



Understanding the Wider Value of Honor Based Ticketing in Light Rail

Professor Graham Currie James Reynolds

PUBLIC TRANSPORT RESEARCH GROUP Institute of Transport Studies Monash University, Australia

Light Rail 2016 – Transforming the urban transport landscape Pullman Melbourne on the Park 25th February 2016



Agenda

- 1 Introduction
 - 2 Research Context
 - 3 Model Development
 - 4 Results
 - 5 Discussion and Conclusions







Melbourne, like most Light Rail systems, uses Honor Based or Proof-of-Payment (POP) fare collection

- · Passengers must have valid ticket
- Random ticket inspections for enforcement
- Allows passengers to board and alight at any door

All door boarding and alighting in Melbourne, Australia

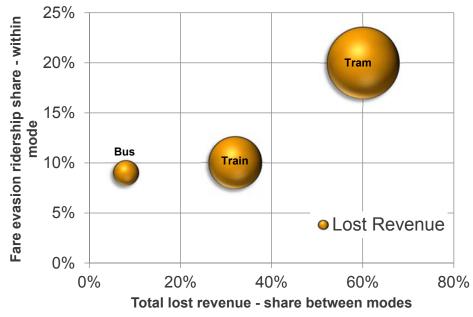


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This is often criticised in the media/community because of high fare evasion rates



Source: ITS (Monash) analysis of the Fare Evasion and Valid Concession Percentage Survey - 2011







An alternative is Pay-on-Entry (POE) fare control such as adopted in Toronto

- Pay fare to driver on boarding, or show valid pass, transfer etc.
- Allows close monitoring of fare payment
- Requires all passengers to **board by the front door**

Front Door Boarding on a Toronto Transit Commission Streetcar



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The trade-offs between POE and POP on LRT have not been fully explored

versus

Pay-on-Entry (POE) Pay driver Longer boarding times Lower fare evasion

Fare Revenue Increases?

Operational Costs / Savings?

Capital Costs?

Honor Based / Proof-of-Payment (POP) Pre-purchase ticket Shorter boarding times Higher fare evasion

Fare Evasion Losses?

Operational Costs / Savings?

Capital Savings?

THIS RESEARCH:

- Develops a model of the Melbourne Tram Network to directly compare the overall financial impacts of POE with POP, and
- Investigates how:
 - Reduced fare evasion under POE fare control; compares to
 - Costs due to **slower boarding times** compared to Honor Based/ POP system.

Currie G and Reynolds J (2016) 'Evaluating Pay-on-Entry Versus Proof-of Payment Ticketing in Light Rail Transit' Transportation Research Record - Transportation Research Board 95th Annual Meeting January 2016







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Trams in Melbourne have open access, while trains and buses have more control of fare payment



Melbourne Tram Network

- Enter by any door (open access)
 - No interaction with driver
 - Roving ticket inspectors

Melbourne Rail Network

- Barrier gates at central stations
- Roving ticket inspectors



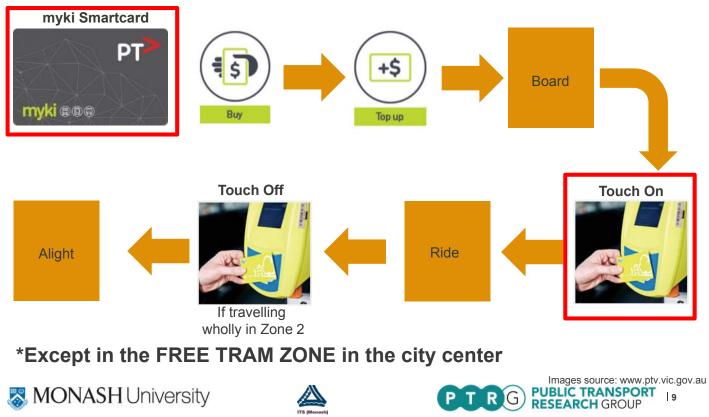


Melbourne Bus Network

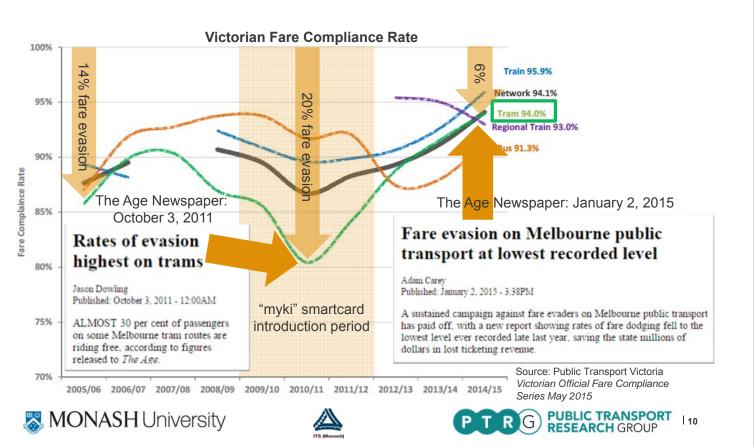
- Enter by front door only
- Validate smartcard in front of driver
- Some roving ticket inspectors







Fare Evasion Trends



Would Melbourne Trams have been better off with POE instead of the myki POP system?

The Age Newspaper: June 2010, October 2011 and June 2011

Pssst! Myki works on trams - most of the time

Clay Lucas

TECHNICALLY, it's again city's trams, despite it being

Leaked government data los system on trams 41,000 tim

No one has been booked, le replace Metcard in 2007 - is and buses, a new law must 1

The troubled smartcard syst cent of the time on trams in

While that might seem high valid across the system at it problem". That is more that

Published: June 11, 2010 - 3:00A How fare evasion can pay on Melbourne's trams

Reid Sexton Published: October 4, 2011 - 12:00AM

TRAM passengers across Melbourne 1 evasion recently hitting more than 20

The figures suggest many fare evader and have prompted calls for a massive

Metlink figures released to The Age sl Melbourne's trams, with 1.03 million

By contrast, there were 108.5 million check just 0.1 per cent of passengers 1

Yesterday The Age reported figures sl Brunswick, almost 30 per cent of pass

It was revealed in August that evasion

Public Transport Users Association pr reliant on inspectors to check tickets. shocked they check such a small perce

Myki vending machines scrapped from trams

Clay Lucas Published: June 22, 2011 - 12:00AM

PASSENGERS will be unable to buy tickets aboard trams after the myki system becomes fully operational across Melbourne at the end of next year, Premier Ted Baillieu has revealed.

The decision means myki vending machines for 500 trams, bought by the former Labor government in 2007 for several million dollars, will never be used

After years of criticism of myki, Mr Baillieu yesterday highlighted the advantages of smartcards, and pledged to resolve myki's many issues

One of those issues was overcharging, which had occurred on one in 10 cards, he said

"The system has been plagued with problems, including with the website, including top-up and accounting, checking processes, power outages, cards that were sent to dead people." Mr Baillieu said

"It's our job to fix the problems. We are going to fix it."

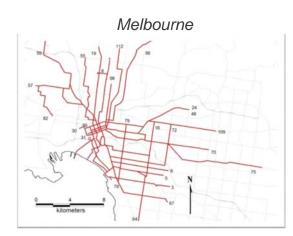
Despite the problems, the company selected by the previous government to build the smartcard in 2005, Kamco, will not be sacked. Instead, it will earn more from taxpayers.

Mr Baillieu said his government had begun renegotiating the contract with Kamco, which was last year bought by Japan's NTT Data. He would not disclose how much extra the government expected to pay Kamco



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Toronto



Some of the largest streetcar systems in the world Melbourne = 167 kms (104 miles)

Toronto = 71 kms (44 miles)

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Toronto = mostly POE

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Different Fare Control Systems Melbourne = POP

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Melbourne vs Toronto





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- Melbourne
 - Tickets pre-purchased
 - Validated during or after entry
 - No interaction with driver
- Toronto
 - Pay-on-Entry (POE) fare paid to farebox in front of driver
 - Pass or transfer must be shown to driver
 - Front door boarding only
 - Some Proof of Payment (POP) zones but on only a limited number of routes



Previous Research - Currie, Delbosc and Reynolds (2012)

- Melbourne and Toronto dwell time surveys
- **Regression models** developed including one with a factor for fare control type

Dwell time = 3.7 + 0.9a + 0.7b + 13.4c - 6d + 3.4e + 9.8fWhere: a = Number of boardings b = Number of alightings c = 1 if 4 doors, else 0 d = 1 if platform stop, else 0 e = 1 if steps, 0 otherwise, f = 1 if pay-on-entry, 0 otherwise

 Model implies that average dwell time for POE is 9.8 seconds higher per stop than for POP

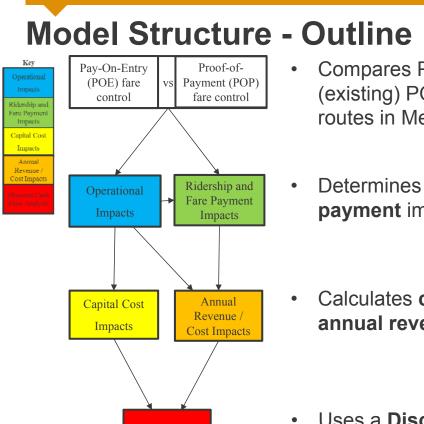
Source: Currie, G., A. Delbosc, and J. Reynolds, *Modeling Dwell Time for Streetcars in Melbourne, Australia, and Toronto, Canada.* Transportation Research Record: Journal of the Transportation Research Board, 2012. **2275**: p. 22-29.











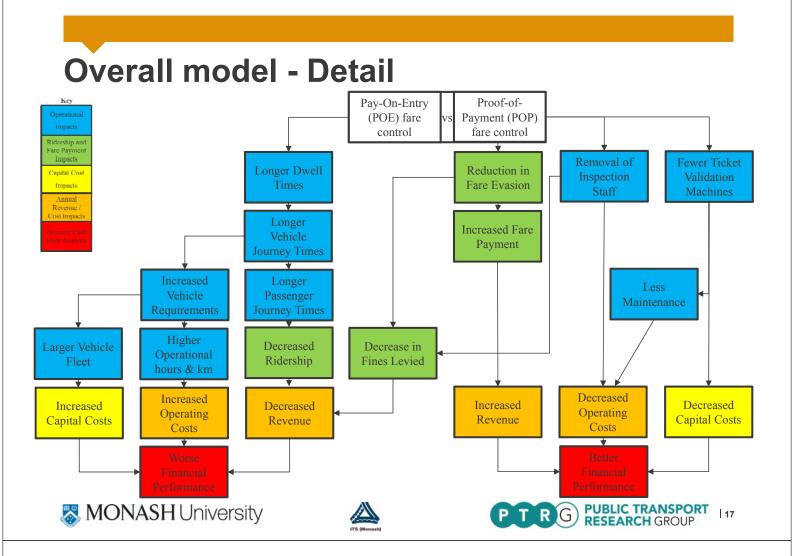
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- Compares POE fare control impacts with the (existing) POP across 22 of the 26 tram routes in Melbourne
- Determines operational, ridership and fare payment impacts
- Calculates capital cost and annual revenue / cost impacts
- Uses a Discount Cash Flow Analysis to calculate a BCR of switching to POE





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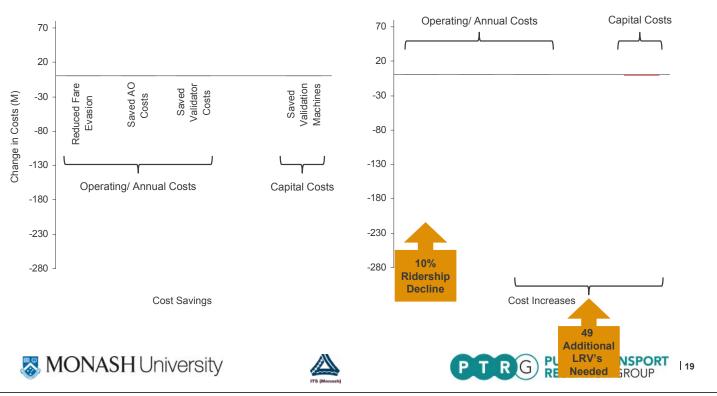


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Impact of Conversion – Honor/POP vs POE



Savings Resulting from Pay the Driver Ticketing

Costs Resulting from Pay the Driver Ticketing

Open access saves \$29M p.a. operating costs & \$210M in Capital – increases ridership 10% and saves 49 LRVs







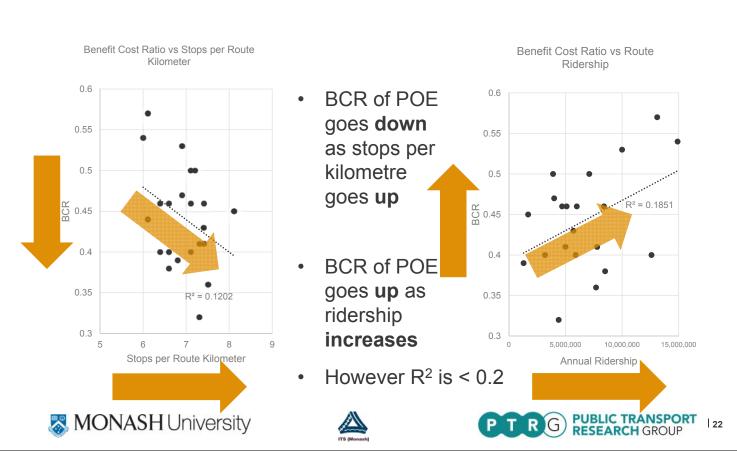
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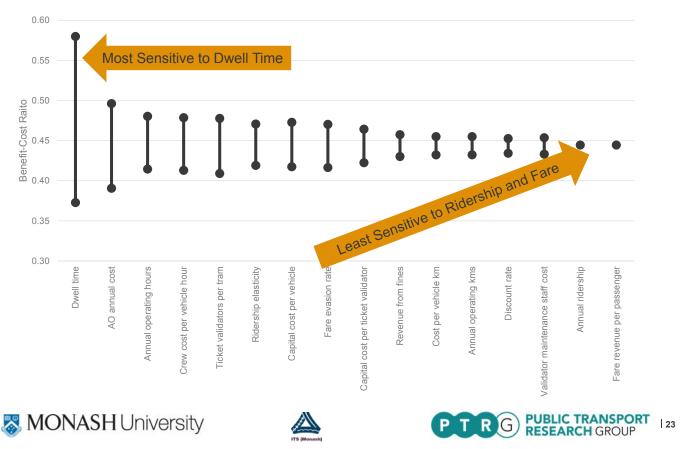
Aggregate Results

Financial Analysis	Annual	Capital
 <u>POE Benefits (\$AU)</u> Reduced fare evasion losses Reduced staffing costs Reduced maintenance of validation machines Fewer ticket validation machines 	8.1m 15.8m 3.1m	65.5m
 <u>POE Costs (\$AU)</u> Lower fare revenue Lower fine revenue Increase vehicle operation costs New vehicles 	17.4m 9.2m 29.8m	276.0m
Total (\$AU) Benefits – Costs	-29.4m	-210.5m
Discount Cash Flow Analysis	BCR	
30 years at 6% discount rate	0.44	
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Route Based Results



Sensitivity Analysis



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Findings

- Melbourne trams have worse financial performance under POE than POP
 - \$AU27.0m annual benefits and \$AU65.5m capital savings
 - But \$AU56.4 annual costs and **\$AU276.0m capital expense**
 - BCR of only 0.44
- Costs associated with longer stop dwell times far outweigh the benefits of POE for reducing fare evasion and staffing costs
- Lower levels of ridership, increased fleet size and operating costs are significant financial penalties of operating a POE fare system





Toronto – should stop using POE!...

Front Door Boarding on a Toronto Transit Commission Streetcar





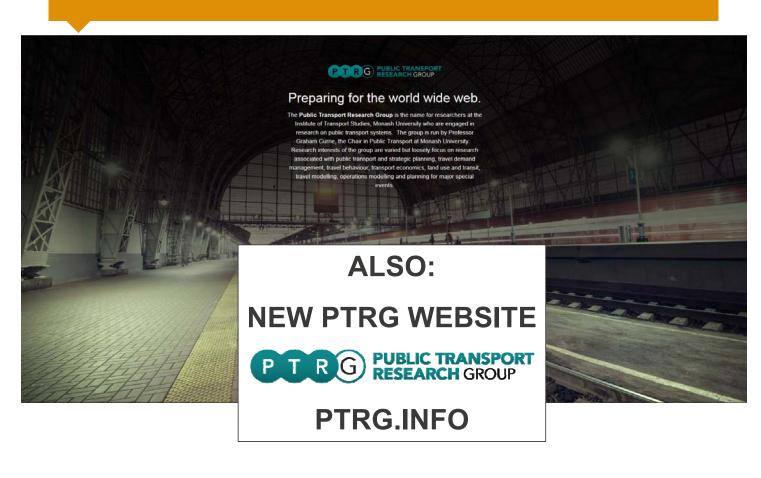
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Engineering Seminar Room (Building 60, Room

Claytoncolour.pdf) When: Monday 27 August

110A) (map available at

http://www.monash.edu.au/pubs

ITS (Monash) Research in the New York Times m · AUSTIN, TEXAS - Kelly Hunka tried out an electric bicycle for the first time last week Hours later, she was back for another ride. "These are so cool," Ms. Hunka, who works for an Austin technology company, said as she paced.

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ITS (Monash) Research in the New York Times

Graham Currie Chair of Public



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Guys I have made a direct attchment of Geoffs piece in the New York Times; Team - FYI linking a newspaper articule directly improves its look on LinkedIn but can only be done on first post of the discussion, not commenting on an existing one.



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approach", we will be reviewing our eriences of using animal mo

