DUSP 11.202 Frank Levy
Planning Economics Session 5

Problem Set 2:
Answers Due Session 6

1) There are at least three alternative theories of city formation: Random Growth Theory, Increasing Returns Theory, and Natural Advantage Theory.

(a) For much of the last century, the main migration routes within the U.S. have been from the North and the East to the South and the West. In the 1950 Census, Phoenix, Arizona ranked as the 99'th largest city in the U.S. In the 1990 Census, Phoenix ranked as the 9'th largest city in the U.S. Over the same time, Boston dropped from 8'th to 20'th and Providence dropped from 37'th to 100'th. Explain which of the theories most likely explains Phoenix' rapid rise in the population ranks. If you choose something other than Marshall's three reasons, explain what if any role the three reasons play in your story.

(b) Over time, technology can cause a location's characteristics to become more or less of a "Natural Advantage". Discuss at least two examples of technology that might help explain the shifts in population ranking described in (a) above.

2) Software firms thrive on two things: the free exchange of information, including information exchanged among firms, and a large degree of informality. The need for informality means that software firms are most productive when they are small. As the firm grows large and becomes bureaucratic their innovation often dries up.

a) Consider the following production function for an individual software firm:

$$Q_j = 5K_j^{.6}L_j^{.5}I^{.3}$$

where: K = the j'th firm's capital, L = the j'th firm's labor, and I represents the sum of all ideas produced by the j'th firm and all other software firms that lie within a twenty mile radius of the firm. In this radius, ideas are informally exchanged through cocktail parties conversations, employees changing jobs, etc.

Is this production function a good representation of the typical software firm described at the beginning of this question? If not, how would you change the production function to better fit the description?

b) Consider the following quote. "If software firms work best when they are small, a state economic development agency should not rely on software firms as a source of employment. Rather, the development agency should accept the fact that the software industry will consist of many small firms spread out over the United States such that no one state will have very many of them."

Explain why this statement is or is not consistent with the description of the typical software firm that opened this question.

3) A byproduct of the Tiebout hypothesis is Tiebout Sorting, a process in which households sort themselves into communities that best fit their taste and income. For example, a town with high taxes and high school expenditures might be very attractive to a family with young children but might be unattractive to a retired couple.

During the 1990s, a number of states undertook dramatic K-12 educational reforms that usually involved two components. One was a substantial increase in targeted state aid to raise school expenditure in the poorest districts and lower spending gaps between poor and rich districts. The second component was a set of standardized tests given to all children in selected grades – e.g. grades 3, 6, 9 etc.. The results of the tests were publicized to allow parents to see how their child and their child's school was performing relative to the rest of the state.

What relevance, if any, does each of these components have on Tiebout Sorting?

4) On many college campuses, the student center contains a small grocery store who leases the space from the college. Food prices in this store are often far higher than average food prices in the surrounding county – e.g. a box of Kellogg's Corn Flakes for selling for $6.29 in the student center versus an average $4.50 in the rest of the county.

a) Carefully explain the relevance of the monopolistic competition model to this example. Does the example fit the monopolistic competition model in all respects? If not, explain where the differences lie.

b) Do you believe that the $6.29 price for corn flakes generates a profit? If so, who is likely to get the profit?

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