

# Shaping Carpool Policies in China

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# Carpool in China: Status, Policies, and Arguments

- A new mode became popular in last few years
  - Massive auto acquisition by urban households
  - Gas price surge
  - Plate number-based driving restrictions in Beijing since the Olympics
- Rapid increase in online matching services
- Cities have been hesitant to embrace carpool
  - Illegal taxicabs?
  - Uninsurable?
- Carpool gaining more and more supporters than opponents

# Questions

- What are the differences in carpooling's social contexts and benefits between Chinese cities and cities that are highly motorized?
- What kind of carpool policies should Chinese cities adopt in the near future?
  - Should carpool be encouraged, facilitated, or subsidized?
  - Should China imitate major carpool policies, such as HOV/HOT lanes, in the West?

# The Up and Down of Carpool in the Industrialized World

- Since autos became mass produced and consumed, interest in carpool has been greatest during oil shortage or crisis
  - Commuting mode share was highest in late 1970s/early 1980s, e.g. ~20% in the U.S.
- Other social benefits were recognized by policies makers only ~20 yrs ago
  - Lowest social cost per passenger-mile among motorized modes
  - More and more policies encouraging carpool, e.g. HOV/HOT lanes and organized carpool
    - As other 2<sup>nd</sup>-best policies, subsidizing carpool has been well accepted politically
    - Effective in reducing congestion, with more favorable results for HOT
  - But carpooling commuters gradually replaced by SOVs since last peak, now roughly 10% in the U.S.
    - Increased household auto availability and falling real fuel cost

# Stated and Revealed Consumer Preference for Carpool in China

- Shanghai 2004 survey (ss=318)
  - 88% of the private car drivers will take carpool riders;
  - 40% of the commuters w/o car will be carpool riders;
  - All would-be carpoolers agree that riders need pay, while only 2% think there may be financial or accident liability arguments;
  - Willingness to carpool and pay increases with commute time length;
  - 73% approve carpool (93% say reasonable, 91% say safe, 65% say legal);
  - Preferred matching methods include third-party service (e.g. website) (70%), intra-community matching (19%), among colleagues (8%);
  - Most would-be carpool riders are female
- Beijing 2006-07 survey (ss=619 HH, 28% w/ cars)
  - 11% carpool (same for HH w/ and w/o car), rate higher among above-middle incomers;
  - 83% approve more formalized carpool (82% among non-adopters);
  - 79% non-adopters may adopt if more formalized
- Guangzhou 2007 online survey (ss=67): 82% support carpool
- Wuhan: Changqing Community 168 cars and their owners formed a free carpool network; survey (ss=863): 66% need carpool, 79% approve legalizing carpool
- Online survey (ss=143): 61.5% willing to be carpool riders; 66% support encouraging carpool

# Efficiency of Carpooling in China

- All else equal, higher occupancy means less cost per passenger – voluntary carpool is a Pareto improvement from solo-driving
- A comparison among the social costs of alternative commuting modes (Wang 2008) produce the breakeven occupancy necessary for cars to be as socially cost-effective as bus and bicycles for commuters in large Chinese cities
  - Assuming in-vehicle VOT 50% of avg. wage rate and 8% social discount rate
  - For radial corridors with peak volume of 10,000 pph, per passenger-km social cost of solo-driving is 2.5 to 4.2 times that of bus or bicycle
  - Considering carpool assembling cost and fact that time cost of traveling cannot be shared by carpoolers, real breakeven occupancy probably ~3-5.
  - Even higher on circumferential corridors

# Effectiveness and Equity Consequences of Carpooling in China

- Will more carpools reduce VKT/congestion?
  - Low auto ownership rate in Chinese cities (33/1000): at most 6.5% commuters may solo drive to work; the vast majority of urban travelers are transit riders, cyclists, or pedestrians
  - More carpools may reduce solo-driving, but more importantly, induce a mode shift from less comfortable but socially desirable transit, bike, and walk to travel by car
- If we subsidize carpooling using, e.g. HOV lanes
  - Subsidize the use of cars, attract more the would-be transit riders, cyclists and pedestrians
  - Subsidize the rich, esp. households that may take advantage by intro-HH carpools
  - Subject to induced traffic
  - Further encourage illegal cabs

# Conclusions

- Carpooling means more AND less in China
  - More attractive
    - Consumers in Chinese cities favor carpool much more than those in industrialized cities
      - Cost structure: capital, fuel, parking vs. time, income
      - Residential spatial pattern
  - Less socially desirable
    - For HOV $n$ + to be socially desirable,  $n$  should be at least 3, very likely 4 or 5
- Existing policies are barriers to voluntary carpool, a Pareto improvement
- Carpool subsidies are economically inefficient and regressive in Chinese cities
  - Subsidizing carpool does not qualify as a 2<sup>nd</sup>-best policy in Chinese cities as of now

# Policy Suggestions

- Clarify taxi regulations and legalize carpool
- Encourage carpool mainly through public education and informational service
- HOVs may be allowed to travel on bus lanes only when they are underutilized or HOT with reduced fee
- Encourage insurance providers respond to challenges and opportunities brought by carpooling
- Without subsidy, the further increase in carpooling should be taken as a success of TDM policies such as carbon tax, congestion toll, parking cashing out, etc.

# Thank You!

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