## Results Summary: Fare evasion rates
Weighted average for all Southern suburban service groups
Low, Central, High Cases

<table>
<thead>
<tr>
<th>Day/ Time</th>
<th>Low Case % Fare evasion</th>
<th>Central Case % Fare evasion</th>
<th>High Case % Fare evasion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon - Fri</td>
<td>7.2%</td>
<td>8.0%</td>
<td>10.9%</td>
</tr>
<tr>
<td>0600-1000</td>
<td>8.7%</td>
<td>9.5%</td>
<td>11.7%</td>
</tr>
<tr>
<td>1000-1600</td>
<td>5.8%</td>
<td>6.5%</td>
<td>8.0%</td>
</tr>
<tr>
<td>1600-1900</td>
<td>6.2%</td>
<td>7.2%</td>
<td>12.5%</td>
</tr>
<tr>
<td>1900-2400</td>
<td>8.9%</td>
<td>10.1%</td>
<td>14.2%</td>
</tr>
<tr>
<td>Saturday</td>
<td>7.4%</td>
<td>8.1%</td>
<td>10.6%</td>
</tr>
<tr>
<td>Sunday</td>
<td>7.5%</td>
<td>8.2%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Overall (weighted average)</td>
<td>7.2%</td>
<td>8.0%</td>
<td>10.9%</td>
</tr>
</tbody>
</table>

High during 0600-1000 Mon-Fri due to high level of passengers using ticket at invalid time (e.g. Off-peak tickets, railcards not valid in AM peak)
Contents

- Survey Scope
- Survey Methodology
- Survey Results
- Weighted Fare Evasion and Revenue at Risk Methodology
- Weighted Fare Evasion Results
- Conclusions
Survey Scope
Survey Scope

- As agreed with DfT, survey focussed on Southern suburban network
- 5 routes were surveyed:
  - London Victoria - Sutton (via West Croydon)
  - London Bridge - Beckenham Junction (via Crystal Palace)
  - London Victoria - Epsom (via Mitcham Junction)
  - East Croydon - Caterham / Tattenham Corner
  - London Bridge - London Victoria (via Denmark Hill / Streatham Hill)

Survey Timetable

- 43 shifts between 27th June and 6th July 2008
- Detailed shift schedule provided
- Morning shift: 06:00 - 15:00
- Afternoon shift: 15:00 - 23:00
Survey Timetable

- All planned engineering works were considered and avoided when designing survey timetable.
- Due to planned engineering works at the weekend, could only survey Victoria - West Croydon section of Victoria - Sutton route on Sunday.
- Days/routes with no service or planned engineering highlighted in timetable below.
- There is no service on London Bridge - Beckenham Junction route on Sundays, therefore no results collected for this route on Sundays.

<table>
<thead>
<tr>
<th></th>
<th>June 27th</th>
<th>28th</th>
<th>29th</th>
<th>30th</th>
<th>July 1st</th>
<th>2nd</th>
<th>3rd</th>
<th>4th</th>
<th>5th</th>
<th>6th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria - Sutton / West Croydon (am)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victoria - Sutton / West Croydon (pm)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>London Bridge - Beckenham (am)</td>
<td></td>
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</tr>
<tr>
<td>London Bridge - Beckenham (pm)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victoria - Epsom via Mitcham Junction (am)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victoria - Epsom via Mitcham Junction (pm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E Croydon to Caterham/Tattenham Corner (am)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E Croydon to Caterham/Tattenham Corner (pm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victoria - London Bridge via Denmark Hill (am)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victoria - London Bridge via Denmark Hill (pm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victoria - London Bridge via Streatham Hill (pm)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
</tbody>
</table>

6
Survey Methodology
Survey Methodology

- **Computerised Survey**
  - Handheld computers
  - Dedicated Software

- **Surveyors**
  - Full briefing provided by SDG and Southern
  - Detailed shift schedule provided, indicating exact trains and route sections to survey
  - Recorded information for every passenger in a train carriage, including alighters and those refusing to show their ticket

- **Debrief with fieldwork contractor and a representative from Southern**
  - Observed that there were lots of alighters who were believed to be getting off at their stop, due to surveyed routes being busy suburban routes.
  - Observed that at busy times of day, once one passenger refused, others often followed suit and refused to take part in survey.

- **Data analysed and cleaned**
  - Any miscoded passenger classes were changed
Ticket and Pass Types

- Surveyors coded passengers’ tickets under the following ticket categories:
  - Single
  - Return
  - PERTIS (Permit to Travel)
  - Rail Season Ticket
  - Oyster Travelcard
  - Paper Travelcard
  - Oyster Pre-Pay
  - Freedom Pass
  - Staff Pass / British Rail Ticket
  - Police Pass
  - Other Pass / Ticket

- Further details were recorded about the exact type of ticket/pass (e.g. Open Return, Young Persons Railcard) and its validity
Passenger Class

Irregularity Profile

- 16 Passenger Irregularity Types
- Aggregated:
  - Valid
  - No Ticket (Non-payment)
  - Invalid Ticket (see next slide for breakdown)
  - Refused
  - Alighted
<table>
<thead>
<tr>
<th>Invalid Ticket Categories</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-payment</td>
<td>The passenger cannot produce a ticket of any kind</td>
</tr>
<tr>
<td>Used at invalid time</td>
<td>The ticket or pass is being used at the wrong time of day</td>
</tr>
<tr>
<td>Child impersonation</td>
<td>The passenger has a child ticket or pass, but is clearly an adult</td>
</tr>
<tr>
<td>Used on invalid departure</td>
<td>The ticket is being used invalidly on a restricted service</td>
</tr>
<tr>
<td>Journey taken after valid date</td>
<td>The ticket or pass has expired</td>
</tr>
<tr>
<td>Journey taken before valid date</td>
<td>The pass is not yet valid</td>
</tr>
<tr>
<td>Overriding</td>
<td>The passenger has travelled further than the destination shown on their ticket</td>
</tr>
<tr>
<td>Forged/Altered</td>
<td>The ticket/pass/photocard has been tampered with/forged, defaced or altered</td>
</tr>
<tr>
<td>Invalid Class</td>
<td>The passenger is travelling in First Class but has a Standard ticket / pass</td>
</tr>
<tr>
<td>Misuse of railcard</td>
<td>The passenger has a ticket or pass that requires a railcard, but does not possess the appropriate card</td>
</tr>
<tr>
<td>No photocard</td>
<td>The passenger has a pass but no valid photocard</td>
</tr>
<tr>
<td>Transferred use</td>
<td>The passenger is using someone else’s pass (photocard does not match)</td>
</tr>
<tr>
<td>Invalid use of Oyster Pre-pay</td>
<td>The passenger is trying to use an Oyster card with pre-pay money stored on it</td>
</tr>
<tr>
<td>Refusal</td>
<td>Passenger refuses to take part in survey</td>
</tr>
</tbody>
</table>
Survey Results (after data cleaning)
Survey Results

Overall

- 20,032 Observations
- 319 (1.6%) Refusals
- 2,926 (14.6%) Alighters
- 17,106 excluding Alighters
### Observations by Route

<table>
<thead>
<tr>
<th>Passenger Class / Route</th>
<th>Valid</th>
<th>No ticket</th>
<th>Invalid ticket</th>
<th>Refused</th>
<th>Alighted</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria - Sutton</td>
<td>3,859</td>
<td>154</td>
<td>103</td>
<td>62</td>
<td>718</td>
<td>4,896</td>
</tr>
<tr>
<td>London Bridge - Beckenham Junction</td>
<td>1,976</td>
<td>157</td>
<td>66</td>
<td>68</td>
<td>365</td>
<td>2,632</td>
</tr>
<tr>
<td>Victoria - Epsom</td>
<td>3,579</td>
<td>169</td>
<td>68</td>
<td>84</td>
<td>669</td>
<td>4,569</td>
</tr>
<tr>
<td>East Croydon - Caterham/ Tattenham Corner</td>
<td>2,770</td>
<td>169</td>
<td>74</td>
<td>75</td>
<td>388</td>
<td>3,476</td>
</tr>
<tr>
<td>Victoria - London Bridge</td>
<td>3,395</td>
<td>143</td>
<td>105</td>
<td>30</td>
<td>786</td>
<td>4,459</td>
</tr>
<tr>
<td><strong>All routes</strong></td>
<td><strong>15,579</strong></td>
<td><strong>792</strong></td>
<td><strong>416</strong></td>
<td><strong>319</strong></td>
<td><strong>2,926</strong></td>
<td><strong>20,032</strong></td>
</tr>
</tbody>
</table>
Ticket Irregularities - by Route

% Passengers

Non payment
Invalid ticket
Refused

Victoria - Sutton
London Bridge - Beckenham
Victoria - Epsom
East Croydon
Victoria - London Bridge
Ticket Irregularities - by Day Type

- Non payment
- Invalid ticket
- Refused

% Passengers

Weekday | Sat | Sun
---|---|---
5.0% | 2.0% | 1.0%
4.0% | 3.0% | 1.5%
3.0% | 2.5% | 1.0%
2.0% | 1.5% | 0.5%
1.0% | 1.0% | 0.5%
0.0% | 0.5% | 0.5%
Ticket Irregularities - by Day Type and Time Band

High % in AM Peak due to tickets/railcards used at invalid time

- Non payment
- Invalid ticket
- Refused

Weekday 06:00-10:00
Weekday 10:00-16:00
Weekday 16:00-19:00
Weekday 19:00-23:00
Saturday
Sunday
Specific Irregularities - All Routes

% Passengers

Irregularity

- Non payment
- Used at invalid time
- Invalid use of Oyster Prepay
- Overriding
- Railcard/Photocard Irregularity
- Invalid departure / After valid date
- Child impersonation
- Other
- Refused
Refusals & Alighters Assumptions
Refusals & Alighters Assumptions

Three sensitivities on assumptions regarding proportion of refusals and alighters that are fare evaders:

<table>
<thead>
<tr>
<th>Assumptions for Refusals &amp; Alighters</th>
<th>% Refusals Fare Evaders</th>
<th>% Alighters Fare Evaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Case</td>
<td>75%</td>
<td>25%</td>
</tr>
<tr>
<td>Central Case</td>
<td>50%</td>
<td>Same as average</td>
</tr>
<tr>
<td>Low Case</td>
<td>Same as average</td>
<td>Same as average</td>
</tr>
</tbody>
</table>

Since a large number of observations in this survey were alighters (14.6%) compared to refusals (1.6%), results are more sensitive to fare evasion assumptions on alighters than refusals.
Weighted Fare Evasion Results
## Fare evasion rates: Central Case
(Central Case: 50% refusals fare evading, % alighters fare evading same as average)

### Fare evasion rates by time of day

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Victoria - Sutton</th>
<th>London Bridge - Beckenham</th>
<th>Victoria - Epsom</th>
<th>East Croydon</th>
<th>London Bridge - Victoria</th>
<th>All routes (weighted average)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon - Fri</td>
<td>7.7%</td>
<td>12.5%</td>
<td>7.5%</td>
<td>8.2%</td>
<td>6.3%</td>
<td>8.0%</td>
</tr>
<tr>
<td>0600-1000</td>
<td>9.9%</td>
<td>11.6%</td>
<td>9.3%</td>
<td>9.2%</td>
<td>8.7%</td>
<td>9.5%</td>
</tr>
<tr>
<td>1000-1600</td>
<td>4.1%</td>
<td>12.9%</td>
<td>5.6%</td>
<td>6.4%</td>
<td>5.8%</td>
<td>6.5%</td>
</tr>
<tr>
<td>1600-1900</td>
<td>7.7%</td>
<td>7.8%</td>
<td>4.5%</td>
<td>12.4%</td>
<td>3.5%</td>
<td>7.2%</td>
</tr>
<tr>
<td>1900-2400</td>
<td>12.3%</td>
<td>18.6%</td>
<td>10.5%</td>
<td>8.2%</td>
<td>6.0%</td>
<td>10.1%</td>
</tr>
<tr>
<td>Saturday</td>
<td>5.2%</td>
<td>8.3%</td>
<td>5.3%</td>
<td>12.2%</td>
<td>8.2%</td>
<td>8.1%</td>
</tr>
<tr>
<td>Sunday</td>
<td>6.9%</td>
<td>8.2% *</td>
<td>8.8%</td>
<td>8.6%</td>
<td>8.5%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Overall</td>
<td>7.5%</td>
<td>12.2%</td>
<td>7.4%</td>
<td>8.5%</td>
<td>6.4%</td>
<td>8.0%</td>
</tr>
</tbody>
</table>

* The % fare evasion is an average of that on other four routes on Sundays, since no service on Sundays on surveyed route in the London Bridge – Beckenham service group.
High Case Fare Evasion much lower than Low and Central Case due to large numbers of alighters compared to refusals.
% Valid Tickets by Type of Day (High, Central, Low Cases of fare evasion)
All routes
% Valid Tickets by Time of Day (High, Central, Low Cases of fare evasion)
Total Fare Evasion Journeys (Central Case)
Total Fare Evasion Proportions (High, Central, Low Cases)

- **Valid**
  - Low Case: 90%
  - Central Case: 90%
  - High Case: 90%

- **No Ticket**
  - Low Case: 0%
  - Central Case: 10%
  - High Case: 20%

- **Invalid Ticket**
  - Low Case: 0%
  - Central Case: 0%
  - High Case: 0%
% Service Group Revenue at Risk: (Low, Central, High Cases)

The bar chart illustrates the percentage of service group revenue at risk for various routes under different cases:

- **Low Case**
- **Central Case**
- **High Case**

The chart compares the revenue at risk for routes such as:
- London Victoria – Sutton
- London Bridge – Beckenham Junction
- London Victoria – Epsom
- East Croydon – Caterham / Tattenham Corner
- London Bridge – London Victoria
- All Routes

The chart shows a range of percentages from 0.0% to 16.0%.
Comparison of % Service Group Revenue at Risk and % Fare Evasion: (Low, Central, High Cases)

- % Fare Evasion is lower than % Revenue at Risk, since for some types of ticket irregularity the revenue lost is assumed to be < 100% of average yield (e.g. Child impersonation 50% average yield lost).
- For other types of irregularity, including passengers with no ticket, the revenue lost is assumed to be 100% average yield.
Conclusions
Revenue Protection Considerations

- Passengers usually have a choice about whether to fare evade or not.
- They may weigh up the decision to fare evade based on the probability of getting caught and the generalised penalty if they do get caught (money paid, time taken, hassle, embarrassment).
- This is the so called ‘Utility Theory of Rational Thief’:
  - Decision to fare evade = $f^n$(Probability of being caught, Penalty if caught)

- Several revenue protection considerations can influence a passenger’s decision to fare evade:
  - Gating at stations
  - RPI (Revenue Protection Inspector) deployment
  - Penalty fares: at present £20 on Southern network

- Increasing the levels of these revenue protection methods will increase the probability of getting caught or increase the penalty, and therefore reduce the number of decisions made to fare evade.
Gated Stations on Southern Network

- Some routes surveyed have more gated stations than others:
  - Victoria - Epsom: 4 gated stations
  - Victoria - Sutton: 4 gated stations
  - London Bridge - Victoria: 2 gated stations
  - London Bridge - Beckenham Junction: 1 gated station
  - East Croydon - Caterham / Tattenham Corner: 1 gated station

- Other gated stations on Southern network:
  - Brighton
  - Hove
  - Eastbourne
  - Redhill
  - Lewes
  - Worthing
  - Chichester
  - Horsham

<table>
<thead>
<tr>
<th>Gated Station</th>
<th>Surveyed Route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Victoria</td>
<td>Victoria - Epsom</td>
</tr>
<tr>
<td></td>
<td>Victoria - Sutton</td>
</tr>
<tr>
<td></td>
<td>London Bridge - Victoria</td>
</tr>
<tr>
<td>London Bridge</td>
<td>London Bridge - Victoria</td>
</tr>
<tr>
<td></td>
<td>London Bridge - Beckenham Junction</td>
</tr>
<tr>
<td>Balham</td>
<td>Victoria - Epsom</td>
</tr>
<tr>
<td></td>
<td>Victoria - Sutton</td>
</tr>
<tr>
<td>Sutton</td>
<td>Victoria - Epsom</td>
</tr>
<tr>
<td></td>
<td>Victoria - Sutton</td>
</tr>
<tr>
<td>West Croydon</td>
<td>Victoria - Sutton</td>
</tr>
<tr>
<td>Epsom</td>
<td>Victoria - Epsom</td>
</tr>
<tr>
<td>East Croydon</td>
<td>East Croydon - Caterham / Tattenham Corner</td>
</tr>
</tbody>
</table>
Conclusions

- **Weighted total fare evasion** is estimated at 8.0% for Southern suburban service groups (Central Case assumptions)
  - This proportion is consistent with results from other rail fare evasion surveys

- **Weighted results by Service Group**
  - Similar level of fare evasion across service groups, except London Bridge - Beckenham Junction which has a higher level of fare evasion (12.2%)

- **Weighted results by Day and Time of Day**
  - Slightly higher level of fare evasion at weekends compared to weekdays
  - Higher level of fare evasion during 0600-1000 and 1900-2400
  - This is partly due to restrictions on tickets in the morning peak and perhaps levels of RPI coverage in the evening

- The Central Case assumptions on alighters (same as average fare evasion) and refusals (50% fare evaders) are our best estimate on levels of fare evasion.

- This survey contained a large proportion of alighters, therefore results are sensitive to assumptions made about alighters, as in the High Case fare evasion assumptions (25% alighters fare evaders, 75% refusals fare evaders).
Conclusions

- Fare evasion levels and therefore revenue at risk is influenced by different revenue protection decisions made by the train operator
  - More gating at stations, greater RPI deployment, and higher penalty fares will all act to reduce the level of fare evasion and revenue at risk.

- Issues may exist with regard to ticket purchasing
  - The provision of ticket windows/machines and other methods of purchasing tickets must be considered
End