The Economics of Payment Card Security and Shifting Fraud Liability

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Incentives

Individuals will make decisions which optimize their expected gains.

E.g. Medical systems are supposed to serve patients but are bought by hospitals so actually serve those interests first.

Externalities

Sometimes the consequences of decisions falls on others.

E.g. Malware installed on a PC harms other computers through a denial-of-service attack, not the PC owner.

Security Economics

Maybe we have security problems because we don't have enough of:
- Cryptography
- Authentication
- Firewalls
- ...

New Uses of Security Technology

Understanding technology is only part of the problem.

Partial Information

Market for Lemons:
- good cars cost more than bad cars
- customers can't tell the difference
- eventually nobody sells good cars

Same situation with security tools.
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Moral Hazard
When someone takes different risk decisions because they are insulated from the consequences
E.g., traders who receive bonuses when they make a profit, and lose nothing when they make a loss

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Cryptography now protects business models
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Value of network grows faster than its size
If a network with 5 members is worth $10, a network with 10 members is worth $40
Consequence: there is one Internet, there are few payment systems (might be one if not for anti-monopoly regulations)
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## Liability Engineering

<table>
<thead>
<tr>
<th>Card</th>
<th>Terminal</th>
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<tbody>
<tr>
<td>magstrip</td>
<td>magstrip</td>
</tr>
<tr>
<td>magstrip</td>
<td>Issuer</td>
</tr>
<tr>
<td>chip</td>
<td>Acquirer</td>
</tr>
<tr>
<td>chip &amp; PIN</td>
<td>Acquirer</td>
</tr>
</tbody>
</table>

Fraud liability was changed to encourage Chip & PIN adoption
Moral Hazard

Once a party does the minimum to shift liability, there is less incentive to improve security further.
Customer Liability

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Law

- Prior to Chip & PIN, customers signed for transactions
- Law was clear: forged signatures are null and void
- With PIN transactions (ATM and since 2005, Point of Sale), the law was unclear
- Sometimes the customer was held liable
- Clarity improved by Payment Services Regulations
Enforcement

- Despite more clarity, it is hard for a customer to sue a bank in the UK
- Loser pays
- No such thing as class action
Lessons

• Payment card security is a technical and economic problem
• All those involved should know something of both
• The market cannot solve all problems: regulatory influence may be required