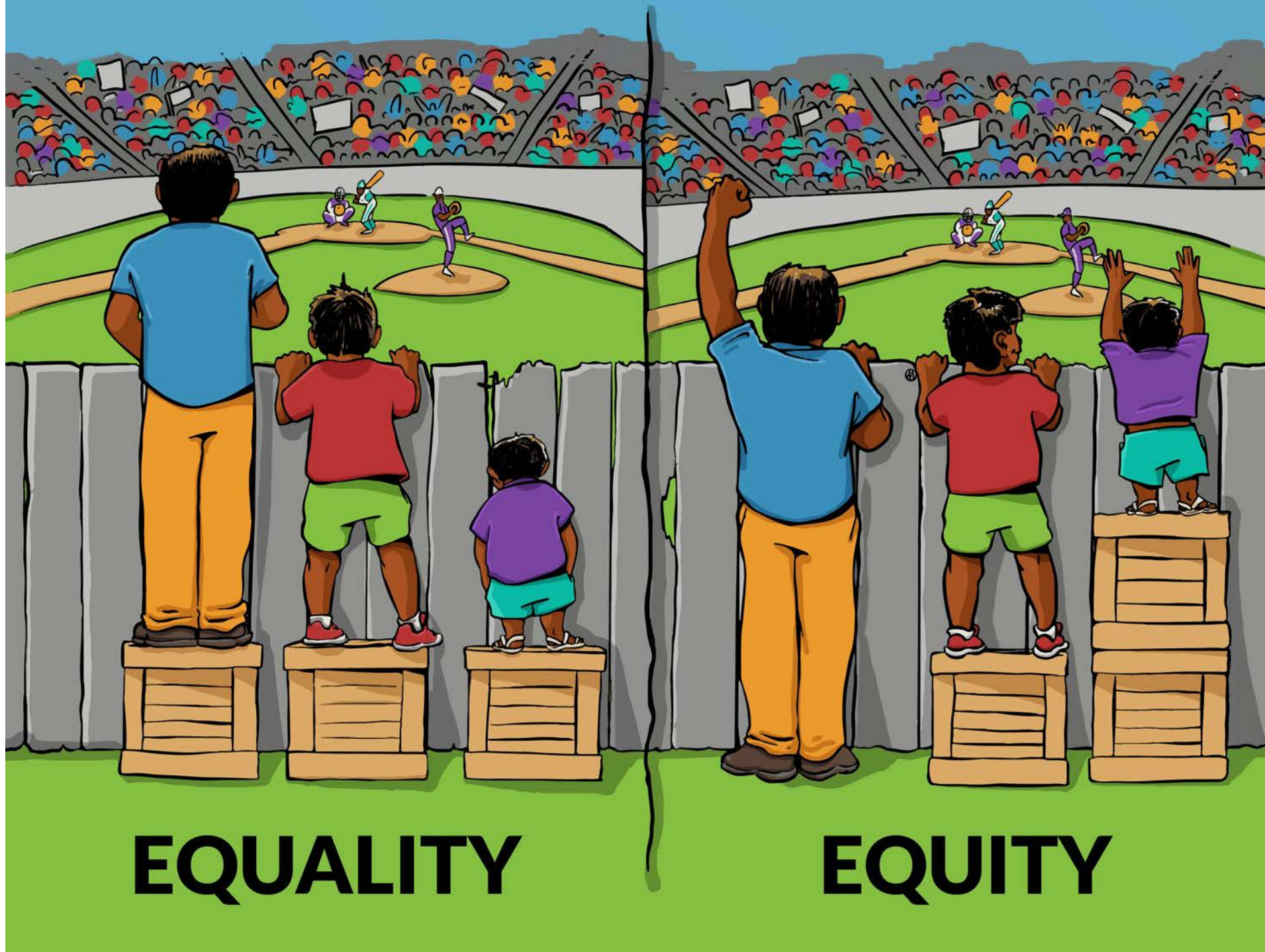


Michelle Poyourow

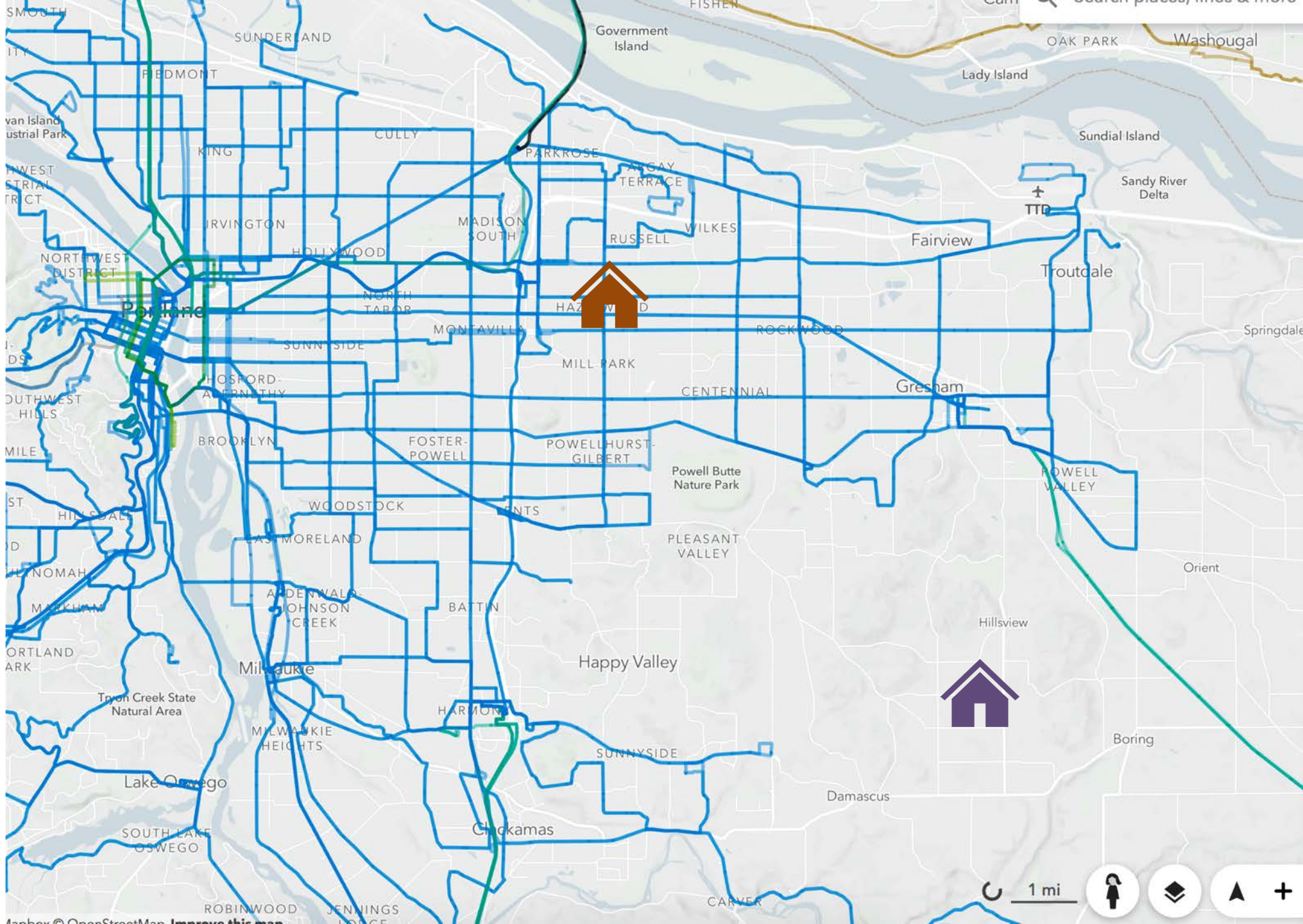


EQUALITY

EQUITY

Image created by
Angus Maguire for the
Interaction Institute
for Social Change





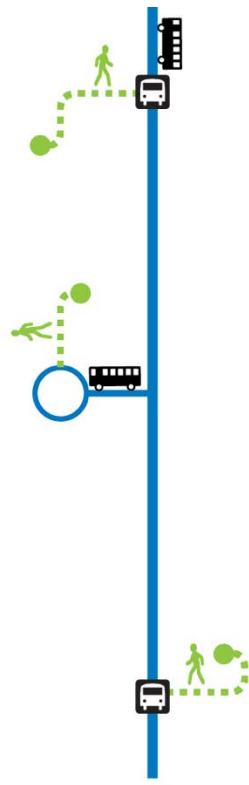


Let's think separately about:

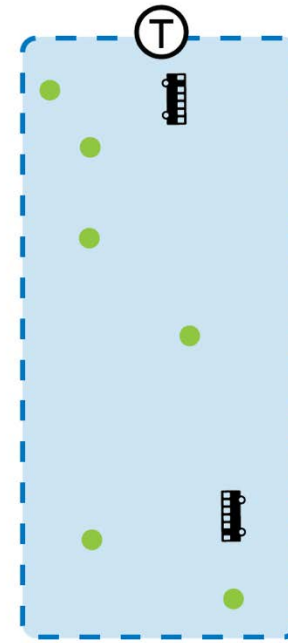
- Responsiveness
- Automation



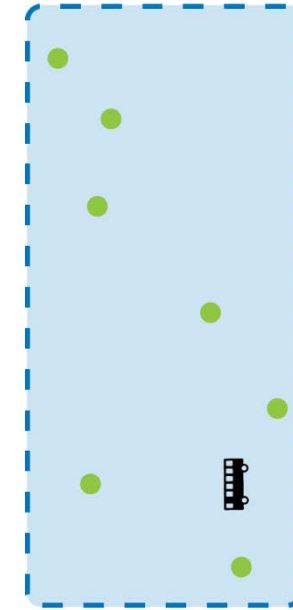
Local
fixed route
bus



Fixed route
with some
deviations on
request



Demand-
response to one
(or few) points;
or along a
corridor



Door-to-door
fully demand-
response zone



More riders per
vehicle hour
physically possible

Fewer riders per
vehicle hour
physically possible

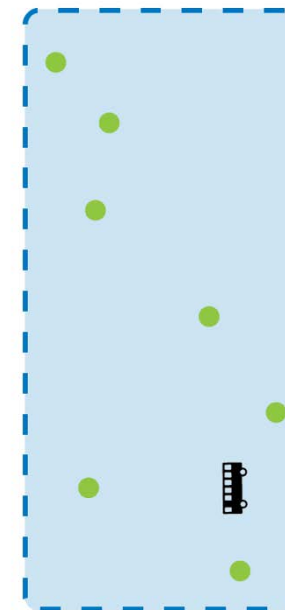
What makes more riders per vehicle hour physically possible?

- Asking people to walk
- Asking people to travel at a different time
- Taking people on longer ride-alongs
- Limiting the options for one end of the trip (e.g. a rail station)
- For paratransit, day-before reservations.
- ...in other words, more rigidity!

Responsiveness to individual desires trades-off against the maximum possible rides per vehicle hour.



Local
fixed route
bus

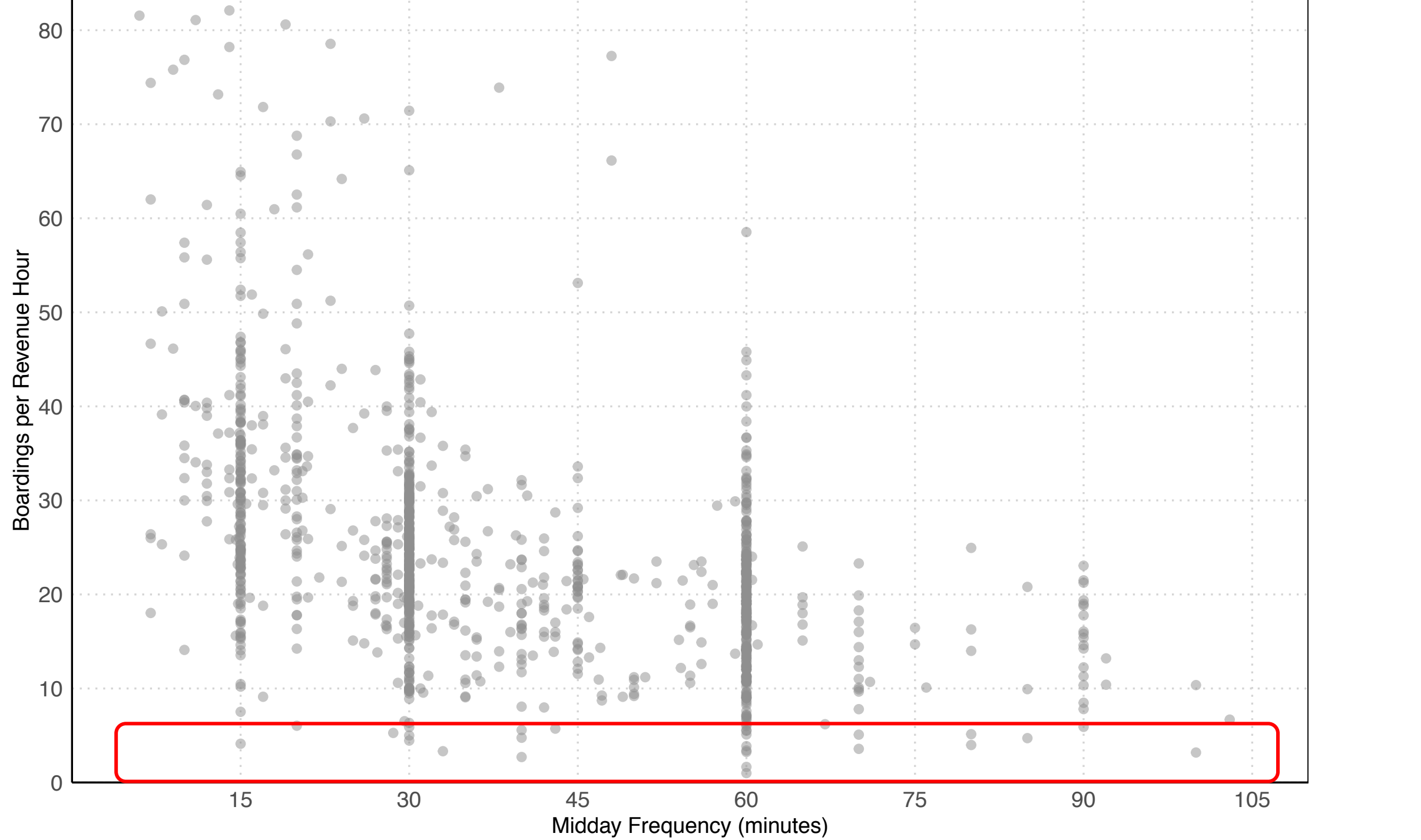


Door-to-door
fully demand-
response zone



Average:
28 riders per
vehicle hour

Record:
6.5 riders per
vehicle hour





Why care about vehicle hours?

- Vehicle hours are your contribution to congestion
 - And energy use, curb space use, emissions, etc.



Why care about vehicle hours?

- Vehicle hours are your contribution to congestion
 - And energy use, curb space use, emissions, etc.
- With human drivers, vehicle hours govern operating cost.


$$\text{Operating cost per vehicle hour} \div \text{Riders per vehicle hour}$$


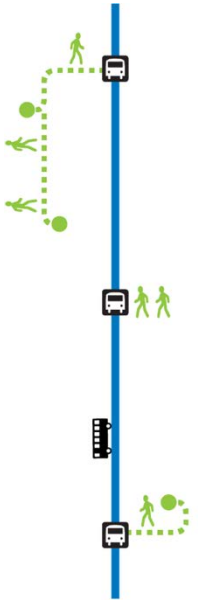
= Operating cost per rider



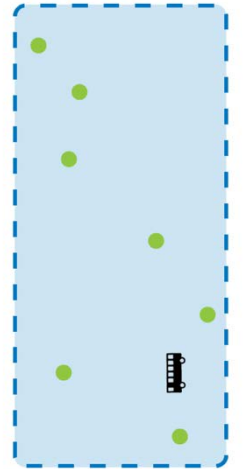


Operating cost per
vehicle hour \div Budget

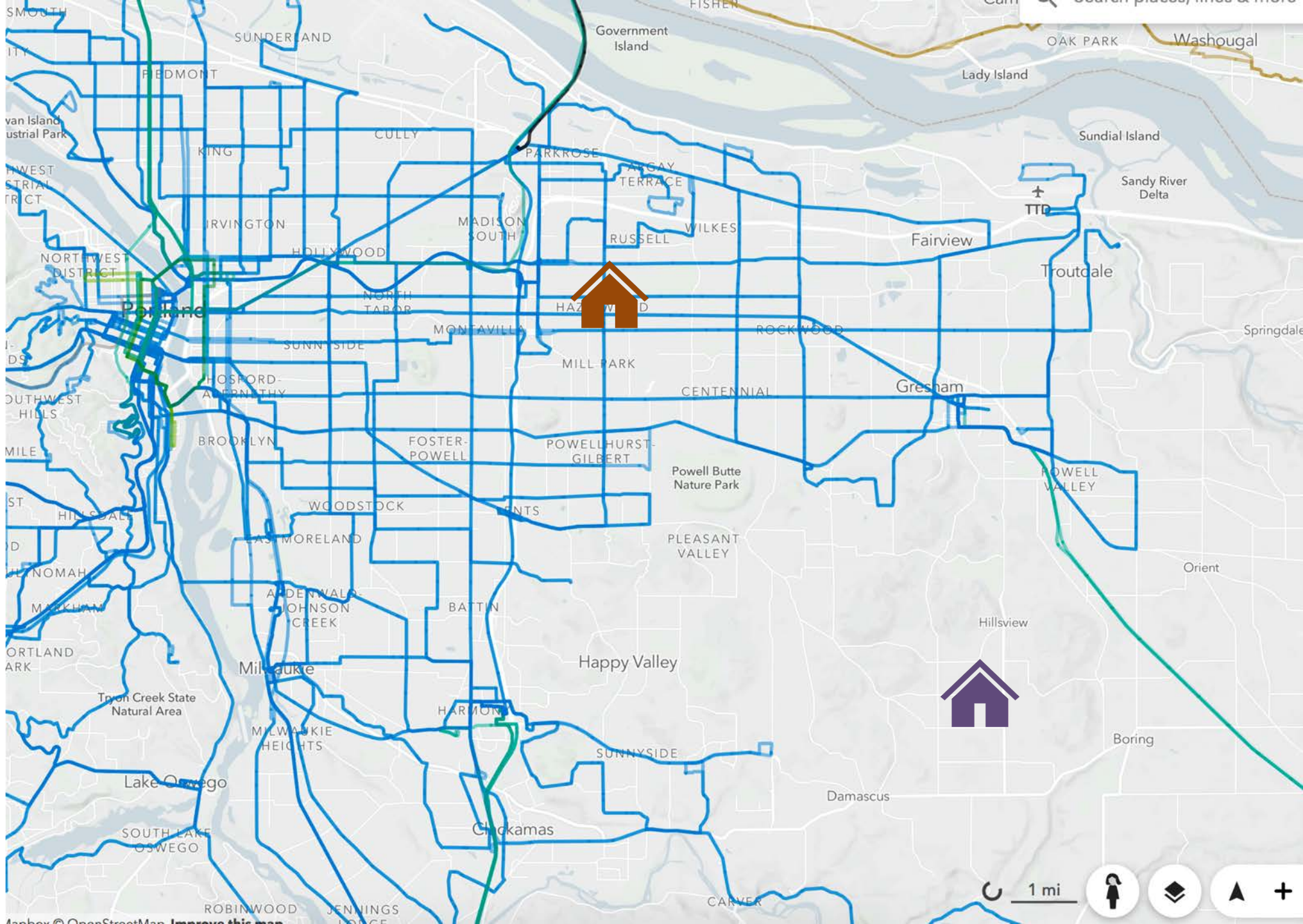
= Vehicle hours



Higher frequencies,
later nights,
longer routes



Reach more low-
density, unwalkable,
distant areas

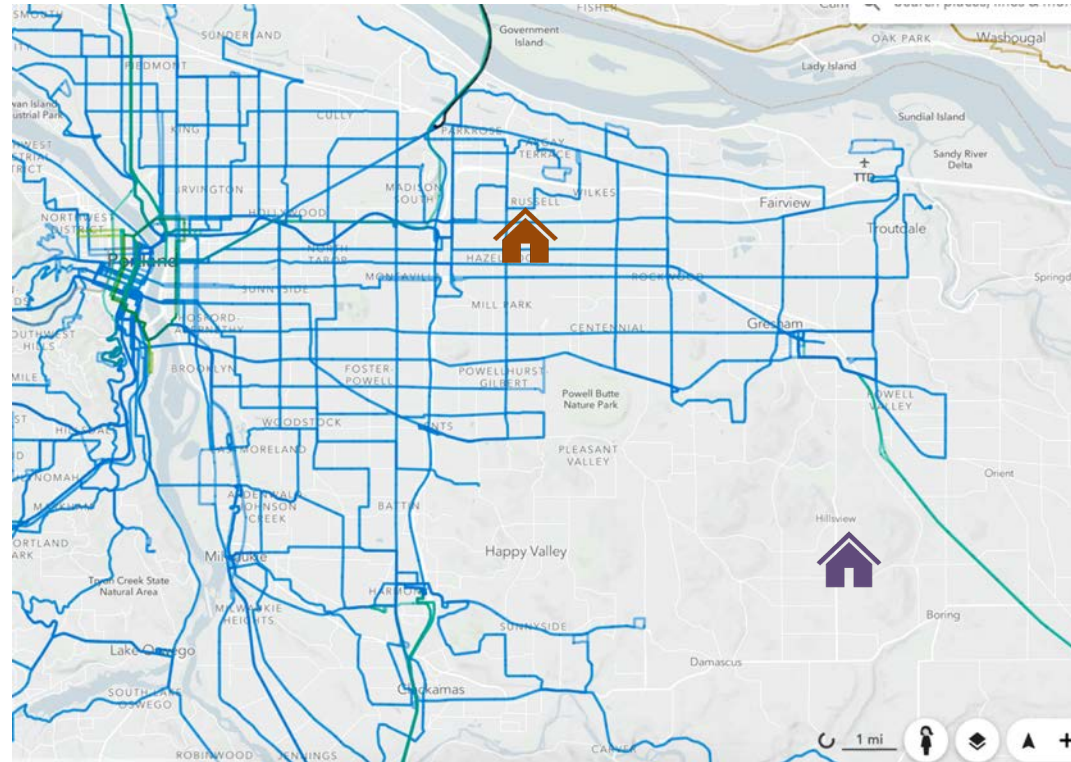




What happens as distance becomes cheaper?

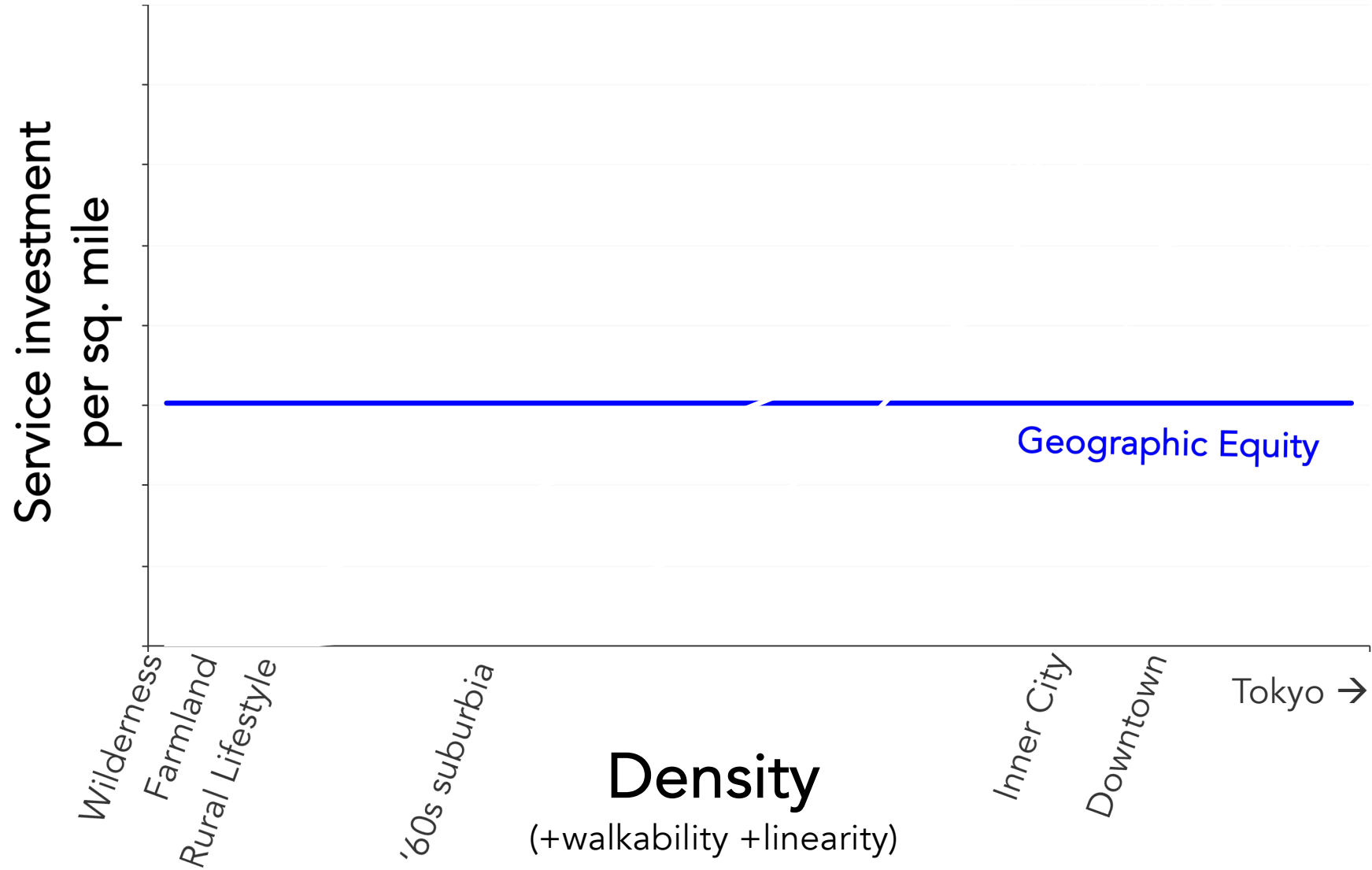
If AVs increase the supply of “boxes,” by making distance cheaper, what happens to the height of the wall?

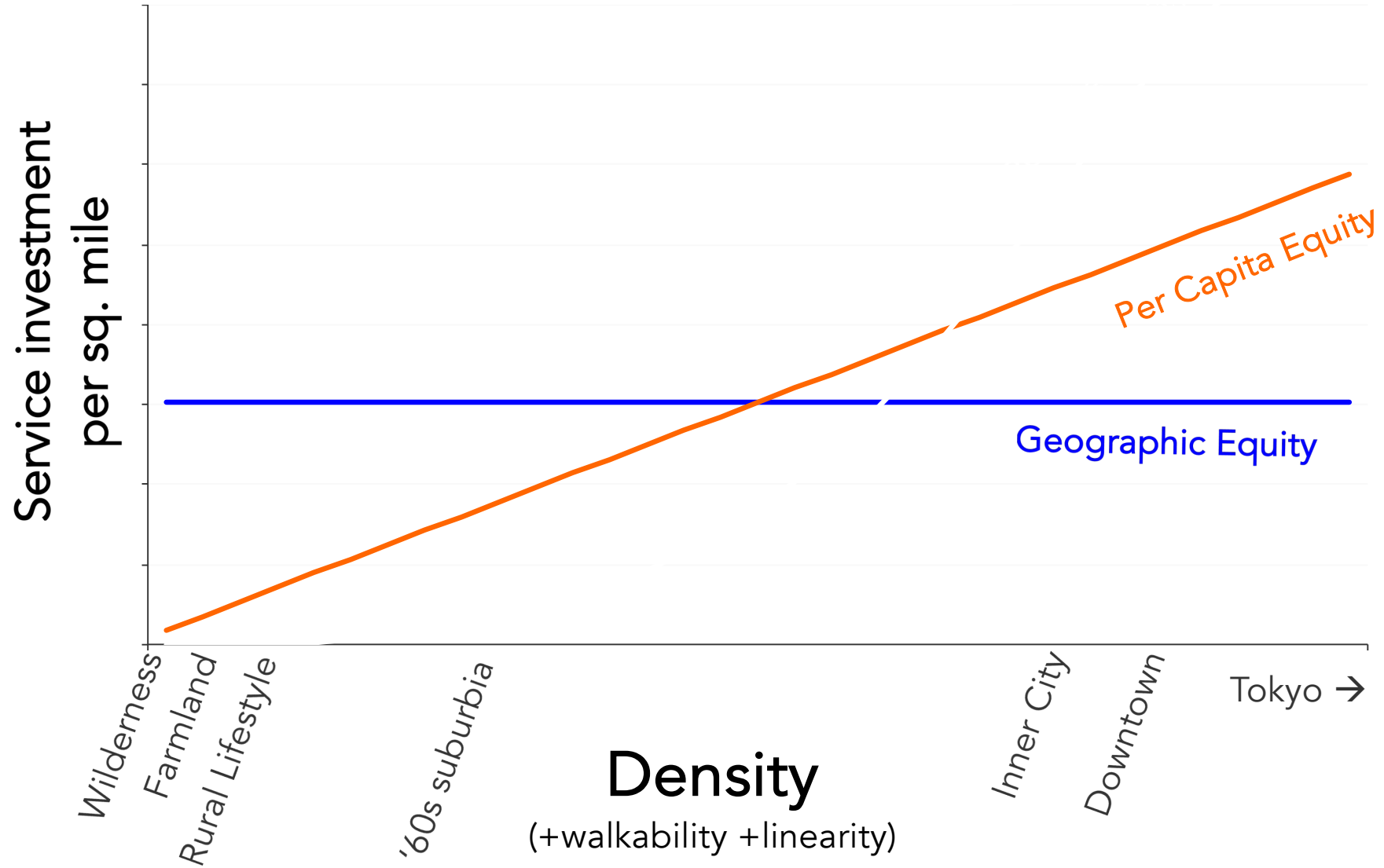
- Do vulnerable people stay where they are today, or do they move?

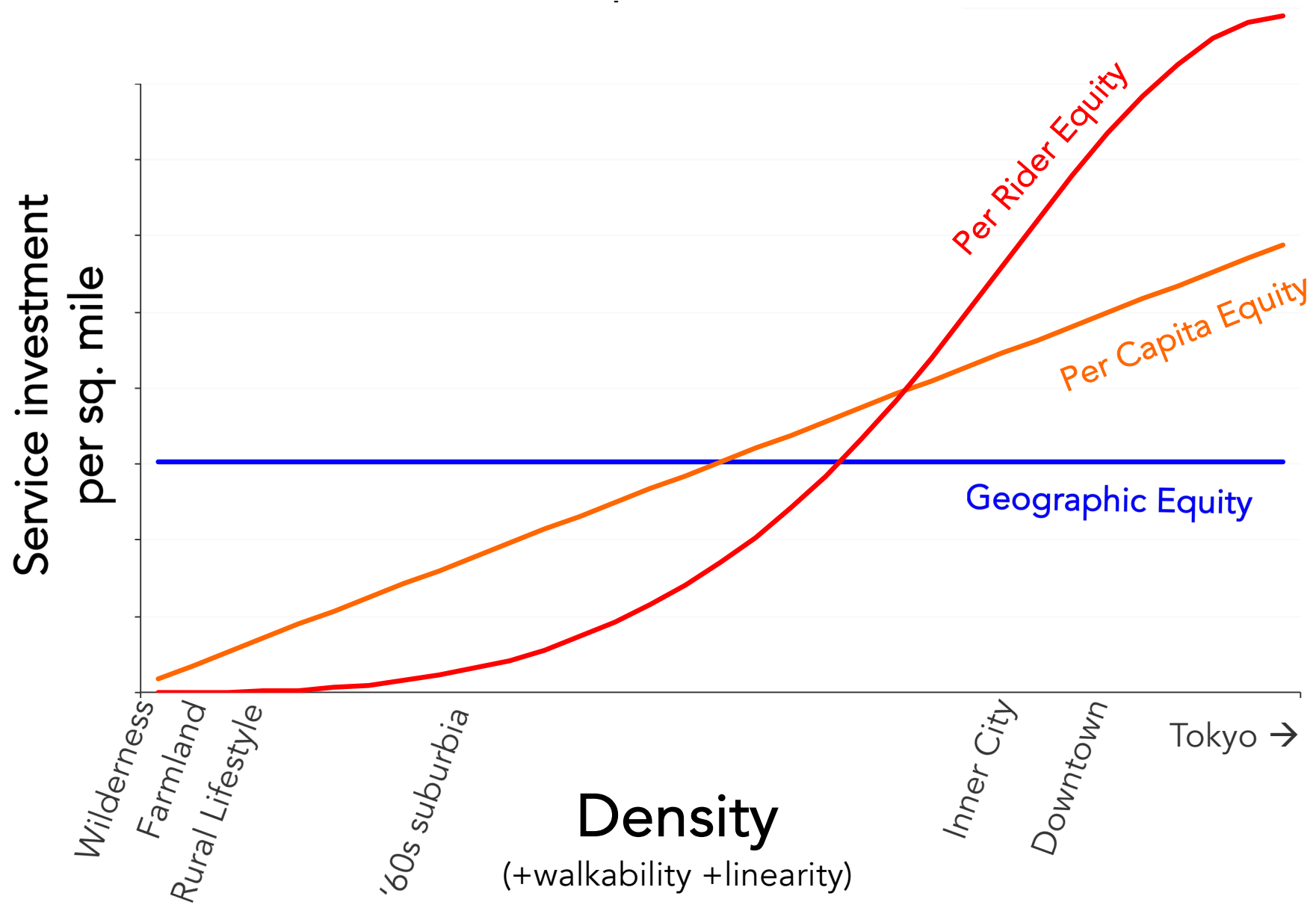


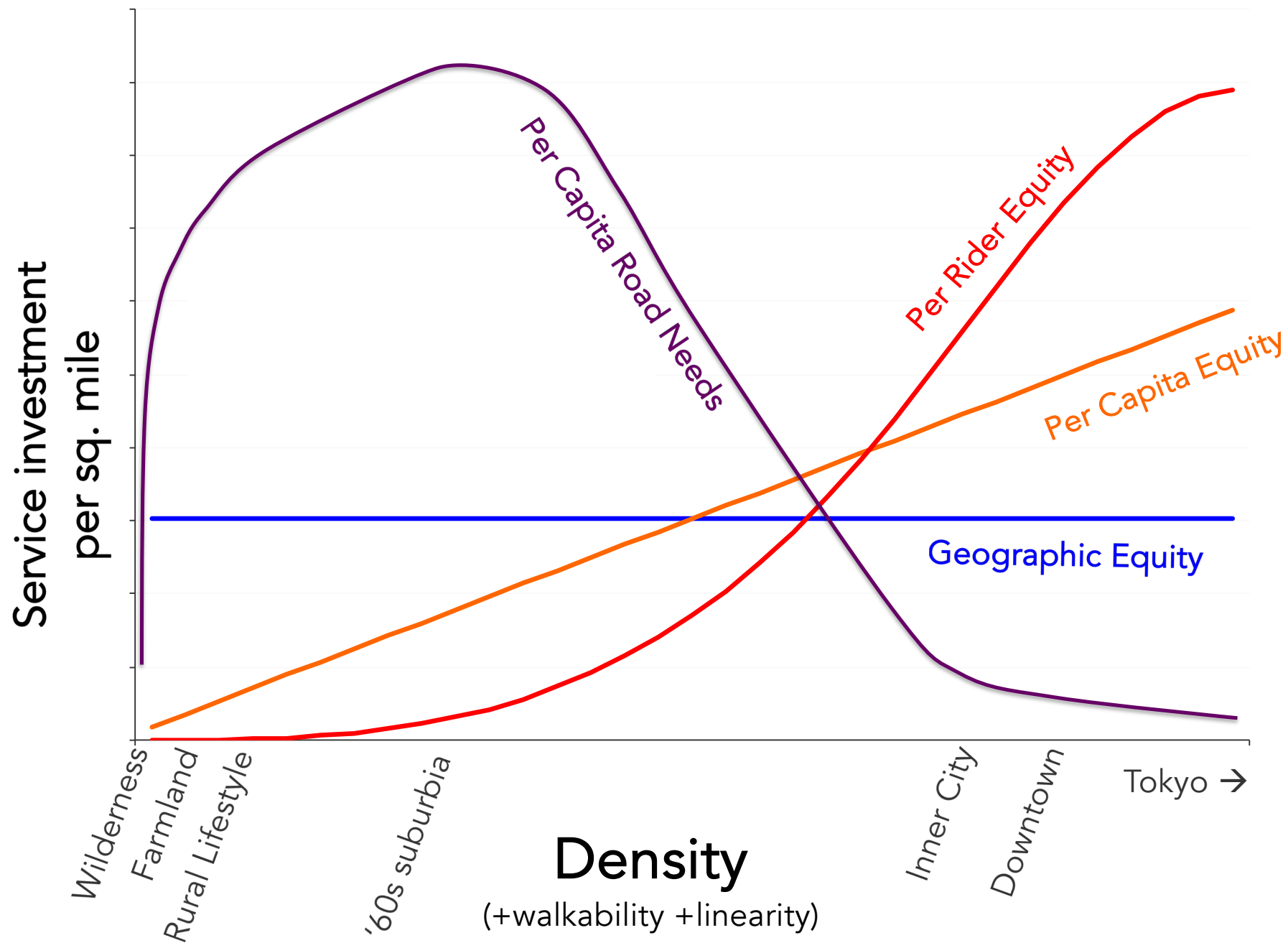
Thank you

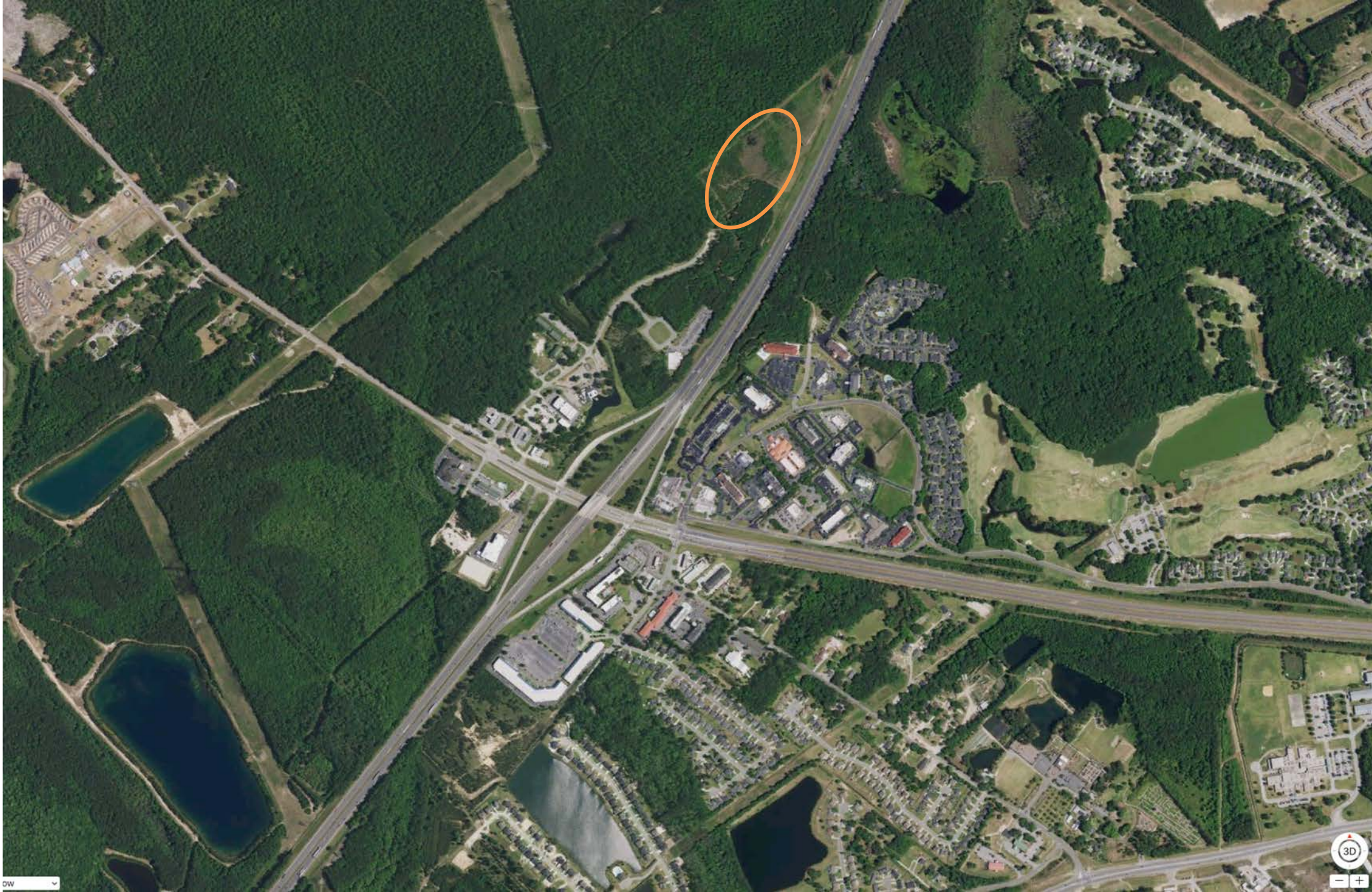
What can “equity” mean in this context?











Problem

- Emissions
- Efficient use of energy
- Efficient use of human effort
- Safety
- Efficient use of space
- Bad information

Technology Solution



Electric vehicles



Autonomous vehicles
(Private, shared or transit)



More fixed routes,
bigger vehicles



Good information

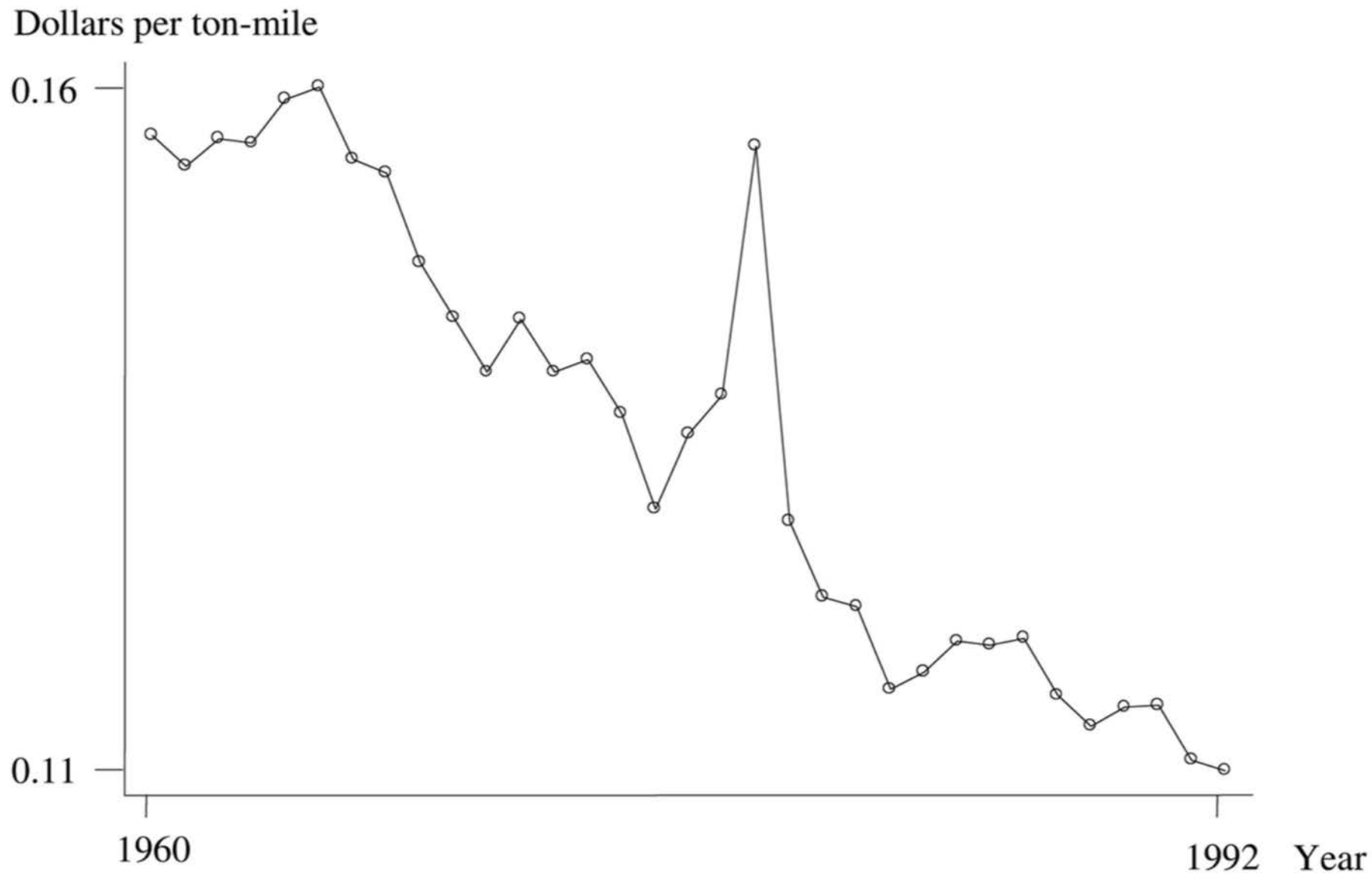


Fig. 5. Revenue per ton-mile, all modes together. *Source:* Bureau of Transportation Statistics Annual Reports

Ton-miles of freight

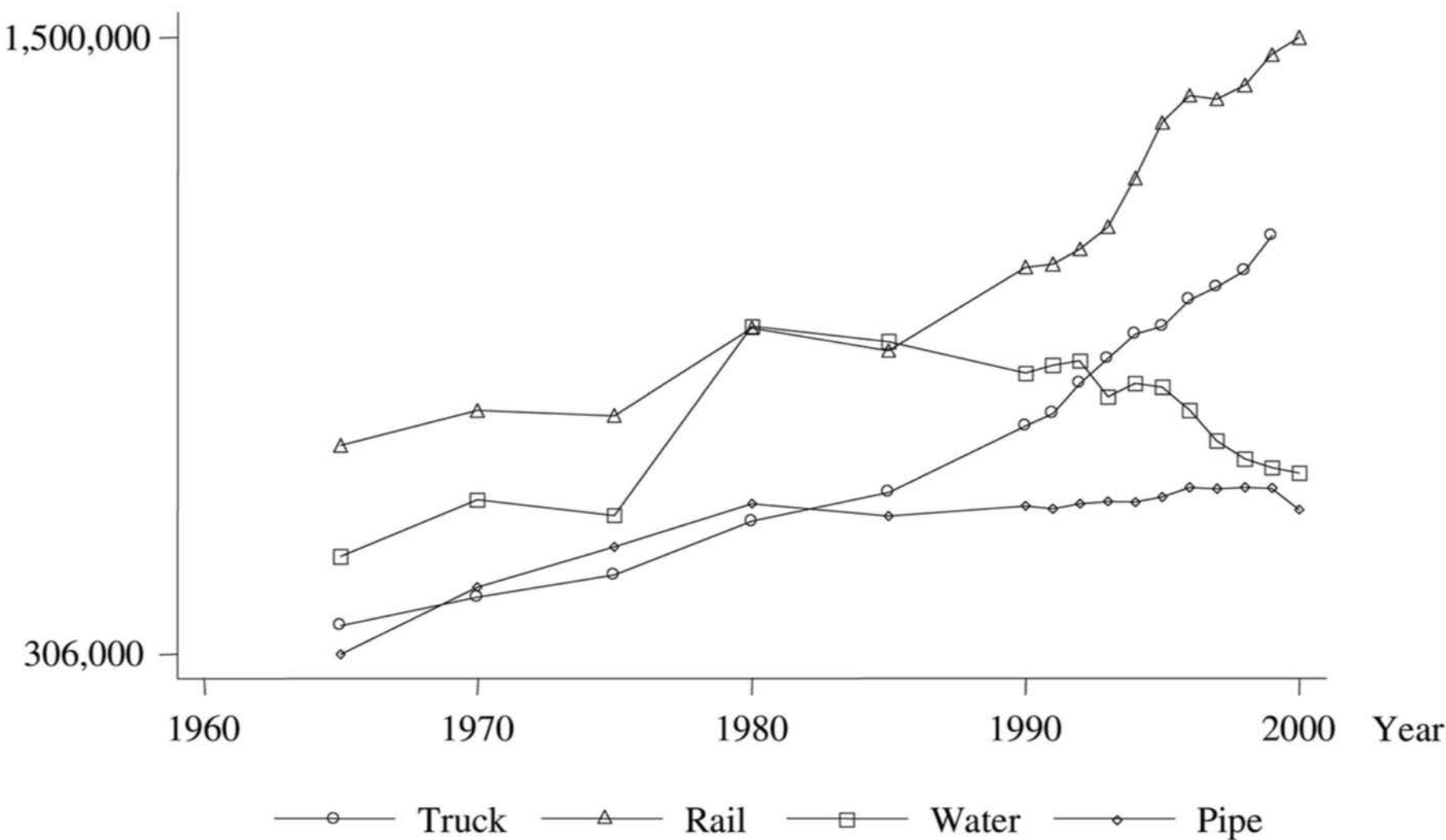


Fig. 6. Ton-miles of freight over time. *Source:* Bureau of Transportation Statistics Annual Reports