The Economic Impact of House Price Changes: A Panel VAR Approach

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Presentation Outline

- Motivation
- Data
- Linear regressions vs. panel VARs
- Parameter stability tests
- Granger Causality and financial markets
- Conclusions

Research Question

- Do real house price changes Granger cause real output growth?

Theories

- Wealth effect
  - Friedman's permanent income hypothesis
- Collateral effect
  - Aoki, Proudman and Vlieghe (2002), Lustig and Nieuwerburg (2004), and Ortalo-Magné and Rady (2004)

Empirical Evidence

- Supporting
  - On consumption
    - Bhatia (1987)
    - Benjamin, Chinloy and Jud (2004), Case, Quigley and Shiller (2001), Kishor (2004)
  - On saving
    - Engelhardt (1994), Engelhardt (1996), and Sheiner (1995)
- Not supporting
  - Phang (2004)

Possible Problems of Existing Empirical Studies

- Simultaneity
  - Most empirical papers rely on linear regressions
  - House price as a independent variable may not be “independent”
  - Unobserved variables may affect both house prices and consumption/saving
- Parameter stability
  - Collateral effect relates to cost of refinance and home equity loan, which varies over time
  - Economic structure varies over time
- Literature
  - Either relies on linear regressions
  - Or use simple VAR without controlling any macro variables or nonstationary parameters

Intended Contributions

- Understand whether house price changes affect output of the economy
  - Treating both output and house prices as endogenous
  - Controlling macro economic variables
  - Allowing non-stationary parameters

Data

- A large panel data
  - 127 Metropolitan statistic areas
  - From 1990:1 to 2002:2
  - 5 MSA level time series for each MSA
    - Per capita GMP
    - Single family home price index
    - Average household income
    - Population
    - Unemployment rate
  - 2 national level time series
    - SP500 index
    - National average 30 year fixed rate mortgage

Data Summary

Linear Regressions

- 9 different specifications

$$gmp_{i,t} = \alpha_0 + \alpha_1 quarter1_{i,t} + \alpha_2 quarter2_{i,t} + \alpha_3 quarter3_{i,t} + \beta hp_{i,t} + \varepsilon_{i,t}$$

Linear Regressions

Panel VARs

- 9 different specifications

$$gmp_{i,t} = \alpha_0 + \alpha_1 quarter1_{i,t} + \alpha_2 quarter2_{i,t} + \alpha_3 quarter3_{i,t} + \sum_{s=1}^{3} \gamma_s gmp_{i,t-s} + \sum_{s=1}^{3} \beta_s hp_{i,t-s} + \varepsilon_{i,t}$$

$$hp_{i,t} = \alpha_0 + \alpha_1 quarter1_{i,t} + \alpha_2 quarter2_{i,t} + \alpha_3 quarter3_{i,t} + \sum_{s=1}^{3} \gamma_s gmp_{i,t-s} + \sum_{s=1}^{3} \beta_s hp_{i,t-s} + \upsilon_{i,t}$$

Panel VAR Results

Parameter Stability

Granger Causality Tests in Rolling Windows

Granger Causality Tests in Increasing Size Windows

Granger Causality and Financial Market Conditions

Conclusions

- A puzzle
  - Significant correlation
  - Insignificant Granger Causality
- Instable parameters
  - Not a good idea to assume stationary parameters
  - Structural breaks or changes
- In short
  - Call for more theories and empirical analysis