Urbanization in a Global Economy

James Mirrlees

Chinese University of Hong Kong

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Travel

- Travel and transport are major sources of pollution and other externalities.
- Not just (or mainly) atmospheric, also, e.g., congestion, noise, injury.
- The externalities are direct, and indirect from inputs into the production of travel.
- Obvious answer: tax.
- The social cost varies greatly with time, type, and place. E.g. congestion at rush hour.

Size of social cost

- Estimates of the cost of congestion on major roads of cities at peak are very high.
- Each minute you spend driving there adds a little to the time many others take travelling.
- If you drive a petrol-car, it adds to greenhouse gases in the atmosphere.
- And you have an increased risk of accident.
- An algorithm to calculate tax at each place and time is needed.
- Even a small positive tax can be unpopular.

Second best

- Therefore we look for second-best policies.
- Some, like vehicle regulations and checks are needed anyway.
- But it is not clear there are rational calculations behind the regulations created.
- Subsidies for R and D are often recommended, and introduced.
- They can lead to wasteful spending. It is low use that needs corrected. More later.

Indirect Reduction of Demand for Travel.

- Another second-best set of policies come from asking what generates demand for travel and transport.
- Distance of home from work; affected by choice of where to live, and producer's choice of scale and location.
- Distance of home from production of consumer goods and services.
- Ask then: what is optimal urban geography?

Methodology

- Since it is messy to model cities (or even villages) with adequate precision, we construct simplified models.
- We ask, for these imaginary little worlds, what would be optimal.
- Then apply the same recommendations tentatively to reality.
- And try to think whether it really makes sense.

The Optimum Town

- Imagine a town with central employment (the CBD). Workers each choose home, a plot of land. Utility depends on the area of home, the distance from the centre (because of commuting costs), and the local population density (because of noise, aesthetics, security).
- Land price depends on distance from the centre. With unequal incomes, sort by distance, but it's ambiguous which way.

Travel subsidy

- If people prefer to have a lower local density, one way of achieving the optimum is by a subsidy to travel.
- People would live further from the centre the higher the subsidy, reducing density and increasing utility.
- The other reasons for taxing travel remain.
- The optimum can also be achieved by housing estates, which may have other advantages.

Other uses of the Model

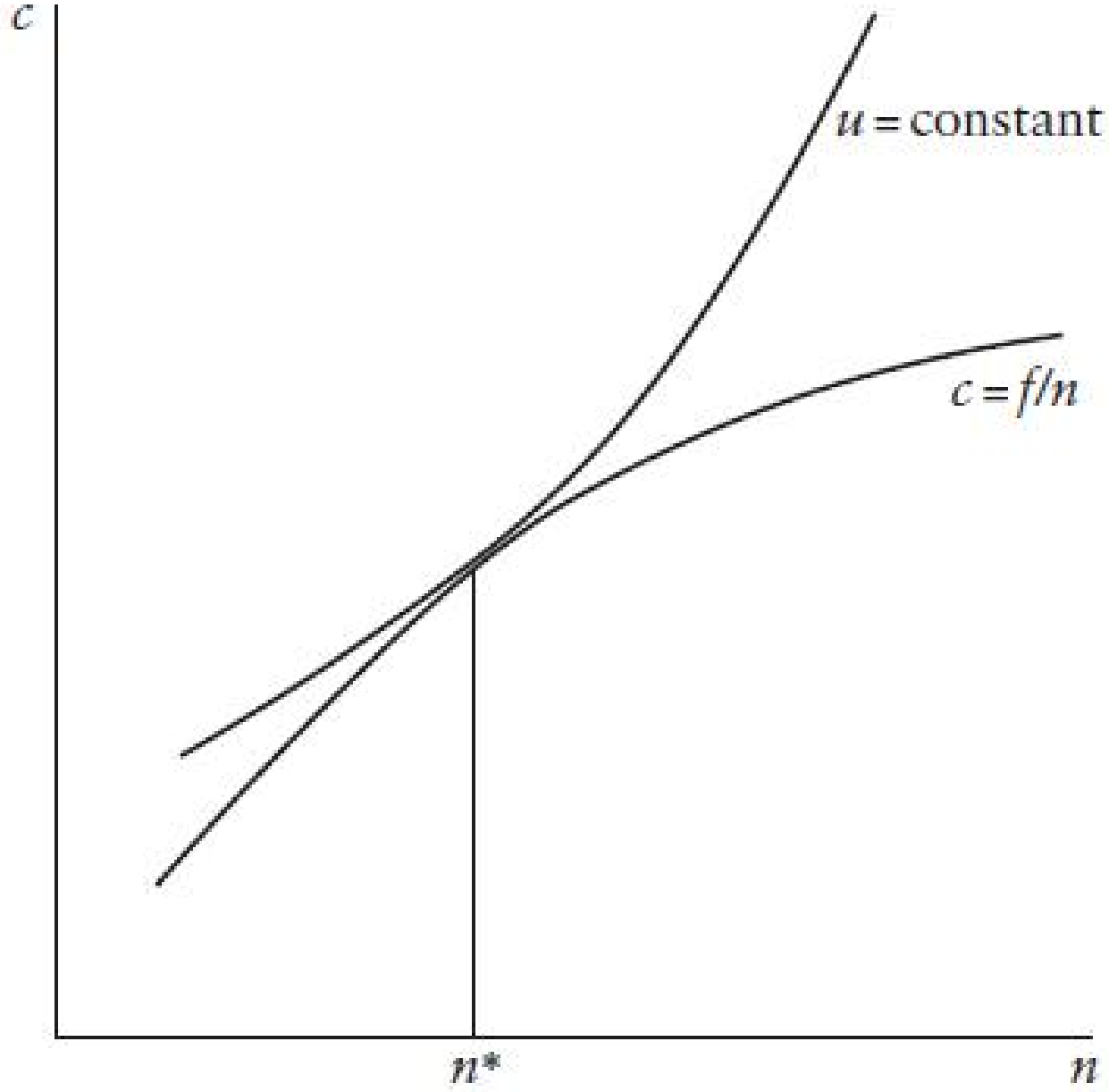
- Interesting to see if rising numbers in a town would increase land price, and by how much.
- In the simplest case, the circular town, land price should rise less than proportionately to numbers.
- But it should rise, perhaps faster if wages are rising too.
- Do not automatically blame speculation!

Geography with Economies of Scale.

- Urban areas maybe first happened for security. But even that arises from economies of scale.
- The total externality from travel in traditional rural areas seems very low.
- It is urban development that introduces travel and transport with significant external costs.
- Because economies of scale are substantial.
- What can we say about the optimum?

Optimum Scale

- The simplest case: production is $f(n)$, where n is number of workers in the firm.
- There are many producers.
- A worker's utility is $u(c, n)$, where consumption c comes from distributing production.
- The optimum is shown in the next slide.
- It is equilibrium if the firm has to pay a wage given by $u(w(n), n) =$ opportunity utility.


c
u = constant
c = f/n
n*
n

Demand-limited Production

- This result holds only when optimum scale is (much?) below demand for product. Aircraft are an example of demand-limited scale.
- The most interesting example is invention, where the marginal cost of using new knowledge is zero.
- Optimum use is demand at a zero price.
- How implement? Use-proportional subsidies, with small standard royalty?

Multiple goods

- Cities produce many different goods and services.
- Typical case: export goods, with significant economies of scale, and non-traded goods for city residents.
- Many export goods also, because of available infrastructure. And there may be external economies among them.
- Is this suboptimal?

Overemployment

Suppose firm i produces $f_i(n_i)$, employing n_i people. The wage is determined by $u(w, \Sigma n_i) = U$. n_i maximizes

$$f_i(n_i) - w(\Sigma n_i)n_i, \text{ given the other } n_j.$$

Then we do not get the optimum : for that, we should maximize $\sum [f_i(n_i) - w(\Sigma n_i)n_i]$.

There is an external diseconomy here. Employing more workers increases the wage to all other producers. The marginal cost of employment is below the marginal social cost.

Optimum Size of Cities

- Most large cities suffer from atmospheric pollution, and congestion. Thus, in the model, the wage increases with the size of city.
- In this simple model, each city in the country is too large. There are too few cities.
- This looks like a real phenomenon.
- The implied policy is marginal taxation of employment.
- One can argue low-wage labour should be subsidized, on distributional grounds!

Politics

- Cities are created as a political act, and their growth is influenced by political decisions, such as planning permissions.
- Why do city administrations want their cities to grow?
- Is city autonomy undesirable? If so, what incentives might be employed to encourage socially desirable reform?

Adjustment

- Urban geography is famously an example of the influence of history on the present.
- There are costs in creating new urban centres, and of moving populations.
- Set-up costs of new cities (or towns) are neglected in the models used. What does that imply for reformist policies? Should the conclusion be modified?