Security, at what cost?
Quantifying people’s trade-offs across privacy, liberty and security

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Why is the privacy/security trade-off an issue for CIP?

- People are a key part of the CIP picture:
  - Users
  - Operators
- Policy makers need more robust tools to determine expected impacts of CIP measures upon individuals and wider society
- Need to value non-market impacts
  
  Currently done in a manner difficult to incorporate into formal CBA
The debate on security policy is highly polarised

- Security measures can potentially have adverse effects on individual privacy or liberty

Policymakers often have to make decisions as to which takes priority
It is important for people’s actual preferences about security policies to be heard

- Citizens are the ones who are subject to the security infrastructure

- Decisions about that infrastructure may be useful from a security perspective

- But they may have other unintended consequences
  - Behavioural
  - Economic
  - Social

- Those consequences can call into question whether certain measures are a good use of public money
Little is known about how individuals view security in relation to their rights to privacy and liberty

- To date, the issue of privacy and liberty vs. security has been examined only through opinion surveys
- Opinion surveys cannot quantify the trade-offs people will make to obtain greater security
- Nor can they estimate how willing people would be to pay for certain security benefits

We used stated-preference methods to gain deeper insights into the trade-offs people are willing to make
RAND Europe uses “stated preference” methods to identify the views of individuals

• This is not an opinion survey

• Stated preference methods elicit what respondents prefer when presented with a set of scenarios for a good or service
  – Scenarios are hypothetical, but drawn directly from real life

• Such methods let us understand what sacrifices people are prepared to make in realistic contexts

• The use of stated preference methods is novel in the domain of security policy
We take situations involving security infrastructure...for example, rail or air travel.

The individual is presented with a...
For each security situation, we create a set of scenarios

The individual is presented with a...

Scenarios...

Security situation

Scenario 1

Scenario 2

Scenario 3
Every scenario includes certain standard features

The individual is presented with a... 

Scenarios...

Attributes...

Security conditions

Level of inconvenience

Cost
Each feature has several possible values

The individual is presented with a...

Attributes...

Values...

Security conditions

Level of inconvenience

Cost

Scenarios...

Scenario 1

Scenario 2

Scenario 3

We create alternative scenarios by building different combinations of values
We then gather data from respondents

- Respondents receive up to a total of 16 scenarios
  - Each scenario highlights different values of the attributes included in scenarios
- Each card presents two or more scenarios
- We ask respondents to choose the scenario on each card that they would most prefer
An example of the survey instrument includes two attributes involving personal data:

<table>
<thead>
<tr>
<th></th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Price (£)</strong></td>
<td>£72</td>
<td>£100</td>
<td>£100</td>
</tr>
<tr>
<td><strong>Processing Time</strong></td>
<td>Two weeks</td>
<td>Two weeks</td>
<td>Same Day</td>
</tr>
<tr>
<td><strong>Type of Personal Information Required</strong></td>
<td>Photograph &amp; DNA Sample</td>
<td>Photograph &amp; DNA Sample</td>
<td>Photograph &amp; Iris Scan</td>
</tr>
<tr>
<td><strong>Level of sharing of passport data</strong></td>
<td>Within the private sector</td>
<td>Across government generally</td>
<td>Within other EU countries</td>
</tr>
<tr>
<td><strong>Additional uses of passport</strong></td>
<td>As a personal identification document &amp; to speed up the processing time for official forms &amp; documents</td>
<td>As a personal identification document &amp; to speed up the processing time for official forms &amp; documents</td>
<td>As a personal identification document</td>
</tr>
<tr>
<td><strong>Number of illegal immigrants that may be identified</strong></td>
<td>300,000</td>
<td>600,000</td>
<td>800,000</td>
</tr>
<tr>
<td><strong>Number of terrorists that may be identified</strong></td>
<td>Less than 750</td>
<td>2,400</td>
<td>2,400</td>
</tr>
</tbody>
</table>

Type of personal info required

Extent to which personal data would be shared

I would opt not to have a passport under any of these conditions.
This is followed by “discrete choice modelling” to analyse the data

• Pulls together all of the individual choices

• Uses the choices people made to quantify the importance of different attributes

• Also inputs socio-demographic data about respondents

• Allows us to understand individual choices
  – Reveals individuals’ trade-offs across different values of an attribute
  – Gives us an estimate of people’s willingness to pay
  – Singles out specific groups that behave differently than the others
We investigated several scenarios in which privacy and liberty might be at odds with security needs.

- Travelling on the UK’s national rail network
- Applying for a passport
- Attending a major public event
We investigated several scenarios in which privacy and liberty might be at odds with security needs.

- Travelling on the UK’s national rail network
- Applying for a passport
- Attending a major public event
Respondents would pay up to a point for providing additional personal information.

Amount respondents willing to pay

Baseline → Photograph

Photograph & Fingerprint

Photograph & Iris Scan

Photograph & DNA Sample

In favour

£0

£7

Against

- £19

Degree of intrusion

£0 £5 £10 £15 £20

- £20 - £15 - £10 - £5

£0 £5 £10 £15 £20

£0 £5 £10 £15 £20
But respondents were unwilling to pay for their personal data to be shared to any extent.

Extent to which personal data would be shared:
- Within the private sector: -£30
- Within other EU countries: -£23
- Across government generally: -£16

Baseline: Only within the IPS
Preferences revealed the trade-offs people were willing to make across privacy, liberty and security

Type of personal information required

- People would rather pay extra to provide photograph and fingerprints
- But would not accept release of advanced biometric information

Extent to which personal data would be shared

- People would prefer their personal data to be kept within the Identity and Passport Service
- Large incentives (e.g. discount on the average price of a passport) would be necessary for respondents to allow sharing of their personal data with third parties
We investigated several scenarios in which privacy and liberty might be at odds with security needs.

- Travelling on the UK’s national rail network
- Applying for a passport
- Attending a major public event
# Rail-travel scenarios included three types of security measures

<table>
<thead>
<tr>
<th>Type of Security</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Camera</strong></td>
<td>Standard CCTV &amp; New cameras that automatically identify individuals</td>
<td>Standard CCTV &amp; New cameras that automatically identify individuals</td>
<td>Standard CCTV cameras</td>
</tr>
<tr>
<td><strong>Time required to pass through security</strong></td>
<td>1 Minute</td>
<td>11 to 15 Minutes</td>
<td>2 to 3 Minutes</td>
</tr>
<tr>
<td><strong>Type of security check</strong></td>
<td>Pat down &amp; bag search for 2 in 1,000 travellers</td>
<td>Pat down &amp; bag search for 1 in 1,000 travellers</td>
<td>Pat down &amp; bag search for 10 in 1,000 travellers</td>
</tr>
<tr>
<td><strong>Presence of the following type of security personnel:</strong></td>
<td>Rail staff, British Transport Police &amp; Armed Police</td>
<td>Rail staff and British Transport police</td>
<td>Rail staff, British Transport Police, Armed Police &amp; Uniformed Military</td>
</tr>
<tr>
<td><strong>Increase on price of ticket to cover security</strong></td>
<td>£1</td>
<td>£1.50</td>
<td>£3</td>
</tr>
<tr>
<td><strong>Number of known terrorist plots disrupted</strong></td>
<td>5 plots disrupted every 10 years</td>
<td>5 plots disrupted every 10 years</td>
<td>10 plots disrupted every 10 years</td>
</tr>
<tr>
<td><strong>Visibility of response to a security incident</strong></td>
<td>If an incident occurs there is some disruption and chaos</td>
<td>If an incident occurs there is some disruption and chaos</td>
<td>If an incident occurs things are handled with minimal disruption</td>
</tr>
</tbody>
</table>

I would choose not to use the rail system under any of these conditions.

RAND
People would pay considerably more for advanced CCTV than for CCTV.

The chart shows the degree of intrusion on privacy and the amount respondents are willing to pay.

- Advanced CCTV: £3.14
- CCTV: £2.05

The baseline has no camera.
People would pay much more for detectors and X-rays than for pat down and bag search

Degree of intrusion on privacy and liberty

- Metal detector / X-ray for all: £2.44
- Pat down & bag search (10 in 1000): £1.17
- Pat down & bag search (2 in 1000): £0.87
- Pat down & bag search (1 in 1000): £0.87
- No checks: Baseline £0.00

Amount respondents willing to pay
People were hesitant to pay more for additional levels of highly specialised security personnel.

<table>
<thead>
<tr>
<th>Level of specialisation</th>
<th>Amount respondents willing to pay (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail staff &amp; British Transport Police</td>
<td>£0.73</td>
</tr>
<tr>
<td>All of the below, plus armed police</td>
<td>£0.54</td>
</tr>
<tr>
<td>All of the below, plus armed police &amp; uniformed military</td>
<td>£0.29</td>
</tr>
</tbody>
</table>
These preferences showed the trade-offs people were willing to make across privacy, liberty and security

**Type of camera**
- The security benefits of the more privacy-intrusive cameras seemed to outweigh people's concerns about privacy

**Type of security check**
- We anticipated that pat down and bag search would be less intrusive on privacy and liberty
- But people felt that metal detectors and X-rays resulted in a higher security/privacy & liberty trade-off

**Type of security personnel**
- People seem to perceive that more specialised security personnel is necessary
- However, presence of uniformed military was valued less than other types of security personnel
We investigated several scenarios in which privacy and liberty might be at odds with security needs.

- Applying for a passport
- Travelling on the UK’s national rail network
- Attending a major public event
Scenarios for a major public event included several security measures

<table>
<thead>
<tr>
<th>Delay to pass through security checks</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 minutes to 1 hour</td>
<td>30 minutes to 1 hour</td>
<td>1 to 2 hours</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Security Check Types</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pat down search</td>
<td>Metal detector / X-Ray</td>
<td>Pat down search</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of identity check required upon arrival</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ticket and a fingerprint scan</td>
<td>Ticket and an iris- scan</td>
<td>Ticket and an iris- scan</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of security personnel</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stewards, private security officials, uniformed police &amp; armed police</td>
<td>Stewards, private security officials, uniformed police &amp; armed police</td>
<td>Stewards, private security officials, uniformed police &amp; armed police</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location of security personnel</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>On the way to the stadium, at the turnstiles, in control room &amp; throughout the crowd</td>
<td>On the way to the stadium, at the turnstiles, in control room &amp; inside the stadium</td>
<td>On the way to the stadium, at the turnstiles, in control room, inside the stadium &amp; throughout the crowd</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional costs on ticket to cover security</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over £4</td>
<td>£2 to £4</td>
<td>Over £4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visibility of response to a security incident</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>If an incident occurs there is some disruption and chaos</td>
<td>If an incident occurs then you are aware of that when you get back home</td>
<td>If an incident occurs there is some disruption and chaos</td>
<td></td>
</tr>
</tbody>
</table>

Please select your answer here:

- [ ]
- [ ]
- [ ]
- [ ]
- [ ]

I would choose not to attend the event under any of these conditions

Type of identity check

Type of security personnel

RAND
People would pay for more intrusive forms of identity check — and the most for ticket check with photo ID.

<table>
<thead>
<tr>
<th>Degree of intrusion on privacy and liberty</th>
<th>Amount respondents willing to pay (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ticket check + iris scan</td>
<td>£1.02</td>
</tr>
<tr>
<td>Ticket check + fingerprint scan</td>
<td>£1.02</td>
</tr>
<tr>
<td>Ticket check + photo ID</td>
<td>£1.20</td>
</tr>
<tr>
<td>Ticket check + given pass or badge</td>
<td>£0.72</td>
</tr>
</tbody>
</table>

Baseline: Ticket check
People would pay a bit more for more highly specialised security personnel, but only around 50p.

- Baseline + uniformed police or military personnel: £0.54
- Baseline + uniformed police: £0.62
- Stewards & private security officials: £0.00
Preferences revealed the trade-offs people were willing to make across privacy, liberty and security

<table>
<thead>
<tr>
<th>Type of security personnel</th>
<th>Type of identity check</th>
</tr>
</thead>
<tbody>
<tr>
<td>People were willing to pay more for highly specialised security personnel.</td>
<td></td>
</tr>
<tr>
<td>People preferred some form of identity check, but were less willing to pay for checks requiring biometric information.</td>
<td></td>
</tr>
<tr>
<td>But the benefit perceived is lower compared with other security interventions.</td>
<td></td>
</tr>
</tbody>
</table>
A particularly promising area in which to apply this approach is Privacy Impact Assessments

- Privacy Impact Assessments aim to anticipate the effects of new initiatives on the privacy of those affected

- Interest in these assessments is growing rapidly

- Our study offers an innovative way of approaching them
  - Collection of quantitative data
  - Assessment of how an initiative is seen in a practical way, ‘in the round’
We learnt a number of lessons from our experiment

- The results demonstrate the validity of using this innovative approach
- The experiment revealed a number of areas we would look at more deeply
  - Data gathering
  - Explicit definitions
  - Refinement of attributes
Stated-preference methods could ensure a stronger evidence base for security policy

- Obtain the views of citizens subject to the security infrastructure, and quantify them
- Add another information source for risk management
- Identify the gap between policy and preferences
  - Where does policy based on privileged security information run counter to popular preferences?
  - Where can policy be adjusted without losing security benefits?
- Bring greater objectivity into a charged debate