

Residential concentration dampens monetary policy transmission

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Motivation

- **Housing** plays a key role in **monetary policy transmission**: tied to interest rates via mortgages; large part of household portfolios.
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- **This paper**: does the spatial structure of housing affect monetary policy transmission?

Research strategy

1. **Build** a regional monetary business cycle model with spatial structure.
2. **Test** the implications of the model in reduced form.

→ Main result: a more **concentrated** spatial structure **dampens** consumption responses via **housing demand** channels.

Theory: how does spatial structure affect monetary policy?

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→ **Residential concentration:** *average exposure to residential housing in close proximity.*

- Can be **measured** using geospatial data on **housing volumes**, with straightforward **aggregation**.

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Housing service flows: (following Rossi-Hansberg et al., 2010; Ortega et al., 2011)

$$H_{t,g}^{\mathcal{S}} = \underbrace{V_{t,g}^{\mathcal{S},\mathcal{O}}}_{\text{Owned housing volume}} + \underbrace{X_g}_{\text{Residential externality}} \quad \text{with} \quad X_g = \xi \times \underbrace{V_g}_{\text{Total housing volume in grid cell } g}$$
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Production: CES between $L_t^{\mathcal{S},\mathcal{F}}$ and $L_t^{\mathcal{B},\mathcal{F}}$. **Monetary policy:** exogenous fluctuations in R_t .

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1. **Location preferences:** a higher ω_g drives up steady-state **housing and rental prices**.

Then, if residential concentration is higher:

- More housing is **located on** high- ω_g cells.
- More households face higher housing and rental prices.
- \mathcal{B} buy and rent **less housing** and **consume less**.

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2. **Residential externalities:** act as a **buffer for housing service flows** around the steady state.

Then, if residential concentration is higher:

- **Exposure** to residential housing is stronger.
- Households accept larger fluctuations in occupied housing volumes.
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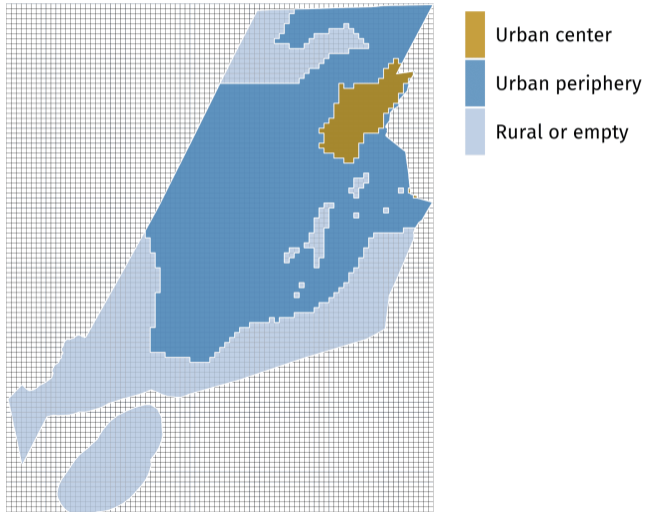
→ \mathcal{B} buy and rent **more housing** and **consume less**.

- Via both channels, **consumption responses are dampened**.

Categorize grid cells to bring the model to the data (1/2)

An example of the grid cell classification

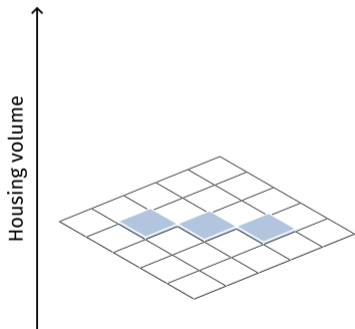
Visualization of Rhode Island, 1km × 1km grid.



Categorize grid cells to bring the model to the data (2/2)

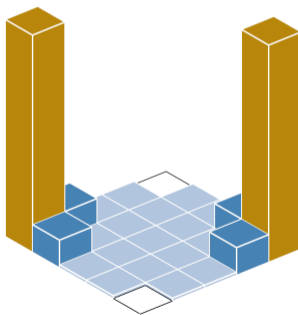
Region 1

(low residential concentration;
an abstraction of Vermont)



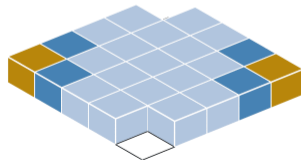
Region 2

(high residential concentration;
an abstraction of California)



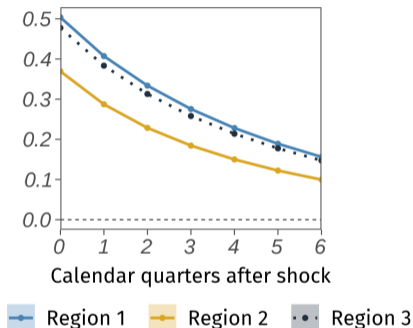
Region 3

(medium residential concentration;
Region 2 with uniform distribution)



Quantitatively, monetary policy is 25% less effective in Region 2 vs. 1 and 3

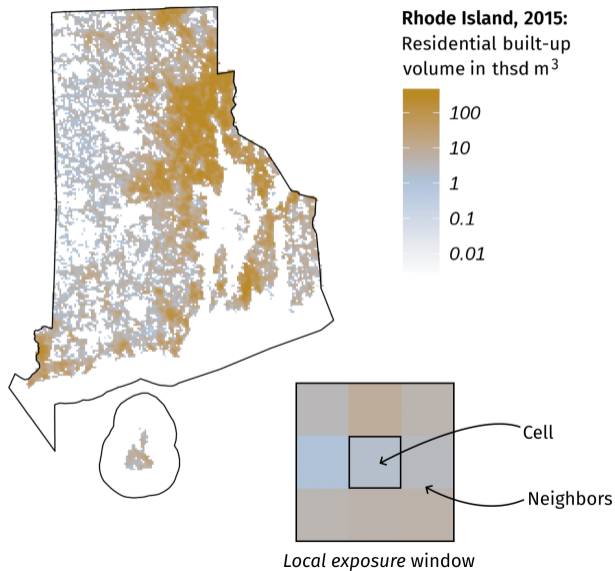
Regional consumption responses to a simulated monetary policy shock
Shock: -25bp (p.a.). Changes relative to steady state (%). Regional aggregates.



- **Calibration** with US housing market statistics (2018–2019), spatial housing price estimates (2012–2023; from Amaral et al., 2025), and American Community Survey data (2016–2020).
- **Decomposition:** ω_g and X_g each account for half of the effect.
- The results hold robust in an extensive **sensitivity analysis**.

Empirics: can we observe the dampening in the data?

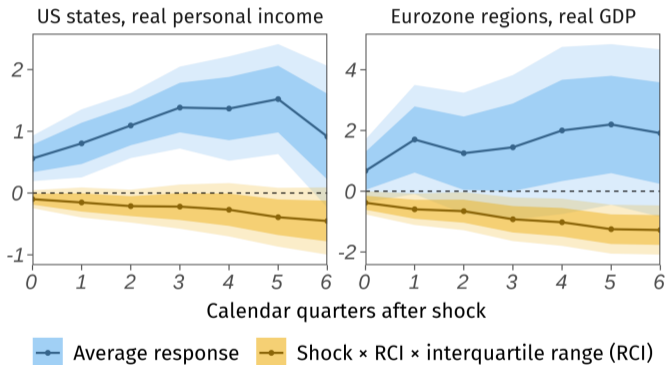
Measurement: average exposure to residential housing in close proximity



Empirical results: the dampening is confirmed for the US and the Eurozone

Empirical responses to a monetary policy shock

Changes in %. Shock: -25bp (p.a.). Data: 2000-2017. Conf.: 68%, 90%.



- **Robust** to RCI definition, price index deflation, shock directions, numbers of lags, and set of controls.
- Works poorly with (population or housing) density. Works well **conditional on density**.

Conclusions

- The **spatial structure** of housing matters for regional monetary policy transmission.
- High vs. low residential concentration: consumption response is **dampened by 20-30%**.
- More generally: **granular spatial features** of the housing market affect short-run macroeconomic dynamics.

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