Questions for Lecture Notes II

- Why do we observe cities of different size?
- Why do we observe cities of different type?
- How cities have an impact on income and employment growth?
Benefits from living in a large city

- As the number of workers increase, agglomeration economies are more important and wages increase.
- Agglomeration economies increase at a decreasing rate (different industries have different patterns).
Costs from living in a large city

- As the number of workers increase:
  - More commuting costs.
  - More density and congestion.
  - Noise, pollution, traffic, crime, etc.
- These costs increase at a constant or even at an increasing rate.
Utility and City Size

Tension between agglomeration economies and diseconomies of scale

Why not all workers live in Medium cities?

Because land rent would be very high in M and some workers would prefer to move to S and L !!!
Utility and City Size

Utility per worker (in $)

Considering land rent

Small       Medium       Large

Utility = Income - urban and commute costs - land rent

People should be indifferent about living in any of the cities

Real question
Will a region have many small cities or few large ones
Size Distribution

Rank-Size Rule
(Zipf’s Law)

Rank times population is constant across cities

\[ \text{Rank} \cdot \text{Size} = K \]

\[ \ln(\text{Rank}) + \ln(\text{Size}) = \ln(K) \]

\[ \ln(\text{Rank}) = \ln(K) - \ln(\text{Size}) \]
Rank-Size rule (United States)

\[ \ln(\text{Rank}) = -1.3221 \ln(\text{Size}) + 20.563 \]

\[ R^2 = 0.9936 \]
Rank-Size rule (Brazil)

\[ \ln(\text{Rank}) = -1.2256 \cdot \ln(\text{Size}) + 19.42 \]

\[ R^2 = 0.9954 \]
Rank-Size rule (Mexico)

\[ \ln(Rank) = -1.0915 \ln(Size) + 17.211 \]

\[ R^2 = 0.9704 \]
Zipf’s Law for the US across time

Source: Rossi-Hansberg and Wright (2006)
Zipf’s Law in Developed countries

Source: Rossi-Hansberg and Wright (2006)
Zipf’s Law in Developing countries

Source: Rossi-Hansberg and Wright (2006)
Urban Giants

- Large primary city
  - Economies of scale on trade
  - Trade restrictions (Krugman, 1996)
  - Dictators (Ades and Glaeser, 1995)
    - Roman Circuses

- We will analyze the case of New York, the US urban colossus (in these lecture notes).
Why do cities come in different size and varieties?

- Localization Economies
- Urbanization Economies (amplification effect)
- Consumption Goods [local industries] (amplification effect)
  - NBA franchise
  - Brain Surgery
Consumption Goods

- Population base - > variety > local employment - > city size

- Agglomeration economies in Marketing - > retail clusters
  -> market cities and concentration within cities (malls, shopping centers...).
  - Shopping externalities
    - Imperfect Substitutes:
      - For example, Santa Monica Blvd.
    - Complementary Goods:
      - For example, Restaurants + Cinemas in Westwood Village
Imperfect Substitutes—Comparison Shopping

![Graph showing the comparison of Initial Supply and Supply in Cluster with different demand curves D', D''(cs), and D''(ncs)]

Initial Supply

Supply in Cluster

$10$

$12$

Q

D'

D''(cs)

D''(ncs)
Example: Car Dealers in Santa Monica

- A Mercedes-Benz
- B Honda
- C BMW
- D Cars With Class
- E Infiniti
- F Saab
- G Nissan
- H Mercedes-Benz
- J Car Factory
Consumer City

Glaeser, Kolko and Saiz (2001)

*Productivity Premium + Amenity Premium = Rent Premium*

- Now cities can find a justification from a consumer perspective.

- Interesting Fact:
  Wages have increased less than housing prices in cities !!!

MORE AMENITY PREMIUM!!!
City Size and Heterogeneity [Quigley, 1998]

<table>
<thead>
<tr>
<th>Factor</th>
<th>Example</th>
<th>Theoretical Argument</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Scale Economies</td>
<td>larger plant size</td>
<td>Mills (1967), Dixit (1973)</td>
</tr>
<tr>
<td>in production, within firms</td>
<td>public goods: parks, sports stadiums</td>
<td>Arnott and Stiglitz (1979)</td>
</tr>
<tr>
<td>in consumption</td>
<td></td>
<td></td>
</tr>
<tr>
<td>in production</td>
<td>theater, restaurants, high/low</td>
<td>Rivera-Batiz (1988)</td>
</tr>
<tr>
<td>in consumption</td>
<td>culture</td>
<td></td>
</tr>
<tr>
<td>3. Transaction Costs</td>
<td>labor market matching</td>
<td>Helsley and Strange (1990),</td>
</tr>
<tr>
<td>in production</td>
<td></td>
<td>Acemoglu (1996)</td>
</tr>
<tr>
<td>in consumption</td>
<td>shopping districts</td>
<td>Artle (1959)</td>
</tr>
<tr>
<td>in production</td>
<td>resale market for assets</td>
<td>Helsley and Strange (1991)</td>
</tr>
<tr>
<td>in consumption</td>
<td>substitute goods</td>
<td>Mills and Hamilton (1984)</td>
</tr>
</tbody>
</table>
Different types of city

- Specialized cities (Important Localization Economies)
- Diverse cities (Important Urbanization Economies)
- Model of laboratory cities.
  - Industries born at diverse cities where innovation (highly dependent on UE) is very important.
  - Once mature, industries move to specialized cities where LE are more important for standardized production.
  - Evidence: 70% of firms that change location go from diverse to specialized cities (Duranton and Puga (01)). This pattern is much more important for research and development firms.
The Future of Cities

- Telecommunication and face2face contact: Complements or Substitutes?
- Gaspar and Glaeser (1998)
  - imperfect substitutes
  - increase in number of relationships
- Complementarity argument
  - Demand for one type of communication affects the demand of others.
Summary Ch. 4 O’Sullivan

- Differences in city size are caused in part by differences in localization economies across industries. Any underlying differences in city size are amplified by urbanization economies and the provision of local goods and services.

- The incubation process (laboratory cities) results from localization and urbanization economies. A large city provides a nurturing environment that helps firms and industries in the early stages of product development.

- Innovations in telecommunication technology will not cause cities to disappear because some activities require face time, so there will always be a need for cities and the physical proximity they provide.

- A shopping externality occurs if the sales of a particular store increase as other retailers move closer to the store. These agglomerative economics in marketing cause the clustering of retailers. Comparison shopping causes the clustering of firms selling imperfect substitutes. One-stop shopping causes the clustering of firms selling complementary goods.
Economic Growth

- Classical sources of growth:
  - Capital deepening (increase in capital per worker)
  - Increases in human capital (improve in knowledge and skills through more education and experience)
  - Technological progress (new ideas and inventions)

- Urban source of growth
  - Agglomeration economies (by physical proximity)
Economic Growth

- Gibrat’s Law of cities
  - Mean and variance of the growth rate of a city are independent of its size.
Growth spreading across cities

![Graph showing utility per worker against workers per city for Region A and Region B.](image)
Urban Employment Growth

- Assume a region with many cities.
  - Workers have a fixed number of hours to work
  - Participation rate is fixed
  - Workers can move freely across cities inside the region
Urban Employment Growth – Labor Demand

Substitution Effect
Firms replace labor by capital

Output Effect
Firms produce less output

Labor Demand has a negative slope
Urban Employment Growth – Labor Demand

Increase in:
- Demand for exports
- Labor productivity
- Industrial public services
- Tech. complements of labor
- Improvement in inputs

Reduction in:
- Business Taxes
Urban Employment Growth – Labor Demand

Multiplier Effect
The increase in the number of workers increase the demand for local goods and the labor demand too

Average Multiplier = 2.13
(using Portland industries)
Urban Employment Growth – Labor Supply

Wages

Workers in the city

Labor Supply has a positive slope

Empirically

\[ e(C, L) = e(w, L) = 0.2 \]

\[ \Rightarrow e(L, w) = 5 \]
Urban Employment Growth – Labor Supply

Increase in:
- City amenities
- Residential Public Services

Reduction in:
- Residential Taxes

Workers in the city

Wages
Urban Employment Growth
Changes in labor demand

Wages (w)

Labor supply
New labor demand
Labor demand

New Equilibrium

↑ Demand ⇒ ↑ w and ↑ L

Labor Excess Demand

Workers in the city (L)
Urban Employment Growth
Changes in labor demand (Some numbers)

\[ \uparrow w = \frac{12\%}{1 + 5} = 2\% \]

Wages (w)

Labor supply \((Elast=5)\)

New labor demand \((Elast=1)\)

New Equilibrium

Workers in the city (L)
Urban Employment Growth
Changes in labor demand (Some numbers)

Changes in labor demand

Wages ($w$)

Labor supply ($\text{Elast}=5$)

New labor demand ($\text{Elast}=1$)

Labor demand

Workers in the city ($L$)

$\uparrow L = 5 \cdot 2\% = 10\%$
Urban Employment Growth
Changes in labor supply

Wages (w)

Labor supply
New labor supply

↑ Supply ⇒ ↓ w and ↑ L

New Equilibrium

Labor demand

Labor Excess Supply

Workers in the city (L)

Econ 137 - Summer 2007
Local policies that increase employment

- Policies that tend to increase labor demand
  - Tax reduction
    - A 10% decrease in business taxes increase business activity in the metropolitan area by 1-6% and in the municipality by 10-30% (locations are better substitutes).
    - Depends how extra collection is used
  - Public Services
    - High impact
  - Subsidies and Incentives
    - Small effects. Perverse effects in most cases.

- Policies that tend to increase labor supply
  - Environmental Quality
    - This policy also decrease labor demand. The final effect on employment is not clear
Summary Ch. 5 O’Sullivan

- An increase in per-capita income results from capital deepening, increases in human capital, technological progress and agglomeration economies.
- An increase in export employment increases local employment through the multiplier process.
- Local government can increase urban employment through reducing taxes or giving subsidies, but mostly by providing public services.
New York: The US urban colossus

- For two centuries, New York has been the largest city in the nation.
- More than 8 million people.
- Population grew by 9% in the last decade.
- NY’s history is one of almost unbroken triumph (the worst crisis, which occurred in the seventies, lasted for less than a decade).

What accounts for this steady success?
New York: The US urban colossus

- The ultimate success of New York comes from its role as the center of the global trading network.
- Manufacturing, immigration and finance followed from maritime supremacy.
- NY is a living example of the importance of:
  - Agglomeration economies
  - Scale economies
  - Localization economies
  - Benefits from specialization
  - Transportation costs (first in manufacturing and now in information technologies)
  - “Idea city”.

Econ 137 - Summer 2007
New York: The US urban colossus
New York: The US urban colossus

- 1624-1790: The early city.
  - “A deep water port at the heart of the Hudson”. However, at that time, NY was not the most important port (Boston, Philadelphia, New Orleans).

- 1790-1860: The rise to dominance.
  - Population went from 33K to 813K.
  - Domination of American shipping and immigration (technical advantages of NY’s port, hub and spoke transportation network).
  - Explosion of manufacturing (sugar refineries, printing and publishing and garment industries).
New York: The US urban colossus

1860-1920: The immigrant city

- Population went from 813K to 7900K.
- Immigration encouraged by declining in both transatlantic and intra-city travel costs but still high inter-cities travel costs.
- Immigration encouraged by immigrant specific social and political infrastructure.
- Economically static structure and increase in the possibility of scale economies.
New York: The US urban colossus

  - Decline in inter-cities travel costs. Cars and trucks.
  - Collapse of local manufacturing.
  - Orientation towards finance and corporate management (encouraged by the existence of the port and related risk sharing of sea voyages).
  - High value of knowledge and easiness of information flow.

- Future of New York?
  - Reduction in the costs of exchanging information.
  - Face2face contacts.
  - Consumption amenities
New York: The US urban colossus

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>New York City, NY</td>
<td>6,930,446</td>
<td>-0.01</td>
<td>0.01</td>
<td>-0.10</td>
<td>0.04</td>
<td>0.09</td>
<td>8,008,278</td>
<td></td>
</tr>
<tr>
<td>Chicago, IL</td>
<td>3,376,438</td>
<td>-0.02</td>
<td>-0.05</td>
<td>-0.11</td>
<td>-0.07</td>
<td>0.04</td>
<td>2,896,016</td>
<td></td>
</tr>
<tr>
<td>Philadelphia, PA</td>
<td>1,950,961</td>
<td>-0.03</td>
<td>-0.03</td>
<td>-0.13</td>
<td>-0.06</td>
<td>-0.04</td>
<td>1,517,550</td>
<td></td>
</tr>
<tr>
<td>Detroit, MI</td>
<td>1,568,662</td>
<td>-0.10</td>
<td>-0.09</td>
<td>-0.20</td>
<td>-0.15</td>
<td>-0.07</td>
<td>951,270</td>
<td></td>
</tr>
<tr>
<td>Los Angeles, CA</td>
<td>1,238,048</td>
<td>0.26</td>
<td>0.14</td>
<td>0.05</td>
<td>0.17</td>
<td>0.06</td>
<td>3,694,820</td>
<td></td>
</tr>
<tr>
<td>Cleveland, OH</td>
<td>900,429</td>
<td>-0.04</td>
<td>-0.14</td>
<td>-0.24</td>
<td>-0.12</td>
<td>-0.05</td>
<td>478,403</td>
<td></td>
</tr>
<tr>
<td>St. Louis, MO</td>
<td>821,960</td>
<td>-0.12</td>
<td>-0.17</td>
<td>-0.27</td>
<td>-0.12</td>
<td>-0.12</td>
<td>348,189</td>
<td></td>
</tr>
<tr>
<td>Baltimore, MD</td>
<td>804,874</td>
<td>-0.01</td>
<td>-0.04</td>
<td>-0.13</td>
<td>-0.06</td>
<td>-0.12</td>
<td>651,154</td>
<td></td>
</tr>
<tr>
<td>Boston, MA</td>
<td>781,188</td>
<td>-0.13</td>
<td>-0.08</td>
<td>-0.12</td>
<td>0.02</td>
<td>0.03</td>
<td>589,141</td>
<td></td>
</tr>
<tr>
<td>Pittsburgh, PA</td>
<td>669,817</td>
<td>-0.11</td>
<td>-0.14</td>
<td>-0.17</td>
<td>-0.13</td>
<td>-0.10</td>
<td>334,563</td>
<td></td>
</tr>
<tr>
<td>United States</td>
<td>151,325,798</td>
<td>0.19</td>
<td>0.13</td>
<td>0.11</td>
<td>0.09</td>
<td>0.13</td>
<td>281,421,906</td>
<td></td>
</tr>
</tbody>
</table>

Note: All data comes from U.S. Census of Population.
Questions for Lecture Notes II

- Why do we observe cities with different size?
- Why do we observe cities of different type?
- How cities have an impact on income and employment growth?
Practice Exercises - Lecture Notes II

O’Sullivan

- Chapter 4. Exercises 2, 3 and 5.
- Chapter 5: All exercises.