



# CERIAS

the center for education and research in information assurance and security

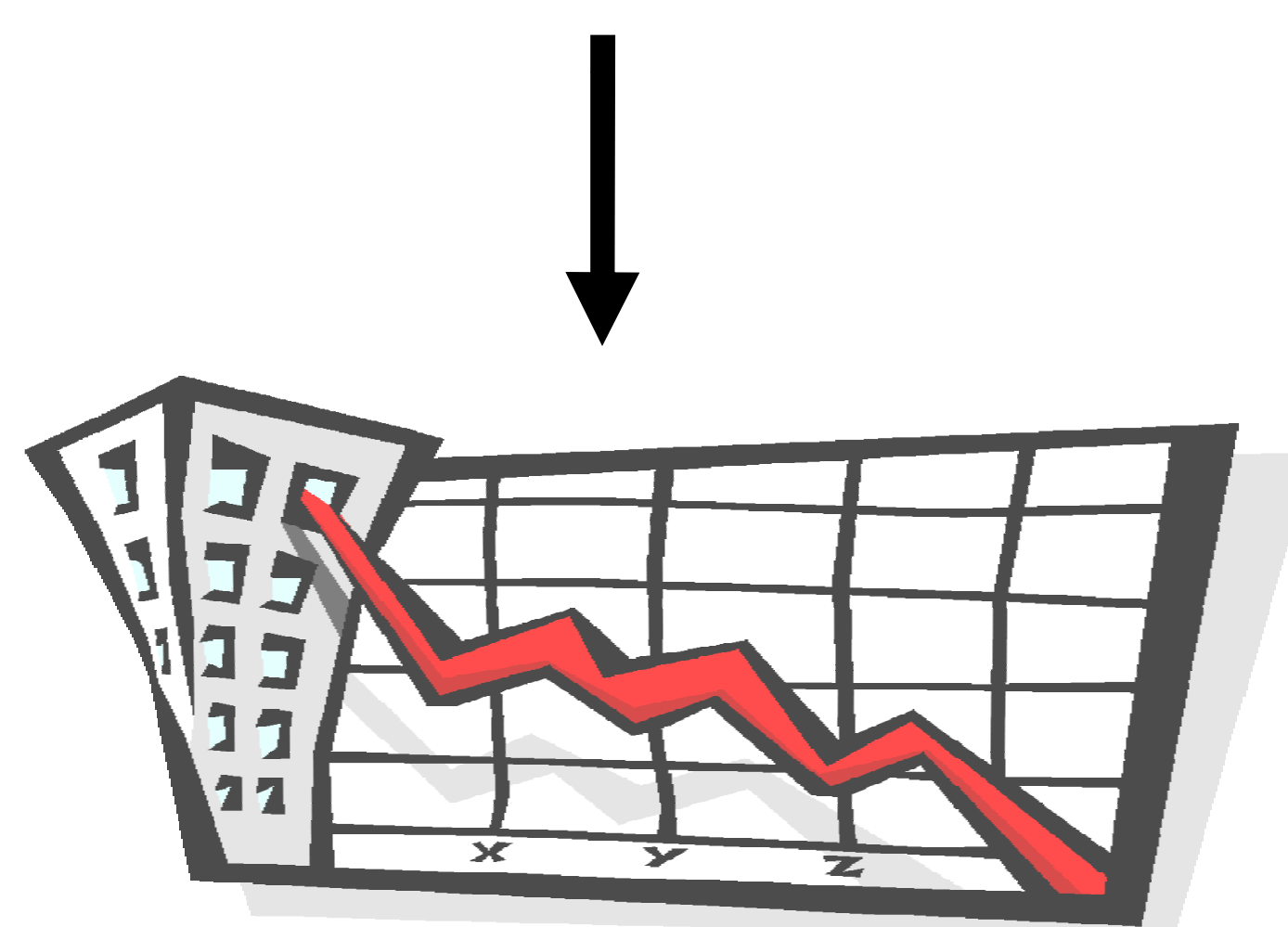
## Investors' Perceptions of Information Security Incidents and Short-term Profitable Investment Opportunities



In Millions of USD (except for per share items)	31 months ending 2007-09-30	31 months ending 2006-09-30
Operating Income	11,012,000	11,083,000
Operating Expenses	(2,102,000)	(2,122,000)
Operating Profit	8,910,000	8,961,000
Non-Operating Income	1,000,000	1,000,000
Non-Operating Expenses	(100,000)	(100,000)
Non-Operating Profit	900,000	900,000
Income Before Income Taxes	9,810,000	9,861,000
Income Tax Expense	(1,000,000)	(1,000,000)
Income After Income Taxes	8,810,000	8,861,000
Minority Interest	(100,000)	(100,000)
Net Income	8,710,000	8,761,000
Net Income Available to Common Equity Shareholders	8,710,000	8,761,000
Minority Interest	(100,000)	(100,000)
Minority Interest Available to Common Equity Shareholders	8,610,000	8,661,000
Basic EPS	0.22	0.22
Diluted EPS	0.21	0.21
Weighted Average Shares Outstanding	40,000,000	40,000,000
Weighted Average Shares Outstanding - Diluted	40,000,000	40,000,000
Dividends per Share - Common Stock Primary Issue	0.00	0.00

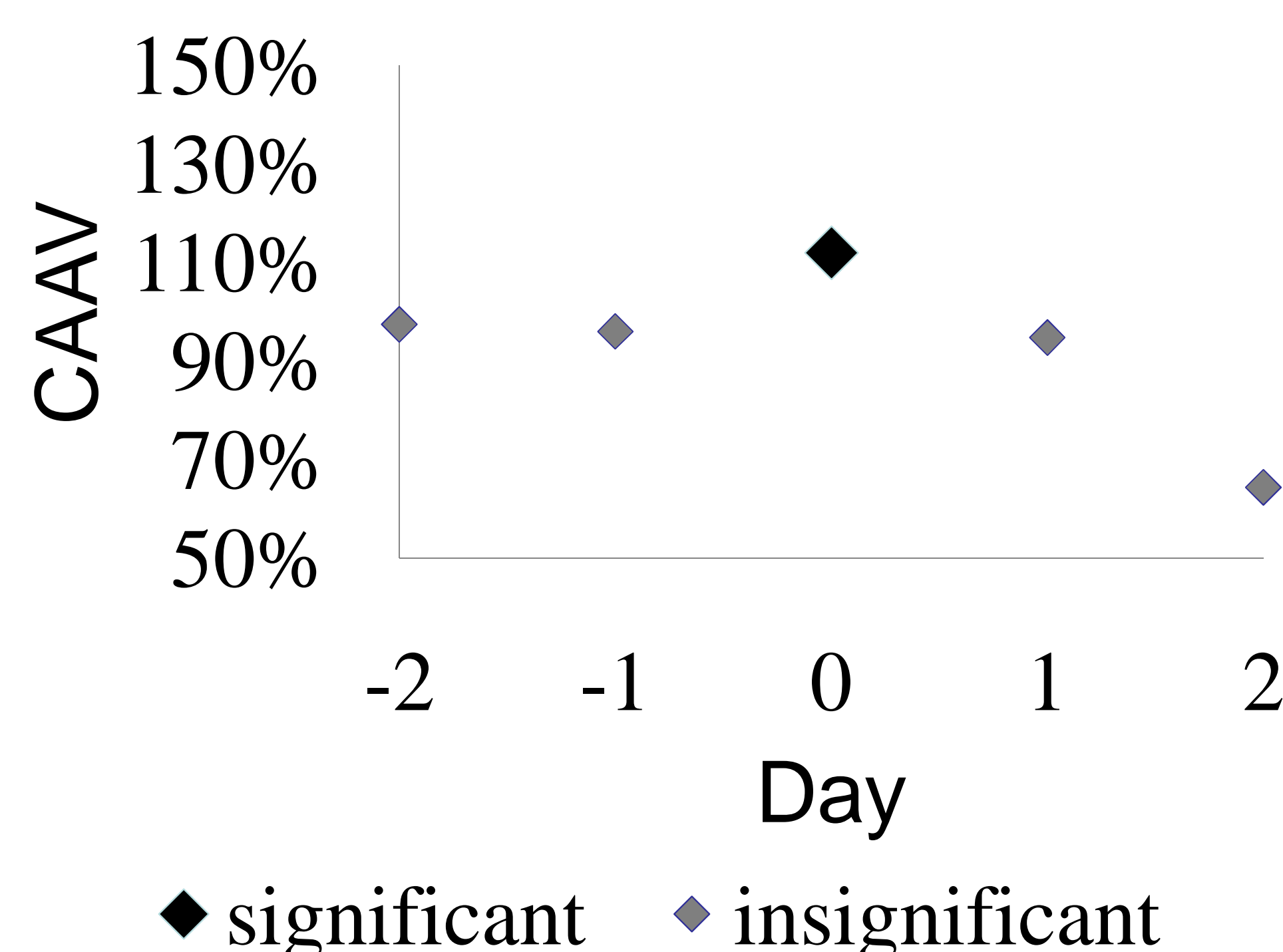
### Information Security Incidents

Media announcements from 1997 to 2007 in the Wall Street Journal, USA Today, the Washington Post, the New York Times, CNET, ZDNet by searching 12 keywords



### Trading Volume Behavior

- Trading volume reactions to information security incidents in the two-day period around announcements after controlling for confounding effects
- Different interpretations between noise and sophisticated investors of the impact of security incidents on a firm's future performance and uncertainty



Variables	Coefficient
Intercept	<b>0.89<sup>***</sup></b>
Size	0.01
Age	0.00
Price_Reaction	<b>2.60<sup>**</sup></b>
Confidentiality	-0.09
Integrity	-0.03
InstOwn	<b>-0.12<sup>*</sup></b>

### Subsequent Quarterly Performance and Uncertainty

Earnings per Share (EPS)  
Implied Volatility

### Subsequent Quarterly Performance

- None of the analysts' forecast revisions can be associated to incidents.
- All the firms' performance is greater than the analysts' forecasts (0.02,  $p < 0.05$ )
- Institutional investors don't change their holdings.
  - Sophisticated investors don't interpret security breaches as harming future performance

### Subsequent Quarterly Uncertainty

- Implied volatility decreases about 1.26% ( $p < 0.05$ )

### Profitable Investment Opportunities

- Buy on the breach announcement date and sell after three trading days → 300% annual return

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