Identity Fraud – Valuing Compromised Data

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The Economics of Security

- (Most) Security problems are actually economic problems

- (Most) Effective security measures are rooted in economics

- “Never spend more money solving a problem than tolerating it will cost you” (Courtney’s Second Law)
Two Very Different Actors

• **Rational** criminal behavior
  - Strictly financial motivations
  - Deterred when economic costs exceed their benefit
  - Notion of “Acceptable Losses”

• **Irrational** actors
  - Non-financial motivation
  - Terrorists, pedophiles, political activists, etc
  - “Acceptable Losses” may be effectively zero
  - Only deterred when economic costs exceed their means, not their benefit
  - Tradeoffs between enemy’s (anticipated) capabilities and deployment of our own
<table>
<thead>
<tr>
<th>Breach</th>
<th>Number of CC Account Numbers</th>
<th>Value @ $3 per (1)</th>
<th>Value @ $100 per (2)</th>
<th>Cost @ $182 per (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CardSystems</strong></td>
<td>40 Million</td>
<td>$120 Million</td>
<td>$4 Billion</td>
<td>$7.28 Billion</td>
</tr>
<tr>
<td>(mid 2005)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2006 Rev (est): $20M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assets acquired for $47M</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TJX</strong></td>
<td>95 Million (and growing)</td>
<td>$285 Million</td>
<td>$9.5 Billion</td>
<td>$17.2 Billion</td>
</tr>
<tr>
<td>(July 2005) (4)</td>
<td></td>
<td>23% 1.6%</td>
<td>77% 55%</td>
<td>139% 99%</td>
</tr>
<tr>
<td>Cap: $12.35B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006 Rev: $17.4B</td>
<td></td>
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</tbody>
</table>

(1) Symantec, March 2007
(2) World Bank / APWG, January 2005
(3) Ponemon, October 2006
(4) 450,000 “Full Identities” also compromised
### March 2007: The Market Rates

#### Table 3. Advertised prices of items traded on underground economy servers

*Source: Symantec Corporation*

<table>
<thead>
<tr>
<th>Item</th>
<th>Advertised Price (In US Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States-based credit card with card verification value</td>
<td>$1–$6</td>
</tr>
<tr>
<td>United Kingdom-based credit card with card verification value</td>
<td>$2–$12</td>
</tr>
<tr>
<td>An identity (including US bank account, credit card, date of birth, and government issued identification number)</td>
<td>$14–$18</td>
</tr>
<tr>
<td>List of 29,000 emails</td>
<td>$5</td>
</tr>
<tr>
<td>Online banking account with a $9,900 balance</td>
<td>$300</td>
</tr>
<tr>
<td>Yahoo Mail cookie exploit—advertised to facilitate full access when successful</td>
<td>$3</td>
</tr>
<tr>
<td>Valid Yahoo and Hotmail email cookies</td>
<td>$3</td>
</tr>
<tr>
<td>Compromised computer</td>
<td>$6–$20</td>
</tr>
<tr>
<td>Phishing Web site hosting—per site</td>
<td>$3–5</td>
</tr>
<tr>
<td>Verified PayPal account with balance (balance varies)</td>
<td>$50–$500</td>
</tr>
<tr>
<td>Unverified PayPal account with balance (balance varies)</td>
<td>$10–$50</td>
</tr>
<tr>
<td>Skype account</td>
<td>$12</td>
</tr>
<tr>
<td>World of Warcraft account—one month duration</td>
<td>$10</td>
</tr>
</tbody>
</table>

- 33x Risk Premium on cash bank accounts
- High Risk Premiums in general (especially ‘complete identity’)
- C V V secret is “part of the deal”
- Seems to indicate commodization, maturing market
Impact to TJX

Dec 29, 2006
Close: $28.52  
Jan 17, 2007  
Halted @ $29.85  
March 14, 2007  
Close: $26.00  
Sep 21, 2007  
Settled Class Action Suit  
Close: $30.09  

Nov 2, 2007
Close: $27.77
TJX vs S&P
Retail Index
1/1/07 - present

Oct 2, 2007: TJX 29.10
RLX 482.42

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Volume 2,709,360
Impact?

- **CardSystems**
  - Killed by Visa & AMEX using PCI (Oct 31, 2005)
  - Assets sold to PayByTouch
  - "We do not feel like we paid anything like a fire sale price" – CyberSource after signing LOI
  - Assets sold at ~2x multiple; liabilities discharged
  - PayByTouch settled with FTC (Feb 2006)

- **TJX**
  - Net change in share price: $-0.75
  - Shares outstanding: 444.62M
  - Lost value: $333.47M
  - 52 Week pps change: -2.49%
  - Slightly underperformed S&P Retail Index for 6 mos
TJX Now

- June 3, 2003 close: $32.23
- 52 week high is 34.93
- Poster-child for PCI

Jim Cramer 4/708:
“I like TJX. They're executing... they're doing a great job. It's one of my favorite retailers ...No way am I backing away!”
Thoughts

• There is too much data to protect; we must make the data less valuable
  ▪ Identity information seems to be losing value
  ▪ Likely due to success in “back-end” fraud detection / prevention

• Are economic (dis) incentives aligned with security responsibility? In the event of a breech, do the responsible parties feel the pain?

• Do the data stewards care about breeches?
For More Information

- Workshop on the Economics of Information Security (WEIS)
  [www.econinfosec.org](http://www.econinfosec.org)

- *The economic cost of publicly announced information security breaches: empirical evidence from the stock market*
  Journal of Computer Security
  Volume 11, Issue 3 (March 2003)

- *Economics of Information Security*
  L. Jean Camp and Stephen Lewis, Editors

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