

Current economic opportunities and challenges facing Auckland transport system

Commuter choice: car or public transport and what influences this choice

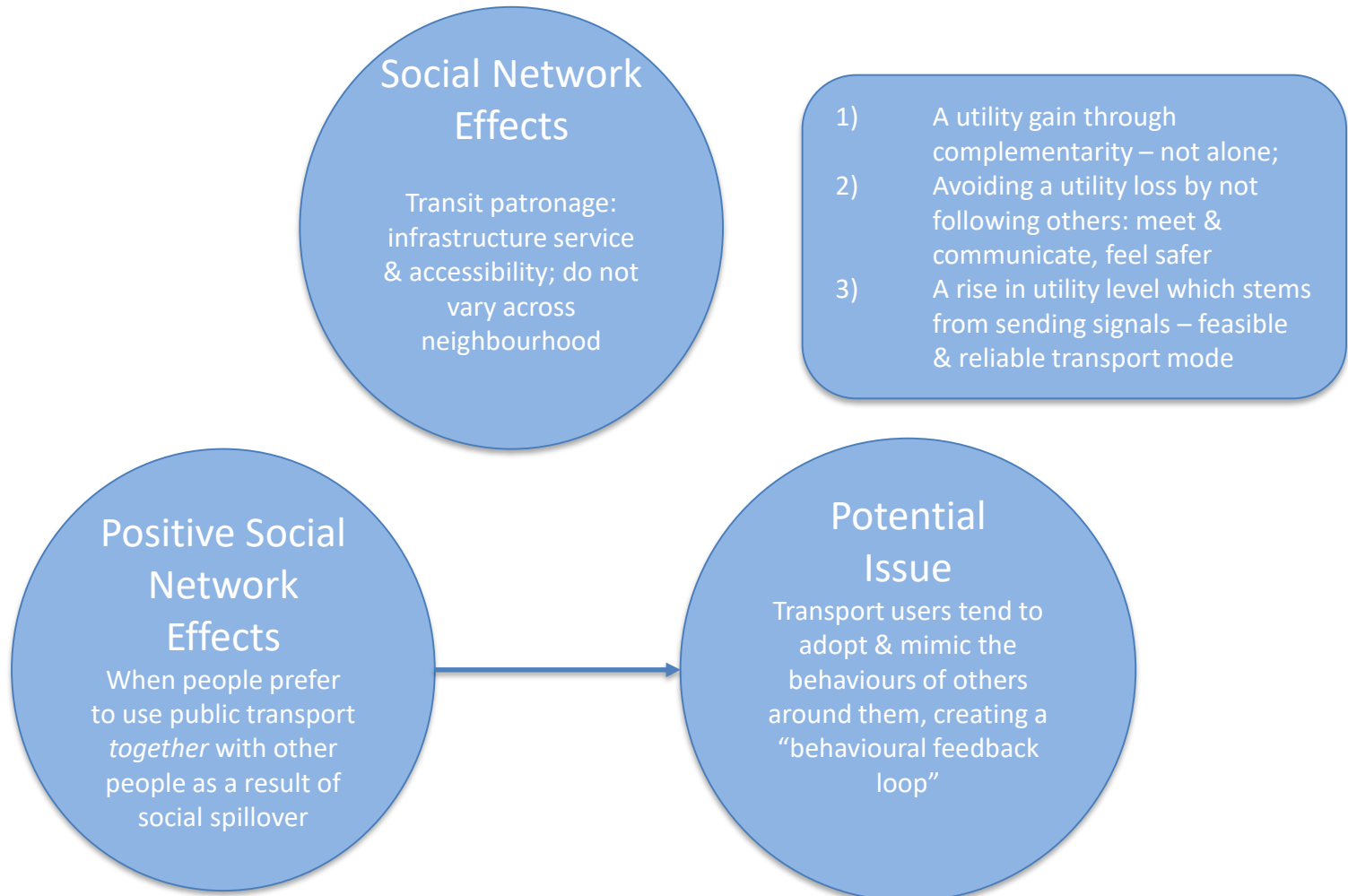
Selena Sheng
Energy Centre

Energy Spotlight 2018



Current Challenges

neighbourhood effects/peer effects/social interactions/social spillovers



Questions & Proposed Solutions



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1. To understand commuter's different transport mode preference in Auckland.
2. To fill the research gap of lacking of incorporation of social network effects – 1st study in NZ
3. To quantify the impact of social network effects on public transport.
4. To correct for the correlation nature of the social network effects.

What is the probability that a commuter will choose to use public transport to go to work, given the transport mode preference of his/her neighbours and the characteristics of the regions where he/she lives?

Model Specification



1. Transport mode choice model WITHOUT social network effects

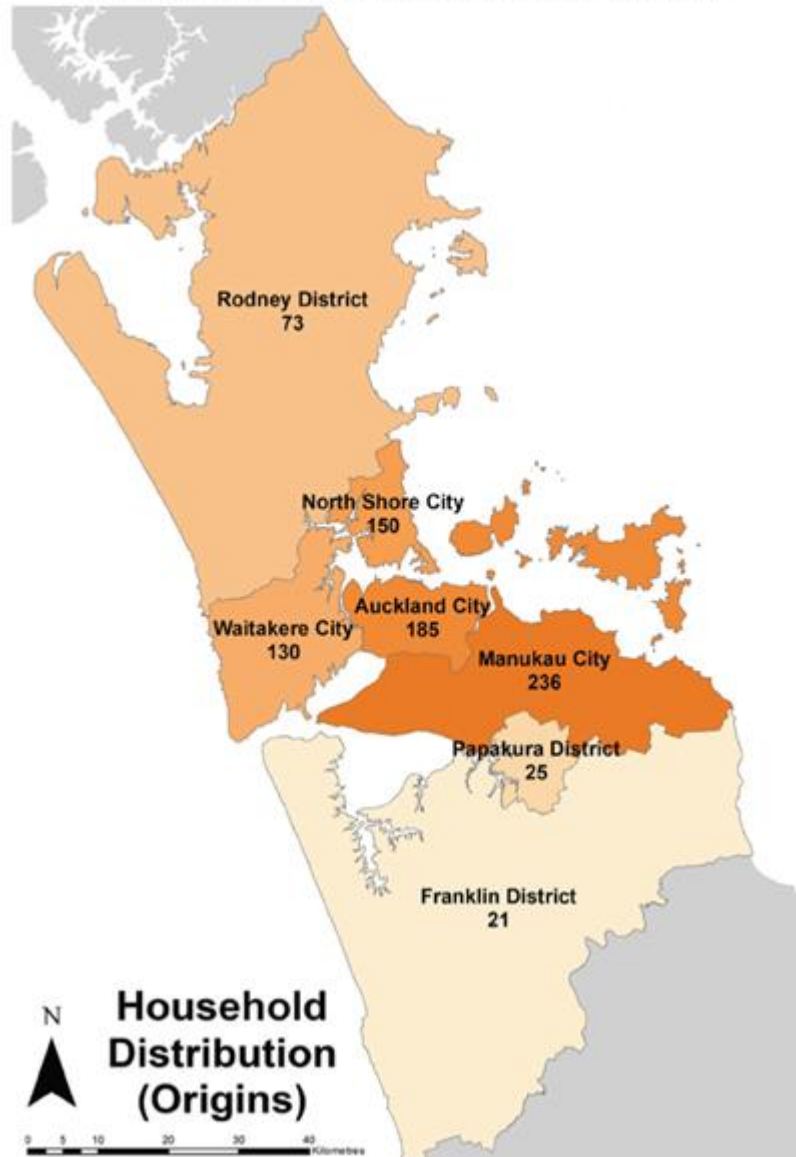
- *The probability that Selena chooses public transport over car:*
 - Her utility level of using public transport > Her utility level of using car*
- *Selena's utility level could be dependent on:*
 - *She has a relatively large family: 5 people*
 - *She is a mother of 2 boys;*
 - *Her household has 2 cars;*
 - *She has a full – time job and works in the CBD;*
 - *She has to walk 3km + to the nearest bus stop; etc.*

2. Transport mode choice model WITH social network effects

- *Social network effects:*
 - *How to define a "neighbour" e.g. Selena & Bas?*
- *Potential issue:*
 - *Average transport mode choice by Selena's neighbours*

Study Area and Timeframe

Figure 1
Distribution of All Surveyed Households in the Auckland Region by Colour Bands



- Data source: NZHTS by the MoT.
- An official nationwide on-going household travel survey since 2003/04.
- Home-based work trips only.
- Auckland region (7 cities/districts).
- Household locations: NOT spatially random.
- Study period: 2005/06, 2006/07, 2007/08, & 2008/09.
- Total # of observations: 814 (23.2% of the total)

Variables



Potential factors affecting transport mode choices by commuters:

1. Personal/household characteristics

- Household size
- Children
- Number of vehicles
- Income
- Gender
- Work status
- Age

2. Trip details

- Trip distance
- Distance to the nearest public transport station
- Whether Origin/Destination is Auckland City

3. Others

- Petrol price
- Year Effects

Results



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1. Social network effects do exist within the data

- As confirmed by several tests.

2. Positive social network effects found among commuters

- The probability that commuters choose to take public transport to go to work increases when their neighbours have a high propensity to do so.

3. All other control variables have expected signs (except work status)

4. Confirmation of correlation issues

- Revealed by the results from the 2nd model.

5. Robustness check

- Excluding long-distance trips (#13), walking distance trips (#81), or both (#94).
- Extremes have little influence on the results.

Policy Implications

- Transport mode choice decision-making is dependent on social network effects.
- People's transport mode choice decisions **DO** influence each other, **positively**
 - As the % of commuters taking public transport to work increases, we expect to see a spillover effect that changes some non-public transport users travel behaviour.
- The social network effects = the 2nd largest impact (approx. 20%) on commuter's transport mode choice (in Auckland, after household vehicles, approx. 30%).
 - Shifting road user's travel behaviour - a more economical way?
- For urban/transportation planners:
 1. on infrastructure improvements
 2. on strengthening the city's 'greener' transport mode culture
- For future transport policy:
 1. Campaigns
 2. Ads on social media
 3. Public transport Ambassadors



Limitations and Future Work



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- **Omitted variables:** the high estimated value of the social network effects parameter
- **More info on the supply side of public transport (preferences for flexibility, comfort, & infrastructure quality etc.)**
- **Panel data:** multiple commuters through multiple years (the MoT)

Sheng, M. and Sharp, B. (2019). Commuter's Transport Mode Preferences and Social Network Effects in New Zealand: An Instrumental Variable Approach. *Journal of Transport Economics and Policy*, 53(1), 19-46.

Other related work-in-progress projects:

➤ 2018 – 2020, University of Auckland – Business and Economics Faculty Research Development Fund (Principle Investigator), ***Experimental Study of Congestion Pricing and the Role of Public Information***, Project Number 3717596.

➤ 2017 – 2022, Ministry of Business and Consumer Affairs – Good Employment Endeavour Fund 2017 (Associate Investigator), ***Development of IPT-based Transportation Systems***, Research Project 3714101.



Thank you 😊
Questions?