

Dealing with Fiscal Stress: Cities versus Suburbs

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Motivation

- ▶ Central city population declines in post-industrial cities, but the population grows in their suburbs.
 - ▶ Lots of literature: amenity values changes, race or crime rate
 - ▶ Public sector: highway construction (Baum-Snow, 2007)
- ▶ Public sector behavior:
 - ▶ Local population trend \iff Local government behaviors
 - ▶ Tiebout (1956): potential residents sort through neighborhoods to have the best combination of tax payments and public goods.
 - ▶ Sachs (2011): When the economic base expands, local governments collect more taxes per capita and spend more on high-quality public goods to ensure competitiveness.

▶ How to define suburbs?

▶ Suburbanization trend

Research Question

- ▶ **Whether central city and suburban local governments respond to the changes in incomes differently?**
 - ▶ Central city governments:
declining economic bases, concentrated employment
 - ▶ Suburban governments: growing population
- ▶ **Contribution:**
 - ▶ Local governments in different economic environments respond to shocks differently.
 - ▶ Provide a potential factor that could affect suburbanization.

Literature Review

- ▶ How do governments adjust their fiscal policies based on changing economic bases?
 - ▶ Cut expenditure and increase property tax rate [Ross et al. (2015); Chernick et al. (2017); Feler and Senses, 2017]
 - ▶ Use savings or rainy day funds
Rosengren (2018); Bautista et al. (2022)
- ▶ Two approaches: China import shocks and changes in the manufacturing industry in the United States.
 - ▶ Feler and Senses (2017): declining housing prices and economic activity reduce local government revenue and expenditure when China joined WTO.
 - ▶ Goldsmith-Pinkham (2020): Bartik instrument

Data

- ▶ Data is obtained from:
 - ▶ 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 Quarterly Census of Employment and Wages
 - ▶ Trade Data: United Nations Commodity Trade Statistics Database
 - ▶ Demographic variables: US Census Bureau's USA Counties database

Local Government Type

- ▶ Feler and Senses (2017): aggregate all types of local governments and group counties by commuting patterns.
- ▶ Census Bureau: Annual Survey of State and Local Government Finances
 - ▶ Type 1: County (i.e., Harris county)
 - ▶ Type 2: City (i.e., Houston city, Bellaire city...etc.)
 - ▶ Type 3: Town, Village (i.e. Richmond town)
 - ▶ Type 4: Special district
 - ▶ Type 5: School district
- ▶ General purpose governments: Type 2, 3
- ▶ Single purpose governments: Type 4, 5
- ▶ **Suburban governments:**
non-central city general governments within a commuting zone

China Import Shocks

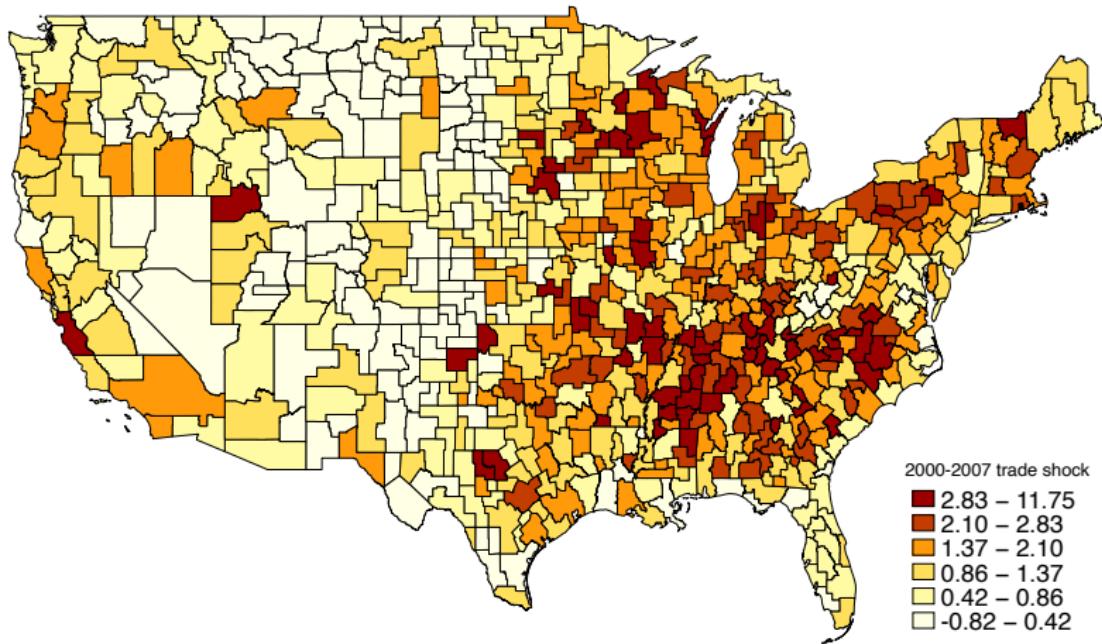
China Import Shocks: Autor et al. (2013)

- ▶ China import shocks: commuting zone level data.

$$\Delta IS_{i,t}^{US} = \sum_j \frac{\Delta M_{US,j,t} \frac{Emp_{i,j,t}}{Emp_{j,t}}}{Emp_{i,t}}$$

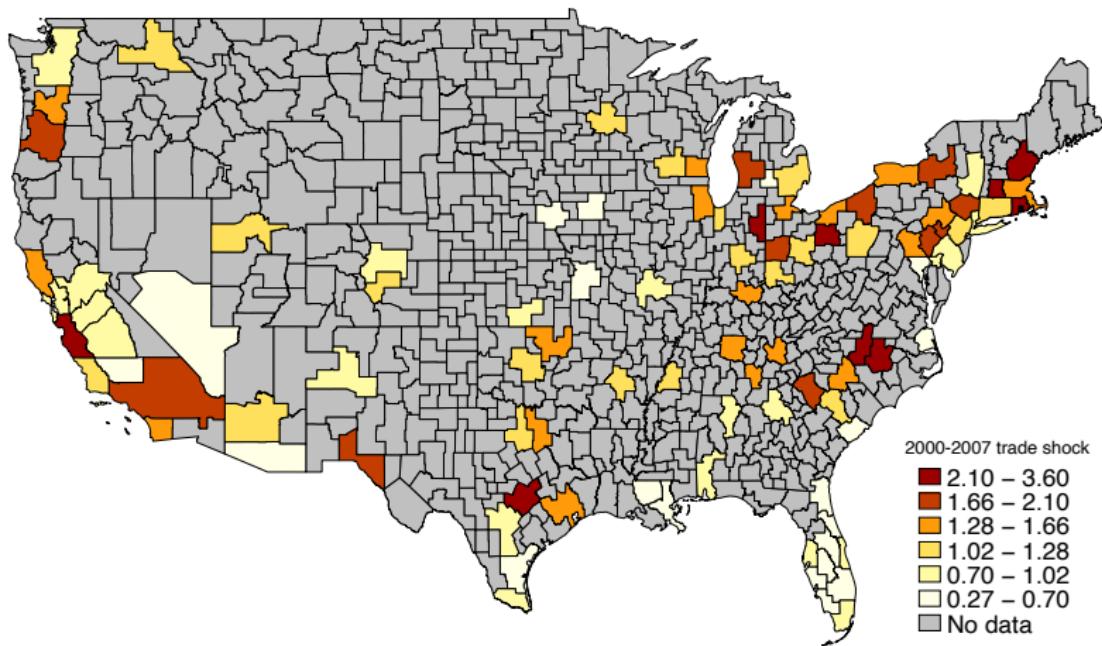
- ▶ i : commuting zones
- ▶ j : industry sectors
- ▶ t : time periods, 1990-2000, 2000-2007
- ▶ $\Delta M_{US,j,t}$: the change of China import to US in industry j
- ▶ The share of local industrial employment over national industrial employment in industry j .

China Import Shocks in 722 CZs



- ▶ This figure shows China import penetration changes from 2000-2007. The legend indicates values on different scales.

China Import Shocks in Top 100 CZs



- Top 100 CZs defined by the Census population level in 1990.

Empirical Strategy

Empirical Strategy

- ▶ Main specification:

$$\Delta Y_{i,t}^{City} = \gamma_t + \alpha_1 \Delta \hat{IS}_{i,t}^{US} + \mathbf{X}'_{i,t} \alpha_2 + \epsilon_{i,t} \quad (1)$$

$$\Delta Y_{i,t}^{Sub} = \gamma_t + \beta_1 \Delta \hat{IS}_{i,t}^{US} + \mathbf{X}'_{i,t} \beta_2 + \varepsilon_{i,t} \quad (2)$$

- ▶ $\Delta Y_{i,t}$: Δ Local fiscal variables in commuting zone i over two periods, 1990-2000 and 2000-2007.
- ▶ $\Delta IS_{i,t}^{US}$: Δ China imports values to US in commuting zone i over two periods.
- ▶ $X_{i,t}$: regional control variables like demographic characteristics and market composition in commuting zone i .
- ▶ γ_t : time fixed effects

Empirical Approach

- ▶ Endogeneity: import demand in the US might be related to imports from China.
- ▶ IV strategy: contemporaneous change in other high-income country imports of Chinese goods to capture the exogenous variation.

- ▶ First stage: $\hat{IS}_{i,t}^{US} = \tau_t + \gamma \Delta IS_{i,t}^{NUS} + \eta_{it}$

$$\Delta IS_{i,t}^{NUS} = \sum_j \frac{\Delta M_{NUS,j,t} \frac{Emp_{j,t-1}}{Emp_{j,t-1}}}{Emp_{i,t-1}}$$

- ▶ $\Delta M_{NUS,j,t}$: the change of China imports to high-income countries per worker in industry j at period t .
- ▶ The share of local industrial employment over national industrial employment in industry j at previous period $t - 1$.

Summary Statistics

- ▶ Map government variables into a consumer model:
income, consumption, saving

	100 Central City		100 Suburbs		622 Central City		622 Suburbs	
	1990	2007	1990	2007	1990	2007	1990	2007
Total revenue	\$1.89	\$2.62	\$0.98	\$1.32	\$1.42	\$1.86	\$0.87	\$1.14
Total tax revenue	\$0.58	\$0.79	\$0.31	\$0.50	\$0.32	\$0.48	\$0.20	\$0.31
Property tax revenue	\$0.30	\$0.40	\$0.19	\$0.28	\$0.17	\$0.22	\$0.11	\$0.15
Total expenditure	\$1.88	\$2.42	\$0.99	\$1.28	\$1.40	\$1.81	\$0.85	\$1.10
Current operation	\$0.81	\$1.16	\$0.46	\$0.65	\$0.53	\$0.76	\$0.31	\$0.46
Capital outlay	\$0.18	\$0.23	\$0.09	\$0.13	\$0.11	\$0.16	\$0.06	\$0.11
Investment	\$0.51	\$0.57	\$0.34	\$0.37	\$0.52	\$0.62	\$0.35	\$0.43
Total Debt Outstanding	\$2.52	\$3.18	\$0.98	\$1.17	\$1.85	\$1.66	\$1.13	\$1.09
Total Cash&Security	\$2.47	\$3.88	\$0.86	\$1.22	\$1.64	\$1.67	\$0.92	\$1.06

Summary statistics: in US\$1,000 (per capita)

- ▶ Total expenditure: current operation, capital outlay, transfer
 - ▶ Investment (Infrastructure): transportation, utility

Summary Statistics

	100 Central City		100 Suburbs		622 Central City		622 Suburbs	
	1990	2007	1990	2007	1990	2007	1990	2007
Total revenue	\$1.89	\$2.62	\$0.98	\$1.32	\$1.42	\$1.86	\$0.87	\$1.14
Total tax revenue	\$0.58	\$0.79	\$0.31	\$0.50	\$0.32	\$0.48	\$0.20	\$0.31
	33.64%	32.81%	33.55%	39.19%	27.80%	30.53%	25.76%	28.26%
Property tax revenue	\$0.30	\$0.40	\$0.19	\$0.28	\$0.17	\$0.22	\$0.11	\$0.15
	17.03%	15.80%	19.24%	21.07%	14.75%	13.90%	15.09%	14.72%
Total expenditure	\$1.88	\$2.42	\$0.99	\$1.28	\$1.40	\$1.81	\$0.85	\$1.10
Current operation	\$0.81	\$1.16	\$0.46	\$0.65	\$0.53	\$0.76	\$0.31	\$0.46
	46.59%	50.68%	46.88%	51.47%	44.22%	48.46%	39.79%	43.42%
Capital outlay	\$0.18	\$0.23	\$0.09	\$0.13	\$0.11	\$0.16	\$0.06	\$0.11
	9.80%	9.68%	8.76%	10.53%	7.98%	8.96%	7.50%	8.99%
Investment	\$0.51	\$0.57	\$0.34	\$0.37	\$0.52	\$0.62	\$0.35	\$0.43
	24.37%	22.33%	32.87%	28.70%	35.70%	32.59%	42.86%	39.18%
Total Debt Outstanding	\$2.52	\$3.18	\$0.98	\$1.17	\$1.85	\$1.66	\$1.13	\$1.09
Total Cash&Security	\$2.47	\$3.88	\$0.86	\$1.22	\$1.64	\$1.67	\$0.92	\$1.06

Summary statistics: in US\$1,000 (per capita)

- ▶ Property tax revenue share, investment expenditure share:
top 100 central cities < top 100 suburbs

Regression Results 1: Top 100 Central Cities vs Suburbs

Table 1: Regressions of China Import Shocks on Local Financial Variables

	(1) Total revenue	(2) Total expenditure	(3) Current expenditure	(4) Capital expenditure	(5) Investment expenditure	(6) Debt Outstanding	(7) Cash & Security
Central cities: value changes (per capita)							
	-334.728* (187.770)	-34.254 (51.748)	-20.736 (29.900)	-42.699 (39.050)	-51.736** (20.241)	-115.907 (160.111)	-206.982 (237.592)
Suburbs: value changes (per capita)							
	-47.712* (27.917)	-13.765 (23.477)	8.124 (14.144)	-2.534 (5.800)	-34.343 (21.682)	-36.544 (35.735)	-55.496* (28.997)
Observations	200	200	200	200	200	200	200

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

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

- ▶ Central cities: cut investment expenditure
- ▶ Suburbs: withdraw from saving

Regression Results 2: Top 100 CZs vs 622 CZs

Table 2: Regressions of China Import Shocks on Local Fiscal Variables

	(1) Total revenue	(2) Total taxes	(3) Property taxes	(4) Total expenditure	(5) Current expenditure	(6) Capital expenditure	(7) Investment expenditure
100 CZs Central Cities: value changes (per capita)							
	-334.728* (187.770)	-114.931* (68.653)	-48.226** (23.114)	-34.254 (51.748)	-20.736 (29.900)	-42.699 (39.050)	-51.736** (20.241)
Observations	200	200	200	200	200	200	200
622 CZs Central Cities: value changes (per capita)							
	-54.883 (50.801)	-7.945 (7.033)	-7.161* (3.787)	-79.658* (43.179)	-22.642* (11.616)	-22.873** (10.408)	-29.749 (18.276)
Observations	1,244	1,244	1,244	1,244	1,244	1,244	1,244

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

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

- ▶ Top 100 central cities: cut investment expenditure
- ▶ Remaining central cities: cut current and capital expenditure

Regression Results 3: Special and School Districts

Table 3: Regressions of China Import Shocks on Local Fiscal Variables

	(1) Total revenue	(2) Intergovt. transfer aid	(3) Total taxes	(4) Property taxes	(5) Total expenditure	(6) Current expenditure	(7) Capital expenditure	(8) Investment expenditure
Feler and Senses (2017): value changes (per capita)								
	-117.732** (52.921)	-3.496 (9.928)	-45.331* (23.252)	-17.280 (11.319)	-43.515*** (25.551)	-	-	-
Special Districts: value changes (per capita)								
	-1.243 (21.066)	-11.610 (10.971)	-4.498 (5.230)	-2.834 (2.460)	-17.841 (19.410)	-13.587 (15.142)	-4.941 (3.631)	-2.323 (8.347)
School Districts: value changes (per capita)								
	12.901 (22.738)	8.601 (15.516)	5.736 (13.142)	6.377 (12.831)	1.527 (19.541)	13.652 (20.218)	-12.041 (10.061)	-
Observations	200	200	200	200	200	200	200	200

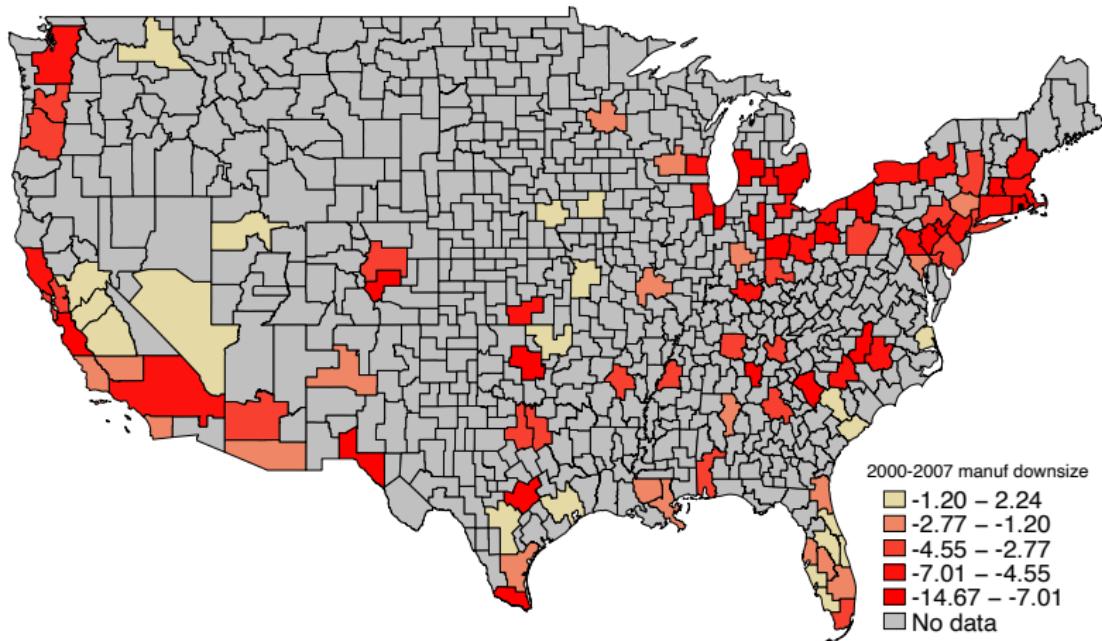
Robust standard errors are in parentheses, clustering at the commuting zone level.

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

- ▶ Special districts and school districts are not affected.

The changes in the manufacturing industry

Manufacturing Downsizing Impacts in the Top 100 CZs



- Local labor markets experienced a relative decline in employment and earnings when China joined WTO.
(Autor et al. 2013)

Manufacturing Downsizing Impacts: Bartik IV

- ▶ Main specification:

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

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

$$\Delta \hat{Manuf}_{i,t} = \tau_t + \gamma \Delta B_{i,t} + \eta_{i,t} \quad (5)$$

- ▶ $\Delta Y_{i,t}$: Δ Local fiscal variables in commuting zone i over two periods, 1990-2000 and 2000-2007.
- ▶ $\Delta Manuf_{i,t}$: Δ Manufacturing industry employments changes in commuting zone i over two periods.
 - ▶ $\Delta Manuf_{it} = \sum_j \frac{Emp_{i,j,t}}{Emp_{i,t}} g_{i,j,t}$; $\Delta B_{it} = \sum_j \frac{Emp_{i,j,t-1}}{Emp_{i,t-1}} g_{j,t}$
- ▶ $X_{i,t}$: regional control variables like demographic characteristics and market composition in commuting zone i .
- ▶ γ_t : time fixed effects

Regression Results 4: Compare with Feler&Senses (2017)

Table 4: Regressions of Manufacturing Downsizing Effects on Local Fiscal Variables

	(1) Total revenue	(2) Tax revenue	(3) Property taxes	(4) Total expenditure
All types of local governments				
Feler and Senses (2017)				
value changes (per capita)	-117.732** (52.921)	-45.331* (23.252)	-17.280 (11.319)	-43.515* (25.551)
Manufacturing industry downsizing impacts				
value changes (per capita)	121.690*** (41.073)	47.302** (18.880)	31.855*** (11.440)	78.470*** (25.116)
Observations	1,444	1,444	1,444	1,444

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

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

- ▶ Areas are more exposed to China import shocks ↑
 - ▶ property value fall and economic activities decline ↓
- ▶ Manufacturing industry decline ↓
 - ▶ local governments receive less revenue and cut expenditure ↓

Regression Results 5: Top 100 Central Cities vs Suburbs

Table 5: Regressions of Manufacturing Effects on Local Financing Variables

	(1) Total expenditure	(2) Current expenditure	(3) Capital expenditure	(4) Investment expenditure	(5) Debt Outstanding	(6) Cash & Security	(7) Other fund
Central cities: value changes (per capita)							
	222.204*** (85.179)	115.807** (55.979)	-6.867 (50.297)	63.690** (27.931)	75.153 (194.405)	312.414 (249.832)	50.781 (86.872)
Suburbs: value changes (per capita)							
	52.507** (25.710)	15.589 (9.951)	6.080 (7.349)	29.993** (14.632)	51.507 (43.675)	93.402* (49.835)	40.365 (25.819)
Observations	200	200	200	200	200	200	200

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

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

- ▶ Central cities: cut investment expenditure
- ▶ Suburbs: cut investment expenditure, withdraw from saving

Conclusion

- ▶ Aggregation bias:
 - ▶ Feler and Senses (2017): aggregate all types of local governments into one unit.
- ▶ Top 100 central city local governments:
 - ▶ Cut \$51.7 investment expenditure when \$1,000 increase China import values.
 - ▶ As if permanent impacts.
- ▶ Top 100 suburban local governments:
 - ▶ Dis-save \$55.5 cash & security when \$1,000 increase China import values.
 - ▶ As if temporary impacts.
- ▶ Top 100 central city governments are likely to hamper the relative competitiveness of a region in the long run.

Thank you

- ▶ Welcome comments or suggestions: yhsu6@uh.edu

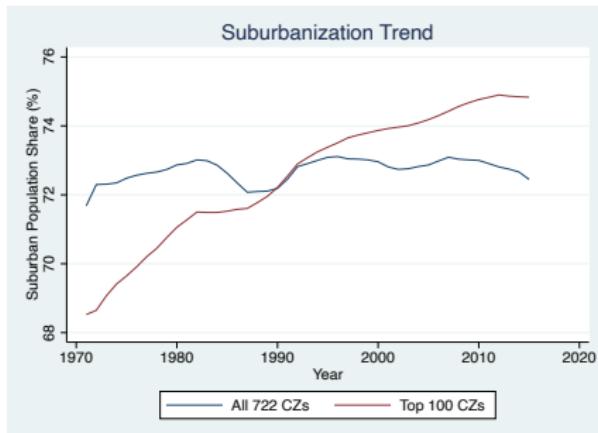
Commuting Zone: the combination of cities and suburbs



- ▶ Commuting Zone (CZ): the geographic unit determining a local labor market. (Tolbert and Sizer, 1996)
- ▶ Houston Commuting Zone:
including 12 counties and 104 independent local governments.
- ▶ Suburbs: aggregation of non-central city areas within a CZ.

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Suburban pop share outpaces city pop share in Top 100CZs



- ▶ Suburban population share: suburban population over commuting zone population.
- ▶ Suburbs are comparable to central cities of Top 100 CZs.
 - ▶ Top 100 CZs defined by the Census population level in 1990.
 - ▶ Top 100 CZs account for about 70 % of national population.

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