Employee Transit Pass Program

Team 4
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Would a Subsidized Employee Transit Pass help UBC achieve its transportation targets?

**Target 1**
Sustainable Travel
by 2040 at least two-thirds of all trips to and from UBC will be made by walking, cycling or transit.
maintain at least 50% of all trips to and from the campus on public transit.

**Target 2**
Single Occupant Vehicles
reduce SOV travel to and from UBC by 20% from 1996 levels
maintain at least 30% reduction from 1997 levels in daily SOV trips per person to and from UBC

**Target 3**
Daily Private Automobile Traffic
maintain daily private automobile traffic at or less than 1997 levels.
POLICY QUESTION:

- Should UBC Vancouver subsidize an Employee Transit Pass program? What would the optimal subsidy amount be?

Further Research on:
- The effect on UBC employee ridership to campus
- The financial impact on UBC of a subsidized employee transit pass
ECONOMIC FRAMEWORK

- We conducted a cost-benefit analysis:
  - Benefits:
    - Consumer surplus (benefit to faculty & staff)
  - Costs:
    - Tax Implications (cost to faculty & staff)
    - Direct subsidy cost (cost to UBC)
    - Implementation costs (cost to UBC)

- Results are summarized as a table of costs and benefits
ASSUMPTIONS AND LIMITATIONS

- Assume those listed as using public transit use a monthly transit pass
- Could not isolate faculty and staff responses in the data
- Conducting analysis as a single three-zone pass
- Conduct analysis for each individual zone; using the same relationship between quantity and price from single three-zone pass
- Currently given excess demand for parking, we are uncertain how parking revenue would be affected
Estimating elasticity of demand for transit passes:

- Previous Employee Pass Program (EPP) introduced by TransLink, discontinued in 2014, offered a 15% discount
- Elasticity = (% change in Quantity) / (% change Price)
- Elasticity of demand is approximately –0.39
METHODOLOGY (3 ZONE PASS OPT IN MODEL)

Estimating the change consumer surplus ($\Delta CS$):
- Example: at a 50% subsidy price = $87
- Benefits to Faculty & Staff
  - $\Delta CS = $775,800.00$ (benefits per month)
  - $\Delta CS = $9,310,000$ (benefits per year)
NET BENEFIT TO FACULTY & STAFF

At 50% discount: Price = $87, Quantity = 10,105

CONSUMER SURPLUS
$9,310,000

TAX IMPLICATIONS
$3,713,000

NET BENEFIT TO FACULTY & STAFF
$5,596,000
METHODOLOGY (3 ZONE PASS OPT IN MODEL)

Total cost to UBC
- At 50% discount: Price = $87, Quantity = 10,105

DIRECT SUBSIDY COST TO UBC  
$10,549,000

IMPLEMENTATION COST  
$274,000

TOTAL COST TO UBC  
$10,824,000
METHODOLOGY (3 ZONE PASS OPT IN MODEL)

Net benefit of 50% subsidy

\[
\begin{align*}
\text{NET BENEFIT TO FACULTY} & \quad - \quad \text{TOTAL COST TO UBC} \\
$5,596,000 & \quad - \quad $10,824,000 \\
\text{NET BENEFIT OF SUBSIDY} & \\
- $5,228,000
\end{align*}
\]
<table>
<thead>
<tr>
<th>Discount Factor</th>
<th>Price of Transit Pass (per month)</th>
<th>Quantity sold</th>
<th>Net Benefit to Faculty and Staff</th>
<th>Total Cost to UBC</th>
<th>Net Benefit of Subsidy Program</th>
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<tbody>
<tr>
<td>0%</td>
<td>$174</td>
<td>7730</td>
<td>$0</td>
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<td>$0</td>
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<tr>
<td>10%</td>
<td>$157</td>
<td>8051</td>
<td>$1,056,000</td>
<td>$1,955,000</td>
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<td>20%</td>
<td>$139</td>
<td>8426</td>
<td>$2,135,000</td>
<td>$3,793,000</td>
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<td>30%</td>
<td>$122</td>
<td>8873</td>
<td>$3,244,000</td>
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<td>40%</td>
<td>$104</td>
<td>9417</td>
<td>$4,392,000</td>
<td>$8,140,000</td>
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<td>50%</td>
<td>$87</td>
<td>10105</td>
<td>$5,596,000</td>
<td>$10,824,000</td>
<td>-$5,228,000</td>
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<td>60%</td>
<td>$70</td>
<td>11015</td>
<td>$6,884,000</td>
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<td>80%</td>
<td>$35</td>
<td>14399</td>
<td>$10,016,000</td>
<td>$24,326,000</td>
<td>-$14,310,000</td>
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INDIVIDUAL ZONE OPT IN MODEL

- Total Cost for providing individual zone subsidy at 30% discount: -$1,695,798
- Total Cost for providing only a three zone pass at 30% discount: -$2,588,443
- On average 35% less expensive to provide individual zone subsidy passes
  - Most 27% less expensive (10% subsidy)
  - Least 38% less expensive (80% subsidy)
ANNUAL MANDATORY MODEL

- More expensive for UBC
- Expect similar change in ridership as in opt-in model
- Added intangible costs
SHADOW PRICING

- Intangible Goals Considerations:
  - Reputational Value
  - Environmental Goals
- We estimate the average value of reduced emissions per rider to be about $40
- If UBC values intangible benefits at size of negative monetary value, then project could still be worthwhile
<table>
<thead>
<tr>
<th>Current Revenue from Faculty &amp; Staff</th>
<th># of Passes Guaranteed by UBC</th>
<th>Price to keep TransLink Revenue Neutral</th>
<th>Subsidy</th>
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<tbody>
<tr>
<td>$1,345,020.00</td>
<td>8000</td>
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<td>14000</td>
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<td>$96.07</td>
<td>44.79%</td>
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<td>15000</td>
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<td>$89.67</td>
<td>48.47%</td>
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Subsidy cost to UBC

Cost to keep TransLink revenue neutral

$122,27
AREAS FOR FURTHER RESEARCH

- Having an accurate elasticity for all three transit zones individually, which would require data collection
- Looking into accuracy of parking revenue changes as there might be a waitlist
RECOMMENDATION

- UBC would incur a net financial loss under all subsidy programs analyzed
- Most cost effective strategy: Negotiate with TransLink
  - If unable to negotiate, Individual Zone Model is more cost effective than Single Three-Zone Model
  - Produces about the same quantity of passes purchased