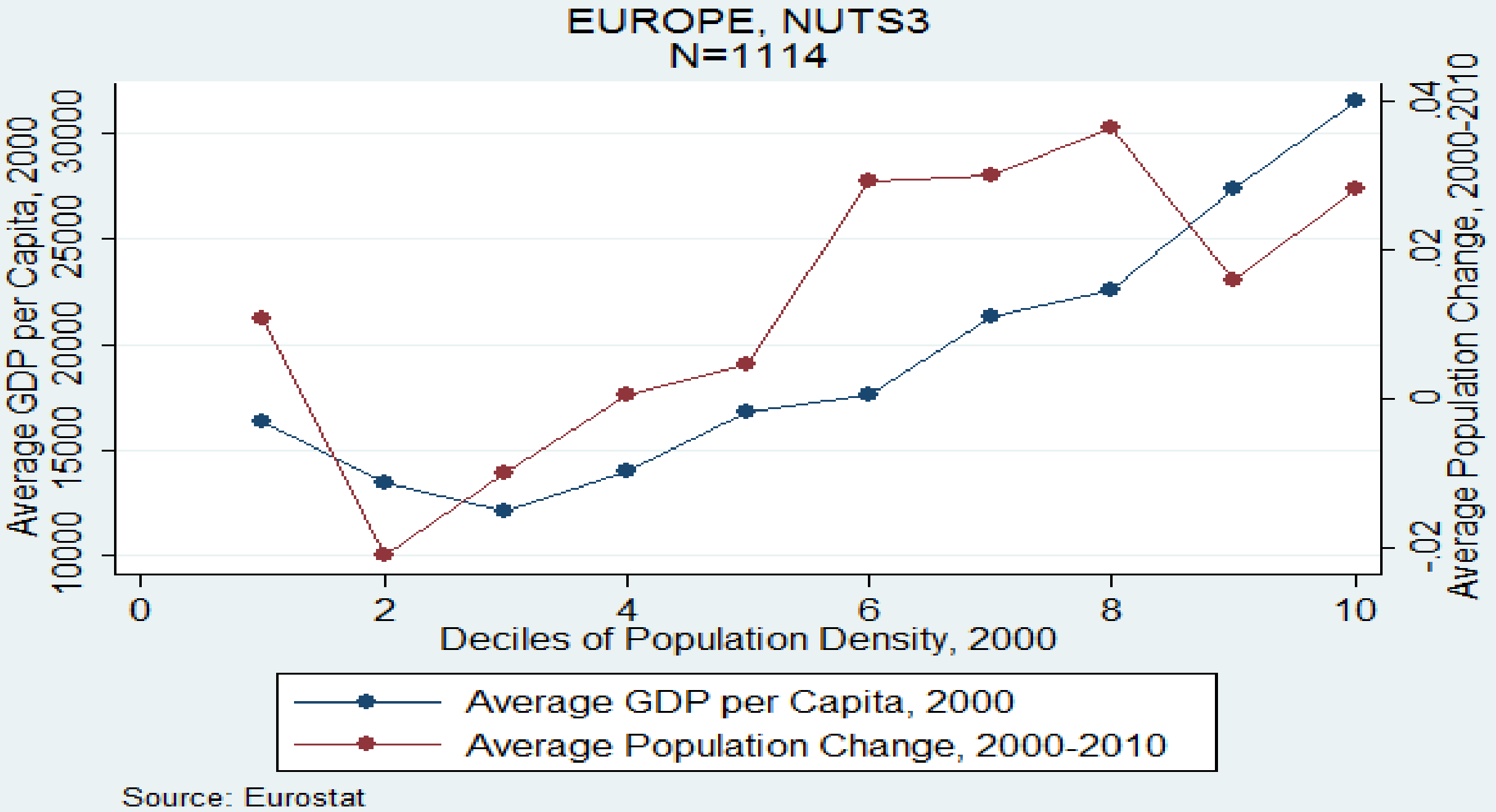
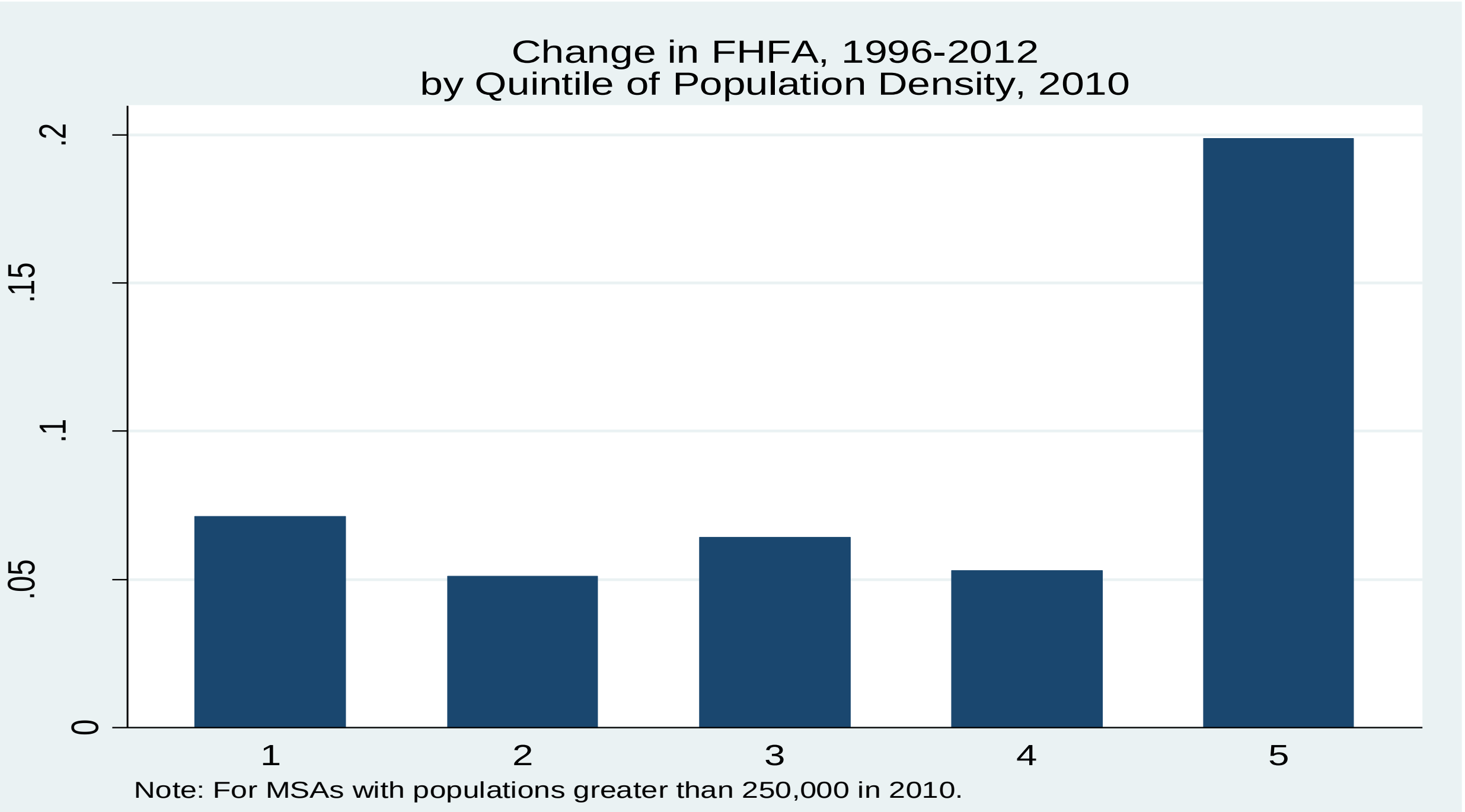
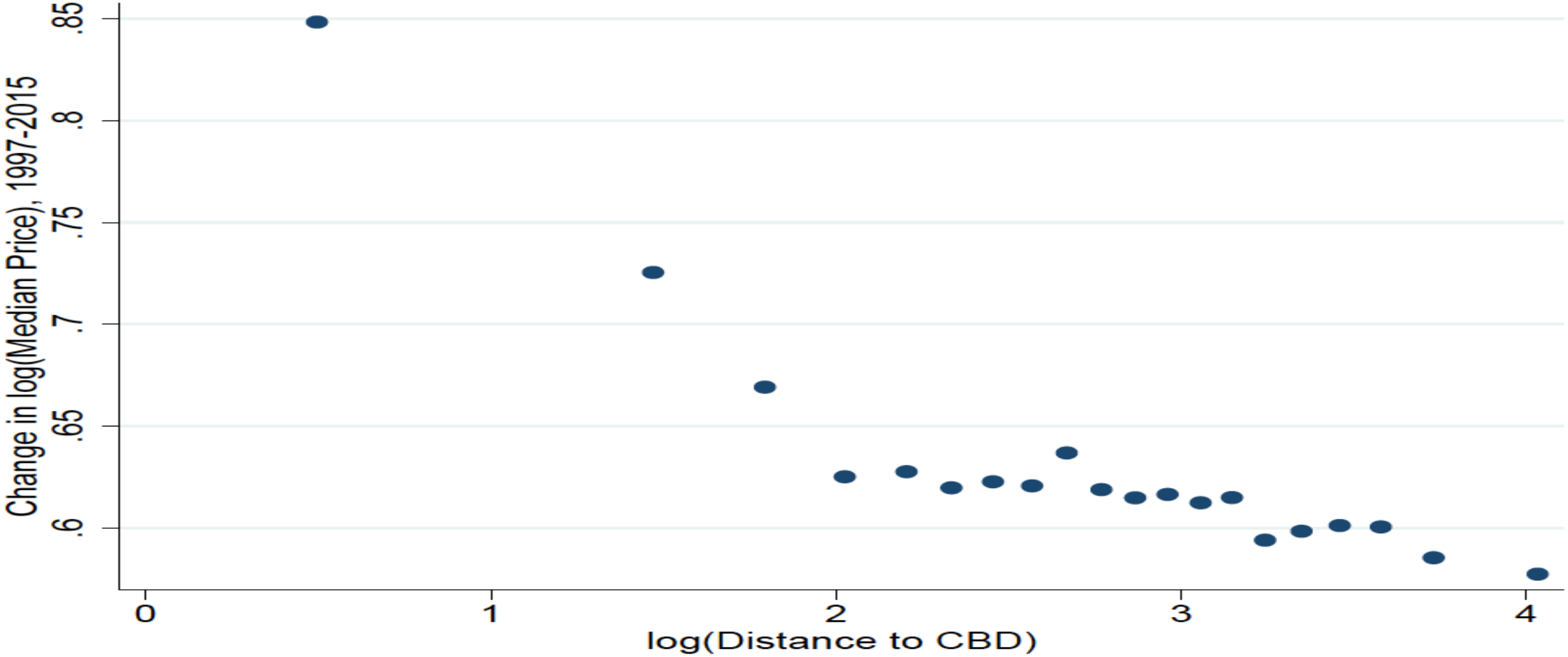
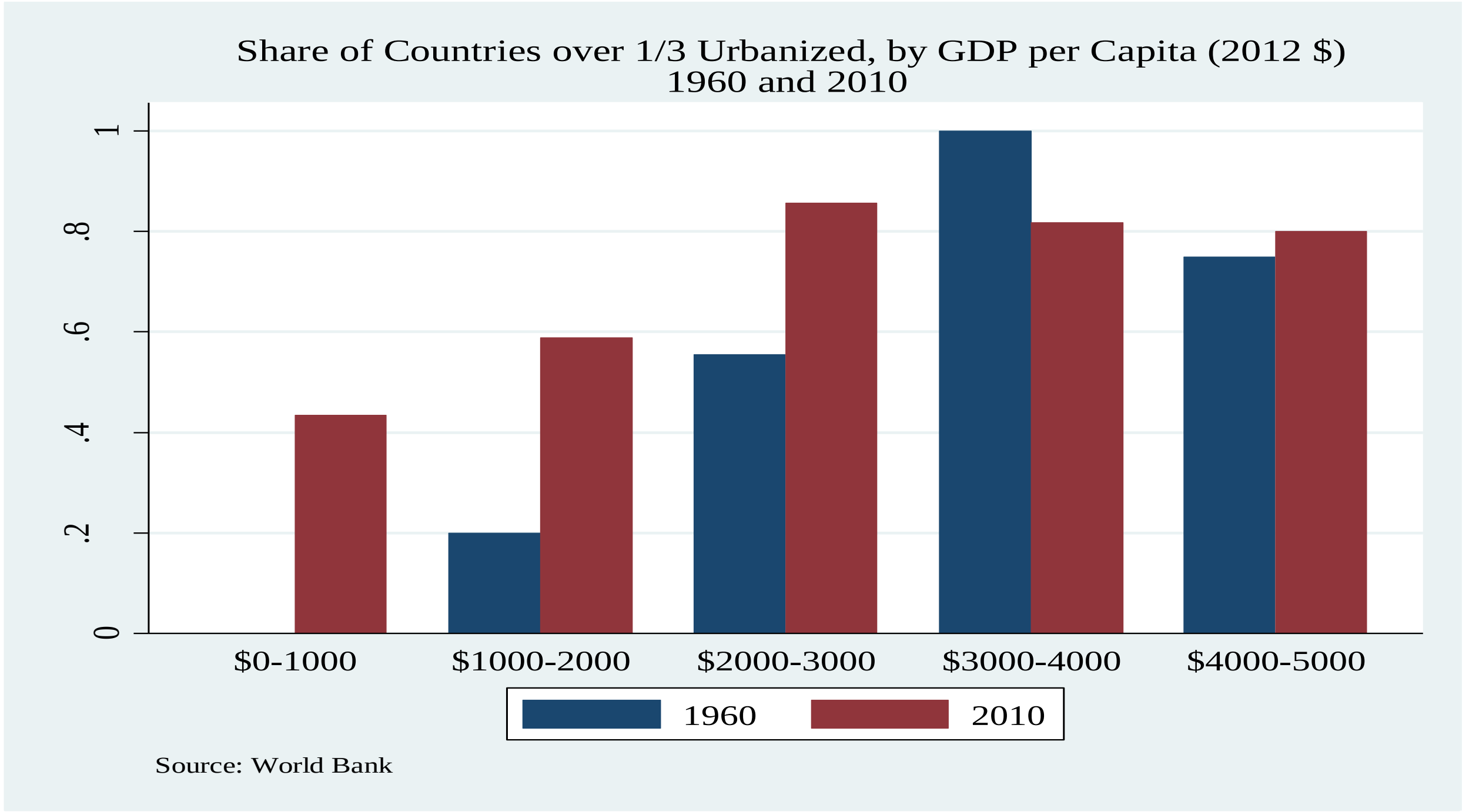

EUROPE, NUTS3
N=1114
Average GDP per Capita, 2000
10000 15000 20000 25000 30000
Average Population Change, 2000-2010
-.02 0 .02 .04
0 2 4 6 8 10
Deciles of Population Density, 2000
Average GDP per Capita, 2000
Average Population Change, 2000-2010
Source: Eurostat


Change in FHFA, 1996-2012
by Quintile of Population Density, 2010
0
.05
.1
.15
.2
1
2
3
4
5
Note: For MSAs with populations greater than 250,000 in 2010.

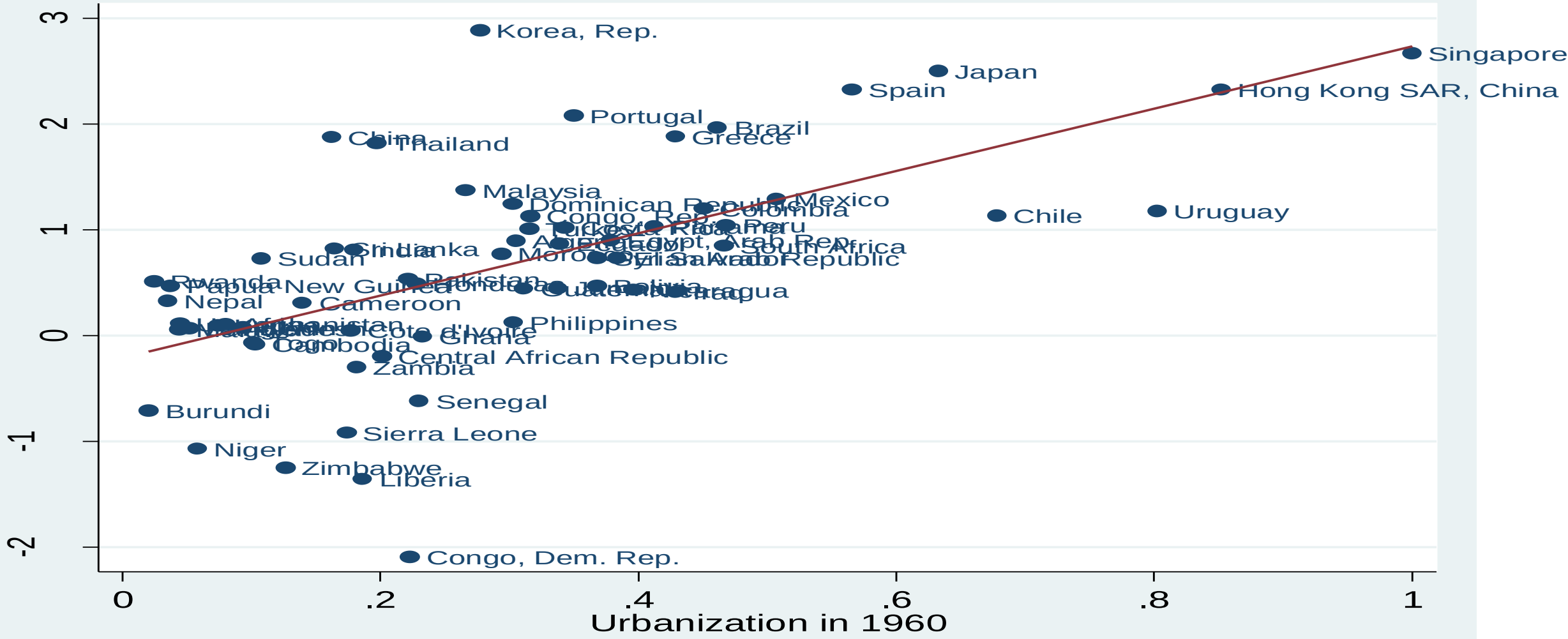
The Great Pro-City Price Tilt (U.S.)



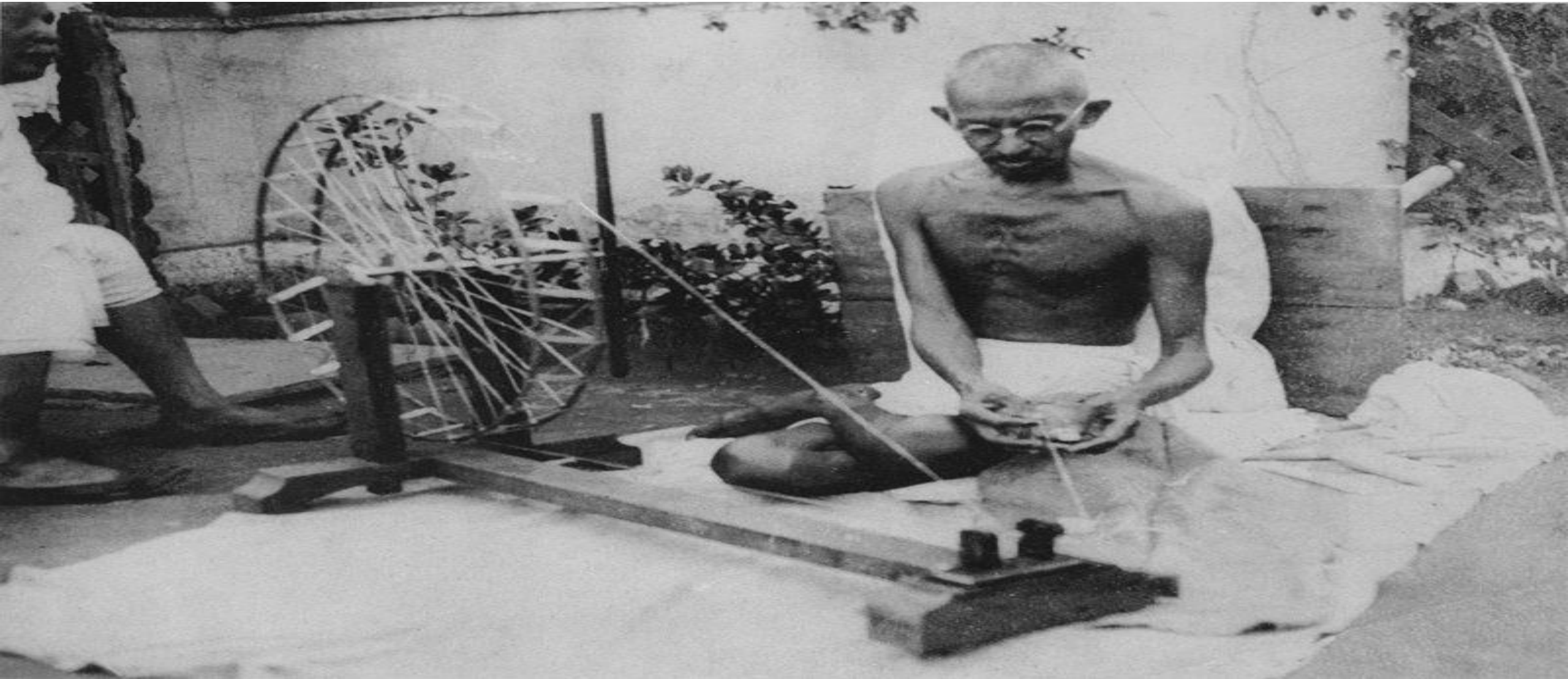
Hipsman (2015) Using Zillow Sub-city

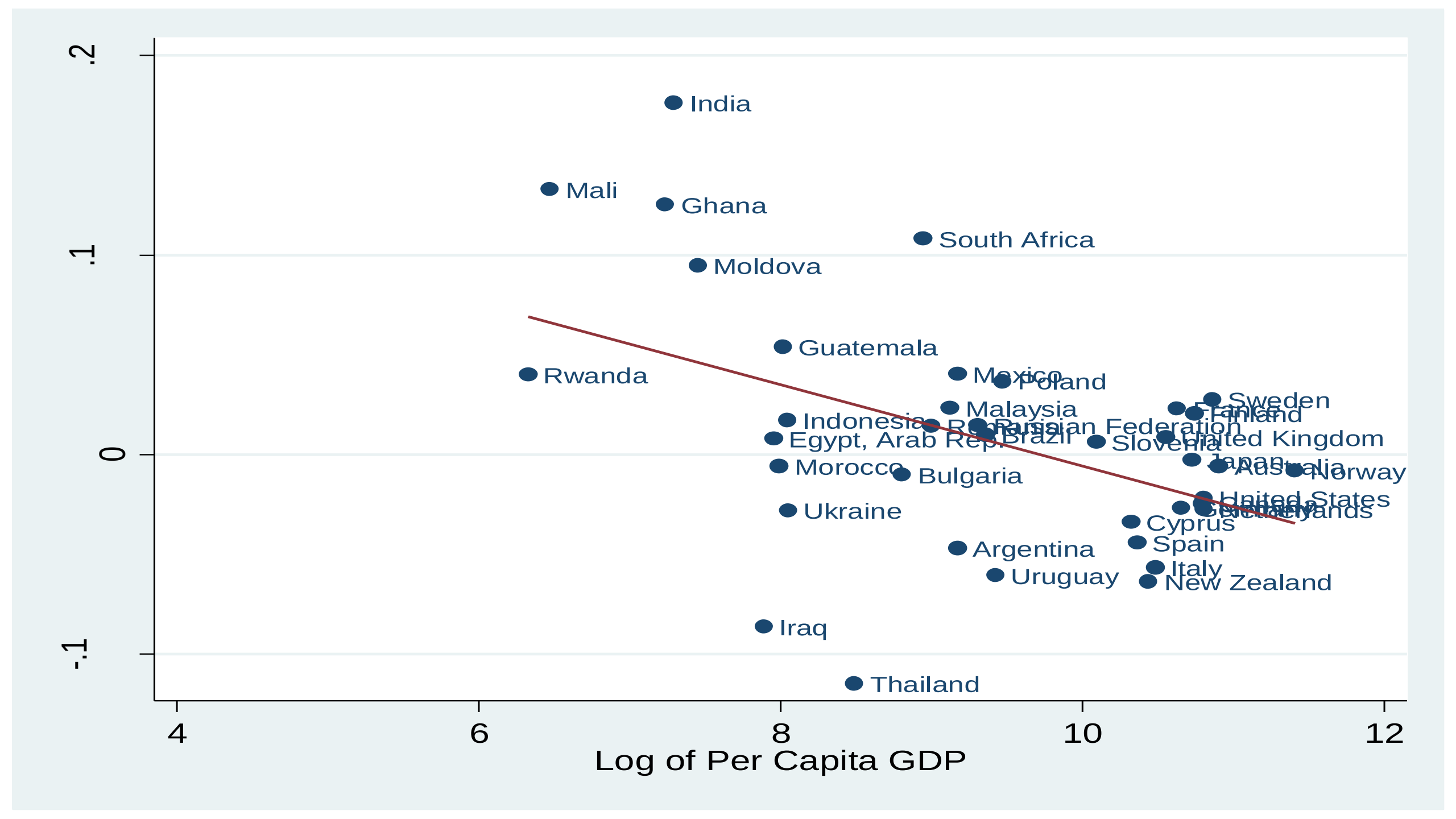

Share of Countries over 1/3 Urbanized, by GDP per Capita (2012 $)
1960 and 2010
0
.2
.4
.6
.8
1
$0-1000
$1000-2000
$2000-3000
$3000-4000
$4000-5000
1960
2010
Source: World Bank

Per Capita GDP Growth 1960-2010 (Poor Countries<$5000 PC GDP)



“I regard the growth of cities as an evil thing, unfortunate for mankind and the world. ”




.2
.1
0
-.1
India
Mali
Ghana
South Africa
Moldova
Guatemala
Rwanda
Mexico
Poland
Sweden
Malaysia
Finland
Indonesia
Russian Federation
Egypt, Arab Rep.
Brazil
Slovenia
United Kingdom
Morocco
Bulgaria
Norway
Ukraine
Cyprus
Spain
Argentina
Italy
Uruguay
New Zealand
Iraq
Thailand
4
6
8
10
12
Log of Per Capita GDP

The Urban Triad

The Economic Magic of Human Interaction by David Stanley (Flea Market)

Government battling the Demons of Density

The Physical City by rulto

Technology and the City

Photo by Bernard Gagnon

Centripetal Skyscrapers

The Chicago Home Insurance Building, built in 1885, is widely considered the world's first metal-framed skyscraper. This technology would come to dictate the shape of most cities in the twentieth century and beyond.

Chicago History Museum/Getty Images

Until nearby commercial structures began to dwarf it in 1890, Trinity Church had been New York's tallest building for forty years. The two buildings to the church's left held that honor for thirty years until they were destroyed in a terrible attack that ultimately illustrated the resilience of a great city.

Jeff Greenberg/ World of Stock

Centrifugal Cars (and Radios and TVs)

Cars and Highways Killed Urban Industry

Liverpool in the 1980s

Photo by David Sinclair

So Why Didn’t These

Image by ChtiTux

Image by Danamania

Kill Finance and Urban Information Industries

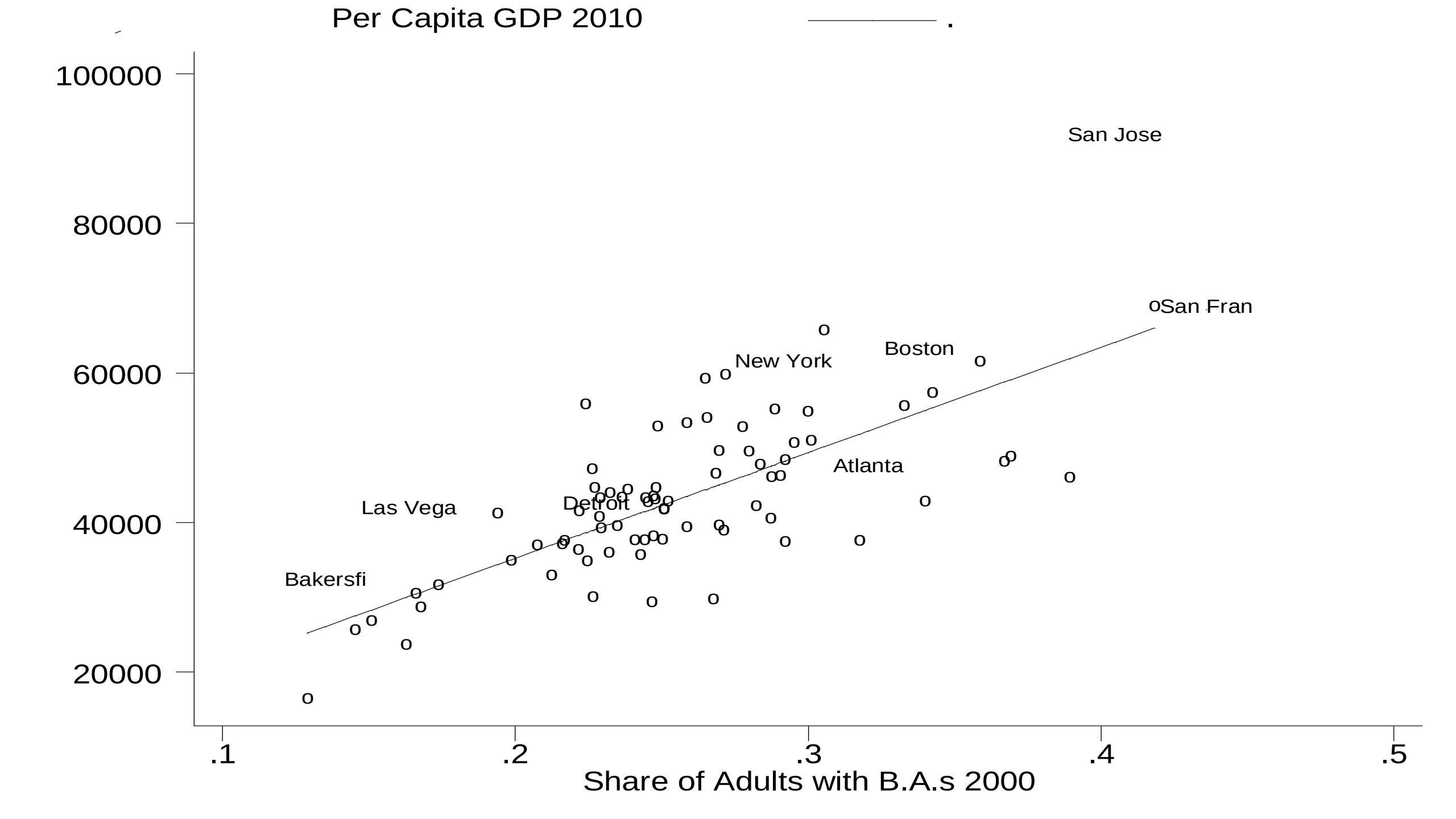
Photo by Runner1928

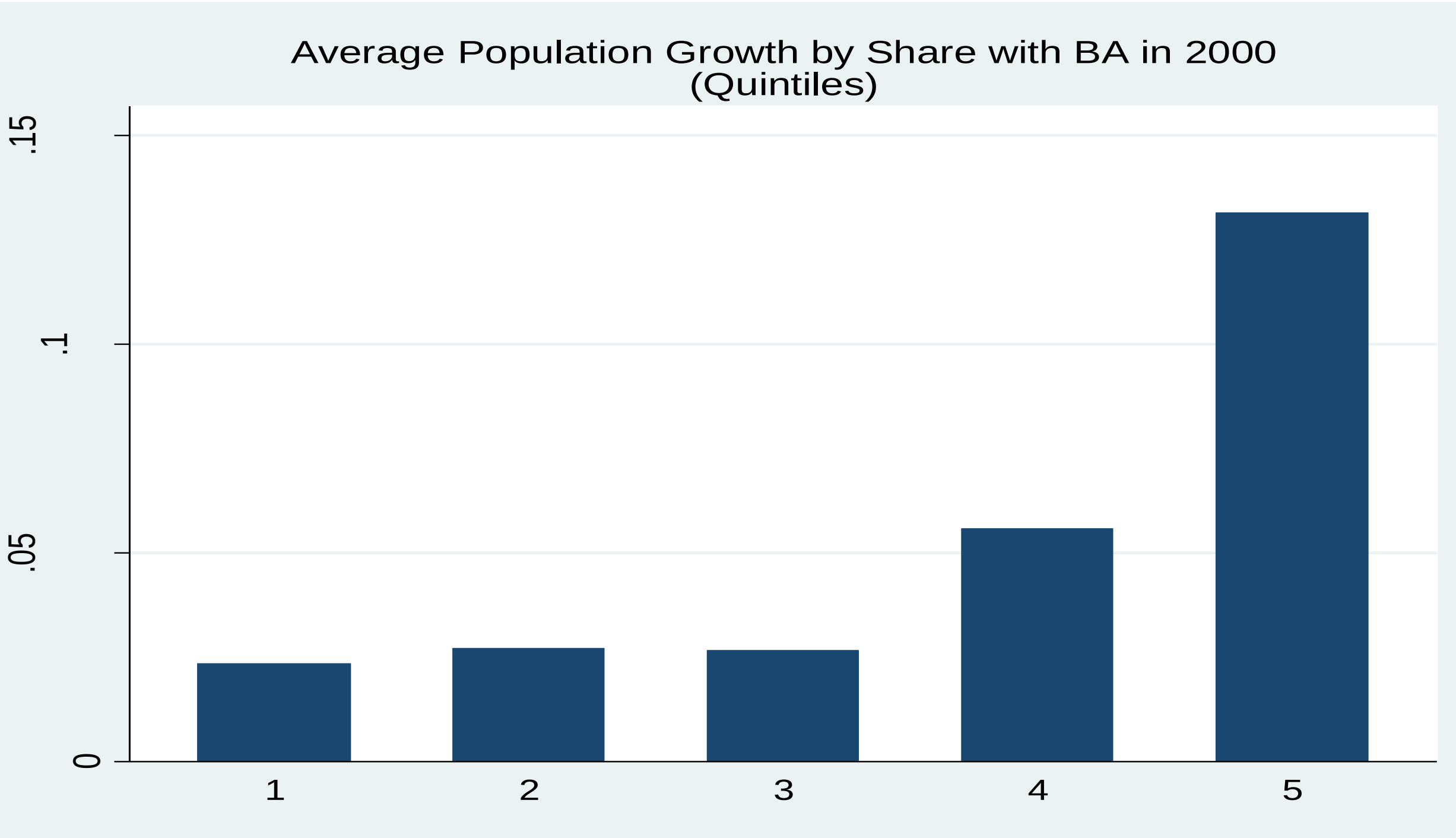
The 21st Century Urban Edge: Knowledge

Will the last person to leave Seattle (and Milan) please turn out the lights?

Photo by Daniel Schwen

Photo by Sky_HLV

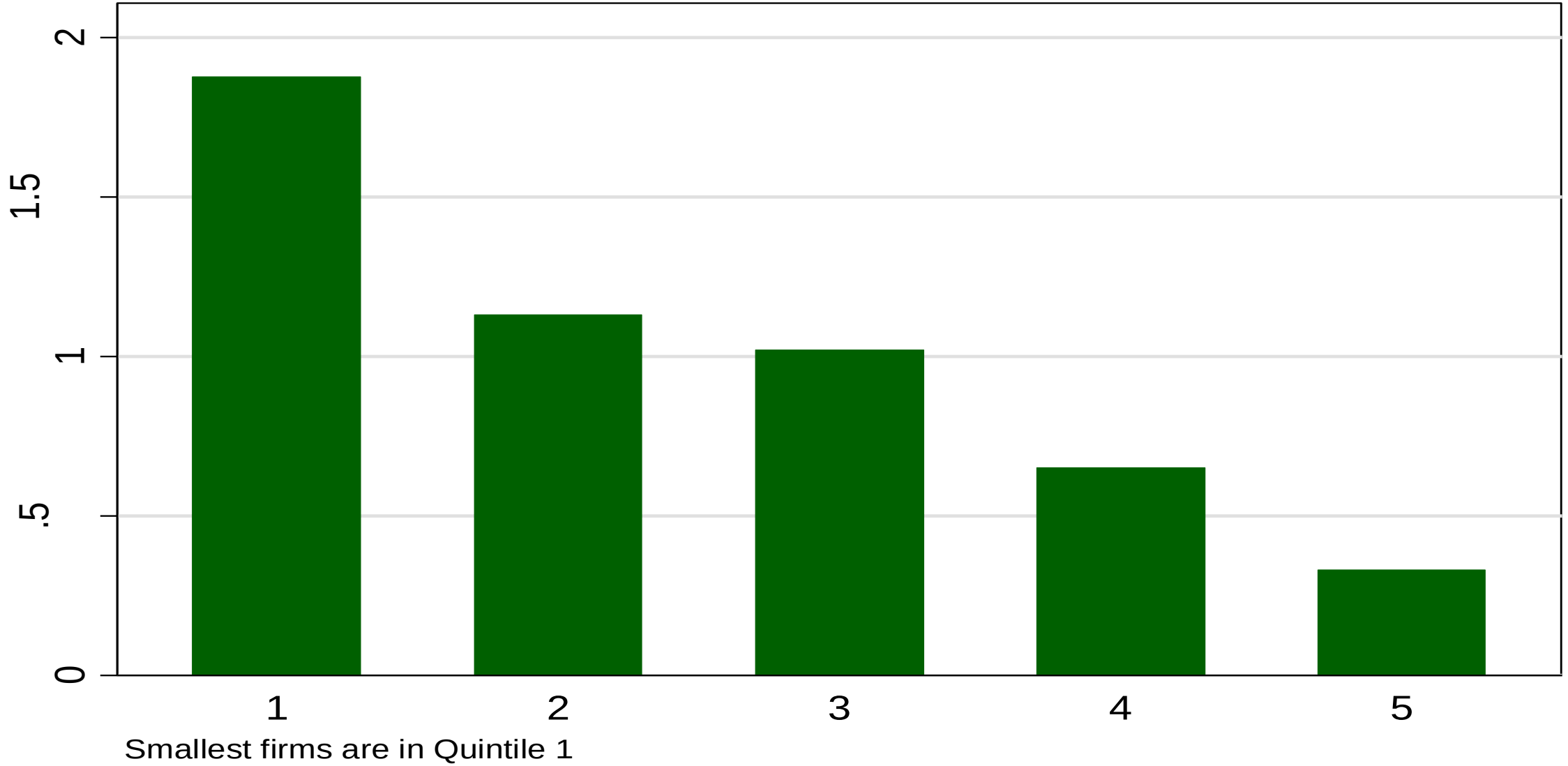

Per Capita GDP 2010
100000
80000
60000
40000
20000
San Jose
San Fran
Boston
New York
Atlanta
Las Vega
Detroit
Bakersfi
.1
.2
.3
.4
.5
Share of Adults with B.A.s 2000


Average Population Growth by Share with BA in 2000
(Quintiles)
.15
.1
.05
0
1
2
3
4
5

Chinitz: Contrasts in Agglomeration: New York and Pittsburgh

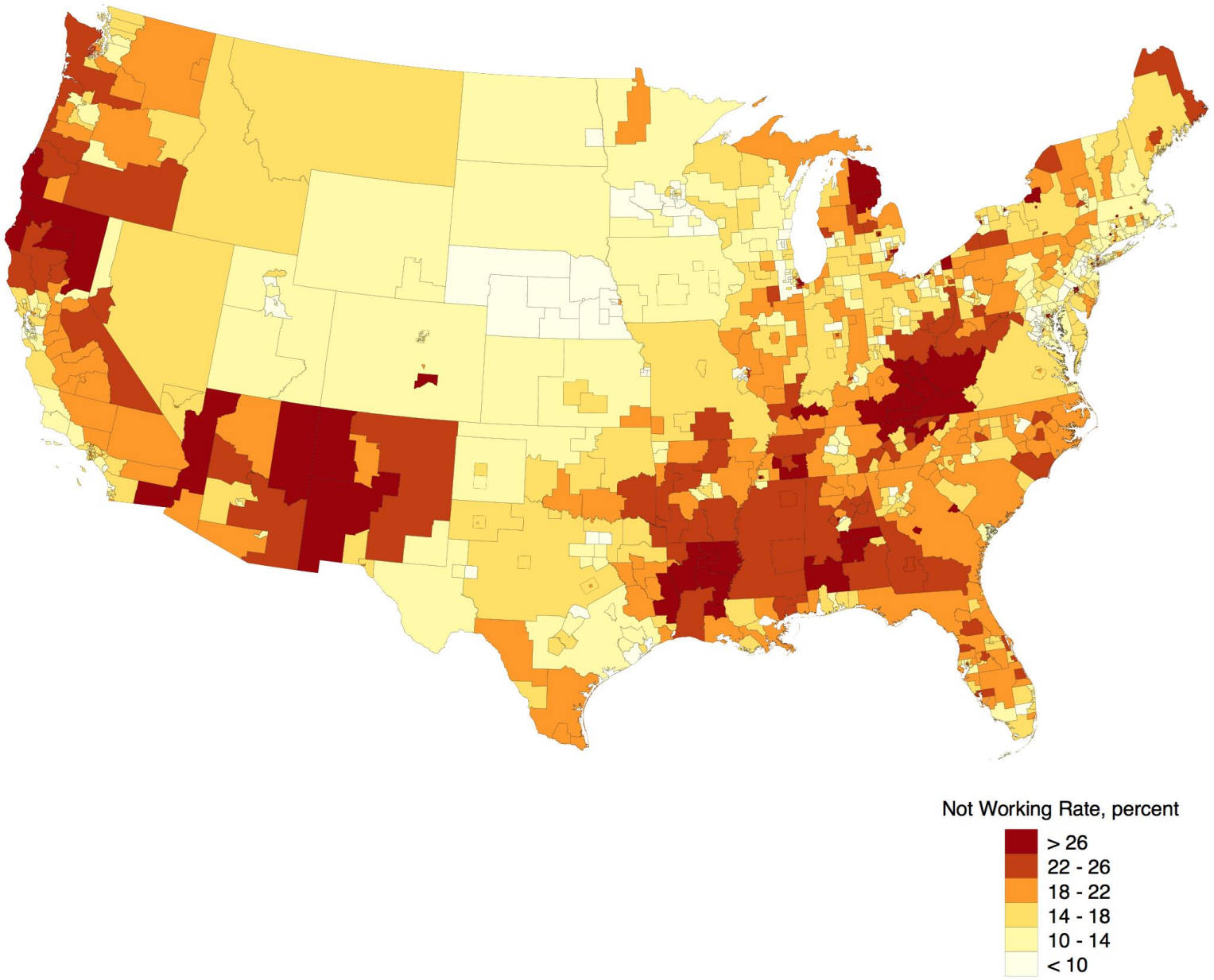
Economic Growth and Firm Size

MSA Employment Growth (1977-2010) by Average Firm Size (1977) Quintiles

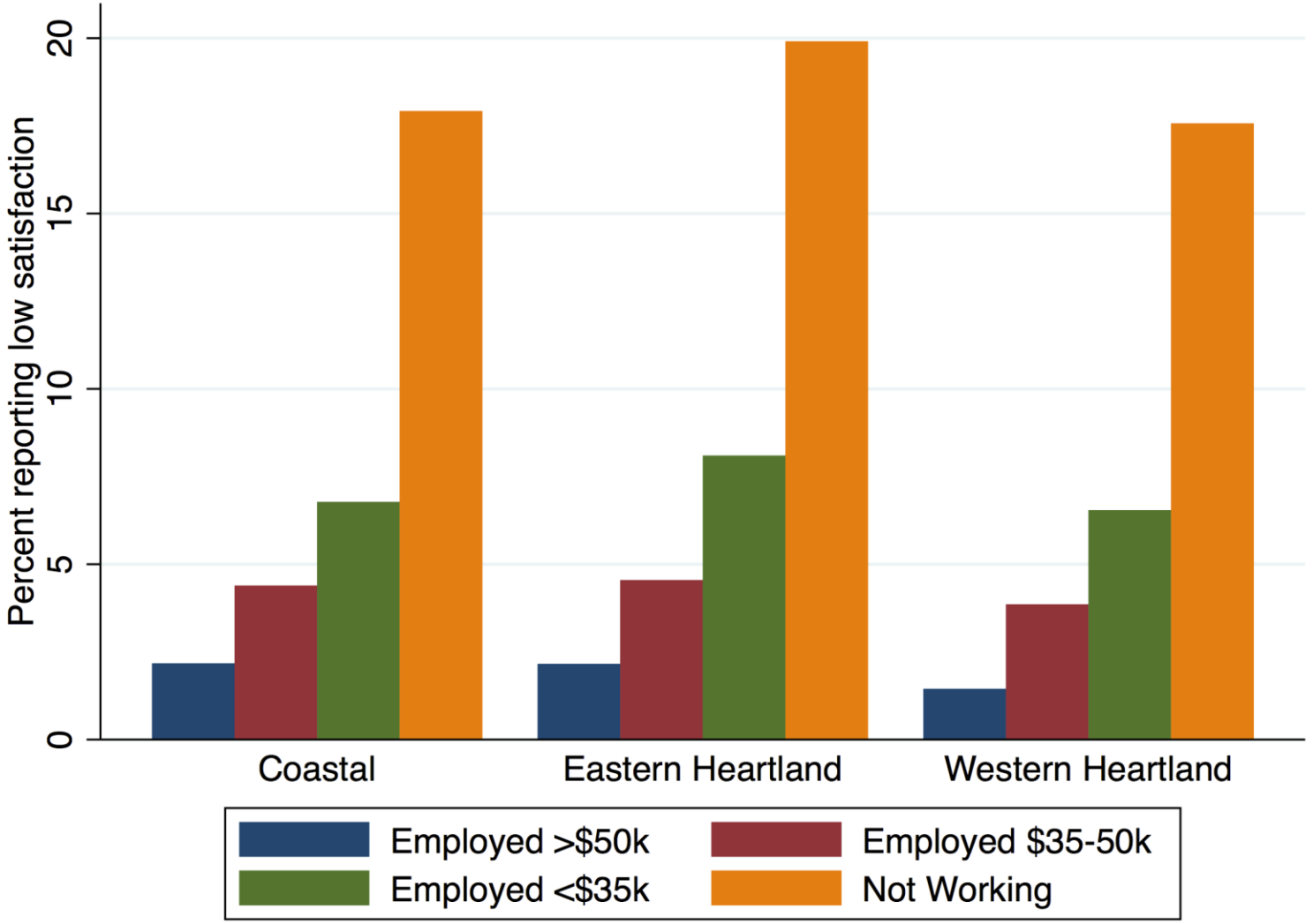



Employment rate by location
Employment Rate, percent
88
84
80
1980
1990
2000
2010
Year
Key
Major Metro Area
Other Metro Area
Non-Metro Area

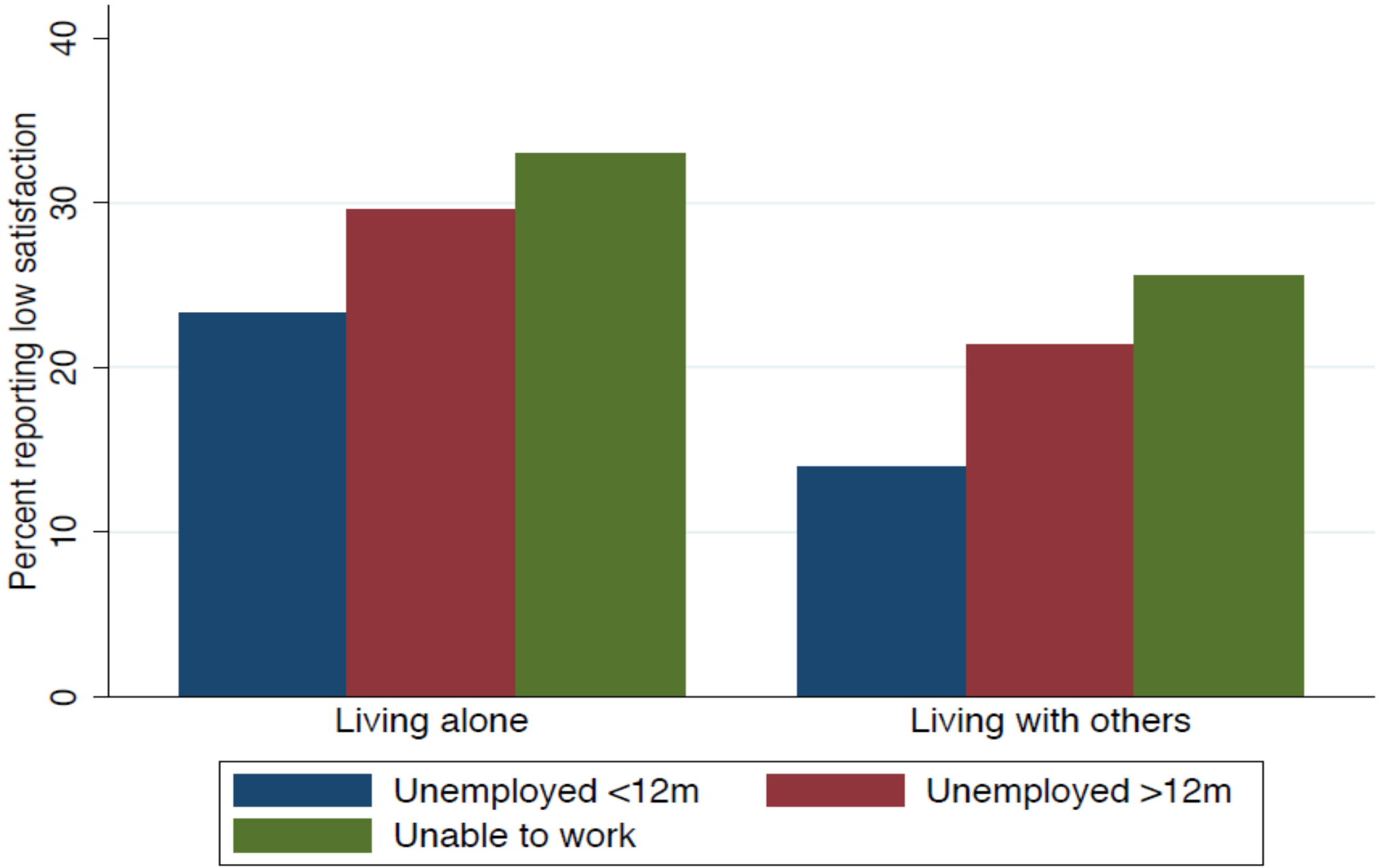
Geography of Jobless America: Prime Aged Men 2015



Low life satisfaction of not working men



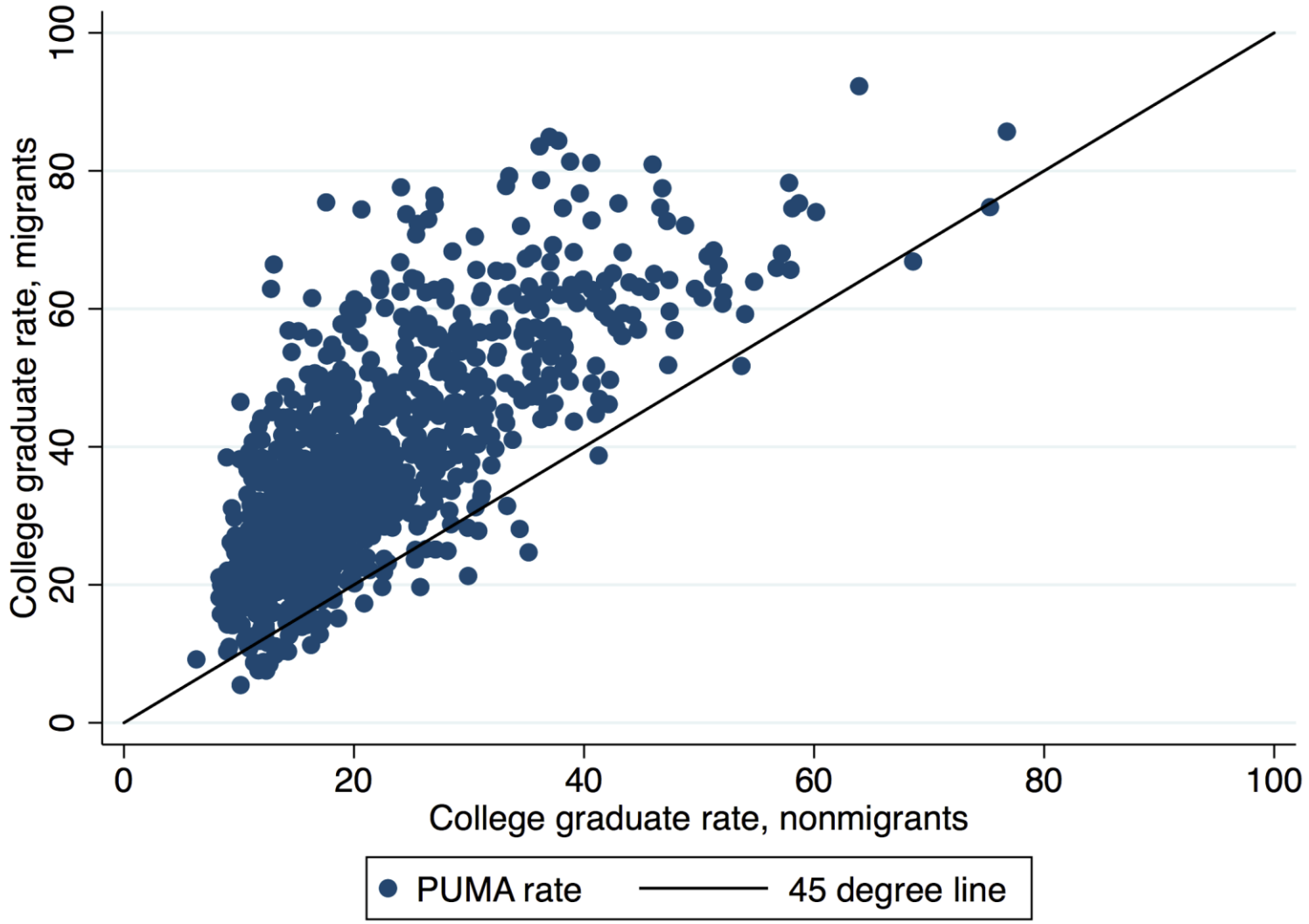
Prime men, 2005-2010



Changes in the U.S.

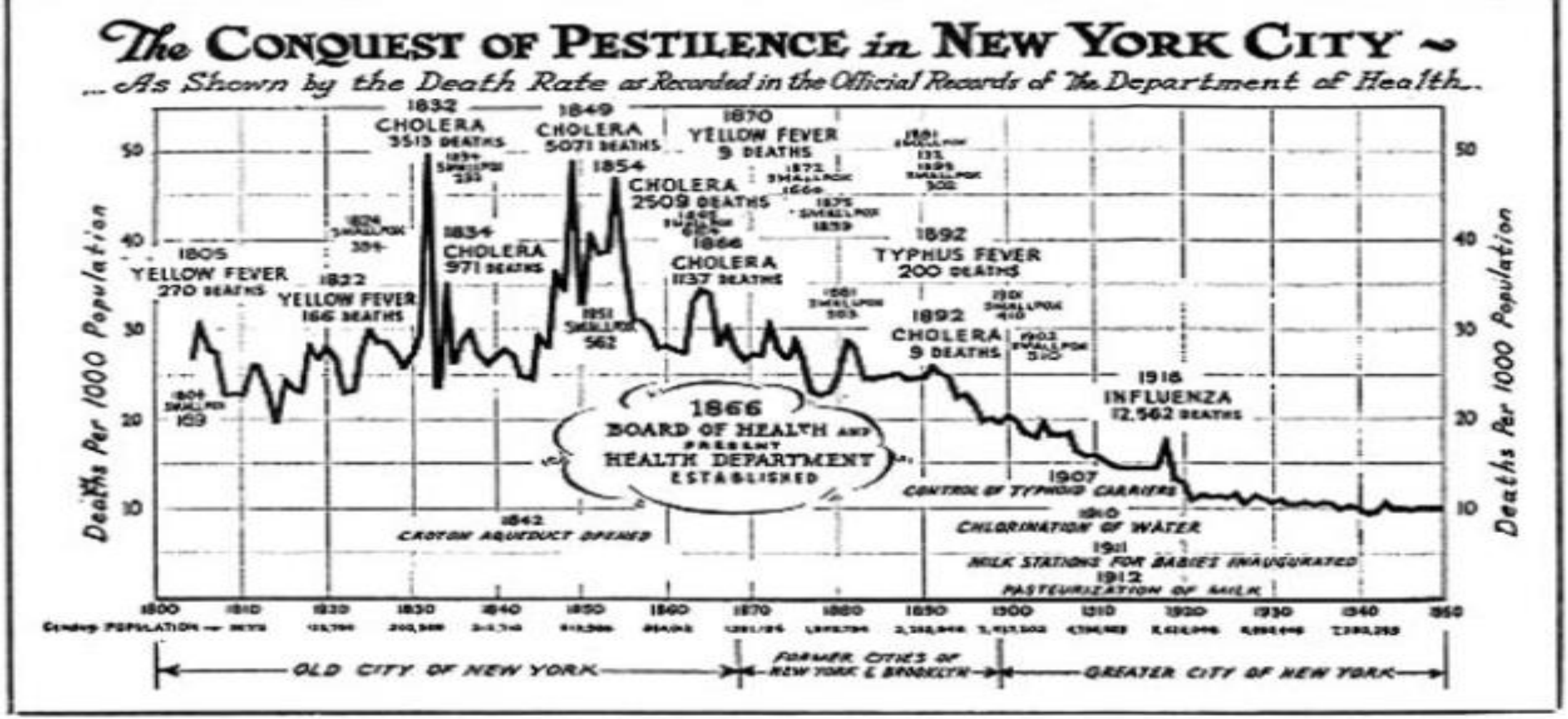
- Migration has declined and (especially migration of the less skilled) is not directed towards high wage areas (Ganong and Shoag, 2017)
- Successful areas make it increasingly difficult to build low cost housing (Glaeser, Gyourko, Saks, 2005), leading to spatial mismatch (Hsieh and Moretti, 2016).
- Change in share with college degrees positively correlated with initial share of population with college degrees (Moretti, 2004).
- Income convergence across metropolitan areas or PUMAs has slowed or disappeared entirely (Berry and Glaeser, 2006)
  - $\text{Log}(Y_{2010}/Y_{1980})=.02*\ \text{Log}(Y_{1980})$ (IV with 90^{th} and 10^{th} percentile in 1980).

Skilled migration



Saving Depressed (Rural) Places

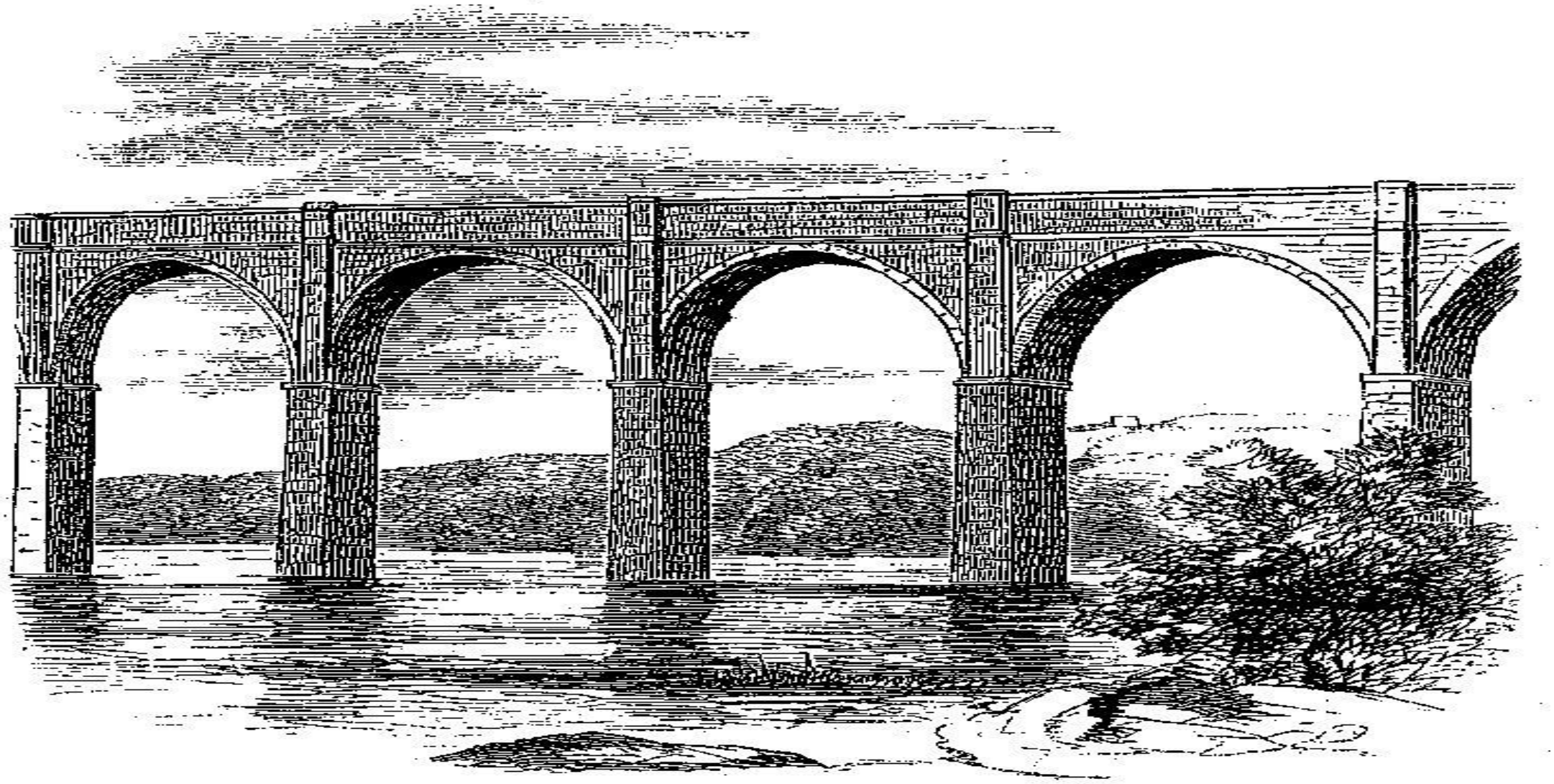
- Don’t Artificially Push Economic Activity Away from Successful Cities.
  - Help poor people not poor places.
- Infrastructure is usually a bad solution for declining places.
  - Cost-Benefit Analysis not place-making.
- Reduce the social problems for the people who are left behind.
- Joblessness is a particularly terrible curse with real externalities.
  - Targeted and experimental vocational training.
  - Social welfare policy reform that favors work.
  - Robust employment subsidies that are higher in areas where the employment rate is more elastic.



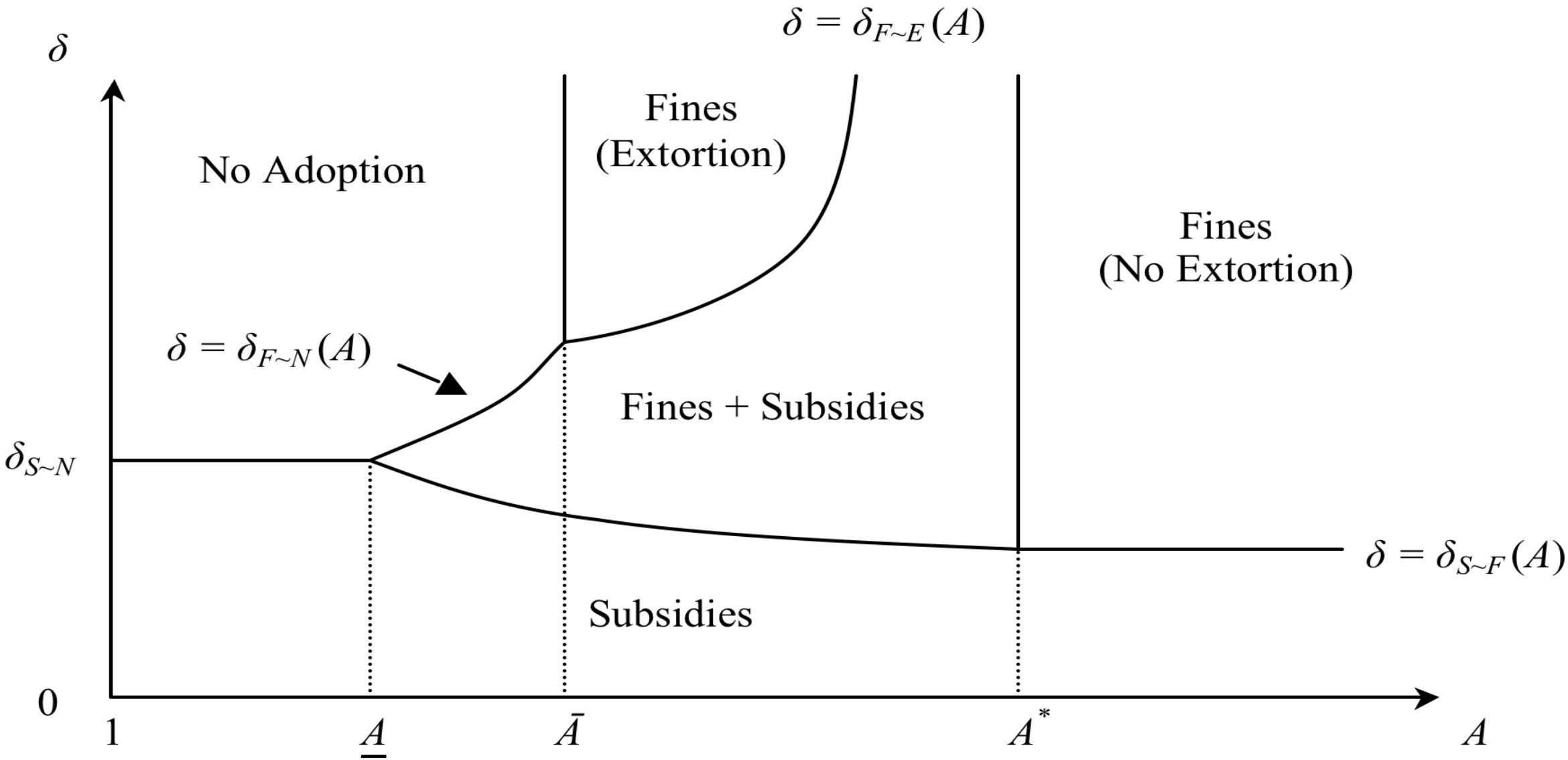
New York City's Department of Health shows the timeline of the city's mortality rate, which sharply dropped with the provision of clean water in the nineteenth century.

New York City Department of Health and Mental Hygiene

Incentives and Infrastructure



SECTION OF THE HIGH BRIDGE OVER THE HARLEM RIVER.


$\delta = \delta_{F\sim E}(A)$
δ
Fines
(Extortion)
No Adoption
Fines
(No Extortion)
$\delta = \delta_{F\sim N}(A)$
Fines + Subsidies
$\delta_{S\sim N}$
$\delta = \delta_{S\sim F}(A)$
Subsidies
0
1
$\underline{A}$
$\bar{A}$
A^*
A

Panel A: Respiratory Infections

Dependent Variable:	Number of Cases			
Age:	All	Under 1	1-5	Over 5
Days of Supply Issues	2.40	.61	.89	.90
	(.91)***	(.29)**	(.32)***	(.47)*
Observations	1,230	1,230	1,230	1,230
Mean of DV	461.9	97.8	147.7	216.4
1 Std. Deviation Increase Effect	56.9	14.5	21.1	21.3
Observations	1,230	1,230	1,230	1,230

Panel B: Measles

Dependent Variable:	Number of Cases			
Age:	All	Under 1	1-5	Over 5
Days of Supply Issues	.035	-.00003	.0047	.030
	(.010)***	(.0035)	(.0084)	(.0077)***
Mean of DV	4.65	.590	2.02	2.04
1 Std. Deviation Increase Effect	.83	-.0071	.11	.71
Observations	1,230	1,230	1,230	1,230

Metering and Water Supply Problems

	(1) Average Consumption	(2) % Metered Connections	(3) Peri-Urban	(4) Population Density
Days of supply issues	-.192	-.416**	.484***	.165
Days of supply issues (normalized by total connections)	-.060	-.365**	.092	-.146
Days of Supply Issues (normalized by account complaints)	-.046	-.505***	.265*	-.041
Fraction days with at least one supply complaint	-.349**	-.397***	.299*	-.096
Mean	197.3	.548	.275	7,015

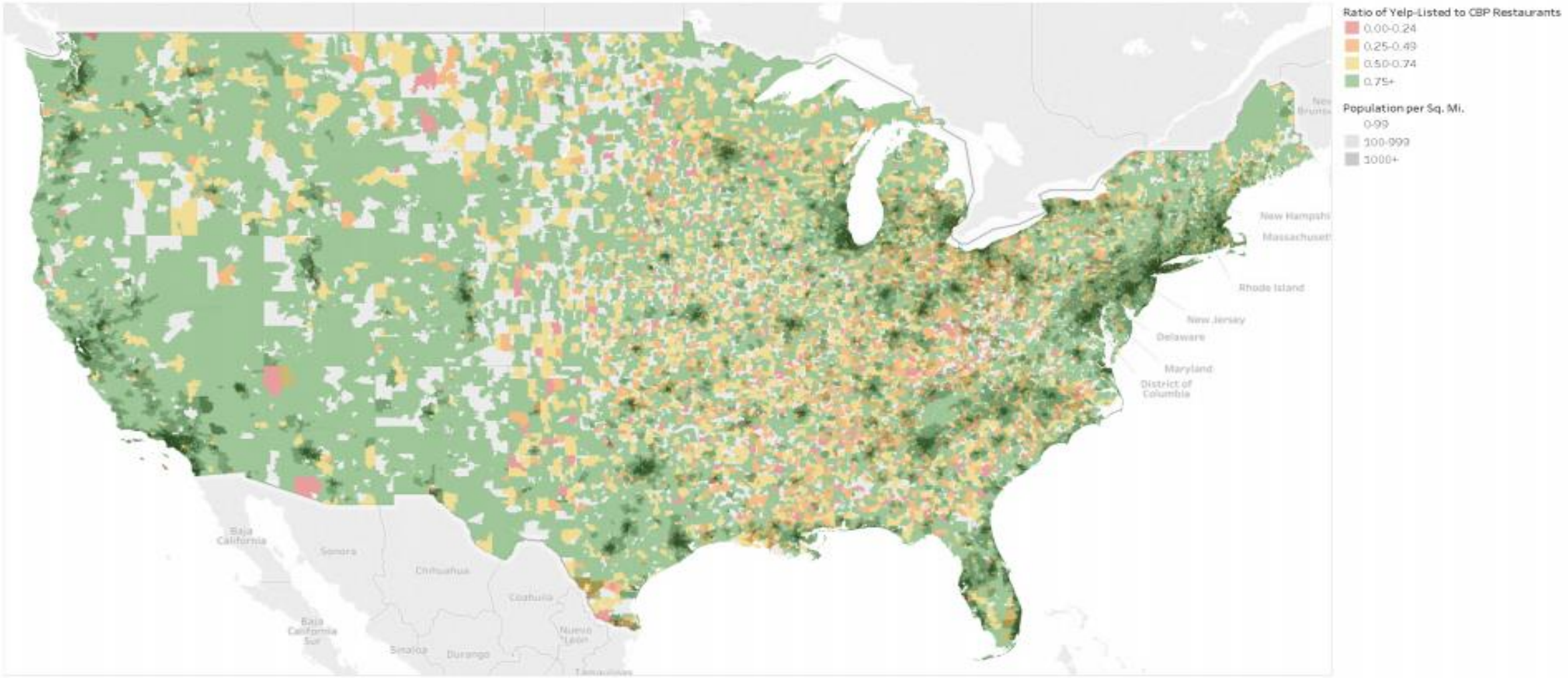
Engineering vs. Economics: Singapore

Technological Change and the City: Zipcar, Airbnb: Autonomous Vehicles

Photo by Mario Roberto Duran Ortiz

Photo by Ritusaheb

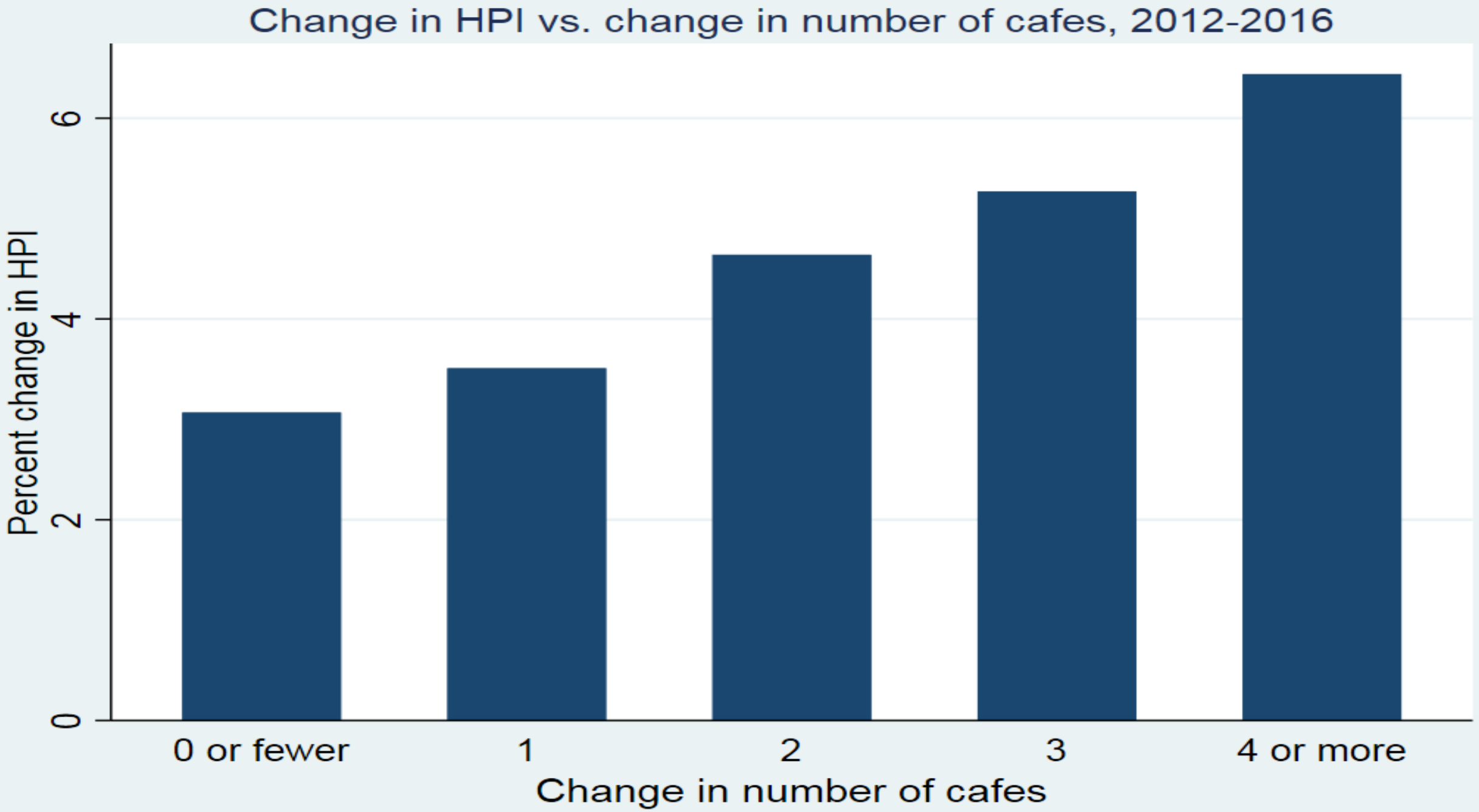
Yelp Coverage of Restaurants in 2015



	Population Density		Income		Education	
	High	*Low*	*High*	*Low*	*High*	*Low*
R-squared	0.244	0.056	0.328	0.149	0.291	0.064
Out-of-bag R-squared	0.194	0.029	0.256	0.075	0.234	0.023
Mean Absolute Error	12.731	3.922	9.806	6.997	11.111	5.593
Mean Squared Error	427.918	42.065	292.104	186.273	363.237	110.182
Median Absolute Error	7.966	2.492	5.0785	3.476	6.030	3.034
Mean CBP Growth	*6.799*	*0.494*	*6.106*	*1.370*	*6.453*	*0.900*
St. Dev CBP Growth	*20.484*	*6.485*	*17.654*	*13.011*	*19.137*	*10.153*
Observations	*42644*	*42648*	*41548*	*41552*	*42224*	*42568*

Nowcasting Gentrification

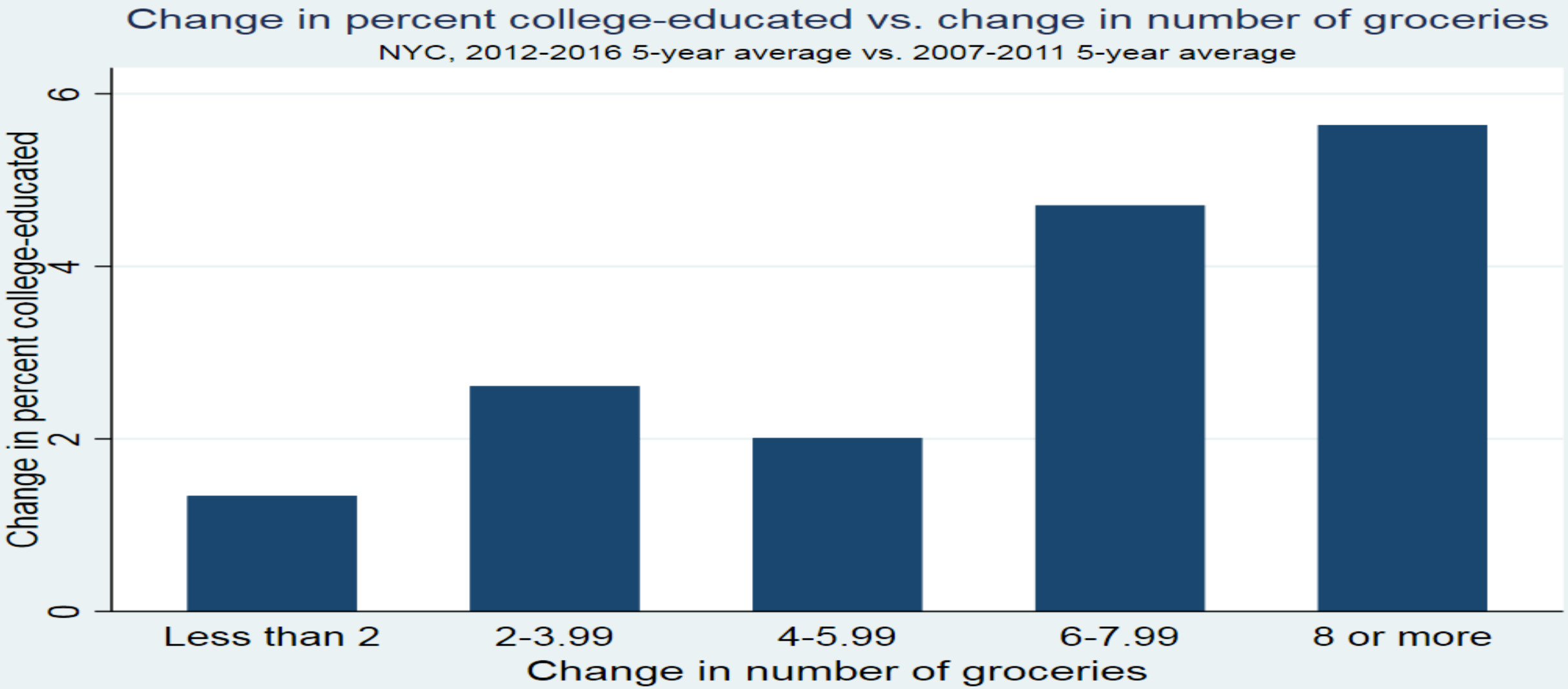
- Cities are wracked with the agonies of success– but data on gentrification often appears with a lag.
- Can Yelp nowcast housing price increases, demographic change and the physical change of each neighborhood?
  - We do demographic change for NYC and a few other large cities.
- This also creates a snapshot of what gentrification looks like.


Change in HPI vs. change in number of cafes, 2012-2016
Percent change in HPI
0
2
4
6
0 or fewer
1
2
3
4 or more
Change in number of cafes

	(1)	(2)	(3)
	% Change in HPI	% Change in HPI	% Change in HPI
Yelp Starbucks Growth (lag1)	0.482***		0.291***
	(0.087)		(0.079)
Yelp Starbucks Growth (lag2)	0.260***		0.155*
	(0.070)		(0.066)
% Change in HPI (lag1)		0.324***	0.323***
		(0.013)	(0.013)
% Change in HPI (lag2)		0.076***	0.076***
		(0.011)	(0.011)
Constant	-0.890***	0.900***	0.835***
	(0.060)	(0.065)	(0.068)
Year FE	Yes	Yes	Yes
Observations	24865	24819	24819
Adjusted R^2	0.239	0.332	0.333

All regressions include a full set of calendar year dummies and cluster standard errors at the ZIP Code level. * p<0.10, ** p<0.05, *** p<0.01.

Nowcasting Demographics

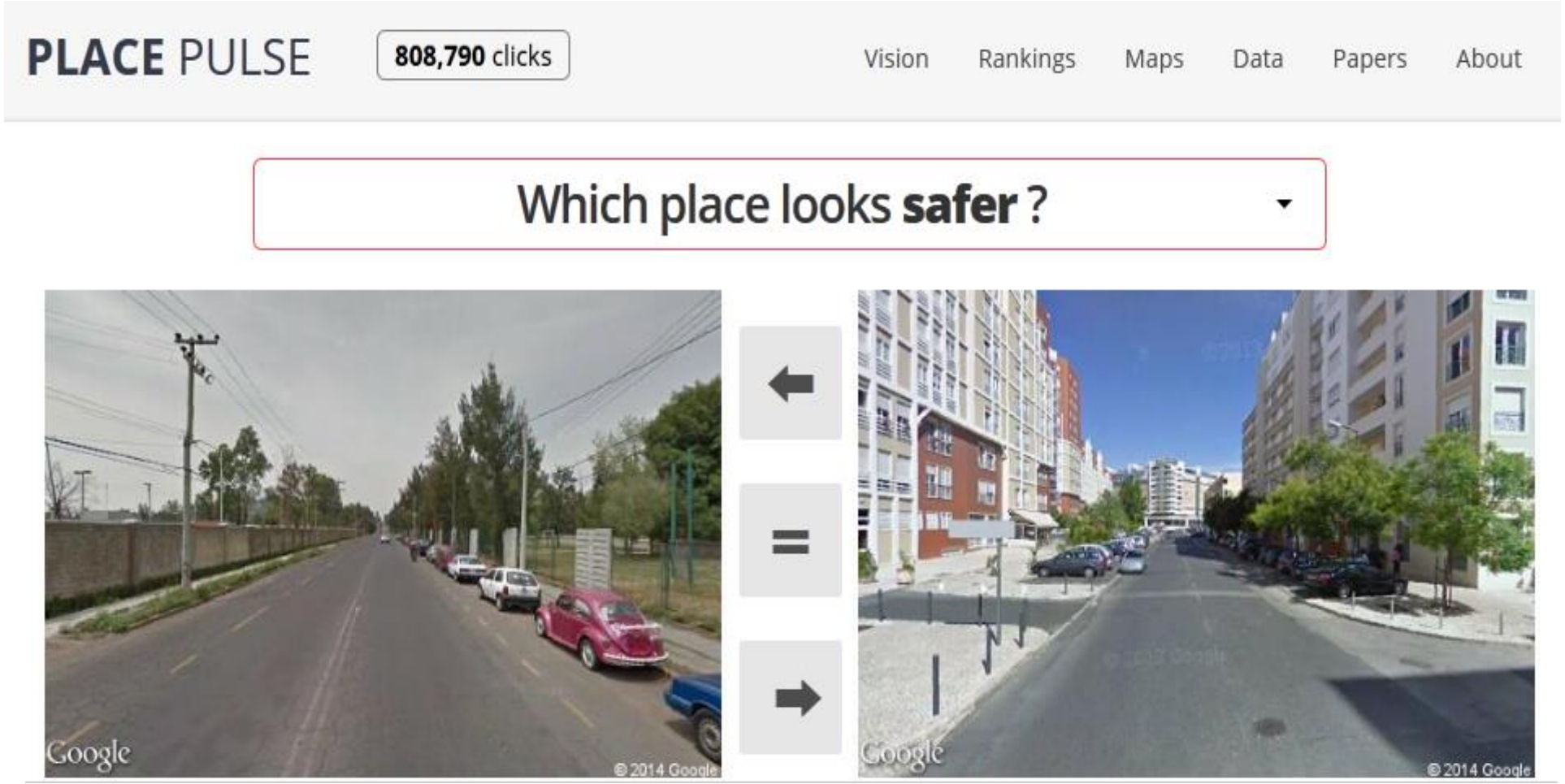


Nowcasting Demographics

	Change in percent of college educated	Change in percent of ages 25 to 34	Change in percent white	Obs.
Change in the number of groceries	0.352***	0.178*	0.189*	173
	(0.000002)	(0.019)	(0.013)	
Change in the number of laundromats	0.338***	0.200*	0.120	122
	(0.0001)	(0.027)	(0.187)	
Change in the number of cafes	0.319***	0.093	0.084	179
	(0.00001)	(0.216)	(0.264)	
Change in the number of bars	0.313***	0.140	0.114	176
	(0.00002)	(0.064)	(0.132)	
Change in the number of restaurants	0.270***	0.152*	0.098	180
	(0.0003)	(0.041)	(0.191)	
Change in the number of barbers	0.237**	0.197*	0.084	160
	(0.003)	(0.012)	(0.291)	
Change in the number of winebars	0.232**	0.143	0.144	136
	(0.007)	(0.097)	(0.094)	
Change in the number of convenience stores	0.222**	0.079	0.128	162
	(0.004)	(0.320)	(0.104)	
Change in the number of fastfood	0.200**	0.024	0.046	173
	(0.008)	(0.758)	(0.544)	

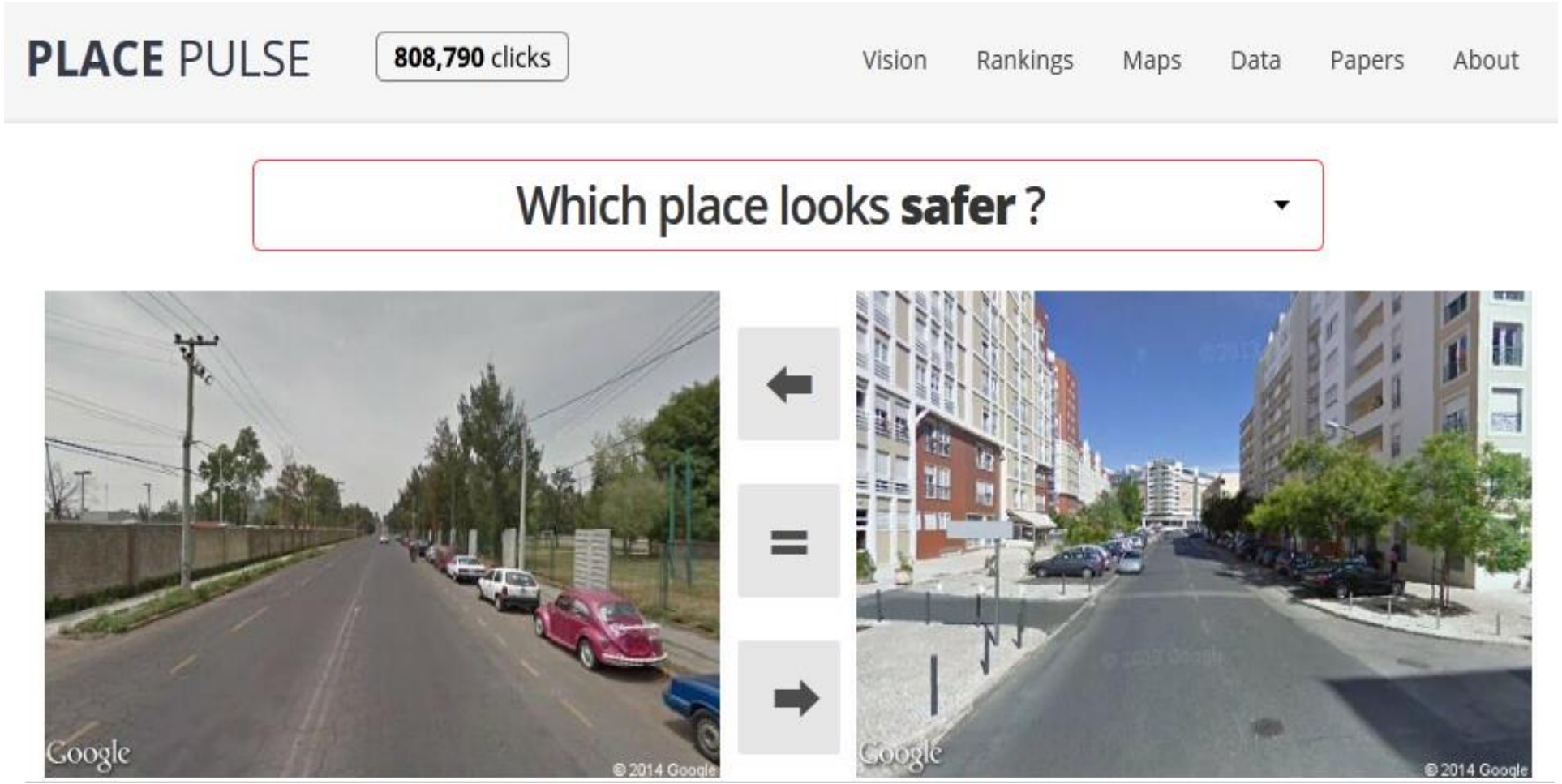
Street-level Imagery

- Images of streets collected by vehicle-mounted cameras
- Accompany maps in interactive web interfaces
- Google Street View, Microsoft Streetside, Tencent (China), Wonobo (India)



pulse.media.mit.edu
Salesses, Schechtner, and Hidalgo (2013)

Crowdsourced urban appearance survey



4,000 Images From New York, Boston, Linz and Salzburg

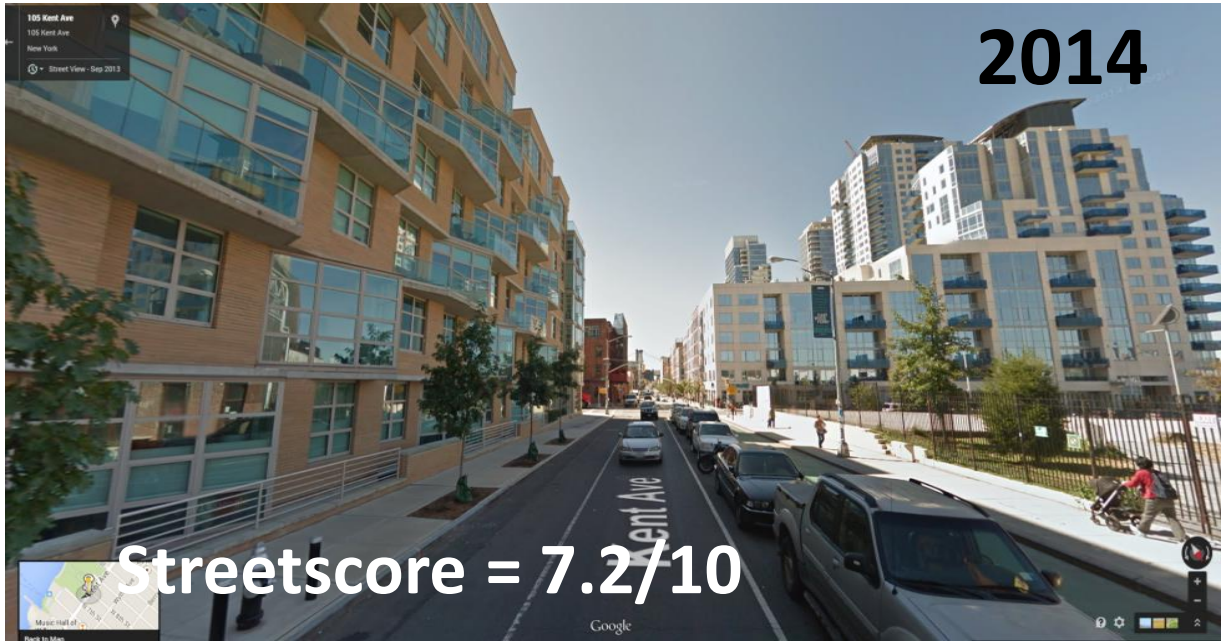
More than **8,000** Unique Participants from **91** countries

More than **200,000** Pairwise Comparisons

#Total Street blocks
~1,000,000

#Sampled Street blocks
1,700

This is Nikhil Naik’s big innovation



Change in Streetscore is a proxy for more general change in the built environment

Naik, Glaeser, Hidalgo, Kominers,and Raskar

Predicting Change in Streetscore

Glaeser et al. (1995, 2009), Ciccone and Hall (1996), Bettencourt (2013)

	Coefficients for Streetchange 2007-2014		
Independent Variables	(4)	(5)	(6)
Share College Education 2000	0.657***		0.703***
	(0.106)		(0.105)
Log Population Density 2000		0.056***	0.084***
		(0.020)	(0.024)
Streetscore 2007	0.027***	0.033**	0.013
	(0.010)	(0.014)	(0.012)

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

Population Density and College Education are strongest predictors of future growth in neighborhoods

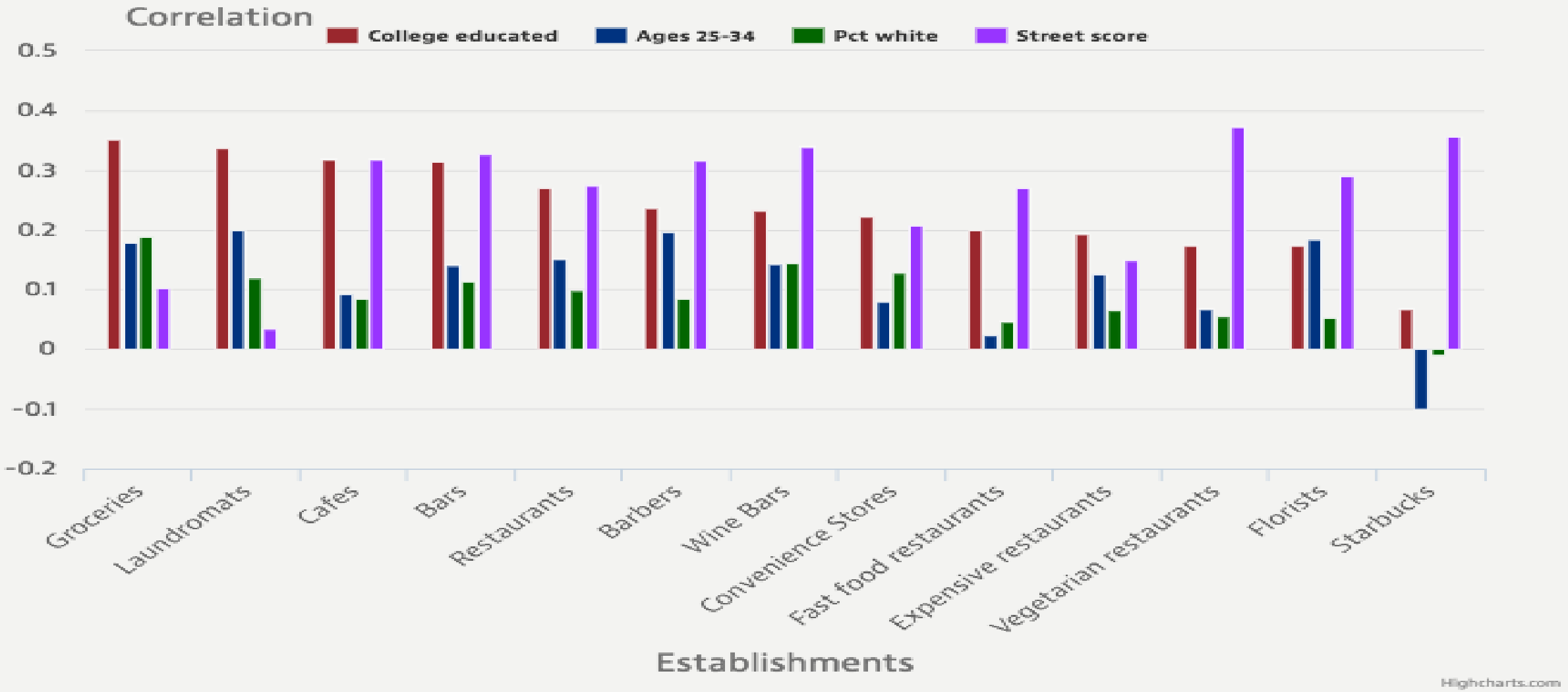
Controlling for race, income, age, housing costs etc.

The Slow Spread of Success

	Coefficients for Streetchange 2007-2014			
Independent Variables	(1)	(2)	(3)	(4)
Distance to CBD	-0.042***	-0.050***	-0.051***	-0.036***
	(0.011)	(0.011)	(0.011)	(0.011)
Adjacent Streetscore 2007	0.063***			0.049**
	(0.019)			(0.019)
Adjacent Log Population Density 2000		0.115**		0.093**
		(0.046)		(0.046)
Adjacent Share College Education 2000			0.620***	0.626***
			(0.167)	(0.172)

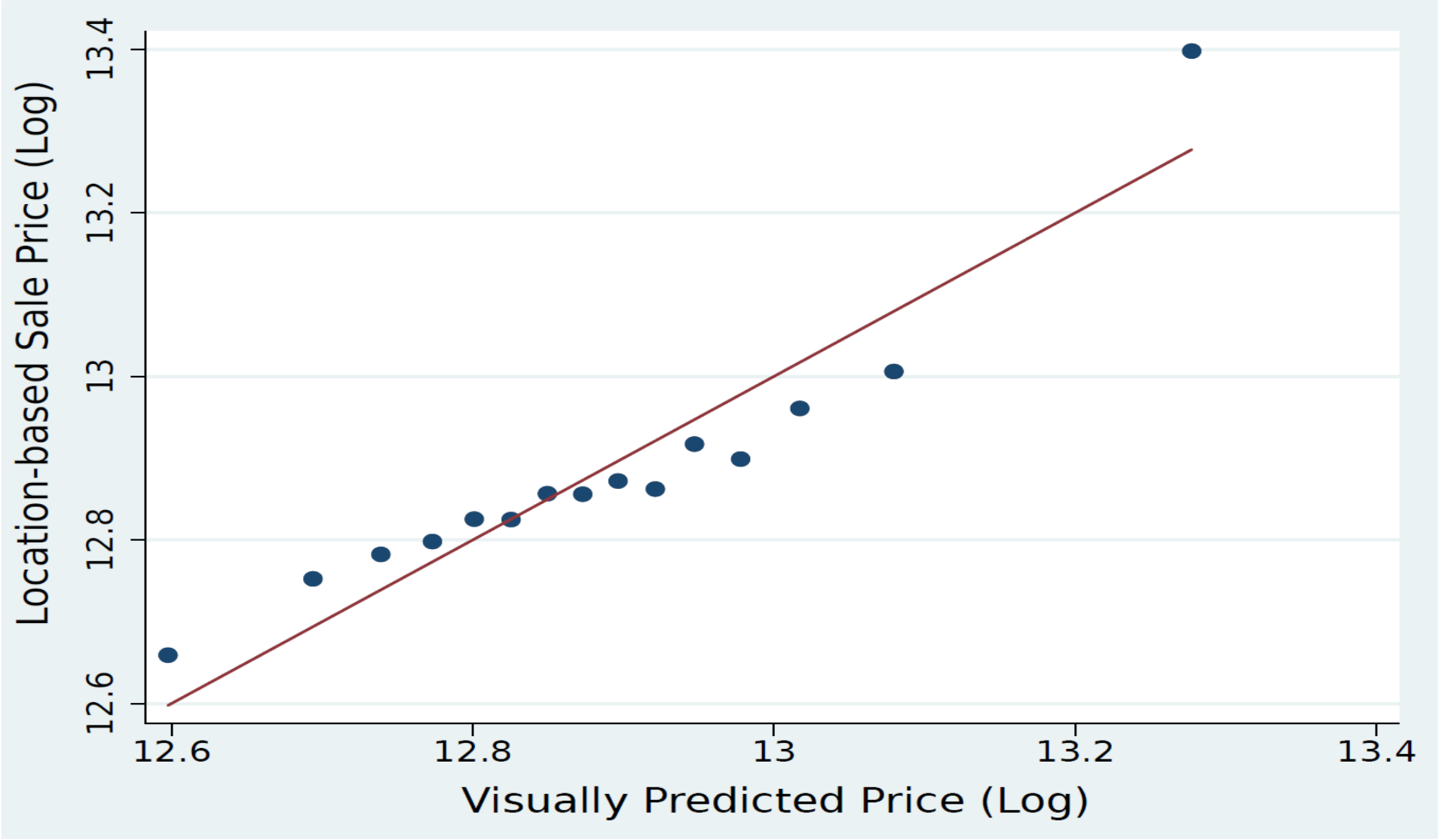
Signs of gentrification

The growth of certain types of businesses in a neighborhood can be early signs of gentrification on the horizon. Below are how increases in certain types of establishments were correlated with demographic changes and perceptions of safety in New York City.



Source: author data

Valuing Housing using Streetview Images



The Foreclosure Hypothesis

- It is well known that foreclosure brings in much less than the book value of the home.
- Campbell, Giglio and Pathak document the price impact of a forced sale.
- Some have claimed that the foreclosure effect is due to destruction of the physical home.
- We take Boston homes that were foreclosure from 2007-2009.
- We match with 5 nearest neighbors using a propensity score based either on initial visuals or initial visuals plus other characteristics (including location).
- We then compare the difference in visually-predicted price (Not Real Price).
- We find a 3-4 percent loss in Visual Value due to Foreclosure.

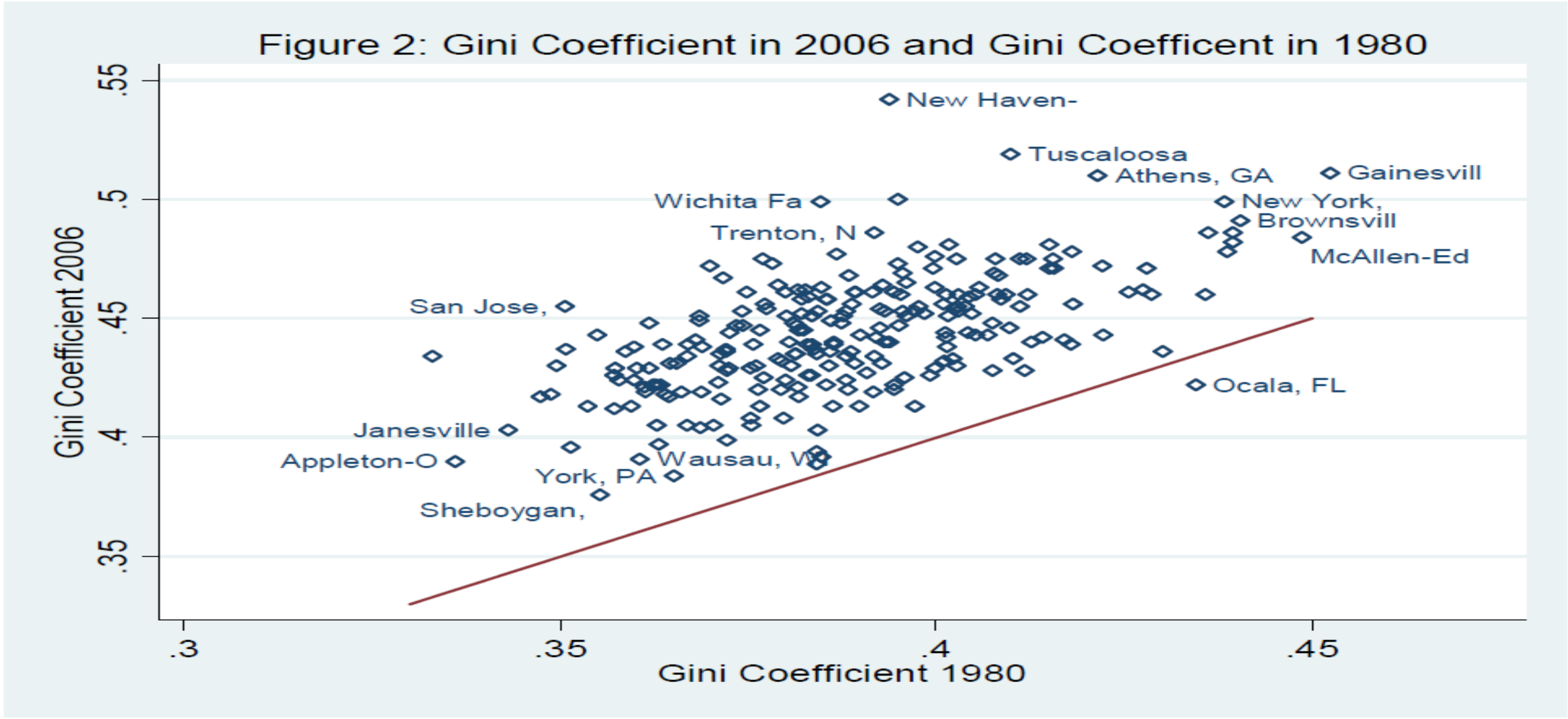
Matching Model	Treatment (#Samples)	Control (#Samples)	Treatment (After–Before)	Control (After–Before)	Diff in Diff	Standard Error	Z-score
(1) Effect of Remodeling on Visually-predicted Price							
Vis. Index	1025	5576	0.017	-0.000	0.030***	0.011	2.75
Vis. Index + Basic Features					0.041***	0.001	3.47
(2) Effect of Remodeling on Visually-Predicted Price (Single Family Homes)							
Vis. Index	424	2073	0.046	0.006	0.024	0.018	1.35
Vis. Index + Basic Features					0.049***	0.019	2.60
(3) Effect of Foreclosures on Visually-predicted Price							
Vis. Index	1256	3601	-0.018	0.003	-0.023***	0.008	-2.81
Vis. Index + Basic Features					-0.030**	0.009	-3.16
(4) Effect of Foreclosures on Visually-predicted Price (Unremodeled Homes)							
Vis. Index	890	2788	-0.022	0.004	-0.024***	0.009	-2.60
Vis. Index + Basic Features					-0.035***	0.011	-3.18
(5) Effect of Foreclosures on Visually-predicted Price (Single Family Homes)							
Vis. Index	363	1987	-0.021	0.015	-0.032**	0.014	-2.22
Vis. Index + Basic Features					-0.040***	0.016	-2.46
(6) Effect of Foreclosures on Visually-predicted Price (Single Family Unremodeled Homes)							
Vis. Index	281	1537	-0.021	0.017	-0.038***	0.015	-2.49
Vis. Index + Basic Features					-0.047***	0.019	-2.36

es: All price variables are in log dollars, residualized on location. In the Vis. Index matching model, a propensi
e is constructed on the basis of a home's visually-predicted log price (based on Street View features). In t
Index + Basic Features model, a neighborhood dummy, log living area, year built (normalized), and owr
ıpied flag is added to the set of covariates used for matching. The table reports the Abadie–Imbens standa

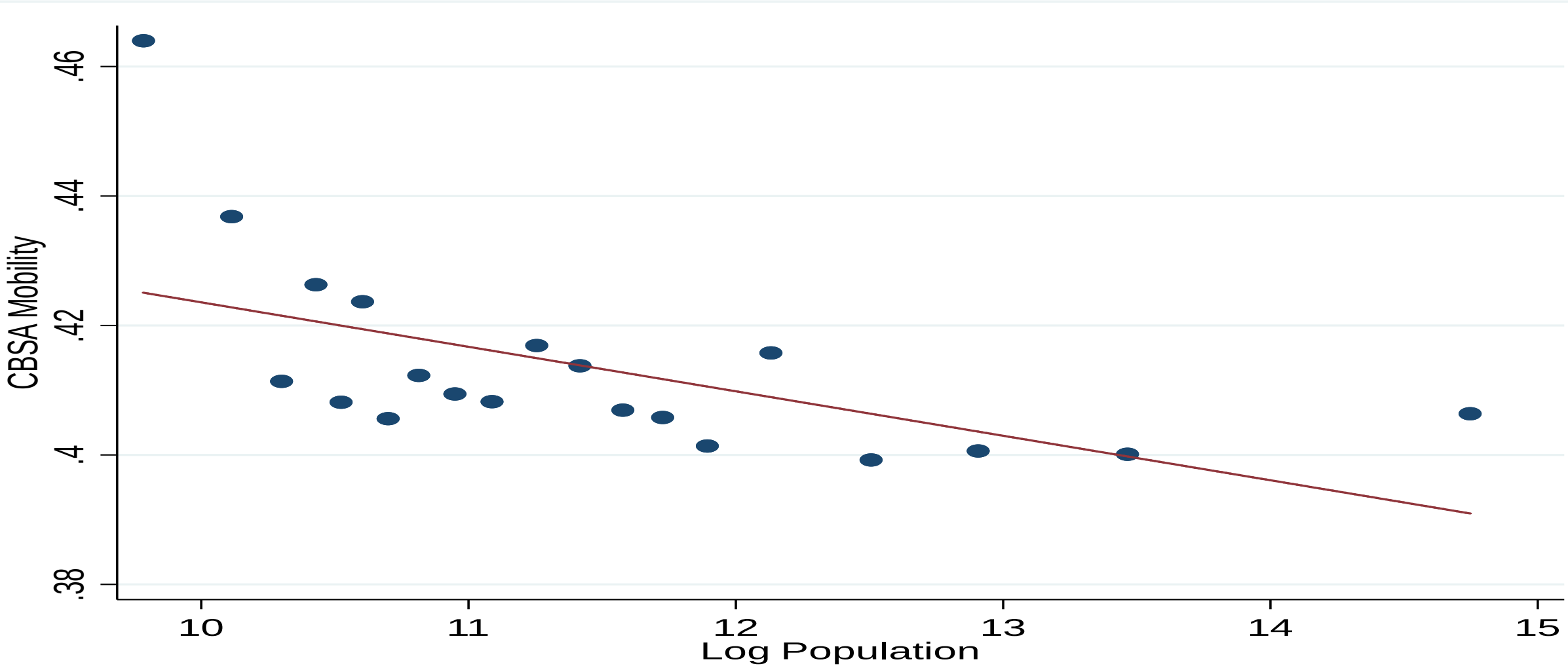
The Rise of the Consumer City

Picture by Mario Roberto Durán Ortiz)

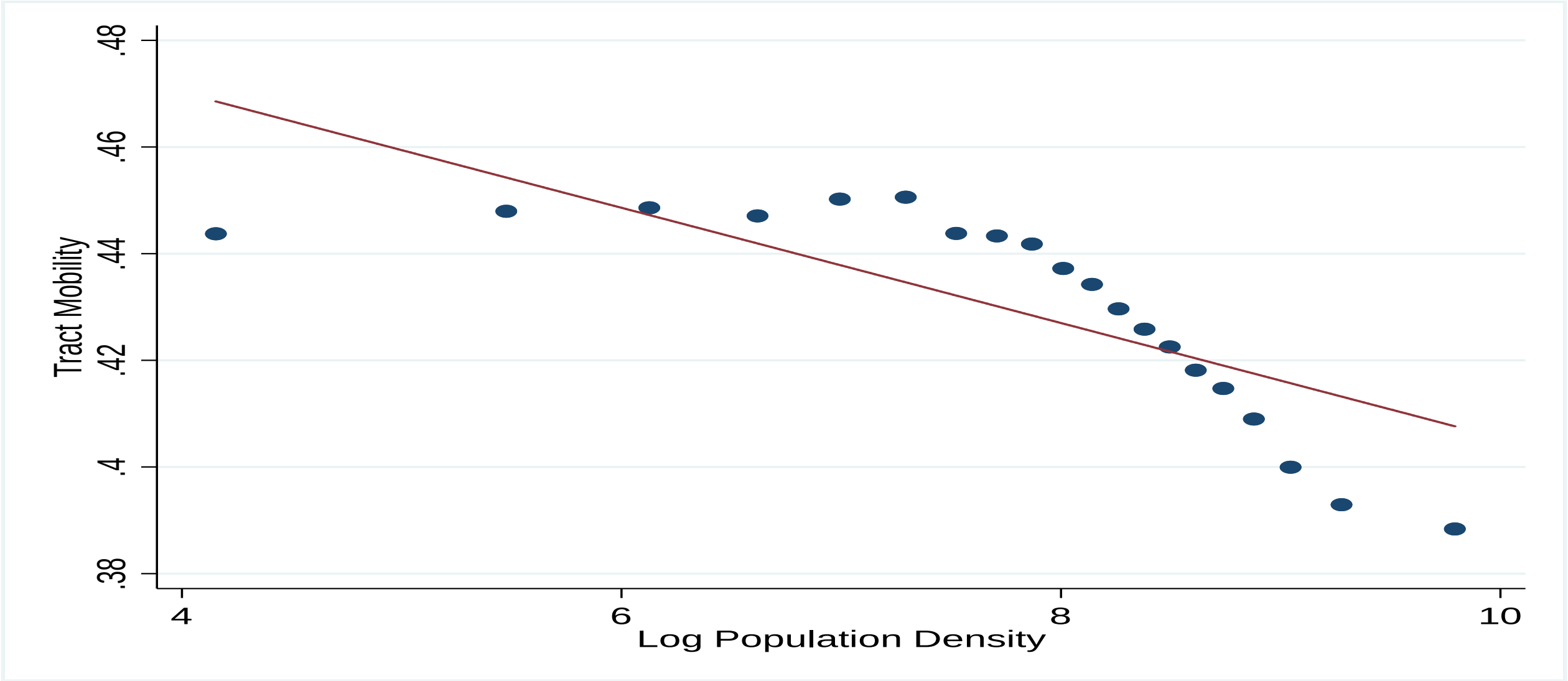
Agonies of Success: Inequality



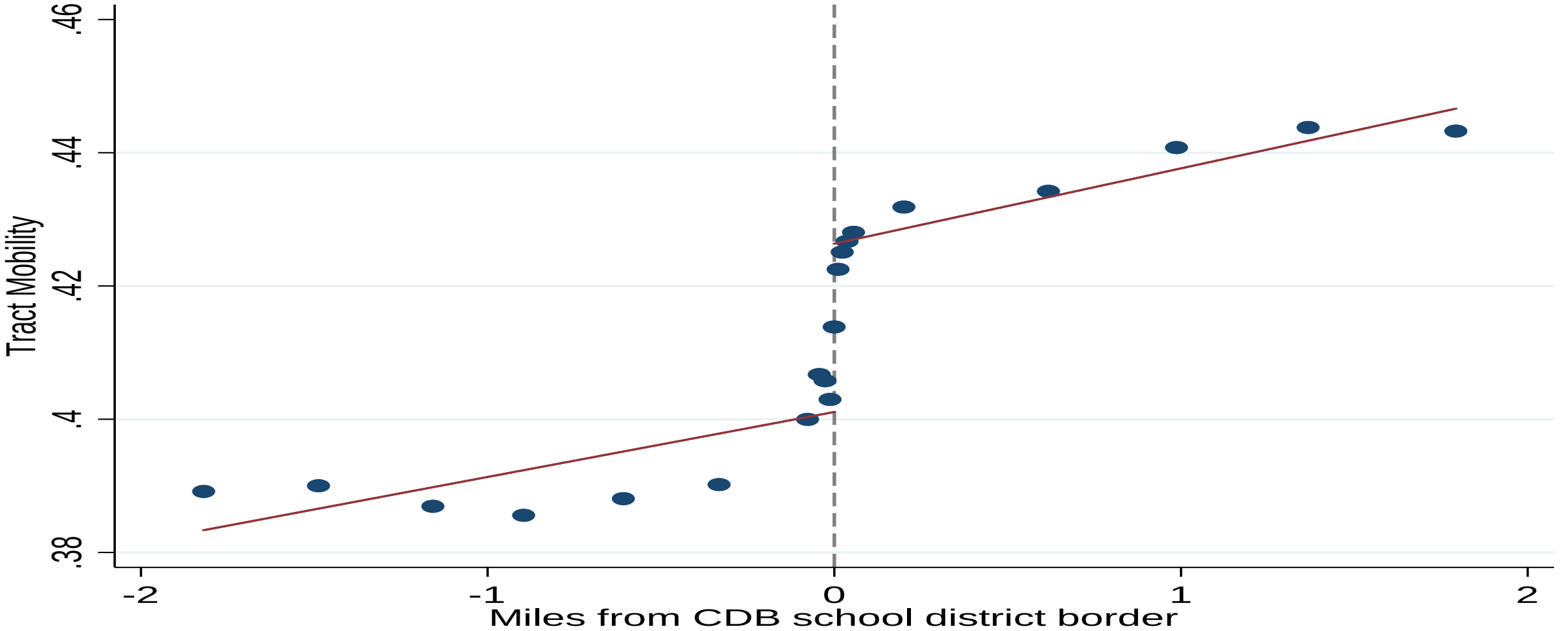
Chetty, Friedman, Hendren Linked IRS Data shows less upward mobility in dig cities



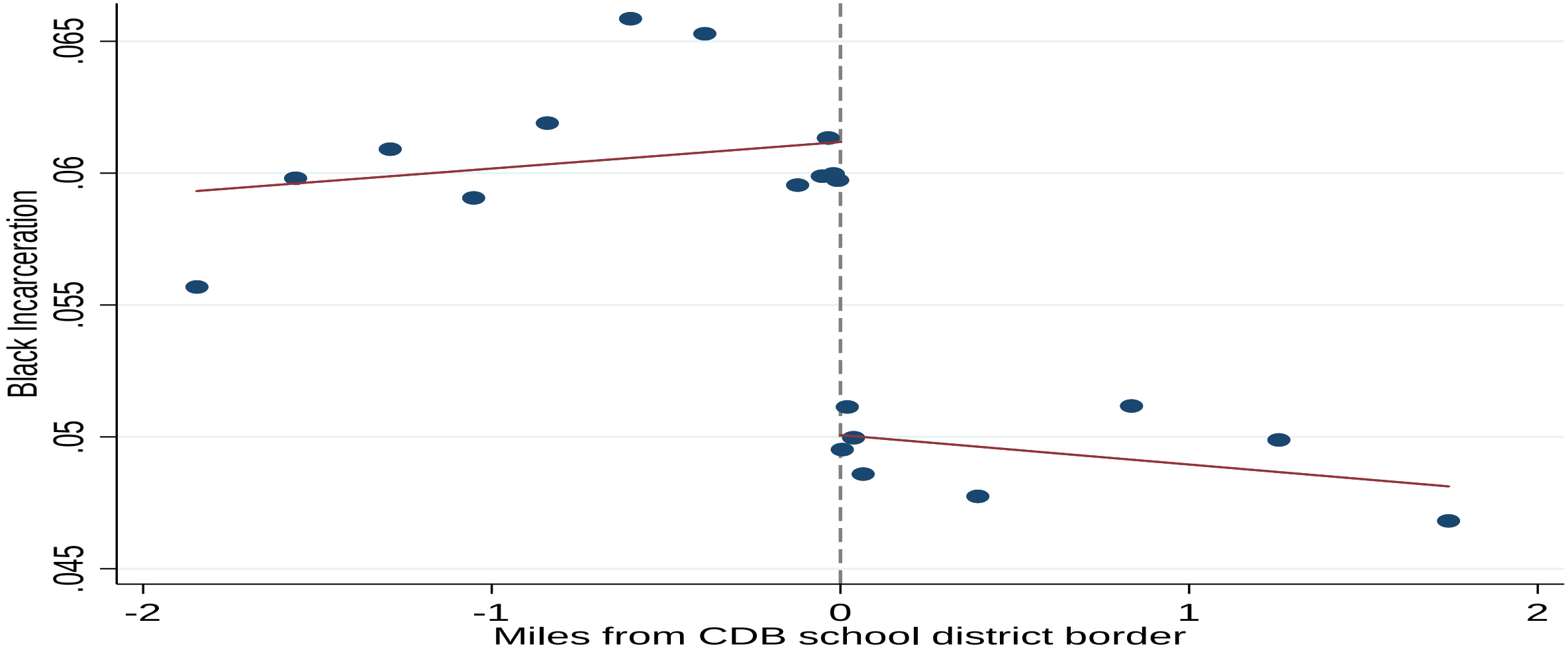
Tract Level Density and Upward Mobility across the United States with Metro Areas



Opportunity and Central City School Districts: Border Discontinuities



Adult Incarceration for African Americans and School District Border Discontinuities



Why are cities so good for productivity and so bad for opportunity?

- Hypothesis # 1: Cities attract the poor, and this represents unobserved parental human capital that is potentially compounded by neighborhood effects and schools.

- Hypothesis # 2: Urban density permits interactions – good and bad – and these distract from human capital accumulation (children's crime and parental entertainment).

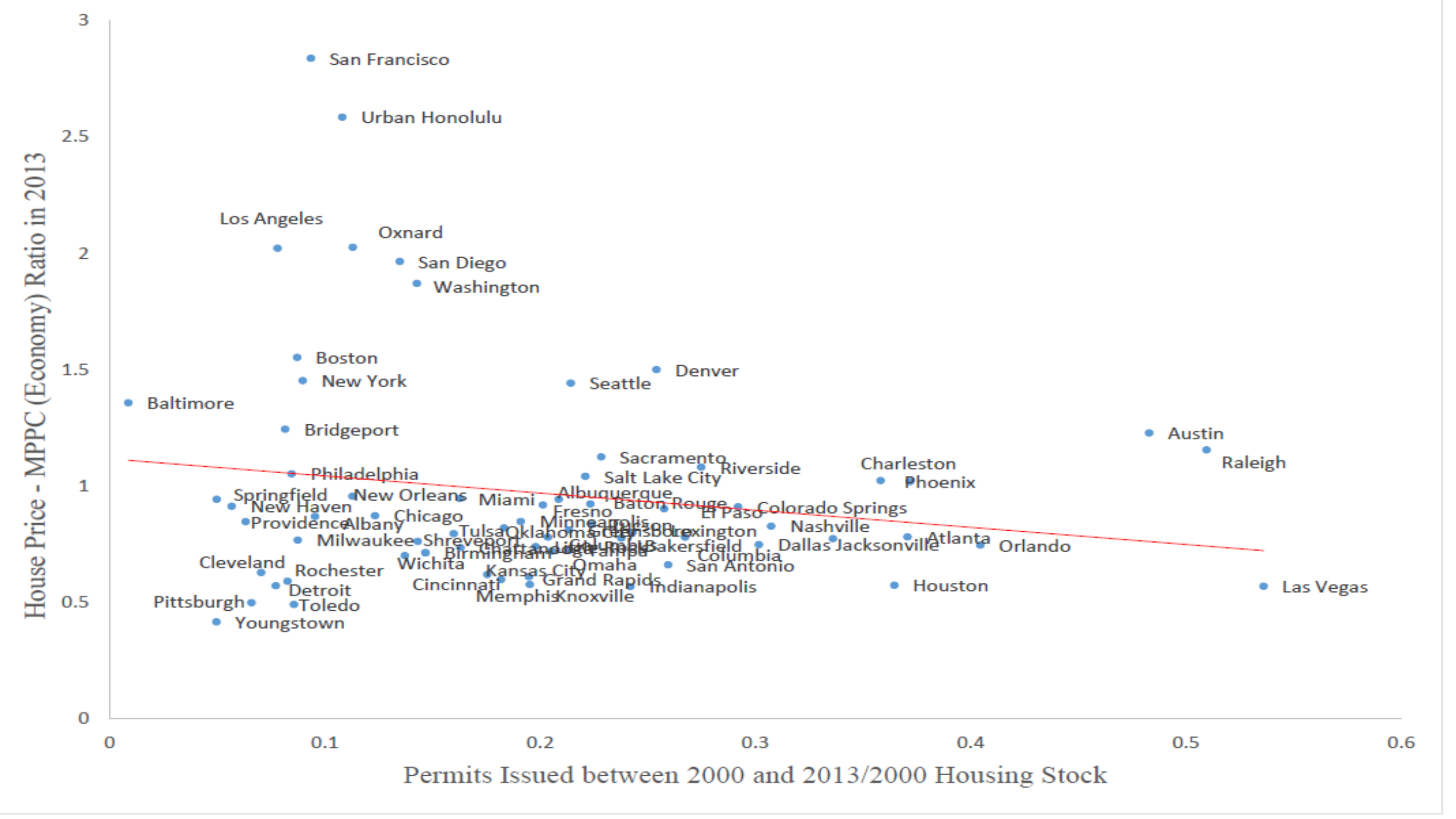
- Hypothesis # 3: Urban density enables more segregation and it is segregation that ultimately lowers upward mobility.

The Physical City:
NIMBYism vs. Monumentalism

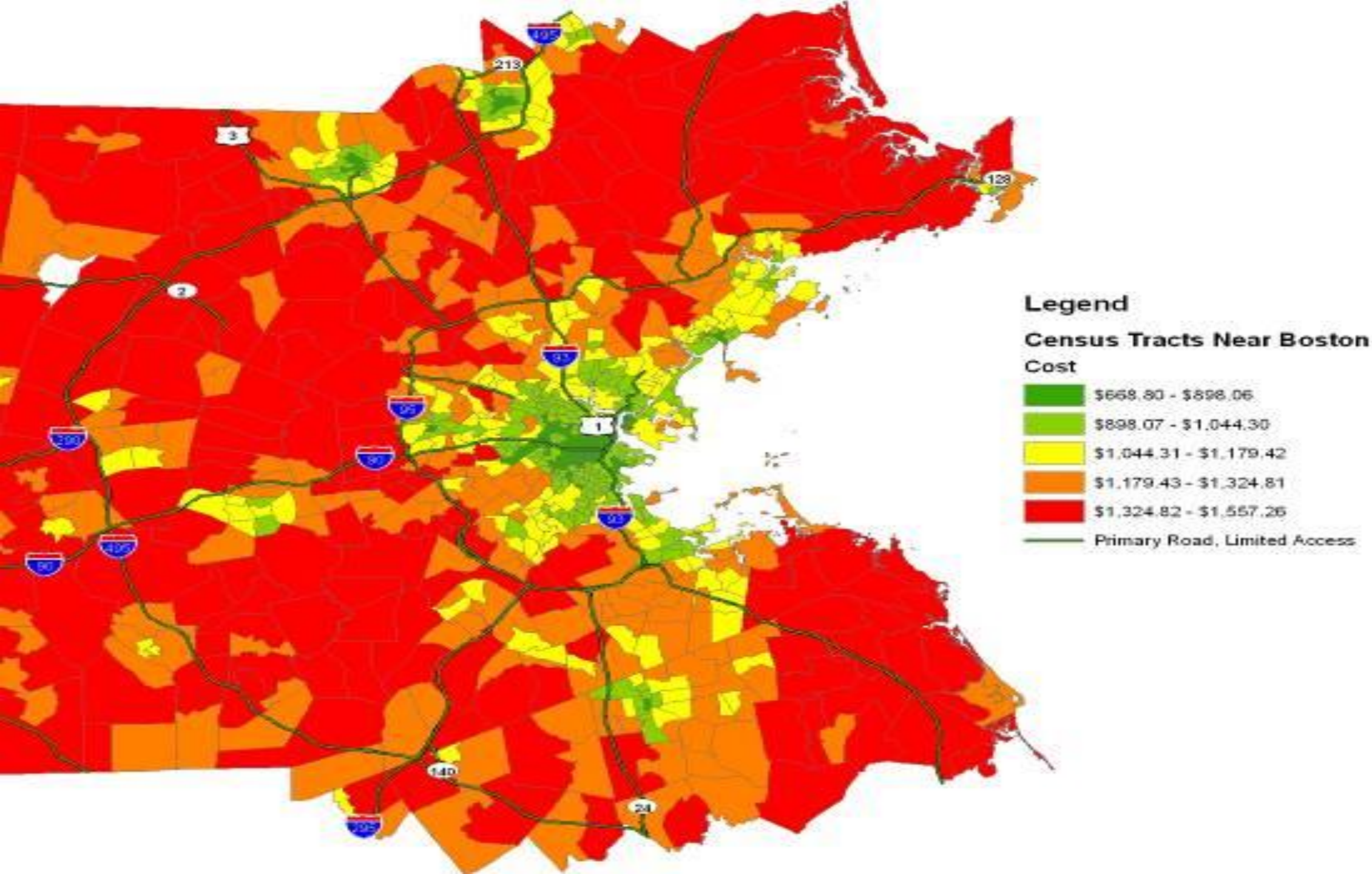
Mumbai has recently begun building up, but the city is still short, expensive, and congested because of decades of overrestricting height. *Scott Eels / Bloomberg / Getty Images*

Astana by ChelseaFunNumberOne -

Is Paris a Gated Community?


House Price - MPPC (Economy) Ratio in 2013
Permits Issued between 2000 and 2013/2000 Housing Stock
0
0.5
1
1.5
2
2.5
3
0
0.1
0.2
0.3
0.4
0.5
0.6
San Francisco
Urban Honolulu
Los Angeles
Oxnard
San Diego
Washington
Boston
New York
Denver
Seattle
Baltimore
Bridgeport
Austin
Raleigh
Sacramento
Riverside
Charleston
Phoenix
Philadelphia
Salt Lake City
Springfield
New Orleans
Miami
Albuquerque
Baton Rouge
Colorado Springs
New Haven
Fresno
El Paso
Providence
Albany
Chicago
Minneapolis
Nashville
Milwaukee
Shreveport
Tulsa
Oklahoma City
Lexington
Atlanta
Dallas
Jacksonville
Orlando
Bakersfield
Columbia
Cleveland
Rochester
Wichita
Omaha
San Antonio
Kansas City
Detroit
Cincinnati
Grand Rapids
Houston
Las Vegas
Indianapolis
Pittsburgh
Toledo
Memphis
Knoxville
Youngstown

But Where Can Amsterdam Build?


Legend
Census Tracts Near Boston
Cost
$668.80 - $898.06
$898.07 - $1,044.30
$1,044.31 - $1,179.42
$1,179.43 - $1,324.81
$1,324.82 - $1,557.26
Primary Road, Limited Access


N
W
E
S
Urumqi
Qiqihaer
Daqing
Harbin
Mudanjiang
Jilin
Tonghua
Changchun
Chifeng
Shenyang
Liaoyang
Baotou
Huhehaote
Beijing
Qinhuangdao
Wuhai
Shuozhou
Tianjin
Dalian
Yinchuan
Changzhou
Taiyuan
Yantai
Shijiazhuang
Handan
Jinan
Zibo
Qingdao
Xining
Lanzhou
Yizhao
Huai River
Ii'an
Lvliang
Suqian
Zhengzhou
Huaian
Huainan
Yixhou
Hefei
Wuxi
Nanjing
Xianyang
Chengdu
Wuhan
Ningbo
Hangzhou
Shaoxing
Chongqing
Quzhou
Lishui
Jinhua
Taizhou
Changsha
Nanchang
Wenzhou
Guiyang
Fuzhou
Kunming
Xiamen
Nanning
Shenzhen
Guangzhou
Zhuhai
Haikou
CO2 emissions(Ton/household)
1.0-1.5
1.5-2.0
2.0-2.5
2.5-3.0
3.0-5.5

The Boston/Amsterdam Hypothesis: Democracy, Urbanization and Inclusion

Image by Ramy Raoof