

Agglomeration Economies

Urban Economics

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Agglomeration Economies

- ▶ Why do we see such a remarkable clustering of human activity in a small number of urban areas?
- ▶ Spatial Eq. Model: cities may form because some places have innate advantages in productivity, housing supply or amenities.
- ▶ Or it may be because clusters of people endogenously increase productivity, housing supply or amenities (agglomeration effects)
 - ▶ Example: Los Angeles. In its early history, prosperous retirees came to enjoy the climate (an innate amenity). Also: restaurants and theater endogenously emerged with the influx of population.
 - ▶ But: if cities were driven by amenities, then real wages should be lower in big urban areas. This is not true. People require a wage premium to locate in big cities.
 - ▶ Can cities be driven by innate advantage in supplying housing, or because density makes it easier to build? No. It is more expensive to build vertically than horizontally. Housing supply is more expensive in bigger areas.

Agglomeration Economies

- Then cities exist because they are areas with high levels of productivity, which might occur because people come to places that are innately more productive or because density itself enhances productivity because of agglomeration economies

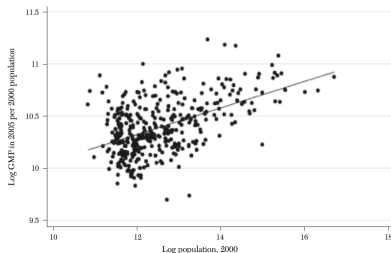


Figure 1. Productivity and City Size

Notes: Units of observation are Metropolitan Statistical Areas under the 2006 definitions. Population is from the Census, as described in the Data Appendix. Gross Metropolitan Product is from the Bureau of Economic Analysis.

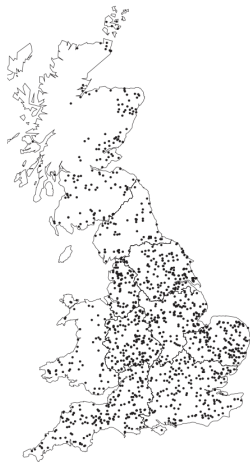
The regression line is $\log GMP \text{ per capita} = 0.13 [0.01] \times \log \text{population} + 8.8 [0.1]$.
 $R^2 = 0.25$ and $N = 363$.

Evidence of Agglomeration Economies

- ▶ Three strategies to identify agglomeration economies
 - 1 Show there is too much spatial concentration to be random (Duranton and Overman, 2005)
 - 2 Compare productivity over space (Greenstone, 2010)
 - 3 Compare wages and rents across space (Quantitative Spatial Models, Ahlfeldt et al, 2015)

Spatial Concentration

Extremes of Localization and Dispersion



(c) Other Agricultural and Forestry
Machinery (SIC2932)



(d) Machinery for Textile, Apparel and
Leather Production (SIC2954)

Spatial Concentration

Ambiguous Cases



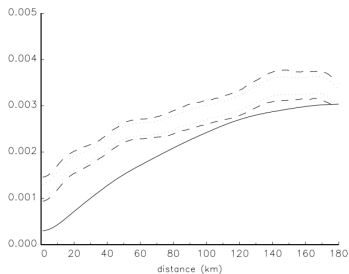
(a) Basic Pharmaceuticals
(SIC2441)



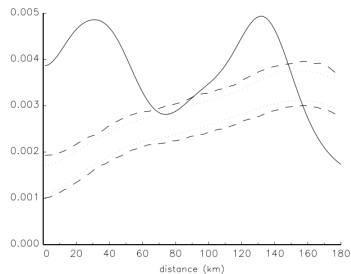
(b) Pharmaceutical Preparations
(SIC2442)

Spatial Concentration

K Density Estimates



(c) Other Agricultural and Forestry Machinery (SIC2932)



(d) Machinery for Textile, Apparel and Leather Production (SIC2954)

Most Localized

sic92	Industry	Γ or Ψ
Most localised		
2214	Publishing of Sound Recordings	0.470
1711	Preparation and Spinning of Cotton-type Fibres	0.411
2231	Reproduction of Sound Recordings	0.403
1760	Manufacture of Knitted and Crocheted Fabrics	0.321
1713	Preparation and Spinning of Worsted-type Fibres	0.319
2861	Manufacture of Cutlery	0.314
1771	Manufacture of Knitted and Crocheted Hosiery	0.290
1810	Manufacture of Leather Clothes	0.203
1822	Manufacture of Other Outerwear	0.181
2211	Publishing of Books	0.178

Most Dispersed

Most dispersed		
1520	Processing and Preserving of Fish and Fish Products	0.200
3511	Building and Repairing of Ships	0.113
1581	Manufacture of Bread, Fresh Pastry Goods and Cakes	0.094
2010	Saw Milling and Planing of Wood, Impregnation of Wood	0.082
2932	Other Agricultural and Forestry Machinery	0.067
1551	Operation of Dairies and Cheese Making	0.064
1752	Manufacture of Cordage, Rope, Twine and Netting	0.062
3615	Manufacture of Mattresses	0.050
1571	Manufacture of Prepared Feeds for Farm Animals	0.049
2030	Manufacture of Builders' Carpentry and Joinery	0.047

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- ▶ The most direct approach
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- ▶ Problems with this approach?
 - ▶ Natural advantages make a region more productive
 - ▶ Greater productivity attracts workers and firms
- ▶ Can you think on an ideal experiment?

MDP Greenstone, Hornbeck, and Moretti (2010)

- ▶ Use new plant openings, and compare results of those counties where plants opened up vs those that didn't
- ▶ What is the model?
 - ▶ New plants choose their location to maximize profits

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 - ▶ New plants choose their location to maximize profits
 - ▶ Places without new plants are not a valid control group

MDP Greenstone, Hornbeck, and Moretti (2010)

- ▶ Regular feature in the corporate real estate journal Site Selection Stories about the location choice of large new plants
- ▶ Gradual narrowing down of potential counties to 2 or 3 finalists
- ▶ The 1 or 2 losers in the shortlist provide a control group
 - ▶ Almost as attractive as the winning county
 - ▶ Yet, they did not receive the treatment

MDP Greenstone, Hornbeck, and Moretti (2010)

TABLE 1
THE MILLION DOLLAR PLANT SAMPLE

	(1)
Sample MDP openings: ^a	
Across all industries	47
Within same two-digit SIC	16
Across all industries:	
Number of loser counties per winner county:	
1	31
2+	16
Reported year – matched year: ^b	
–2 to –1	20
0	15
1 to 3	12
Reported year of MDP location:	
1981–85	11
1986–89	18
1990–93	18
MDP characteristics, 5 years after opening: ^c	
Output (\$1,000s)	452,801 (901,690)
Output, relative to county output 1 year prior	.086 (.109)
Hours of labor (1,000s)	2,986 (6,789)

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► Plant-level regression

$$\log(Y) = \log(A) + \beta_1 \log(L) + \beta_2 \log(K_B) + \beta_3 \log(K_E) + \beta_4 \log(M) \quad (1)$$

► where

$$\log(A) = \delta_1 \text{Winner} + \delta_2 \text{Post} + \delta_3 \text{Winner} \times \text{Post} \quad (2)$$

MDP Greenstone, Hornbeck, and Moretti (2010)

Difference: Winners – Losers

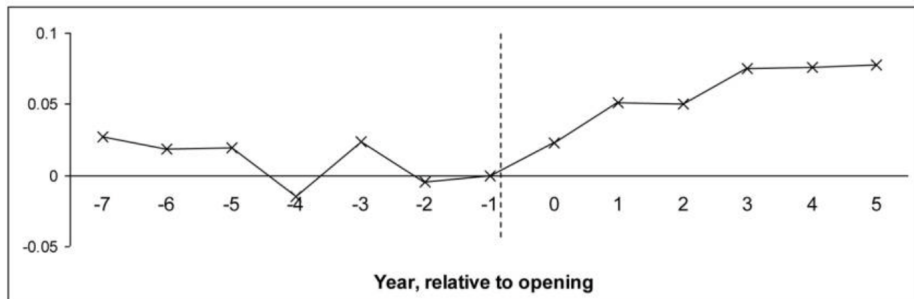


TABLE 9
CHANGES IN COUNTIES' NUMBER OF PLANTS, TOTAL OUTPUT, AND SKILL-ADJUSTED
WAGES FOLLOWING AN MDP OPENING

	A. CENSUS OF MANUFACTURES		B. CENSUS OF POPULATION
	Dependent Variable: Log(Plants) (1)	Dependent Variable: Log(Total Output) (2)	Dependent Variable: Log(Wage) (3)
Difference-in- difference	.1255** (.0550)	.1454 (.0900)	.0268* (.0139)
R^2	.9984	.9931	.3623
Observations	209	209	1,057,999

Further Readings

- ▶ Duranton, G., & Overman, H. G. (2005). Testing for localization using micro-geographic data. *The Review of Economic Studies*, 72(4), 1077-1106.
- ▶ Glaeser, E. L., & Gottlieb, J. D. (2009). The wealth of cities: Agglomeration economies and spatial equilibrium in the United States. *Journal of economic literature*, 47(4), 983-1028.
- ▶ Glaeser, E. (2008). *Cities, agglomeration, and spatial equilibrium*. OUP Oxford.
- ▶ Greenstone, M., Hornbeck, R., & Moretti, E. (2010). Identifying agglomeration spillovers: Evidence from winners and losers of large plant openings. *Journal of Political Economy*, 118(3), 536-598.
- ▶ Ponzetto, G. (2012) *Agglomeration and Transport Costs*. Mimeo