



Urban and real estate economics

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Course Material Developed by Department of Economics,

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Urban and real estate economics

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Week 3

Why do cities exist?

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1. Importance of location

What does the value of real estates depend on?

- Lesson learnt on the 1st week: the three most important factors that determine the attraction of a real estate is:

location, location, location

Location-related parts

- From week 3 to 7 we will deal with location
- Week 3: concentration in space: cities
- Week 4: size of cities
- Week 5: Ricardian rent, pull to the centre
- Week 6: equable berth (mutually repulsive forces)
- Week 7: further space patterns in urban regions

2. The mysterious existence of cities and their growing role

Not a simply explicable observation

- Cities exist: In some geographic locations people live in a denser, dirtier and noisier place than elsewhere.

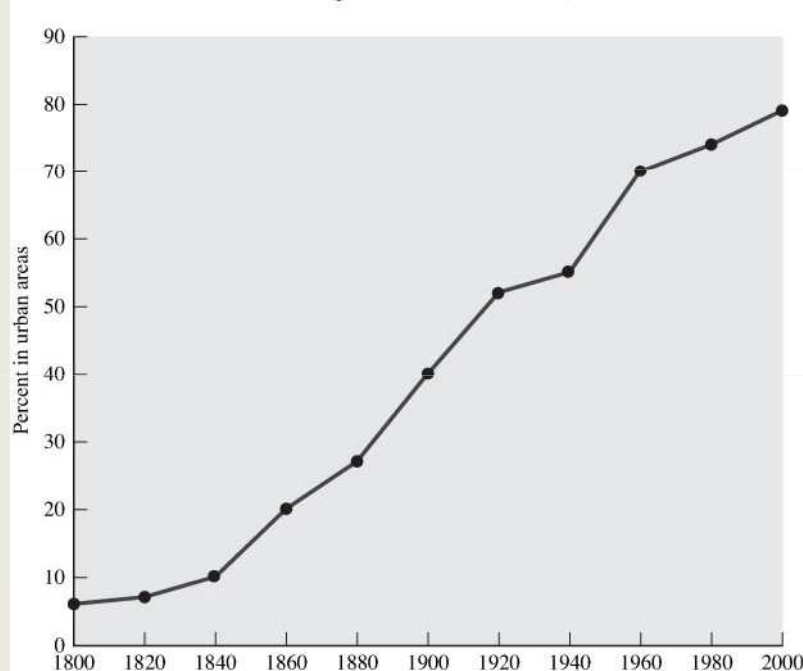
<http://freakonomics.blogs.nytimes.com/2011/02/14/to-get-america-growing-again-its-time-to-unleash-our-cities-a-guest-post-by-ed-glaeser/#more-52063>

- Explanation

Cities come into existence because we are not self-sufficient. If everybody could produce their own needs, we wouldn't have any reason to live in crowded cities.

Role of cities

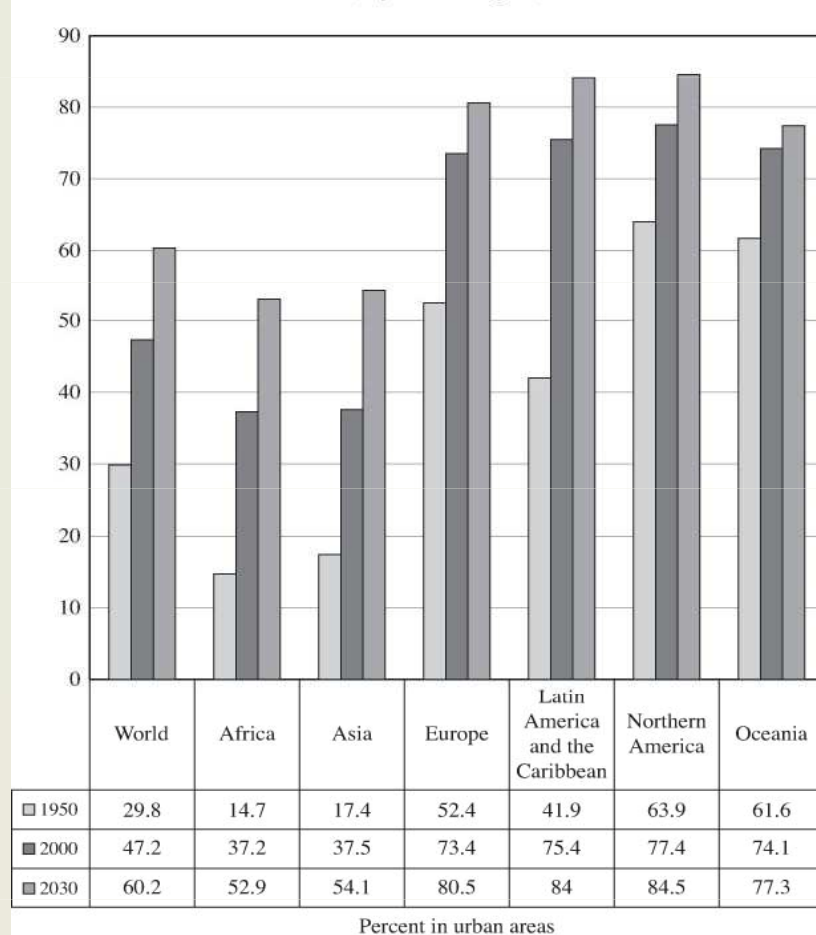
FIGURE 1-1 Percent of U.S. Population in Urban Areas, 1800–2000



In 200 years the proportion of city-dwellers rose dramatically.
(Figure: O'Sullivan)

Role of cities

FIGURE 1-2 Urbanization Rates, by World Region, 1950-2030



Source: United Nations: World Urban Prospects, 2001 Revision.

- In the developed world the proportion of city-dwellers is higher (Figure: O'Sullivan)

Role of cities

- In the database of World Bank we can find a lot of information about cities

<http://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS/countries/1W?display=graph>

3. Explanations for the development of cities

The reasons for the development of cities

- Indirect way of thinking: upon the realization of following conditions, cities wouldn't come into existence
 - equal productivity
 - constant returns to scale (= no scale efficiency) in exchange
 - constant returns to scale (= no scale efficiency) in production

Consequence of the conditions

- **Equal productivity**

There is no need to trade, everybody can produce their own needs.

- **Constant returns to scale (= no scale efficiency) in exchange**

It is no use trading goods in bulk, everybody can trade whenever they want.

- **Constant returns to scale (= no scale efficiency) in production**

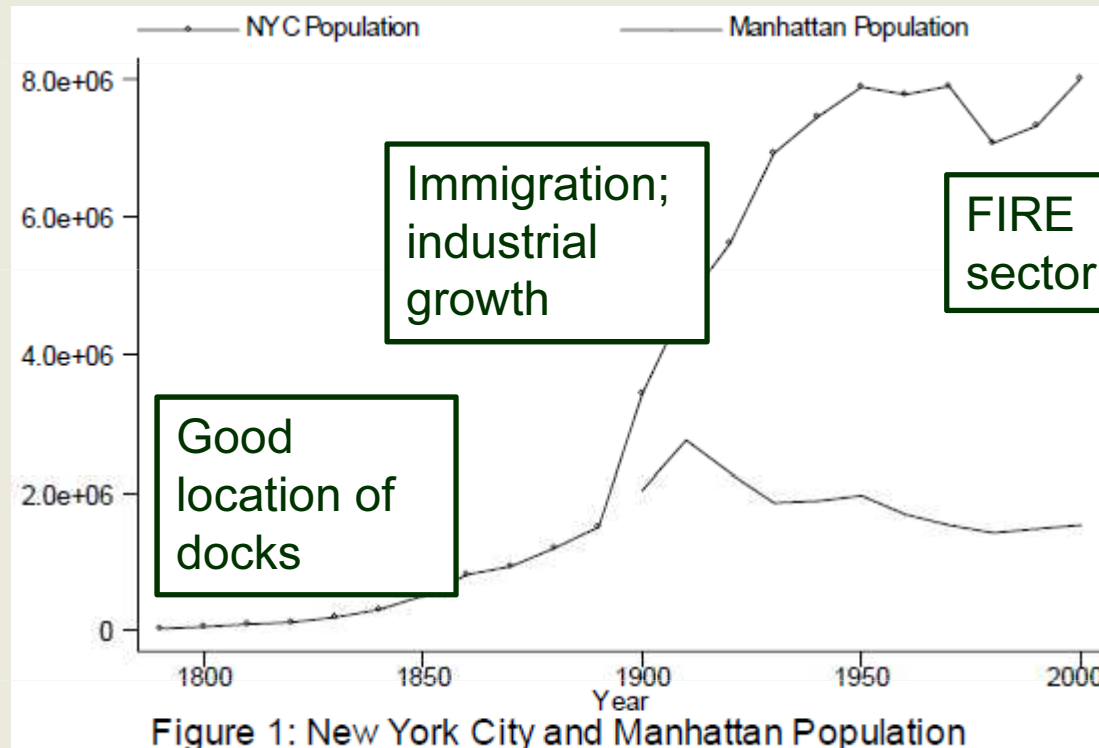
It is no use producing goods together, everybody can produce for themselves.

Trading towns

- If it is worth trading and the trade meets the requirements of scale efficiency, the producers will think it is worth paying for the merchants' services.
- The merchants settle down in central areas

Give some examples for trading towns!

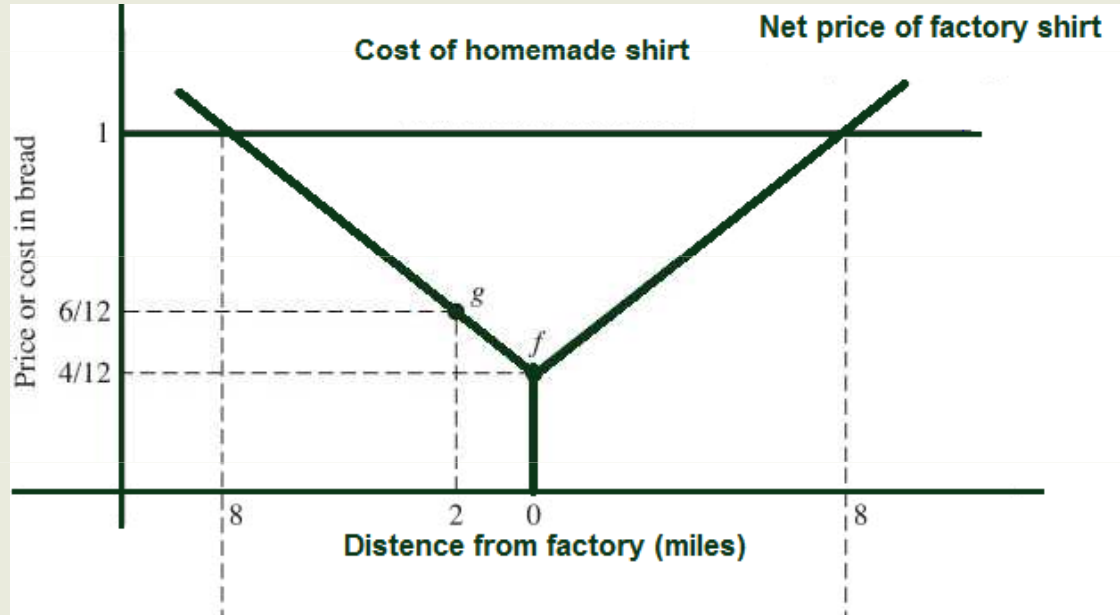
Edward Glaeser: Urban Colossus: Why is New York America's Largest City?



Factory towns

- Let's suppose that the production is scale-efficient!
- One worker at home can produce one shirt or a loaf of bread in one hour.
- One worker in the factory can produce three shirts in one hour.
- The cost of commuting to work and home is $1/12$ loaf of bread per mile
- Who will buy the shirts made in the factory?

Who will buy the shirt made in the factory?



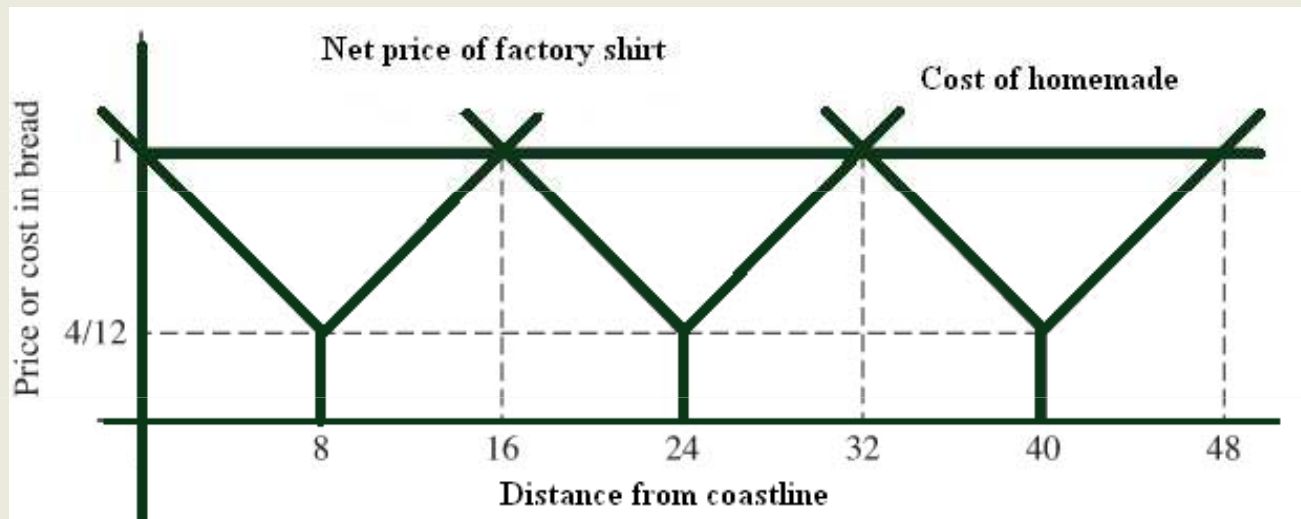
Market area of factory (O'Sullivan, Figure 2-1)

The net price of a factory is the factory price ($1/3 = 4/12$ loaf of bread) plus transport cost ($1/12$ loaf per round trip mile). The market area of the factory is the area over which the net price of a factory shirt is less than the cost of a homemade shirt (one loaf).

Location of factory towns

- Based on argument above where will factories settle down in a 48 mile wide region?

Distribution of towns in the region



System of factory towns (O'Sullivan, Figure 2-2)

Each factory's market area is 16 miles wide, so a system of factory towns develops with a distance of 16 miles between towns. In this equilibrium, workers specialize, with shirt workers in towns and bread producers in rural areas between towns.

Old and new economic geography

- According to the former explanations cities come into existence even if there is no specific geographical feature around. Finding the reasons is the invention of the new economic geography.
- The old one could always come up with explanations by using the geographical diversity.

Can you give examples?

Towns established near energy resources

- If the cost of transportation of raw materials to processing plant is significant, towns will come into existence near the resources.
- A typical example is the sugar production. Only 15% of the sugar cane will be sugar so sugar factories will settle down near the sugar cane plantations.

One product – one input model

- P : product price in point M
- q_i : the raw material we need to produce one unit of product
- a : transportation cost of raw material (q_i) per km
- b : transportation cost of product per km
- w : workers' wage
- L : amount of labour needed to produce one unit of product
- R : price of raw materials in point I
- x : transport distance of input
- y : transport distance of output
- $z=x+y$: the distance between I (input exploitation place) and M (product application place)

One product – one input model

- Manufacturer's profit
 $pQ - q_I RQ - wLQ - Q(q_I ax + by)$
- Profit maximum condition

$$MR = p + Q \frac{\partial p}{\partial Q} = q_I R + wL + q_I ax + by = MC$$

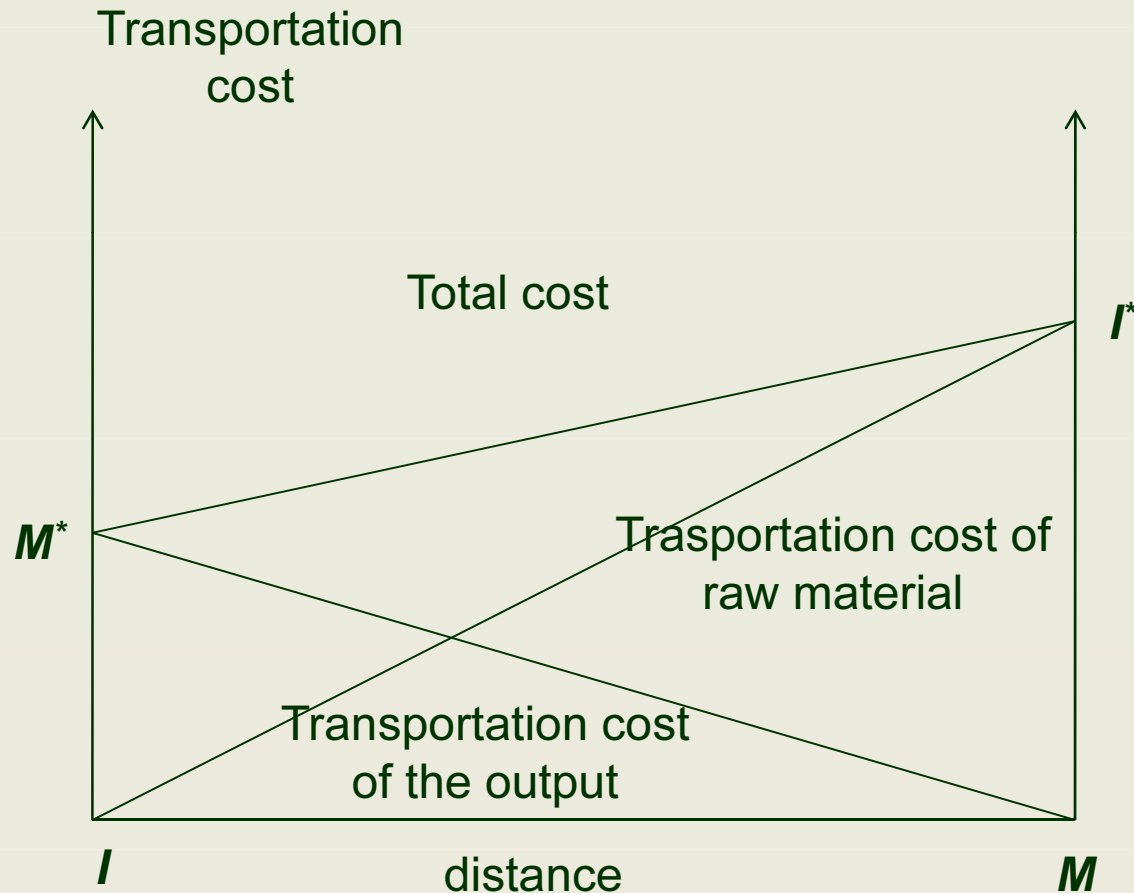
- To minimize the margin cost (MC) by choosing the company seat

$$MC = q_I R + wL + q_I ax + by$$

$$MC = q_I R + wL + q_I ax + b(z - x)$$

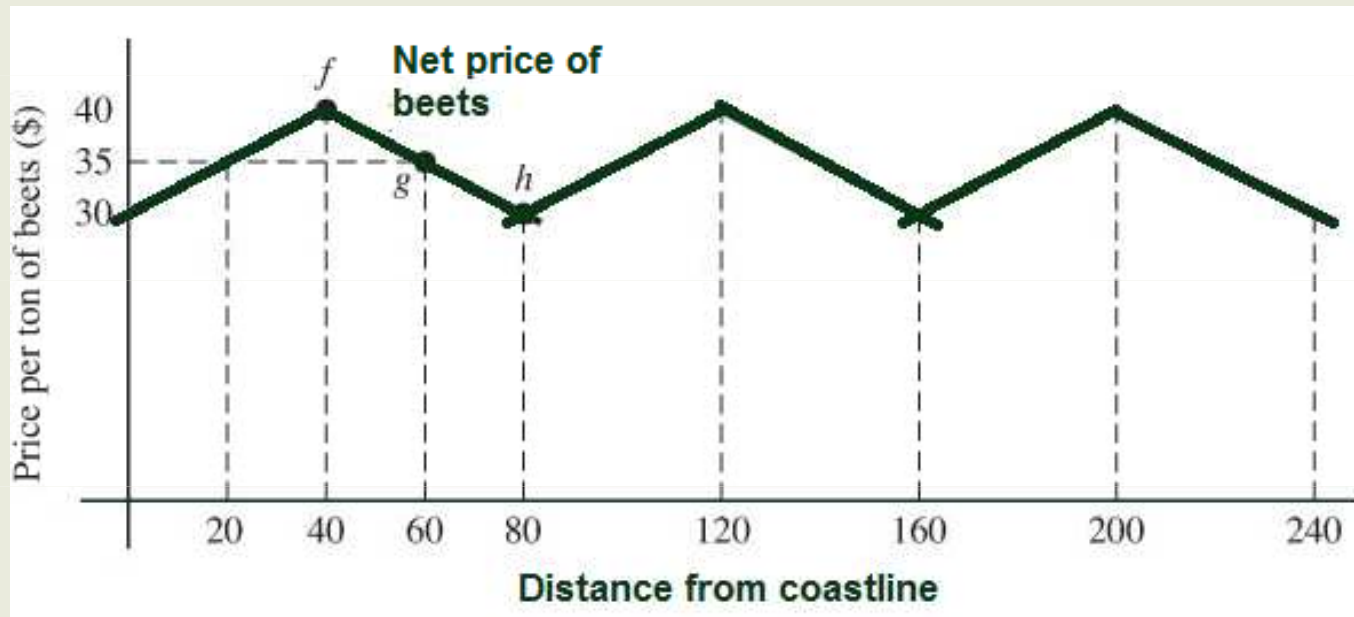
- If $q_I a > b$ then the transportation of the product as raw material is more expensive, so with a higher x the MC grows, thus it is worth settling down near the source of raw materials

One product – one input modell



In this case the transportation cost of the product as raw material is higher so the total cost of transportation can be minimalized if the production settles down near the source of the raw material

Distribution of the cities in the region



System of Processing Towns (O'Sullivan Figure 2-3)

The net price of beets (received by farmers) decreases as the distance to the processing plant increases. The market area of the typical sugar-beet processing plant is 80 miles wide, so a system of processing towns develops with a distance of 80 miles between them.

Task: beer and wine

- Breweries are usually established close to their customers while wineries settle close to the raw materials they use and away from cities.

Why? What could be the reason?

- Consider a 120-mile-wide linear region. Beer consumers are equably distributed in the region while the grape grows in the west part of the region in equable distribution. In the region there are two breweries and two wineries.

Where do they settle?

Task: beer and wine (help)

- Brewery: how can we minimize the transportation cost of beer to all the customers?
- Winery: how can we minimize the transportation cost of grape to the winery?

Note

- Cities can rise for many other reasons, of course.
- Geographical, religious and protective roles could all lead to the rise of cities

Thanks for your attention!

Curriculum

- Arthur O'Sullivan [2009]: *Urban Economics*. Chapter 1-2.
- John F. McDonald – Daniel P. McMillen [2007]: *Urban Economics and Real Estate (Theory and Policy)*. Appendix to Chapter 3.

Further readings

- Edward Glaeser: Urban Colossus: Why is New York America's Largest City? *NBER WP* No. 2073. June 2005.