

Revenue Protection – National and International Research Perspectives

TfL Meeting

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Outline

- 1 Introduction
- 2 Fare Evasion Psychology - Melbourne
- 3 Fare Evasion Psychology - International
- 4 Research Developments



This paper reviews recent research on revenue protection & fare evasion psychology



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Psychology of Fare Evasion (Melbourne) - AIMS

- Overall project objective:
 - to understand the psychology behind fare evasion and provide actionable recommendations for use in improving compliance.
- Aims
 - 1. To understand what motivates people to fare evade
 - What is the prevalence and distribution of unintentional, opportunistic and purposeful fare evasion?
 - 2. To develop an empirical model that will suggest strategies to reduce fare evasion

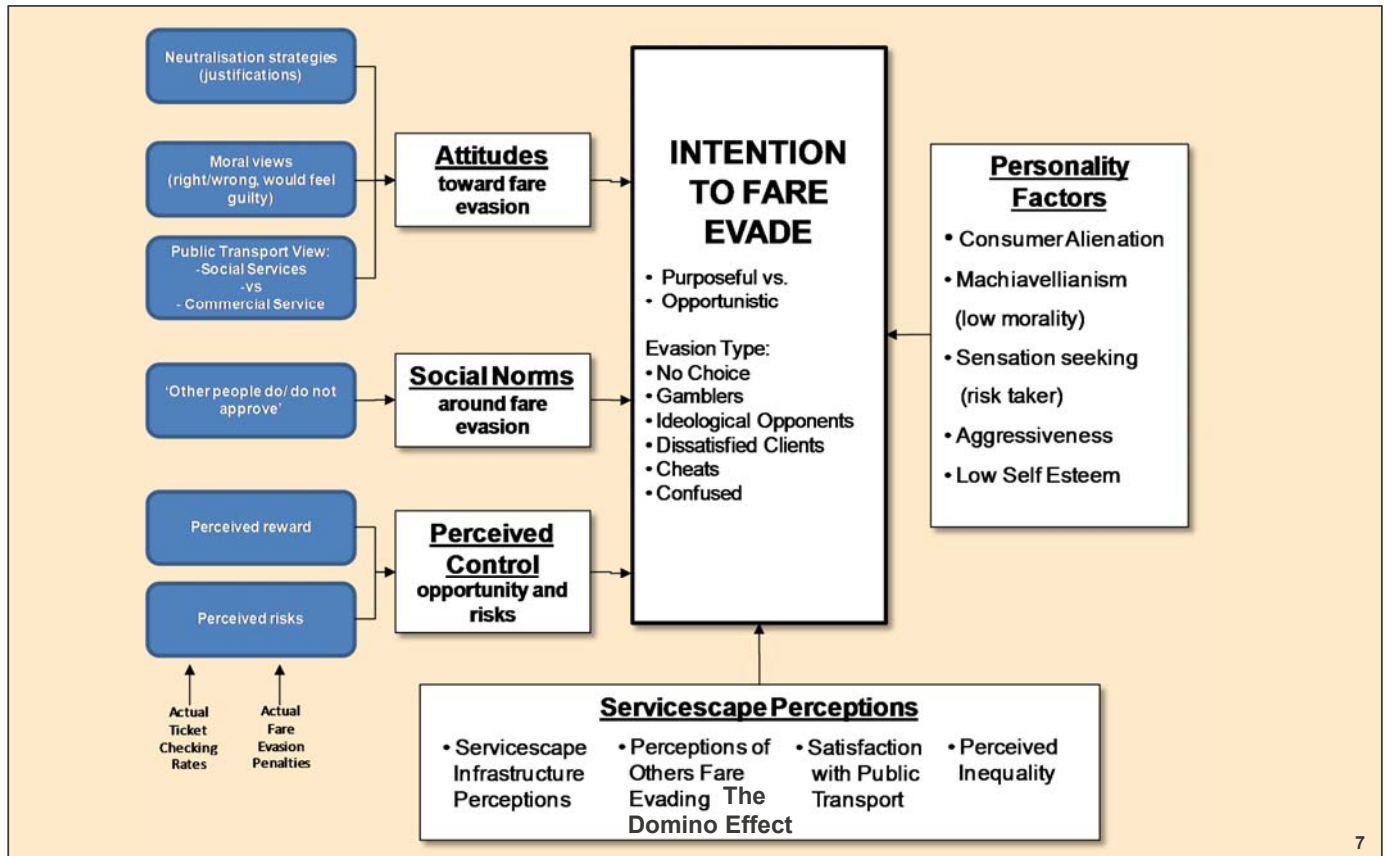
Four 'rationales' for Fare Evasion were found...

Fare Evasion Rationales

Perspective	1. Its wrong – the accidental evader	2. The 'it's not my fault' evader	3. The calculated risk-taker evader	4. Career evaders
Occurrence	Rare	Occasional	Fairly Often	Always
Intentions	No Intention – Evasion by Accident	No Intention – Evasion due to payment barriers	Intention – Evasion due to low risk	Entirely Intentional
Feelings	Guilt/ Embarrassment	Nervous, worried but no guilt	Dispassionate, vigilant, no guilt	Pride
View of Fare Evaders	Condemnation	Empathy - sense of injustice to condemnation	Understanding to condemnation	Empathy

Strong view that Fare Evasion is about INTENT. Feeling of INJUSTICE about being caught if you intended to buy a ticket – feel “THE SYSTEM IS WRONG” if this happens

...supporting a theoretical model explaining FE choice



Key Finding: most fare loss is a few frequent users..

Table 5.3: Estimated Volume of Trips Made by Fare Evasion Frequency and Public Transport Trip Frequency Groups

Estimated Share of Trips Involving Evasion		Estimated Fare Evasion Trips Made by People in Each Evasion Frequency Group (M p.a.)						Total Trips (M)	Share of Total Travel	Share of Evasion Trips
		6-7 days a week	5 days a week	3-4 days a week	1-2 days a week	> monthly	Less often			
Always	100.0%	1.2	2.9	-	-	-	0.0	4.1	0.8%	16%
Almost Always	95.0%	1.1	4.6	-	-	0.0	0.0	5.8	1.1%	22%
Mostly	75.0%	0.9	3.7	2.7	0.6	0.1	0.0	7.9	1.5%	30%
Regularly	37.5%	0.4	0.7	0.8	0.3	0.1	0.0	2.3	0.4%	9%
Occasionally	12.5%	0.1	2.8	1.3	0.4	0.1	0.0	4.8	0.9%	18%
Rarely	1.0%	0.0	0.6	0.4	0.2	0.0	0.0	1.2	0.2%	5%
Never	0.0%	-	-	-	-	-	-	0	0.0%	-
Sub-Total: Fare Evasion Trips (M p.a.)		3.8	15.4	5.2	1.4	0.4	0.1	26.2	5.1%	100%
Share of Total Evasion		14.3%	58.7%	19.9%	5.4%	1.4%	0.3%			

Recidivists

- 68% of all FE trips
- 65,400 people
- 81% high frequency PT users

High Frequency Users who Fare Evade

- 73% of all FE trips
- 285,900 people
- 75% Recidivists

All Fare Evaders

- 822,200 people (20.6% of Melbourne population)
- 71% (580,000 people) a one off occurrence never

... "recidivists" contrast with accidental evaders

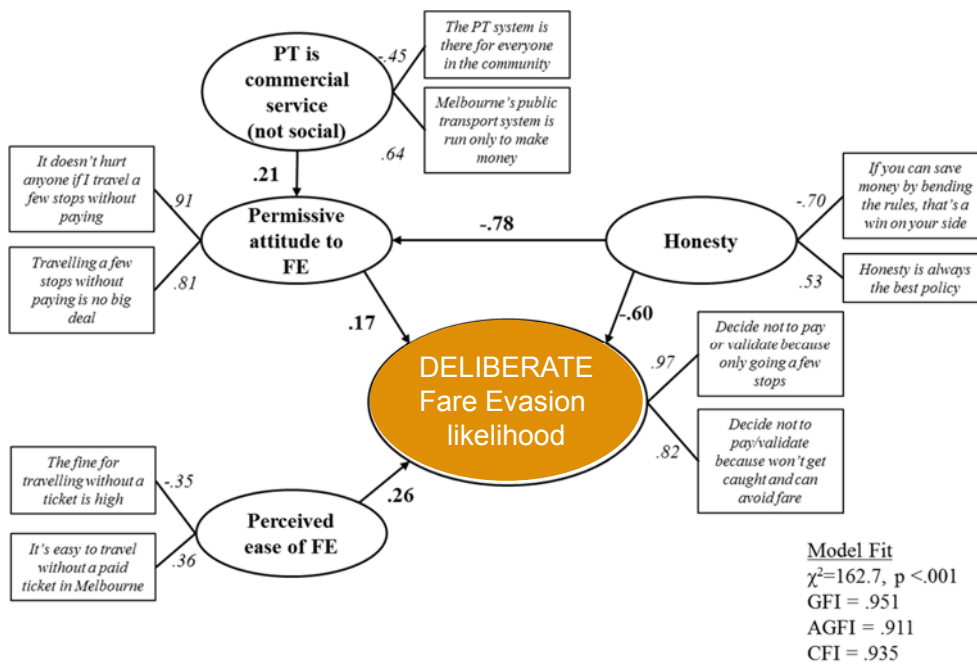
Contrasting Fare Evader Metrics

Measure	Fare Evader Type			
	Recidivists	Meant to pay, accident, one off	Deliberate	Unintentional
Share of people fare evading at least once p.a.	8%	70%	41.0%	44.0%
Share of revenue lost/fare evasion trips	68%	5%	77.4%	15.5%
Estimated Value of Revenue Lost p.a.	\$54M	\$4M	\$47.8M	\$9.6M
Number of People	65,400	580,000	702,240	1,388,520
Share of Melbourne population	1.6%	14.5%	17.6%	34.8%
Lost Revenue per person p.a.	\$826	\$6.90	\$68.00	\$6.90

3 valid FE clusters were identified

Deliberate Evaders	Unintentional Evaders	Never Evaders
17.6% of market	34.8% of market	47.6% of market
<ul style="list-style-type: none"> Most likely to repeat FE and intend to FE in future High frequency PT user, full-time worker or student, age 17-34 Lower self esteem, higher sensation seeking, less honest More influenced by the 'domino effect' Most likely to have been caught for FE (8%p.a.) Have a poorer opinion of PT Think PT is run for commercial profit 	<ul style="list-style-type: none"> One-off FE and low future intent Range of PT use (frequent to infrequent) Range of demographics (no standout features) Higher self esteem, lower sensation seeking, more honest Strongest worry about being caught (5% caught in last year) Stronger view that PT is for social benefit not commercial 	<ul style="list-style-type: none"> Almost no FE and very low future intent Lower frequency PT users Range of demographics but higher older and retired Highest self esteem, lowest sensation seeking, highest honesty rating, stronger social beliefs Stronger view that PT is for social benefit not commercial
Biggest revenue loss	Very little revenue loss	Almost no revenue loss

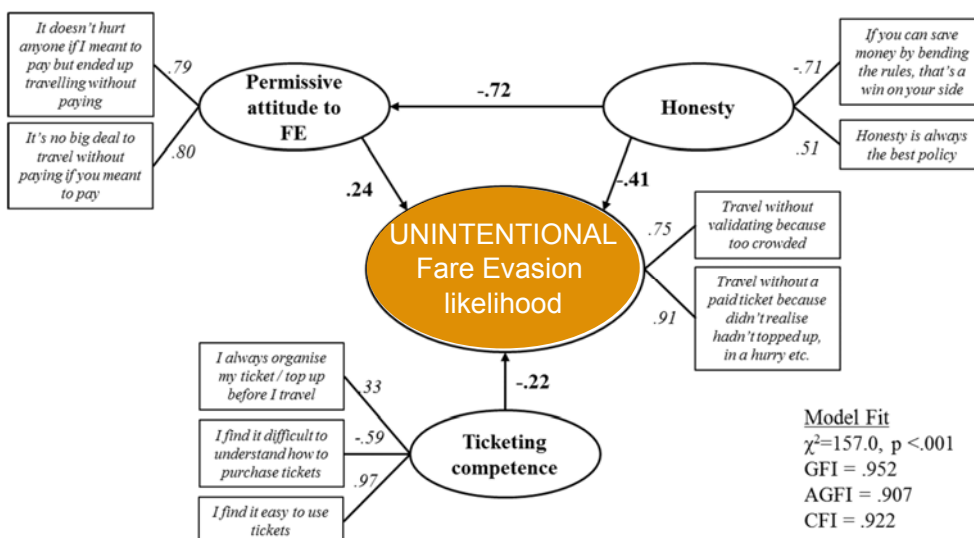
Deliberate FE is driven by (dis)honesty, (weak) perceived control and permissive views



Key Points

- (dis) honesty a critical driver
- Ease of evasion next followed by permissive attitudes
- (dis) honesty and Permissive attitudes linked
- View PT is provided for commercial (profit) motives affects permissive views
- Negative Servicescape views not a direct driver
- Personality factors a secondary issue

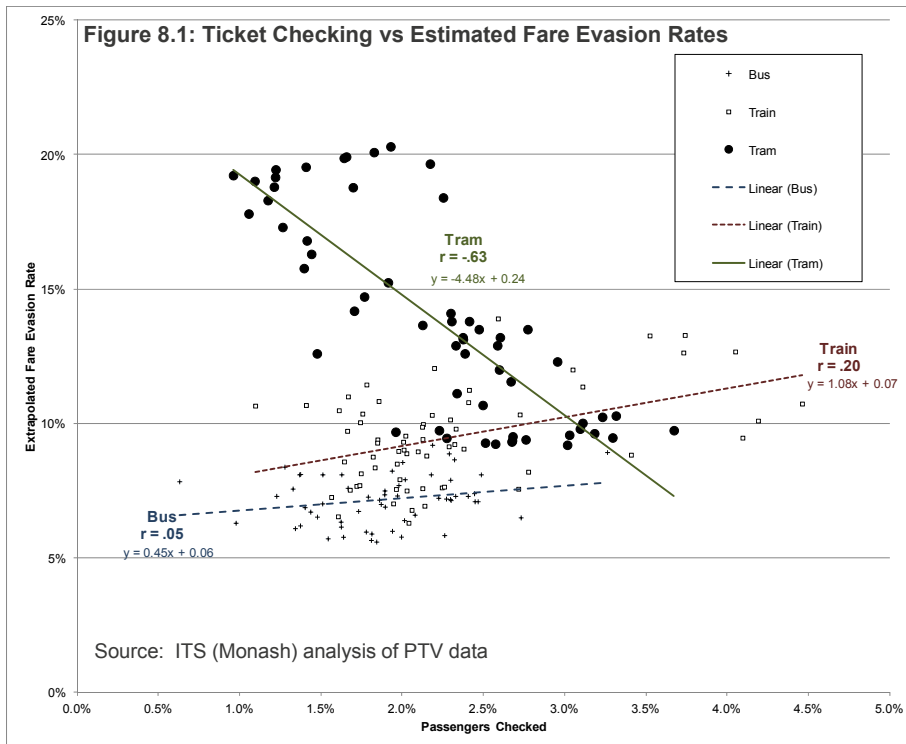
Accidental FE is driven by (dis)honesty permissive views and (poor) ticketing competence



Key Points

- (dis) honesty a main driver followed by permissive attitudes then ticketing competence
- Ease of evasion is not an issue since evasion is accidental/unintended
- Ticketing competence a valuable concept in understanding accidental fare evasion

Key Finding: FE Sensitivity Analysis suggests ticket check rates can reduce tram FE....



Key Points

- Doubling ticket inspection rate from **1.31% (average rate in 2011)** to 2.62% would act to reduce fare evasion on trams from 18.13% to 12.26%.
- doubling rates acts to reduce fare evasion rates by about a third.
- In financial terms additional revenue of \$14M p.a. but doubling checking will cost money
- Implies an elasticity of about -0.32

Outcomes:

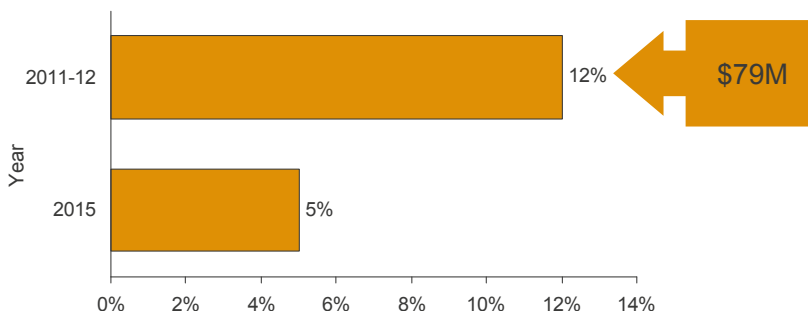
Monash Key Findings

- Target Recidivist Fare Evaders
- Increase Ticket Checking Rates

PTV Action

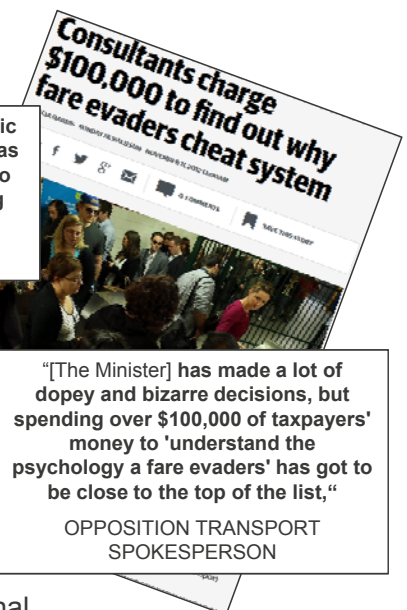
- The "Free Loader" Campaign
- Increase in Ticket Checking

Fare Evasion as a Share of Revenue



"a waste of public transport funds as it was unlikely to reveal anything startling."

PTUA



A Notional Saving of over \$45M p.a.

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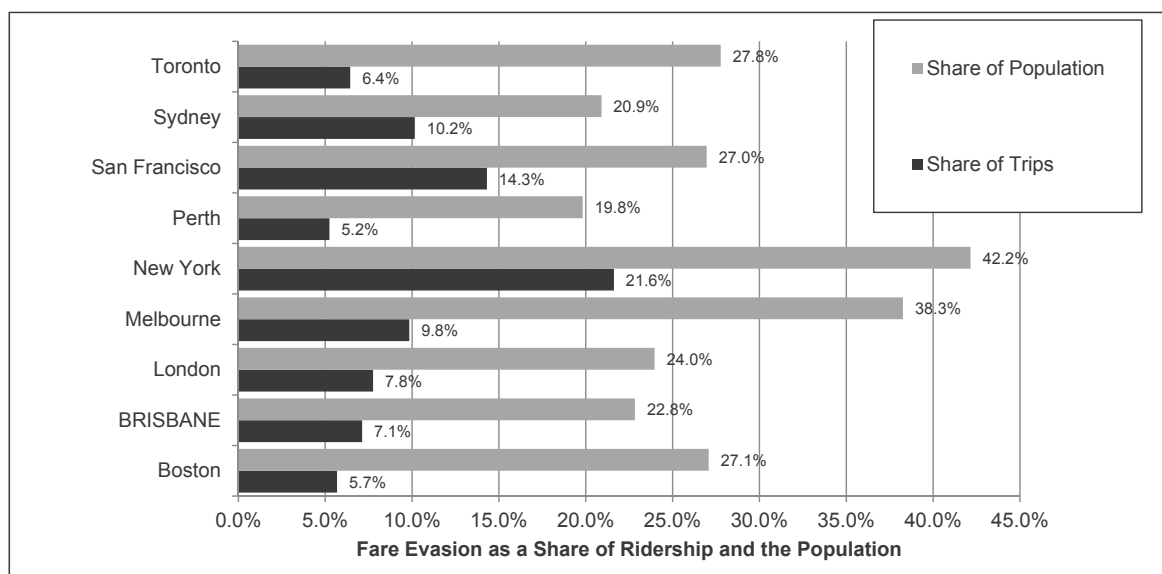


Cross National follow-on study - AIMS

- Overall project objective:
 - **Cross national study of 9 international cities including Melbourne, London, Sydney and Perth**
- Aims
 - Implement web survey method for fare evasion metrics on a sample on international cities (including London) to estimate broad levels of:
 - Fare evasion (trip share, population share)
 - Recidivism rates
- Approach
 - 200 randomised PT users living in target cities

OZ Cities; FE rate of PT trips 5-10%; share of residents have FE'd in last year 20-38%

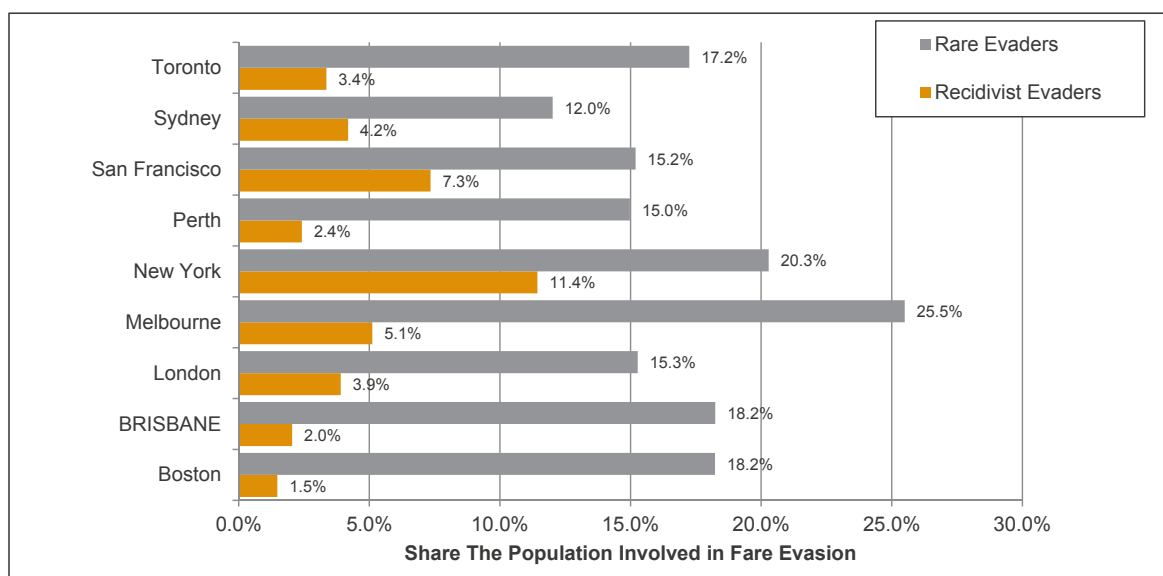
Fare Evasion (at least once p.a.) as a Share of Ridership and the Population



Source: Monash Cross National Study

OZ Cities; share of pop who are recidivists; 2-5% - rare FE'drs 12-26%

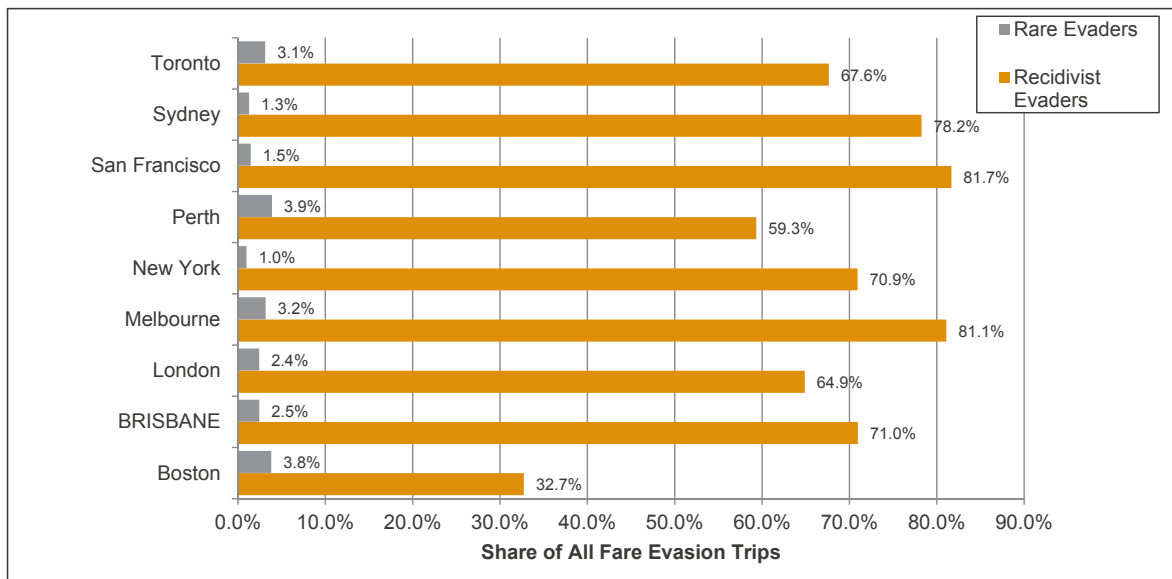
Share of the Population Engaged in Fare Evasion (at least once p.a.)



Source: Monash Cross National Study

OZ Cities – Share FE trips/ revenue lost due to recidivists 59-81% - RECIDIVISM IS A GLOBAL PROBLEM

Share Fare Evasion Travel; Recidivist vs Rare Evaders



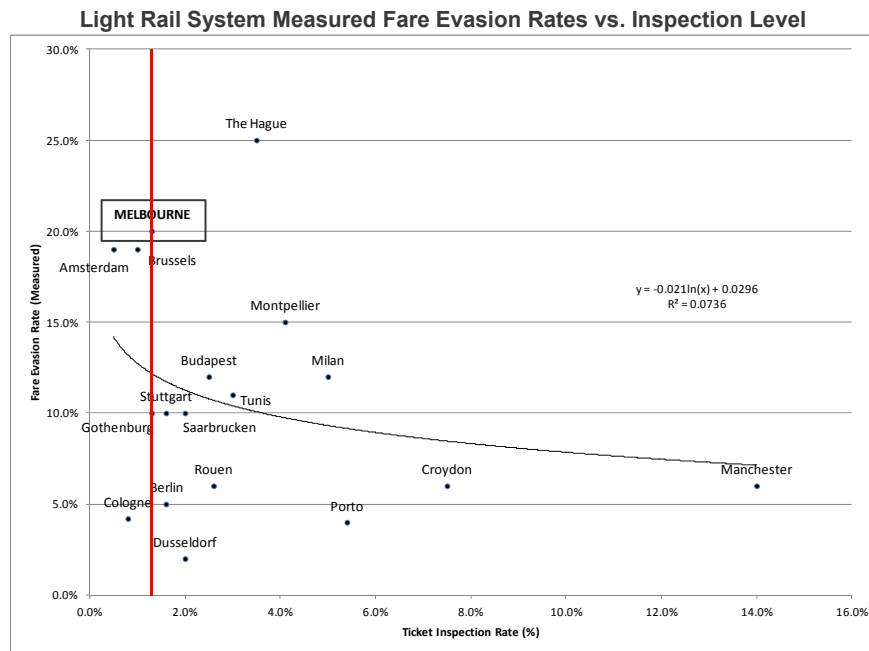
Source: Monash Cross National Study

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Melbourne's tram proof of payment ticket inspection rate (1.3%) was low compared to other cities



New Italian research suggests “optimal” proof of payment ticket inspection rates of 3.8% - 4.5%

Barabino et al (2013)

Context & Data	Approach	Optimal Inspection Rate
<ul style="list-style-type: none"> Fare evasion on buses in Sardinia, Italy 98 days of ticket checks 3,659 on-board interviews 	<ul style="list-style-type: none"> Economic model (focus on profit maximisation) Costs of fare evasion control (inspectors, administration) Increase revenue yield from lower fare evasion 	3.8%

Barabino et al (2014)

Context & Data	Approach	Optimal Inspection Rate
<ul style="list-style-type: none"> Fare evasion on buses in Sardinia, Italy 3 years of ticket checks (total of 27,514 checks) 10,586 on-board interviews 	<ul style="list-style-type: none"> Profit maximisation model Costs of fare evasion control (inspectors, administration) Increase revenue yield from lower fare evasion 	4.5%

Fare evader profiles, again from Italy, profile young, unemployed males, and those taking short trips

Key determinants of fare evaders in Italy

- Male
- Less than 26 years old
- Low education level
- Unemployed and/or students without other means of transport
- Those undertaking trips less than 15 mins
- Systematic users not satisfied with the service
- Passengers on routes with low inspection rates
- Passengers with fines and previous ticket violations

Source: Barabino, B., Salis, S. & Useli, B. (2015) 'What are the determinants in making people free riders in proof-of-payment transit systems? Evidence from Italy'. *Transportation Research Part A*, Vol. 80, pp. 184-196

Santiago, Chile model FE influences; key are proximity to intermodal stations, ticket inspections & time of day

Modelling of Factors Linked to Higher Fare Evasion Rates

Variables affecting fare evasion	% change in fare evasion rate	
Proximity to intermodal station	-89.8%	} DECREASE in fare evasion
Ticket inspections	-45.8%	
Morning weekday	-29.6%	
Area with high income level (>US\$1,674)	-28.9%	
Proximity to metro station	-16.4%	
Area with moderate income level (US\$1,065-1,674)	-14.2%	} INCREASE in fare evasion
Bus occupancy	+0.8%	
Number of passengers alighting	+1.8%	
Number of bus doors	+5.9%	
Afternoon weekday	+19.6%	

Source: Guarda, P., Ortuzar, J., Galilea, P., Handy, S. & Munoz, J. (2015) 'Decreasing fare evasion without fines? A microeconomic analysis'. Presented at Thredbo 14 Conference, Santiago, Chile.

Emerging technologies: range from ticket inspectors fitted with CCTV on their jackets...

Transdev Auckland



Source: <http://transportblog.co.nz/tag/fare-evasion/>

CCTV unit

...to sophisticated camera technology at ticket barriers...

Detector system in Barcelona

Process of monitoring video cameras at ticket barriers is automated

Inspectors are alerted to potential fare evaders via smart phone app

Mass ticket inspections replaced by selective checks using smaller teams



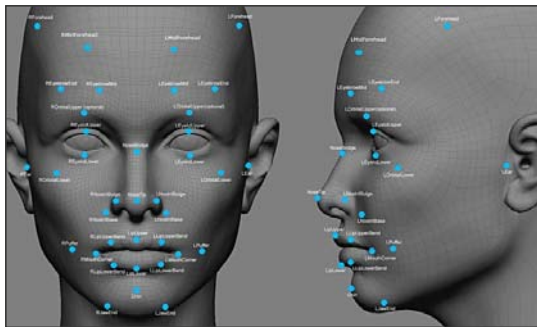
Source: <http://www.railway-technology.com/>

...and even facial recognition (biometric technology), although applications are yet to be seen in this area

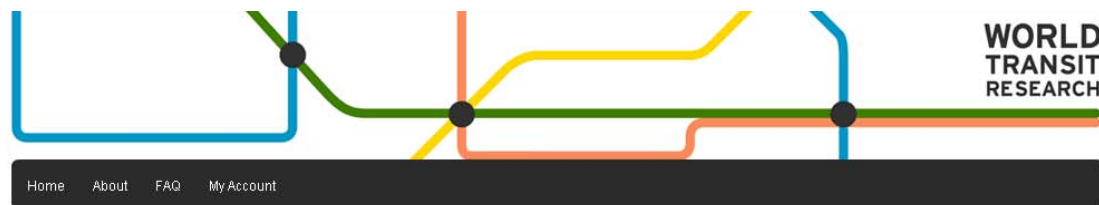
UITP Survey Results (2015)

- 74 public transport organisations in 30 countries
- None have used facial recognition technology yet
- Half (50%) are interested in using facial recognition technology in the future

Source: UITP (2015) *Video Surveillance in Public Transport: International Trends 2015-16*, Full Report



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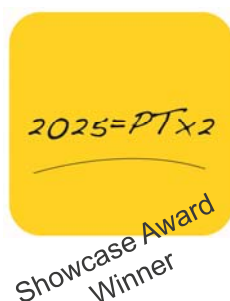
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