Economics 301
Problem Set due November 10, 2023 Upload your answers to canvas

1) One million people live and work in a city, which is arrayed on a line segment. The feasible population density in the city is 100,000 per mile. All of the work occurs downtown, which we label as point zero. Commuting in this city requires T units of time per mile traveled.

The city borders a vast farmland, where the daily land rental rate is $100{,}000a$. That is, a farm owner would accept converting a mile of his farmland to 100,000 residences if each resident paid daily rent of a.

The population consists of low- and high-skill workers, with time values w_L and w_H, respectively. The time units for wages are the same as for commuting. Consumers treat commute time as equivalent to work time in terms of the value forgone opportunities for leisure or household production.

a) What is the equilibrium residential rental rate downtown?

b) How would the downtown rental rate be affected by an increase in population? Does it matter whether the new city residents are low- or high-skill?

c) At a time when the city population was one million, an ordinance was passed limiting residential density beyond mile 9. We model regulatory stringency as a parameter $\tau \in [0,1]$, with regulation limiting density to $100{,}000\,\tau$ per mile. How are the different types of workers harmed by this regulation?

d) Aside from the workers, who might benefit from the land use restriction? How does the dollar amount of their benefit compare to the cost to workers?

e) The regulatory beneficiaries are loosely organized to pressure the city government to tighten the regulations, or at least refrain from loosening them. They spend $B \geq 0$ in such lobbying. Likewise, the workers are loosely organized and spend $A \geq 0$ trying to convince the city government to do the opposite. The policy outcome is $\tau = A/(A+B)$. Each group understands how their lobbying affects the policy outcome. They take the other group's spending as given. What factors would each group take into consideration when deciding how much to lobby?

f) How would population growth affect the equilibrium land use regulation? Does it matter whether the new city residents are low- or high-skill?

g) How might the function mapping lobbying to policy be different if the beneficiaries were better organized?

2) *True, False, or Uncertain*: In a city with rent control – a law that puts a maximum on what landlords can charge for housing – an increase in resident's incomes would exacerbate the housing shortage rather than increasing the quantity of housing.