Homework Problem 5 (best solution)

- Copenhagen imposed restrictions on electric scooter rental services:

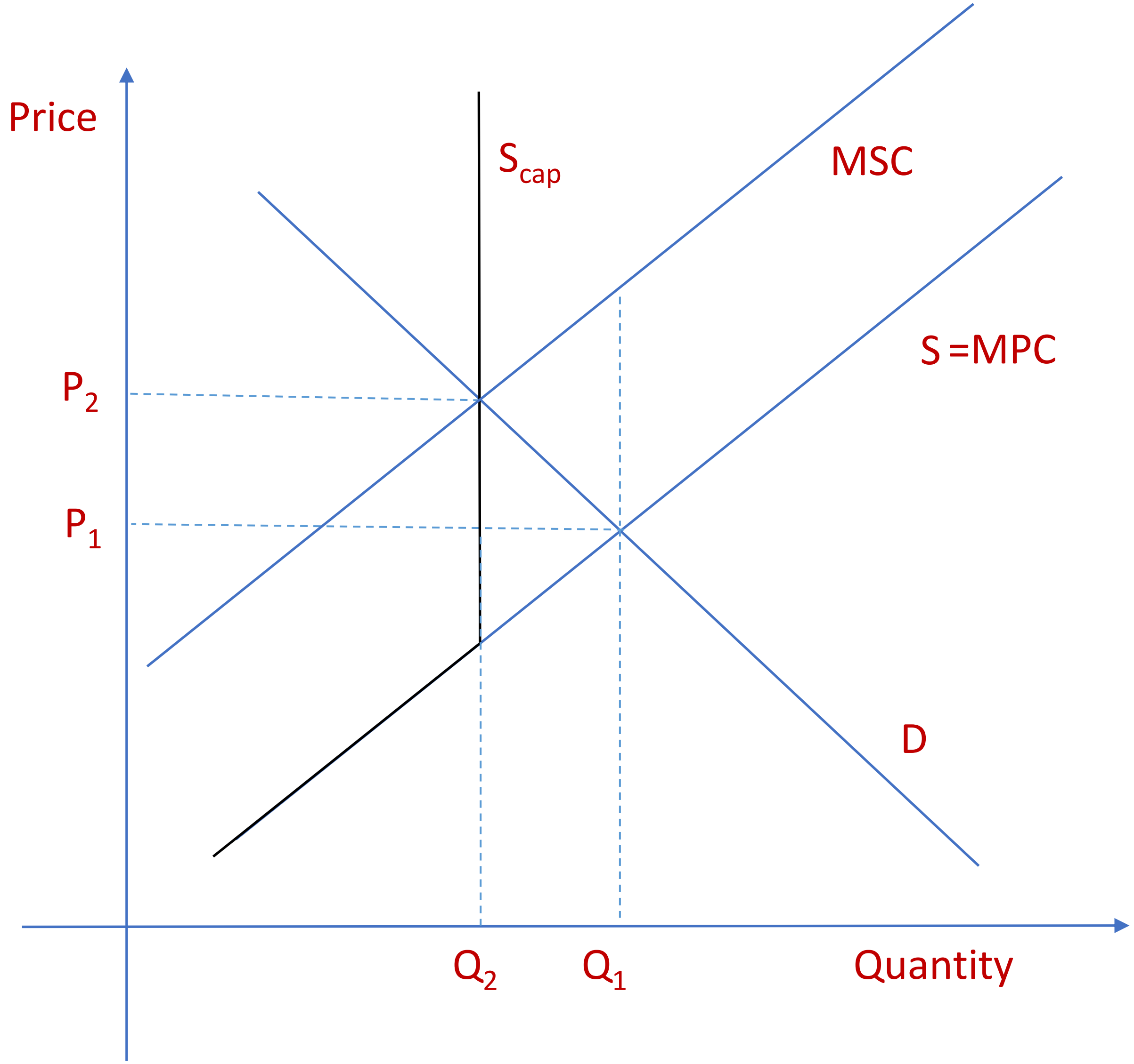
    1. Capped the total # of scooters in the city
    2. Designated parking zones for scooters (with fines to service provider for non-compliance)
    3. Mandatory helmet use for riders

1. Cap on the # of e-scooters

- Supply capped at Q_2
  - Curve shifts from S to S_{cap}
- To deal with excess demand, scooter services increase prices: P_1 to P_2
- Government's motive?

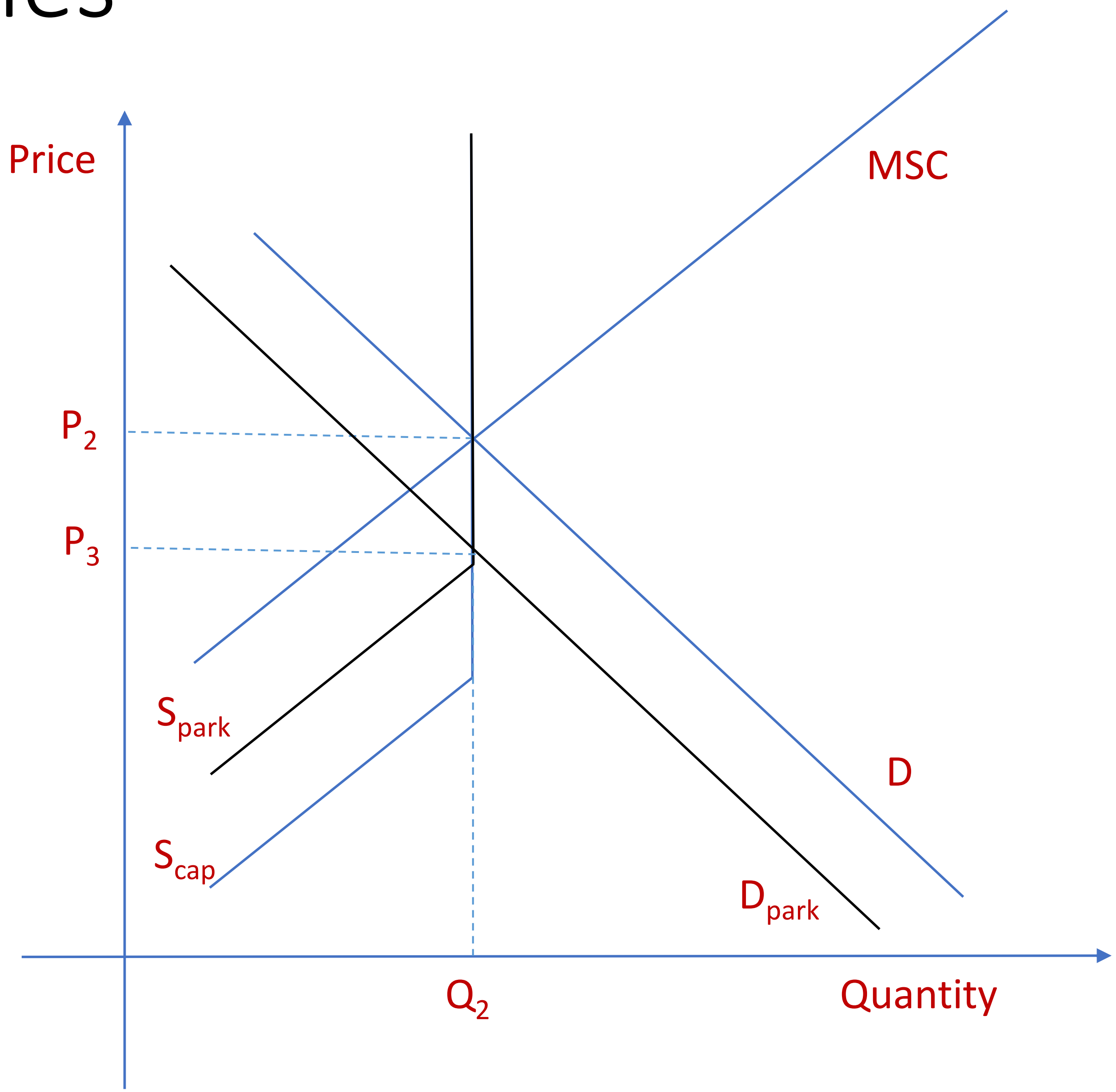
  Negative externality from too many scooters in crowded areas leading to accidents

- Cap lowers supply to socially optimal amount and higher prices incorporate the external cost to society.



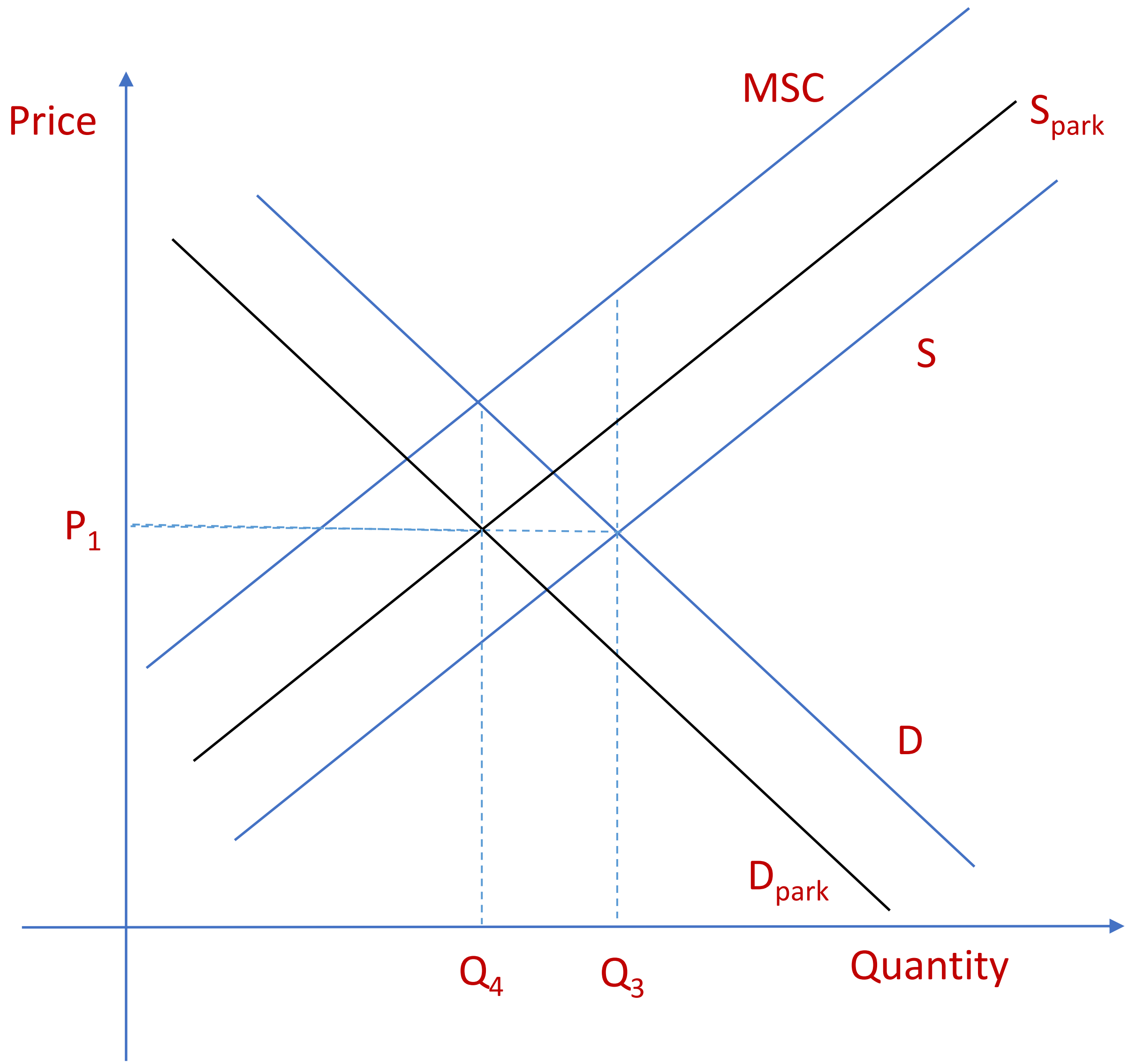
2. Designated parking zones

- Higher supplier costs
  - have to make sure their e-scooters are parked correctly and pay fines for riders mis-parking.
  - Supply shift from S_{cap} to S_{park}
  - Might also lower MSC
- Scooters less accessible to riders
  - Demand shifts down from D to D_{park}
  - Lower price P_3
- Government motive?
  - Cap already dealt with oversupply (due to negative externality)…



2. Designated parking zones

- Government motive?
  - Cap already dealt with oversupply (due to negative externality)…
- Location-specific demand and supply might differ from optimal
  - Even if total quantity is at optimal
  - social optimal may also differ in areas with more/less traffic from other modes
- Lower D_{park} and higher S_{park} can reduce location-specific quantity to optimal



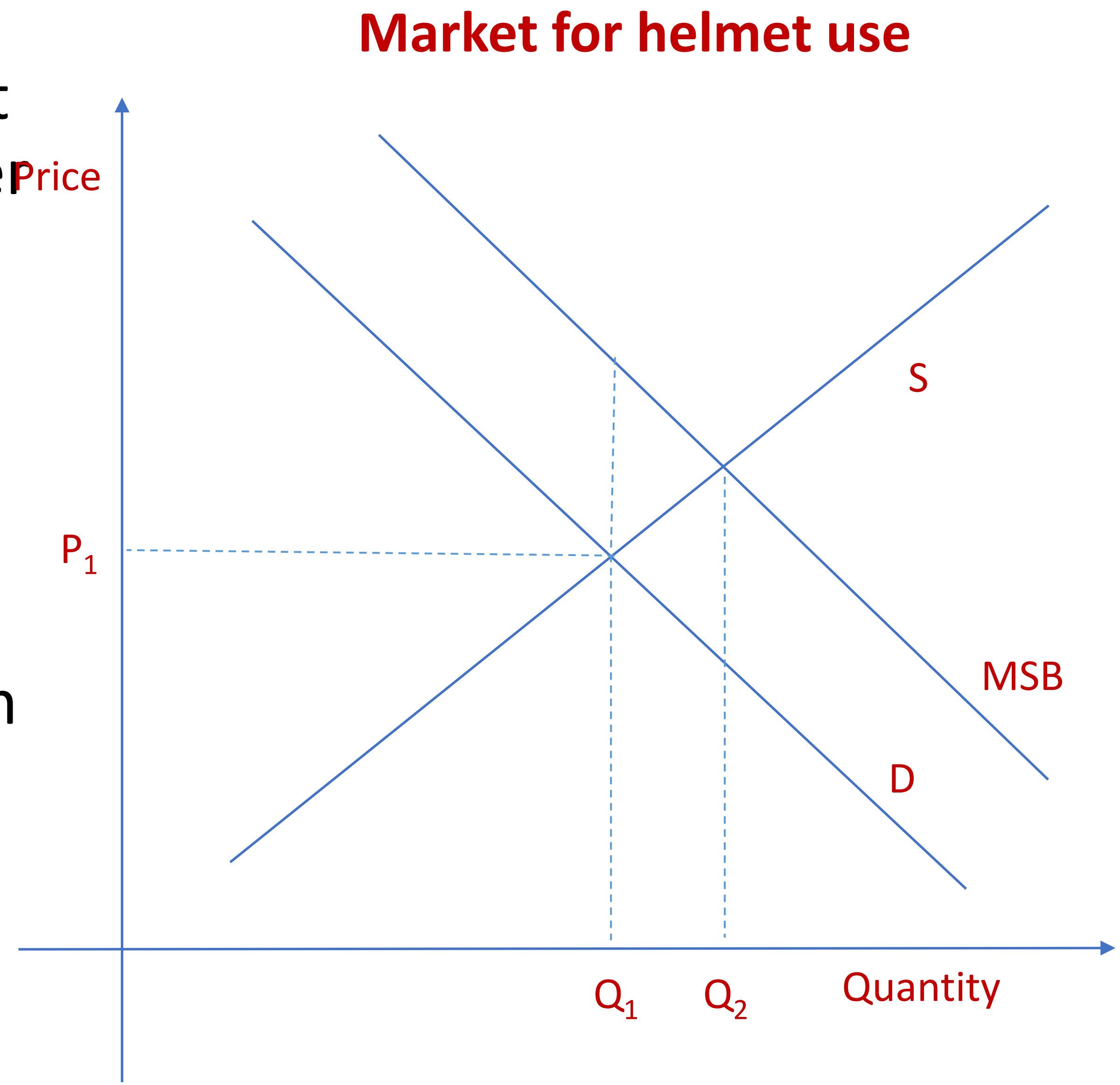
3. Mandatory helmet use

- Could add to rider costs and lower net benefits from e-scooter use (and lower demand)

- Government motive to intervene?
  - Individuals underuse helmets?

- Externality? E.g., on healthcare system

- Lack of information? Individuals underestimate risk to themselves



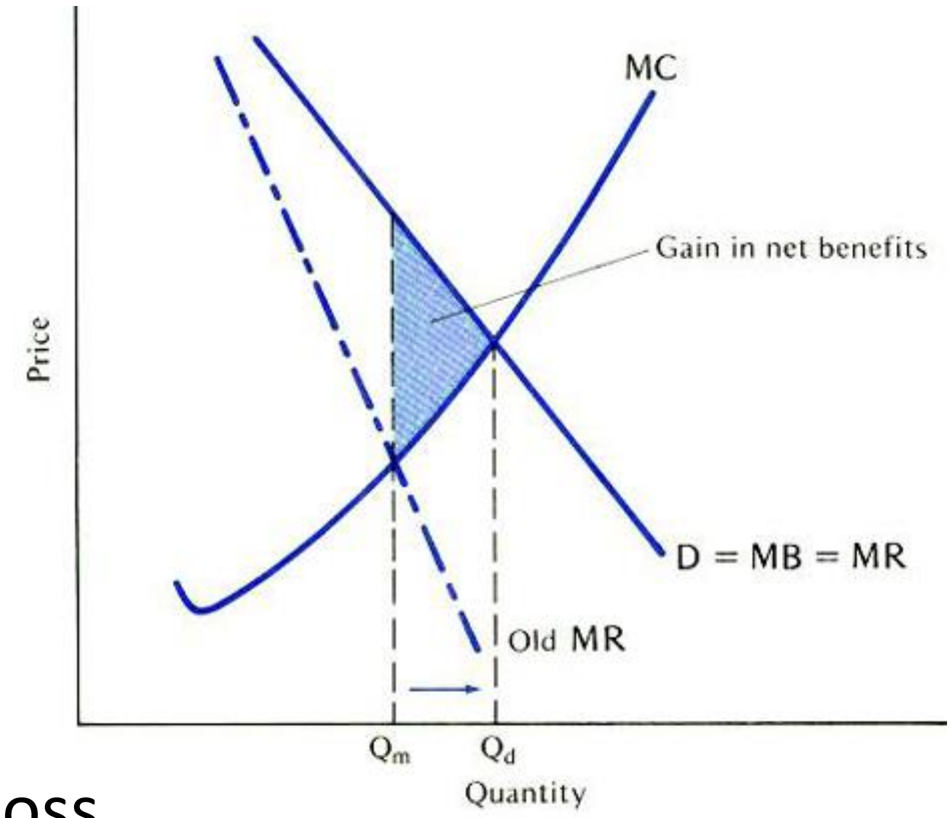
Alternative interventions

- Ban on e-scooters
  - Social optimal is unlikely to be zero
- Taxing e-scooter rental services
  - May lead to more price increase than quantity decrease (e.g., if demand is price-inelastic)
  - Or e-scooter service might compromise other aspects of service that do not generate external cost
- Public e-scooter rental service
  - City might lack expertise, cost efficiency, etc.
- Mandatory training or a “rider’s license”
  - Costly to implement, might exclude lower-income riders disproportionately more (e.g., with driver’s license but lower external costs?)
- Subsidizing alternative transport modes
  - E.g., privately owned e-scooters and bicycles
  - Riders might be more careful with own e-scooter

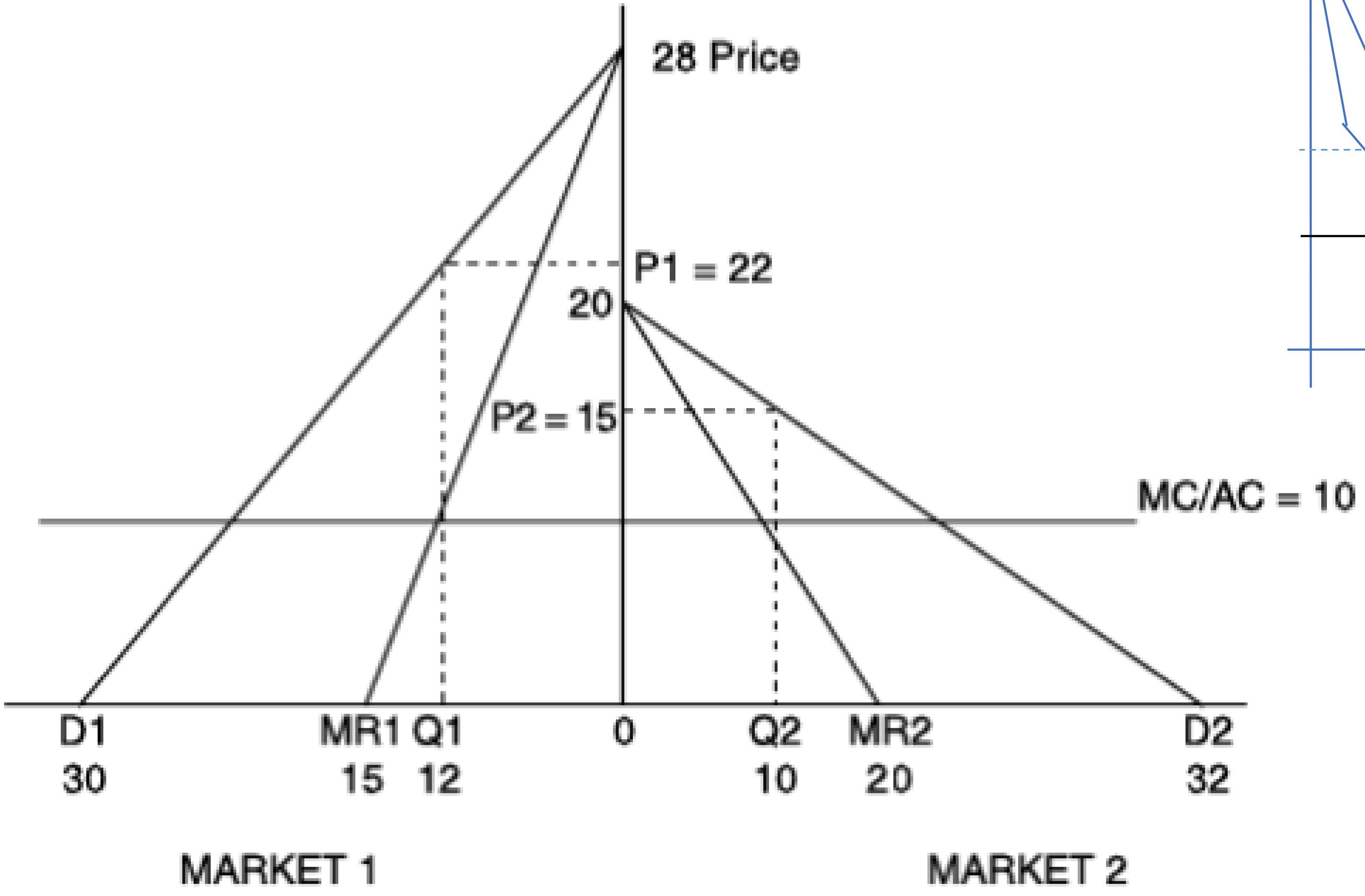
Q_2

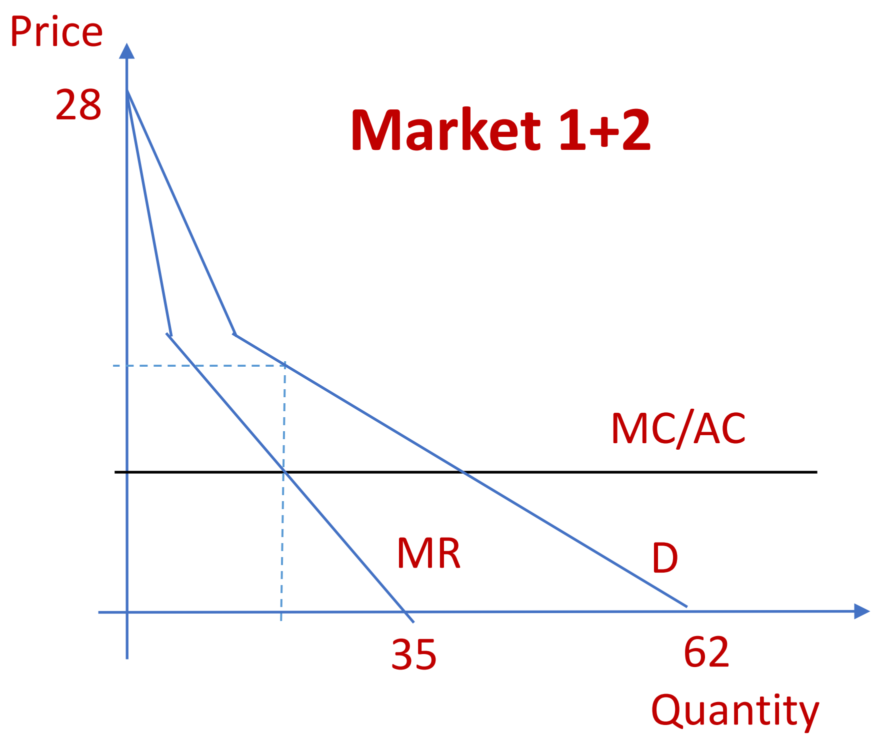
Price Discrimination (review)

- Sell the same service to different buyers at different prices
  - e.g., student discounts, lower off peak fares, etc.
- Can sell more quantities than at one price.
- Perfect price discrimination: no deadweight loss.
  - But zero consumer surplus
- Requires: market power, market separability, low admin costs, different price elasticities of demand



Homework 6


28 Price
P1 = 22
20
P2 = 15
MC/AC = 10
D1
30
MR1
15
Q1
12
0
Q2
10
MR2
20
D2
32
MARKET 1
MARKET 2


Price
28
Market 1+2
MC/AC
MR
D
35
62
Quantity

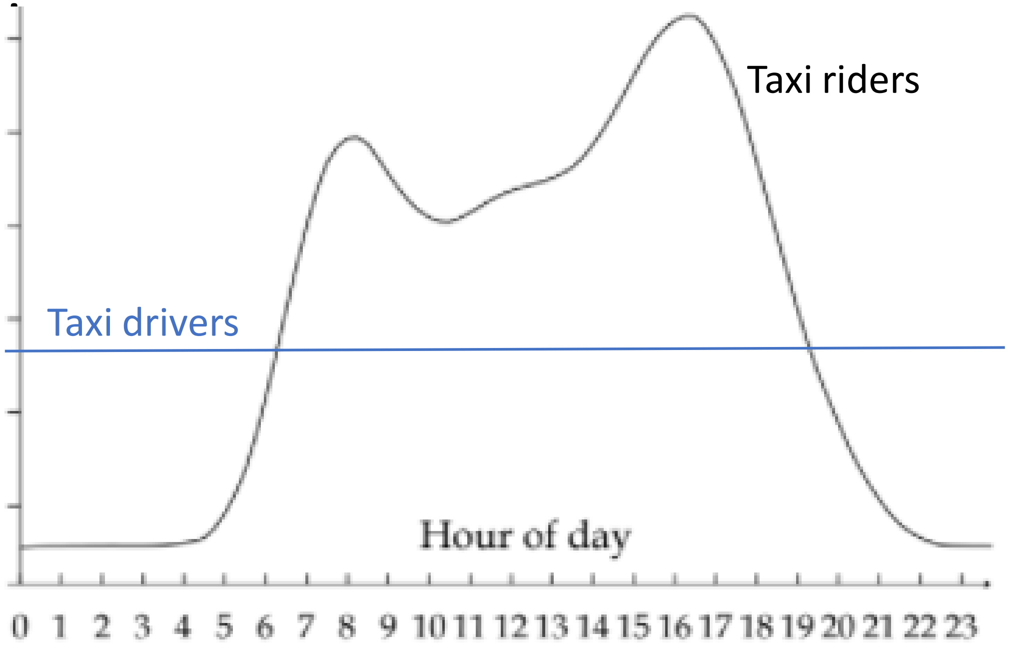
Price discrimination examples

- Real-time pricing of ride hailing services
- Congestion pricing

Inefficiencies in taxi markets

- Demand for taxi rides varies over time and space
  - As a taxi driver, where do you cruise for customers? When is the time better spent doing some other jc

- Supply of taxi rides varies over time and space



- One taxi fare won't do. Need price discrimination.

- But riders and drivers have imperfect information on taxi supply and demand.

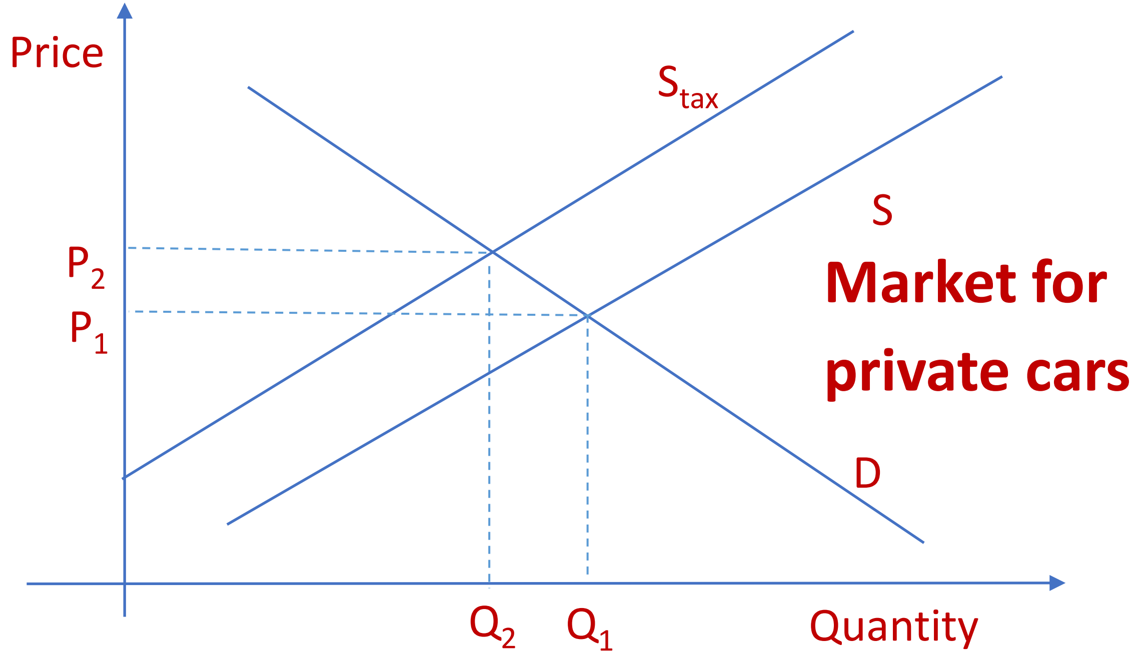
Real-time pricing in ride hailing markets

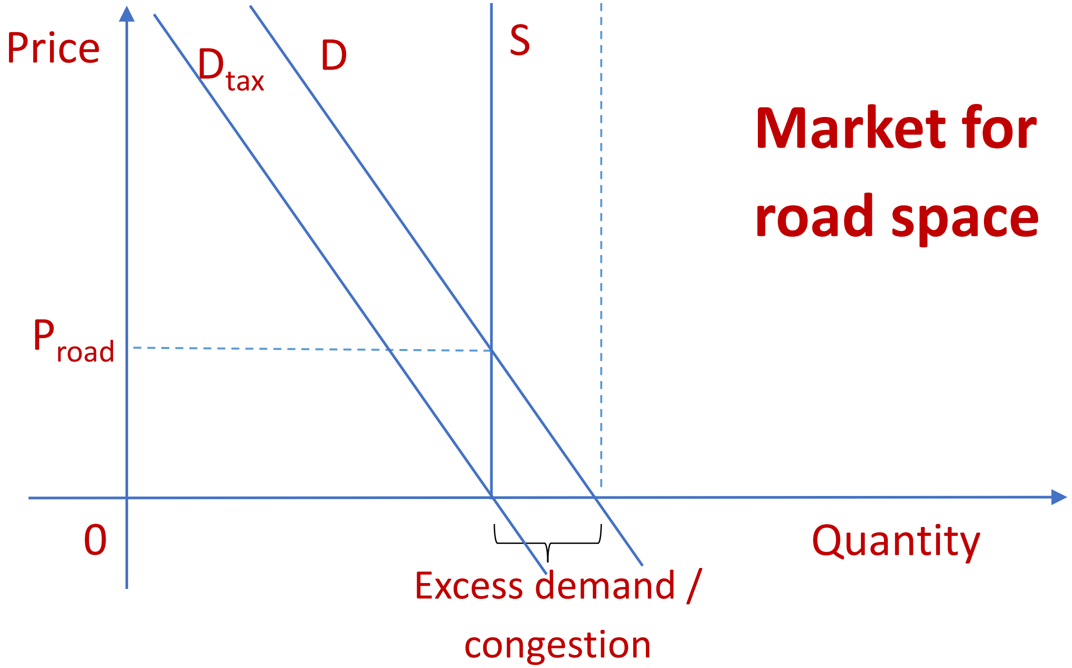
- More efficient at clearing any excess demand or supply across time and space
- Ridesharing platforms not necessarily maximizing supplier profits (like private monopolists), or consumer surplus, or net social benefits.
- Say, maximizing # of rides (or long term market share):
    - Can match low-cost drivers to low-value riders at low prices
    - Can match high-cost drivers to high-value riders at high prices
    - Surplus?
- Who benefits from real-time pricing? Active area of research.

Congestion

- Road space
  - is fixed (in the short run): vertical supply curve
  - demand is complementary to demand for private cars
- Price of road space fixed at 0
  - But demand meets supply at a lower quantity

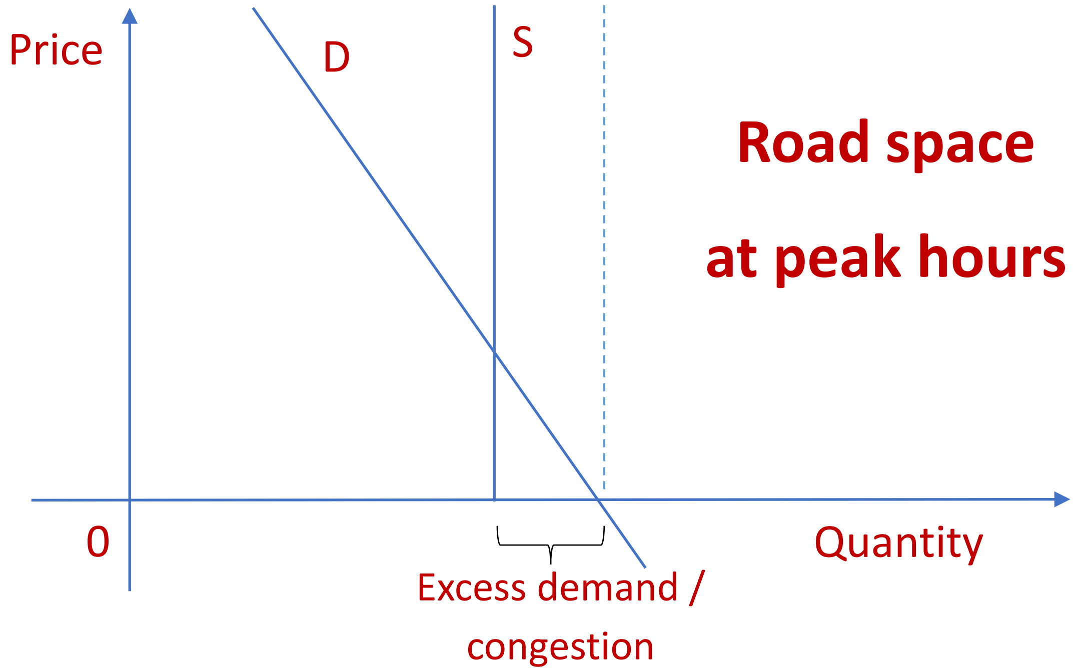
  → Excess Demand / congestion
  - Congestion is an externality of private cars
- Option 1: Tax private cars
- Option 2: Price roads higher
  - congestion tax/charge

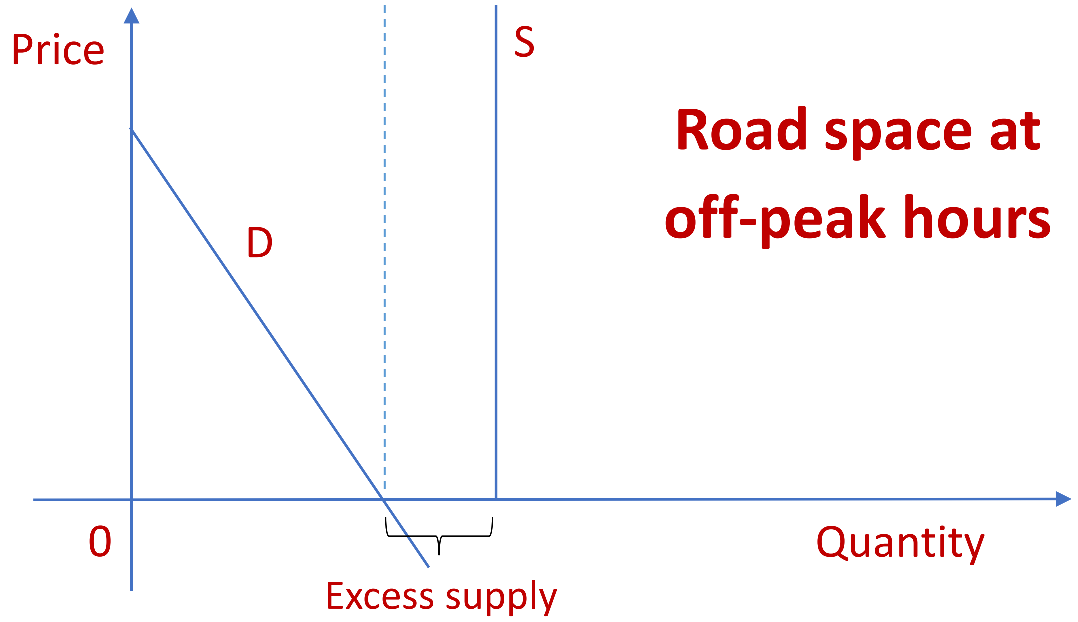




Congestion pricing

- Demand for road space varies over time and space.
- Need to price discriminate
  - Instead of taxing cars, directly price roads
  - To shift travelers from peak hours to off-peak hours
- May also price discriminate across space (e.g., more central parts of cities), by road usage, etc.
- Raises equity issues

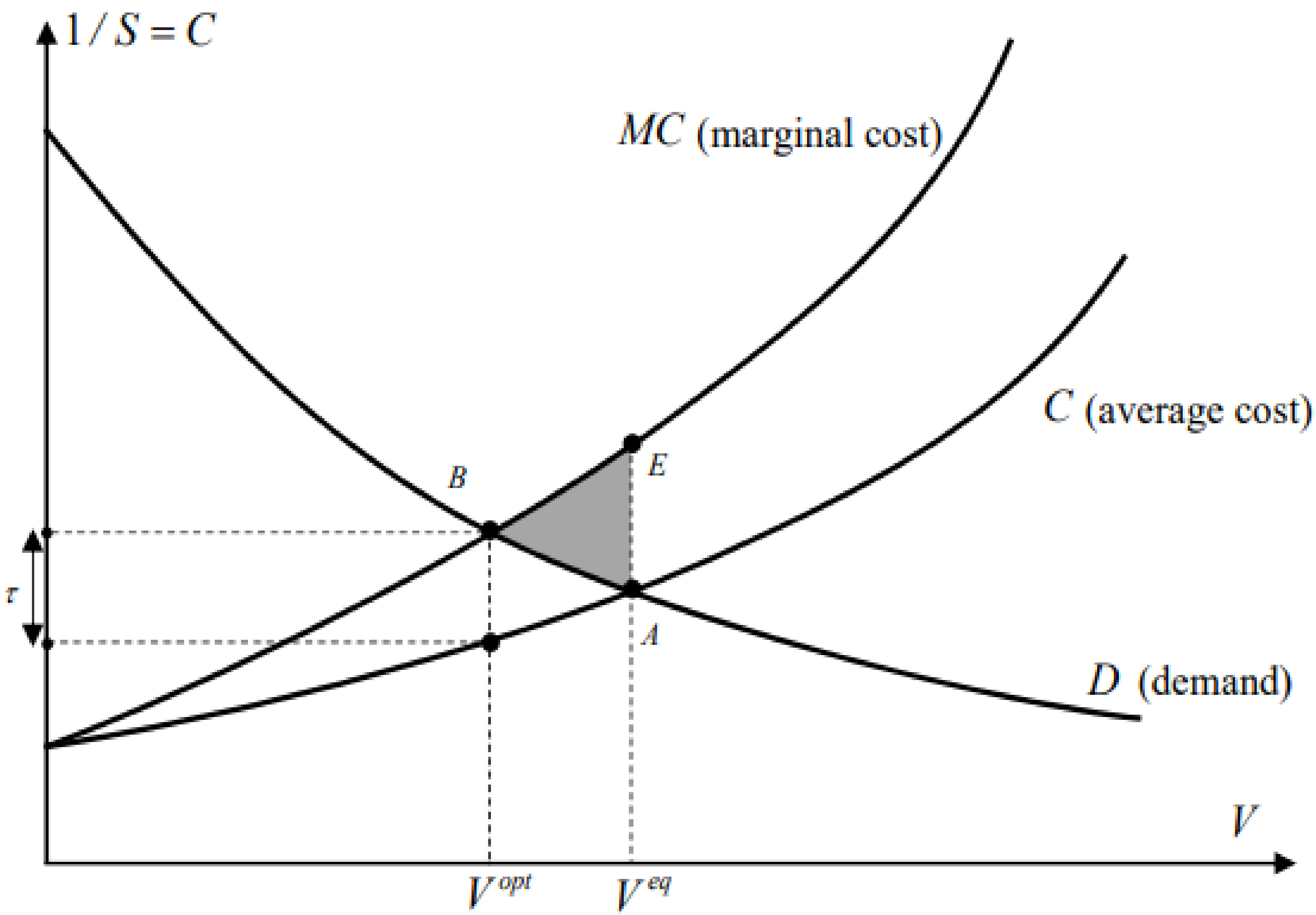




Congestion in the market for urban travel

- Travelers are both demanders and suppliers
- Price = inverse travel speed (1/S)
- Quantity = travel volume (V)

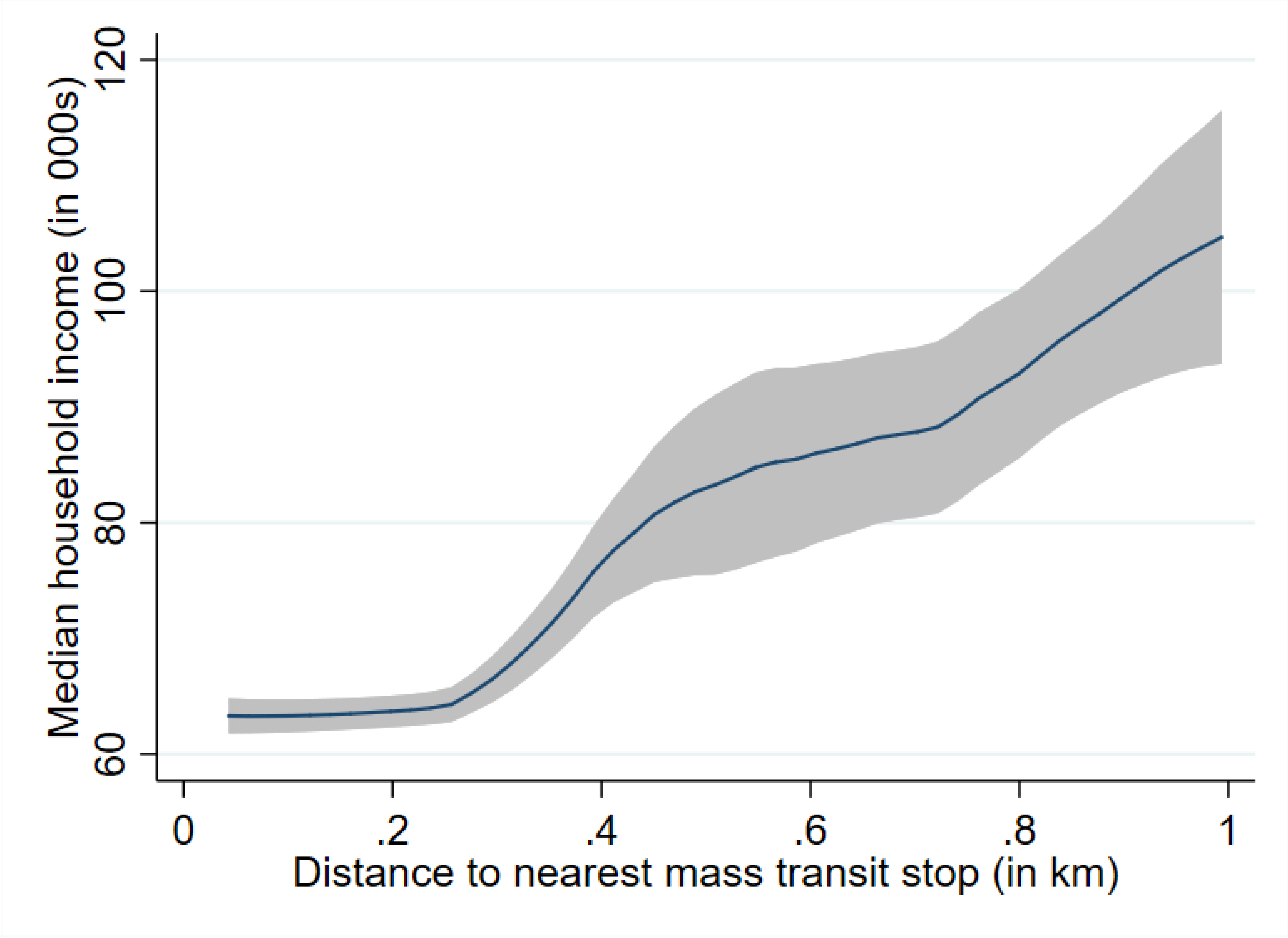
- Average traveler faces the Average Cost
- The cost their travel imposes on everyone's travel is the Marginal Cost
- In equilibrium: more travel than optimal (DWL in gray)



No “free” Lunch

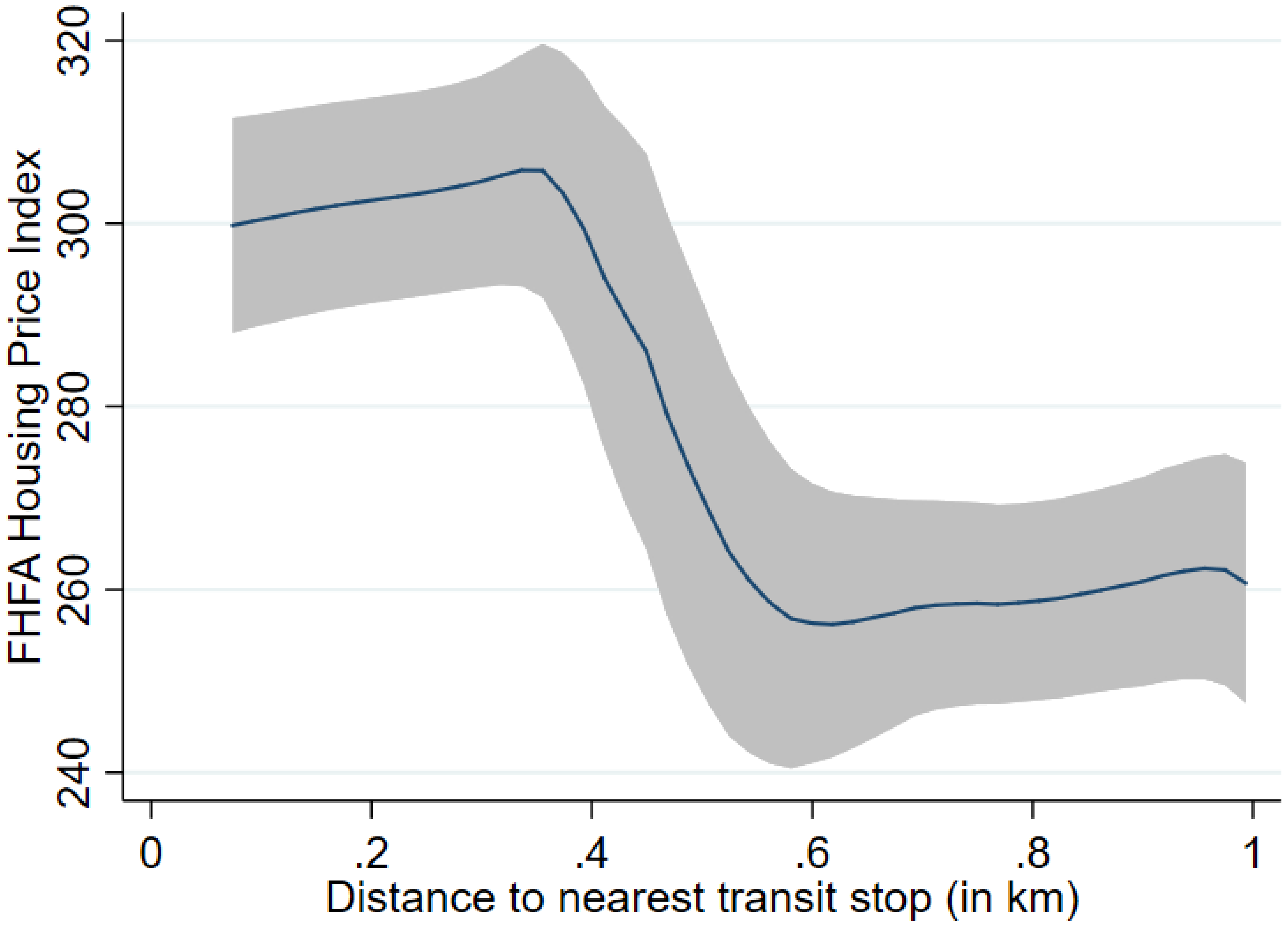
- We can control some forms of prices (e.g., monetary), but costs may get passed down
  - in other forms
  - To other markets
- What is the real price of public transit travel?
  - Fares
  - Travel times, wait times, crowdedness, …
  - Proximity to transit station, housing prices, …
  - Road space → costs of using other modes, …
  - Opportunity cost of government spending on public transit
  - …
- How do these costs of public transit vary across urban residents?

Public transit access in New York



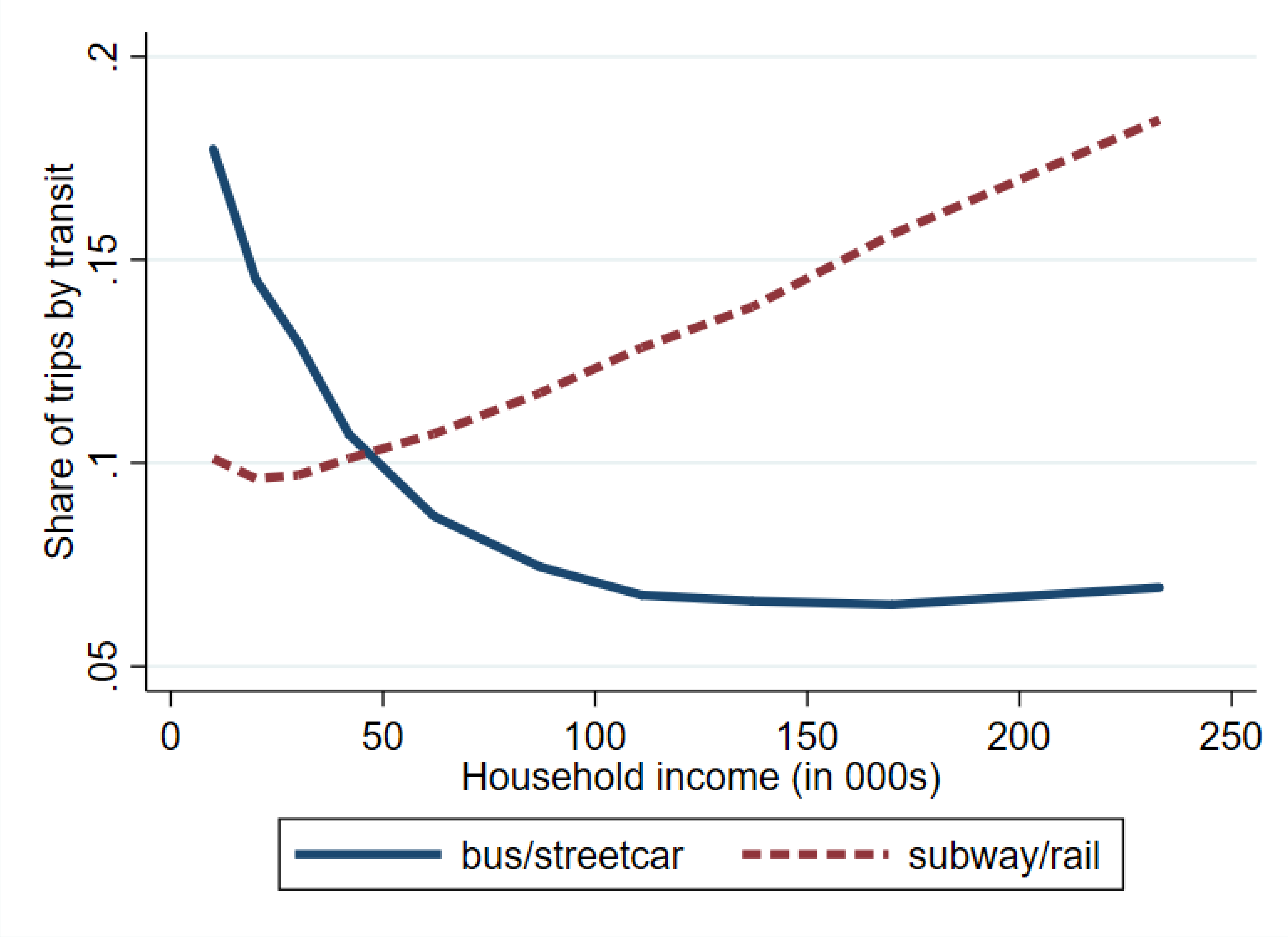
Poorer households reside closer to mass transit stops.

Housing prices near transit stops (New York)



Housing prices are higher near mass transit stops.

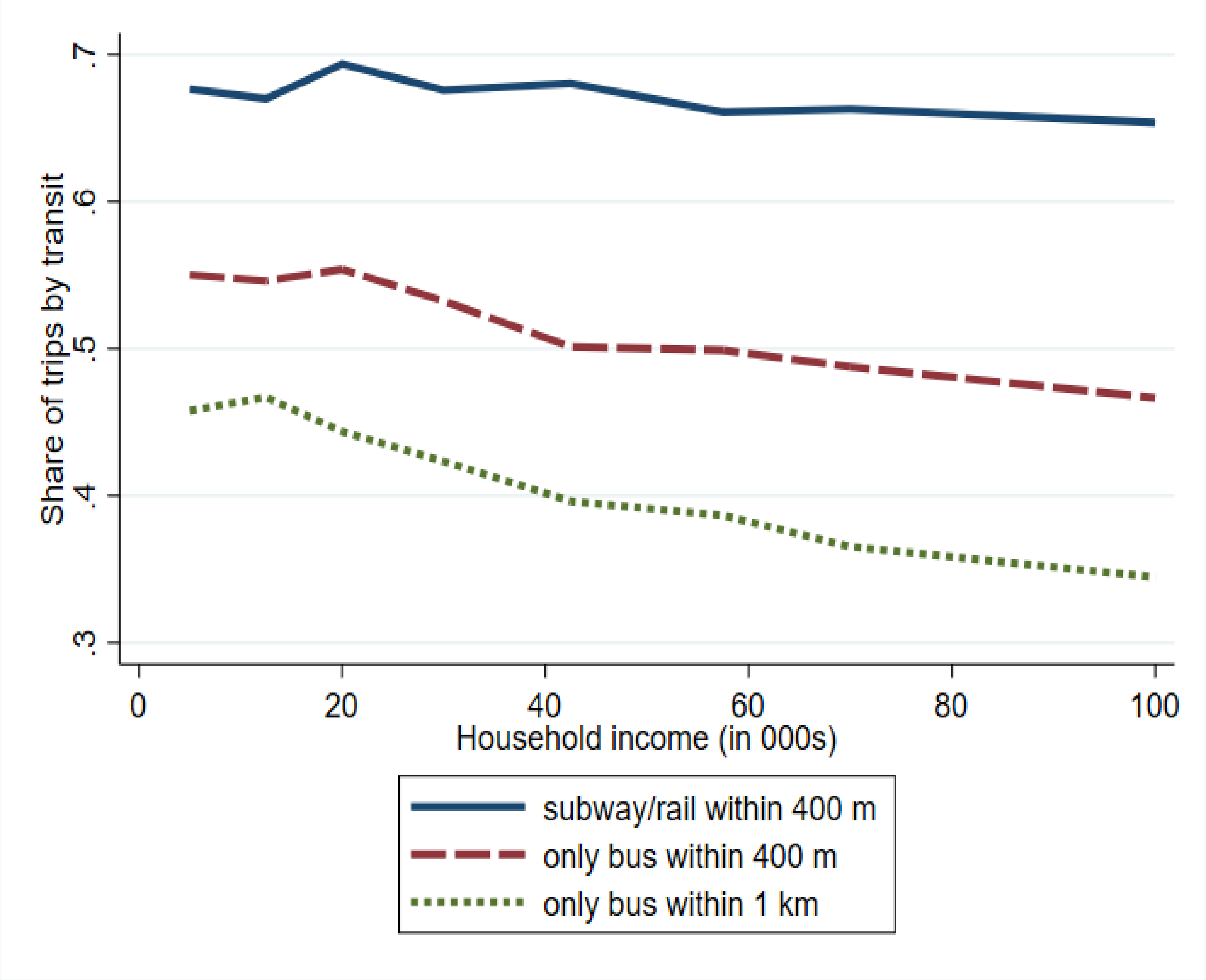
Public transit ridership (commutes in US cities)



Low-income commuters ride bus more.

High-income commuters ride subway/rail more.

Public transit ridership (commutes in US cities)



- …because subway/rail are closer to high-income neighborhoods

One possible explanation:

- Higher-income households outbid low-income households for proximity to rail transit (but not to bus transit).
- b/c bus transit is inferior good, but rail transit is normal good

Which travelers should public transit target?

1. Subsidized travel for those with few/poor alternatives?
   - Typically low-income

2. Or for those with high negative externalities (e.g., drivers of private vehicles)?
   - Typically high-income

3. Or for those with higher willingness/ability to pay?

4. Price discriminate to generate revenue from some riders and subsidize travel for others?

Access to public transit and housing market

- New subway station may increase demand for housing in the neighborhood

- Housing price response depends on housing supply elasticity
  - How easy is it for developers to provide new housing?
  - Often restricted by building density / zoning laws