Session 2.1
Demand Analysis

Introductory Course on Economic Analysis of Investment Projects
Demand Analysis

• Critical to project success
• Methods of estimation
• Statistical projections
• Market surveys of potential customers
• Econometric modelling ‘contingent valuation’
**Statistical projections**

- Demand is a function of income, product price, competitors prices, taste/advertising.
- Simple projections based on income elasticity of demand and targeted/projected GDP growth.
- If elasticity is 1.2 then if GDP growth is 5% product demand growth is 6%.
Statistical projections

- Price can be included in a model where price elasticity is known or can be approximated.
- For transport:
  \[ T_{xt} = (T_{x0} (1+g_t)^y) \times \frac{C_{xt}}{C_{x0}}^n \]
- Where \( T_{xt} \) is traffic flow (AADT) for type \( x \), \( t \) is a future year, \( 0 \) is the base year, \( g \) is GDP per capita growth rate, \( y \) is income elasticity of demand, \( C \) is generalized travel costs including any toll payments, and \( n \) is a constant price elasticity.
Market surveys

- Can establish current expenditure patterns
- Contingent valuation (CV) surveys can be used to determine how much people would pay for good or service
- Also reveal what demand will be at a particular price
Generalized Travel Costs

Traffic

Demand

C1

C2

0

T1

T2
Willingness to pay

- Basis for consumer welfare change
- Used for economic analysis benefit valuation for non-traded goods
- Consumer surplus = WTP – actual payment
- Welfare triangle
Willingness to pay

- Important for tariff setting and used for benefit valuation in non-traded sectors
- CV surveys set bid price and establish if household will/will not use service/buy good at that price
- Probit model explains yes/no decision by set of variables relating to household characteristics, service quality and bid price
Mean willingness to pay

The probit model will be of the form \( Y = \alpha + \beta_1 X + \beta_2 B + \varepsilon \)

Where \( y \) is the yes/no response, \( X \) is a vector of variables reflecting household, area or other characteristics, \( B \) is the bid price and \( \varepsilon \) is an error term.

Mean WTP is derived from the expression

\[
(\sum (\beta_1 X^a) / \beta_2)^{-1}
\]

where \( X^a \) is the mean value of \( X \) variables.
Mean willingness to pay

- Where as illustrated below there is constant in the probit model ($\alpha$) this must be added to the sum of the products to give ($\alpha + \sum(\beta_1 \times X^a)$) so that mean WTP becomes

$$\frac{(\alpha + \sum(\beta_1 \times X^a)}{\beta_2} \times 1.$$ 

eg below Mean WTP = RMB 7.18
### Mean Willingness to Pay (MWTP) Calculation for Zhaoxian

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Mean</th>
<th>Coefficient*Mean</th>
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<tbody>
<tr>
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<tr>
<td>Income</td>
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<td>1.89640</td>
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<tr>
<td>Total</td>
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<td></td>
<td>1.42062</td>
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<tr>
<td>Mean WTP</td>
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<td><strong>7.18249</strong></td>
</tr>
</tbody>
</table>

Mean WTP \( (1.42062/-0.19779)*-1 = 7.18248515 \)
Mean willingness to pay

- The same approach can be applied to derive mean WTP for specific target groups by replacing the average value for each variable X (for example RMB 24.5 for income above) with the specific X value for the group concerned (for example RMB 20 for the very poor).
Thank you