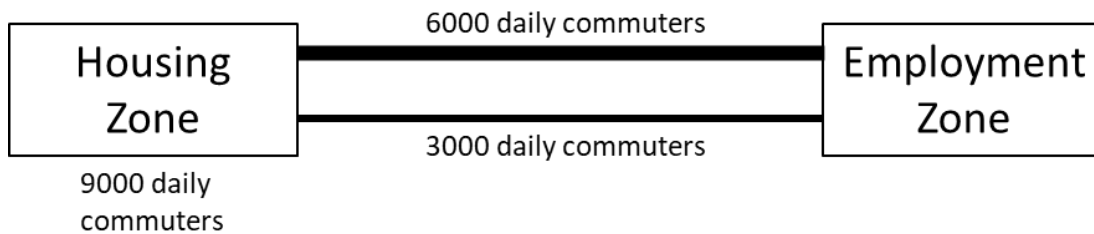


Problem Set #4 (Optional, exam prep, due 03/20/2024 by 12:05p at final exam, in my mailbox Urban 350, or via email; if submitted will replace lowest PS 1-3 grade, leave)

For full credit, please show your work!



You've just been appointed by the new Mayor of Commuter City, a town full of unhappy nine-to-fivers, to lead a special task force with a mandate to reduce congestion on the city's expressway. The town charter makes things especially difficult, since it forbids any mixing of land uses (including working from home!), and all undeveloped areas are part of a nature preserve.

Currently, 9,000 daily commuters slog the 10 miles to work: 6,000 on the expressway (free flow speed 60 mph) and 3,000 on a surface street (free flow speed 45mph). Since the last mayor's disastrous "A Car for Every Commuter!" program, travel speeds during peak periods have dropped to 30mph on both routes. The faded town slogan "Home of the 10 minute commute" has become a mockery. Answer the following questions about Commuter City and its options.

1. In the box below, carefully plot plausible curves for Commuter City Expressway peak hour auto travel, including: current demand, generalized marginal private cost (MPC), and generalized marginal social cost (MSC. Be sure to label current quantity (Q), and the resulting dead-weight loss area (DWL).

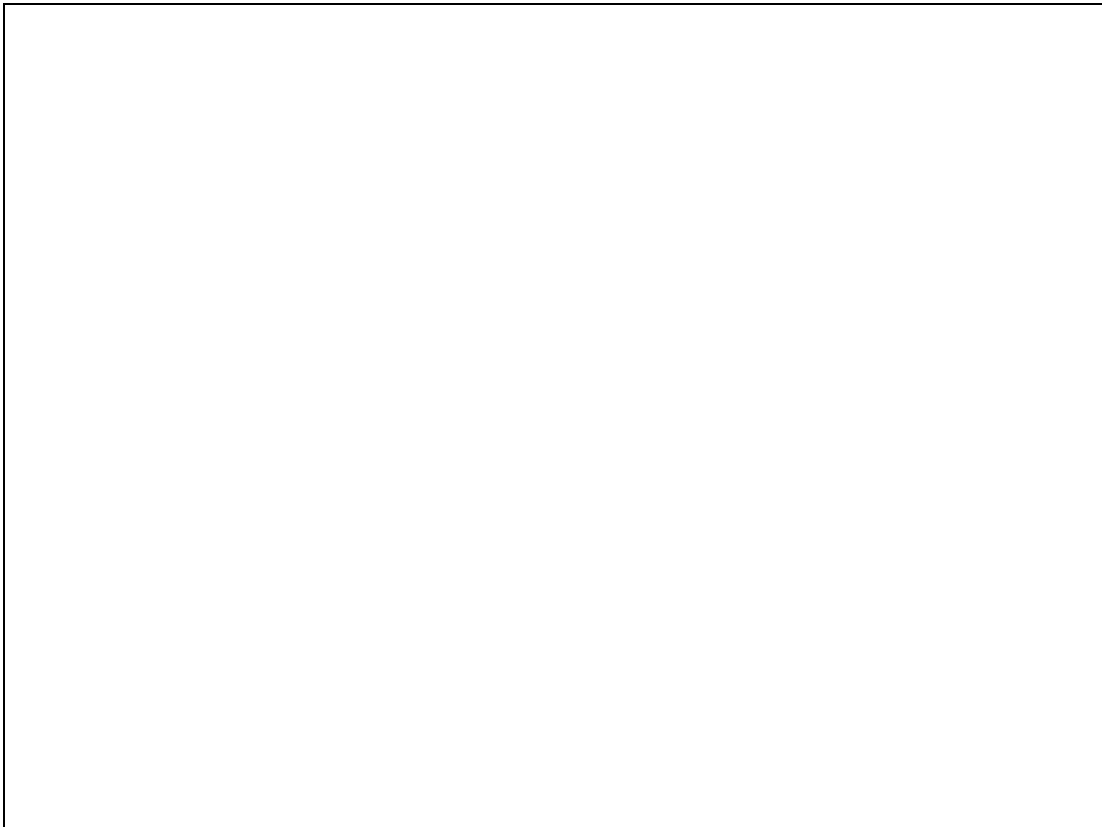


2. What does the generalized marginal private cost, MPC, represent?

3. What creates the gap or wedge between MPC and MSC represent?

4. What does the DWL area represent?

5. Re-sketch your plot from (1) above, this time showing how your task force might implement optimal peak period congestion pricing on the expressway. Ignore the surface street for now, and don't worry about numbers just sketch the results graphically. Be sure to include and clearly label: the congestion charge amount, the charge revenue, and the new Q after the charge.



6. What is the most likely outcome for the surface street route after the congestion charge is implemented in terms of number of users, traffic speeds, and generalized cost? Also frame your answer considering commuters with relatively low and relatively high values of travel time (VOTT).

7. The Congestion Task Force decides to use the congestion charge revenue to start a commuter bus service to reduce congestion and provide an alternative option on the surface street.
 - a. Explain to the mayor with a graph and in words (he took USP 537 many years ago) why the commuter bus will likely require a permanent subsidy to reach optimal service levels. Assume the Mohring Effect will be present, since there's only a single corridor.

