

➤ **Birth of firms**

New firms locate by maximizing expected profits → Where productivity is higher



New firms locate where economies of agglomeration are strong

Rosenthal and Strange (2003) Geographic scope

$$B_{j,t} = b_z y_{z,j,t-1} + \gamma_{m,b} + \epsilon_{b,t}$$

	Software SIC 7371-73, 75	Food Products SIC 20	Apparel SIC 23	Printing & Publishing SIC 27	Fabricated Metal SIC 34	Machinery SIC 35
Diversity and Competition Effects						
ZIP code Herfindahl Index	-1.040E+01 (-36.369)	-3.634E+00 (-17.049)	-2.151E+01 (-17.551)	-6.036E+00 (-34.340)	-1.395E+00 (-20.190)	-2.265E+00 (-27.265)
ZIP code firms per worker— other ind.	-9.466E+00 (-22.272)	-3.349E+00 (-12.051)	-1.329E+01 (-8.838)	-5.149E+00 (-19.763)	-1.631E+00 (-16.241)	-2.160E+00 (-18.948)
ZIP code firms per worker— own ind.	1.473E+00 (13.151)	4.561E-01 (5.875)	2.936E+00 (7.969)	4.859E-01 (6.459)	5.230E-02 (1.924)	-1.694E-01 (-0.495)
Urbanization Effects: Other (Total - Own) Industry Employment in the ...						
0 to 1 mile ring	1.070E-06 (1.120)	1.060E-06 (2.195)	-2.000E-05 (-5.445)	7.000E-06 (7.529)	-1.050E-07 (-0.527)	5.010E-07 (2.235)
1 to 5 mile ring	1.600E-06 (6.308)	2.180E-07 (1.476)	6.040E-06 (5.113)	1.360E-06 (4.149)	-2.820E-08 (-0.494)	-2.260E-08 (-0.321)
5 to 10 mile ring	-2.570E-07 (-1.431)	1.350E-07 (1.243)	1.110E-06 (1.258)	5.460E-07 (2.304)	2.050E-08 (0.522)	7.960E-09 (0.174)
10 to 15 mile ring	3.270E-07 (2.094)	-4.560E-08 (-0.405)	1.780E-06 (-2.2040)	3.480E-07 (1.638)	3.610E-08 (0.939)	9.170E-09 (0.233)
Localization Effects: Own Industry Employment in the ...						
0 to 1 mile ring	3.843E-04 (7.446)	1.680E-05 (0.469)	8.054E-04 (11.033)	-5.950E-05 (-3.966)	6.150E-05 (4.145)	6.360E-05 (6.088)
1 to 5 mile ring	5.030E-05 (3.844)	5.690E-05 (4.830)	-8.770E-05 (-2.474)	-2.130E-06 (-0.340)	2.330E-05 (5.017)	1.540E-05 (4.818)
5 to 10 mile ring	3.380E-05 (3.669)	-1.160E-05 (-1.293)	-3.870E-06 (-0.139)	-8.170E-06 (-1.666)	2.150E-06 (0.679)	-1.620E-06 (-0.747)
10 to 15 mile ring	-1.470E-05 (-1.723)	5.700E-06 (0.643)	-6.100E-05 (-2.127)	-5.530E-06 (-1.190)	-1.170E-06 (-0.425)	6.520E-06 (3.483)
Average Change in Localization Effect per Mile from ...*						
0.5 to 3 miles	-1.34E-04	1.60E-05	-3.57E-04	2.29E-05	-1.53E-05	-1.93E-05
3 to 7.5 miles	-3.67E-06	-1.52E-05	1.86E-05	-1.34E-06	-4.70E-06	-3.78E-06
7.5 to 12.5 miles	-9.70E-06	3.46E-06	-1.14E-05	5.28E-07	-6.64E-07	1.63E-06

- Competition increase births
- Diversity increase births
- Localization effects more important than urbanization effects

For any given concentric ring of employment, the coefficient on the localization effect variable is typically at least one order of magnitude larger than the coefficient on the urbanization effect

Most localization effects are significant

Most urbanization effects are not significant

- Localization economies attenuate rapidly in the first few miles but slowly thereafter
- The pattern of urbanization effects is ambiguous

TABLE 5.—LOCALIZATION EFFECTS CONTROLLING FOR ESTABLISHMENT SIZE

Employment at	Software SIC 7371-73, 75	Food Products SIC 20	Apparel SIC 23	Printing & Publishing SIC 27	Fabricated Metal SIC 34	Machinery SIC 35
Births of New Establishments						
Small firms (1-24 workers)	1.76E-03 (10.733)	1.29E-03 (4.155)	-5.74E-04 (-1.303)	4.15E-04 (4.365)	1.66E-04 (2.754)	2.80E-04 (5.544)
Medium firms (25-99 workers)	-6.58E-04 (-4.453)	9.58E-06 (0.083)	-1.92E-04 (-0.601)	-3.41E-04 (-4.164)	4.30E-05 (1.409)	-2.49E-05 (-0.674)
Large firms (100+ workers)	4.84E-05 (3.502)	1.96E-05 (1.396)	6.09E-04 (3.589)	-5.33E-07 (-0.049)	3.31E-06 (0.504)	4.40E-06 (1.267)
New-Establishment Employment						
Small firms (1-24 workers)	2.48E-02 (6.614)	3.76E-02 (1.957)	-6.85E-02 (-2.551)	1.81E-02 (3.163)	1.65E-02 (2.901)	1.23E-02 (4.463)
Medium firms (25-99 workers)	6.88E-04 (0.205)	1.52E-02 (2.162)	4.17E-02 (2.539)	-1.48E-02 (-3.017)	7.74E-04 (0.275)	6.53E-04 (0.326)
Large firms (100+ workers)	7.97E-04 (2.519)	1.88E-03 (2.212)	-3.52E-03 (-0.405)	-1.68E-04 (-0.254)	2.35E-03 (4.161)	1.67E-04 (0.881)

➤ Role of industrial organization and business culture

Chinitz (1961) Some places are endowed with a greater number of entrepreneurs than others. This endowment of entrepreneurial human capital influences economic success

New York vs. Pittsburgh

New York's historical garment industry was a natural training ground for entrepreneurs.

- ✓ Low barriers to entry (few serious fixed costs) \Rightarrow large number of small entrepreneurs
- ✓ This entrepreneurship in turn influenced neighbouring industries

Pittsburgh big company city that stifled entrepreneurship, tracing the roots of this mentality to Pittsburgh's dominant steel industry

- Intergenerational transmission of entrepreneurship
- Culture of entrepreneurship
- Capital constraints
- Access to intermediate goods

Rosenthal & Strange (2010)

An increase in activity at small establishments will have a larger effect on entrepreneurship than will an equivalent increase in activity at large establishments

**Table 2: Tobit Models for the Number of Arrivals and Employment for
New (< 12 months old) Small (< 10 worker) Establishments By 1-Digit Industry Category
(Robust standard errors in parentheses)**

	Manufacturing SIC 20-39		Wholesale Trade SIC 50, 51		FIRE SIC 60-65, 67		Services SIC 73, 80, 81, 86, 87, 89	
	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment
ALL industries within 1 Mile of Census Tract Centroid (all controls in 1,000s)								
Establishments with size NA	-0.2072 (0.0425)	-0.6069 (0.1158)	-0.2963 (0.2934)	-0.8977 (0.8236)	-0.4405 (0.1669)	-0.9936 (0.4123)	-1.9500 (0.5052)	-4.4170 (1.0542)
Emp at estab with < 10 workers	0.0142 (0.0029)	0.0370 (0.0078)	0.0309 (0.0232)	0.0984 (0.0643)	0.0165 (0.0108)	0.0301 (0.0269)	0.1093 (0.0334)	0.2183 (0.0693)
Emp at estab with 10 to 49 workers	-0.0002 (0.0009)	0.0013 (0.0024)	-0.0272 (0.0088)	-0.0844 (0.0251)	0.0060 (0.0028)	0.0176 (0.0070)	-0.0136 (0.0086)	-0.0154 (0.0179)
Emp at estab with > 50 workers	-0.0002 (0.0001)	-0.0004 (0.0003)	0.0013 (0.0008)	0.0042 (0.0024)	0.0003 (0.0004)	0.0006 (0.0011)	0.0022 (0.0013)	0.0055 (0.0027)
OWN industry within 1 Mile of Census Tract Centroid (all controls in 1,000s)								
Establishments with size NA	7.1420 (2.3649)	26.2700 (6.6675)	-68.6100 (16.9407)	-170.6000 (45.8602)	-10.4100 (1.0866)	-28.8600 (2.8184)	3.3490 (1.3237)	8.4460 (3.9102)
Emp at estab with < 10 workers	0.0245 (0.1441)	-0.3390 (0.3942)	0.8419 (0.1900)	1.5850 (0.4818)	0.5602 (0.0905)	1.4060 (0.2264)	0.1888 (0.0444)	0.4994 (0.1051)
Emp at estab with 10 to 49 workers	0.1597 (0.0626)	0.6065 (0.1758)	0.3007 (0.1489)	1.2120 (0.4081)	-0.0237 (0.0550)	0.0601 (0.1397)	0.2710 (0.0299)	0.5707 (0.0687)
Emp at estab with > 50 workers	-0.0121 (0.0049)	-0.0435 (0.0156)	0.2232 (0.0603)	0.6056 (0.1628)	0.0184 (0.0048)	0.0420 (0.0124)	-0.0195 (0.0075)	-0.0581 (0.0174)

**Table 3: Linear Tract Fixed Effect Models for the Number of Arrivals and Employment for
New (< 12 months old) Small (< 10 worker) Establishments Controlling for Local Employment Within 1 and 5 Miles
(Robust standard errors in parentheses)**

	All 35 2-Digit Industries				Manufacturing SIC 20-39			
	1-Mile Controls Only		1- and 5-Mile Controls		1-Mile Controls Only		1- and 5-Mile Controls	
Local Activity Within 1 Mile (in 1,000s)	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment
OWN industry estab. with size NA	-5.6000 (0.7407)	-10.5000 (1.8261)	-4.8500 (0.8802)	-7.4800 (2.1808)	4.2700 (1.5641)	18.2200 (4.4657)	4.7800 (1.7836)	20.1800 (5.1349)
OWN industry emp at estab with < 10 workers	0.1000 (0.0254)	0.2300 (0.0644)	0.2400 (0.0363)	0.5400 (0.0853)	0.2900 (0.0983)	0.3500 (0.2734)	0.4500 (0.1148)	0.8200 (0.3118)
OWN industry emp at estab with 10 to 49 workers	0.3000 (0.0217)	0.7000 (0.0552)	0.2500 (0.0260)	0.5700 (0.0642)	0.0200 (0.0333)	0.2500 (0.1168)	-0.0400 (0.0500)	0.0600 (0.1200)
OWN industry emp at estab with > 50 workers	-0.0015 (0.0031)	-0.0094 (0.0085)	0.0069 (0.0037)	0.0100 (0.0085)	-0.0025 (0.0028)	-0.0200 (0.0104)	-0.0003 (0.0029)	-0.0100 (0.0072)
Local Activity Within 5 Miles (in 1,000s)								
OWN industry estab. with size NA	-	-	-0.0500 (0.0658)	-0.4200 (0.1479)	-	-	-0.1300 (0.0872)	-0.5000 (0.2688)
OWN industry emp at estab with < 10 workers	-	-	-0.0094 (0.0022)	-0.0200 (0.0044)	-	-	-0.0300 (0.0062)	-0.1100 (0.0205)
OWN industry emp at estab with 10 to 49 workers	-	-	-0.0041 (0.0017)	-0.0039 (0.0035)	-	-	0.0100 (0.0025)	0.0400 (0.0084)
OWN industry emp at estab with > 50 workers	-	-	-0.0020 (0.0002)	-0.0050 (0.0005)	-	-	-0.0004 (0.0001)	-0.0005 (0.0004)
Census Tract Fixed Effects	31,908	31,908	31,908	31,908	31,908	31,908	31,908	31,908
Observations	1,116,780	1,116,780	1,116,780	1,116,780	638,160	638,160	638,160	638,160
R-sq within	0.2945	0.2484	0.2962	0.2505	0.1049	0.0681	0.1055	0.0688
R-sq between	0.0274	0.0350	0.0367	0.0446	0.0300	0.0406	0.0323	0.0433
R-sq overall	0.2564	0.2138	0.2593	0.2172	0.0919	0.0637	0.0927	0.0647

The presence of many small downstream establishments encourages upstream activity

Large establishments tend to internally source to a greater degree \Rightarrow Employment at large establishments does not encourage upstream activity to the same degree that employment at small establishments

3 industries whose services are sometimes contracted out, but at other times provided internally:

Business Services, Legal Services and Engineering-Accounting-Research-Management-Related Services

Table 4: Tobit Models for Select Service Industries of the Number of Arrivals and Employment for New (< 12 months old) Small (< 10 worker) Establishments (Robust standard errors in parentheses)

	Business Services SIC 73		Legal Services SIC 81		Engineering, Accounting, Research, Management, and Related Services SIC 87	
	Arrivals	Employment	Arrivals	Employment	Arrivals	Employment
ALL industries within 1 Mile of Census Tract Centroid (all controls in 1,000s)						
Establishments with size NA	-4.5910 (2.5648)	-9.7430 (5.1279)	-1.0730 (0.1717)	-2.5020 (0.4802)	-2.6830 (1.2899)	-6.2180 (2.8787)
Emp at estab with < 10 workers	0.1992 (0.1119)	0.3137 (0.2241)	0.0527 (0.0111)	0.1212 (0.0308)	0.0890 (0.0514)	0.1972 (0.1078)
Emp at estab with 10 to 49 workers	0.1488 (0.0295)	0.3343 (0.0624)	-0.0106 (0.0054)	-0.0289 (0.0159)	0.0878 (0.0412)	0.1753 (0.0985)
Emp at estab with > 50 workers	0.0032 (0.0077)	0.0068 (0.0161)	0.0012 (0.0010)	0.0040 (0.0036)	0.0068 (0.0044)	0.0153 (0.0096)
OWN industry within 1 Mile of Census Tract Centroid (all controls in 1,000s)						
Establishments with size NA	-158.50 (68.6147)	-318.90 (141.1062)	-42.380 (17.6583)	-135.00 (49.0909)	-62.560 (33.2766)	-141.80 (74.2408)
Emp at estab with < 10 workers	-0.2469 (0.5742)	0.0898 (1.1220)	0.6249 (0.1570)	1.5210 (0.4422)	-0.2009 (0.4367)	-0.6157 (1.0616)
Emp at estab with 10 to 49 workers	0.6067 (0.2696)	1.0910 (0.5538)	0.3180 (0.1747)	1.0320 (0.4914)	0.2129 (0.2839)	0.7640 (0.6761)
Emp at estab with > 50 workers	0.0223 (0.0421)	0.0652 (0.0905)	-0.0559 (0.0174)	-0.1506 (0.0477)	-0.0453 (0.0220)	-0.0725 (0.0465)

- Additional employment at large establishments has an effect on births that is insignificant, of the wrong sign or much smaller than the effects for small or medium establishments
- Nearly every 1-digit industry group or 2-digit industry there are positive and significant effects associated with employment at small or medium sized establishments
- The small establishment effect will reinforce other tendencies in the system of cities towards core-periphery type of outcome. This is because small companies benefit and rely more on shared infrastructure and related agglomeration economies characteristics of central cities.
- Those cities with vibrant small business sectors will tend to continue to have vibrant small business sectors

SOURCES OF AGGLOMERATION ECONOMIES

- Rosenthal and Strange (2001) “Determinants of agglomeration”
- High level of concentration indicative of agglomeration economies but also other explanations.
- R&S objective: to evaluate the degree to which agglomerative externalities explain inter-industry differences in spatial concentration.
- They regress a measure of industry concentration (Index of Ellison-Glaeser) on proxies of sources of agglomeration
- Fourth quarter 2000

➤ Variables

☐ Controls for natural advantage and transportation costs

- Energy per \$ shipment
- Natural resources per \$ shipment
- Water per \$ shipment

To the extent that industries concentrate because of a desire to locate close to the sources of their energy, natural resources, and water related inputs, expectation of positive coefficients of these variables

- Inventory per \$ of shipment (Transportation cost).
 1. Value of the end-of-year inventories divided by the value of shipments
 2. Data on actual product shipping costs by industry not suitable: industries with high transport rate locate so as to minimize distances to their markets and the related shipping costs.
 3. Industries that produce highly perishable products face high product shipping costs per unit of distance.
 4. With multiple markets, less agglomeration. Conversely for non perishable

- Controls for agglomerative externalities

□ Sharing

- Manufactured inputs per \$ of shipment
- Nonmanufactured inputs per \$ of shipment

- Manufactured:
 - ✓ Larger economies of scale
 - ✓ Greater industry specificity
- Expectation: non-manufactured less impact on agglomeration

□ Learning

- Innovations per \$ of shipment
- Innovations defined as the number of new products advertised in trade magazines in 1982, the only year for which such data are available

□ Matching

- If matching is possible, an industry benefits by agglomerating because it is better able to hire workers with industry-specific skills.
- It is difficult to identify industry characteristics that are related to the specialization of the industry's labour force

Three proxies:

- Net productivity (Value of shipments less the value of purchased inputs divided by the number of workers in the industry)
- Management workers/ (Management workers+ Production workers)
- % of workers with doctorates, Master's degree, and Bachelor's degree

➤ Strategy:

- They estimate equations for concentration measures at three different levels of spatial detail:
 - State
 - County
 - Zipcode
- Does different sources operate at different spatial scales?

The 10 Most Agglomerated Manufacturing Industries at the SIC 4-Digit Level

Zipcode level			County level			State level		
SIC	SIC description	γ	SIC	SIC description	γ	SIC	SIC description	γ
2371	Fur goods	0.352	2371	Fur goods	0.372	2397	Schiffli machine embroideries	0.499
3761	Guided missiles & space vehicles, parts	0.260	2397	Schiffli machine embroideries	0.251	3761	Guided missiles & space vehicles, parts	0.434
3579	Office machines & parts	0.145	3761	Guided missiles & space vehicles, parts	0.239	2284	Thread and handwork yarns	0.413
2087	Flavoring extracts & syrups	0.142	2874	Phosphatic fertilizers	0.215	2371	Fur goods	0.408
3149	Footwear, except rubber, n.e.c.	0.139	3861	Photographic equipment and supplies	0.191	2273	Carpets and rugs	0.406
2335	Womens' and misses' dresses	0.118	2111	Cigarettes	0.191	2084	Wines, brandy, and brandy spirits	0.372
2381	Fabric dress and work gloves	0.114	3149	Footwear, except rubber, n.e.c.	0.185	2251	Womens' hosiery, except socks	0.371
3764	Missile and rocket engines	0.111	2043	Cereal breakfast foods	0.180	3533	Oil & gas field equipment & parts	0.339
3676	Electronic resistors	0.086	2335	Women's, misses', and juniors'	0.178	2436	Softwood veneer and plywood	0.328
3844	X-ray apparatus, tubes, & parts	0.084	2841	Soap & detergents	0.167	2141	Manufactured tobacco	0.305

➤ Results

☐ Natural advantage and transportation costs

- Natural advantage (except energy). Significant at state level
- Inventories. Significant at state level (Industries with output that is costly to transport are more likely to locate close to their markets → less agglomeration)

☐ Sharing

- Manufactured inputs. Significant at state level
- Nonmanufactured inputs. Negative coefficient and significant at state level
- A reliance on manufactured inputs contributes to agglomeration
- A reliance on service inputs does not (constant returns to scale and not industry specific → available everywhere)

❑ Matching

- Net productivity. Significant at the three levels
- Managerial share of workers. Significant at county and zipcode level
- Master's degree. Significant at the three levels

❑ Learning

- Innovations. Significant at zipcode level

- Reliance on manufactured and naturally occurring inputs and the production of perishable products serve to increase the importance of shipping costs in firm location
- That, in turn, positively affects state-level agglomeration but has little effect on agglomeration at lower levels
- Knowledge spillovers positively affect agglomeration at highly localized levels
- Reliance on skilled labor affects agglomeration at all levels