

# Geographical Economics Winter 2014/2015

## Assignment 2: Due by December 28th 2014

### **General information**

**This problem set MUST be solved individually. Each student MUST turn in the copy of the**

**solution on paper support. Do not forget to identify at the beginning of each page.**

**There are not specific requirements about the format (font, lines etc) of the document students are expected to turn in.**

**The solution of this assignment MUST be turned in my office by 12 p.m.. (B3-0114)**

**1. Suppose that country L has a plentiful supply of labor (and low wages) but a relatively low supply of raw materials. In contrast, H has a plentiful supply of raw materials, but a relatively low supply of labor (and high wages). The two countries are separated by a mountain range that makes travel between the two countries prohibitively costly. Suppose that a weight-losing product is initially produced in H (close to the supply of raw materials). Suppose that a tunnel is bored through the mountain, decreasing the costs of shipping raw materials and output between the two countries. Assume that laborers do not migrate from one country to the other.**

**a. How will the tunnel affect the location choices of weight-losing firms?**

The tunnel means a reduction of transport costs. Now the weight-losing firms of H can relocate to L to take advantage of the lower labor cost. The firms can transport the raw material from H to L because the sum of labor costs and transport cost is the lowest in L.

**b. How will the tunnel affect wages in the two countries?**

Wages are higher in H than in L. After the tunnel is bored the effect of the relocation of firms from H to L is changing the demand for labor between both countries. The increase in the demand for labor in L will drive up the wages in L, reducing the initial wage differential between both countries

**c. How might this analysis be used to explain (1) the shift in manufacturing from the United States to East Asian countries and (2) the narrowing of the wage differential between the United States and East Asian countries?**

The dramatic reduction in transportation costs had the effect of attracting production of US companies to low wage countries in East Asian countries. Now these firms could move around inputs and output while benefiting from the low labor cost of those countries.

The increase of labor demand in EA countries and the corresponding decrease in US had the effect of reducing the wage differential in the case of unskilled labor.

**2. The firms of an industry produce a consumption good in a market in perfect competition. They use an intermediate good to produce the final good. The production of the intermediate input is subject to the following function of total costs:  $TC(x) = 4x$  where TC is the total cost of producing the intermediate inputs and x is the quantity produced of the intermediate input.**

**Discuss if the firms of the final good will have incentives to agglomerate in a cluster to benefit from the joint use of the producers of the intermediate input.**

In order to have an incentive to agglomerate final good firms, need a technology of the intermediate good firms with increasing returns to scale (economies of scale). As more final good firms agglomerate in a cluster the more efficient intermediate good producers will be because of the reduction of average cost.

In the problem the total costs of the producers of the intermediate is  $TC(x)=4x$ . This implies that the average cost is  $AC=TC(x)/x=4$ . That is the average is constant so that the can't generate economies of scale. The concentration of final good producers will not result in a decrease of the average cost. Final good producers will not benefit from joint use of the producers of the intermediate good.

**3. Explain why product differentiation favors the agglomeration of firms producing the same type of good**

Product differentiation allows deviating competition from price towards quality or other type of non-price competition.

The spatial concentration of firms producing the same type of good would lead to increase the price competition between them as we saw in the Hotelling model. The way

to avoid this problem was for firms to use product differentiation. By using this strategy firms could locate in the center of the market without undermining profits.

#### **4. Why small and medium size cities tend to be specialized in some tradable product?**

If agglomeration economies are location economies, that is, firms benefit only from the concentration of firms in the same activity, the location of firms of different industries will not generate benefits across industries. Instead, the larger number of firms will increase the costs of agglomeration.

As a result, the most efficient equilibrium for a small or medium size city is to specialize in one type of industry. But this is only true in the case that agglomeration benefits have an intraindustry nature.

#### **5. Imagine that you want to estimate an equation like the following:**

$$\ln w_{cs} = \alpha + \beta \cdot denemp_c + \varepsilon_{cs}$$

**where  $w_{cs}$  is the average wage in local area c and sector s**

**$denemp_c$  is the employment density in local area c**

**Explain:**

**a) Why should be expected a relationship between wage/productivity of a local area/sector and employment density of the area.**

Because density is a measure of agglomeration that is related to the generation of the effects of agglomeration that increase productivity and wages in a region or city.

Density is related to the generation of both pecuniary and technological externalities in affecting the price of the output through higher or lower competition, the price of the non labor inputs (land,...). But density also affects learning effects due to the facilitation of interactions between firms and workers.

That is why we could expect a significant relation between density and wages/productivity across space.

**b) Suppose that you run a regression and find a negative sign of  $\beta$ . How would you interpret that negative sign?**

A negative sign would imply that the congestion effects of agglomeration (higher land costs, pollution, traffic congestion,...) outweigh the positive effects. The  $\beta$  is measuring a net effect