

Policy Options to Promote Car-sharing while Suppressing Private Car Usage: An Analysis by Trip Distance

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Research Description

Objectives

- Investigating the factors affecting car-sharing and private car choices
- Revealing the effectiveness of policy options that could promote car-sharing usage and suppress private car usage

Case study

China-Taiyuan (4m citizens, bike-sharing success, car-sharing not yet available)

Methodology

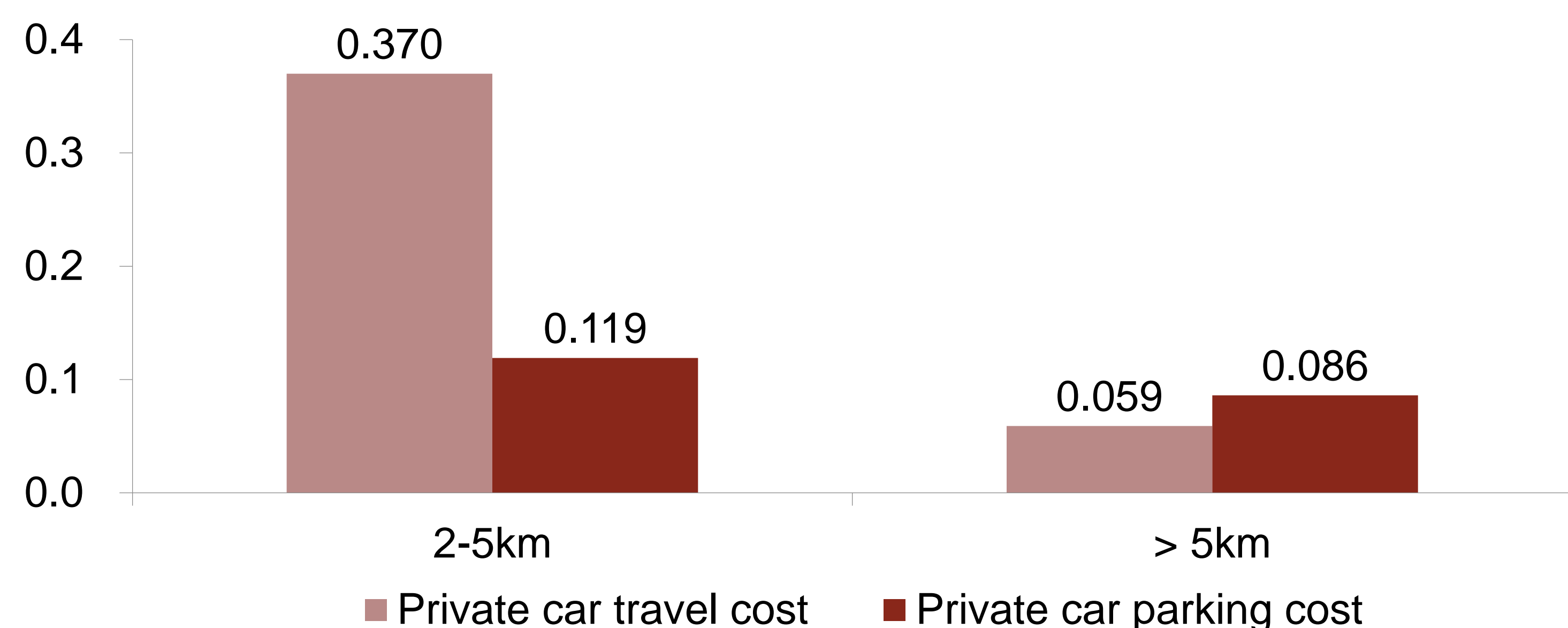
- Capturing car-sharing choice via a stated preference (SP) survey (while revealed preference (RP) trip diary information also being collected)
- Applying a mixed nested logit (**mixed NL**) model on the **pooled SP & RP data** to investigate the impacting factors
- Simulating the pattern of modal split changes in the SP environment to reveal the effectiveness of different policy options
- Calculating informative indicators (value of travel time savings, direct & cross elasticity) to generate wider insights

Sample breakdown

- Trip distance 2-5km: 3,698 individuals with 6,848 SP choice observations
- Trip distance > 5km: 6,317 individuals with 11,925 SP choice observations

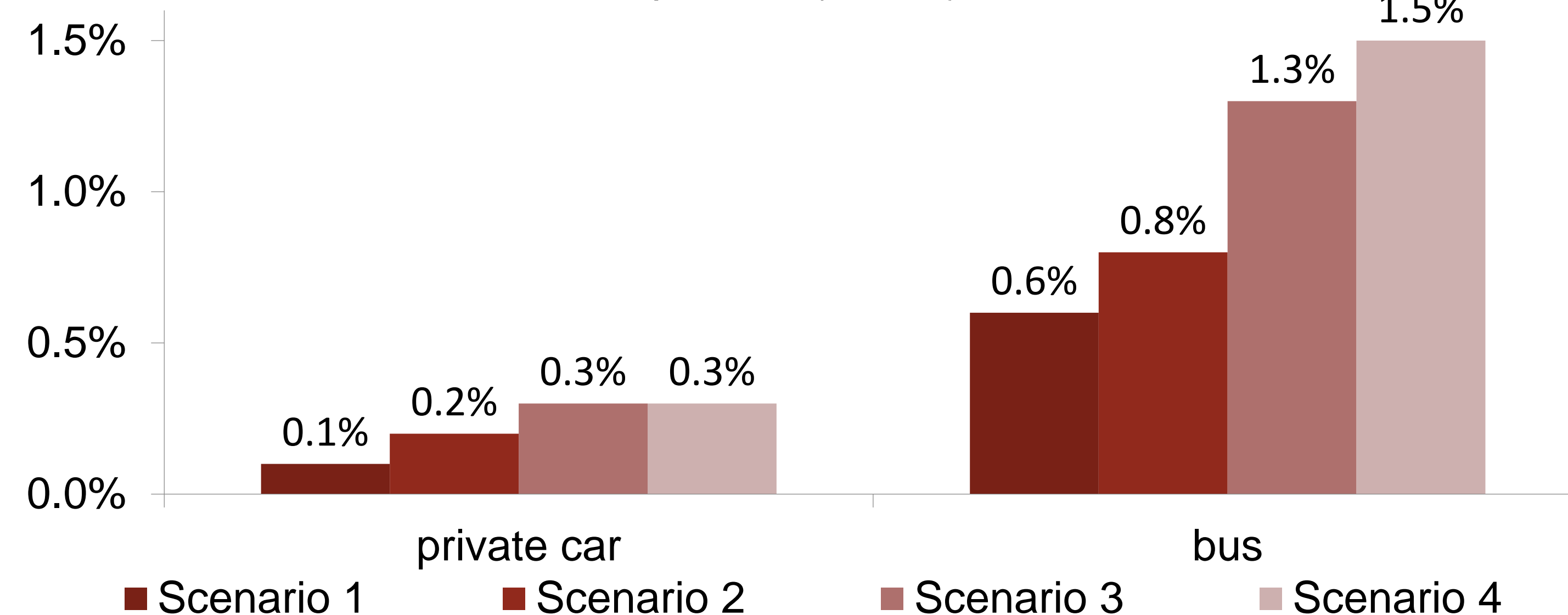
Finding #1: it is easier to make people switch away from private car in shorter trips

Direct point elasticity of private car demand (in absolute value)



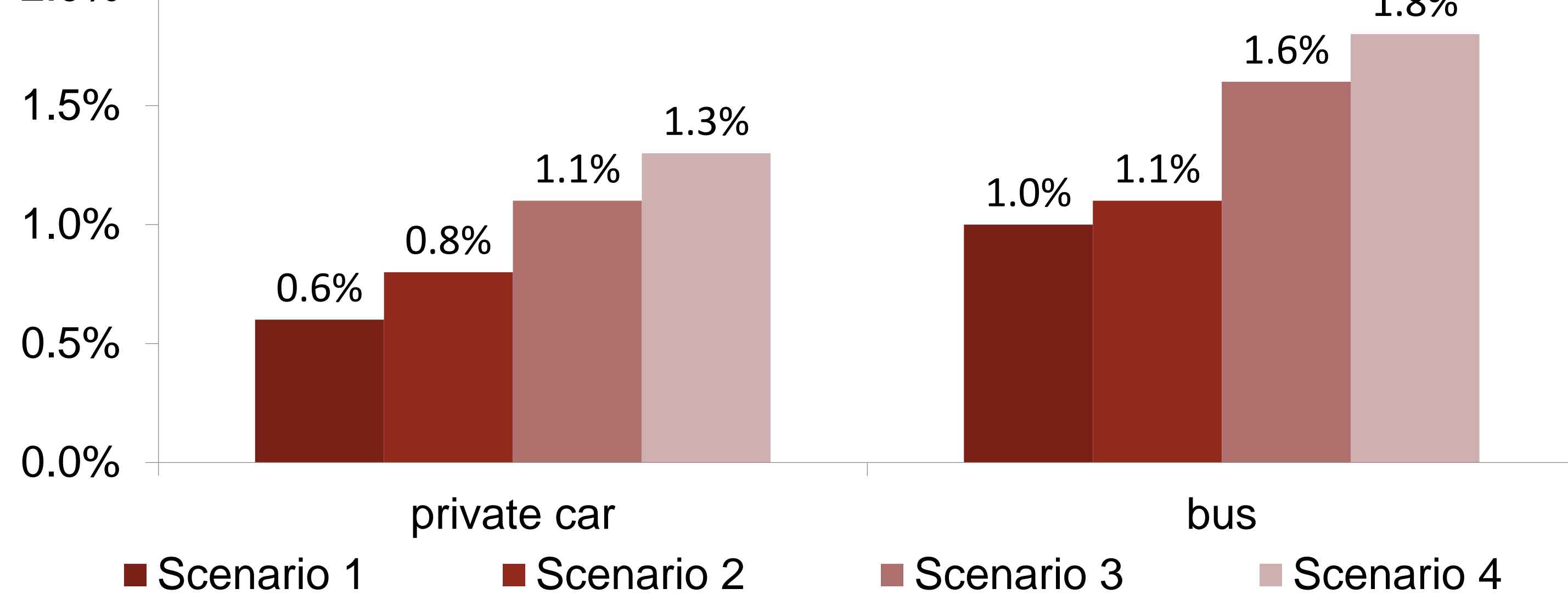
Finding #2: for shorter trips, an increasing demand for car-sharing mainly comes from bus users rather than private car users

Scales of market share decrease due to car-sharing promotion policies (2-5km)



Finding #3: for longer trips, as a comparison to above, private car users are more willing to choose a better car-sharing service

Scales of market share decrease due to car-sharing promotion policies (> 5km)

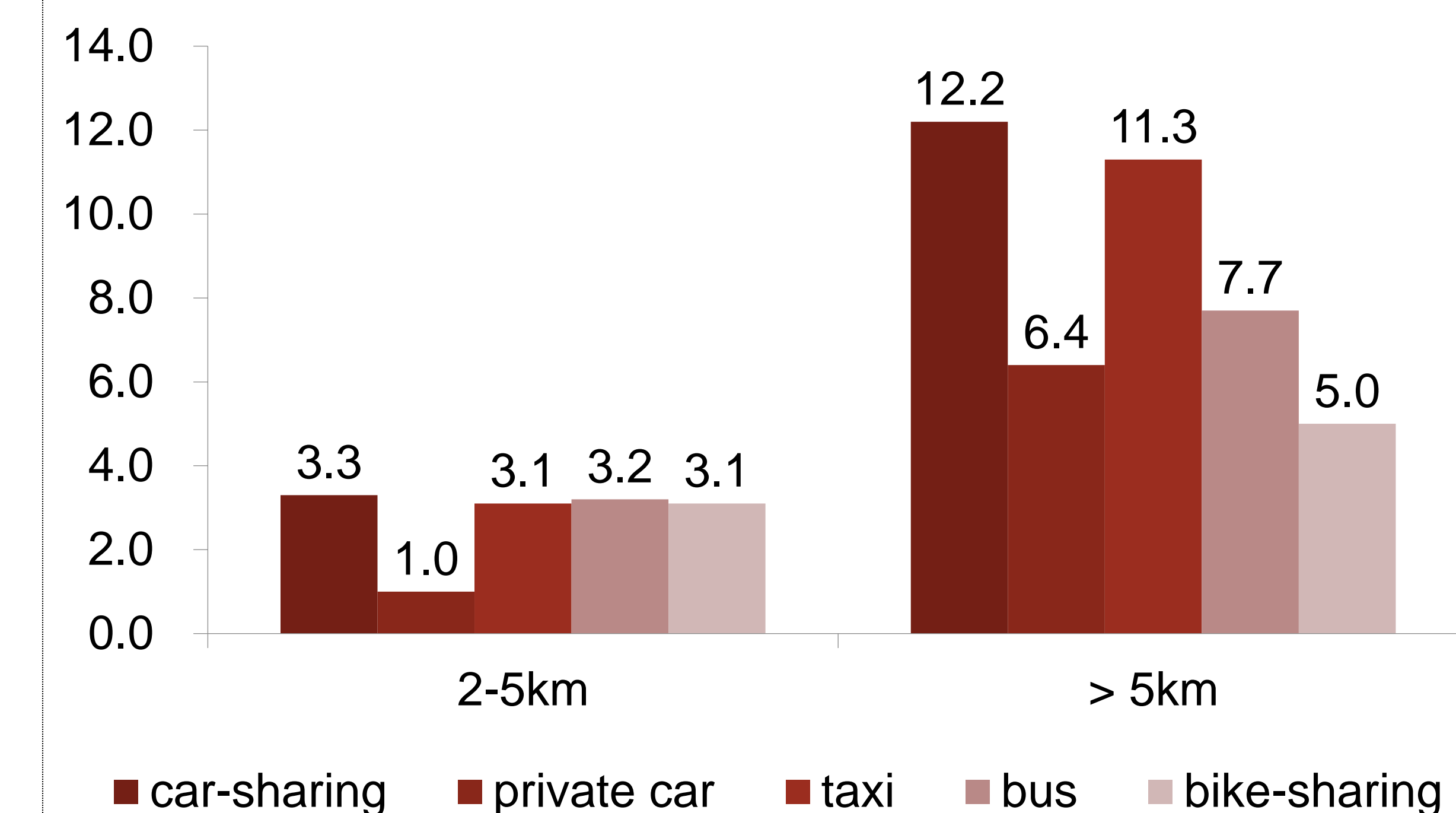


Concluding Remarks/Policy Takeaways

- Raising the cost of private car usage (e.g. via travel cost, parking cost) should be prioritized for shorter trips rather than longer trips (**Finding #1**).
- Shorter trips do need such measures to suppress private car usage, otherwise car-sharing would absorb more bus users instead (**Finding #2**).
- Longer trips need a more effective solution and that would be making car-sharing as an attractive alternative to private car (**Finding #3**).
- To promote car-sharing usage, in shorter trips, decreasing travel cost is more effective than travel time whereas in longer trips, decreasing travel time is more effective than travel cost (**Finding #4**).
- Back to the shorter trip case where measures on private car travel cost and parking cost would help, it is up to policy makers' discretion to prioritize which cost to be raised (**Finding #5**).

Finding #4: the value of travel time savings increases with trip distance for all modes

Value of travel time savings (in \$/h)



Finding #5: for shorter trips, there is not a clear preference in real practice between raising private car travel cost or parking cost for suppressing private car usage

- The elasticity results (0.370 vs 0.119, see Finding #1) indicate that travel cost increase is a more effective measure than parking cost increase;
- However, in real practice, parking cost increase usually has higher policy flexibility than travel cost increase—private car travel cost (i.e. fuel cost) heavily depends on market oil price whereas parking cost is often a rather local issue and less constrained for adjustment.
- The simulation results show that a hypothesized 20% travel cost increase is equally effective to a hypothesized 50% parking cost increase.

