Toll Equity on WSDOT Toll Facilities

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Toll Equity in Washington

• Extension of the 2019 work by the Data Science for Social Good program at the University of Washington

• That study examined use of the I-405 Express Toll Lanes throughout 2018

• That study found...
Overall, higher-income households use the HOT lanes more.
Most households that use the system are not high-income
Most users don’t use the system much
Few trips are made by low-frequency users
Higher-income households benefit overall
Per trip, lower-income drivers get more net benefit
Income by frequency of use

One-time users have lower incomes
High-income drivers travel more often during low-toll periods.
This study
1) Is reviewing the literature about other toll equity programs in the U.S.
2) Updating the I-405 project results using data from July 2021 – June 2022
3) Examining and comparing the SR 167 HOT lane use with I-405 Express Toll Lane Use
4) Examining use of
   1) SR 520
   2) SR 99
   3) SR 16
Toll Equity in Washington

• These facilities have different tolling approaches

• Exist in parts of the state with very different income distributions

• Have very different opportunities to avoid paying tolls
  • SR 16 – no real option
  • SR 99 & SR 520 – alternatives exist, given modest geographic diversion
  • SR 167 & I-405 – easily selected, parallel facilities
Project Goals

• Provide a better understanding of who is using (and not using) these facilities

• Examine how household income and tolling approach effect use of these roadways

• Provide an understanding of how benefits and costs associated are currently being distributed

• Provide a baseline against which changes can be measured against given changing economic conditions or policy decisions
Data Being Used

- Census data – at the block group level
- Roadway performance on I-405 and SR 167
  - Travel times
  - Volumes
  - Speeds
- Toll transaction data
  - July 2021 – June 2023
    - Time and price
- Billing location data – at the census block group level
  - (i.e., we know the neighborhood where bills are sent)
Location based services data (LBS) from smartphones

- A large sample of origin / destination of trips in the state
  - ~200,000 trips per day
- Allows analysis of trips that use our five facilities
  - Origins and Destinations
  - Travel times (and date / time of trip)
  - Whether a given trip uses one of the five facilities
- Census block group of “home location” for those trips

Not limited to users of the toll facilities

- Provides an understanding of who is making trips on the toll facility, as well as who is making similar trips, but that do not use the toll facility
Project Schedule

• Started June 2022

• Ending June 2023

• Project Status
  • Have had some delays obtaining the LBS data
  • Have all other data
  • Have performed most DSSG computations for new data
    • Currently performing quality control on those analyses
Literature Review

• Equity
  • Provide equitable access to affordable and reliable transportation options based on the requirements of the communities being served

• Areas of Equity Consideration
  • Process equity
  • Outcome equity
  • Income equity
  • Geographic equity
  • Modal equity
Summary of Low-income Toll Programs

• Los Angeles
• Virginia (Hampton Roads / Newport News)
• Illinois (I-Pass)
• San Mateo, CA
• Bay Area (I-880), CA  
  • I-880 (starting up)  
  • Treasure Island (proposed)
• Colorado (starting up)
• Portland, OR (proposed)
Summary of Programs

• Benefits

• Eligibility

• Enrollment, verification, dealing with the unbanked
Benefits

• LA
  • $25 one-time payment to the account
  • Waived maintenance fee
  • Earn $5 for taking 15 transit trips
  • Investment in neighborhood projects

• VDOT
  • 50% discount on first 10 weekly trips
  • No minimum balance

• San Mateo
  • $100 transit card, OR
  • $100 toll transponder account

Reinvest the revenue so that those who incur the costs also receive the benefits.

Because generalized costs impact the surrounding communities, those communities should receive the benefits.

Keep revenues focused on transportation investments.
Benefits

• I-Pass
  • 50% off – if prepaid toll account
  • Free I-Pass transponder
  • Lowered initial account balance requirement
    $4 instead of $10
  • $20 initial account gift upon enrollment
  • Eligible for eliminated late fees

• I-880
  • 50% reduction in standard ETL rate
Benefits

• Colorado
  • Free switchable transponder
  • $100 toll credit first year
  • Free transit passes

• Treasure Island (not yet operational)
  • Graduated discount for residents based on income level
  • Monthly subsidy for low-income workers on the island
Eligibility

• LA
  • Resident of LA County
  • Income <200% of federal poverty level

• VDOT
  • Annual income < $50,000
  • Resident of Portsmouth City or Norfolk County

• San Mateo
  • Less than 60% of area median income
  • Resident of San Mateo County
Eligibility

- **I-Pass**
  - Income <250% of FPL
  - Resident of Illinois

- **I-880**
  - Income <200% of FPL
  - Resident of the Bay Area

- **Colorado**
  - Income <200% of FPL
  - Resident of Globeville or Elyria-Swansea

- **Treasure Island**
  - Income <55% - 120% of AMI
  - Residency/work location on island)
Enrollment, Verification, Unbanked

• LA
  • By phone or service center (CSC)
  • Cash loading at CSC or 7-11 stores (PayNearMe $1.50 fee)
  • Verify at CSC
• VDOT
  • Annual (re)application at CSC
  • Reload via cash with $1.50 fee
• San Mateo
  • On-line or at 8 CSC
  • Uses MTC’s income verification system
Enrollment, Verification, Unbanked

• I-Pass
  • Electronic application process
  • Verified annually

• I-880
  • Apply via computer, mobile phone or in-person
  • Re-verification every two years

• Colorado
  • In-person or on-line
  • Payment via PlusPass App
  • Cash has a $2 transaction fee
Toll Facility Use By Income Distribution

• There is a common distribution pattern of facility use by income
  • Higher income households use the toll facilities more often than lower income households

• However, the income distribution of the toll facility user population is also affected by proximity to the facility and availability of alternatives
Ecological Inference used to assign census demographics to IDs
State income distribution has higher fraction of low income households compared to toll facility users.

Higher use of SR 520 by high-income households.

SR 167 has higher mid-income households.

Income distribution (not trips) of households in the entire state.
Use of the Toll Facility by Frequency of User Observation

Much higher use of SR 520 & SR 99

Many one-time users of SR 99

Much smaller user base on SR 167

Number of Annual Trips

Travel Group

Travel Group

Number of Annual Trips

Total Accounts
How Often Do People Use the Toll Facility?

- Higher fraction of single trip users on SR 16
- Lower fraction of single trip users on SR 520
- Lower fraction of very frequent users on SR 99

Frequency of Use of the Toll Facility:

- Fraction of Users
- How Often Do People Use the Toll Facility?
Income Distributions in the State
Number of Households with Income Below $50,000
Number of Households with Income Below $50,000
Number of Households with Income From $50,000 to $99,999
Number of Households with Income From $100,000 to $149,999
Number of Households with Income Greater than $150,000
Use and Income for I-405 Users
Number of Trips from Households with Income Below $50,000 Using I-405 ETL
Number of Trips from Households with Income from $50,000 to $99,999 Using I-405 ETL
Number of Trips from Households with Income from $100,000 to $149,999 Using I-405 ETL
Number of Trips from Households with Income Greater than $150,000 Using I-405 ETL
Use and Income for SR 520 Users
Surprising that some low-income trips exist in some places on the eastside, but there are low-income households, according to the census.
Moderate trip making patterns on both sides of the lake.
Number of Trips from Households with Income from $100,000 to $149,999 Using SR 520

Moderate trip making patterns on both sides of the lake
Number of Trips from Households with Income Greater than $150,000 Using SR 520

Heavier use from the eastside and from Capital Hill / Madison Valley
Use and Income for SR 167 Users
Number of Trips from Households with Income Below $50,000 Using SR 167

Trips are primarily from the east of SR 167
Number of Trips from Households with Income from $50,000 to $99,999 Using SR 167

Lots of trips from the southern part of the region, only moderate trip making from the Kent Hill
Number of Trips from Households with Income from $100,000 to $149,999 Using SR 167
Number of Trips from Households with Income Greater than $150,000 Using SR 167
Use and Income for SR 99 Users
Number of Trips from Households with Income Below $50,000 Using SR 99

As expected, most SR 99 users live west of the corridor.
Number of Trips from Households with Income from $50,000 to $99,999 Using SR 99
Number of Trips from Households with Income from $100,000 to $149,999 Using SR 99
Number of Trips from Households with Income Greater than $150,000 Using SR 99

Interesting number of trips from West Seattle

Expected number of trips from Queen Anne / Ballard
Use and Income for SR 16 Users
Many more SR 16 accounts live north of the bridge than south of the bridge.
Number of Trips from Households with Income from $50,000 to $99,999 Using SR 16

Many trips are made from Gig Harbor and its surrounding areas, regardless of income level.
Many trips are made from Gig Harbor and its surrounding areas, regardless of income level.
Number of Trips from Households with Income Greater than $150,000 Using SR 16

Many trips are made from Gig Harbor and its surrounding areas, regardless of income level.
Current Work

• We are testing LBS data for data quality and reliability

• Initial tests show it to be good
Next steps

- Finish value of time and value of reliability calculations

Lower peaks in 2021
No negative SB AM reliability
Next steps

• Compare total trip making (LBS data) with trips made with toll transaction data
  • Tells us about possible bias in the LBS data

• Compare Origin/Destination travel times for trips that use the facility versus travel times with similar start/end points but that don’t use the facility
  • Observed value of time
  • Geographic bias in the travel patterns
Outcome Goals

• Understand impact of tolls on travel behavior
  • Value (time and dollar) of travel benefits from taking the toll facilities
  • Number of trips made (using/not using the toll facilities)
  • Size of diversion
  • Impact of toll on trip making for low-income communities
Questions?
Extra Slides if Desired
Number of Households with Income From $50,000 to $99,999
Number of Households with Income From $100,000 to $149,999
Number of Households with Income Greater than $150,000