Dealing with Fiscal Stress: Cities versus Suburbs

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3. Results
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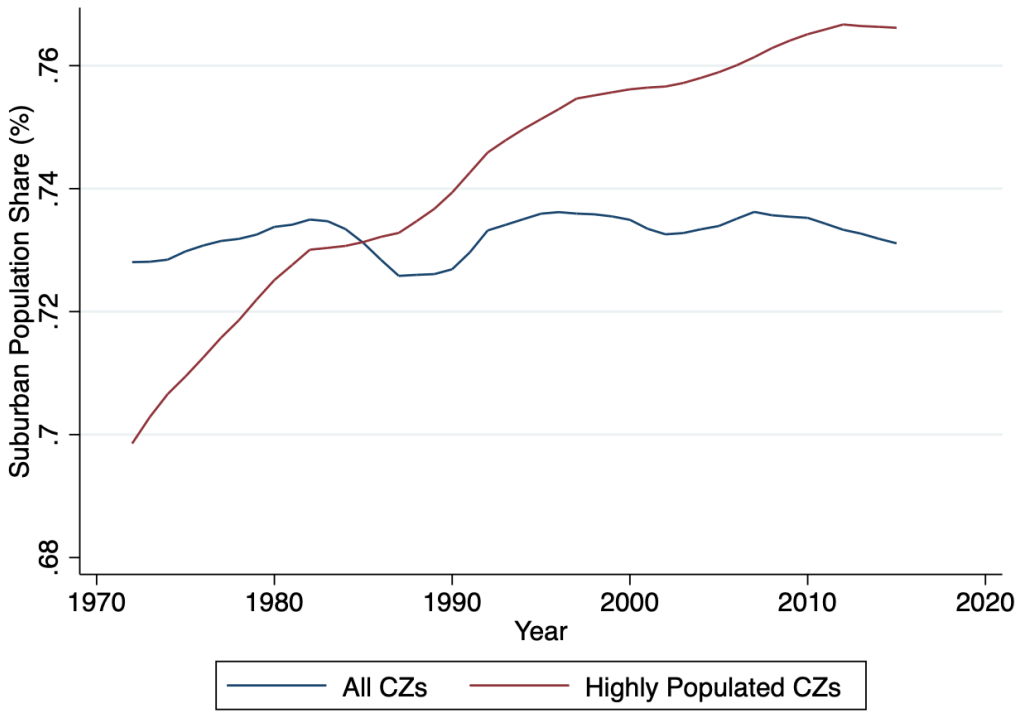
Suburbanization Trend



- Commuting zone (CZ): the geographic unit determining a local labor market (Tolbert and Sizer, 1996)
- Highly Populated CZs defined by the Census population level in 1990
  - Highly Populated CZs are the top quartile CZs (around 82 % of national population)

Introduction

- **Economic environment in highly populated areas:**
  - Central city government: declining economic bases, concentrated employment
  - Suburban governments: growing population
- **Research questions:**
  - How do changes in the local economic environment affect the provision of public goods by local governments?
  - Does the response differ between the central city and surrounding suburban local governments?
- **Contributions:**
  - The responses to the same economic shocks vary among local governments in the central city and the suburban governments in highly populated areas
  - Explore alternative approach: local employment shocks

Background

- **Public policy and economic environment:**
  - Local tax revenues, expenditures and savings respond to fiscal stress ▸ Literature Review
    - Long run changes: cut infrastructure expenditure
    - Short run changes: withdraw from saving
- **Economic shocks: China joined WTO**
  - Local governments received less revenue and cut expenditure when China joined WTO (Feler and Senses, 2017)
- **Feler and Senses (2017):**
  - Aggregate all types of local governments within a commuting zone into one unit
  - Local government types: multiple-purpose, single-purpose

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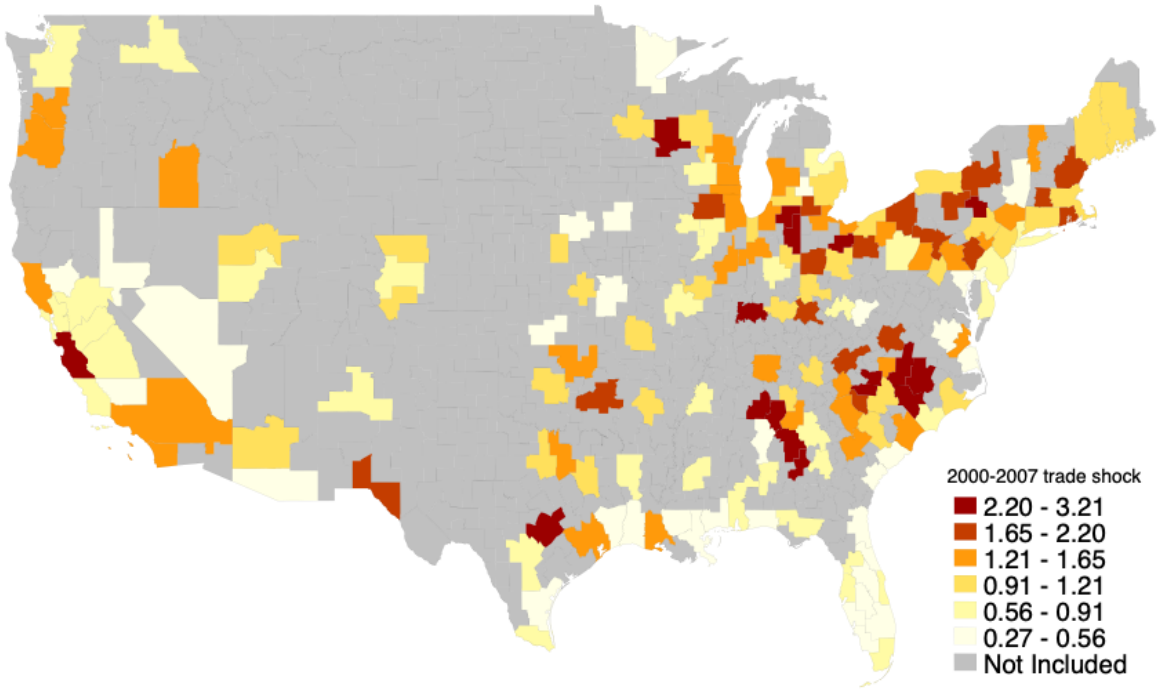
Data

- Fiscal Data: U.S. Census Bureau's Annual Survey of State and Local Government Finances
- Population Data: U.S. Census Bureau's Population and Housing Unit Estimates Dataset
- Employment Data: Census Bureau's County Business Pattern
- Trade Data: United Nations Commodity Trade Statistics Database
- Demographic variables: US Census Bureau's USA Counties database

China Import Shocks: Autor et al. (2013)

- China import shocks: commuting zone level data
- $\Delta IS^{US}_{i,T} = \sum_j \frac{\Delta M^{US}_{j,T} \frac{Emp_{i,j,T}}{Emp_{j,T}}}{Emp_{i,T}}$
  - i: commuting zones
  - j: industry sectors
  - T: time interval, 1990-2000, 2000-2007
  - $\Delta IS^{US}_{i,T}$: China import exposure variable over time interval **T**
  - $\Delta M^{US}_{j,T}$: the change of China import to US in industry **j** over time interval **T**
  - $\frac{Emp_{i,j,T}}{Emp_{j,T}}$: the share of local industrial employment over national industrial employment in industry **j** at start-of-period in time interval **T**

China Import Shocks in Highly Populated CZs



- China import shock: changes in imports per worker in US$1,000
- Highly populated CZs defined by the Census population level in 1990
- The legend indicates values for bottom four quintiles and top two deciles

Empirical Strategy

$$\Delta Y_{i,T}^{City} = \gamma_T + \alpha_1 \Delta IS_{i,T}^{US} + \mathbf{X}'_{i,T}\alpha_2 + \epsilon_{iT} \quad (1)$$

$$\Delta Y_{i,T}^{Sub} = \gamma_T + \beta_1 \Delta IS_{i,T}^{US} + \mathbf{X}'_{i,T}\beta_2 + \varepsilon_{iT} \quad (2)$$

- $\Delta Y_{i,T}$: ΔLocal fiscal variables in CZ **i** over time interval **T**
- $\Delta IS_{i,T}^{US}$: ΔChina imports values to US in CZ **i** over time **T**
- $X_{i,T}$: regional control variables, start-of-period demographic characteristics in CZ **i**
- γ_T: time fixed effects
- T: time interval, 1990-2000 and 2000-2007

IV Strategy

- Endogeneity problem
- IV strategy: contemporaneous change in other high-income country imports of Chinese goods to capture the exogenous variation (Autor et al., 2013)
  - First stage: $\Delta IS_{i,T}^{US} = \tau_T + \gamma \Delta IS_{i,T}^{NUS} + \eta_{iT}$
  - $\Delta IS_{i,T}^{NUS} = \sum_j \frac{\Delta M_{j,T}^{NUS} \frac{Emp_{i,j,T-\mathbf{1}}}{Emp_{j,T-\mathbf{1}}}}{Emp_{i,T-\mathbf{1}}}$
  - $\Delta M_{j,T}^{NUS}$: the change of China imports to high-income countries per worker in industry **j** in time interval **T**

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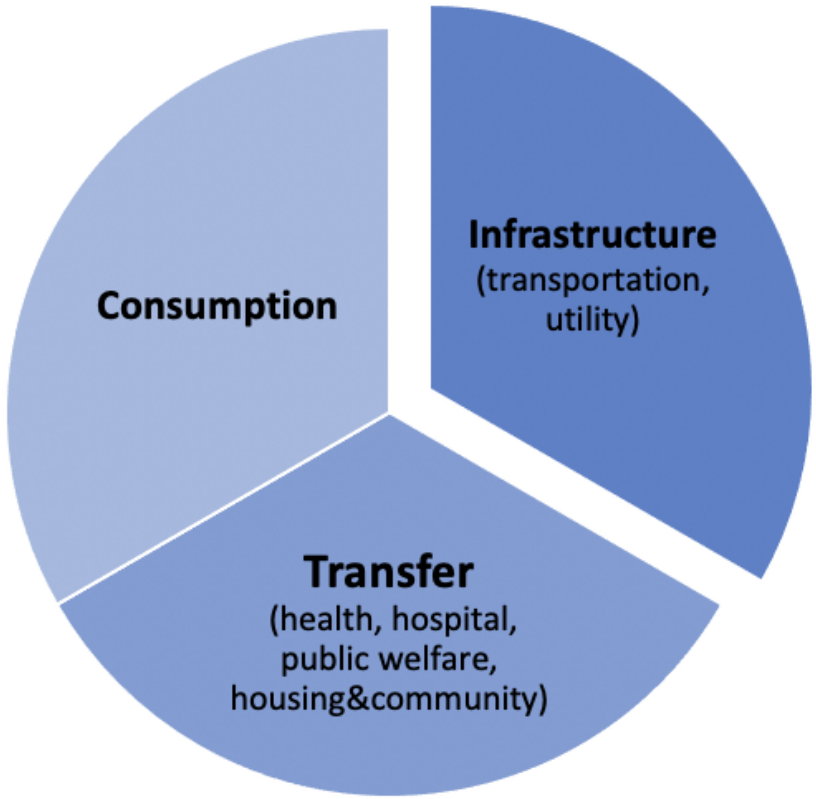
Government Variables

- Expenditure categories:
  - Infrastructure: transportation, utility
  - Transfer: health, hospital, public welfare, housing&community
  - Consumption: police, library, etc.



Summary Statistics: Highly Populated Central Cities vs Suburbs

	Highly Populated CZs			
	Central City		Suburbs	
	1990	2007	1990	2007
Total Revenue	$1,699	$2,333	$972	$1,265
Total tax revenue	$505	$714	$284	$453
Total Expenditure	$1,695	$2,193	$978	$1,234
Consumption	$873	$1,255	$505	$742
	55.8%	61%	52.9%	60.6%
Infrastructure	$513	$582	$353	$373
	26.8%	24%	34.8%	30.1%
Total Debt Outstanding	$2116	$2633	$906	$1076
Total Cash&Security	$2027	$3077	$795	$1072

Summary statistics: in real term per capita (base year: 2000) or percentage %

Regression Results: Effect of Import Shocks on Local Fiscal Variables

Table 1: Highly Populated Central Cities vs Suburbs

	(1) Total revenue	(2) Consumption expenditure	(3) Infrastructure expenditure	(4) Debt Outstanding	(5) Cash & Security
Highly Populated Central Cities: value changes (per capita)					
Δ import values	-316.35**	28.75	-64.88***	-82.50	-162.95
	(139.58)	(36.50)	(19.46)	(128.48)	(172.06)
Highly Populated Suburbs: value changes (per capita)					
Δ import values	-57.02*	-8.71	-27.49	-71.88*	-76.97**
	(29.27)	(12.71)	(19.37)	(38.03)	(37.50)
Observations	350	350	350	350	350
T-Test: $\alpha_1 = \beta_1$	Reject	Not Reject	Reject	Not Reject	Reject

Robust standard errors are in parentheses, clustering at the commuting zone level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Highly populated CZs: top quartile CZs

- Central city governments might hamper the relative competitiveness within an area in the long run. ▸ First Stage
  - Central cities: cut infrastructure expenditure
  - Suburbs: withdraw from saving

Regression Results: Effect of Import Shocks on Local Fiscal Variables

Table 2: Highly Populated CZs vs Less Populated CZs

	(1) Total revenue	(2) Consumption expenditure	(3) Infrastructure expenditure	(4) Debt Outstanding	(5) Cash & Security
Highly Populated Central Cities: value changes (per capita)					
Δ import values	-316.35**	28.75	-64.88***	-82.50	-162.95
	(139.58)	(36.50)	(19.46)	(128.48)	(172.06)
Observations	350	350	350	350	350
Less Populated Central Cities: value changes (per capita)					
Δ import values	-22.84	-33.37*	-12.47**	-204.39	-242.27
	(59.86)	(18.59)	(14.03)	(209.13)	(216.29)
Observations	1,068	1,068	1,068	1,068	1,068
T-Test: $\alpha_1 = \beta_1$	Reject	Reject	Reject	Not Reject	Not Reject

Robust standard errors are in parentheses, clustering at the commuting zone level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Highly populated CZs: top quartile CZs

- Highly populated CZs central cities: cut infra expense
- Less populated CZs central cities: cut consumption & infra expense
- Tiebout competition in highly populated CZs: not cutting consumption expense

Regression Results: Effect of Import Shocks on Local Fiscal Variables

Table 3: Highly Populated Special and School Districts

	(1) Total revenue	(2) Intergovt. transfer aid	(3) Total taxes	(4) Property taxes	(5) Total expenditure	(6) Consumption expenditure	(7) Infrastructure expenditure
Highly Populated Special Districts: value changes (per capita)							
Δ import values	-1.24	-11.61	-4.49	-2.83	-17.84	-18.53	-2.32
	(21.07)	(10.97)	(5.23)	(2.46)	(19.41)	(15.06)	(8.35)
Highly Populated School Districts: value changes (per capita)							
Δ import values	12.90	8.60	5.74	6.38	1.53	1.61	-
	(22.74)	(15.52)	(13.14)	(12.83)	(19.54)	(20.52)	-
Observations	350	350	350	350	350	350	350

Robust standard errors are in parentheses, clustering at the commuting zone level.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Highly populated CZs: top quartile CZs

- Single-purpose local governments: not respond to import shocks

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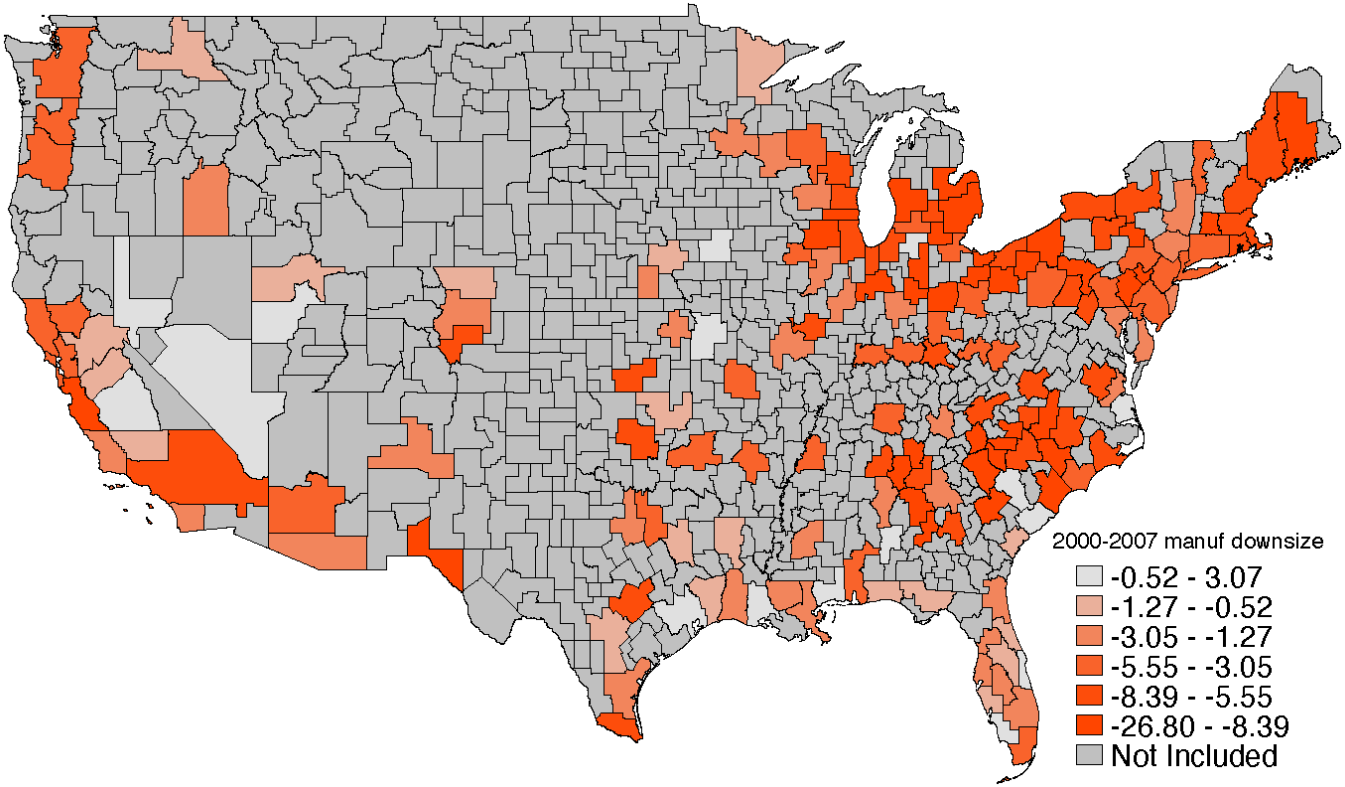
Decline in Manufacturing Industries in Highly Populated CZs



- Local labor markets experienced a relative decline in employment and earnings when China joined WTO (Autor et al. 2013)
- The legend indicates values for bottom four quintiles and top two deciles
- Employment shock: changes in %

Alternative Empirical Strategy Using Bartik IV

$$\Delta Y_{i,T}^{City} = \gamma_t + \alpha_1 \Delta Manuf_{i,T} + \mathbf{X}'_{i,T}\alpha_2 + \epsilon_{iT} \quad (3)$$

$$\Delta Y_{i,T}^{Sub} = \gamma_t + \beta_1 \Delta Manuf_{i,T} + \mathbf{X}'_{i,T}\beta_2 + \varepsilon_{iT} \quad (4)$$

- $\Delta Y_{i,T}$: ΔLocal fiscal variables in CZ **i** over time interval **T**
- $\Delta Manuf_{i,T}$: weighted manuf. employment growth in CZ **i** over time **T**
- $X_{i,T}$: regional control variables, start-of-period demographic characteristics in CZ **i**
- γ_T: time fixed effects
- T: time interval, 1990-2000 and 2000-2007

Bartik IV strategy

- Endogeneity problem
- Bartik IV: local industry shares and national industry growth rates (Goldsmith-Pinkham, 2020)
  - First stage: $\Delta Manuf_{i,T} = \tau_T + \gamma \Delta B_{i,T} + \eta_{iT}$
  - Bartik IV: $\Delta B_{i,T} = \sum_j g_{j,T} \frac{Emp_{i,j,T-\mathbf{1}}}{Emp_{i,T-\mathbf{1}}}$
  - $g_{j,T}$: national industry **j** growth rate over time interval **T**
  - $\frac{Emp_{i,j,T-\mathbf{1}}}{Emp_{i,T-\mathbf{1}}}$: local industry **j** employment share in CZ **i**, start-of-period in time interval **T-1**
  - T: time interval, 1990-2000 and 2000-2007

Results: Effect of Employment Shocks on Local Fiscal Variables

Table 4: Highly Populated Central Cities vs Suburbs

	(1) Total expenditure	(2) Consumption expenditure	(3) Infrastructure expenditure	(4) Debt Outstanding	(5) Cash & Security
Highly Populated Central Cities: value changes (per capita)					
Δ manuf.	211.95***	53.93	30.49***	85.67	168.80
employment	(83.39)	(43.31)	(9.69)	(100.35)	(113.41)
Highly Populated Suburbs: value changes (per capita)					
Δ manuf.	34.69**	17.19**	11.18**	50.99*	64.57***
employment	(13.64)	(7.89)	(5.02)	(26.46)	(25.18)
Observations	350	350	350	350	350
T-Test: $\alpha_1 = \beta_1$	Reject	Not Reject	Reject	Not Reject	Reject

Robust standard errors are in parentheses, clustering at the commuting zone level.

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Highly populated CZs: top quartile CZs

- Similar results as the import shocks specification: ▸ Import Shock
  - Central cities: cut infrastructure expenditure
  - Suburbs: cut infrastructure expenditure, withdraw from saving

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Conclusion

- Central city and suburban local governments in highly populated CZs respond to economic shocks differently.
  - **Central city governments:**
    - cut infrastructure expenditure as if permanent impacts
    - planning to decline
  - **Suburban governments:**
    - withdraw cash & security as if temporary impacts
    - recover from shocks after few years
  - **Contribution:** central cities' behavior hampers their relative competitiveness within the region in the long run
- Local governments in highly populated CZs respond to economic shocks differently than those in less populated CZs.
  - Highly populated central cities:
    not cutting consumption expense (Tiebout competition)

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Literature Review

- **Public policy and economic environment**
  - Expenditures or revenues:
    - Craig and Hoang (2011); Skidmore and Scorsone (2011); Ross et al. (2015); Chernick et al. (2017); Feler and Senses (2017); Buschman and Sjoquist (2017)
  - Savings or rainy day funds:
    - Rosengren (2018); Bautista et al. (2022)
  - Unemployment insurance:
    - Craig and Hoang (2011); Craig et al. (2016)

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First Stage Regression Results

- First Stage:
  - Import shock approach:
    $\Delta IS^{US}_{i,T} = \tau_T + \gamma \Delta IS^{NUS}_{i,T} + \eta_{iT}$
  - Employment shock approach:
    $\Delta Manuf_{i,T} = \tau_T + \gamma \Delta B_{i,T} + \eta_{iT}$

	(1) Highly populated $\Delta IS^{US}_{i,T}$	(2) Less populated $\Delta IS^{US}_{i,T}$	(3) Highly populated $\Delta Manuf_{i,T}$	(4) Less populated $\Delta Manuf_{i,T}$
$\Delta IS^{NUS}_{i,T}$	0.61***	0.61***		
	(0.12)	(0.14)		
$\Delta B_{i,T}$			0.78***	0.81***
			(0.14)	(0.12)
Observations	350	1068	350	1068
F statistic	44.32	43.20	30.47	36.28

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Highly populated CZs: top quartile CZs

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Regression Results: Effect of Import Shocks on Local Fiscal Variables

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