

Housing Price, Labor Supply, and Household Behaviors: The Large City Effects

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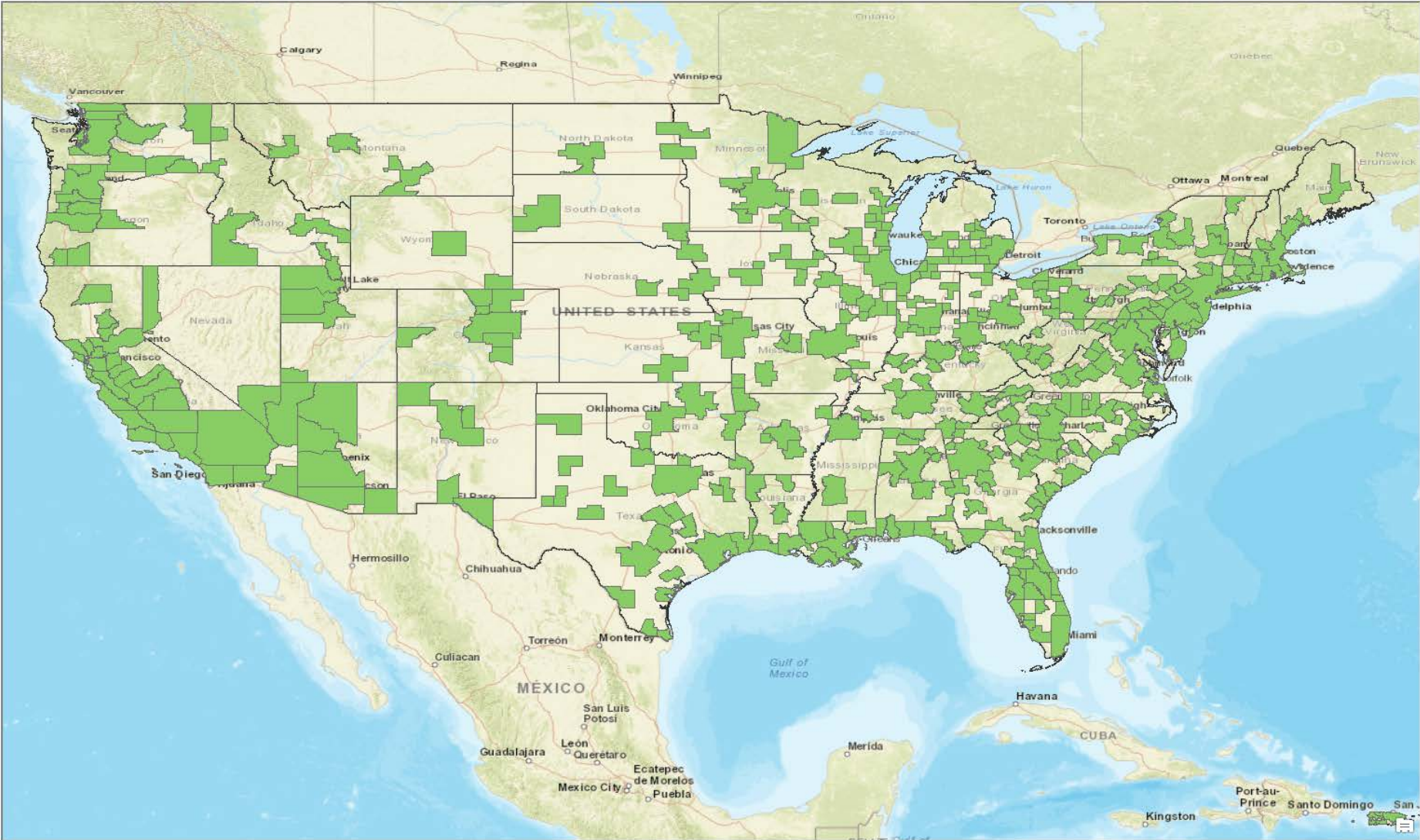
Introduction

- Housing price movements have profound effects on individual/household behaviors (Campbell & Cocco, 2007; Mian and Sufi, 2011; Aladangady, 2017)
 - Most of the studies focus on the effects of housing prices on ***local residents***.
- However, housing price shapes spatial patterns of firms (Glaeser and Gottlieb, 2009) and geographical distribution of households (Gyourko et al. 2013).
- It is natural to ask whether and how housing price of large cities affect the behaviors of people in nearby cities.
 - “Dream” city effects; Mobility of labor force and capital; etc;
 - An empirical question to answer as theory may predict either direction;
 - Deepen understanding about how housing price affects behaviors of human beings.

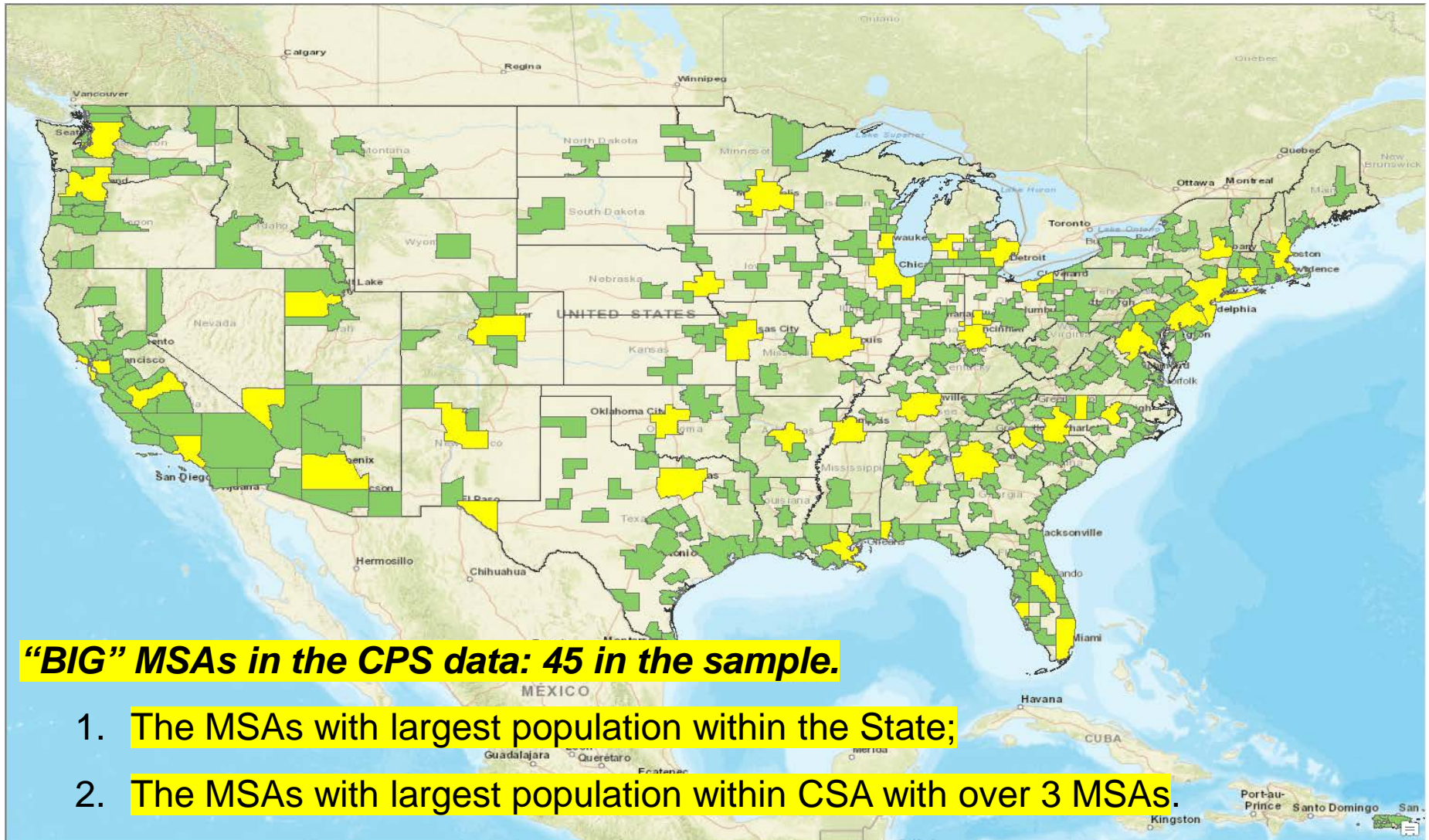
Introduction (Cont)

- Data used in the study:
 - Current Population Survey in the US 1990-2017;
 - The Federal Housing Finance Agency (FHFA);
 - Urban Household Survey (UHS) in China, 2002- 2009.
- The endogeneity issue of housing price movements: Instrument variable (IV)
 - Elasticity of the housing supply in the US (Saiz 2010 and Chaney et al, 2012)
 - China: Elasticity of housing supply? Land supply by the local government?
- Housing price in the big MSAs significantly impacts on those living in nearby MSAs:
 - Labor supply \uparrow , Wage \uparrow . Especially, for female and younger people.
 - Only exists for those living in rented houses.
 - No significant evidence for impact on migration, marriage, and household size.
- In contrast, no significant evidence on the outcomes among those within the big MSAs.

Metropolitan Statistical Areas (MSA)



Large MSAs in year

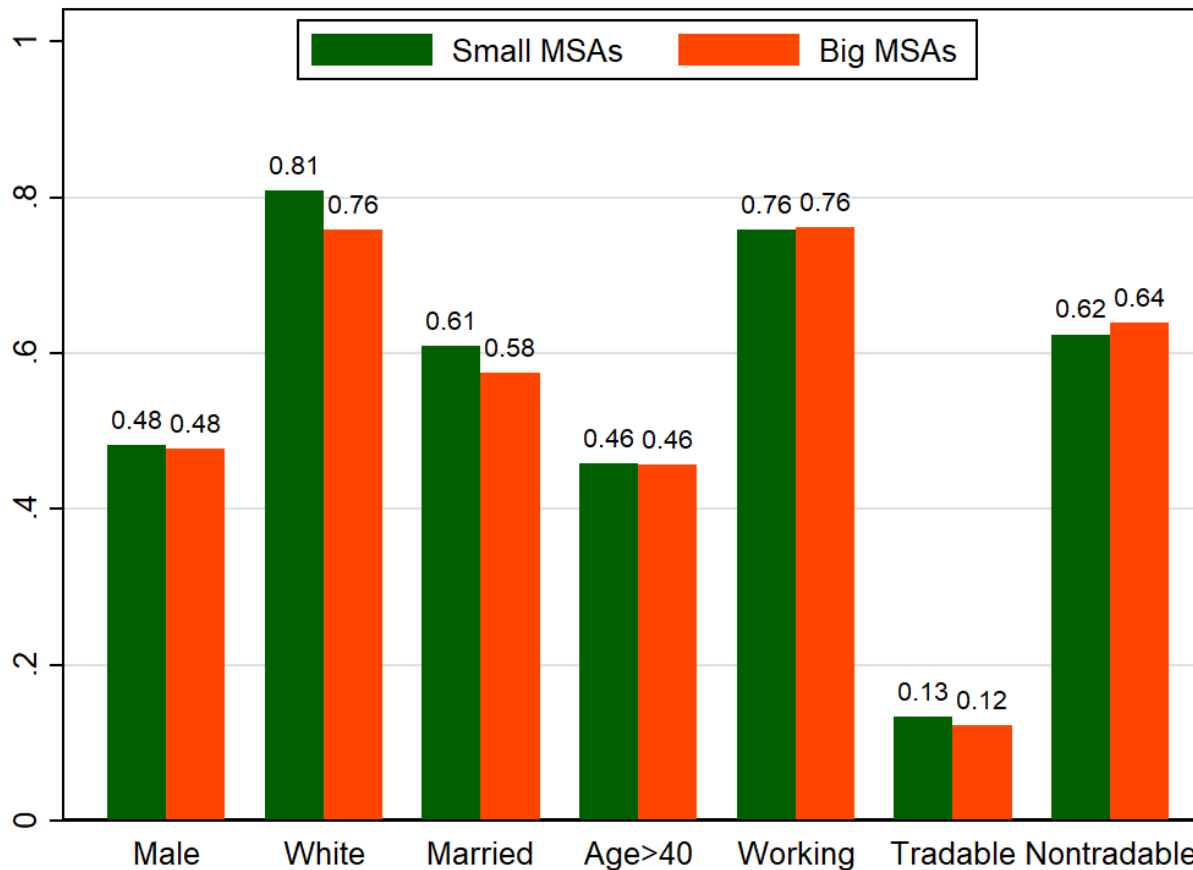


Example of Combined Statistical Area (CSA)

Rank	Name	Population	Constituents MSAs
1	New York-Newark, NY-NJ-CT-PA	23,076,664	<p>New York-Newark-Jersey City, NY-NJ-PA</p> <p>Bridgeport-Stamford-Norwalk, CT New Haven-Milford, CT Allentown-Bethlehem-Easton, PA-NJ Trenton, NJ Kingston, NY East Stroudsburg, PA</p>
2	Los Angeles-Long Beach, CA	17,877,006	<p>Los Angeles-Long Beach-Anaheim, CA</p> <p>Riverside-San Bernardino-Ontario, CA Oxnard-Thousand Oaks-Ventura, CA</p>
3	Chicago-Naperville, IL-IN-WI	9,840,929	<p>Chicago-Naperville-Elgin, IL-IN-WI</p> <p>Kankakee, IL Michigan City-La Porte, IN</p>
4	Washington-Baltimore-Arlington, DC-MD-VA-WV-PA	9,051,961	<p>Washington-Arlington-Alexandria, DC-VA-MD-WV</p> <p>Baltimore-Columbia-Towson, MD Hagerstown-Martinsburg, MD-WV Chambersburg-Waynesboro, PA Winchester, VA-WV California-Lexington Park, MD</p>

Data Description

- Those aged 21-59 in CPS 1990-2017.
- Cover rich information on individual and household outcomes such as demographics, labor supply, occupation, industry, and wage.



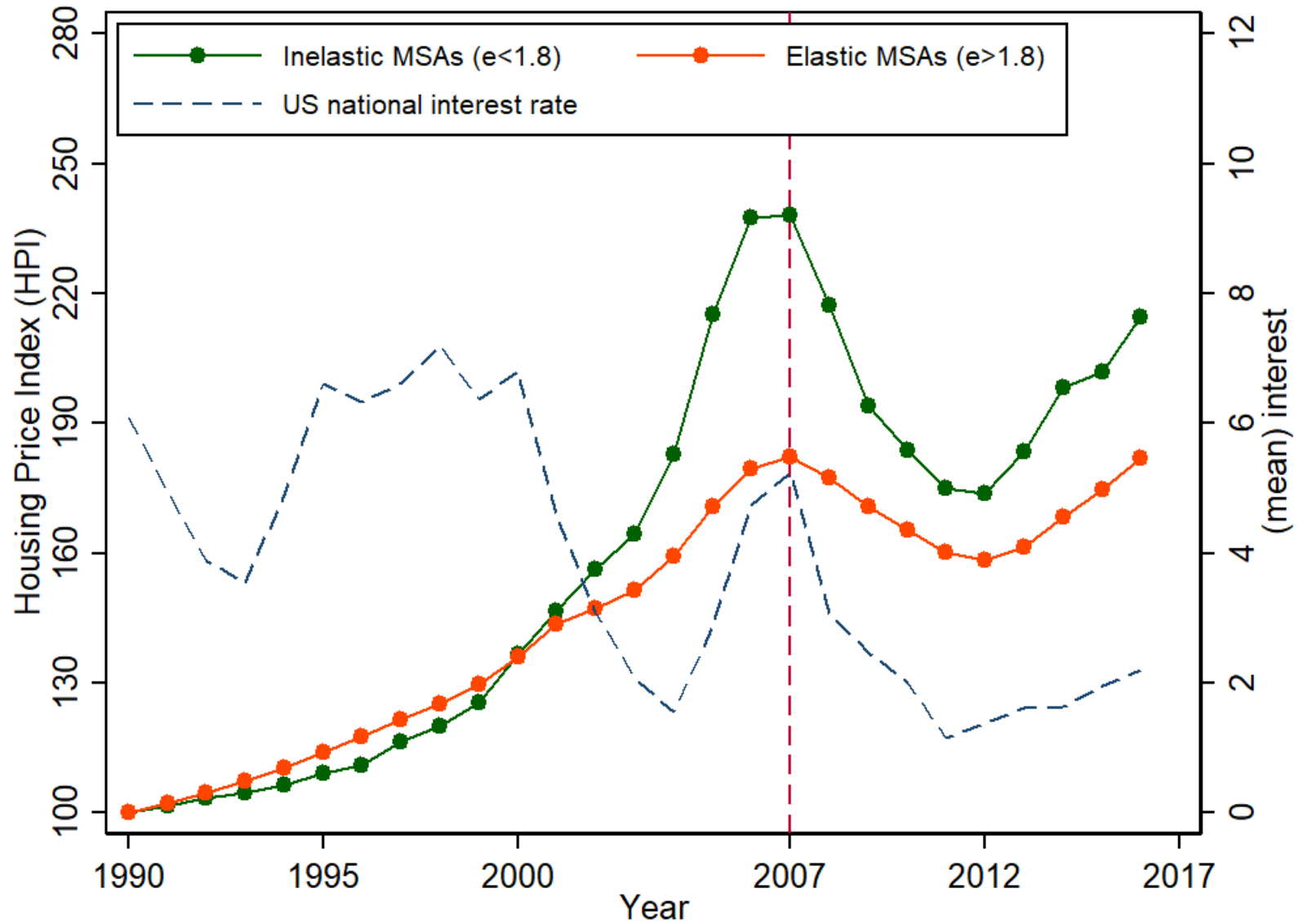
Exogeneous variation for Housing Price Index

- Following the previous literature, we use the interaction of land supply elasticity and the real interest rate (*elasticity*interest*) as the instrumental variable for housing price.
- To check the effects of *elasticity*interest* on HPI, we estimate the following equation to investigate the impact of *elasticity*interest* on housing price index (Chaney et al, 2012).

$$HPI_{ct} = elasticity_c * interest_t + \delta_c + \delta_t + \epsilon_{ict}$$

- The dependent variable is housing price index of MSA c in year t.
- Covariates include fixed effects of MSA c and year t, representatively.
- Standard errors are clustered at the MSA level.

Exogenous variation: Land supply elasticity



First Stage Results

VARIABLES	(1)	(2)	(3)	(4)
	Housing Price Index (= 100 in 1990)			
	All MSAs in the sample	All Big MSAs in the sample		
Elasticity*Real interest rate	2.89*** (0.69)		2.48*** (0.80)	
Elasticity*Real interest rate * Pre-recession period (1990-2007)		3.71*** (0.53)		3.00*** (0.58)
Elasticity*Real interest rate * Post-recession period (2008-2017)		-8.53*** (1.30)		-8.77*** (1.66)
Observations	1,554	1,554	1,075	1,075
R-squared	0.83	0.90	0.84	0.90
CBSA fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Number of CBSAs	65	65	45	45

Robust standard errors in parentheses are clustered at the CBSA level.

*** p<0.01, ** p<0.05, * p<0.1

OLS and Two Stage Least Squares (2SLS) estimation

- OLS estimation:

$$Y_{imt} = HPI_{M,t-1} + D(MSA, year, gender, age) + \varepsilon_{imt}$$

- Two stage least squares estimate the following (Chaney et al, 2012):

$$(1) HPI_{M,t-1} = Elasticity_M * Interest_{t-1} + D(MSA, year, gender, age) + \varepsilon_{imt}$$

$$(2) Y_{imt} = \hat{H}PI_{M,t-1} + D(MSA, year, gender, age) + \varepsilon_{imt}$$

- $HPI_{M,t-1}$ is the housing price index of BIG MSA in year t-1.
- Y_{imt} is the outcome variable for individual/household i in MSA m in year t.
- Covariates include fixed effects of MSA, calendar year, gender, and age.
- Standard errors are clustered at the BIG MSA level.

Table 2: Effects of Housing Price Shocks in Big MSAs on Labor Supply

Dependent variable VARIABLES	(1)	(2)	(3)	(4)
	OLS		2SLS	
Panel A: People in MSAs Nearby the BIG ones (Mean = 0.75)				
HPI _{c,t-1} of big MSAs (=1 in 1990)	0.007 (0.005)		0.047** (0.018)	
Observations	535,388		535,388	
R-squared	0.056		0.056	
MSA fixed effects	Yes		Yes	
Year fixed effects	Yes		Yes	
Panel B: Big MSAs (Mean = 0.76)				
HPI _{c,t-1} of big MSAs (=1 in 1990)	0.015** (0.006)		0.021 (0.022)	
Observations	997,746		997,746	
R-squared	0.052		0.052	
MSA fixed effects	Yes		Yes	
Year fixed effects	Yes		Yes	

Robust standard errors in parentheses are clustered at the big MSA level.

Demographic variables including gender, age, and their combinations are controlled for.

*** p<0.01, ** p<0.05, * p<0.1

Table 3. Effects of Housing Price Shocks in Big MSAs on Labor Supply, by subsamples

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	Working	Working at Tradable sector	Working at Non-tradable sector	Working	Working at Tradable sector	Working at Non-tradable sector
MSA sample	MSAs Nearby the big ones			Big MSAs		
Full sample	0.047**	-0.001	0.048**	0.021	0.006	0.016
Male	0.033	-0.008	0.041	-0.003	0.008	-0.011
Female	0.060***	0.004	0.055**	0.044	0.004	0.040
Younger (<40)	0.077***	0.031*	0.045*	0.009	0.023	-0.014
Older (>=40)	0.012	-0.035	0.047	0.029	-0.012	0.041

Note: Data source is CPS. Each coefficient represents a single regression. The setting is the same as that in column 4 of Table 2.

Table 4. Effects of Housing Price Shocks in Big Cities on Wages (2SLS estimation)

	(1)	(2)	(3)	(4)	(5)
Dep. Var.	Log(Wage)				
Sample	Full	Male	Female	Younger	Older
<i>Panel A: People in MSAs nearby the big ones</i>					
Mean	10.1	10.3	9.83	10.3	9.83
HPI of big MSAs	0.132** (0.050)	0.054 (0.060)	0.216*** (0.061)	0.203*** (0.049)	0.049 (0.077)
<i>Panel B: People in BIG MSAs</i>					
Mean	10.2	10.4	9.96	10.4	9.96
HPI of big MSAs	0.047 (0.046)	0.052 (0.067)	0.042 (0.057)	0.048 (0.064)	0.060 (0.055)

Note: Data source is CPS. Standard errors are clustered at the BIG MSA level. The equation for estimation is the same as that in column 4 of Table 2.

Table 5. Effects of Housing Price Shocks on Labor Supply and Wages, by Home Ownership

Dependent var.	(1) Working	(2) Log(Wage)	(3) Working	(4) Log(Wage)
Sample	Small MSAs nearby big ones		Big MSAs	
<i>Panel A: Individuals in rented houses</i>				
Mean	0.69	9.8	0.71	9.9
HPI	0.095** (0.038)	0.148** (0.069)	0.040 (0.035)	0.086 (0.095)
<i>Panel B: Individuals in self-owned houses</i>				
Mean	0.79	10.2	0.79	10.4
HPI	0.020 (0.017)	0.080 (0.061)	0.005 (0.025)	-0.002 (0.050)

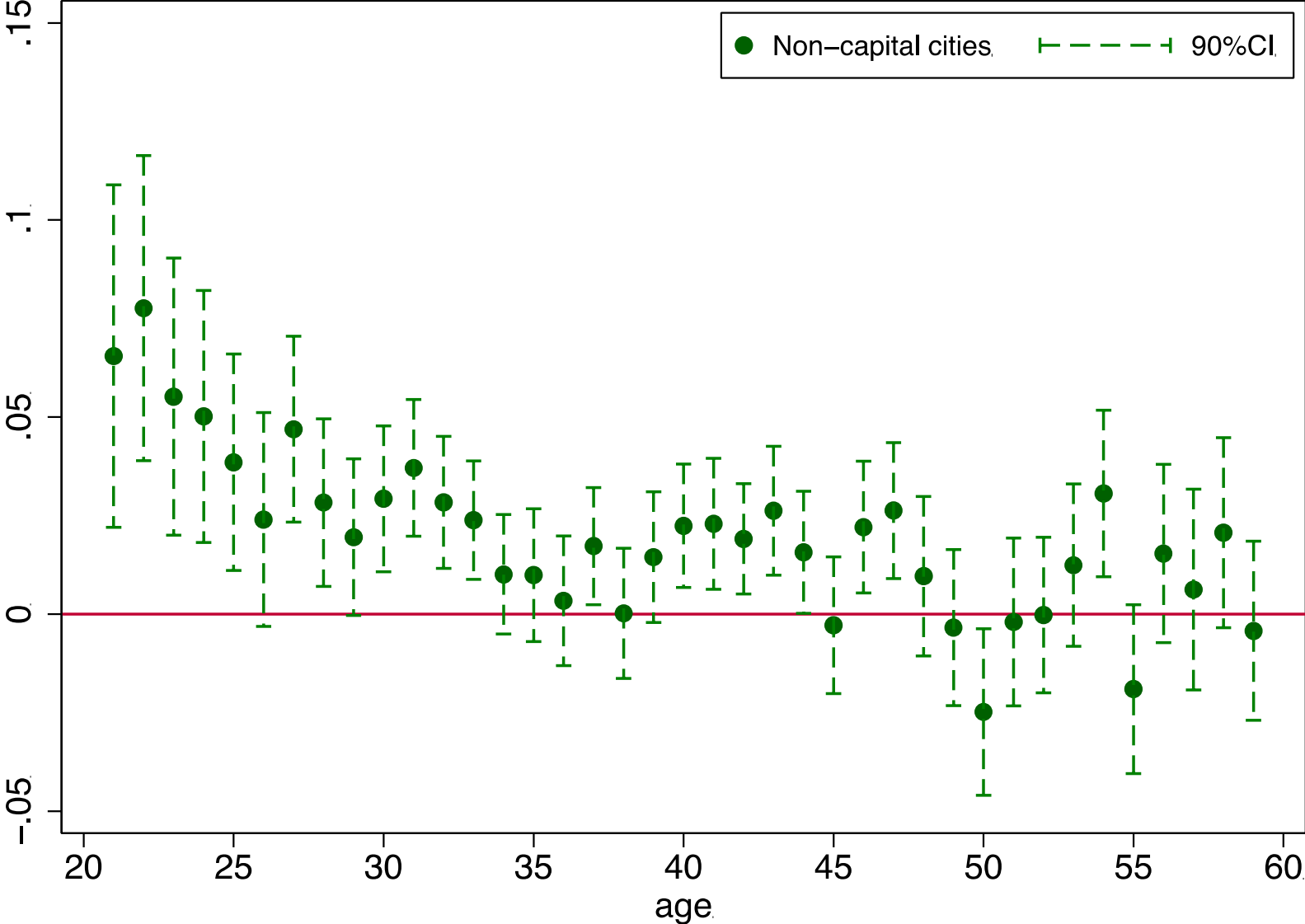
Note: Data source is CPS. Standard errors are clustered at the BIG MSA level. The equation for estimation is the same as that in column 4 of Table 2.

We do not find much evidence on migration, marital status, and household size.

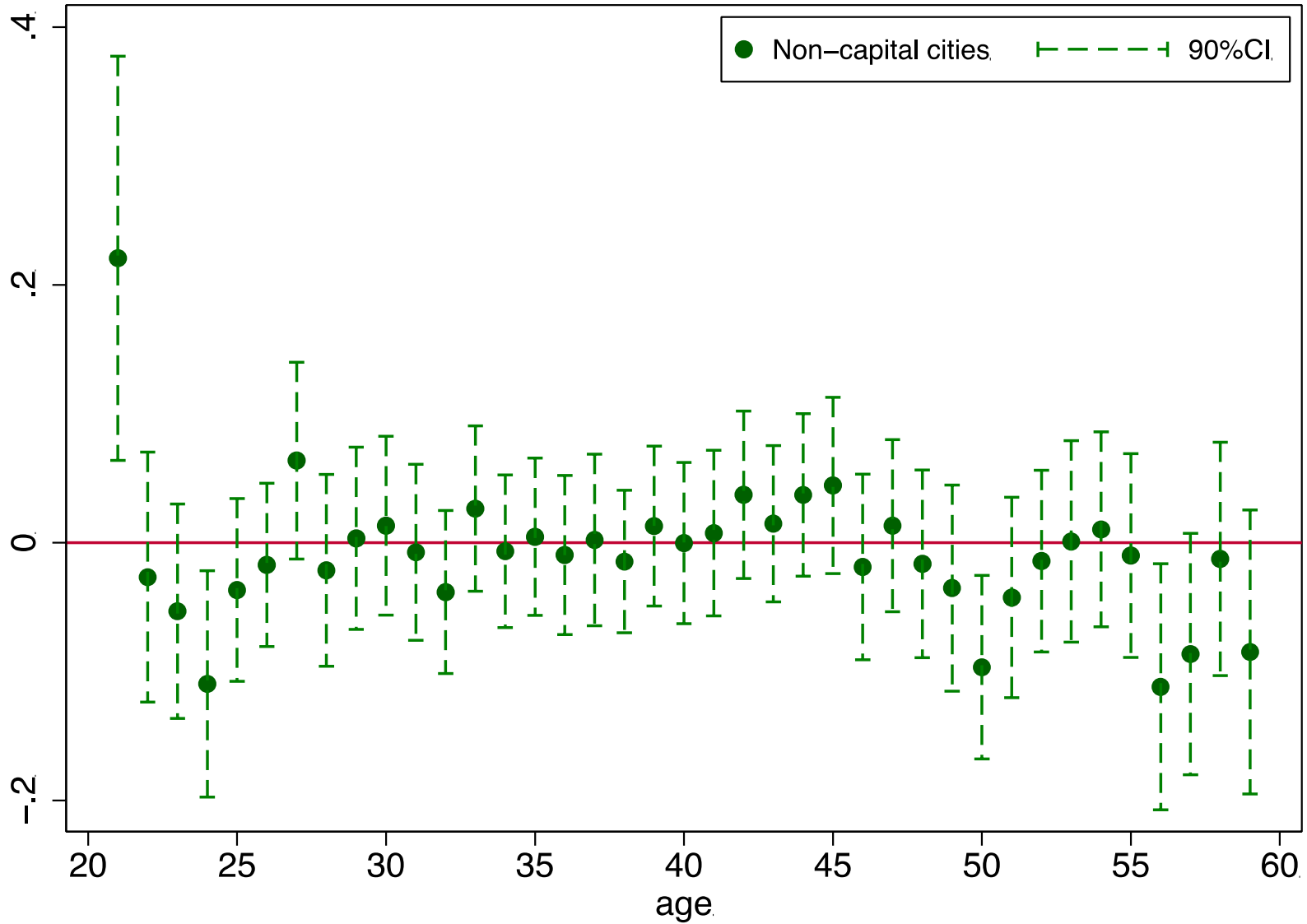
Big cities in China: 35 big cities in different provinces (Capital cities)



OLS estimates: Effects of Housing Price Shocks in Big cities on Labor Participation in China



OLS estimates: Effects of Housing Price Shocks in Big cities on log wage in China



First Stage of potential IV in China

VARIABLES	(1) Housing Price Index (= 100 in 2003) Saiz (2010) elasticity	(2)
Elasticity*Real interest rate	0.19 (0.97)	
Elasticity*lending interest rate (5yrs)		-3.52 (6.31)
Observations	222	222
R-squared	0.88	0.88
City fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Number of cities	32	32

Robust standard errors in parentheses are clustered at the City level.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

First Stage of potential IV in China (Cont)

VARIABLES	Housing Price Index (= 100 in 2003)			
	(1)	(2)	(3)	(4)
	Residential		New	
Number of Land Supply (Z-score)	-3.06** (1.50)		-2.18* (1.21)	
Area of Land Supply (Z-score)		-2.36** (0.98)		-2.92*** (0.98)
Observations	691	691	719	719
R-squared	0.87	0.88	0.86	0.87
City fixed effect	Yes	Yes	Yes	Yes
Year fixed effect	Yes	Yes	Yes	Yes
Number of cities	119	119	119	119

Robust standard errors in parentheses are clustered at the City level.

*** p<0.01, ** p<0.05, * p<0.1

Conclusions

- Using housing supply elasticity as an instrument for HPI in the US, we find that
 - An increase in housing prices in big cities significantly increases the labor supply in non-tradable sector and wage level among people living in nearby small cities.
 - More significant among women, younger, and those living in rented houses.
 - No significant evidence for the above effects among those living within the big cities.
- Data in China suggest that housing price changes in big cities is also positively associated with labor supply among those living in smaller and nearby cities.
 - More will come in the next version.
- In general, the effects of housing price shocks on the outcomes among those living in nearby cities would be an important component in the whole picture that might have been largely ignored in the previous literature.

To do list

- Mechanism, Mechanism, Mechanism!
 - Heterogeneity: By education level; ethnicity; etc.
 - Labor demand side results.
 - Investigation on more outcomes.
 - American Housing Survey
 - American Community Survey
- More about China.
 - What is the correct instrument?
 - Any difference between China and USA?