Fiscal Policy, Liquidity, and Spatial Housing Price Disparity: A local projection approach

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Introduction

Increasing and Polarizing Housing Prices in Major Cities

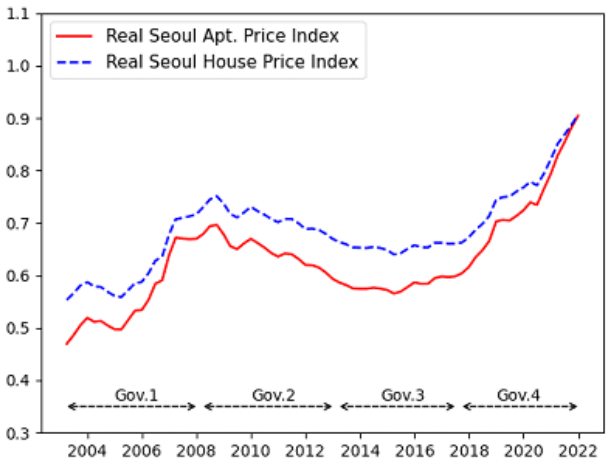
- Rising and increasingly polarized housing prices have been observed worldwide for decades. Many studies have examined their causes from both micro- and macroeconomic perspectives.
  - e.g., economic growth, low interest rates, regulatory policies, wealth polarization, $\cdots$
- However, most studies **do not fully explain spatial housing price disparities**.
- An alternative explanation is the **"superstar mechanism"** proposed by Gyourko et al. (2013), which highlights the interaction between **excess demand** and **limited supply** in superstar cities.
  - Superstar cities attract strong housing demand due to superior security, education, and living environments, while their supply is limited and difficult to expand.
  - Economic development and income polarization have increased the number of high-income individuals, leading to substantial housing price surges, especially in superstar areas.

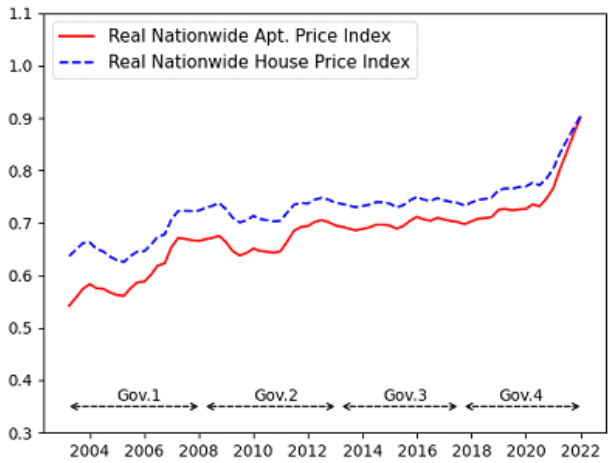
Introduction

Fiscal Policy and Housing Prices

- In Korea, housing prices also rose sharply during the 2000s, coinciding with periods of **expansionary fiscal policy**. Fiscal policy may have been an **important driver on the demand side**. Does it boost housing asset price?
  - Housing prices surged notably during the first and fourth administrations, both characterized by strong fiscal expansion.
  - Anecdotally speaking, some believe that fiscal policy may have played a **significant role in boosting housing demand**, although theoretical and empirical evidence has so far been limited.

Real Housing and Apartment Price Indices in Seoul and Nationwide (KB)





Introduction

Existing Fiscal Literature Failed to Explain Housing Prices

- **Counter-cyclical fiscal policy**
  - New Keynesian view: expansionary fiscal policy is effective in boosting short-run aggregate demand (Feldstein, 2009).
  - Opposing view: fiscal policy is less effective or neutral (Barro and Redlick, 2011).
- **Ricardian Equivalence vs. Neoclassical Crowding-Out Effect**
  - Under the crowding-out effect, higher government spending raises interest rates, which can lower housing prices (Feldstein, 2009).
- **Studies by type of fiscal spending**
  - Distinguish between **productive** (e.g., infrastructure, education, health, social security) and **non-productive** (e.g., defense) fiscal spending (Aschauer, 1989).
- **Fiscal Theory of the Price Level (FTPL)**
  - FTPL provides a theoretical link between fiscal policy and prices, but it primarily explains **inflation**, not housing prices.
  - Moreover, there is little evidence supporting fiscal inflation in Korea.

Introduction

Existing Housing Literature Failed to Explain the Positive Relationship btn Fiscal Policy and Housing Asset

- **Microeconomic Approach**
  - Hedonic price models identify the determinants of individual housing prices (e.g., size, quality, location) using micro-level data (Rosen, 1974).
- **Macroeconomic Approach**
  - VAR models have been used to examine the relationship between housing prices and macroeconomic variables.
    - $\rightarrow$ Monetary policy shocks (e.g., Ahearne *et al.*, 2005)
    - $\rightarrow$ Fiscal policy shocks (e.g., Afonso and Sousa, 2009)
  - These studies establish empirical relationships but **fail to explain the channels** through which fiscal policy affects housing prices.
- **Alternative Approach: Superstar Mechanism**
  - Excess demand and inelastic supply in superstar cities drive price divergence (Gyourko *et al.*, 2013).
  - Ultimately, **the law of demand and supply explains the sharp price increases in major areas**. We aim to **link this mechanism to fiscal policy**.

Introduction

What We Do

- We provide **evidence** that expansionary fiscal spending has increased housing prices.
  - This effect was most pronounced in **Seoul**, under administrations that pursued vigorous fiscal expansion.
- We offer **a theoretical interpretation** by combining a weak version of the Fiscal Theory of the Price Level (FTPL) with the **superstar mechanism**.
  - **Weak version FTPL (Sim and Lee, 2025)**: Sudden large-scale government bond issuance to finance fiscal expansion raises pressure on interest rates. The central bank's intervention to stabilize the market leads to **liquidity (M2) expansion**.
  - **Superstar Mechanism (Gyourko et al., 2013)**: In superstar cities with inelastic supply and excess demand, even small demand shocks can trigger **sharp price increases**.

Introduction: Summary of Sim and Lee (2025)

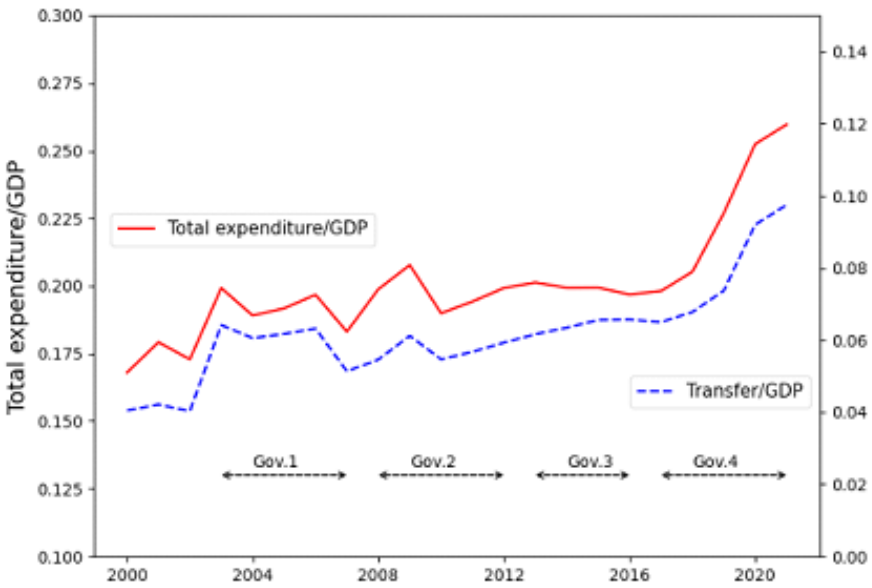
Fiscal Spending → Liquidity Expansion

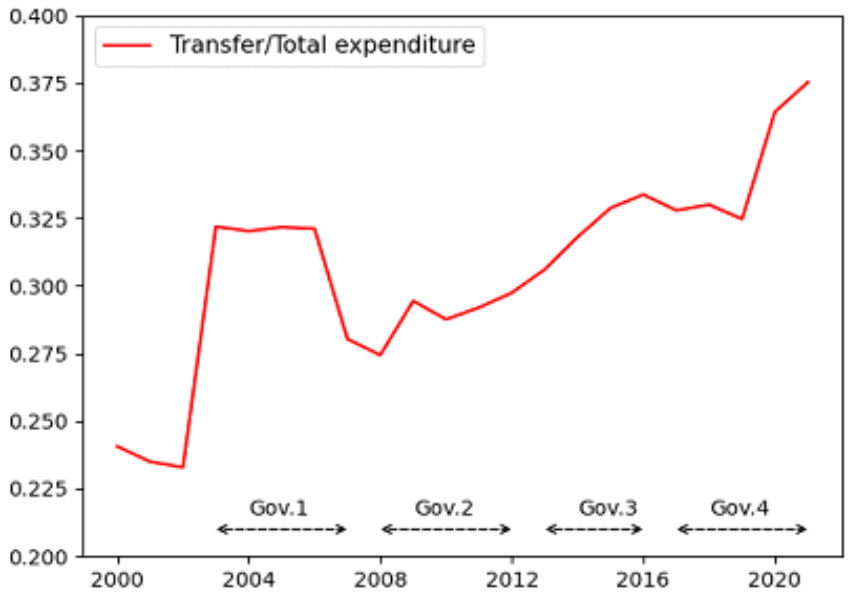
- **Empirical Finding**: A strong and robust positive relationship exists between **debt-financed fiscal spending** and **liquidity (M2)** in Korea, even after controlling for monetary policy effects.
- **Transmission Mechanism**:
  - Debt-financed fiscal expansion puts upward pressure on market interest rates.
  - To maintain the policy rate (Taylor rule), the central bank intervenes through **bond purchases or reduced sterilization**, leading to **passive liquidity expansion**.
  - This mechanism works without explicit fiscal inflation and reflects **indirect fiscal monetization**.
- **Implication for Housing**:
  - Increased liquidity has well-known asset price effects; **fiscal shocks contribute to liquidity growth**, which likely underlies recent sharp increases in Korean housing and asset prices.

Expansionary Fiscal Policy

Total Expenditure/GDP and Transfers/GDP

- Periods of **fiscal expansion** under the first and fourth administrations coincided with **sharp increases in housing prices** in Seoul.
- As overall fiscal spending increased, the **share of transfer expenditures** in total spending also rose significantly.

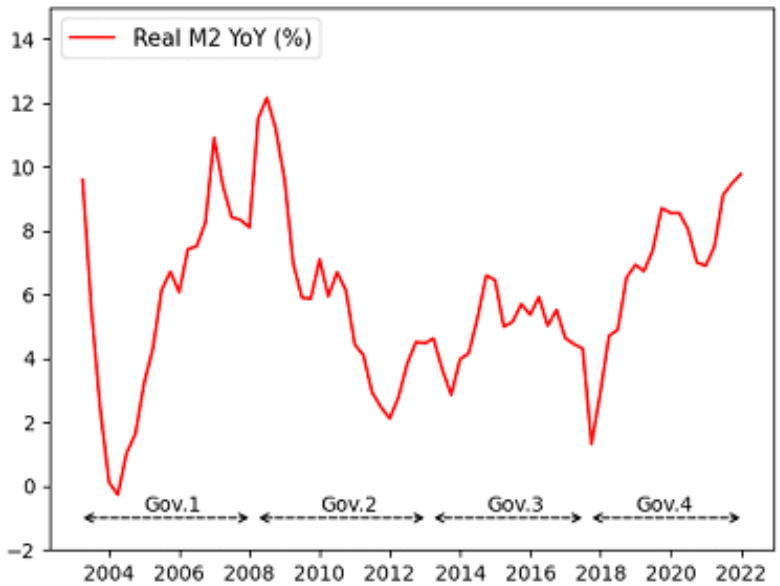


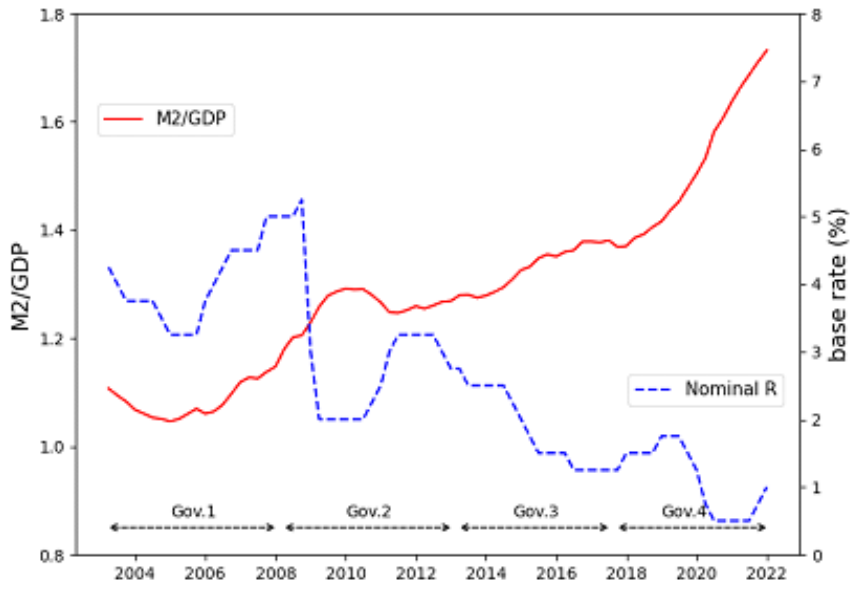


Low Interest Rates and Liquidity

Interest Rates and Liquidity

- The sharp rise in housing prices during the 2000s is often attributed to the **persistence of low interest rates** and the resulting **expansion of liquidity**.





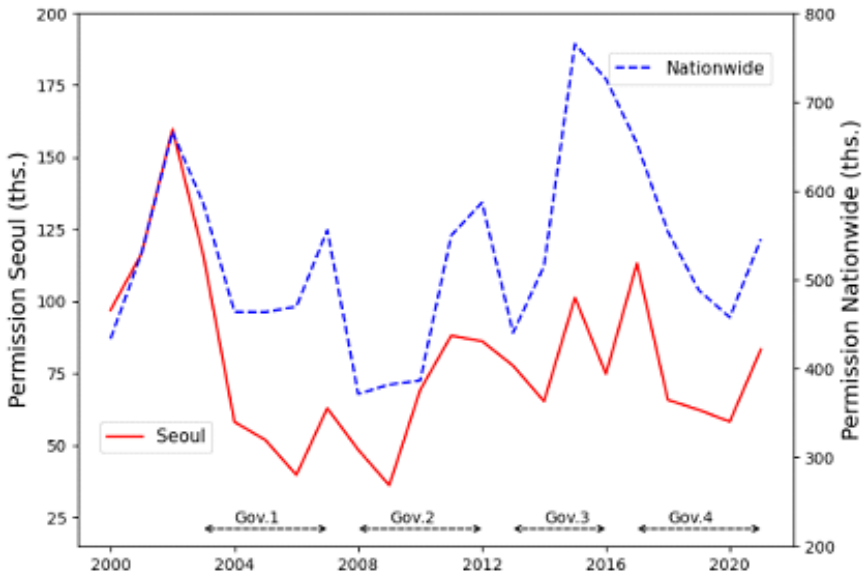
Housing Policies

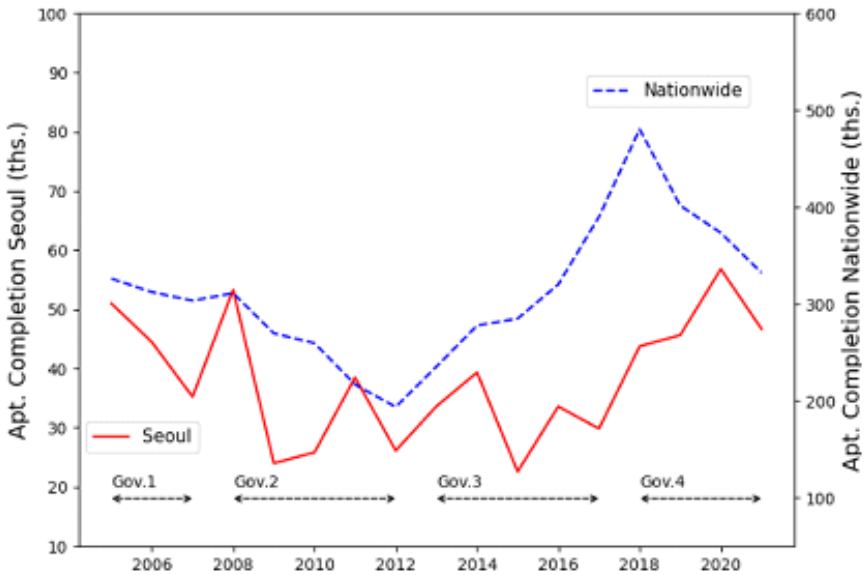
Regulatory Stance

- The **1st and 4th administrations** implemented **tighter housing market regulations**, while the **2nd and 3rd administrations** adopted **easing policies**.

Housing Permits and Completions

- The number of housing permits was **relatively low during the 1st and 4th administrations**, consistent with their tighter regulatory stance.





Methodology and Data

Specification

- Bring a local projection identification to panel data analysis of regional housing prices
- The specification follows **Local Projection models** (Jordà, 2005), directly estimating horizon-h responses.
- We estimate the dynamic impact of fiscal shocks on housing prices using a **Difference-in-Differences framework with rich fixed effects**.

$$HP_{i,t+h} = \alpha_i + \lambda_t + \beta_1 FS_{t-4} + \beta_2 \Delta_4 FS_t + \beta_3 (Seoul \times \Delta_4 FS_t) + X'_{i,t}\gamma + \epsilon_{i,t}$$

- $HP_{i,t+h}$: log real housing price index at horizon h, $h = 1, \ldots, 8$
- α_i: regional fixed effects for 16 regions
- λ_t: year fixed effects
- FS_{t-4}: four-quarter lag of fiscal variable
- $\Delta_4 FS_t$: fiscal shock (four-quarter change in fiscal variable)
- $Seoul \times \Delta_4 FS_t$: interaction between Seoul dummy and fiscal shock
- $X_{i,t}$: vector of control variables

Variables and Data Sources

Local Variables

- **Housing Prices**: Apartment price indices for 16 regions (Kookmin Bank, KB)
- **Regional Characteristics**: Annual regional unemployment rates, log population density, working-age population ratio (ages 16–64), and total fertility rate (TFR) (Statistics Korea)
- **GRDP**: Annual Gross Regional Domestic Product (Statistics Korea)

Macro Variables

- **M2**: Quarterly averages of seasonally adjusted values (Bank of Korea, BOK)
- **Interest Rate** (r): Household loan interest rate (BOK)

Fiscal Variables

- **Consolidated Fiscal Balance** (Ministry of Economy and Finance, MOEF)
- **Fiscal Projections**: OECD Economic Outlook

Variable Processing

- Fiscal variables (FS) and the GDP deflator are seasonally adjusted using the **X-12 method**.
- All macro variables except the interest rate are **deflated by the GDP deflator** and **log-transformed**.

Empirical Results

Core Identification Strategy

- **Using fiscal spending shocks directly**: fiscal variable here is exogenous (refer to Blanchard and Perotti, 2002).
- The empirical strategy analyzes whether exogenous fiscal spending affects housing prices through a **liquidity expansion channel**.
- **Demand and supply factors are controlled for** using both macroeconomic variables and local panel controls.

Regression Models

① Fiscal shock + Regional and year fixed effects + DiD effects (Seoul × fiscal shocks)
② ① + Interest rate (r)
③ ② + GRDP
④ ③ + Housing permits
⑤ ④ + M2 and DiD effect
⑥ ④ + Regional unemployment
⑦ ⑥ + Population density
⑧ ⑦ + Working-age population ratio (ages 16–64)
⑨ ⑧ + Total fertility rate
⑩ ⑨ + M2 and DiD effect

Empirical Results

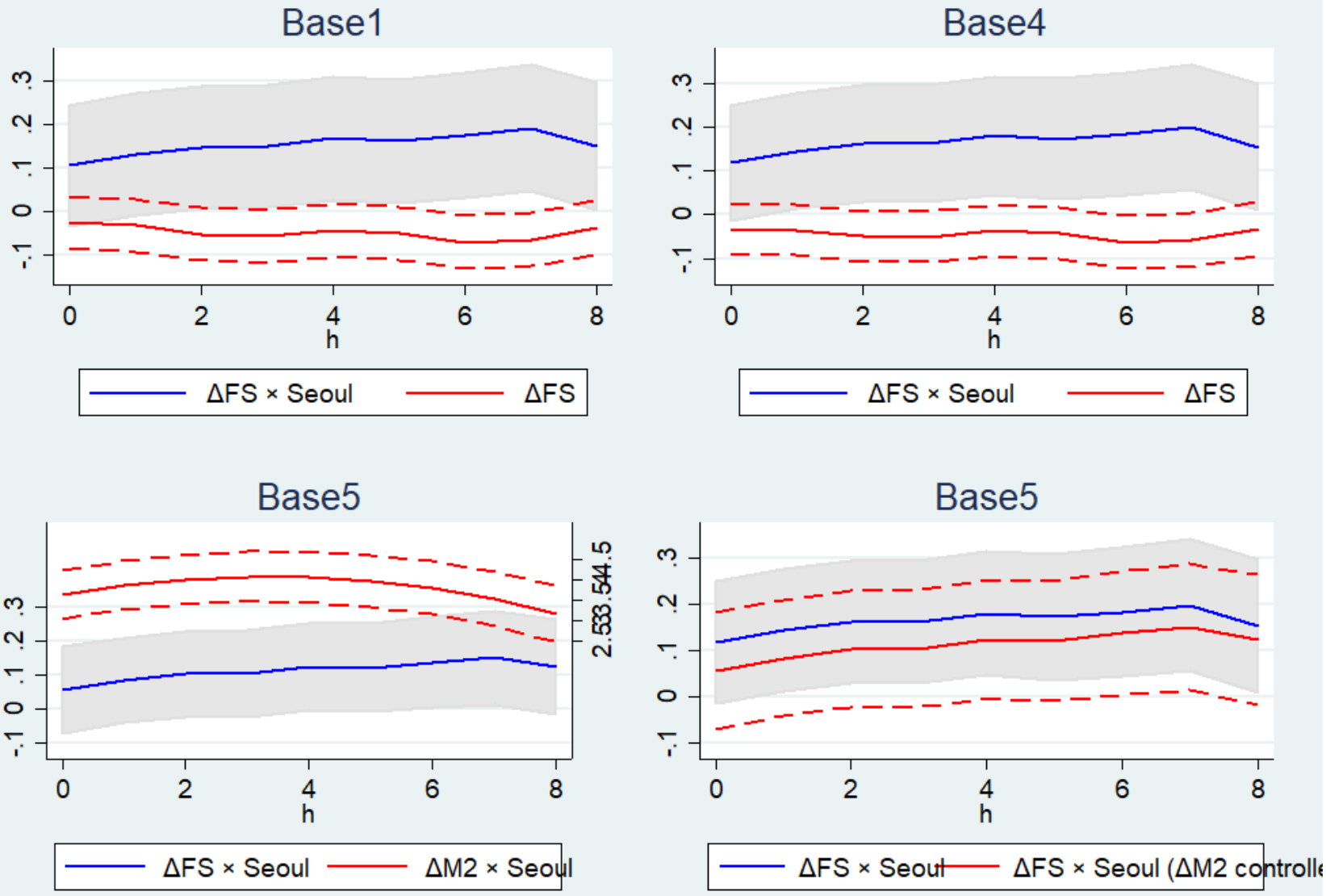
The regression table is reported only for $h = 0$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Seoul	-	-	-	-	-	-	-	-	-	-
Seoul × $\Delta_4 FS_t$	0.105	0.105	0.103	0.118	0.056	0.114	0.099	0.099	0.136*	0.080
	(0.086)	(0.086)	(0.086)	(0.081)	(0.077)	(0.079)	(0.079)	(0.079)	(0.076)	(0.073)
Seoul × $\Delta_4 M2_t$					3.641***					3.469***
					(0.359)					(0.339)
$\Delta_4 FS_t$	-0.026	-0.033	-0.033	-0.034	-0.039	-0.032	-0.031	-0.031	-0.033	-0.025
	(0.036)	(0.037)	(0.037)	(0.035)	(0.034)	(0.034)	(0.034)	(0.034)	(0.033)	(0.032)
$\Delta_4 M2_t$					0.310					0.046
					(0.272)					(0.260)
FS_{t-4}	-0.051	-0.059	-0.059	-0.059	-0.088*	-0.054	-0.054	-0.054	-0.054	-0.055
	(0.053)	(0.053)	(0.053)	(0.050)	(0.049)	(0.049)	(0.049)	(0.049)	(0.047)	(0.046)
$M2_{t-4}$					0.331***					-0.072
					(0.123)					(0.135)
r		0.014	0.014	0.014	0.018*	0.025**	0.024**	0.024**	0.025**	0.027***
		(0.012)	(0.012)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.010)	(0.010)
GRDP			0.075**	0.007	-0.017	-0.015	0.084*	0.081*	0.121***	0.077*
			(0.037)	(0.035)	(0.034)	(0.035)	(0.046)	(0.046)	(0.044)	(0.043)
Permit				0.075***	0.078***	0.074***	0.071***	0.071***	0.068***	0.071***
				(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Unemp						-0.022***	-0.020***	-0.020***	-0.021***	-0.022***
						(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
Population density							-0.287***	-0.463***	-0.485***	-0.392***
							(0.087)	(0.109)	(0.105)	(0.101)
Working-age population ratio								0.012***	0.018***	0.015***
								(0.005)	(0.004)	(0.004)
Total fertility rate									0.654***	0.651***
									(0.068)	(0.065)
Constant	-0.136	-0.172	-0.640	-0.966**	-3.784***	-0.834**	0.470	0.785	0.205	0.641
	(0.330)	(0.332)	(0.404)	(0.382)	(1.156)	(0.376)	(0.545)	(0.556)	(0.538)	(1.295)
Observations	1,152	1,152	1,152	1,152	1,152	1,152	1,152	1,152	1,152	1,152
R-squared	0.572	0.573	0.574	0.623	0.657	0.635	0.639	0.641	0.669	0.698
Number of id	16	16	16	16	16	16	16	16	16	16

Note: 1) Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1 2) Δ_t denotes the four-quarter (one-year) change in the fiscal variable

Empirical Results

IRF: 90% confidence interval (CI)



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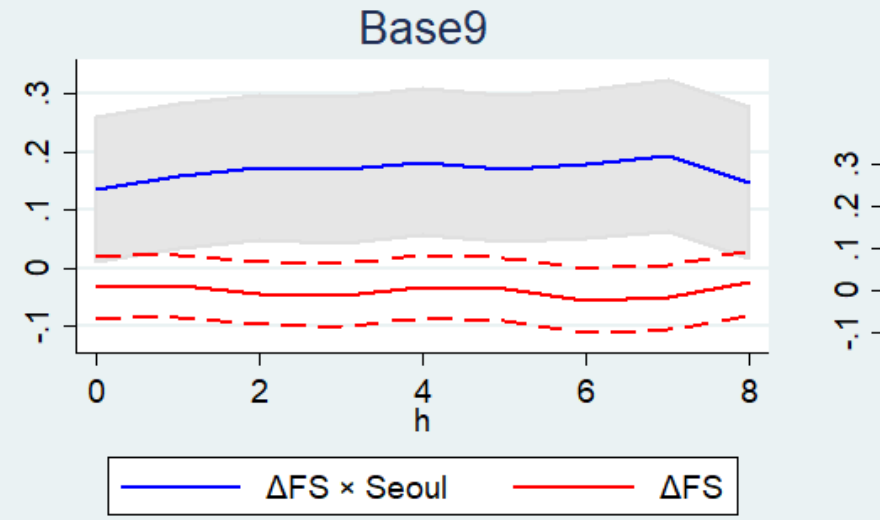
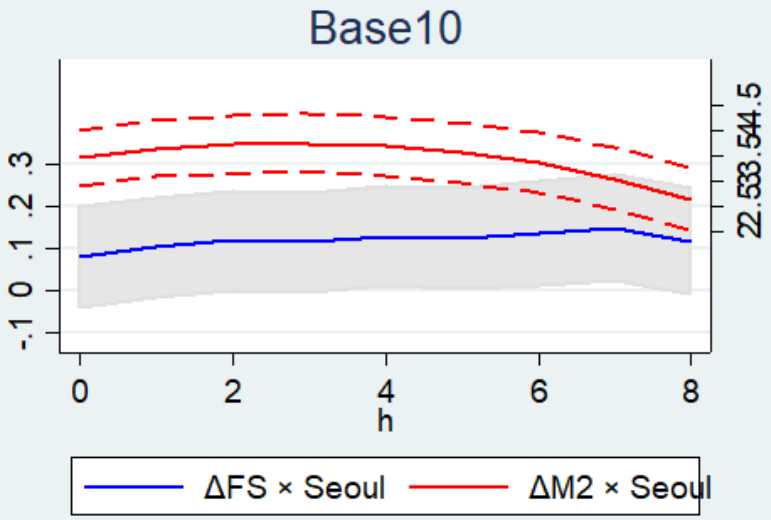
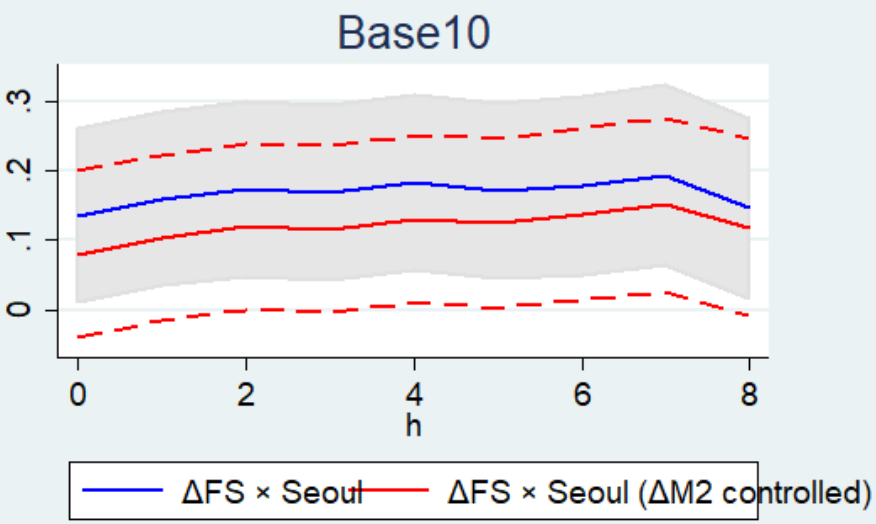






Empirical Results: Fiscal and Liquidity Effects

1. Fiscal Effect

- Fiscal shocks lead to a **significant increase in housing prices in Seoul**, but have little effect in other regions.
- The response is **immediate and persistent** over the horizon.

2. Liquidity Effect

- Controlling for M2 shocks reduces the estimated fiscal effect by roughly half, while the impact of M2 becomes dominant.
- This indicates that **fiscal policy affects housing prices primarily through a liquidity expansion channel**.
- A residual fiscal effect remains even after controlling for M2, possibly reflecting **expectation effects**.
- The magnitude of the M2 effect substantially exceeds that of fiscal shocks; this issue is addressed in the **sensitivity analysis**.

Empirical Results: Effects of Individual Control Variables

3. Effects of Individual Control Variables

- **Expected Signs / Consistent with Prior Expectations**
  - $\hat{\beta}(\textbf{GRDP}) > 0$
  - $\hat{\beta}(\textbf{Unemployment}) < 0$
  - $\hat{\beta}(\textbf{Working-Age Ratio}) > 0$
  - $\hat{\beta}(\textbf{Fertility}) > 0$

- **Unexpected Signs or Additional Explanation**
  - $\hat{\beta}(\textbf{Permit}) > 0$: expected to be negative as a supply factor, but the coefficient is positive; this is examined in the sensitivity analysis and reflects opposite responses between Seoul and non-Seoul regions.
  - $\hat{\beta}\textbf{(r)}$?: difficult to explain but negligible magnitudes.
  - $\hat{\beta}(\textbf{Population Density}) < 0$: denser areas exhibit weaker price growth, possibly reflecting lower housing preference in highly populated areas.

Empirical Results

Additional Analysis (sensitivity checks)

1. **Dependent Variable**: Detached housing prices
2. **Dependent Variable**: Jeonse (deposit-based lease) prices
3. **Treatment Group**: Seoul $\rightarrow$ Capital region (Seoul, Incheon, Gyeonggi)
4. **Treatment Group**: Seoul and the surrounding capital regions (Incheon, Gyeonggi) simultaneously (DiD)
5. **Fiscal Variable**: Next-year government consumption growth expectations (YoY, OECD EO), without lag or shock (stationary by ADF test)
6. **Permit Effect**: Estimated separately for Seoul vs. non-Seoul regions (simultaneous specification)
7. **Fiscal Variable**: Government bond balance-to-GDP ratio (GB/GDP)
8. **Fiscal + Liquidity**: GB/GDP with M2/GDP as an additional DiD control

Empirical Results

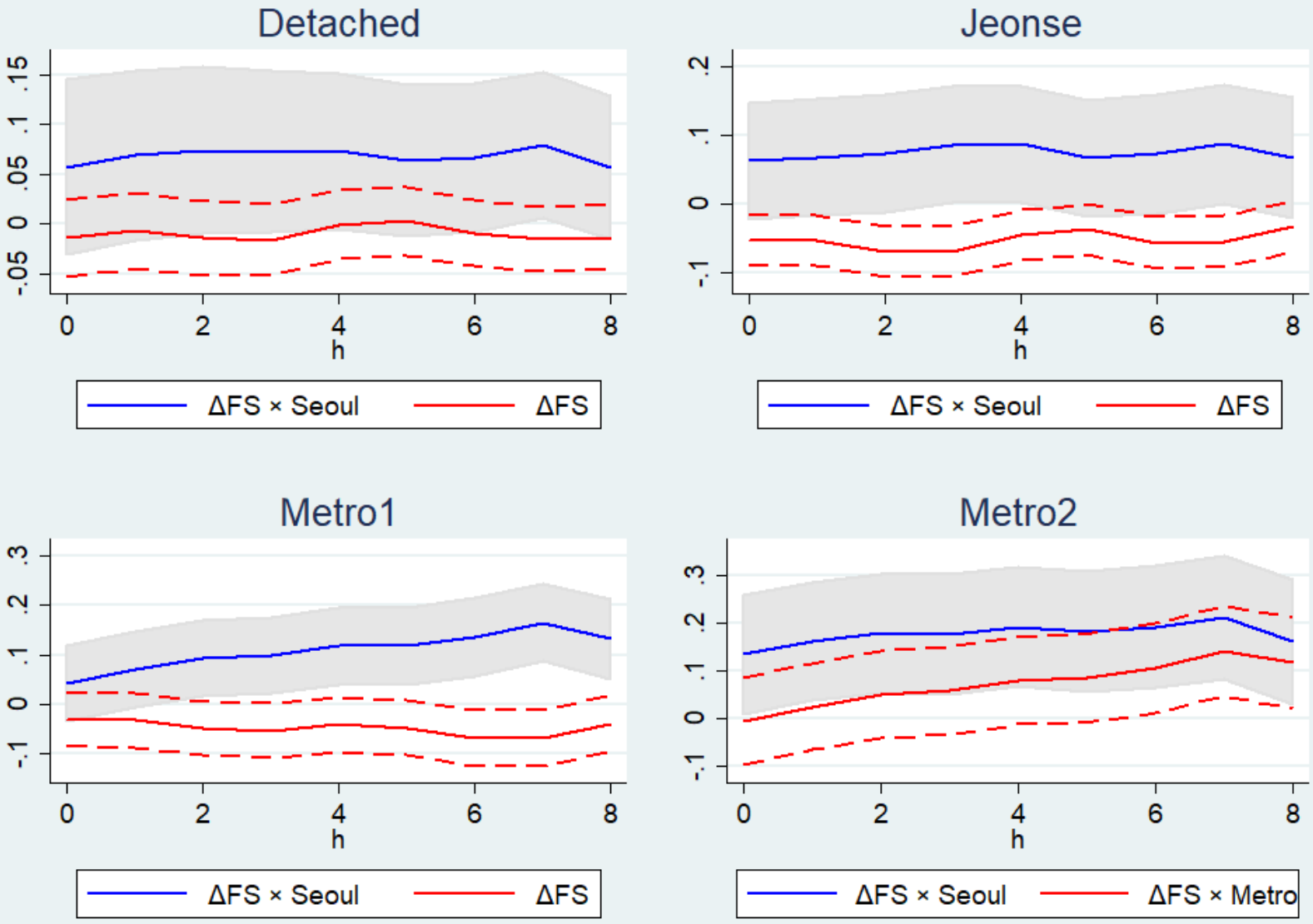
The regression table is reported only for $h = 0$

VARIABLES	(1) Detached	(2) Jeonse	(3) Metro1	(4) Metro2	(5) OECD1	(6) Permit	(7) GBGDP	(8) M2GDP
Regions	-	-	-	-	-	-	-	-
Seoul × $\Delta_t FS_t$	0.057	0.064	0.042	0.135*		0.087	1.068*	0.256
	(0.054)	(0.051)	(0.047)	(0.076)		(0.075)	(0.587)	(0.575)
Metro (w/o Seoul) × $\Delta_t FS_t$				-0.004				
				(0.056)				
Seoul × $\Delta_t M2_t$								1.817***
								(0.204)
Seoul × FS_t					5.880***			
					(0.681)			
$\Delta_t FS_t$	-0.014	-0.052**	-0.033	-0.033		-0.030	0.154	0.408
	(0.024)	(0.022)	(0.033)	(0.033)		(0.032)	(0.498)	(0.524)
FS_t					-1.201***			
					(0.398)			
$\Delta_t M2_t$								-0.178
								(0.163)
FS_{t-4}	-0.029	-0.107***	-0.054	-0.054		-0.054	0.340	0.626
	(0.034)	(0.032)	(0.047)	(0.047)		(0.046)	(0.384)	(0.435)
$M2_{t-4}$								-0.274
								(0.199)
r	0.003	0.013*	0.025**	0.025**	0.007	0.025**	0.024**	0.029***
	(0.008)	(0.007)	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)
GRDP	-0.123***	0.266***	0.123***	0.121***	0.056	0.107**	0.120***	0.075*
	(0.032)	(0.030)	(0.044)	(0.044)	(0.043)	(0.044)	(0.045)	(0.043)

VARIABLES	(1) Detached	(2) Jeonse	(3) Metro1	(4) Metro2	(5) OECD1	(6) Permit	(7) GBGDP	(8) M2GDP
Permit	0.031***	0.026***	0.068***	0.068***	0.063***		0.069***	0.071***
	(0.005)	(0.004)	(0.006)	(0.006)	(0.006)		(0.006)	(0.006)
Non-Seoul × *Permit*						0.073***		
						(0.006)		
Seoul × *Permit*						-0.122***		
						(0.030)		
Unemp	-0.004	-0.019***	-0.021***	-0.021***	-0.024***	-0.021***	-0.020***	-0.021***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
Population density	-0.621***	-0.137*	-0.494***	-0.485***	-0.348***	-0.488***	-0.483***	-0.366***
	(0.081)	(0.071)	(0.105)	(0.105)	(0.098)	(0.103)	(0.105)	(0.103)
Working-age population ratio	0.025***	-0.002	0.018***	0.018***	0.019***	0.014***	0.017***	0.018***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Total fertility rate	-0.139***	-0.106**	0.650***	0.654***	0.650***	0.530***	0.632***	0.754***
	(0.049)	(0.046)	(0.068)	(0.068)	(0.065)	(0.070)	(0.068)	(0.067)
Constant	2.992***	-0.736**	0.252	0.204	-0.602	0.714	-0.125	-0.536
	(0.437)	(0.365)	(0.538)	(0.538)	(0.424)	(0.534)	(0.456)	(0.474)
Observations	1,080	1,152	1,152	1,152	1,207	1,152	1,152	1,152
R-squared	0.304	0.910	0.668	0.669	0.692	0.681	0.669	0.691
Number of id	15	16	16	16	16	16	16	16

Empirical Results: IRF graphs

IRF: 90% confidence interval (CI)



Empirical Results: IRF graphs

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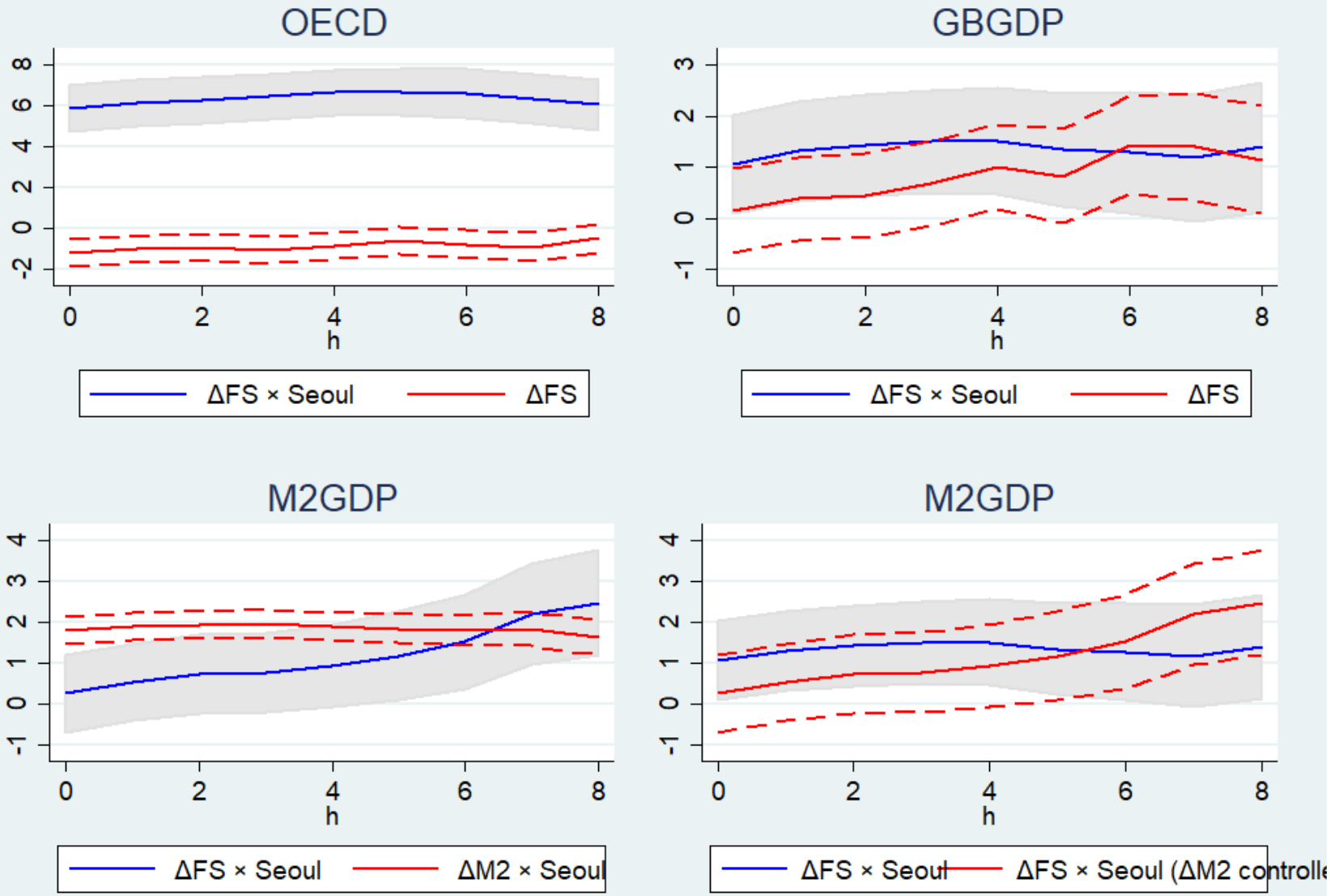


Empirical Results: Additional Analysis (1)

1. **Dependent Variable: Detached Housing Prices**
   - Detached houses are less investment-oriented than apartments.
   - Fiscal and liquidity effects are present but weaker than for apartments.
2. **Dependent Variable: Jeonse (Deposit-based Lease) Prices**
   - Similar to detached houses, fiscal and liquidity effects are weaker than for apartment prices.
   - This suggests fiscal expansion and liquidity mainly flowed into apartment markets as investment assets.
3. **Treatment Group: Seoul → Capital Region (Seoul, Incheon, Gyeonggi)**
   - In the capital region, fiscal effects on housing prices appear with a lag, indicating slower transmission outside Seoul.
4. **Treatment Group: Seoul and Non-Seoul Capital Regions Simultaneously (DiD)**
   - Seoul shows **immediate price increases**, while Incheon and Gyeonggi experience **gradual increases** over time.

Empirical Results: Additional Analysis (2)

⑤ **Fiscal Variable: Next-year Government Consumption Growth (OECD), No Lag or Shock**

- ADF tests show stationarity → no need to define lag/shock.
- Results confirm fiscal expansion raises Seoul housing prices even without lag structure.

⑥ **Permit Effect: Seoul vs. Non-Seoul Regions (Simultaneous)**

- Permits **decrease Seoul housing prices** (supply signal), but **increase non-Seoul prices**, likely due to new town development and infrastructure investment.

⑦ **Fiscal Variable: Government Bond Balance-to-GDP (GB/GDP)**

- Fiscal expansion raises non-Seoul prices with a lag.
- In Seoul, effects are stronger and more immediate than in non-Seoul regions.

⑧ **Fiscal + Liquidity: GB/GDP with M2/GDP (DiD Control)**

- Controlling for liquidity reduces fiscal coefficients.
- M2 responds quickly with short-term price effects, while fiscal expansion affects prices with a lagged effect.

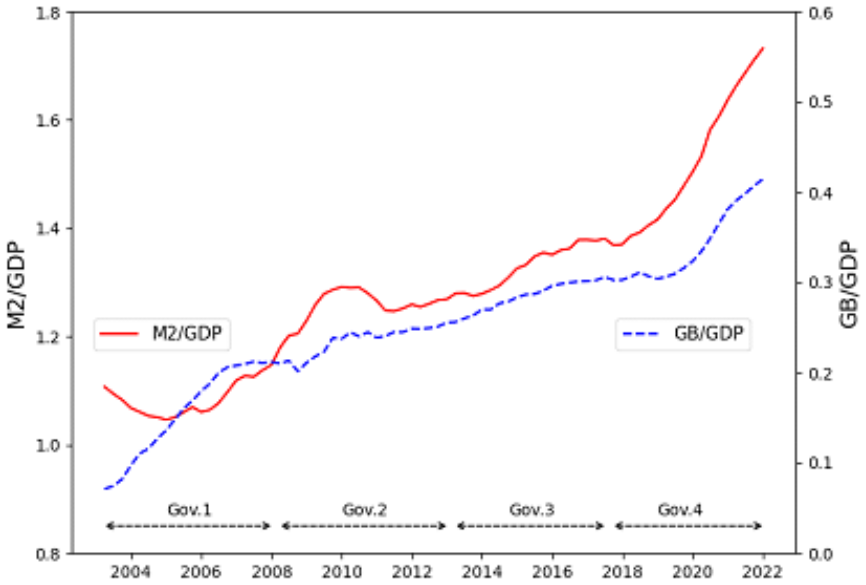
How can fiscal policy push up housing prices?

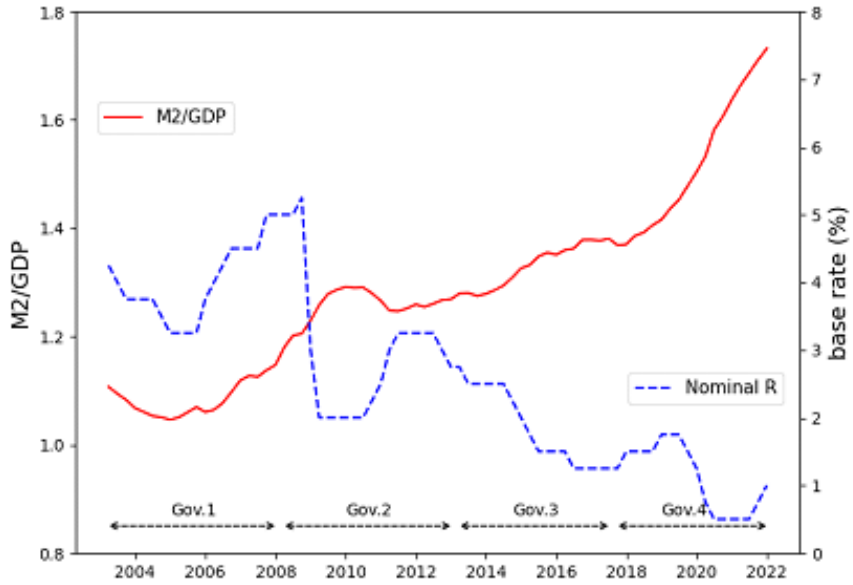
Fiscal spending expands liquidity and fuels asset prices

- Fiscal expansion $\Rightarrow$ higher liquidity ($M2$) $\Rightarrow$ stronger demand for assets, including housing.
- In Korea, **Sim and Lee (2025, KER)** found that:
  - $M2/GDP$ is co-integrated with the government bond balance/GDP (GB/GDP) rather than the policy rate.
  - As GB/GDP rises, liquidity increases via the Bank of Korea's balance sheet expansion.
  - The central bank mitigates potential crowding-out effects by purchasing government bonds or reducing the issuance of MSBs.
- These findings imply a **fiscal monetization channel**, in which fiscal expansion induces monetary accommodation even without explicit QE.
- **Our paper builds on this mechanism** by examining how such liquidity transmission affects **regional housing price dynamics** over time.

How can the fiscal policy push up housing prices?

Trends of M2/GDP, GB/GDP, and r in the 2000s in South Korea





Sensitivity Analysis: SVAR with Short-run Restrictions

Identification of Structural Fiscal Shocks

- **Goal:** Verify that exogenous fiscal spending shocks, identified following Blanchard & Perotti (2002), increase housing prices through the liquidity transmission channel.

Identification Strategy (Example: 3-variable case)

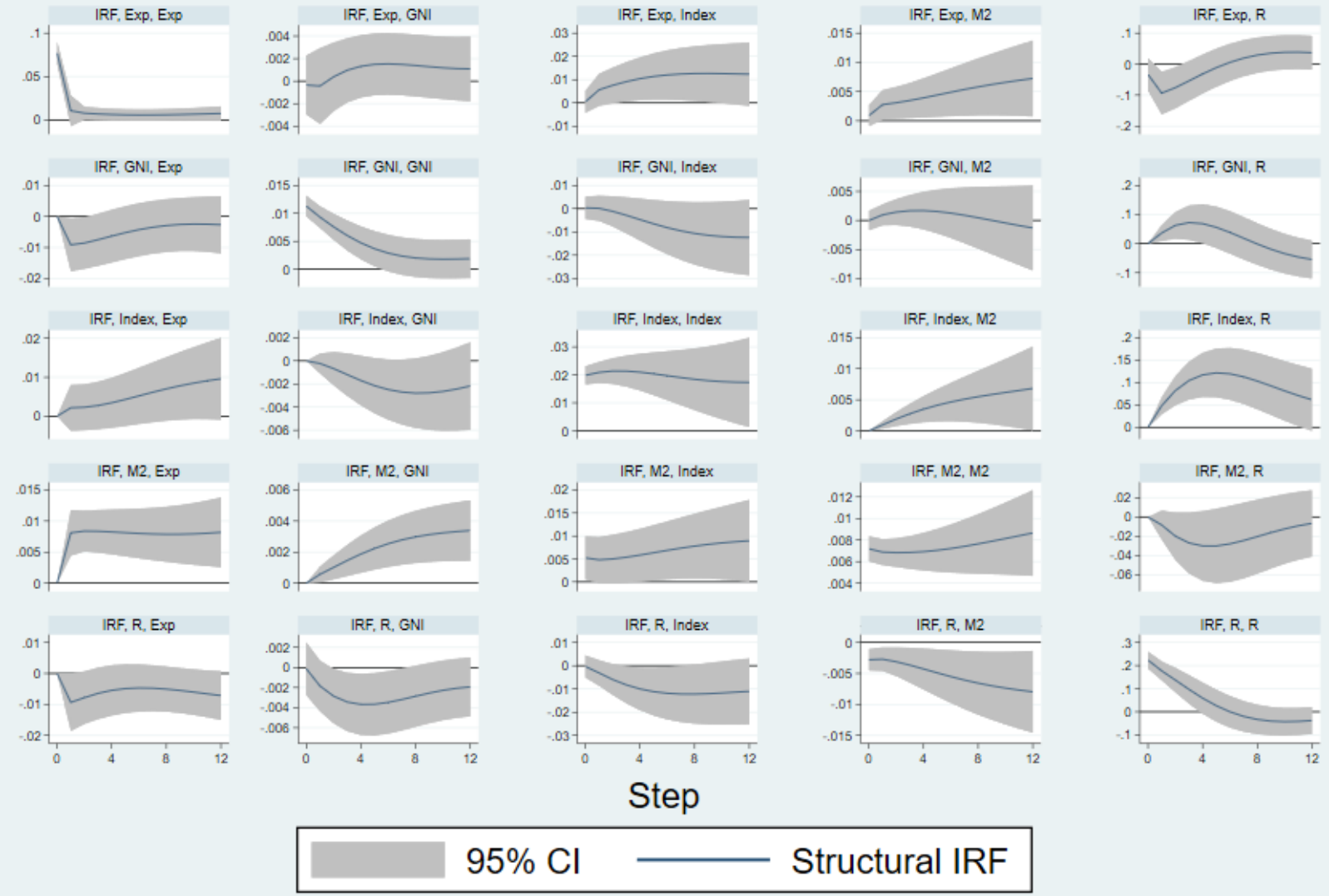
$$Au_t = B\varepsilon_t, \quad A = \begin{pmatrix} 1 & 0 & 0 \\ a_{21} & 1 & 0 \\ a_{31} & a_{32} & 1 \end{pmatrix}, \quad B = \begin{pmatrix} b_{11} & 0 & 0 \\ 0 & b_{22} & 0 \\ 0 & 0 & b_{33} \end{pmatrix}$$

- Recursive short-run ordering: log real total expenditure $\rightarrow r \rightarrow$ log real GNI $\rightarrow$ log real M2 $\rightarrow$ log real Seoul housing prices (5-variable SVAR).
- Reduced-form residuals (u_t) are transformed into structural shocks (ε_t).
- Lag length: 1 (AIC/HQIC).

Key Result

- Expansionary fiscal shocks increase liquidity (M2) and, in turn, raise housing prices through the **liquidity transmission channel**.
- The negative fiscal–interest rate link ($\rho(\text{Exp}, r) < 0$) indicates **fiscal monetization**: the central bank accommodates fiscal expansion.

Sensitivity Analysis: SVAR with Short-run Restrictions



Conclusions

- This study provides new evidence that fiscal expansion raises housing prices in Korea, primarily through a liquidity channel.
- Using Local Projections combined with a DiD framework with regional fixed effects, we estimate dynamic responses of housing prices to fiscal shocks.
  - Fiscal spending shocks significantly increase housing prices only in Seoul, where liquidity inflows and financial depth are concentrated.
  - The response is immediate and persistent, while the effect largely vanishes in other regions.
  - When M2 is controlled for, the fiscal effect diminishes, indicating that liquidity expansion mediates the transmission from fiscal policy to housing prices.
- These results suggest that fiscal policy has worked as a quasi-monetary stimulus in asset markets during the sample period, particularly in financially developed urban centers.

Conclusions (continued)

- The findings can be interpreted through a combination of **fiscal monetization** and the **Superstar Mechanism**.
  - **Fiscal Monetization (Sim and Lee, 2025):** Large-scale debt-financed fiscal expansion increases pressure on market interest rates, prompting the central bank to intervene by purchasing government bonds or reducing sterilization efforts. This passive accommodation leads to liquidity growth, which in turn stimulates housing demand and drives up asset and housing prices.
  - **Superstar Mechanism (Gyourko et al., 2013):** In supply-constrained and investment-attractive cities like Seoul, even modest liquidity-driven demand shocks cause sharp and persistent housing price increases.
- **Policy implications:**
  - **Caution warranted**: Fiscal policy often involves not only its short-run demand stimulus but also unanticipated indirect monetary and asset-market effects.
  - Another piece of evidence supporting **fiscal soundness**.

Q & A
Thank you