Effects of Monetary Policy via Housing Market

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1. Background

2. Literature Review

3. Data and Methodology

4. Empirical Results and Explanation

5. Conclusion
• 90% of household net worth is real estate
• Rising house prices ➔ wealth effect

The proportion of real assets to the household net worth

- 90.7%
- 44.3%
- 34.9%

Reference: Bank of Korea, Kosis

Interest rate ➔ Housing ➔ Consumption
1 Background
1.1 Interest rate, housing, consumption

- Interest rate change
  - Housing market ↑
    - Wealth Effect (+)
    - Budget constraint effect (-)
    - Substitution Effect (-)

  - Household Consumption
1 Background
1.2 Regional heterogeneity

- Different changes in housing prices
  → The effects of monetary policy on consumption would have regional pattern
Background

1.3 The object of our research

“The regional effects of monetary policy via housing market”
2.1 Elbourne, A. (2008),
‘The UK housing market and the monetary policy transmission’
• Method: Structural VAR model, Two-step approach, Counterfactual approach
• Conclusions: House price movements can explain about one-seventh (15%) of the fall in consumption following an interest rate shock.

2.2 Zan Yang et al. (2017),
‘Monetary Policy, House Prices, and Consumption in China’
• Method: Panel VAR model, Counterfactual approach
• Conclusions: The monetary policy has a significant effect on consumption but with a regional pattern, in terms of the magnitude and the housing wealth channel.
Significance of Our research

- Not much of such a regional studies conducted based on Korea
- Kiho Kim (2015), ‘The Differential Regional Effects of Monetary Policy: The Korea Case’
  - GRDP and other production sides
- Help understand regional discrepancies
- Promote to make appropriate political and economic decision to regional development
0. National Levels / Regional Levels

- Regions: Korean metropolitan city, Gyeonggi-do (Metropolitan area)

→ Regions which are “center of South Korea” in terms of economy and population
3 | Data and Methodology

3.1 Data

1. Period: (National) 2010Q1 ~ 2019Q2 / (Regional) 2011M01 to 2019M09

2. Variables and data sources

<table>
<thead>
<tr>
<th>Variables</th>
<th>Data</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monetary policy</td>
<td>Call rate</td>
<td>BOK ECOS</td>
</tr>
<tr>
<td>Housing price</td>
<td>Housing purchase price composite indices (2019.01=100.0)</td>
<td>KB</td>
</tr>
<tr>
<td>Consumption</td>
<td>(National) Household final consumption expenditure</td>
<td>KOSIS</td>
</tr>
<tr>
<td></td>
<td>(Regional) Change Rate of Total Registered Motor Vehicles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mian, Rao and Sufi(2013), “Household Balance Sheets, Consumption,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and the Economic Slump”, <em>The Quarterly Journal of Economics</em></td>
<td></td>
</tr>
</tbody>
</table>
3. **Adjustment**

   : Seasonality adjustment, Inflation adjustment

4. **Summary statistics**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Std. Dev.</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real call rate</td>
<td>0.288158</td>
<td>0.555</td>
<td>1.42</td>
<td>-1.05</td>
<td>0.871531</td>
<td>-0.28095</td>
<td>1.547444</td>
</tr>
<tr>
<td>Real house price</td>
<td>0.962532</td>
<td>0.96488</td>
<td>0.98312</td>
<td>0.941828</td>
<td>0.011259</td>
<td>-0.42746</td>
<td>2.237087</td>
</tr>
<tr>
<td>Real consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(National)</td>
<td>192868.4</td>
<td>190941.3</td>
<td>213616.1</td>
<td>174163.1</td>
<td>11415.89</td>
<td>0.290911</td>
<td>1.927459</td>
</tr>
<tr>
<td>Real consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Regional: Seoul, %)</td>
<td>0.0419</td>
<td>0.0412</td>
<td>0.2881</td>
<td>-0.3002</td>
<td>0.001010</td>
<td>-0.542830</td>
<td>4.569395</td>
</tr>
</tbody>
</table>
3 | Data and Methodology
3.1 Data

![Graph of Real Call Rate](image)

![Graph of Real House Price](image)

![Graph of Real Consumption: Seoul](image)

![Graph of Real Consumption: National](image)
5. Unit Root test (Stationarity)
   - House price, call rate
     : First differenced
   - Household consumption
     : Log differenced
   - Change Rate of Total Registered Motor Vehicles
     : Stationary
Model: **Structural VAR model**

- Cooley and Leroy (1985), Blanchard and Quah (1989)

\[ AZ_t = c + \sum_{i=1}^{p} A_i Z_{t-i} + e_t \]

where \( \text{var}(e_t) = \Lambda \)
Approach: **Counterfactual approach**

**Base Model:**

\[
AZ_t = \begin{pmatrix}
1 & 0 & 0 \\
\mathbf{b}_{21}^t & 1 & 0 \\
\mathbf{b}_{31}^t & \mathbf{b}_{32}^t & 1
\end{pmatrix}
\begin{pmatrix}
Z_r \\
Z_{hp} \\
Z_{con}
\end{pmatrix}
\]

**Counterfactual Model:**

\[
AZ_t = \begin{pmatrix}
1 & 0 & 0 \\
\mathbf{b}_{21}^t & 1 & 0 \\
\mathbf{b}_{31}^t & 0 & 1
\end{pmatrix}
\begin{pmatrix}
Z_r \\
Z_{hp} \\
Z_{con}
\end{pmatrix}
\]
3 | Data and Methodology

3.2 Methodology

- Approach: **Counterfactual approach**
  - Giving restrictions that the cross correlations between consumption and house prices is zero in the consumption equation (**Housing market is shut down**)
  - Comparing the different results from base model
  - Identifying the role of house prices
4 | Result
4.1 National Results

- Ordering of Variables
  - real interest rate(r), real house price(hp), consumption(con)
- According to AIC, optimal lag = 1

⇒ All results are statistically insignificant
4.2 Regional Results – Seoul, Gyeonggi

- Ordering of Variables
  - real interest rate \( (r) \), real house price \( (hp) \), consumption \( (con) \)
- According to AIC, optimal lag = 11(Seoul), 12(Gyeonggi)

- Accumulated Response of \( hp \) to \( r \)
  - Seoul: Positive impact on \( hp \) (+0.13)
  - Gyeonggi: Positive impact on \( hp \) (+0.19)

**Nam-hyun Kim and Han-Ik Jang(2018), “Influence and Factors of Interest rates on Housing Prices”**
4 | Result

4.2 Regional Results – Seoul, Gyeonggi

Accumulated Response of con to r

- Accumulated Response of con to r: $-0.023\% \ (2^{\text{nd}}) \sim -0.102\% \ (10^{\text{th}})$
- Accumulated Response of con to r (counterfactual): $-0.045\% \ (4^{\text{th}}) \sim -0.103\% \ (10^{\text{th}})$

⇒ When shutting down housing market, consumption decreases more

\(\therefore\) Wealth effect is dominant in Seoul
4 | Result
4.2 Regional Results – Seoul, Gyeonggi

Accumulated Response of $\text{con}$ to $\text{r}$

- Accumulated Response of $\text{con}$ to $\text{r}$: -0.022% (4th)
- Accumulated Response of $\text{con}$ to $\text{r}$ (counterfactual): -0.0247% (3rd) ~ -0.0251% (4th)

⇒ When shutting down housing market, consumption decreases more
∵ Wealth effect is dominant in Gyeonggi
4 | Result

4.2 Regional Results – Daegu

- Ordering of Variables
  - real interest rate (r), real house price (hp), consumption (con)
- According to AIC, optimal lag (p) = 12

Accumulated Response of hp to r
=> Positive impact on hp (+0.25)
4.2 Regional Results – Daegu

Accumulated Response of **con** to **r**

- Accumulated Response of **con** to **r** : -0.034% (4th)
- Accumulated Response of **con** to **r** (counterfactual) : -0.031% (4th)

⇒ When shutting down housing market, consumption decreases less
♀ Substitution effect and budget constraint effect are dominant in Daegu
Result

4.2 Regional Results – Daejeon

- Ordering of Variables
  - real interest rate(r), real house price(hp), consumption(con)
- According to AIC, optimal lag(p) = 12

Accumulated Response of hp to r
=> Positive impact on hp (+0.17)
4.2 Regional Results – Daejeon

- Accumulated Response of con to r: -0.062% (4th)
- Accumulated Response of con to r (counterfactual): -0.062% (4th)

⇒ There is no statistically significant impact on consumption
4 | Result

4.3 Summary

- Heterogeneity in response of consumption to interest rate:
  - Seoul (-0.044%), Gyeonggi (-0.022%), Daegu (-0.034%), Daejeon (-0.062%)

- The role of housing market in the monetary transmission

<table>
<thead>
<tr>
<th></th>
<th>Seoul (7%)</th>
<th>Gyeonggi (13%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wealth Effect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substitution Effect, Budget Constraint Effect</td>
<td>Daegu (8%)</td>
<td></td>
</tr>
</tbody>
</table>
5 | Possible Explanations
-Why dominant effects are different?

- In **Seoul**, there are more renters than house-owners.

<table>
<thead>
<tr>
<th>House-owners</th>
<th>Renters</th>
</tr>
</thead>
<tbody>
<tr>
<td>43.3%</td>
<td>56.7%</td>
</tr>
</tbody>
</table>

- In **Daegu**, there are more house-owners than renters.

<table>
<thead>
<tr>
<th>House-owners</th>
<th>Renters</th>
</tr>
</thead>
<tbody>
<tr>
<td>62.3%</td>
<td>37.7%</td>
</tr>
</tbody>
</table>
Possible Explanations
- Why dominant effects are different?

- Sinai and Souleles (2005)
  - Fluctuation in rents is hedged by a long tenure
  - The household makes decision to possess the house for dwelling.
  - They lose incentive to resell to get additional profit.
  - Thus, change in house price affects less to change in consumption.
Possible Explanations
- Why dominant effects are different?

- Campbell and Cocco (2007)
  - The homeowner for dwelling has less effect on consumption.
  - The homeowner for investing (To sell) increases their consumption.

- The dual role of houses
  - As a consumption
  - As an investment
Possible Explanations

- Why dominant effects are different?

The dual role of houses

Seoul: Investment $\rightarrow$ Wealth effect

Daegu: consumption $\rightarrow$ Substitution effect
Conclusion
6.1 Contribution

- The effects of monetary policy on consumption differ from region to region
- Depending on the role of housing: Invest or Dwell
- CB should consider the specified effects of monetary policy
1. Consumption Variable
   - Does ‘Change rate of total registered motor vehicles’ well represent consumption?
     → It is influenced by the business of car industry

2. Subject of analysis
   - We can include more provinces other than metropolitan cities.
THANK YOU
Q. What does the value mean?

In SVAR, a shock of a variable can be interpreted as increase in one-standard deviation of the variable.

- In our case, standard deviation of first difference of call rate is 0.07
- It can be interpreted as 0.07% increase in call-rate.
- In general, BOK has increased its base rate by 0.25%.
- Although the numerical value seems tiny, it is nonnegligible.
Q. Real Housing Price

Real housing price in Korea

\[
\text{Real Housing Price} = \frac{\text{Housing Price Index (2019.01 = 100)}}{\text{Consumer Price Index (2015 = 100)}}
\]
Q. Base rate and call rate

Correlation : 0.9984697756

