Fraud Exposure and Precautionary Credit Market Behavior

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Disclaimer

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Introduction

- Large-scale data breaches involving sensitive personally identifiable information (PII) are increasingly common
- These breaches can lead to identity (ID) theft and fraud, which can be costly to victims
- To mitigate the risks of ID theft and fraud, consumers can take precautionary credit market actions:
  - Freeze their credit reports
  - Close down unused accounts
  - Sign up for credit monitoring

Introduction

- In this paper, we examine:
  1. Whether consumers affected by a data breach take precautionary actions in response to the breach, and
  2. How past exposure to fraud (ID theft) or a heightened risk of fraud (data breach) affect their responses.

Introduction

- Prior exposure may affect consumers' responses via learning:
  - Better informed about types of precautionary actions available
  - Practical experience of taking action
- Our hypotheses:
  - Prior ID theft or data breach victims are more likely to take precautionary actions than non-victims.
  - Prior ID theft victims are more likely to take precautionary actions than prior breach victims.
- Test hypotheses in the context of the 2017 Equifax data breach using a standard differences-in-differences (DID) empirical framework

Preview of Results

- Main findings:
- Consumer respond to the news of the breach:
  - increase in the likelihood of having a credit freeze
  - decrease in the number of retail trades held
  - no change in the number of bank cards held
- Previous ID theft victims are more likely to respond to the breach than non-victims
- Previous ID theft victims are more likely to respond than prior breach victims

Background

- Prior research has shown that individuals respond to **data breaches** by freezing their credit reports and/or using credit monitoring (Mikhed and Vogan, 2018)
  - No evidence that individuals changed their credit market behavior
  - Response is short-lived
- Individuals do respond to **identity theft** in credit markets (Blascak et al, 2019)
- Data breach disclosure laws can be effective in reducing identity theft (Romanosky, Telang, Acquisti, 2011)

A Stylized Model of Precautionary Action

- Consumer's decision problem: whether to adopt a protective measure to reduce potential fraud losses in the future.
- Consumer i adopt measure j if

$$p_i L_i > C_{ij} + \epsilon_i$$

  - pi, L_i: perceived probability of fraud and perceived losses from fraud
  - C_{ij}: cost of adopting measure j (monetary + non-monetary)
  - ϵ_i: idiosyncratic cost shock, i.i.d. with mean zero.
- $\Longrightarrow \uparrow p_i$, then consumers will take action

A Stylized Model of Precautionary Action

- "Baseline" scenario (no prior exposure): tendency toward inaction
  - Lack of knowledge or awareness of measures available (Zou et al, 2018)
  - Cost and hassle associated with adopting precautionary measures (Zou et al, 2018)
  - Decision errors due to present-biased preferences and underweighting of fraud risks $\rightarrow$ Status quo bias (Zou et al, 2018; Romanosky et al, 2011).

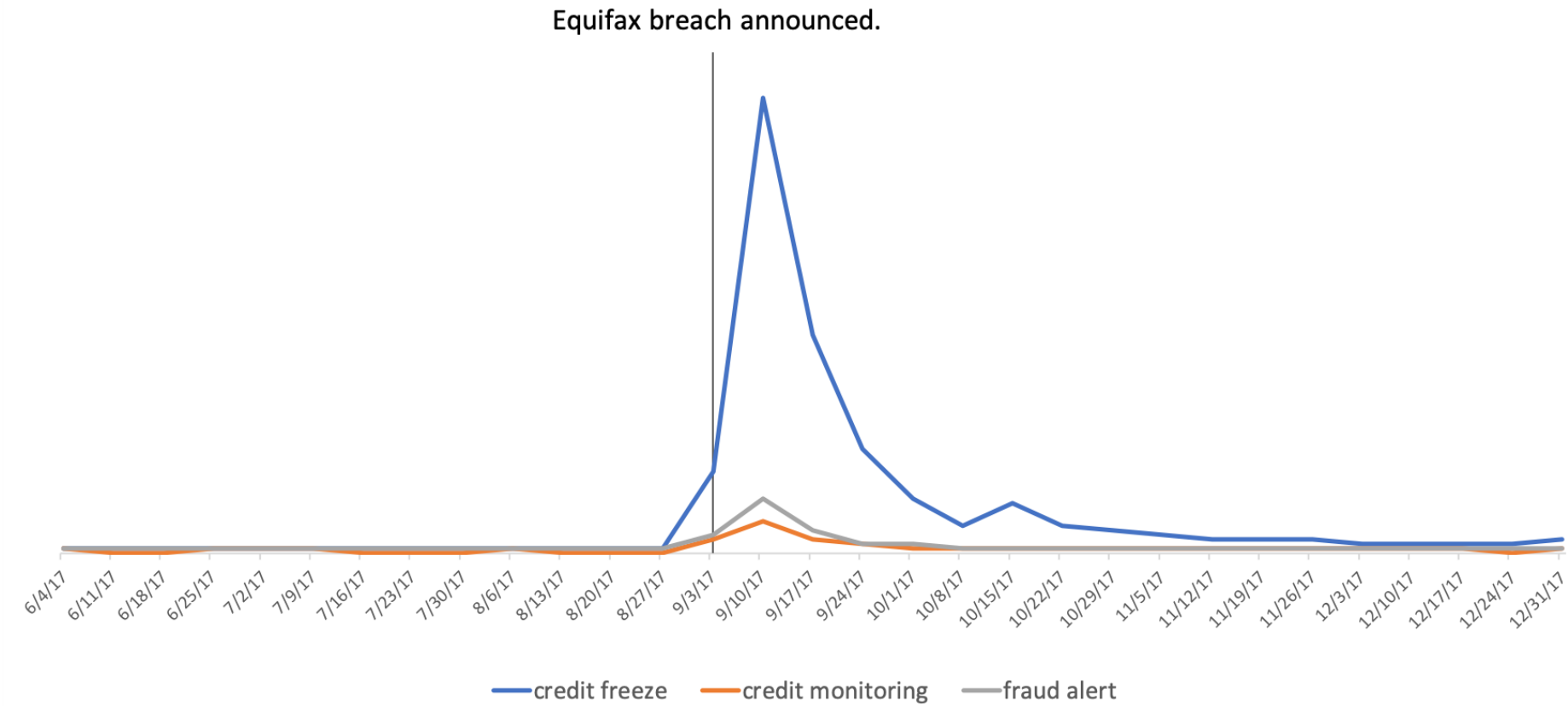
A Stylized Model of Precautionary Action

- Past exposure to fraud or a heightened risk of fraud may affect consumers precautionary behavior by:
  - Increasing their awareness of possible protective measures $\rightarrow$ Lower cost of taking action
  - Reinforcing or counteracting the decision errors via the availability heuristic
- Availability heuristic: assign probability to an event occurring based on how easily instances of such events can be brought to mind.
- Prior fraud exposure $\rightarrow$ Easily think of instances of fraud $\rightarrow$ Overestimate of fraud risks and risk aversion
- Prior exposure to a heightened fraud risks that did not result in fraud $\rightarrow$ Likely to recall the non-occurrence of fraud $\rightarrow$ Further underestimate or neglect fraud risks.

Background: The 2017 Equifax Breach

- Announced on September 7, 2017
- One of the largest and most severe data breaches ever recorded
  - Up to 147 million people affected
  - Information accessed included names, social security numbers (SSNs), birth dates, and home addresses
- Equifax responded by offering free credit monitoring to affected consumers and eventually free credit freezes

Equifax Breach: Did People Respond?



Notes: Authors' calculations using data from Google Trends.

Data

- Federal Reserve Bank of New York/Equifax Consumer Credit Panel (CCP)
  - 5% random sample of quarterly anonymized U.S. consumer credit bureau data
  - 11,848,960 individuals from Q1:2013-Q4:2018
- Merge the CCP will additional data from Equifax on credit freezes and fraud alerts
  - Credit freezes can be placed on a consumer's credit report, restricting access to outside parties
  - Fraud alerts requires businesses to verify a consumer's identity before issuing credit

Data

- Measures of precautionary behavior:
- Credit freezes
- Holding fewer accounts
  - We focus on retail trades
  - More fungible than a bank card

Identifying Prior Victims

- Identify two groups of prior victims:
  1. Prior fraud victims
     - Follow Blascak et al (2019) and use the placement of extended fraud alert flag as a proxy for being a victim of server identity theft
  2. Prior breach victims
     - Identify individuals in living in states that were highly likely exposed to the 2015 Anthem data breach
     - Major data breach where PII of individuals affiliated with Anthem and its subsidiaries were exposed to criminals
     - Exposure to the data breach is geographic
     - We will compare individuals living in IN (most highly exposed state, 68% of residents affected) to individuals in living in IL (1.67% of residents affected)

Empirical Framework

- Estimate the following event study DID regression

$$y_{it} = \alpha_0 + \mathbf{\Pi} T_t \times D_i + \alpha_1 D_i + \mathbf{\Psi} T_t + \mathbf{X}_{it}\mathbf{\Omega} + \delta_i + \gamma_c + \epsilon_{it} \quad (1)$$

- D_i is a dummy variable $= 1$ if an individual is a prior fraud or ID theft victim
- T_t is a vector of quarter dummy variables
- $X_i t$ includes county-level controls for unemployment rate, population, percent minority, and age dummy variables
- Also include individual fixed effects, δ_i, and county fixed effects, γ_c
- $\mathbf{\Pi}$ contains DID coefficient estimates for each quarter

Discussion and Conclusion

- Response greater and more persistent for prior identity theft victims
- Relative to other consumers, former ID theft victims were more likely place credit freezes by 0.1%; for former breach victims, this increase was only 0.05%
- Decline in retail trades small, but persistent
- Implies that increasing information for victims and keeping costs low may improve consumers' ability to take precautionary actions after a breach