

#15 ps

BINGHAMTON UNIVERSITY
COMPREHENSIVE EXAMINATION IN URBAN ECONOMICS
FALL 1999

ANSWER QUESTION 1 IN PART I. THEN CHOOSE THREE MORE QUESTIONS FROM PARTS II AND III. AT LEAST ONE QUESTION MUST BE CHOSEN FROM PART II AND AT LEAST ONE FROM PART III.

PART I—EVERYONE MUST ANSWER QUESTION 1.

1. Assume that all residents are employed at the city center, all residential locations are identical except for distance from the center (r), resident utility depends on consumption of a composite good (z) and residential lot size (s), and the budget constraint for a given resident is $Y = tr + R(r)s + z$, where Y is income, t is commuting cost per mile between home and the central workplace, and $R(r)$ is residential land rent at distance r . The price of the composite good is assumed equal to 1.
 - A. Define (in words) what is meant by a resident's bid rent.
 - B. Write down an equation that describes the bid rent, and either derive it mathematically from the information about residents given above or describe in words how it is derived.
 - C. Identify the sign of the slope and describe the curvature of a resident's bid curve with respect to distance from the city center, and explain the reasons for both. A mathematical derivation may be part of your answer, but also give a verbal explanation.
 - D. Explain why each resident has a family of curves relating his bid to distance from the center, rather than just one.
 - E. Explain how the resident's family of bid curves can be used to identify his maximum-utility equilibrium location in an urban area where the market land rent is given exogenously as $R(r)$.
 - F. What is meant by bid steepness, and how can it be used to predict which of two residents will have an equilibrium location closer to the center?

PART II-ANSWER AT LEAST ONE QUESTION IN PART II.

2. Answer both parts of question 2.

A. In early 19th-century cities, when everyone traveled between home and work on foot, high-wage workers with jobs in the city center lived as close to the center as centrally employed workers with lower wages, or closer. Once mass-transit was introduced as an alternative to walking, centrally employed workers lived farther from the center the higher their incomes. Use an economic analysis to explain the change in residential choices.

B. Today, nearly everyone drives to work. In cities that were developed after automobiles were introduced, there is no strong relationship between the residential choices of centrally employed workers and their incomes, but in cities that were already large before the automobile, centrally employed workers continue to live farther from the center the higher their incomes, even though everyone drives to work. Assuming that workers' tastes do not differ among cities, use an economic analysis to explain the differences in residential patterns between new and old cities today.

3. Consider an economy of identical workers living in different urban areas among which they are costlessly mobile. The equilibrium number of workers in urban area j (N_j) depends upon earning opportunities there (w_j), quality life (E_j), and the level of well-being available elsewhere in the economy (u): $N_j = N(w_j, E_j, u)$. Employment in the area is provided by identical competitive firms in long-run equilibrium that are all located at the city center, ship outputs to national markets, and use only labor in production. Assume that after paying shipping costs from urban area j to national markets, a firm receives $(p-t_j)$ per unit of output, and that each firm's production function in urban area j is $z_j = a_j n_j$, where p is price per unit of output, t_j is transportation cost per unit of output from area j to the national market, z_j is firm output in urban area j , a_j is output per worker in area j , and n_j is number of employees. These assumptions are those used by Fujita in his discussion of systems of cities in Chapter 5.

A. Now consider a second urban area k that is identical with j except that the government in k taxes resident incomes at the rate of τ , so that the wage received by residents is $(1-\tau)w_k$ and the equilibrium number of workers is $N_k = N[(1-\tau)w_k, E_k, u]$. Explain whether, how, and why the long-run equilibrium wage, industry output, industry profit, and number of residents in k will differ from j . Using a bid-rent model of the urban land market, explain whether, how, and why residential land rent, residential density, distance from the center to the edge of the urban area, and resident utility will differ between j and k .

- B. It is often argued that high taxes, whether on businesses or households, depress the level of economic activity in urban areas. Explain whether and why your analysis in (A) supports this argument.
- C. In the model you present in (A), who has the strongest incentives to persuade government officials to lower the tax—residents, business firms, or land owners? Why?
4. Consider an urban area in which all jobs are concentrated at the city center, and households maximize utility, $u = U(z, s)$, subject to the budget $Y = z + R(r)s + tr$, where z is the composite good with price = 1, s is residential lot size, Y is household income, $R(r)$ is land rent at residential distance r miles from the center, and t is commuting cost per mile between home and the central workplace. Assume land to be a normal good and all households to be identical. Use a bid rent model of urban residential equilibrium to explain whether and how residential land rent, the distance between the center and edge of the city, the number of residents, residents' utility, and residential density will change if technological change causes a rise in resident incomes in each of the following circumstances:
- (a) The urban area is a very small one in an economy the rest of which is rural and within which there is free and costless mobility between rural and urban areas.
 - (b) All people in the economy live in the urban area.
 - (c) The urban area is a large one in an economy the rest of which is rural, and migration to the city drives up rural wages and utility levels.

PART III—ANSWER AT LEAST ONE QUESTION IN PART III.

5. Write an essay that discusses the role of agglomeration economies in recent urban economic analysis. Describe the different causes of agglomeration economies that have been suggested and the different ways they may affect productivity; discuss why their presence or absence has important implications for the future of large urban areas; comment on the existence or lack of consistent empirical support for agglomeration economies of various kinds (a non-technical summary of research findings, not a technical discussion of modeling techniques, is all that is needed here); and evaluate the relevance of agglomeration research to discussions of the future of central cities, rather than entire urban areas.

6. Discuss in detail a research paper on the effects of agglomeration economies on urban areas. Your discussion should address in detail the objective of the study, the research design, the results, and any shortcomings of the research design that weaken the credibility of the results.