Effects of Monetary Policy via Housing Market

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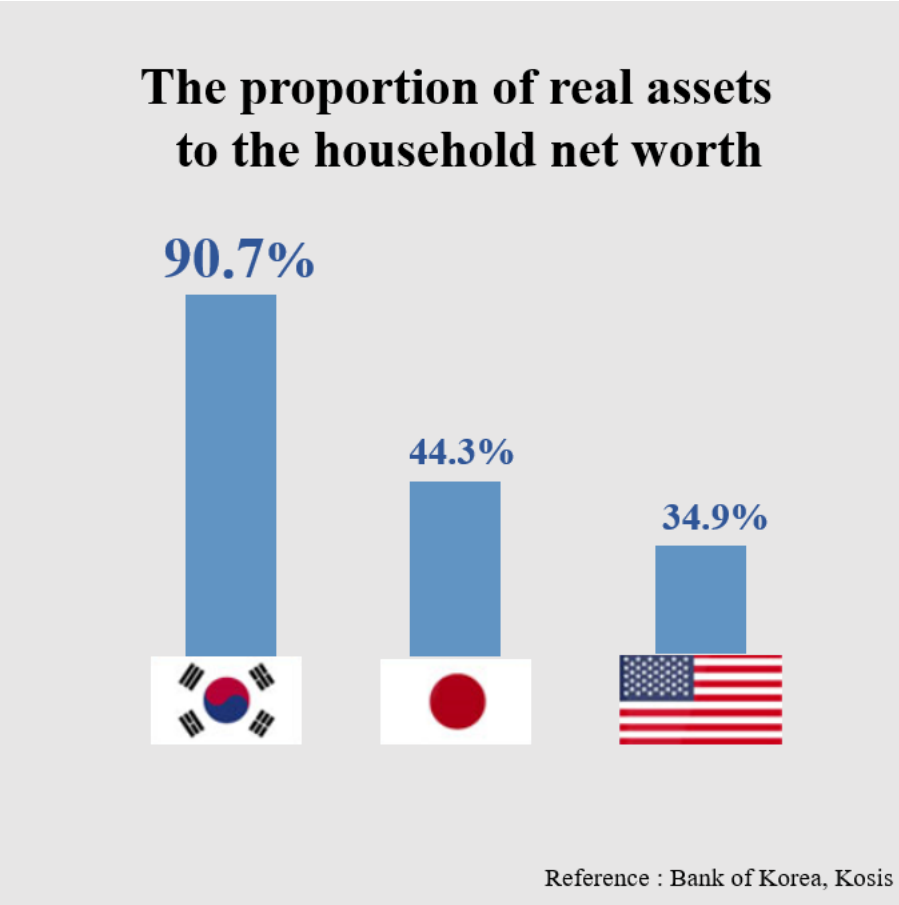
Contents

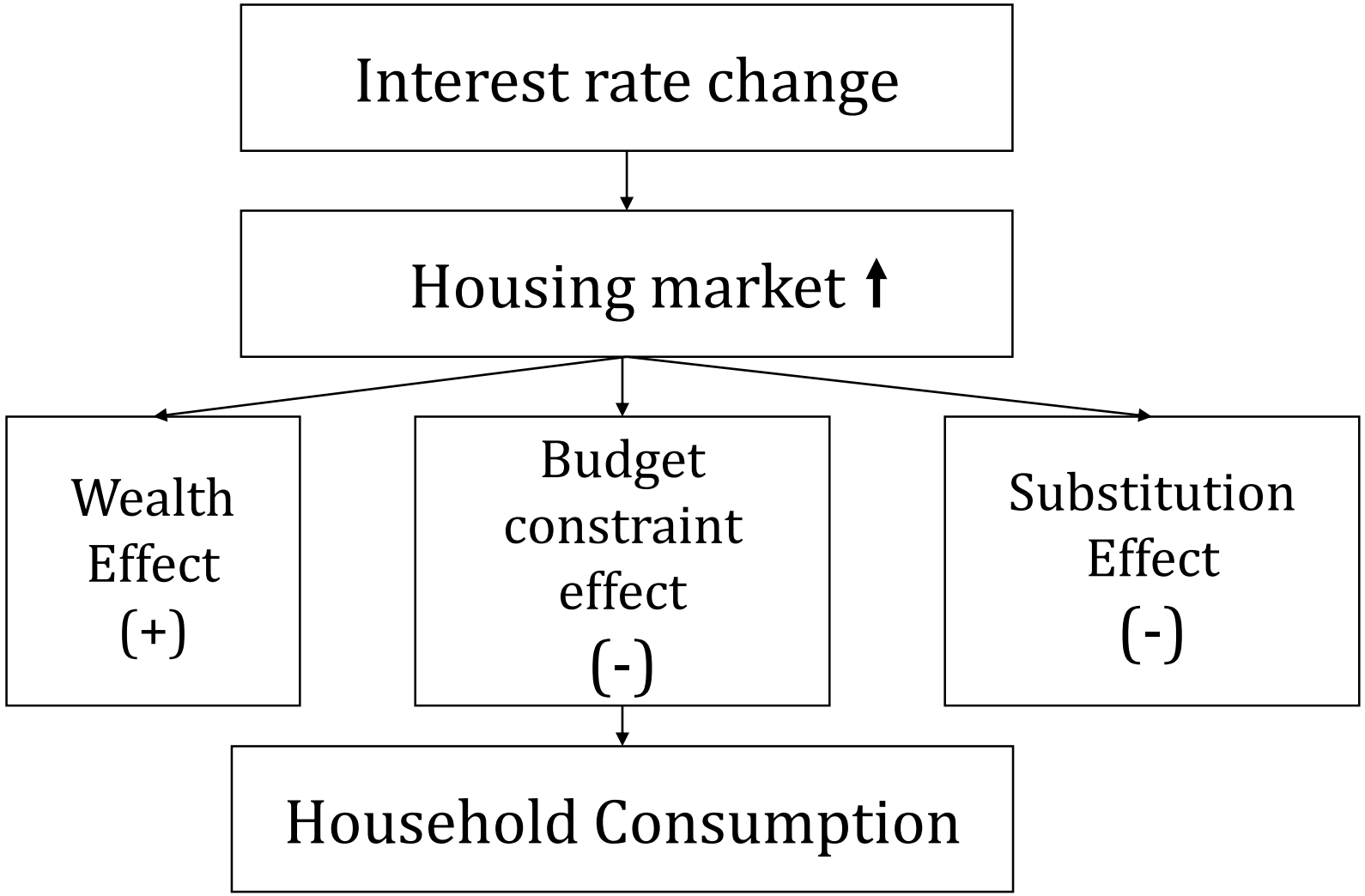
1 | Background
1.1 Interest rate, housing, consumption



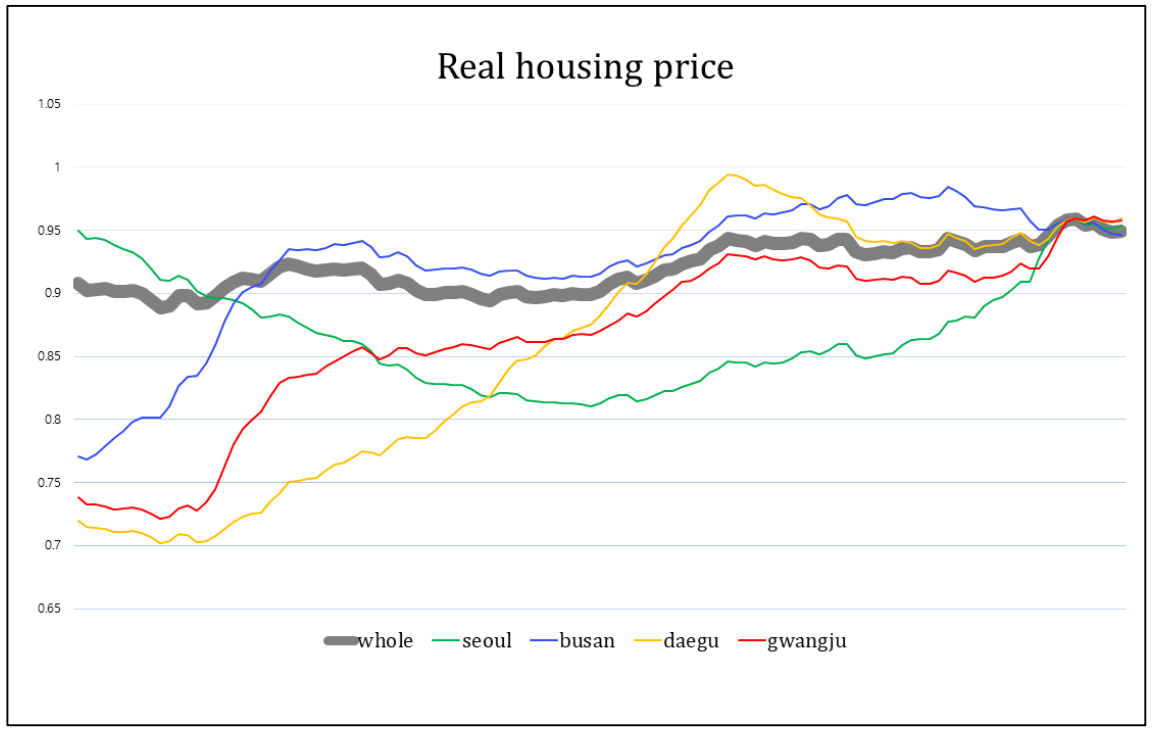
- 90% of household net worth is real estate
- Rising house prices → wealth effect

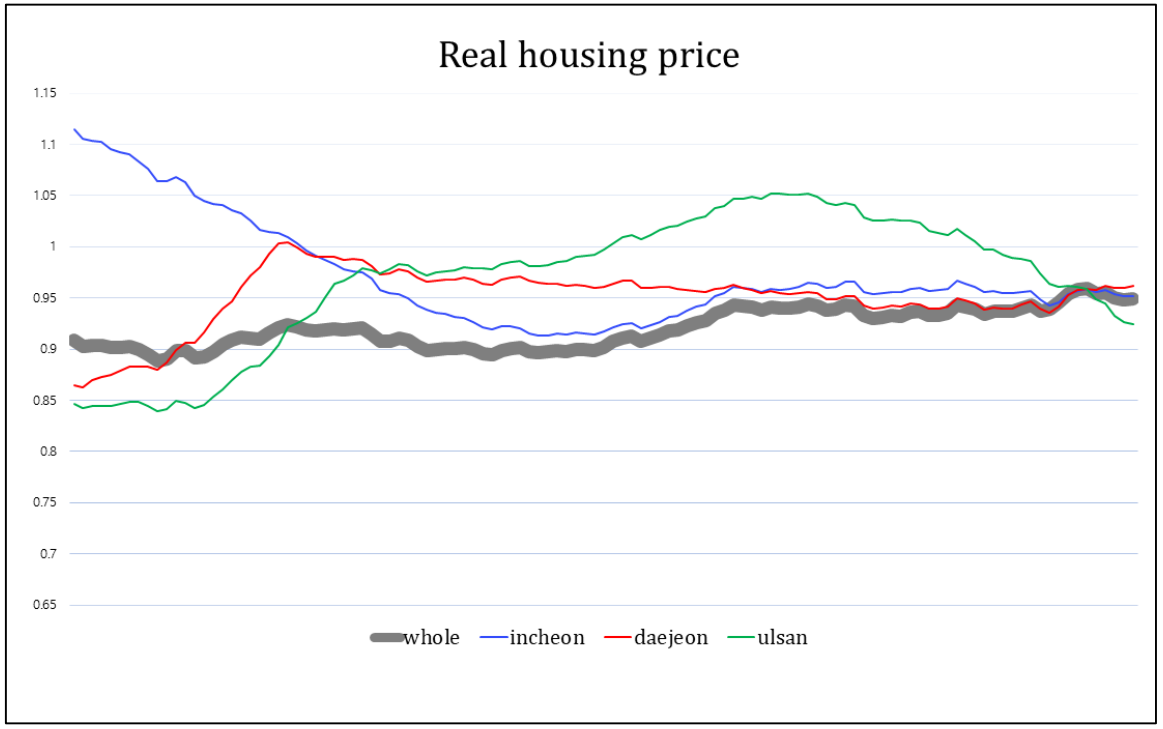
Interest rate → Housing → Consumption

1 | Background
1.1 Interest rate, housing, consumption



1 | Background
1.2 Regional heterogeneity





- Different changes in housing prices

→ The effects of monetary policy on consumption would have regional pattern

1 | Background
1.3 The object of our research

"The regional effects of monetary policy via housing market"

2 | Literature review – Key paper

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.

2 | 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

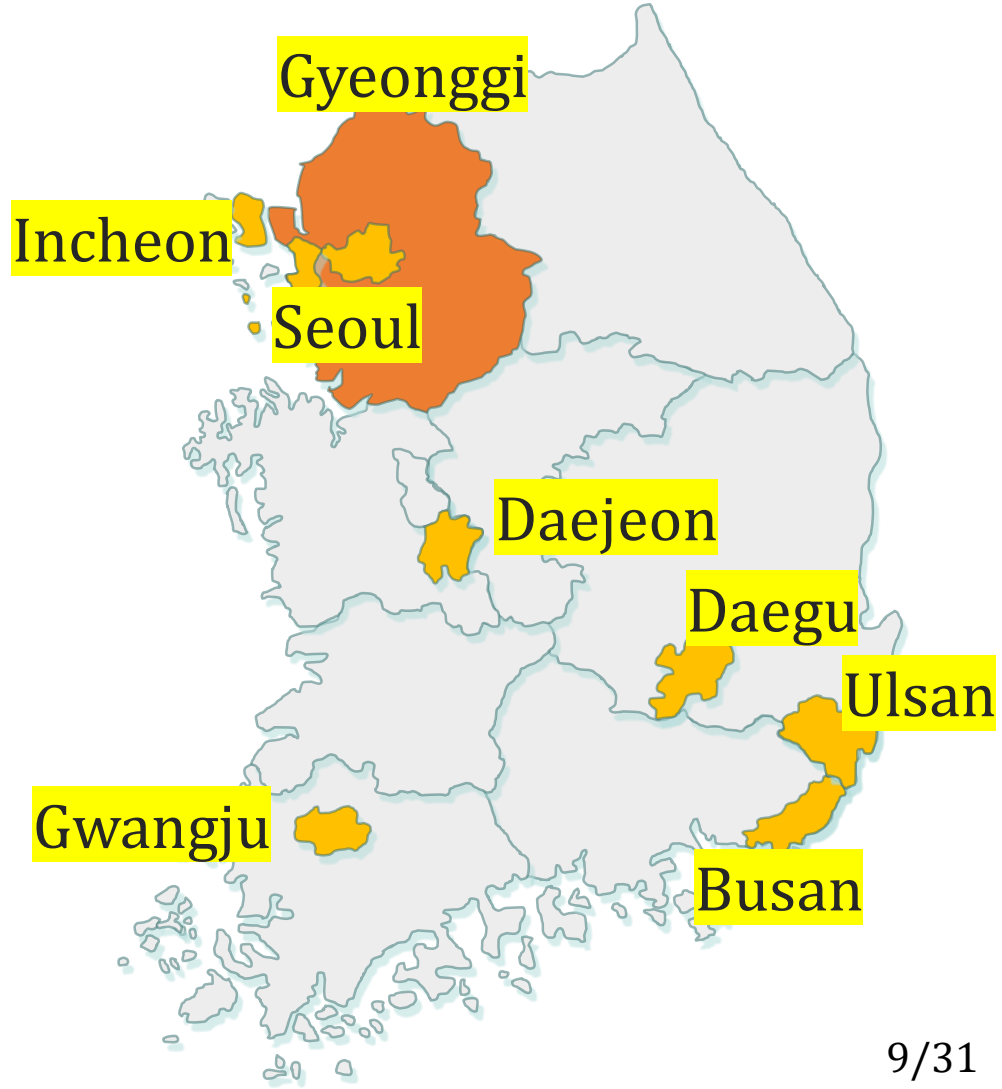
3 | Data and Methodology
3.1 Data

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

Variables	Data	Source
Monetary policy	Call rate	BOK ECOS
Housing price	Housing purchase price composite indices (2019.01=100.0)	KB
Consumption	(National) Household final consumption expenditure	KOSIS
	(Regional) Change Rate of Total Registered Motor Vehicles Mian, Rao and Sufi(2013), "Household Balance Sheets, Consumption, and the Economic Slump", *The Quarterly Journal of Economics*	KOSIS

3 | Data and Methodology
3.1 Data

3. Adjustment

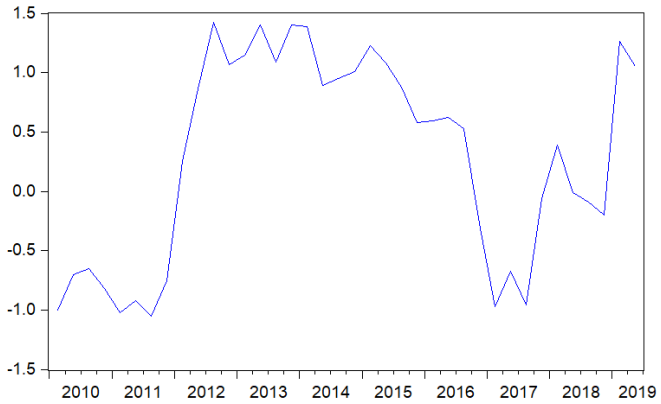
   : Seasonality adjustment, Inflation adjustment

4. Summary statistics

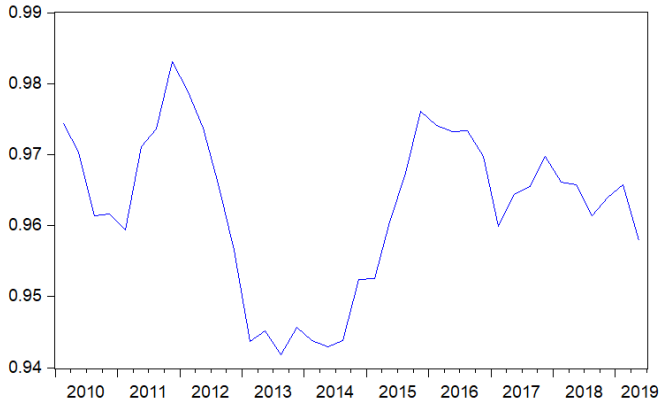
	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
Real call rate	0.288158	0.555	1.42	-1.05	0.871531	-0.28095	1.547444
Real house price	0.962532	0.96488	0.98312	0.941828	0.011259	-0.42746	2.237087
Real consumption (National)	192868.4	190941.3	213616.1	174163.1	11415.89	0.290911	1.927459
Real consumption (Regional: Seoul, %)	0.0419	0.0412	0.2881	-0.3002	0.001010	-0.542830	4.569395

3 | Data and Methodology
3.1 Data

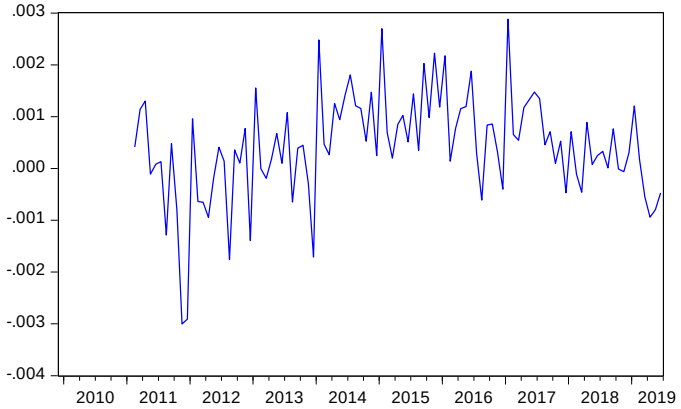
<Real Call Rate>



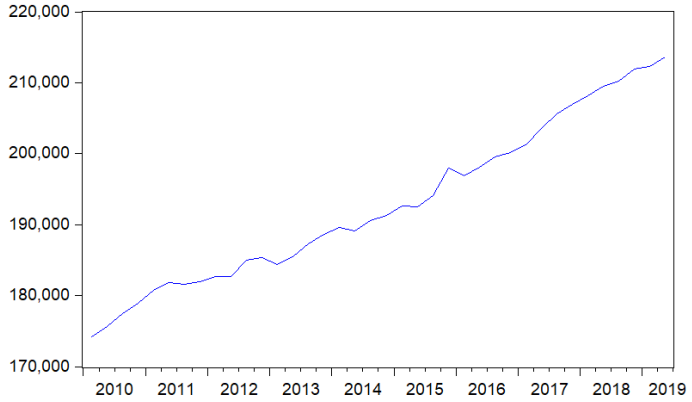
<Real House Price>



<Real Consumption: Seoul>



<Real Consumption: National>



3 | Data and Methodology
3.1 Data

5. Unit Root test (Stationarity)

- **House price, call rate**

  : First differenced

- **Household consumption**

  : Log differenced

- **Change Rate of Total Registered Motor Vehicles**

  : Stationary

3 | Data and Methodology
3.2 Methodology

- Model: **Structural VAR model**
  - Cooley and Leroy(1985), Blanchard and Quah (1989)

$$\mathrm{A}Z_t = c + \sum_{i=1}^{p} A_i Z_{t-i} + e_t$$

where $\mathrm{var}(e_t) = \Lambda$

3 | Data and Methodology
3.2 Methodology

- Approach: **Counterfactual approach**

Base Model:
$$AZ_t = \begin{pmatrix} 1 & 0 & 0 \\ {b_{21}}^t & 1 & 0 \\ {b_{31}}^t & {b_{32}}^t & 1 \end{pmatrix} \begin{pmatrix} Z_r \\ Z_{hp} \\ Z_{con} \end{pmatrix}$$

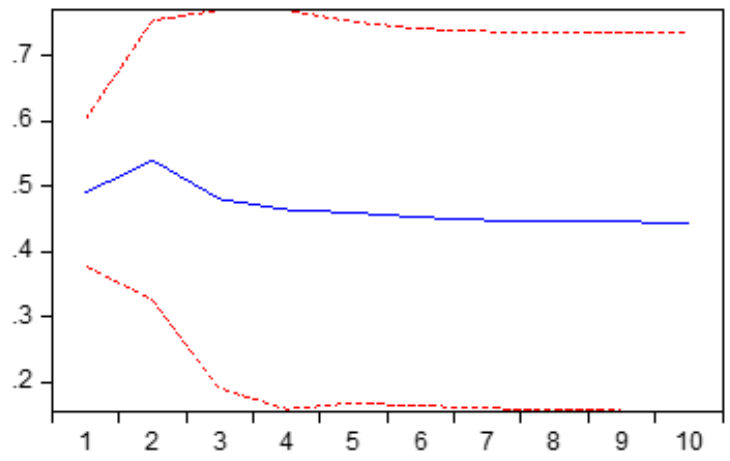
Counterfactual Model:
$$AZ_t = \begin{pmatrix} 1 & 0 & 0 \\ {b_{21}}^t & 1 & 0 \\ {b_{31}}^t & 0 & 1 \end{pmatrix} \begin{pmatrix} Z_r \\ Z_{hp} \\ Z_{con} \end{pmatrix}$$

3 | Data and Methodology
3.2 Methodology

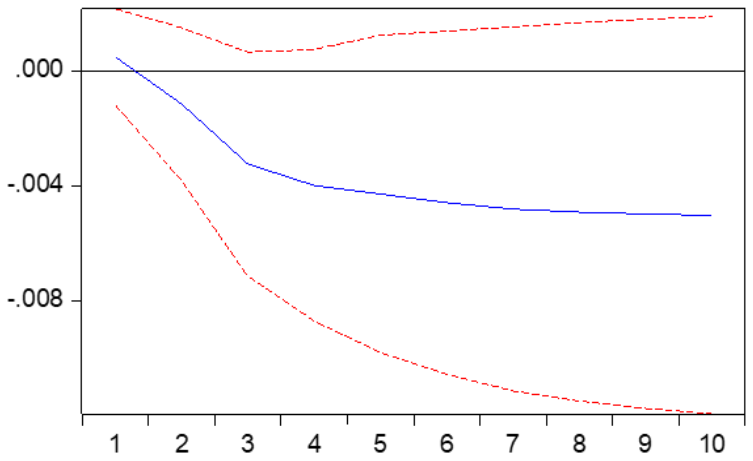
- Approach: **Counterfactual approach**
  - Giving restrictions that the cross correlations between consumption and house prices is zero in the consumption equation (**Housing market is shut down**)
  - Comparing the different results from base model
  - Identifying the role of house prices

4 | Result
4.1 National Results

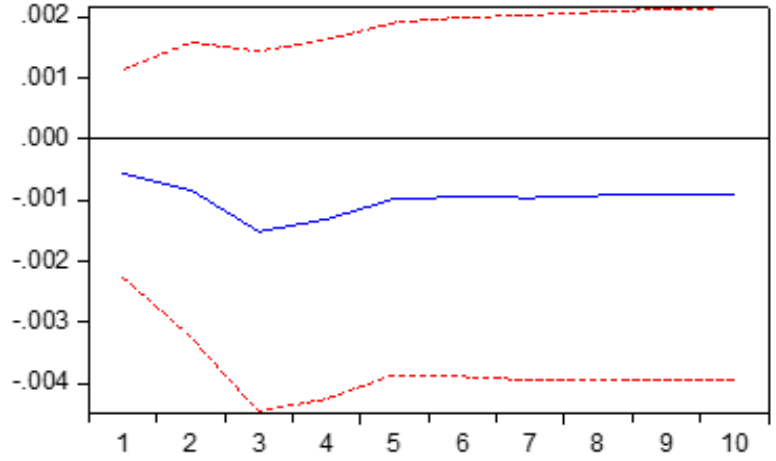
- Ordering of Variables
  - real interest rate(r), real house price(hp), consumption(con)
- According to AIC, optimal lag = 1



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



Accumulated Response of **hp** to **r**



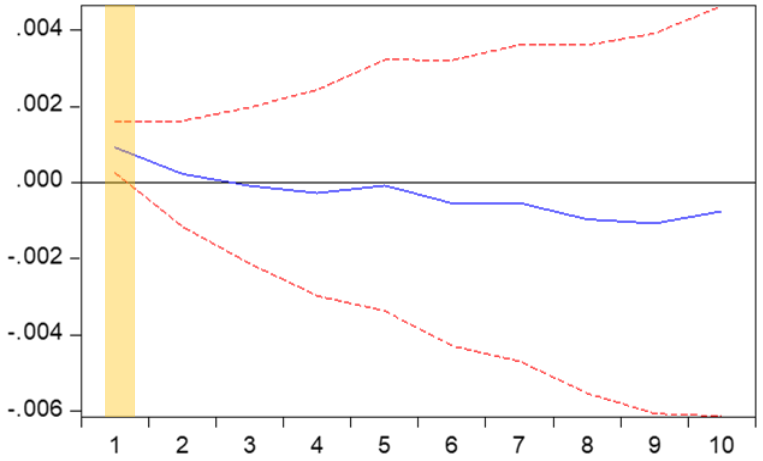
Accumulated Response of **con** to **r**

⇒ All results are statistically insignificant

4 | Result
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)

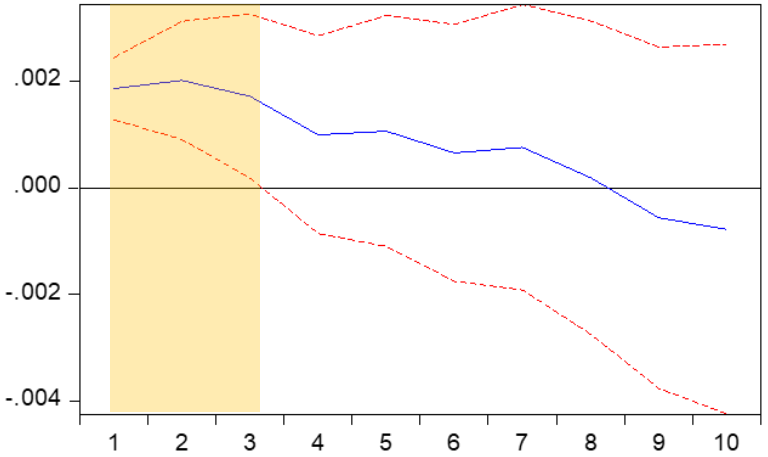
<Seoul>



Accumulated Response of **hp** to **r**

=> Positive impact on hp (+0.13)

<Gyeonggi>



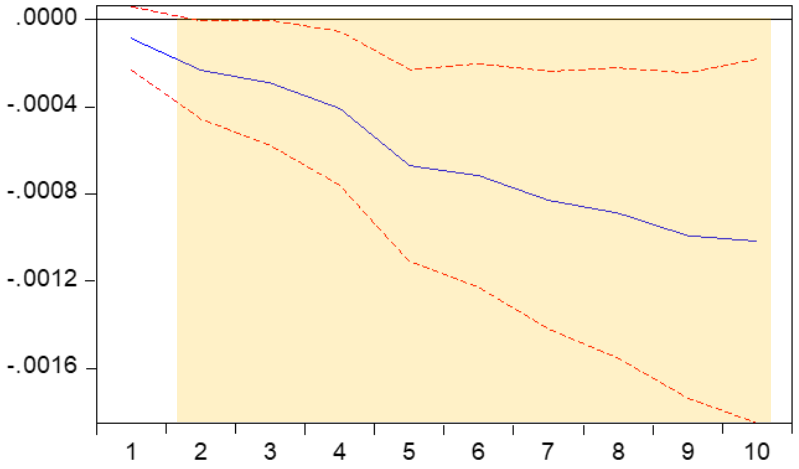
Accumulated Response of **hp** to **r**

=> Positive impact on hp (+0.19)

**Nam-hyun Kim and Han-Ik Jang(2018), "Influence and Factors of Interest rates on Housing Prices"

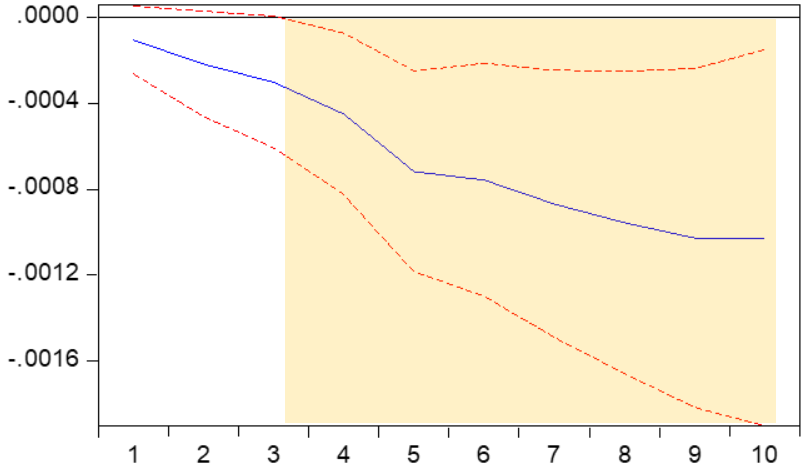
4 | Result
4.2 Regional Results – Seoul, Gyeonggi

<Seoul>



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

counterfactual



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

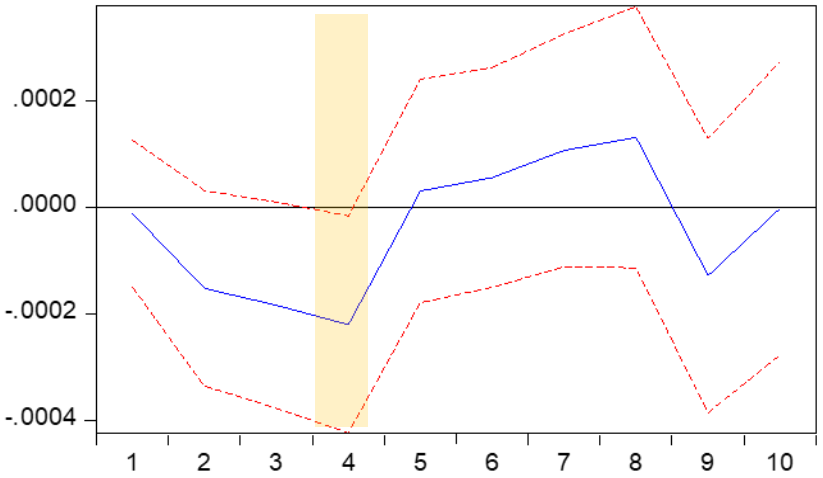
- Accumulated Response of **con** to **r** : -0.023% (2^{nd}) ~ -0.102% (10^{th})
- Accumulated Response of **con** to **r** (counterfactual) : -0.045% (4th) ~ -0.103% (10th)

⇒ When shutting down housing market, consumption decreases more

∴ Wealth effect is dominant in Seoul

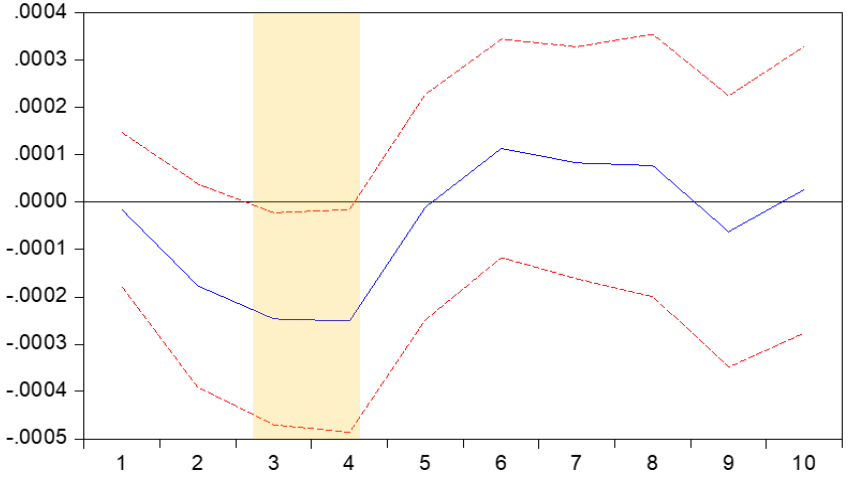
4 | Result
4.2 Regional Results – Seoul, Gyeonggi

<Gyeonggi>



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

counterfactual



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

- Accumulated Response of **con** to **r** : -0.022% (4th)
- Accumulated Response of **con** to **r** (counterfactual) : -0.0247% (3rd) ~ -0.0251% (4th)

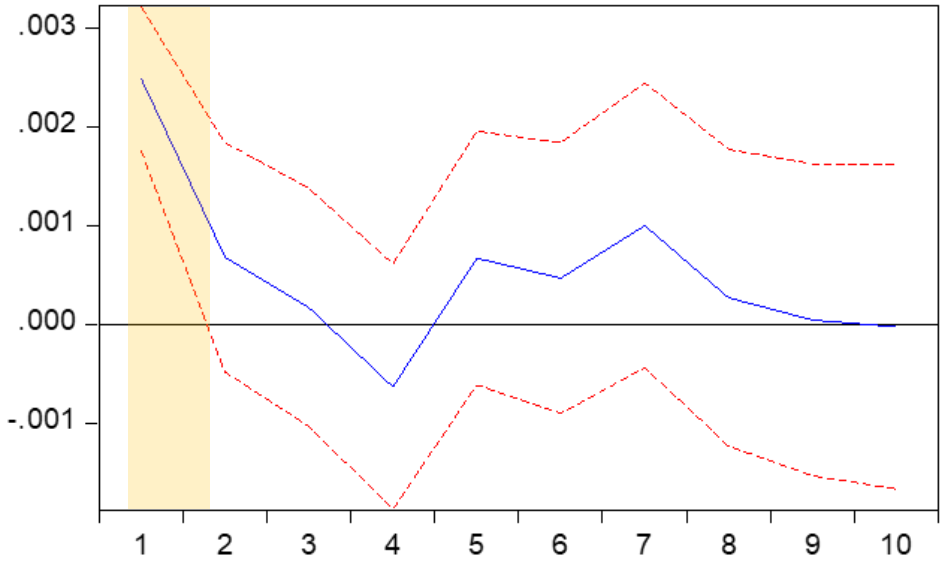
⇒ When shutting down housing market, consumption decreases more

∴ 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

<Daegu>

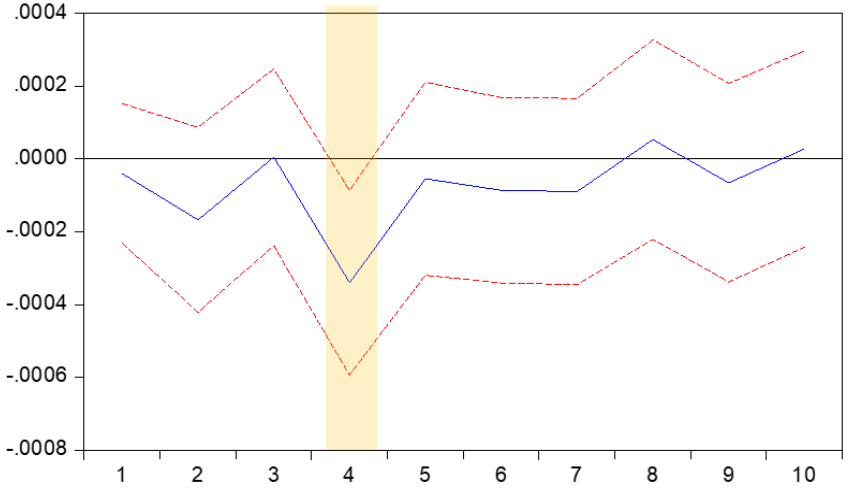


Accumulated Response of **hp** to **r**

=> Positive impact on hp (+0.25)

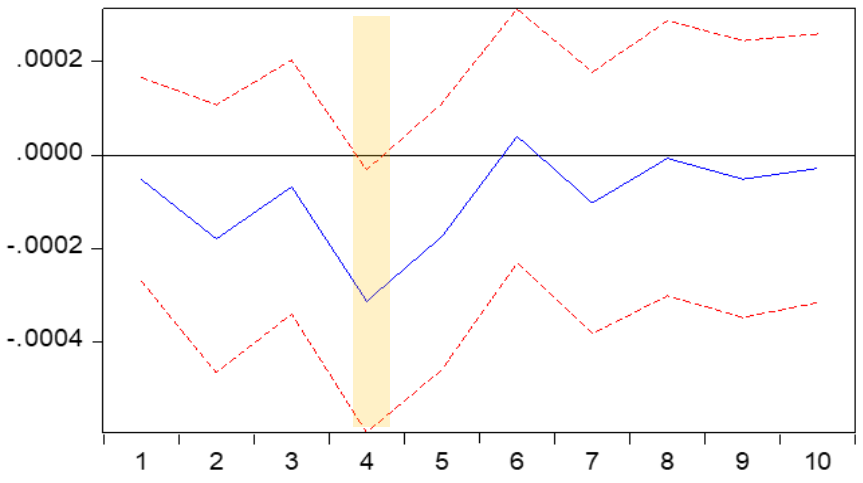
4 | Result
4.2 Regional Results – Daegu

<Daegu>



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

counterfactual



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)

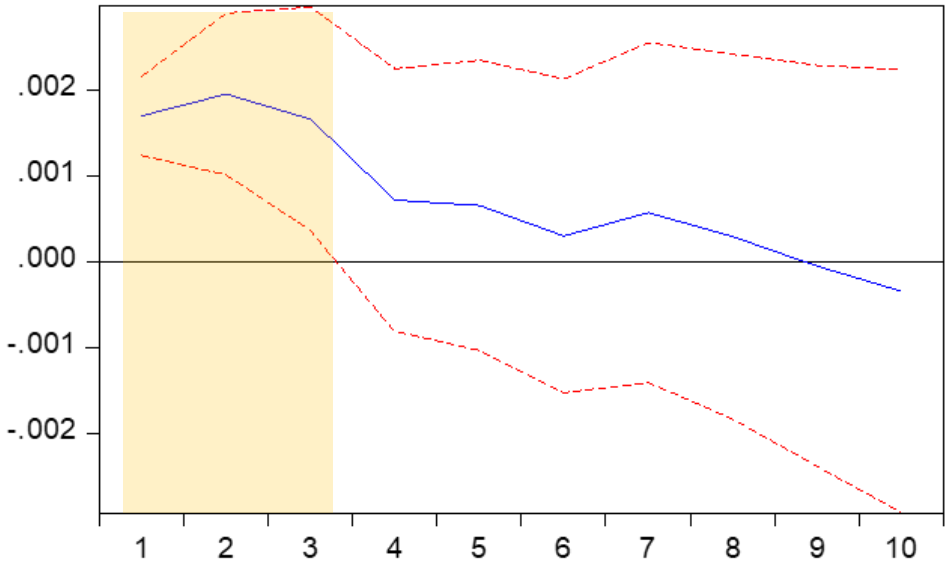
⇒ When shutting down housing market, consumption decreases less

∴ Substitution effect and budget constraint effect are dominant in Daegu

4 | 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

<Daejeon>

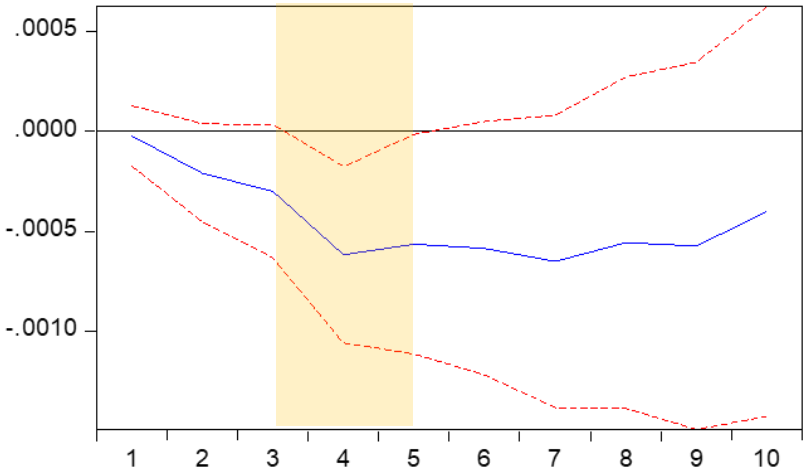


Accumulated Response of **hp** to **r**

=> Positive impact on hp (+0.17)

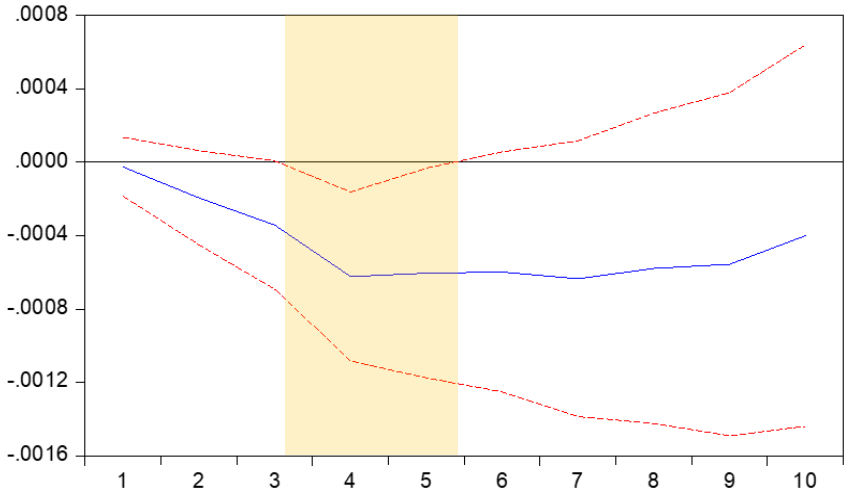
4 | Result
4.2 Regional Results – Daejeon

<Daejeon>



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

counterfactual



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

- 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**

Wealth Effect	Seoul (7%)
	Gyeonggi (13%)
Substitution Effect, Budget Constraint Effect	Daegu (8%)

5 | Possible Explanations
-Why dominant effects are different?

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

House-owners	Renters
43.3%	56.7%

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

House-owners	Renters
62.3%	37.7%

5 | 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.

5 | Possible Explanations
-Why dominant effects are different?

- **Campbell and Cocco (2007)**

  -The homeowner for dwelling has less effect on consumption.

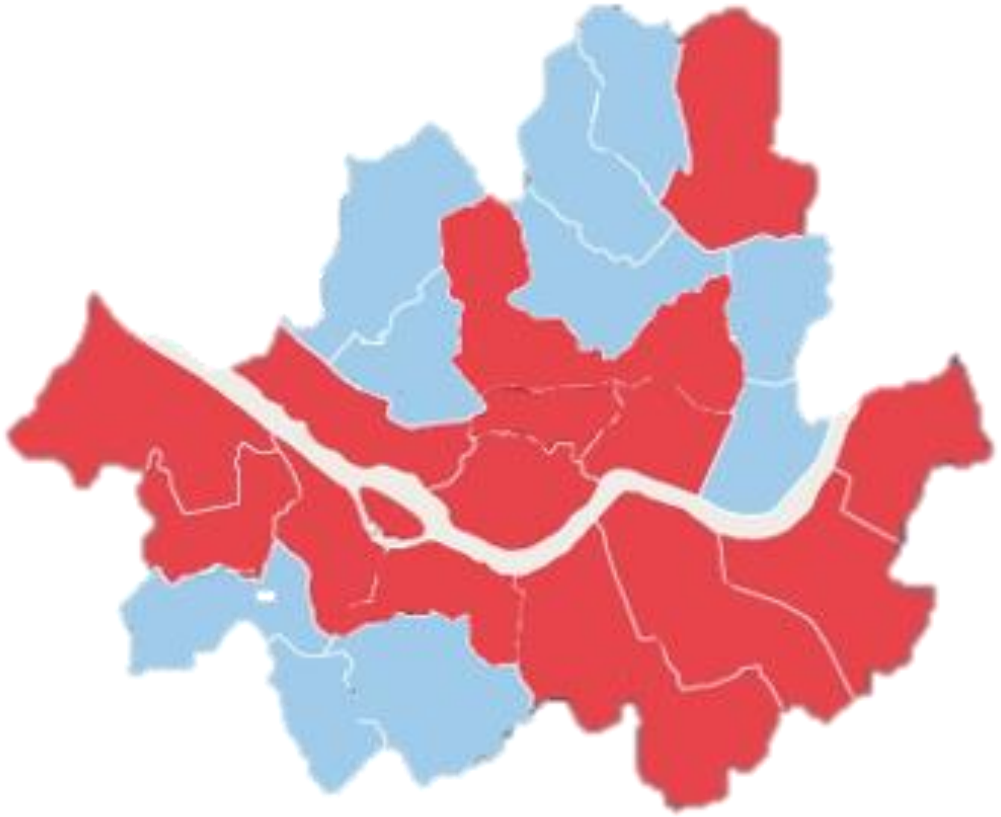
  -The homeowner for investing (To sell) increases their consumption.

- **The dual role of houses**

  - As a **consumption**

  - As an **investment**

5 | Possible Explanations
-Why dominant effects are different?



[25 districts in Seoul]

Speculation Zone

Over-heated Speculation Zone

The dual role of houses

Seoul: Investment → Wealth effect

Daegu: consumption → Substitution effect

6 | 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

6 | Conclusion
6.2 Further Study

1. Consumption Variable

   - Does ‘Change rate of total registered motor vehicles’ well represent consumption?

   → It is influenced by the business of car industry

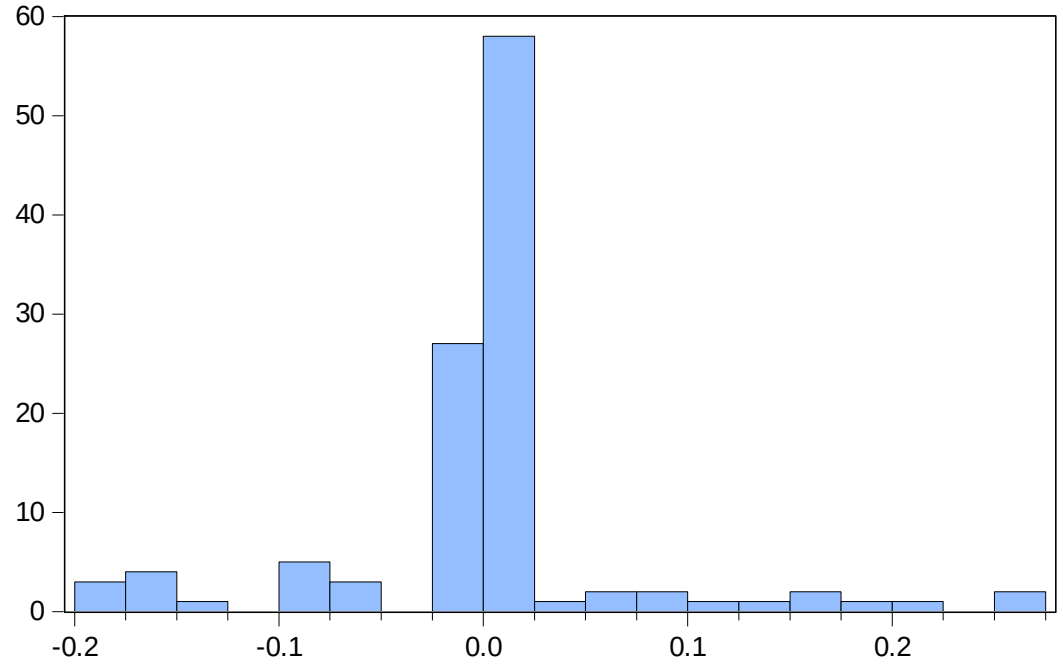
2. Subject of analysis

   - We can include more provinces other than metropolitan cities.

THANK YOU

Q&A

Q. What does the value mean?

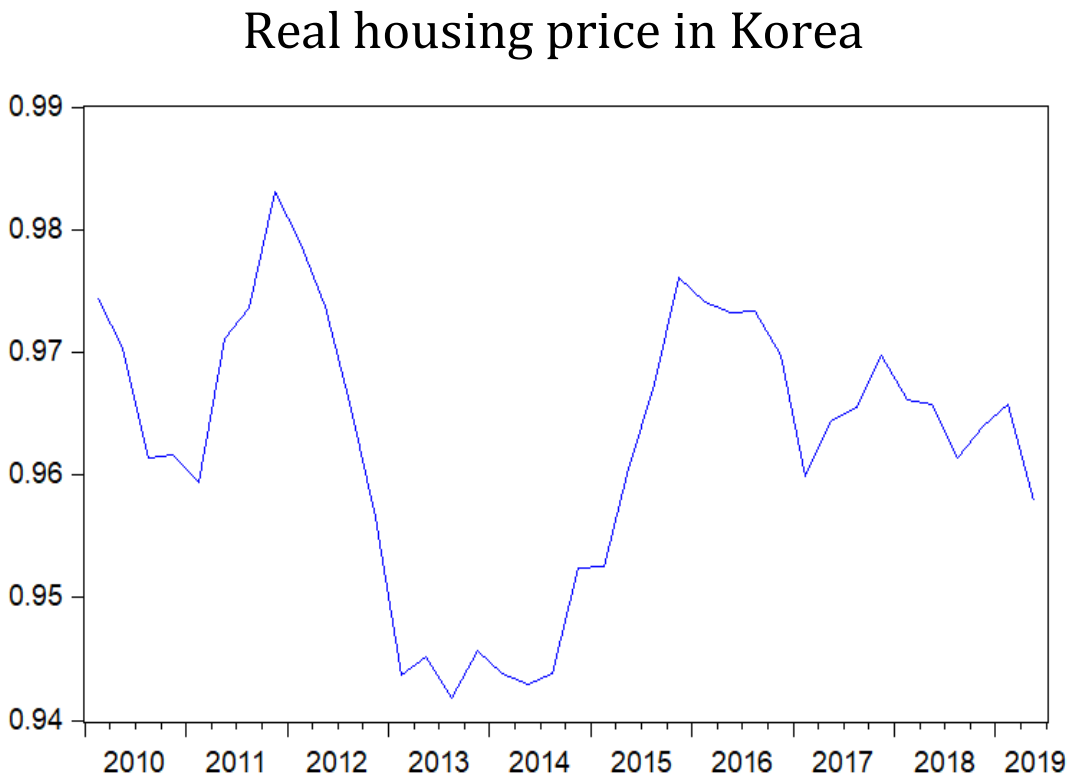


Series: FDCR	
Sample 2009M12 2019M06	
Observations 114	
Mean	-0.002105
Median	0.000000
Maximum	0.260000
Minimum	-0.200000
Std. Dev.	0.073959
Skewness	0.389142
Kurtosis	6.391682
Jarque-Bera	57.51885
Probability	0.000000

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

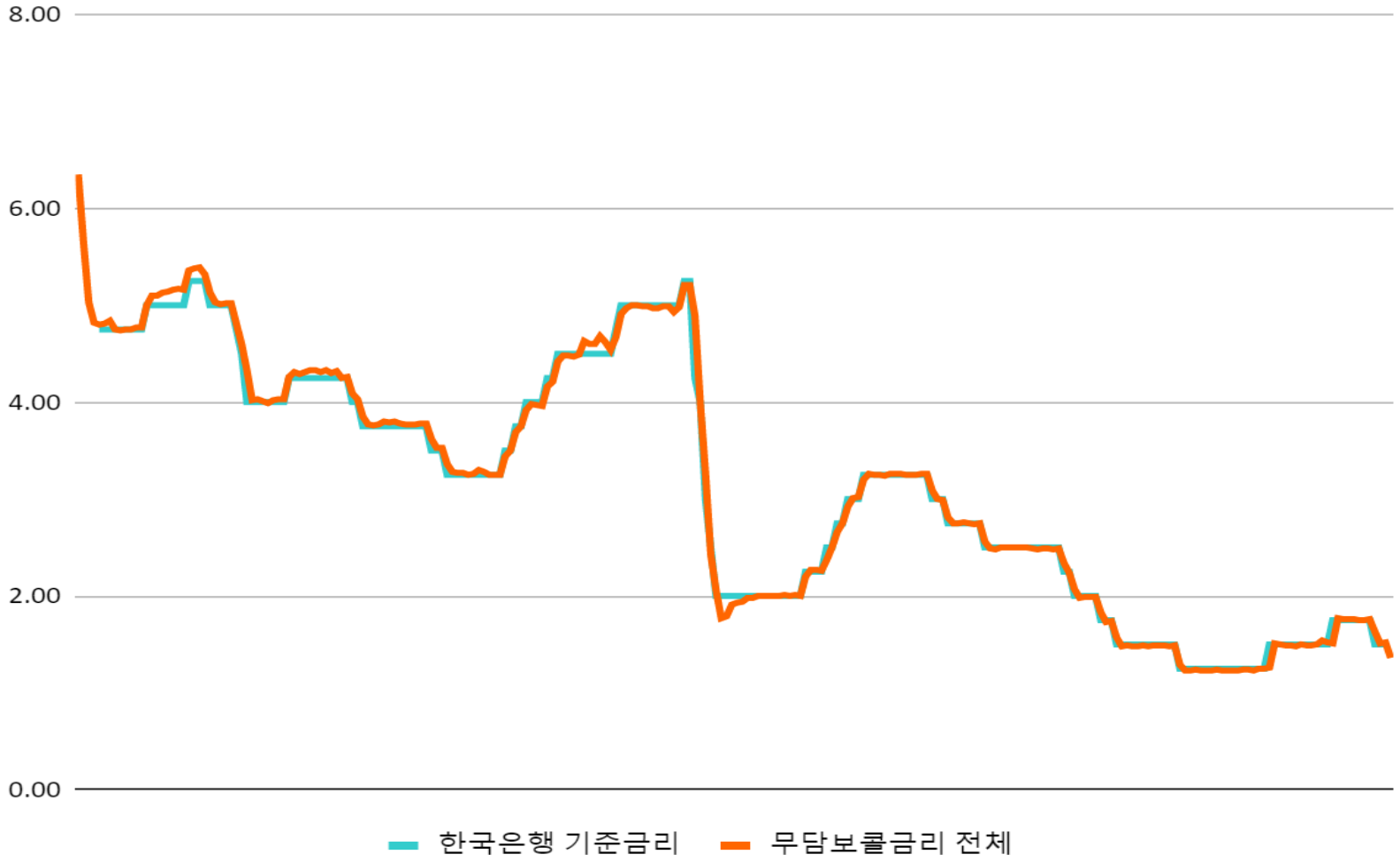
- In our case, standard deviation of first difference of call rate is 0.07
- It can be interpreted as 0.07% increase in call-rate.
- In general, BOK has increased its base rate by 0.25%.
- Although the numerical value seems tiny, it is nonnegligible.

Q. Real Housing Price



$$Real\ Housing\ Price = \frac{Housing\ Price\ Index\ (2019.01 = 100)}{Consumer\ Price\ Index\ (2015 = 100)}$$

Q. Base rate and call rate



Correlation
: 0.9984697756

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