Employee Transit Pass Program

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CURRENT SITUATION

- 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)

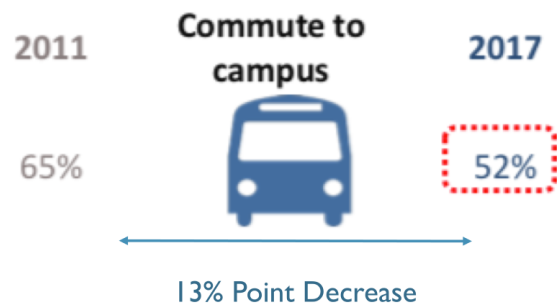- Results are summarized as table of costs and benefits

Consumer Surplus − Tax Implications − Implementation Costs − Direct Cost of Subsidy = Net Benefit of Program

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
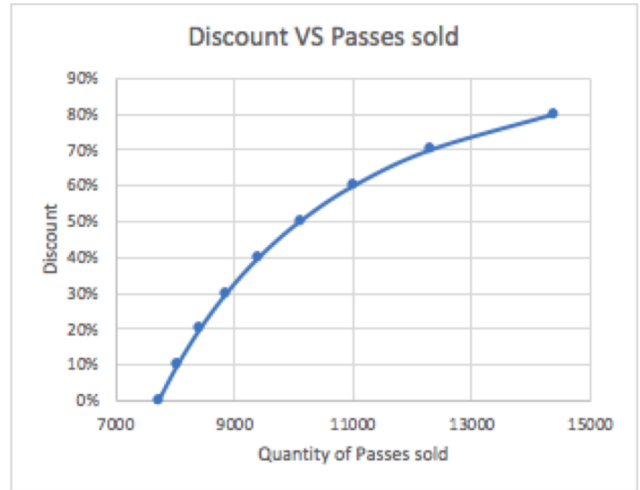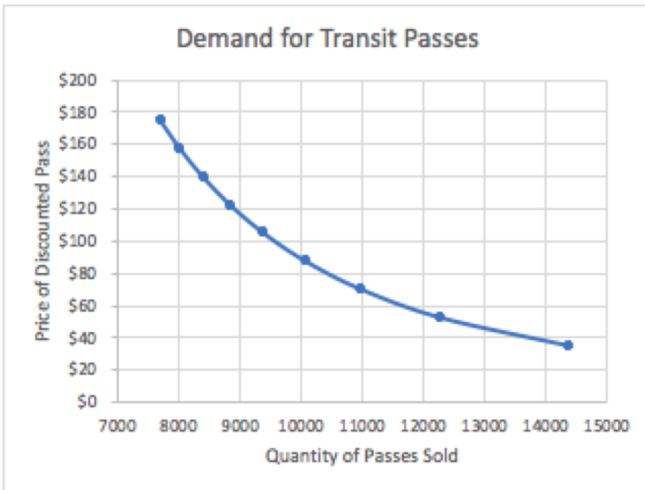
METHODOLOGY
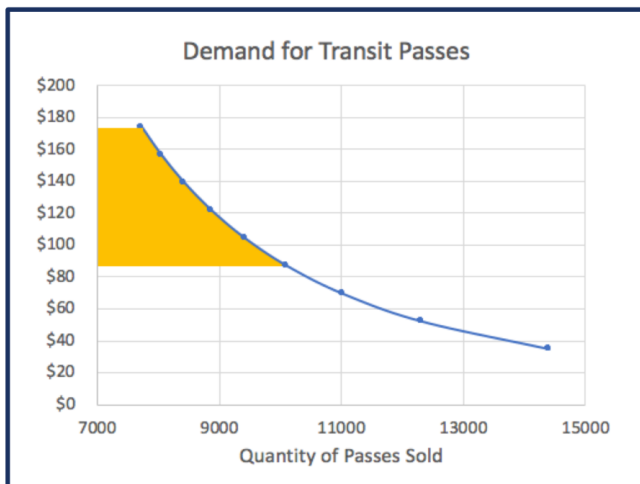
Estimating elasticity of demand for transit passes:

- 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

2011   **Commute to campus**   **2017**

65%   52%

13% Point Decrease

METHODOLOGY

Demand for Transit Passes

Discount VS Passes sold

METHODOLOGY (3 ZONE PASS OPT IN MODEL)

Demand for Transit Passes

(chart: Quantity of Passes Sold vs. price, with shaded area under demand curve)

Estimating the change consumer surplus (ΔCS):

- Example: at a 50% subsidy price = $87
- Benefits to Faculty & Staff
  - ΔCS = $775,800.00 (benefits per month)
  - ΔCS = $9,310,000 (benefits per year)

METHODOLOGY (3 ZONE PASS OPT IN MODEL)

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		IMPLEMENTATION COST		TOTAL COST TO UBC
$10,549,000	**+**	$274,000	**=**	$10,824,000

METHODOLOGY (3 ZONE PASS OPT IN MODEL)

Net benefit of 50% subsidy

NET BENEFIT TO FACULTY & STAFF	−	TOTAL COST TO UBC	=	NET BENEFIT OF SUBSIDY
$5,596,000		$10,824,000		- $5,228,000

3 ZONE PASS OPT IN MODEL ANNUAL NET BENEFITS

| Discount Factor	Price of Transit Pass (per month)	Quantity sold	Net Benefit to Faculty and Staff	Total Cost to UBC	Net Benefit of Subsidy Program
0%	$174	7730	$0	$0	$0
10%	$157	8051	$1,056,000	$1,955,000	-$899,000
20%	$139	8426	$2,135,000	$3,793,000	-$1,658,000
30%	$122	8873	$3,244,000	$5,832,000	-$2,588,000
40%	$104	9417	$4,392,000	$8,140,000	-$3,748,000
50%	$87	10105	$5,596,000	$10,824,000	-$5,228,000
60%	$70	11015	$6,884,000	$14,074,000	-$7,190,000
70%	$52	12310	$8,312,000	$18,267,000	-$9,955,000
80%	$35	14399	$10,016,000	$24,326,000	-$14,310,000

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 Considerations (Per Rider/Year)**
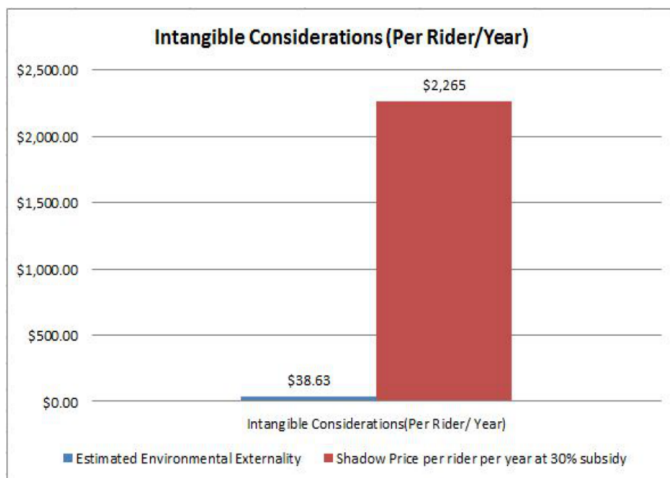
- Intangible Goals Considerations :
  - Reputational Value
  - Environmental Goals
- We estimate the average value of reduced emissions per rider to be about $40
- If UBC values intangible benefits at size of negative monetary value, then project could still be worthwhile

TRANSLINK

Current Revenue from Faculty & Staff	# of Passes Guaranteed by UBC	Price to keep TransLink Revenue Neutral	Subsidy
$1,345,020.00	8000	$168.13	3.38%
	9000	$149.45	14.11%
	10000	$134.50	22.70%
	11000	$122.27	29.73%
	12000	$112.09	35.58%
	13000	$103.46	40.54%
	14000	$96.07	44.79%
	15000	$89.67	48.47%
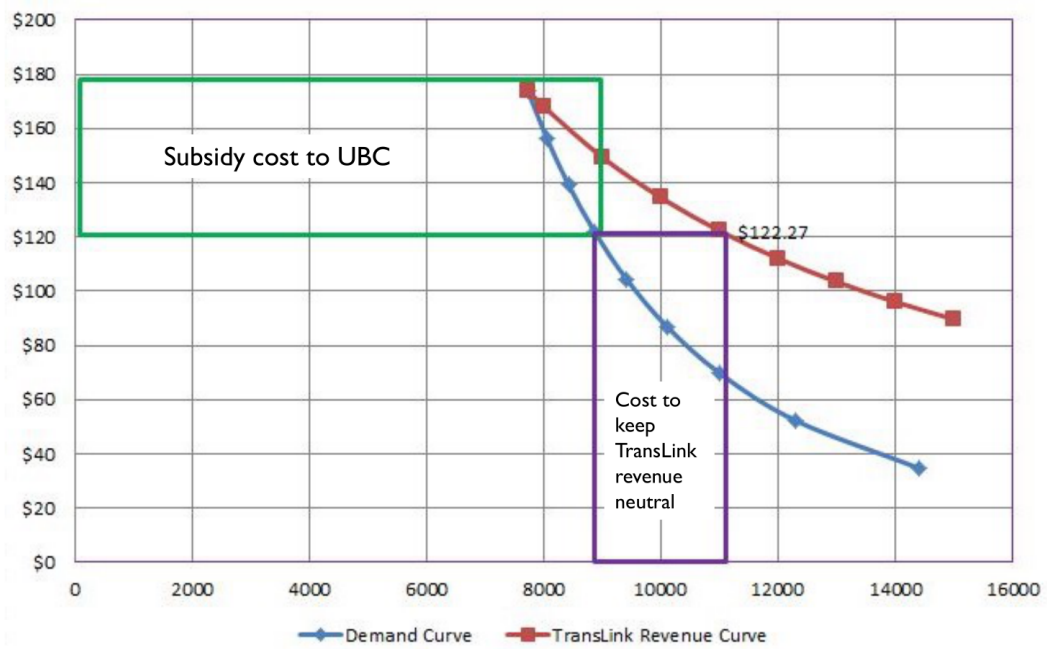
AREAS FOR FURTHER RESEARCH

- 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 finanlial 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