Japanese Facts on Car Demand & others

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Household (HH)
- Population
- Size of HH
- Aging
- Child reduction
- Marriage Age
- Driver attribution

Infrastructure
- Total distance of expressway
- Trend of all modes

Car demand
- Trip length
- Vehicle Kilometer Traveled (VKT)
- # of trips

Economic
- GDP
- Income distribution
- Gas price
- Fare

Car ownership
- # of cars
- # of license holders
- Size of car

Tentative working hypothesis

Clickable, move to figure
Decomposition Approach for Time Series Data during 1987 to 2009

$$\frac{\text{VKT}}{\text{population}} = \frac{\# \text{ of cars}}{\text{population}} \times \frac{\# \text{ of licenses}}{\# \text{ of cars}} \times \frac{\text{VKT}}{\# \text{ of licenses}}$$

$$\Delta \frac{\text{VKT}}{\text{population}} = \left( \Delta \frac{\# \text{ of cars}}{\text{population}} \right) \times \frac{\# \text{ of licenses}}{\# \text{ of cars}} \times \frac{\text{VKT}}{\# \text{ of licenses}} +$$

$$\frac{\# \text{ of cars}}{\text{population}} \times \left( \frac{\# \text{ of licenses}}{\# \text{ of cars}} \right) \times \frac{\text{VKT}}{\# \text{ of licenses}} +$$

$$\frac{\# \text{ of cars}}{\text{population}} \times \frac{\# \text{ of licenses}}{\# \text{ of cars}} \times \left( \Delta \frac{\text{VKT}}{\# \text{ of licenses}} \right)$$
\[
\frac{\text{VKT}}{\text{population}} = \frac{\# \text{ of cars}}{\text{population}} \times \frac{\# \text{ of licenses}}{\# \text{ of cars}} \times \frac{\text{VKT}}{\# \text{ of licenses}}
\]
Population size has been decreasing from 2009, “Aging Rate” increasing constantly.
Number of households is increasing because of the household size (number of household members) is decreasing. Does this decrease car activities?
Increase of average marriage age causes reduction of number of child, car activities, reduction of car sales market…
From 1990, one or two members household became major, now under 4 household covers 75%.
Because of aging, the share of license holders of younger generation is decreasing.
Number of cars has already saturated, however, small size vehicle share is increasing because of efficient & low price, and increase of female drivers → “Downsizing”

(“Small car”: engine displacement is under 660 cc)
Vehicle Kilometers Traveled (VKT) has been apparently decreasing from 2004, simultaneously downsizing occurred.

(“Small car”: engine displacement is under 660 cc)
The share of short trips has been increasing gradually.

Data: “Motor vehicle transport statistics” (sample size is about 15,000)
Low economic growth rate and high level of gas price were one of the major reasons for shrinking car activities.
Low income, especially increasing low income people causes car demand reduction
The share of short trip had been increasing, however, it was decreased in 2010.

Data: “Road Traffic Census” (sampling rate is about 3% of car owners)
The share of elder drivers is dramatically increasing, young drivers (20 or 30 years old male drivers) decreasing.

Share of characteristics of each car’s driver

Data: “Road Traffic Census” (sampling rate is about 3% of car owners)
Female young drivers is decreasing dramatically.

Data: “Road Traffic Census” (sampling rate is about 3% of car owners)
Now, 1/3 trips is covered by small size cars, number of total trips has saturated.

Data: “Road Traffic Census” (sampling rate is about 3% of car owners)
Average trip distance of small cars is shorter than others, however, it has been increasing. Small car is not “additive car”, alternates medium or large size car?

Data: “Road Traffic Census” (sampling rate is about 3% of car owners)
Because of difference of main purpose of car usage, female’s number of trips is greater than male.

Data: “Road Traffic Census” (sampling rate is about 3% of car owners)
Because of difference of main purpose of car usage, male’s average trip length is greater than male.

Data: “Road Traffic Census” (sampling rate is about 3% of car owners)
Amount of passenger kilometers of all modes peaked out from 2004.
Projection of future population in Japan.

How to keep our activities under the hyper-aging society…
Tentative working hypothesis for discussion

- Delaying marriage
- Falling birthrate
- Aging
- Decreasing income
- Low economic growth
- Vehicle downsizing
- Decreasing trip length
- Shrinkage of HH size
- Saturating # of trips
- Decreasing VKT
- VKT by sex, vehicle size, year

Factors:
- Social environment
- Urbanization ?
- # of license holders ?
- Gas price ?

Hypotheses:
- Falling birthrate
- Vehicle downsizing
- Decreasing trip length
- Shrinkage of HH size
- Saturating # of trips
- Decreasing VKT

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A-1
A-2
A-3
# of trips [million]

trip length [km]

VKT [million km*trips]

Male  Female

Small

except Small

Total
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