

Good Housing Booms, Bad Housing Booms

A High-frequency Identification of Housing Speculation and Its Macroeconomic Consequence¹

Sangyup Choi (Yonsei University), Junghyuk Lee (Bank of Korea)

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¹The views expressed are those of the authors and do not necessarily represent those of the Bank of Korea or the Monetary Policy Board.

Broader Question

- Are housing *booms* bad for the economy? If so, why?
- Literature focuses on the consequences of housing *busts*
- “Soft lending standards, hard consequences: how housing booms undermine productive investment” (Sangyup Choi, Young Ju Kim, and Youngjin Yun, 2025)
 - Bank balance sheet constraints interact with firm investment channel using the unique Korean setting and data
- “Good housing booms, bad housing booms: high-frequency identification of housing speculation and its macroeconomic consequences” (Sangyup Choi and Junghyuk Lee, 2025)
 - Identifying bad booms driven by speculative demand using the unique Korean setting and data

Motivation

- Especially, distinguishing “Good” housing booms and “Bad” housing booms poses an empirical challenge because of an apparent endogeneity issue
 - **Good housing booms:** Sustainable housing booms driven by fundamentals.
 - **Bad housing booms:** Housing booms driven by speculative behavior that are associated with economic slowdown; distinct from housing **busts**
- How to identify housing speculation?
- Due to the dual nature of housing as a consumption good and an investment asset, identifying drivers of housing price fluctuations remains a longstanding challenge
- This paper develops a novel *high-frequency* approach to tackle this issue, leveraging the unique institutional feature (**chonsei**) of the Korean housing market

What We Do in the Paper (I)

- Applying a sign-restriction VAR approach with minimal assumptions to 176 district-level (equivalent to US county) monthly housing market data: identify supply, residential demand, and speculative demand shocks
 - speculative demand is the dominant driver in the Korean housing market, and more so in Seoul or the Seoul Metropolitan Area
- Using various district-level aggregate data: show that house price appreciation driven by residential demand is expansionary (**good booms**), while that driven by speculative demand is recessionary (**bad booms**);
 - naive identification cannot discover the recessionary effect of the housing boom
 - distinction is pronounced for consumption (than investment) and non-tradables (than tradables)

What We Do in the Paper (II)

- Using micro-level household debt data (about 1 million sample): debt overhang channel as a potential mechanism
 - only bad booms are followed by a significant increase in household (especially mortgage) debt that could constrain consumption
- Asymmetry and policy mix: contractionary monetary policy shocks cannot contain the bad boom but expansionary shocks can stimulate it
 - macroprudential tightening can contain speculative demand at the expense of residential demand
 - need a careful mix of monetary and macroprudential policies

Chonsei Contract in Korea

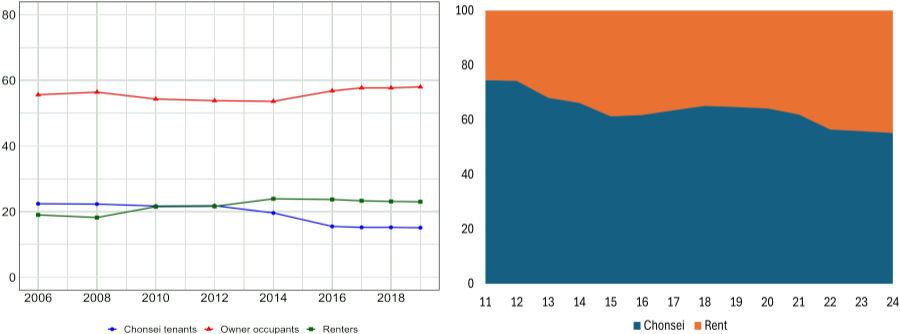
- Accounts for about half of the rental market and 20% of housing types in Korea
- When the contract begins: tenants pay a large lump-sum deposit to the homeowner (40%~80% of the sales price)
- During the lease term: tenants are exempt from paying monthly rent
- When the contract expires: the homeowner has to return the full deposit to the tenants
 - Even if the homeowner defaults, the financial authority sells the housing at the auction and pays the deposit to the tenants
- Because of the unique structure, chonsei prices are less influenced by the expectation of future capital gains in the short run, rather reflecting the value of housing services in the spot market

Why Chonsei, not Rent?

- The financial commitments required for home purchase differ sharply from those for renting
- Even when comparable rental units exist, the fundamental value of housing depends on the entire expected path of future rents (i.e., *flows*) and discount rates, neither of which is directly observable
- The divergence between sales and chonsei prices offers a much cleaner and more direct measure of speculative demand
 - The chonsei system provides a directly observed *stock* price for the very same dwellings traded in the sales market

Share of Chonsei in Korea

Figure: Share of Chonsei occupancy/transaction in Korean housing market



- Left: Share of housing occupancy types
- Right: Share of Chonsei in total lease transactions

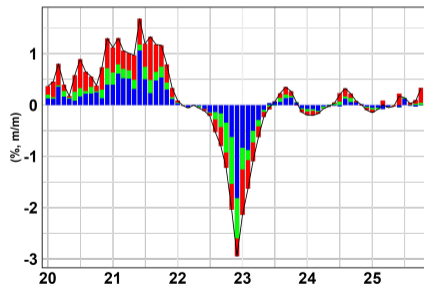
Intuition for Identification

- We decompose district-level house price growth using the modified sign-restriction VAR framework proposed by [Shapiro \(2024\)](#): do not impose any restrictions on IRFs
- First, we label whether changes in housing prices are due to supply or demand shocks using the movement of transaction volume and sales prices (**standard**)
- Second, we further label whether demand-driven changes are due to residential or speculative demand using the movement of sales-chonsei prices ratio (**novel**)
 - Chonsei is a lump-sum lease arrangement that can be used to infer the consumption values
 - Compared to a monthly rent market, chonsei and owner-occupied housing markets are highly substitutable

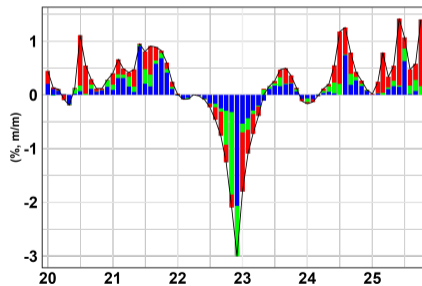
Proof of concept: real-time decomposition outcomes

- Latest decomposition up to 2025M10: consistent with a housing market narrative

Figure: Decomposition: nationwide vs. Seoul



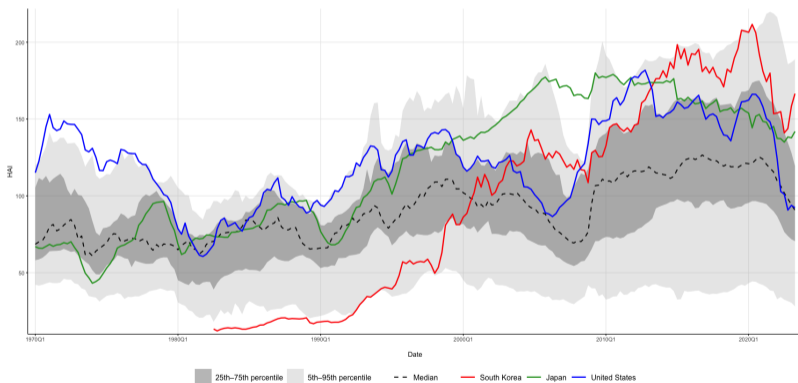
■ Supply ■ Residential demand ■ Speculative demand



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Historical Overview of the Korean Housing Market

Figure: Housing affordability measure: Korea vs. OECD countries



- Housing affordability index (HAI) from 1970Q1 to 2023Q2, as constructed by Biljanovska et al. (2023)

Housing Market Summary

Figure: The evolution of housing prices and the sales-to-chonsei price ratio



- Left: nationwide; Right: Seoul Metropolitan Area

Preview of findings: naive identification

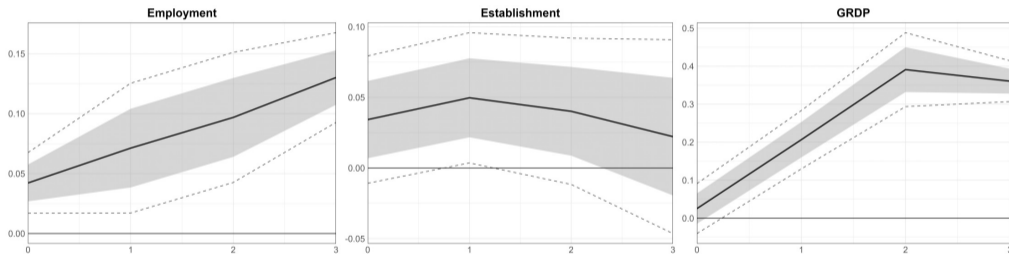


Figure: Effects of housing price growth shocks on regional economic activity

Preview of findings: good booms vs. bad booms

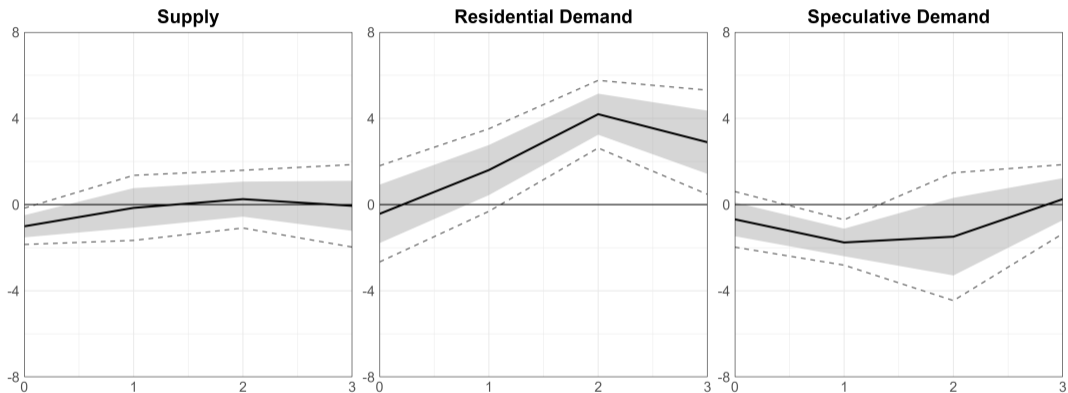


Figure: Effects of structural housing shocks on regional output

- Distinct effects are stronger for consumption than investment, service than manufacturing sector: hints on potential channel

Overview

- 1. Identification Strategy**
- 2. Empirical Implementation**
- 3. Decomposing Housing Price Dynamics in Korea**
- 4. Macroeconomic Effects of Structural Housing Shocks**
- 5. Structural Housing shocks and Household Debt**
- 6. Housing Price Dynamics and Policy Mix**
- 7. Conclusion**

Simple Model for Identification

- Households choose consumption, savings, residential location, and a tenure mode among monthly rent, chonsei (lump-sum lease), and ownership
- While the *physical supply* of housing units in each location is fixed in the short run, the *flow supply* of housing units may vary.
 - Reasonable given the short-run (monthly) and narrow housing market (district-level) in our empirical identification.
- The consumption value of housing can be inferred from a no-arbitrage condition between rental and chonsei.

Ownership status and No-arbitrage condition

- A household owning a unit in location h may use it in one of three ways:
 - **Self-occupancy** ($d = O$): pecuniary payoff 0.
 - **Renting out** ($d = R$): pecuniary payoff $R_t(h)$.
 - **Offering a chonse contract** ($d = C$): the household receives $C_t(h)$, invests it at rate i_t , earns $i_t C_t(h)$, and returns $C_t(h)$ at $t + 1$.
- The financial return from ownership is:

$$\pi_t(h, d) = \begin{cases} 0, & d = O, \\ R_t(h), & d = R, \\ i_t C_t(h), & d = C. \end{cases}$$

- In equilibrium, $\pi_t(h, R) = \pi_t(h, C) \implies R_t(h) = i_t C_t(h)$.

Flow Supply and Flow Demand

- This housing stock in location h fixed in short run ($\bar{H}^S(h)$) and is fully allocated across renters, chonse tenants, and owner-occupants:

$$H_t^R(h) + H_t^C(h) + H_t^O(h) = \bar{H}^S(h).$$

- **Flow Supply** and **Flow Demand** in location h is defined as below:

$$h_t^s(h) = \int \mathbf{1}_{\{h_{t-1}(i)=h, d_{t-1}(i)=O, (h_t(i)\neq h \text{ or } d_t(i)\neq O)\}} di.$$

$$h_t^d(h) = \int \mathbf{1}_{\{h_t(i)=h, d_t(i)=O, (h_{t-1}(i)\neq h \text{ or } d_{t-1}(i)\neq O)\}} di.$$

Rationale for the Flow Supply and Demand

- In short run, the total housing *stock* may be fixed (i.e. construction takes long time)
- However, the tenure-switching decisions of households and resulting *flow* supply and demand can produce the short-run fluctuations in transaction volumes
- For instance, household relocating from h to h' generates two simultaneous effects:
 - Increases flow supply $h_t^s(h)$ in the origin market
 - Increases flow demand $h_t^d(h')$ in the destination market.
- Consistent with our empirical model using **transaction volume** data

Fundamental Value and Chonseil Prices

- Combining the definition of consumption value of housing services and the rental–chonseil no-arbitrage condition $R_t(h) = i_t C_t(h)$ immediately implies:

$$V_t(h) = \sum_{k=1}^{\infty} \frac{E_t R_{t+k}(h_{t+k})}{\prod_{j=0}^{k-1} (1 + i_{t+j})} \implies C_t(h) \propto V_t(h),$$

- Combining the general expression of housing price as sum of fundamental value and speculation:

$$P_t(h) = V_t(h) + B_t(h) \implies \frac{\dot{B}_t(h)}{B_t(h)} = \frac{\dot{P}_t(h)}{P_t(h)} - \frac{\dot{C}_t(h)}{C_t(h)},$$

- In summary, chonseil prices provide a direct market-based measure of the intrinsic consumption value of housing.

Empirical Identification Strategy

- Estimate the following trivariate reduced-form VAR model for each of the 176 districts at monthly frequency: $y_{i,t} = \alpha + \sum_{j=1}^N \Phi_j^i y_{i,t-j} + v_{i,t}$, $y_{i,t} = [q_{i,t} \ p_{i,t} \ r_{i,t}]'$,
- $q_{i,t}$: the log transactions volumes
 $p_{i,t}$: the log housing sales price index
 $r_{i,t}$: the sales-chonsei price ratio
- After estimating the model, we save the residuals from the VAR

Step 1: Supply vs Demand

- Housing price fluctuations in the district i during period t are labeled whether it's supply-driven or demand-driven, by comparing the sign of the residual of prices and the transaction volumes :

$$I_{i \in sup,t} = \begin{cases} 1 & \text{if } \text{sign}(\hat{v}_{i,t}^p) \neq \text{sign}(\hat{v}_{i,t}^q) \\ 0 & \text{otherwise} \end{cases}$$
$$I_{i \in dem,t} = \begin{cases} 1 & \text{if } \text{sign}(\hat{v}_{i,t}^p) = \text{sign}(\hat{v}_{i,t}^q) \\ 0 & \text{otherwise} \end{cases}$$

- In other words, we identify a demand (supply) shock if the resulting fluctuation in p and q exhibits the same (opposite) direction

Step 2: Residential Demand vs Speculative Demand

- Furthermore, using the sign of the residuals of the sales-chonsei price ratio, demand-driven fluctuations are classified as residential or speculative:

$$I_{i \in dem_{Res}, t} = \begin{cases} 1 & \text{if } \text{sign}(\hat{v}_{i,t}^p), \text{sign}(\hat{v}_{i,t}^q) \neq \text{sign}(\hat{v}_{i,t}^r) \\ 0 & \text{otherwise} \end{cases}$$
$$I_{i \in dem_{SpC}, t} = \begin{cases} 1 & \text{if } \text{sign}(\hat{v}_{i,t}^p), \text{sign}(\hat{v}_{i,t}^q) = \text{sign}(\hat{v}_{i,t}^r) \\ 0 & \text{otherwise} \end{cases}$$

- Intuition for the above identification:
 - For example, if there exists a positive (+) speculative demand shock, the price and the transaction volume will increase ($\text{sign}(\hat{v}_{i,t}^p), \text{sign}(\hat{v}_{i,t}^q) > 0$)
 - Also, because the speculative demand will increase the sales price more than the fundamentals, the sales-chonsei price ratio will go up ($\text{sign}(\hat{v}_{i,t}^r) > 0$)
 - So, we can identify the speculative shock if all the residuals have the same sign

Decomposing Housing Price Dynamics in Korea

Employing previous results, divide the national housing sales price into three distinct components by calculating the weighted average for each component:

$$\pi_t = \underbrace{\sum_{i=1}^N I_{i \in sup,t} w_{i,t} \pi_{i,t}}_{\text{Supply Factor}} + \underbrace{\sum_{i=1}^N I_{i \in dem_{Res},t} w_{i,t} \pi_{i,t}}_{\text{Residential Demand Factor}} + \underbrace{\sum_{i=1}^N I_{i \in dem_{Spc},t} w_{i,t} \pi_{i,t}}_{\text{Speculative Demand Factor}}$$

π_t : growth rate of national housing sales price

$\pi_{i,t}$: growth rate of housing sales price in district i in period t

$w_{i,t}$: the corresponding weight of district i in period t

Advantage of the Methodology

- Intuitive and simple
- Need only minimal assumptions and data
- Can be estimated in near real-time: monthly frequency with a minimum delay
- Can be constructed using a recursive or rolling sample: effectively out-of-sample forecasts, so serve as an early-warning indicator of the macroeconomy

HP Decomposition in Korea

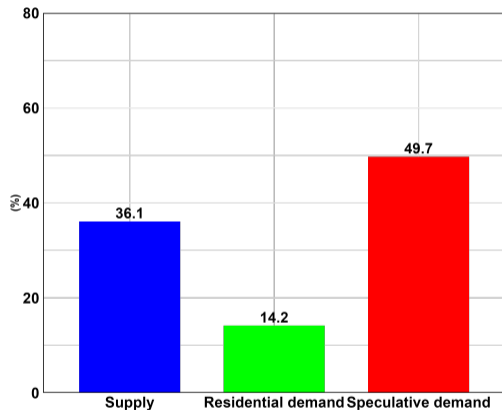
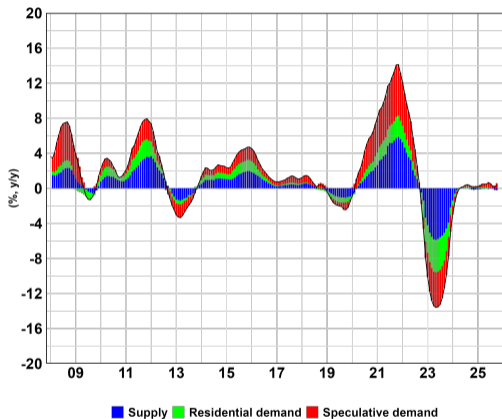


Figure: Supply, residential-demand, and speculative-demand driven housing price growth (left) and contribution of each structural shock to cumulative growth of Korean housing prices (right)

HP Decomposition in Seoul Metropolitan Area

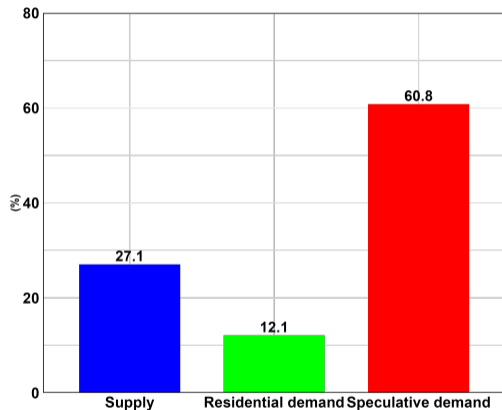
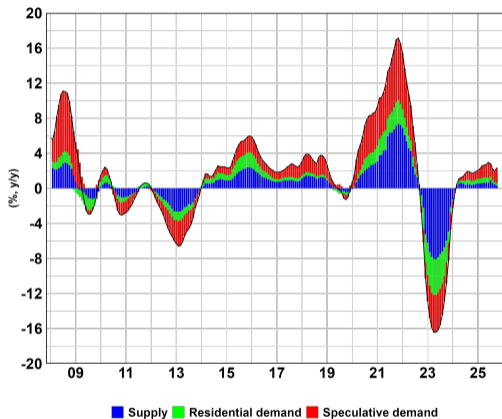


Figure: Supply, residential-demand, and speculative-demand driven housing price growth (left) and contribution of each structural shock to cumulative growth of housing prices (right) in Seoul metropolitan areas

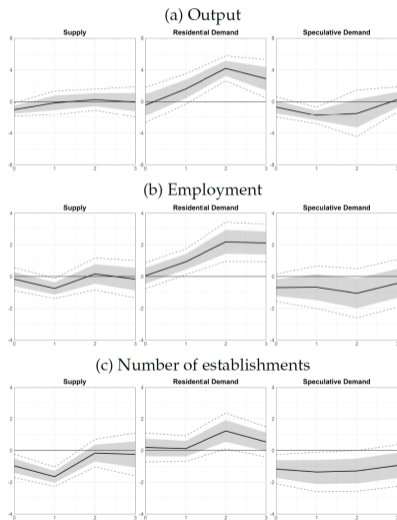
Macroeconomic Effects of Housing Shocks

- To estimate the dynamic macroeconomic effects of structural housing shocks, we employ the following panel LP specification:

$$Y_{i,t+h} - Y_{i,t-1} = \alpha_i^h + \alpha_t^h + \beta^h \text{shock}_{i,t} + \gamma^h X_{i,t-1} + \varepsilon_{i,t+h},$$

- $Y_{i,t}$: the log level of the variable related to economic activities
 $\text{shock}_{i,t}$: one of the three identified shocks (positive = 1, negative = -1);
 $X_{i,t-1}$: lagged growth of the dependent variables
- Include α_i^h and α_t^h , akin to a DID framework, to control for unobserved heterogeneity and national macroeconomic fluctuations
- Use Driscoll-Kraay S.E. to address spatial correlation across regions

Good Housing Booms, Bad Housing Booms



Macroeconomic Effects of Housing Shocks: Robustness Checks

- We check robustness of the result through various ways:
- Robustness for alternative specification
 - Difference GMM estimator ([Arellano and Bond \(1991\)](#)) GMM
 - Alternative FE (time \times province FE) to account for time-varying regional economic conditions Alternative Fixed Effects
- Robustness for alternative data at the district level:
 - Gross Value Added instead of output GVA
 - Monthly labor data Monthly
 - Province-level data (accounting for a broader commuting zone) Province

Macroeconomic Effects of Housing Shocks: Inspecting Mechanism

- Despite the entirely different methods, corroborate the findings in [Choi et al. \(2025\)](#): exogenous housing booms (identified by GIV) slow down economic activity, especially via credit reallocation to the housing sector and declining productive investment
- Distinct effects between residential and speculative demand shocks are pronounced for consumption and non-tradables: *households* are key!

Macroeconomic Effects of Housing Shocks: Inspecting Mechanism

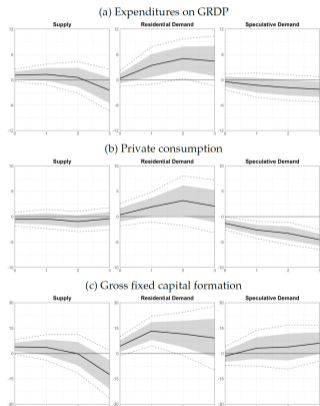


Figure: Cumulative IRF to structural housing shock on composition of GRDP

Macroeconomic Effects of Housing Shocks: Inspecting Mechanism

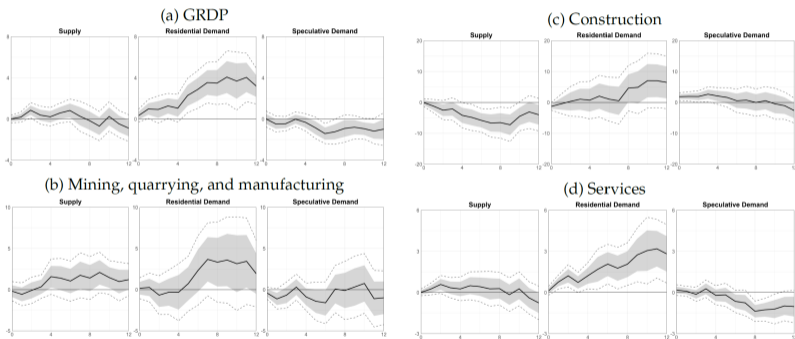


Figure: Cumulative IRF to structural housing shock on quarterly sectoral GRDP

Effects of Housing Shocks to Household Debt

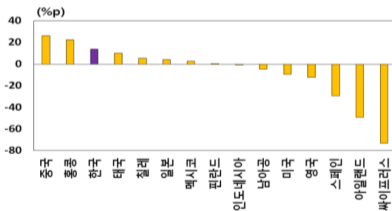
- What makes these different impulse responses?
- One possible explanation: **Debt overhang effect** ([Dynan et al. \(2012\)](#))
- Leveraged the Household Debt Database provided by the Bank of Korea
 - Longitudinal quarterly panel data of individual-level records on both individual characteristics and financial transaction data
 - The dataset encompasses approximately one million individuals engaged in credit activities and derived from actual financial transaction records

Effects of Housing Shocks to Household Debt

- Household debt and consumption in Korea: BOK 이슈노, (김찬우 박동 주 옥 유성)

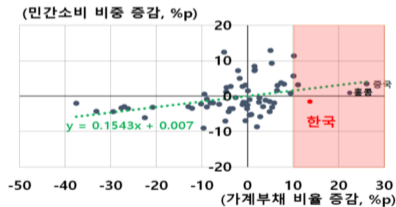
우리나라의 경우 최근 10년간 GDP대비 가계부채가 크게 증가하였음에도 민간소비 비중이 오히려 하락

[그림 1] 국가별 가계부채/GDP 변화폭¹⁾



주: 1) 2024년 대비 2014년 기준. 2024년 값이 없는 경우 2023년 값과 2013년 값을 사용
자료: IMF

[그림 2] 민간소비와 가계부채 비중의 관계¹⁾



주: 1) 2024년 대비 2014년 기준. 2024년 값이 없는 경우 2023년 값과 2013년 값을 사용
자료: IMF, WORLD BANK

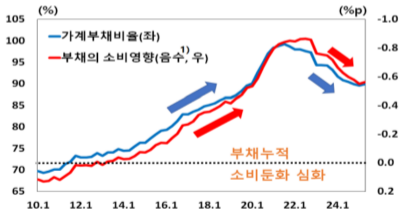
Effects of Housing Shocks to Household Debt

- Household debt and consumption in Korea: BOK 이슈노, (김찬우 박동 주 옥 유성)

가계부채비율이 상승할수록
소비에 대한 부정적인 영향이 확대

부동산 대출비중이 늘어날수록
유동성 제약 완화의 긍정적 영향이 감소

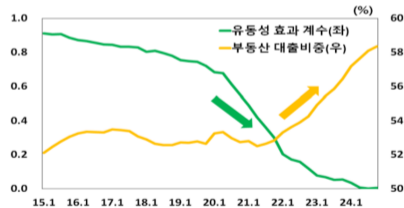
[그림 3] 가계부채비율과 부채의 소비 영향



주: 1) 비교의 편의를 위해 역축으로 표시

자료: 자체 추정

[그림 4] 부동산 대출비중에 따른 유동성 효과¹⁾



주: 1) 롤링(Rolling) 회귀분석으로 추정된 계수 값에
7분기 이동평균을 적용

자료: 자체 추정

Effects of Housing Shocks to Household Debt

- To estimate the effects of structural housing shocks to household debt, we employ the following panel LP specification:

$$Y_{i,j,t+h} - Y_{i,j,t-1} = \alpha_{i,j}^h + \alpha_t^h + \beta^h \text{shock}_{j,t} + \gamma^h X_{i,j,t} + \varepsilon_{i,j,t+h},$$

- $Y_{i,j,t}$: the log level of the loan - total loan, mortgage
 $\text{shock}_{j,t}$: one of the three identified shocks (positive = 1, negative = -1);
 $X_{i,j,t-1}$: lagged growth of the dependent variables and income growth
- Use cluster standard error at the treatment level following [Abadie et al. \(2023\)](#)

Effects of Housing Shocks to Household Debt

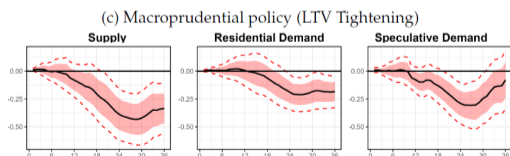
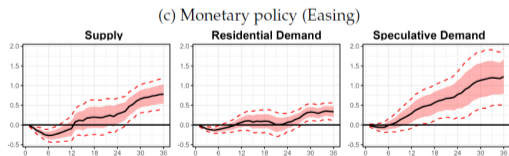
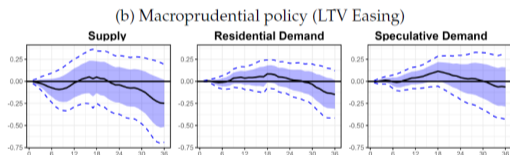
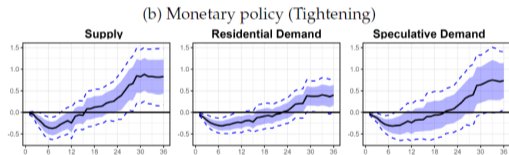
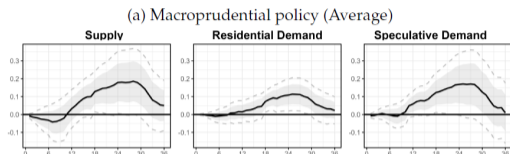
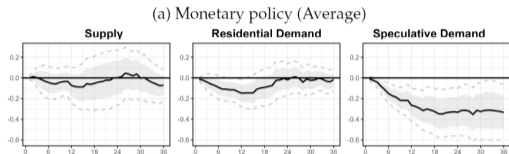


Note: Shaded areas indicate 68% confidence intervals; dotted lines represent 90% confidence intervals. Panel (a) is estimated using total loans data for 745,640 individuals, 2010Q1–2024Q4, while Panel (b) is estimated using mortgages for 290,318 individuals, 2012Q1–2024Q4. Standard errors clustered at district-time level.

Housing Price Dynamics and Policy Mix

- Estimate the impulse responses of housing price growth driven by each factor to MP shock and MPP shock
- Jointly extract MP shock and MPP shock from the structural residuals of the VAR model ([Kim and Mehrotra \(2018\)](#); [Kim and Mehrotra \(2022\)](#)) shocks
- Analyze both symmetric and asymmetric impulse responses via local projection

Effects of MP and MPP Shocks



Note: Left(right) panel shows the cumulative impulse response of the supply, residential demand, and speculative demand driven housing price growth to a 100bp increase of MP shock (1%p increase of MPP shock).

Conclusion

- We develop a novel real-time framework to identify the driver of housing prices by augmenting the distinctive feature in the Korean housing market into a standard supply-demand framework
- Speculative demand is a key driver in the Korean housing market
- Macroeconomic effects of different types of shock are markedly different
 - While residential demand shocks are expansionary, speculative demand shocks are contractionary
- Debt overhang effect is one possible explanation for this difference: future work on the link between debt and consumption dynamics at individual level
- We also highlight the need for a well-calibrated, consistent policy mix

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Robustness to alternative specification: GMM

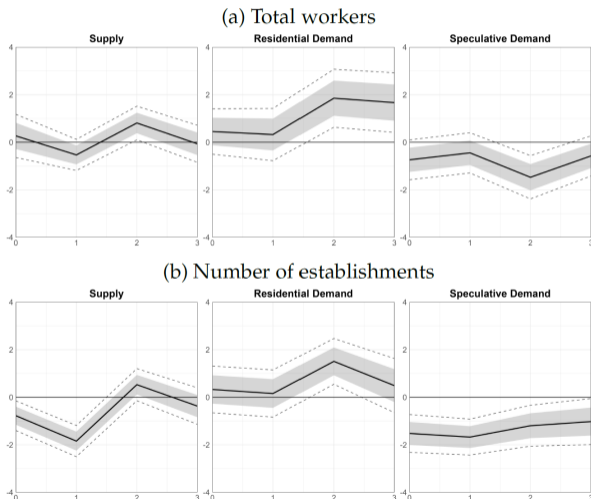


Figure: Cumulative IRF to structural housing shock on regional economic activity: GMM

Robustness to alternative specification: Different fixed effects

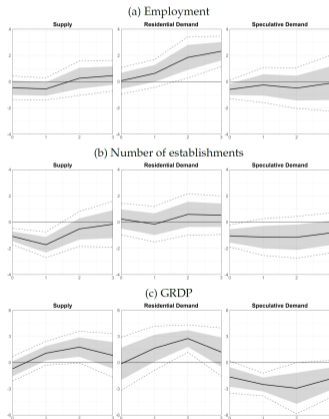


Figure: Cumulative IRF to structural housing shock using different specification

Robustness to alternative district level data: GVA

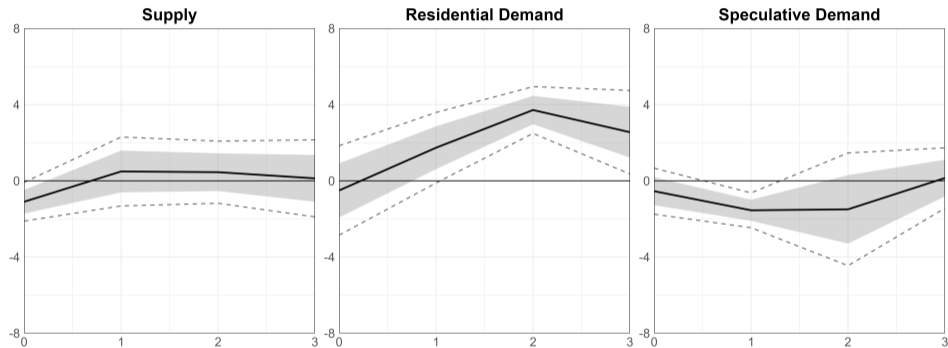


Figure: Cumulative IRF to structural housing shock on regional economic activity: Gross Value Added

Robustness to alternative district level data: Monthly labor data

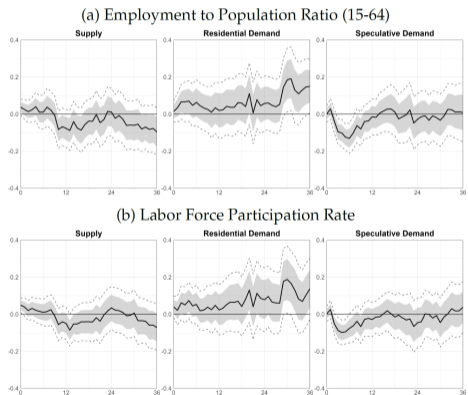


Figure: Cumulative IRF to structural housing shock on monthly labor data

Robustness to geographic aggregation: Regional economic activity in Province level

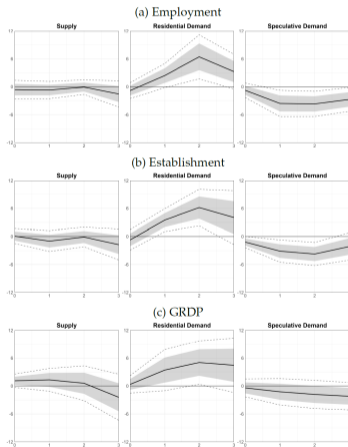


Figure: Cumulative IRF to structural housing shock on regional economic activity (Province level)

MP and MPP shocks

- Following previous literature, we jointly extract monetary and macroprudential policy shocks from the structural residuals of the VAR model ([Kim and Mehrotra \(2018\)](#), [Kim and Mehrotra \(2022\)](#))
- Estimate the following VAR model:

$$y_t = \alpha + B(L)y_{t-1} + D(L)x_t + u_t,$$

- Endogenous variables include key target variables(IP, CPI, Real household loans) for policy, policy measure(call rate, LTV level) in endogenous variables
- Exogenous variables include both the economic and financial conditions in the U.S. (IP and FFR) and dummy variables for GFC.
- Finally, we recover the structural model via recursive restriction