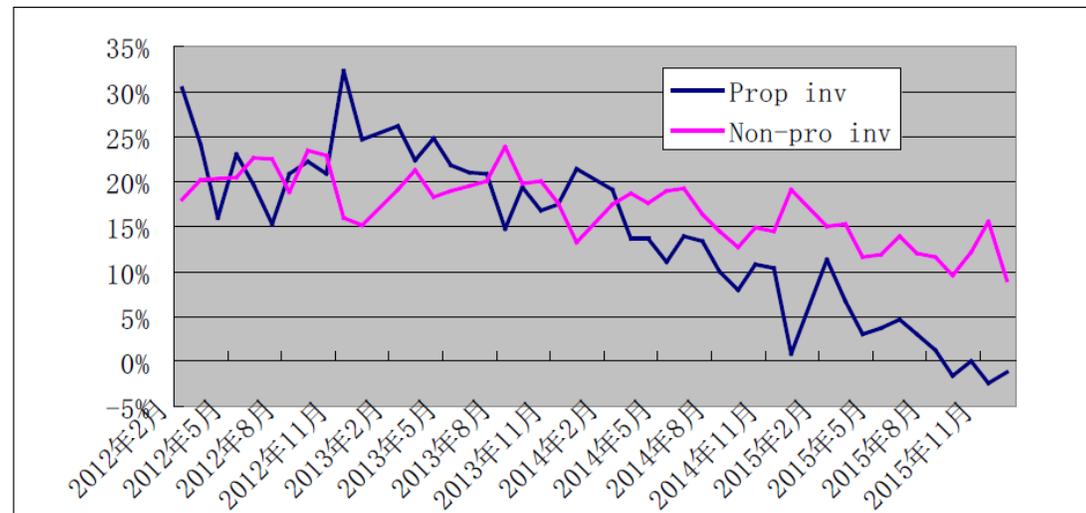
# Modeling the Chinese economy: (Qualitative) DSGE results

- A hike in mortgage rates lowers residential investment and GDP growth (by x% in the first year)
- A hike in the transaction tax (e.g., from 1.2% to 1.7%) reduces residential investment and GDP growth
- A 10% increase in land supply boosts GDP growth initially but leads to lower property prices and lower investment/GDP in the long run
- A 20 percentage point increase in minimum loan-to-value ratio (e.g., from 20% to 40%) reduces real estate investment and GDP growth
- Optimistic beliefs (10% increase in percentage of market participants expecting high property prices) boost property sales (by x% in first year)

## For current and future consideration (1)

- According to the presentation, “cyclicality of the economy is underestimated when property market is missing in models”
  - But standard models which include overall capital (or investment) are capturing the joint effects of housing *and* non-housing cycles. Is it really crucial to distinguish between the two components?

The fact that real estate investment is much more volatile than non-real estate investment is not obvious from the figure in the presentation. Both have different trends



## For current and future consideration (2)

- China modeled as a closed economy. Would openness make a difference?
  - How do we assess external vs internal demand shocks?
  - Would a real estate bust have similar effects as the trade collapse during the Great Recession?
- Theoretical framework closely follows Iacoviello and Neri. In their model most of the variability in house prices, and more in general in real estate activity, stems from the housing preference shock (the **j shock** in the slides).
  - Does this result fit the Chinese experience?
  - What is the relative role of preference shocks vs. regulation and policy?

## For current and future consideration (3)

- In borrowers-lenders models like this, shocks tend to generate a lot of housing trade from one group to the other.
  - Does the empirical evidence for China support this feature? (in other countries it does not)
  - Restrictions on housing preferences may help to reduce volatility in housing sales, but at the cost of lowering volatility in house prices and its impact on the business cycle, that is, the key feature of the model

## For current and future consideration (4)

- The transaction tax is 0.04 to match 1.2 percent every 8 years. But the assumption is that a chunk of the housing stock is traded every quarter, and that chunk should incur the entire 1.2 percent tax, even if in practice individuals might trade their houses only infrequently and discretely
  - The problem here may be that in the model there is excessive trading volume for the reason pointed out above, which would imply too large a tax revenue compared to reality, hence the need to lower significantly the calibration of the transaction tax

## Conclusion

- This is very valuable and far-reaching work in progress
- Rather than simply “importing” a model developed with an eye to the characteristics of economies like the US or the Eurozone and calibrating it to Chinese data, authors make special effort to capture complexity and nuances
- Public kudos to the whole research team at PBOC!