Household stock market participation in the aftermath of an accounting scandal

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Part I

Research questions

Fraud, trust and markets

- Low trust has been seen to be a deterrent to stock market participation (Guiso, Sapienza and Zingales)
- More recent literature points to a "trust effect" on withdrawal from the stock market
  - Gurun, Stoffman and Yonker (2015): Residents of communities that were more exposed to the fraud subsequently withdrew assets
  - Giannetti and Wong (2016): Instances of fraud revelation lowers household participation in stock markets by lowering trust.
- This has huge implications for cost of capital.

New setting, new data

- Present new evidence about these questions
- We ask:
  - Are investors with direct exposure to stock market fraud likely to decrease their participation?
  - Is this a "trust effect" or a "wealth effect"?
  - Is the reaction to fraud is an immediate response or continues to persist over long horizons?
- Narrow our attention to one event, the "Enron of India" fraud, a.k.a Satyam scandal
- Daily holdings comes from the National Securities Depository Limited (NSDL).
- Allows us to identify investors who were directly exposed to the fraud
- Allows us to see the immediate response to an event

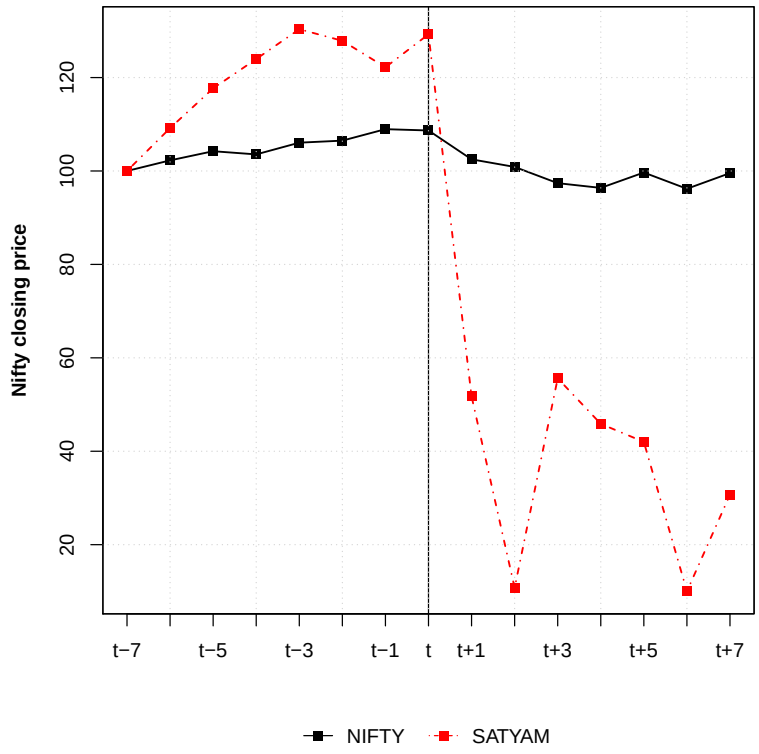
Part II

Research design

The setting

- Satyam was a successful IT company
- Promoter was the poster boy of India's IT revolution.
- On January 7, 2009, the chairman of Satyam publicly confessed that he had manipulated the accounts of the firm by US$1.47 billion
- Investors in Satyam are said to have lost almost Rs.136 billion (US$2 billion) over the next month

Dealing with concerns: Exogenous event

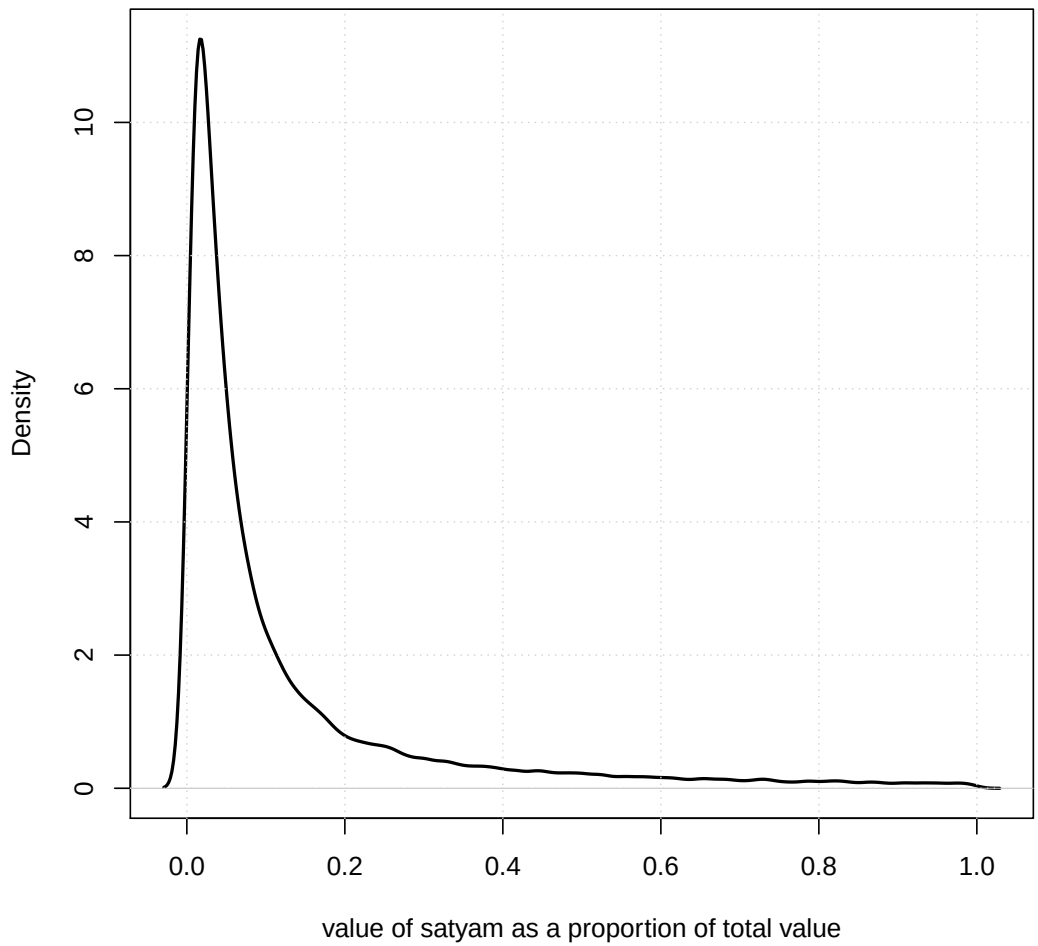


- Announcement was largely a surprise, despite acquisition of two real-estate companies (Maytas Properties and Maytas Infrastructure) a few weeks prior
- Was not related to economic conditions - was a result of accounting fraud.

Data

- As of 6 January, 2009, the day before the Satyam crisis, there were 5.6 million individual accounts in NSDL.
- A stratified random sample of investors from the NSDL universe.
- Sampled from each state, and oversampled Satyam investors in each state.
- Total sample of 439,461 retail investors.
- Of these 10% (40,461) investors held Satyam one day before the crisis.

Satyam shares



Overall sample

	Does not own Satyam	Owns Satyam	Overall
Account age	3.67	4.64***	3.75
	(2.86)	(2.54)	(2.59)
Total traded value (Rs.000) between $t-30$ and t	5.51	25.82***	7.45
	(77.64)	(94.67)	(79.65)
Net traded value (Rs.000) between $t-30$ and t	-1.05	2.57***	-7
	(75.14)	(68.33)	(74.5)
Portfolio value (Rs.000)	81.44	210.27***	93.75
	(145.48)	(227.09)	(159.71)
Portfolio returns between $t-1$ and t	-0.09	-0.29***	-0.11
	(0.04)	(0.37)	(0.13)
Portfolio Beta	0.88	0.85***	0.87
	(0.31)	(0.23)	(0.30)
Has other IT stocks	0.18	0.58***	0.22
	(0.49)	(0.38)	(0.41)
N	382,901	40,461	423,362

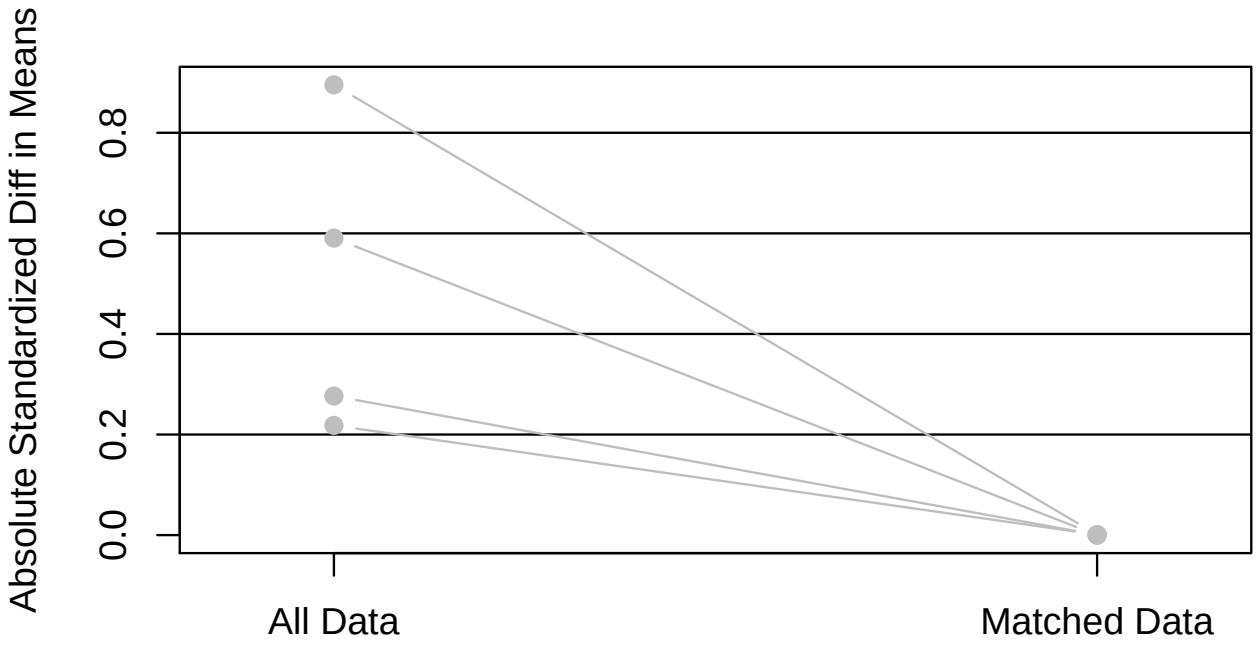
Dealing with concerns: Household preferences

- Prior to the scandal date, match households on:
  - Age in terms of number of years in the stock market
  - Trading intensity
  - Portfolio beta
  - Portfolio value (in logs)

Match balance

	(1) Means Treated	(2) Means Control	(3) SD Control	(4) Mean Diff	(5) t-stat	(6) p-val	(7) SDIFF	(8) ks-stat	p-
Portfolio beta	0.85	0.89	0.29	-0.05	-0.23	0.82	-0.16	0.002	0.00
Log (portfolio value)	11.46	10.06	17.55	13.98	-0.05	0.96	0.04	0.005	0
Net turnover (Rs.)	2576.62	-1052.26	76431.76	3628.87	1.45	0.14	1.02	0.08	0.00
Account age	4.46	3.67	2.53	0.79	0.0004	0.99	0.0003	0.007	0

Standardised bias



Net and gross traded value

For a two stock portfolio, comprising of stocks A and stock B at any given time t, Cash-in and Cash-out (denoted by Δ_{At} and Δ_{Bt}) is calculated by:-

$$\Delta_{At} = P_{At-1} x Q_{At} - P_{At-1} x Q_{At-1} \tag{1}$$

$$\Delta_{Bt} = P_{Bt-1} x Q_{Bt} - P_{Bt-1} x Q_{Bt-1} \tag{2}$$

P_{it} is the price of the stock "i" in time t and Q_{it} is the weights or the quantity of the stock "i" at time t in the portfolio. Net turnover or netΔ is given by:-

$$net\Delta_t = \sum_{A}^{B} \Delta_{it} \tag{3}$$

Gross turnover or grossΔ is given by:-

$$gross\Delta_t = \sum_{A}^{B} |\Delta_{it}| \tag{4}$$

Example

- If an investor has 10 shares of Company A of Rs.10 each in his portfolio on day t. The portfolio value of this investor is Rs.100.
- For simplicity, lets assume that the price remains at Rs.10 on $t+1$.
- Suppose the investor sells the 10 shares of Company A, and buys 10 shares of Company B. The gross traded value here is Rs.200. However, the net traded value is 0
- If the investor sold the 10 shares of Company A, and made no other purchase, then the net traded value would be -Rs.100. This is *cashing-out* of the portfolio.
- If the investor did not sell existing shares and instead bought 10 shares of Company B at Rs.10 each, then the net traded value would be Rs.100. This would be *cashing-in* into the portfolio.

Regression methodology: DID

$$y_{i,t} = \beta_0 + \beta_1 \text{satyam}_{i,t} + \beta_2 \text{post-satyam}_{i,t} + \beta_3 (\text{satyam}_{i,t} \times \text{post-satyam}_{i,t}) + s_i + \epsilon_{i,t}$$

- $Y_{i,t}$ is the net traded value (in Rs. and as a proportion of portfolio value)
- satyam is a dummy which takes value "1" if investor i held Satyam stock (the treated investor) and "0" otherwise (the control investor).
- post-satyam captures whether the observation is from the period before the Satyam event (post-crisis = "0") or after (post-crisis = "1").
- s_i is the state fixed effect.

Part III

Results

Trading on Satyam

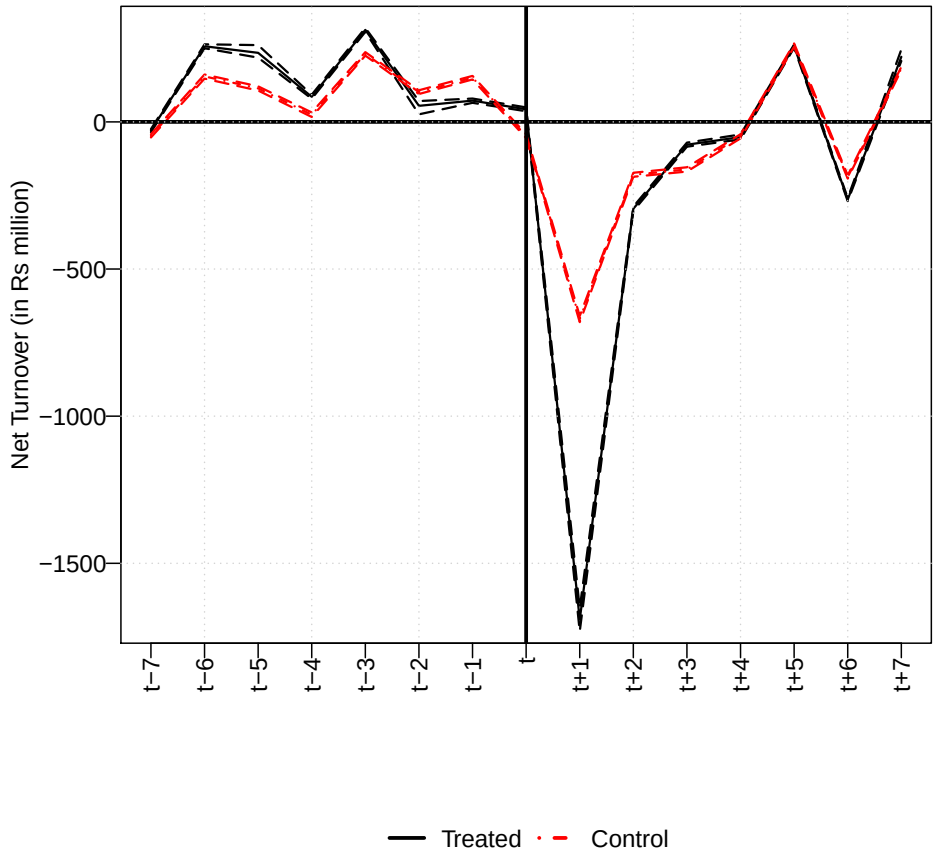
- Satyam trades of the treated group in our sample traded were almost Rs.1.4 billion. Control group were at Rs.36 million
- Net traded value on Satyam of treated investors was -Rs.1.1 billion. Investors *cashed-out*
- Net traded value on Satyam of control investors was Rs.17 million, i.e. they "bought" Satyam shares
- Perhaps seen as an opportunity to buy some of the depressed stock.

DID result on Satyam

	STV (Rs.)	STV/Val (%)
	(1)	(2)
Treat	1,306.203***	0.2
	(27.177)	(0.4)
Post	111.582***	−0.2***
	(5.795)	(0.1)
Treat*Post	−6,030.434***	−9.7***
	(110.596)	(0.8)
Constant	−197.793***	−1.9
	(65.362)	(1.3)
State FE	YES	YES
Observations	1,048,090	1,048,090

- Differential between the average amount cashed-out by the treated and control investors was about Rs.6,030. This is 10 times the pre-treatment average of Rs.583 of *net purchases*.
- Treated investors cashed out Satyam shares worth 9.7% of the portfolio value relative to control investors

Impact on portfolio



- Treated investors (i.e. those who held Satyam stock) sold out their equity holdings on the date of the announcement.
- Overall net traded value of treated investors was -Rs.2.1 billion,
- Of control investors was -Rs.0.9 billion.

DID result on overall portfolio

	Dependent variable:	
	NTV (Rs.)	NTV/Val (%)
	(1)	(2)
Treat	918.994***	0.5
	(51.821)	(0.7)
Post	−7,380.171***	−3.0***
	(64.490)	(0.9)
Treat*Post	−5,136.610***	−10.7***
	(137.904)	(1.6)
Constant	2,816.367***	−1.9
	(84.548)	(1.5)
State FE	YES	YES
Observations	1,048,090	1,048,090

- Average amount de-invested relative to control group is Rs.5,000. This is almost 1.5 times the pre-treatment average of *net purchases* of Rs.3,445.
- Treated investors cashed out 11% of the portfolio value relative to control investors.

Effect on related stocks

	PWC	Directors	HQ HYD	HQ AP	Real Estate	IT
	(1)	(2)	(3)	(4)	(5)	(6)
NTV/Val (%)						
Treat*Post	0.3^{***}	0.4^{***}	0.7^{***}	0.7^{***}	-0.2^{**}	0.3^{***}
	(0.1)	(0.04)	(0.2)	(0.2)	(0.1)	(0.04)
Observations	850,848	549,243	646,553	665,817	246,979	703,266
State FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: *p<0.1; **p<0.05; ***p<0.01

- Treated investors actually *cash-in* into stocks of related firms
- Fraud revelation does not affect all firms

Effects over time: 30 days

	NTV (Rs.)	NTV/portval (%)
	(1)	(2)
Treat	−224.853***	0.6
	(20.754)	(0.6)
Post	−2,089.931***	−2.2*
	(21.048)	(1.2)
Treat*Post	−388.116***	−1.8
	(32.178)	(1.5)
Constant	1,205.814***	−0.7
	(30.802)	(0.6)
State FE	Yes	Yes
Observations	4,884,355	4,884,355

- No statistically significant difference in the cashing out behaviour (as a proportion of portfolio value)
- Cashing out behaviour ceased within one month of the event
- Contrary to the results of Giannetti and Wong 2016 who find large withdrawals by households in equity participation over several years.

Part IV

Treatment Heterogeneity

By portfolio value

	Portfolio value as on 6 Jan, 2009 (Rs.)				
	Q1	Q2	Q3	Q4	Q5
	(1)	(2)	(3)	(4)	(5)
Net turnover / port val (%)					
Treat*Post	-28.0***	-11.0***	-0.3	-0.7	-7.5
	(0.03)	(0.04)	(0.023)	(0.017)	(0.063)
State FE	Yes	Yes	Yes	Yes	Yes
Observations	203334	186620	182786	175253	157728

- At the lowest wealth quintile, treated investors cashed out almost 28% of their portfolio relative to control investor
- As the portfolio value increases, the effect attenuates.
- Points to a "wealth effect" and not a "loss in trust" effect.

By Satyam exposure

	NTV (Rs.)	STV (Rs.)	NTV/Val (%)	STV/Val (%)
	(1)	(2)	(3)	(4)
Post	−3,941.911***	−79.522**	−9.1*	−2.0
	(88.668)	(37.563)	(5.1)	(1.8)
Post*B2	−2,288.990***	−464.079***	1.0	−2.0
	(128.232)	(38.546)	(5.1)	(1.9)
Post*B3	−4,107.557***	−990.240***	−0.7	−4.1**
	(162.174)	(38.526)	(5.1)	(1.9)
Post*B4	−6,351.781***	−2,190.812***	−2.0	−5.2***
	(132.454)	(40.037)	(5.1)	(1.8)
Post*B5	−29,044.280***	−24,986.150***	−21.2***	−25.6***
	(519.158)	(498.061)	(6.3)	(4.0)
Constant	1,523.182***	−56.246	−4.4	−4.1
	(98.178)	(83.754)	(3.4)	(3.3)
Observations	524,616	524,616	524,616	524,616
State FE	Yes	Yes	Yes	Yes

- The greater the exposure to the fraud, the greater is the withdrawal from the market, and the stock in question.
- At lower levels of exposure, no statistically significant difference when measured as a proportion of portfolio value.

By proximity to crisis location

	NTV (Rs.)	NTV/Val (%)
	(1)	(2)
AP	−617.262***	0.5
	(137.89)	(1.6)
Post	−7,429.318***	−2.8***
	(66.21)	(1.0)
AP*Post	1,141.522***	−4.4
	(284.89)	(4.2)
Constant	2983.950***	−0.8
	(38.99)	(0.9)
Observations	524,477	524,477
Note:	*p<0.1; **p<0.05; ***p<0.01	

- Attention narrowed to control investors. Investors in this estimation do not own Satyam and could not have seen a loss in portfolio value owing to Satyam.
- No difference between the trading of investors inside and outside AP.

By investor experience

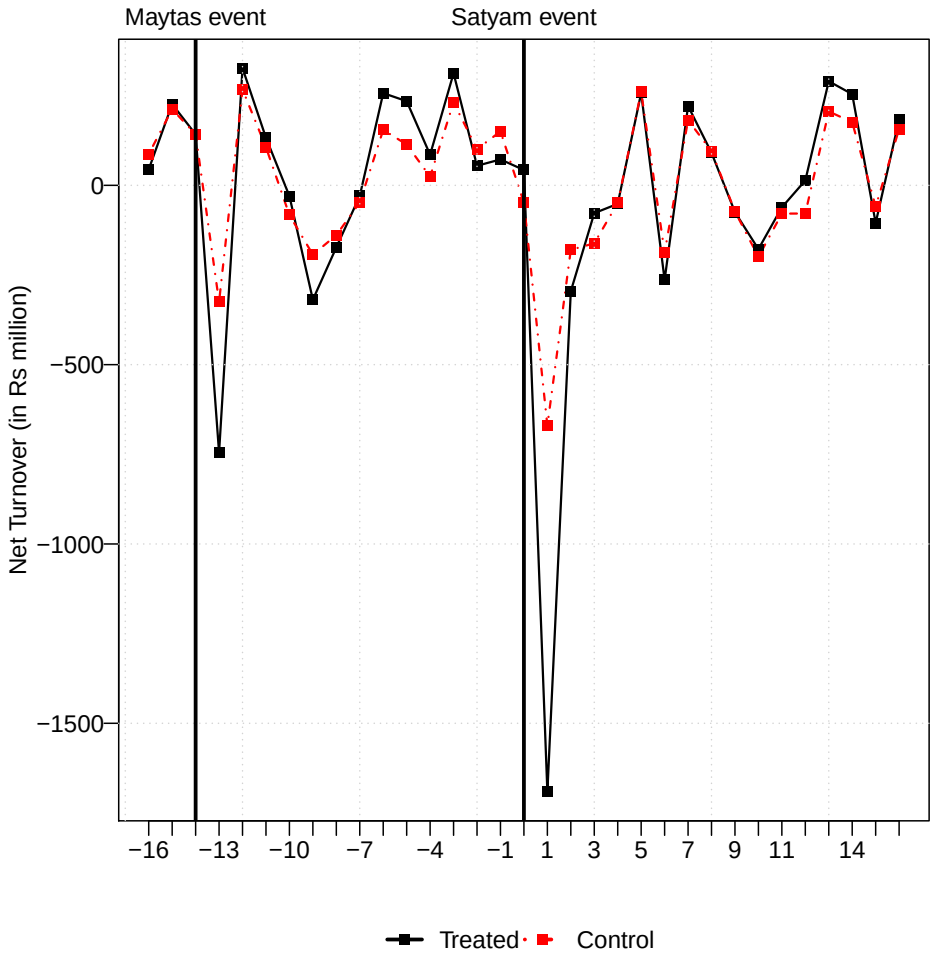
	Age of the investor		
	< 5	5-10	> 10
	(1)	(2)	(3)
Net traded value/ portfolio value			
Treat*Post	-13.2^{***}	-6.5^{***}	-3.2^{***}
	(2.4)	(1.1)	(0.6)
State FE	Yes	Yes	Yes
Observations	577,143	320,779	9,123
Note:			*p<0.1; **p<0.05; ***p<0.01

- Effect attenuates with investor age
- Experience matters. Those relatively new to the markets are more likely to react by cashing out than those who have been in the market for longer.

Part V

Threats to validity

Was it some other event?



Unobservables driving the result?

Restrict control group to those who once held Satyam

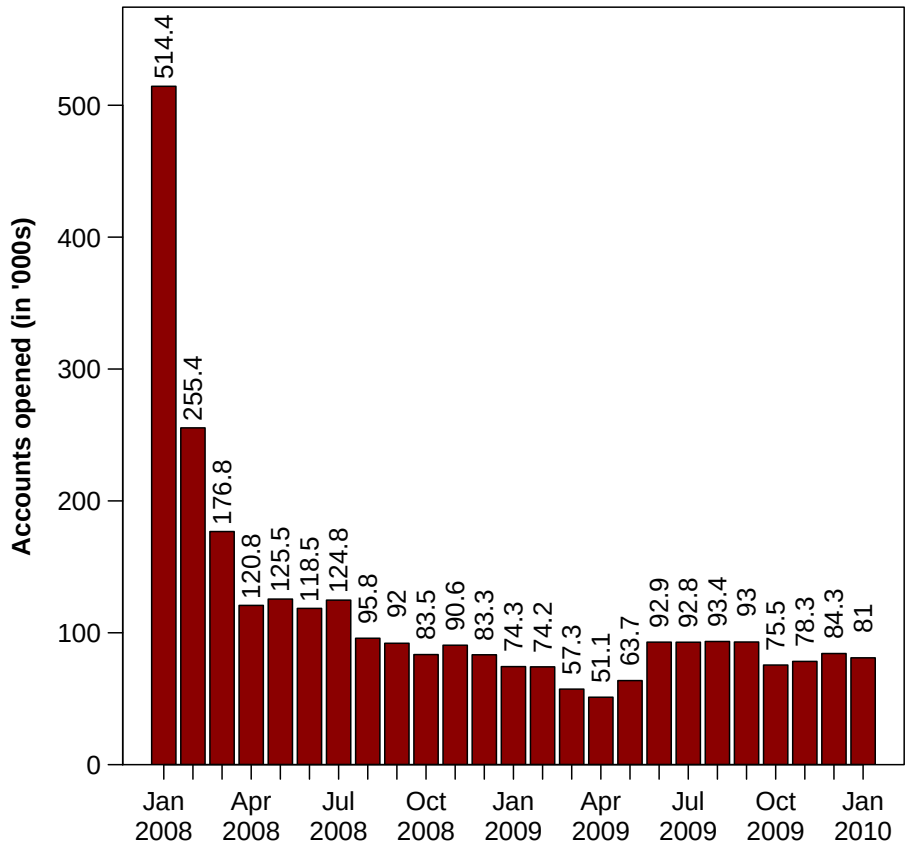
	Full sample	Strict Control	Gave up before Mytas	Gave up after Mytas	Remove in and out
	(1)	(2)	(3)	(4)	(5)
NTV/portfolio value					
Treat*Post	−10.7***	−9.5***	−13.8***	−72.6	−71.6
	(1.6)	(1.4)	(3.7)	(51.4)	(51.4)
Observations	1,049,093	1,012,500	539,623	534,804	522,920
State FE	Yes	Yes	Yes	Yes	Yes
Note:					*p<0.1; **p<0.05; ***p<0.01

- Effect consistent across all specifications.
- It is not just unobservables that are driving the result.

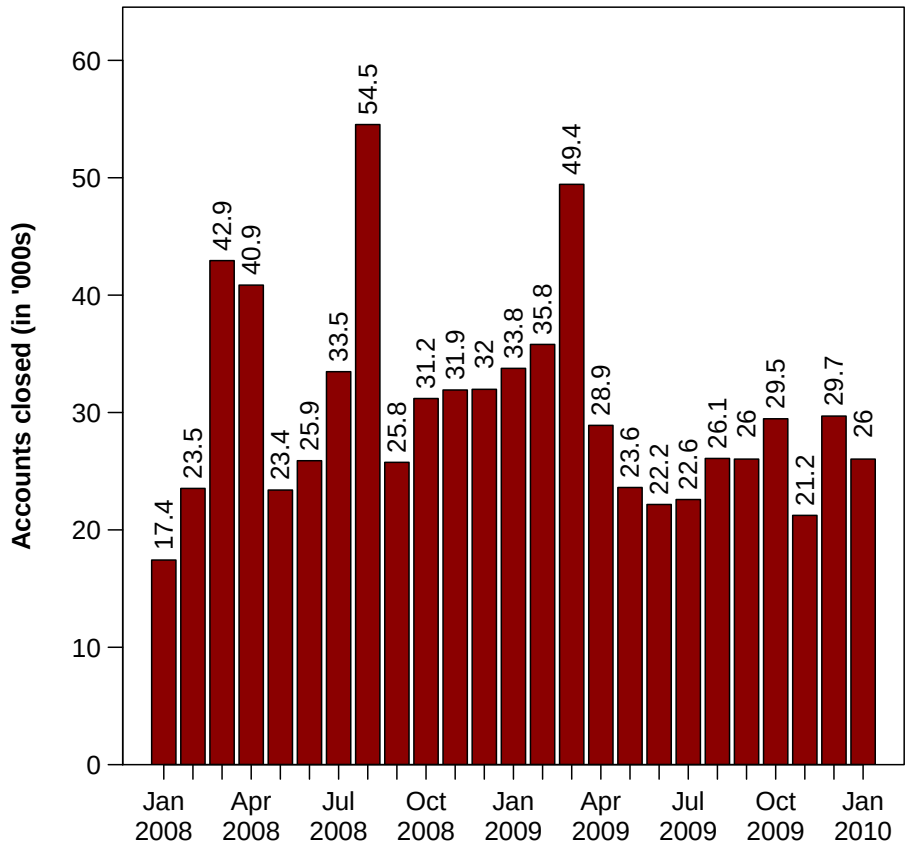
Part VI

Extensive margin

Account opening



Account closing



Part VII

Conclusion

Conclusion

- We find a huge impact on those exposed to fraud
- These investors sell the “bad” stock.
- Effect not very strong on other related stocks.
- Effect not very strong over time.
- Both these results are contrary to international literature
- Suggest a “wealth effect” and not a “loss of trust” effect on the intensive margin
- Possibly related to the composition of “retail” investors
- Possibly related to overall skepticism of the market.
- Probably an effect on the “extensive” margin

Questions/comments?