



Supply Chain Disruptions and Corporate Performance

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A thought



- Without facts you are just another person with an opinion

unless

you are at a level of the organization where your opinion becomes fact



Issues examined

- Effect of supply chain disruptions on shareholder value
 - changes in stock returns
- Effect of supply chain disruptions on profitability
 - operating income, sales, and cost

Sample



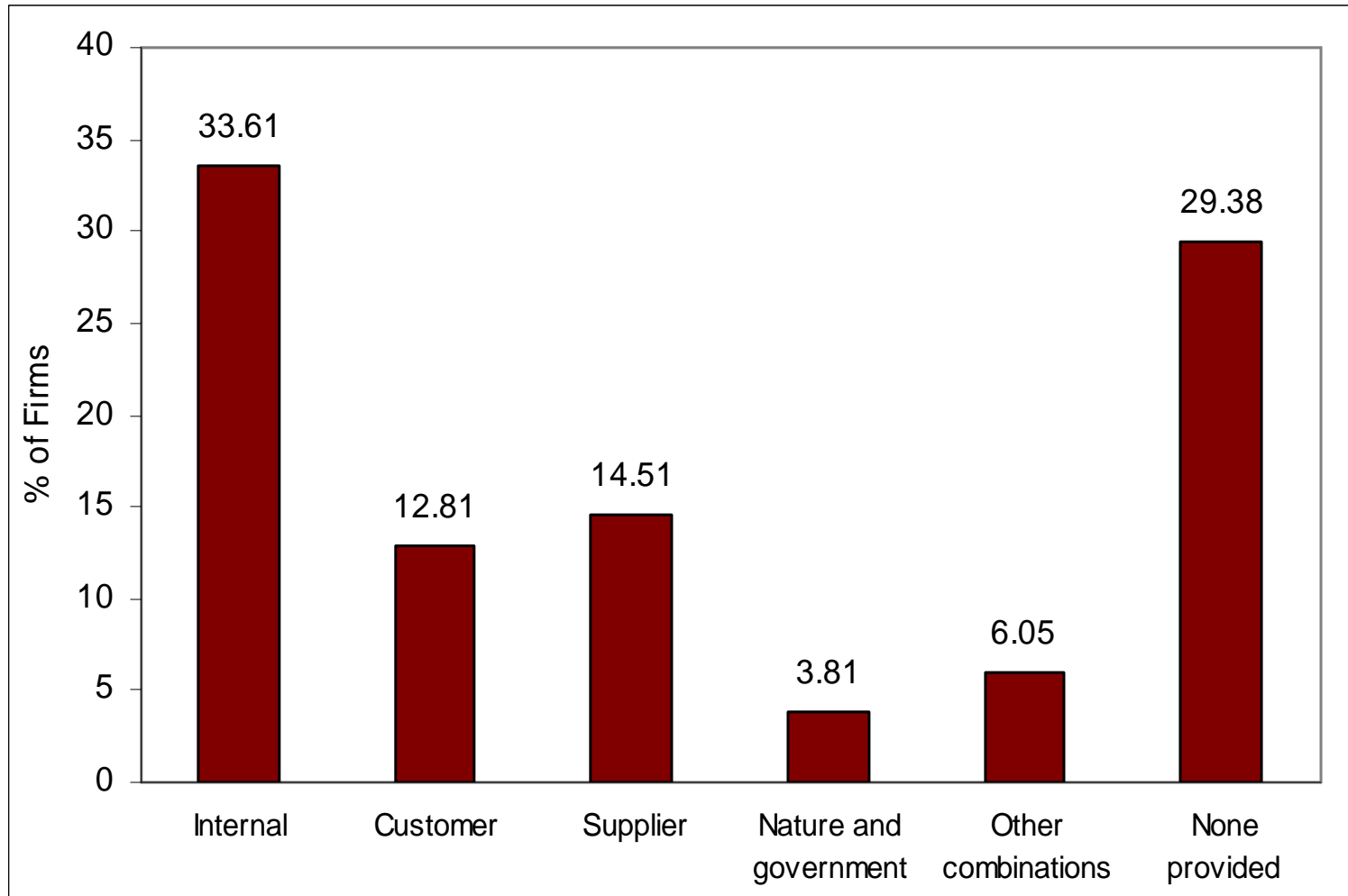
- 800+ announcements of supply chain disruptions (production or shipment delays) from Wall Street Journal and Dow Jones News
 - Sun Microsystems delays shipments of workstations and servers, Dow Jones News Service, December, 14, 2000.
 - Sony Sees Shortage of Playstation 2s for Holiday Season”, The Wall Street Journal, September 28, 2000.
 - Boeing pushing for record production, finds parts shortages, delivery delays, Wall Street Journal, June 26, 1997.
 - Hershey will miss earnings estimate by as much as 10% because of problems in delivering order, Wall Street Journal, September 14, 1999.

Consequences of disruptions

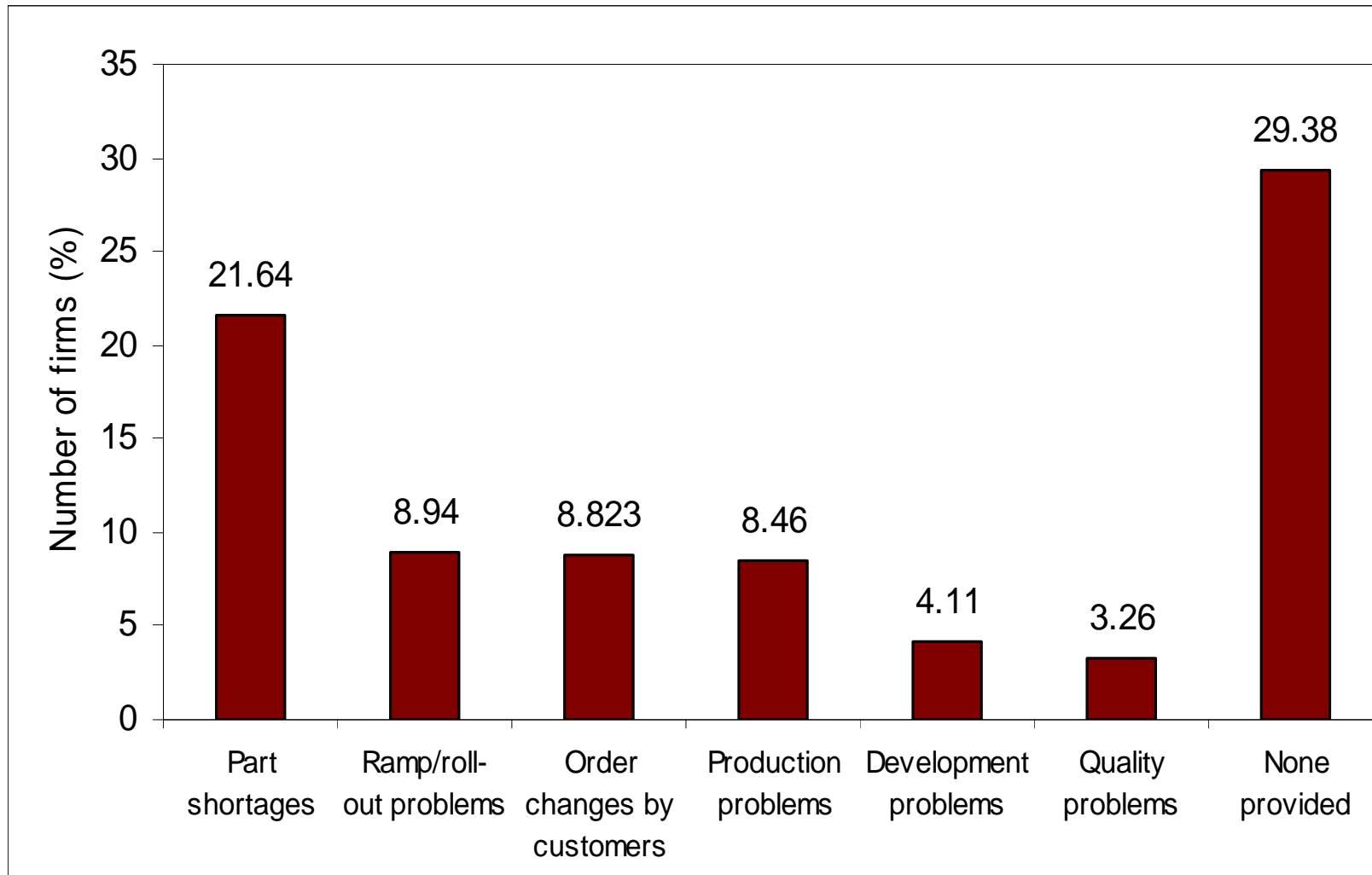


- Lower Revenues
- Higher costs
- Poor asset utilization
- Excess inventory, inventory write-offs, stockouts
- Higher cost of capital/borrowing
- Shareholder lawsuits
- Management and personnel turnover
- Loss of reputation and credibility, negative publicity

Responsibility for disruptions



Reasons for disruptions

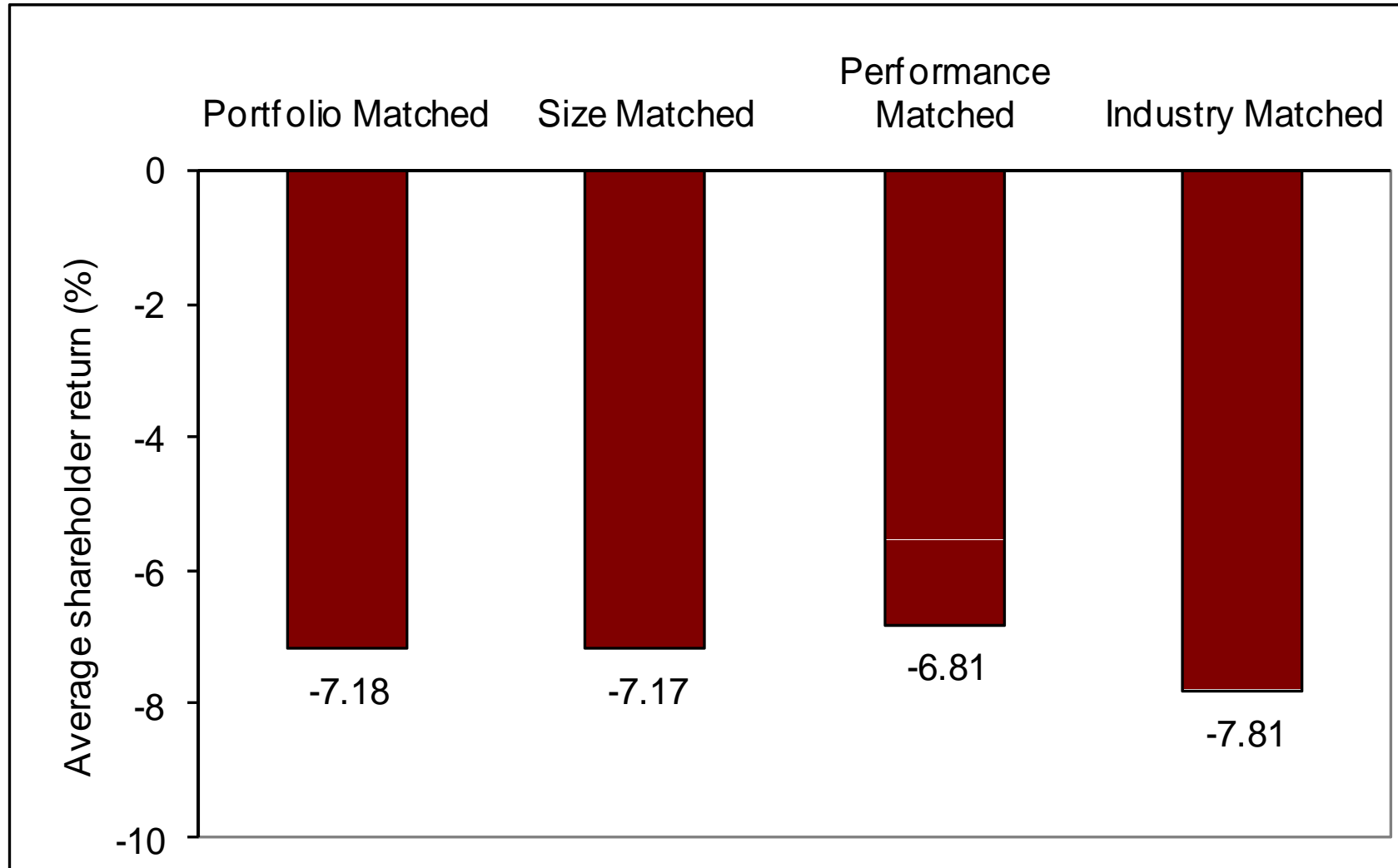


Estimating the performance implications



- Stock price effects of disruption announcements
 - the day before and day of the announcement
- Long-term effects (3 years) of disruptions on
 - Stock returns
 - Profitability
- Performance impacts estimated after adjusting for the performance of benchmarks

Stock market reaction to disruption announcements



Comparison with stock market reaction to other corporate events



Operational events

Increase in capital expenditure	1.0%
Increase in R&D expenditure	1.4%
Effective TQM implementation	0.7%
Internal corporate restructuring	1.0%
Decrease in capital expenditure	-1.8%
Plant closing	-0.7%
Automotive recalls	-0.5%

Marketing events

Change in firm name	0.7%
Brand leveraging	0.3%
Celebrity endorsement	0.2%
New product introduction	0.7%
Affirmative action awards	1.6%

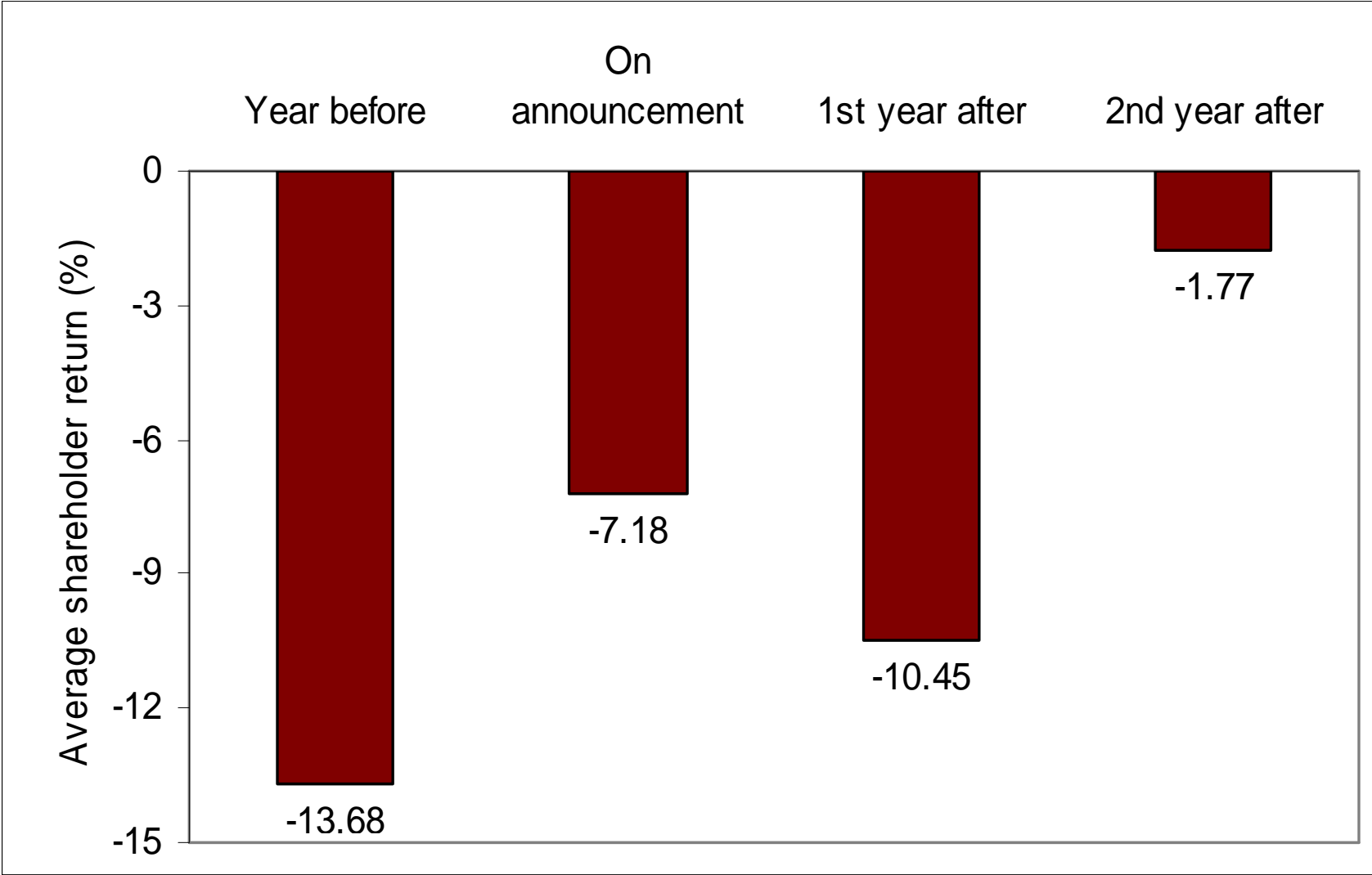
Information technology events

IT Investments	1.0%
IT problems	-1.7%

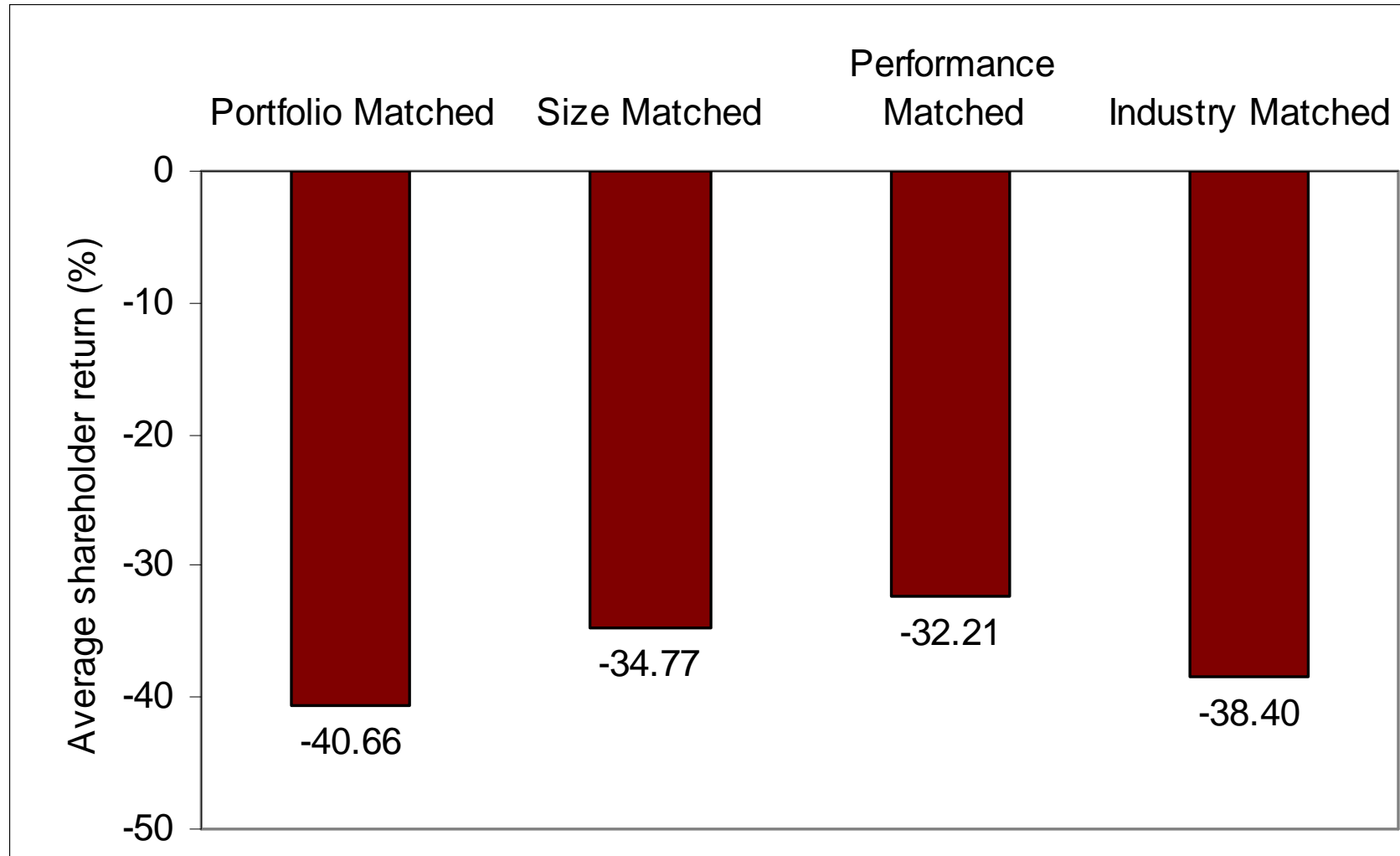
Financial events

Stock splits	3.3%
Open market share repurchase	3.5%
Proxy contest	4.2%
Increasing financial leverage	7.6%
Decreasing financial leverage	-5.4%
Seasoned equity offerings	-3.0%

Average stock returns over different intervals



Average stock returns over three years

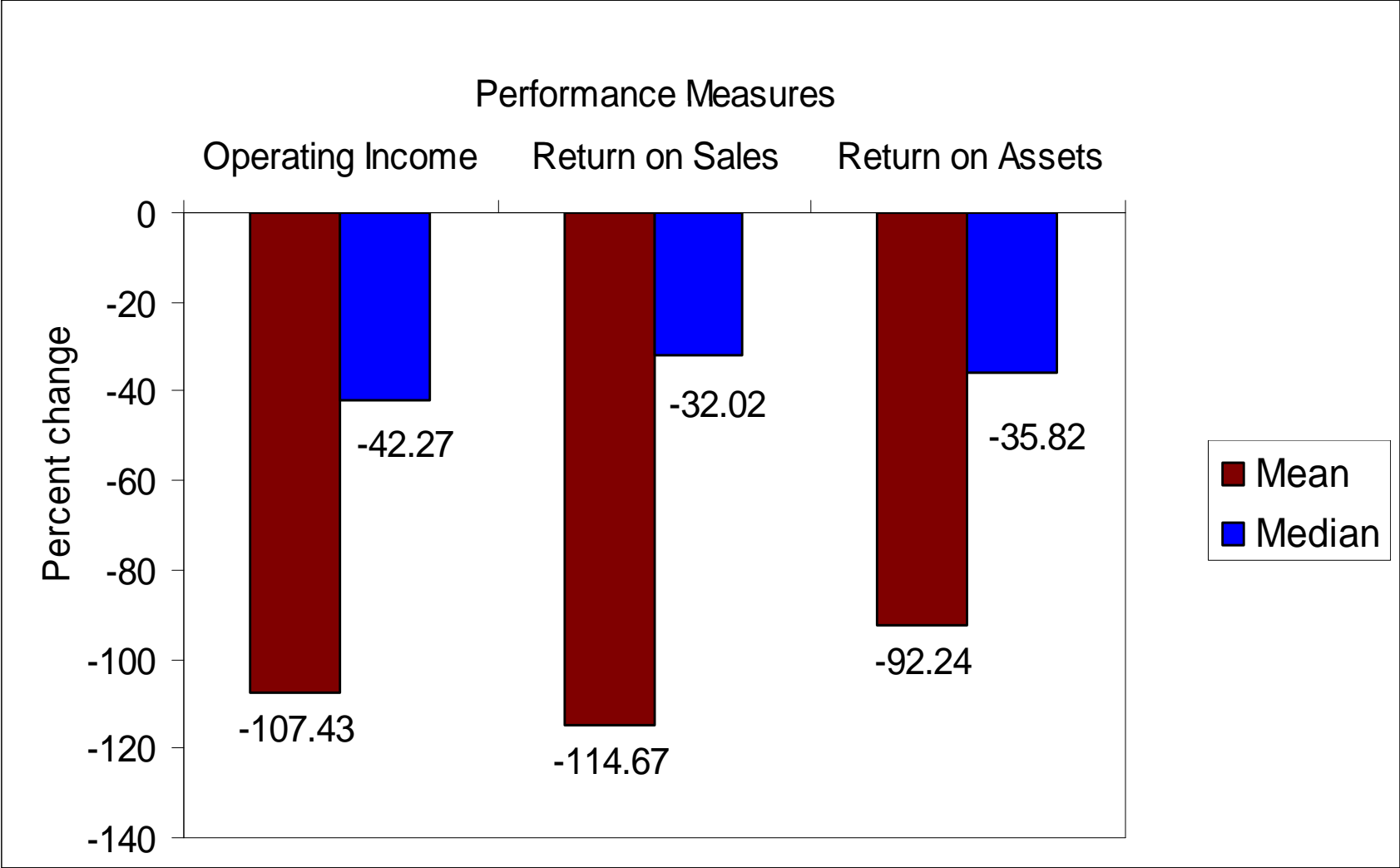


Broader perspectives



- S&P 500 has returned about 12% annually over the last 15 years
- Major disruptions are associated with 35% underperformance in stock returns
- One major disruption every 10 years – average return of 9%

Profitability impacts in the year before the disruption



Summary



- Disruptions cause significant destruction in corporate performance
- It does not matter who or what caused the disruption – you still pay
- Small firms suffer more from disruptions
- Firms do not quickly recover from disruptions

Are supply chains more prone to disruptions today?



- Globalization of supply chains
- Increased reliance on outsourcing and partnerships
- Single sourcing
- Over-concentration of operations
- Little slack in the supply chain – focus on efficiency
- Tightly coupled
- Competition

Why enough attention is not paid to the possibility of disruptions?



- Consequences are not known
- Low frequency events
- Resource shortages
- Requires cross-functional effort
- Short tenure of managers
- You don't get credit for fixing problems that never happened
- You have not experienced one



Dealing with disruptions

- Reduce the frequency (probability) of disruptions
 - better forecasting
 - better planning
 - communicate, collaborate, and share

- Develop ability to predict disruptions (business intelligence)
 - select, define, and track key performance indicators
 - analyze disruptions to develop key leading indicators
 - track leading indicators
 - need visibility



Dealing with disruptions

- Elapsed time between the occurrence and detection of disruption
 - aim for zero elapsed time
 - real time visibility of the extended supply chain
 - event management systems
- Time it takes to deal with the disruption
 - quick resolution, prevent escalation and worsening
 - a process for dealing/responding to disruptions
 - developing capabilities to react and respond

Implications for Managing Supply Chains



- Traditional approach – create shareholder value
 - efficiency driven (impacts on cost and capital cost)
 - cost-benefits analysis (ROI) of potential solutions
- Augment the traditional approach
 - need to preserve value and avoid value destruction
 - value of reliable, responsive, and robust supply chains
 - prevention role of effective SCM
 - effective SCM buys insurance against value destruction

Final Thoughts



- Can you afford the risk of a major supply chain disruption?
- What is the easiest way to create shareholder value or make money? Stop losing it!

Plan



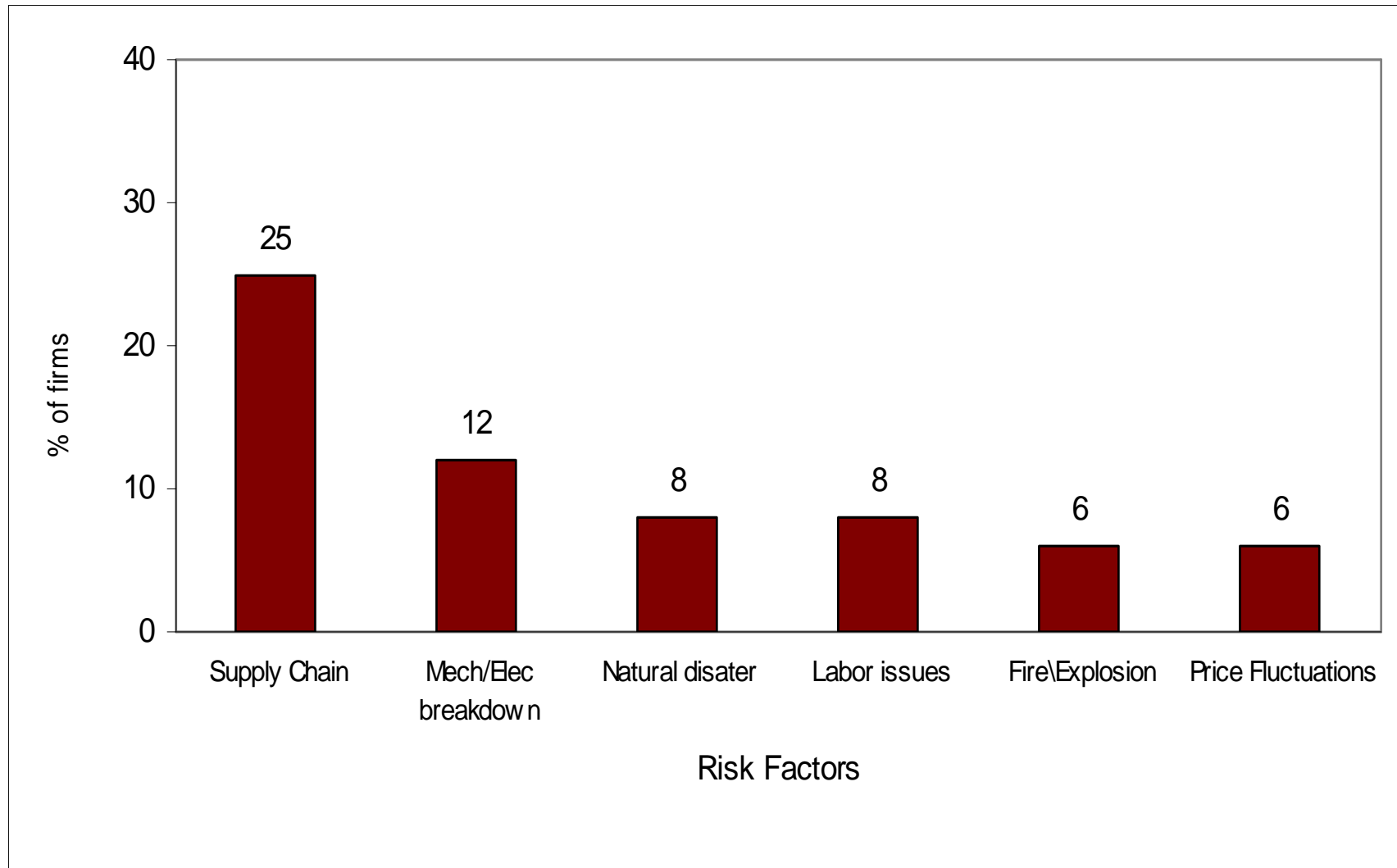
- Importance of managing supply chain disruptions.
- Economic consequences of disruptions.
- Trends affecting the chances of experiencing disruptions.
- Strategies for dealing with disruptions.

Senior executives view on supply chain risk



- Global survey by Harris Interactive Inc. of 600 CFOs.
- Survey by Accenture of 150 supply chain executives.

Primary risk factors



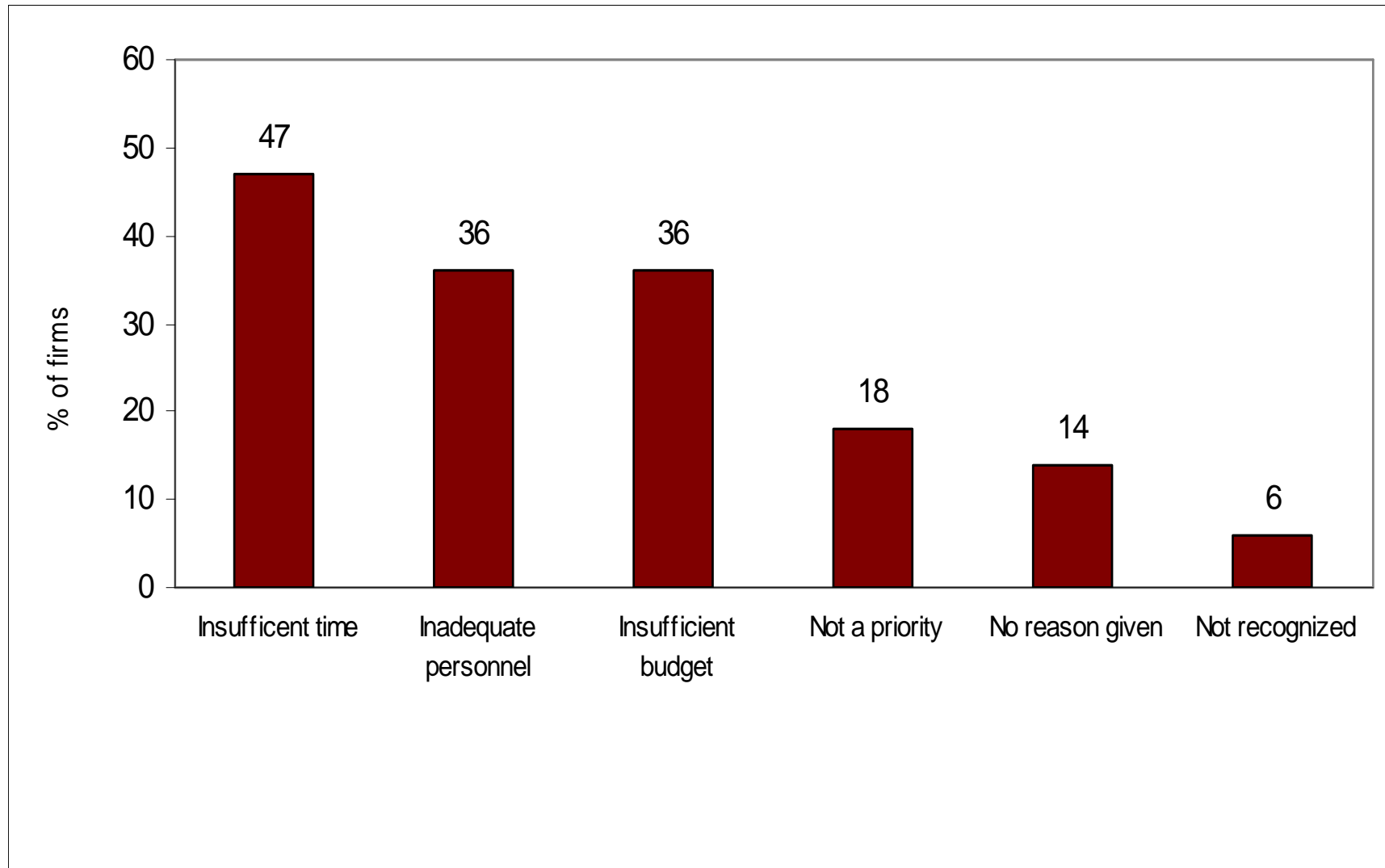
Survey done by Harris Interactive in 2005.

Other findings by Harris Interactive



- 56% of the respondents indicated that they are dealing with risks by focusing on risk prevention and control rather than risk transfer.
- Risk transfer options are limited and most of the risks cited in the survey go beyond what any insurance company can reasonably insure.

Obstacles to addressing risks



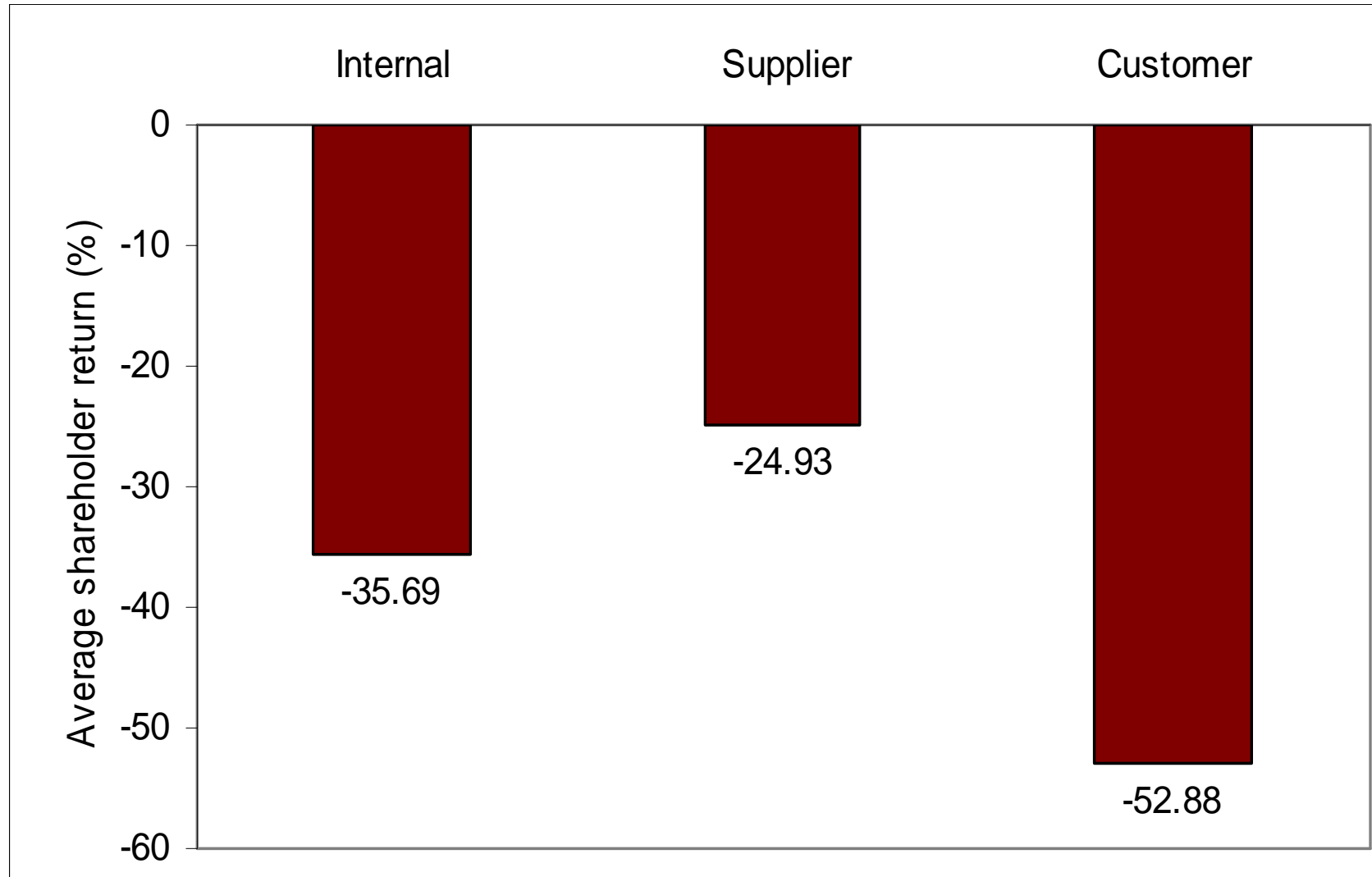
Survey done by Harris Interactive in 2005.

Survey by Accenture

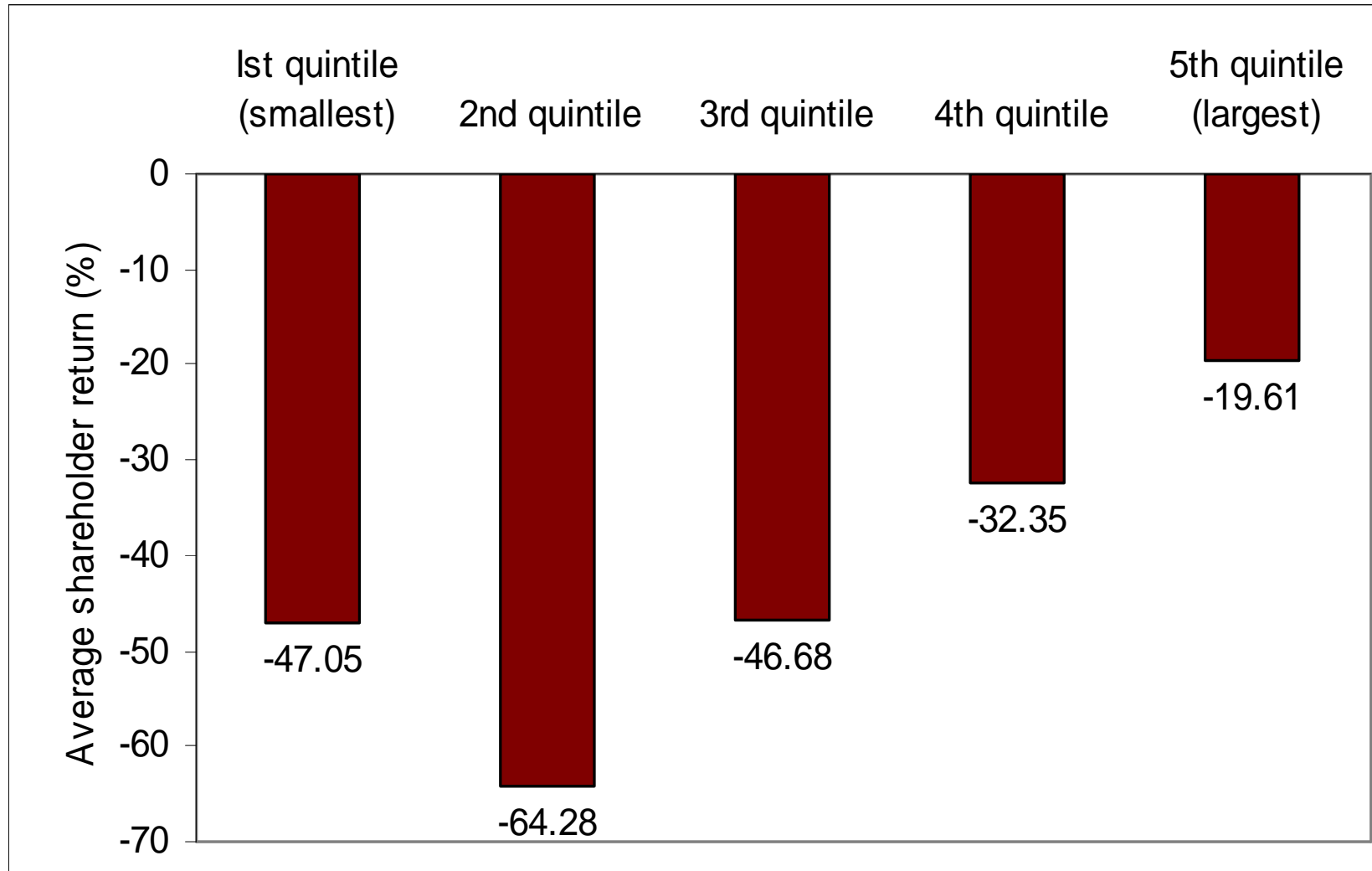


- Survey of 151 supply chain executives of US corporations (sales greater than \$1 billion in 2005).
- 73% acknowledged that their company has experienced a disruption in the past five years.
- Half think that the risk to their company's supply chain will increase in the next three years.
- Almost all supply chain disruptions have had at least some impact on meeting customer expectations and profitability.

Average stock returns by responsibility



Average stock returns by size



Strategies for mitigating supply chain risks



- Contingency planning
 - analyze what could potentially go wrong
 - Identify and analyze possible alternatives
 - develop plans – what to do, when, and how
 - assign responsibility and give authority - who
 - monitor the situation – stay informed, share information
 - execute the plan and adjust as needed

Strategies for mitigating supply chain risks



- Improve the accuracy of forecasts
 - long-term forecasts are less accurate than short-term
 - aggregate forecasts are easier than disaggregate
 - collect data from your supply chain partners
 - questions the assumptions that go into building a forecast
- Visibility
 - aware of what is happening in supply chains
 - select key leading indicators of supply chain performance
 - monitor these indicators using appropriate benchmark
 - communicate deviations to appropriate levels

Strategies for mitigating supply chain risks



- Reduce mean and variance of lead times
 - remove non-value added steps and activities
 - improve the reliability and robustness of processes
 - dynamic lead time issues in planning and forecasting
- Collaborate and cooperate with your supply chain partners
 - develop trust among supply chain partners
 - show that you are willing to collaborate
 - agree upfront on how to share the benefits
 - share information, joint decision making/problem solving

Strategies for mitigating supply chain risks



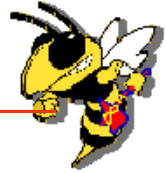
- Redundancy
 - extra inventory
 - extra capacity
 - over specification
 - backup systems
 - multiple suppliers
 - dedicated resource to products, processes
 - committed contracts
 - multiple sites

Strategies for mitigating supply chain risks



- Flexibility
 - Product design
 - standardization
 - modularity
 - parts commonality
 - Manufacturing
 - flexible technology and capacity
 - committed and uncommitted capacity
 - standard processes
 - cross-training
 - Sourcing
 - flexible contracts
 - multiple sourcing
 - supplier capabilities
 - spot markets

Dealing with disruptions



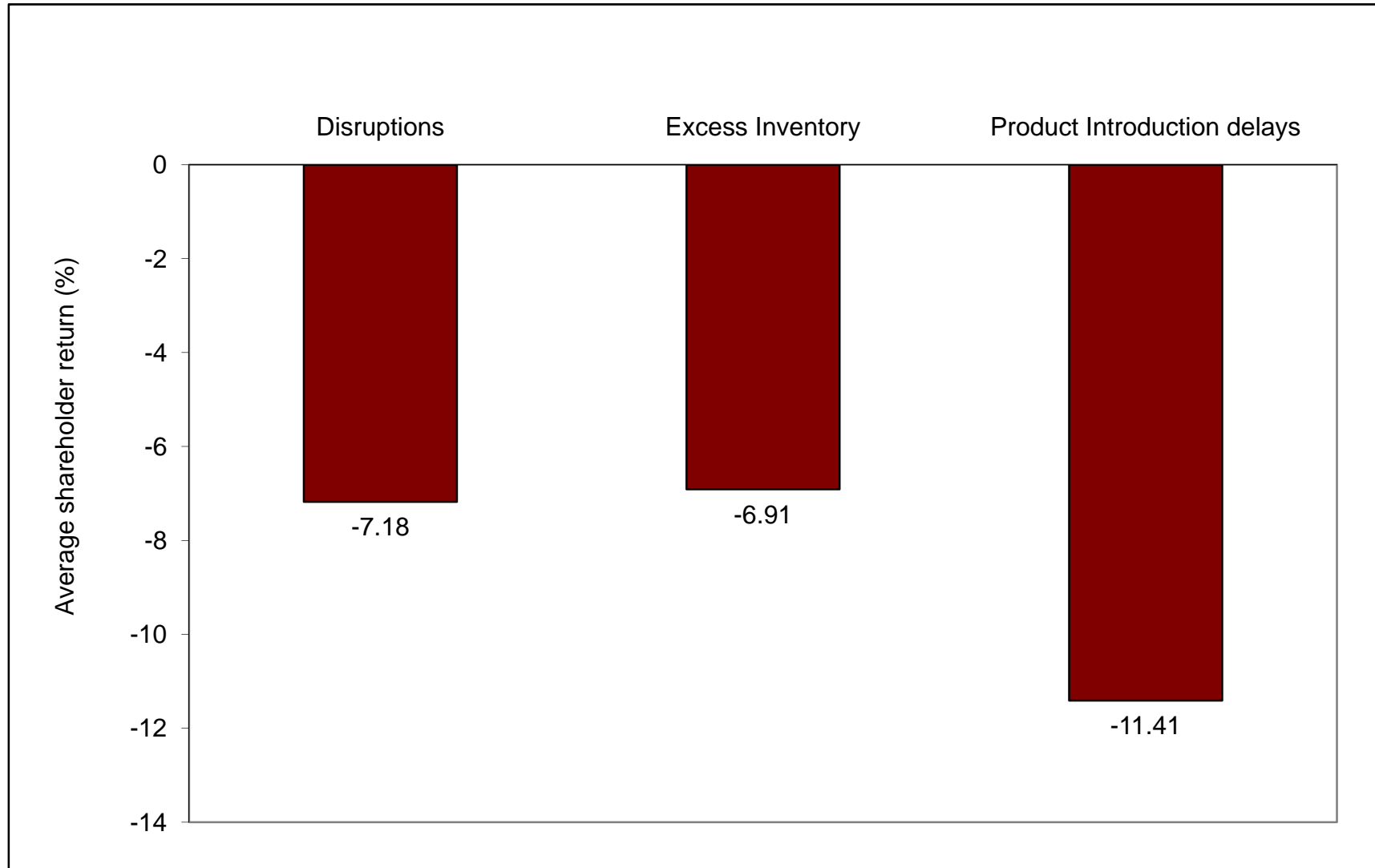
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- Elapsed time between the occurrence and detection of disruption
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- Time it takes to resolve the demand-supply mismatch
 - quick resolution, prevent escalation and worsening
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Being proactive about disruptions

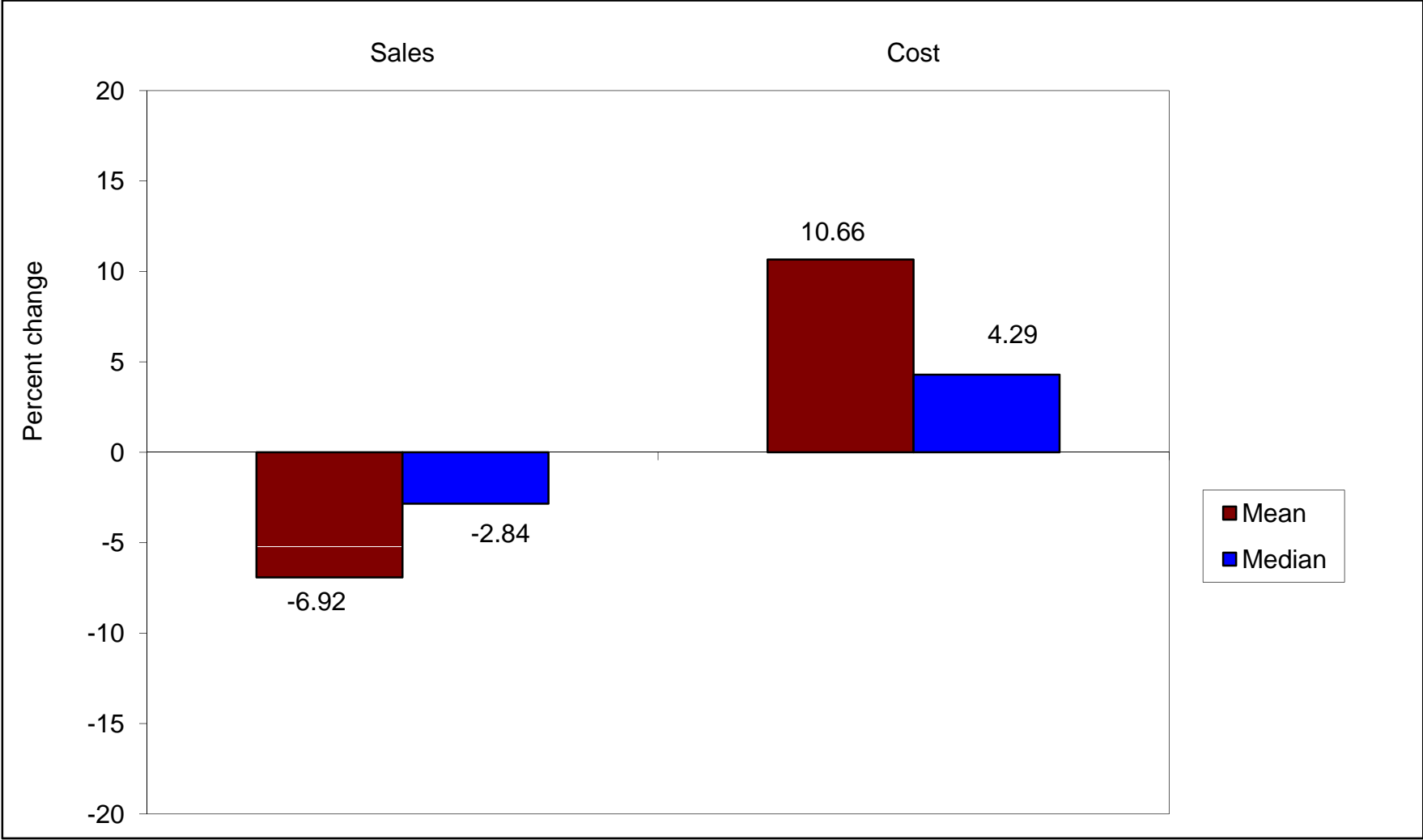


- Turbo charge your imagination - Brainstorm about the various sources of risk
- Scenario analyses
- Think in probabilities
- Create a culture that insists on facing reality

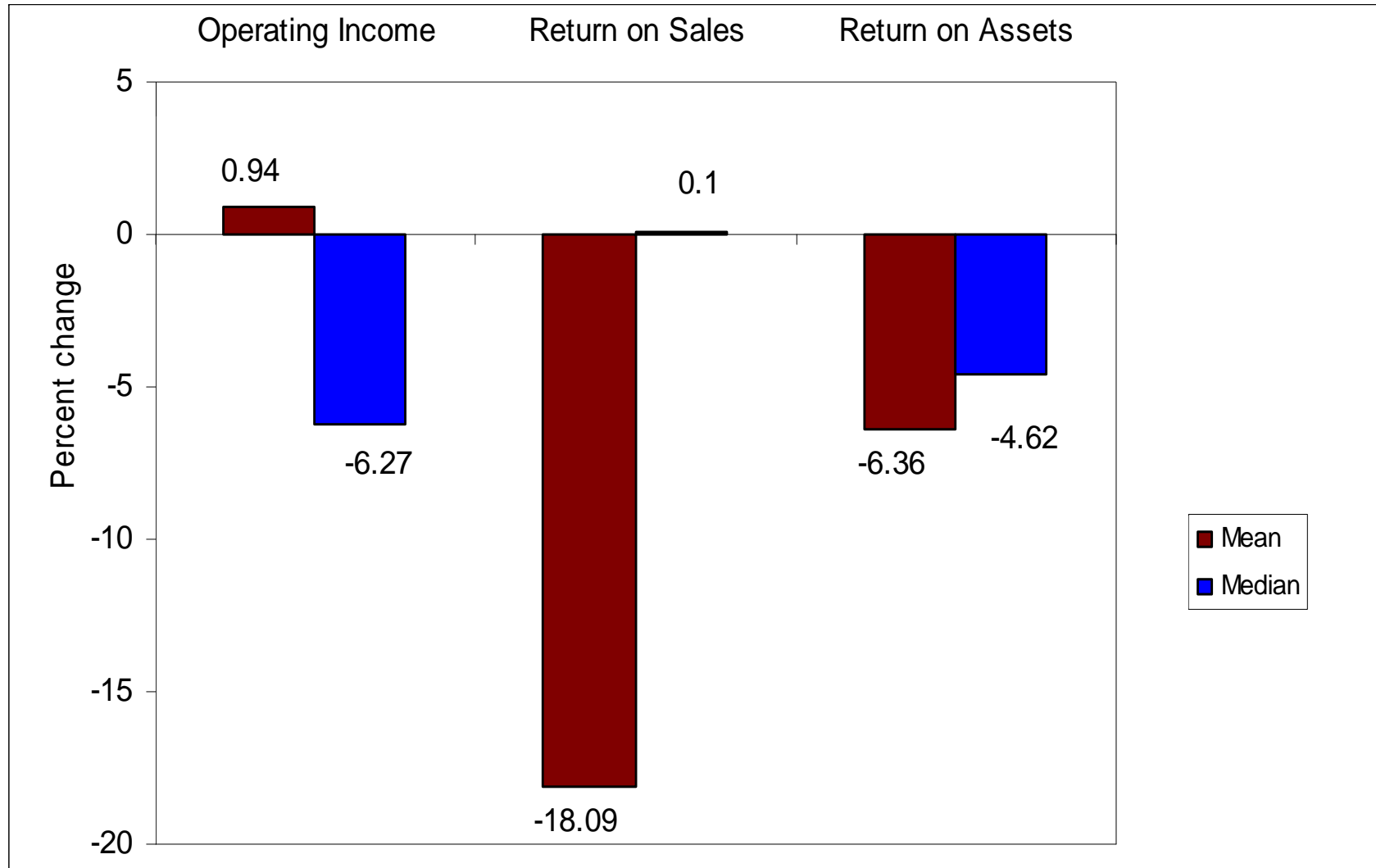
Stock market reaction to different types of demand-supply mismatches



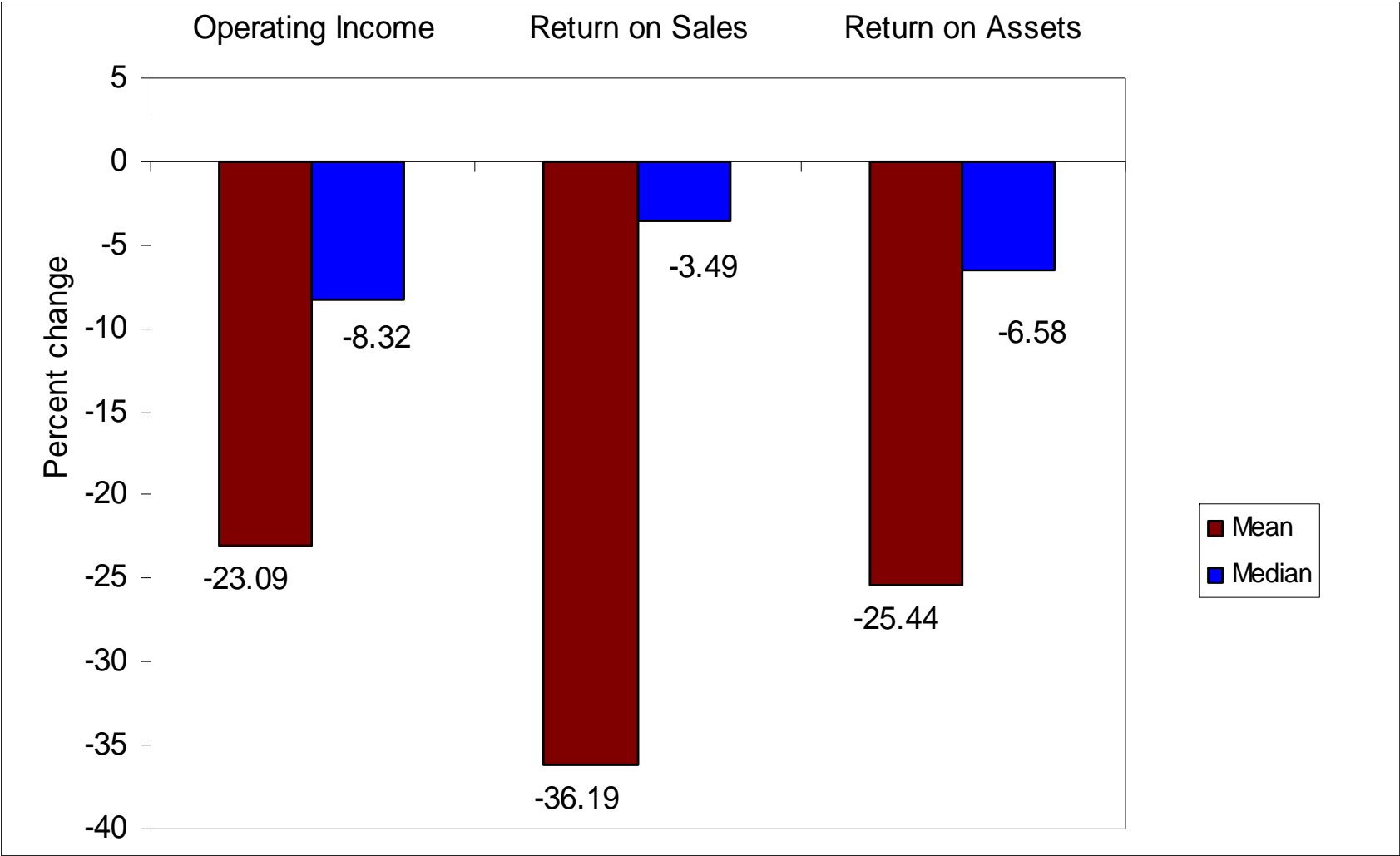
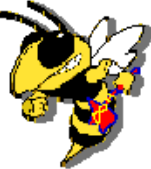
Profitability impacts in the year before the disruption



Profitability impacts in the year after the disruption



Profitability impacts in the 2nd year after the disruption

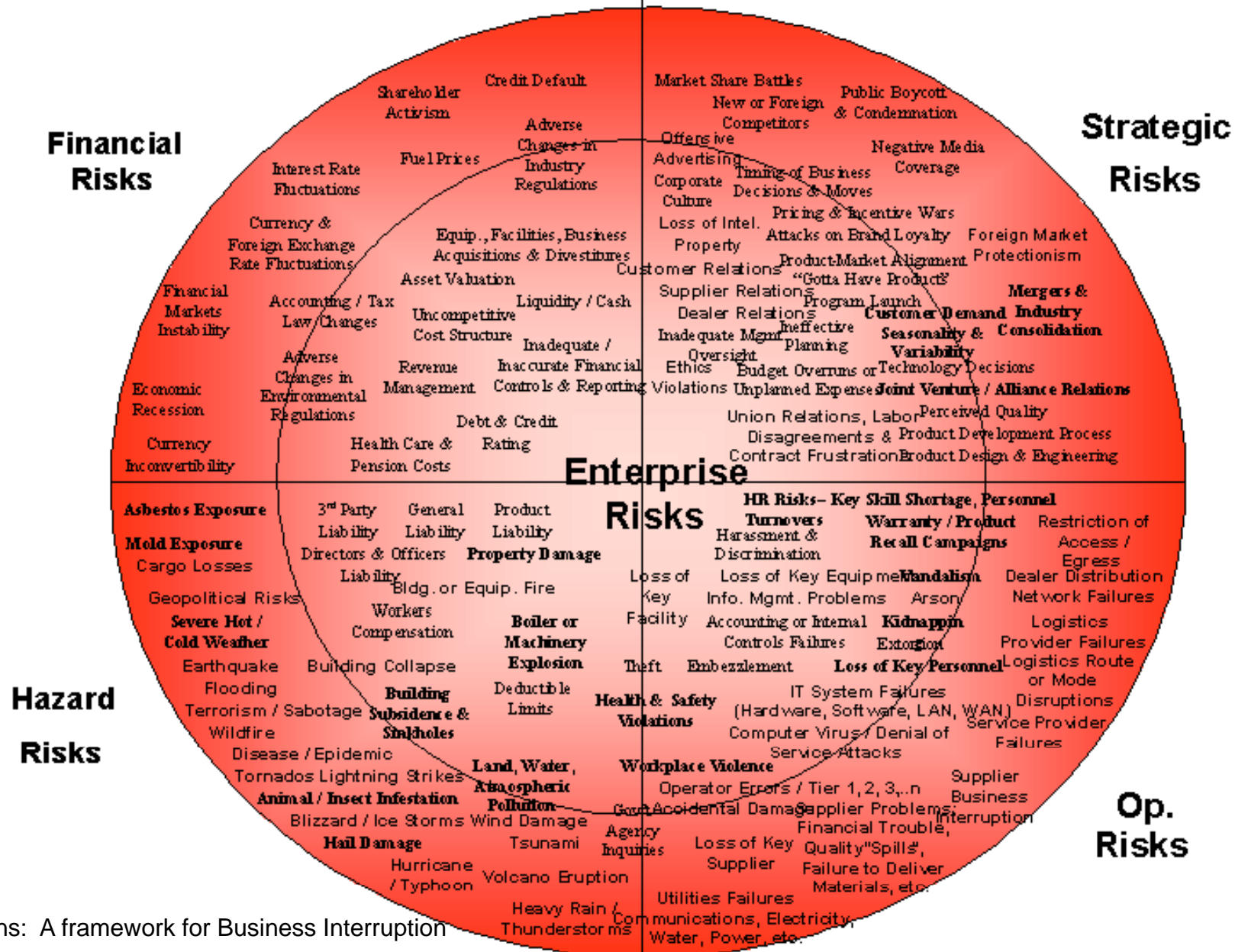


A process for managing supply chain risks



- Identify the primary sources of supply chain risks.
- Estimate the likelihood of the risk occurring.
- Estimate the financial consequences (impact) of risks.
- Prioritize risks based on likelihood and financial impact.
- Identify strategies and actions to mitigate the frequency and/or financial consequences of supply chain risks.
- Review the risk management process and continuously improve the process.

Manufacturing & Supply Chain Risks



Debra Elkins: A framework for Business Interruption Risk Analysis: GM Research Lab Paper



Likelihood/consequences of supply chain risks

- Estimate the likelihood of occurrence of risk
 - estimate the probability/frequency
 - qualitative assessment (point scale or categories)
- Estimate the financial consequences
 - estimate the \$ value of the risk
 - qualitative assessment (point scale or categories)

Prioritizing risks



Financial Impact	Catastrophic	Monitor and address risk mitigation strategies		Highest Priority for Risk Mitigation	
	Significant				
	Moderate	Effort and resources not committed		Active Management of Risk	
	Little				
		Remote	Possible	Likely	Certain
<i>Likelihood/frequency</i>					

- Recovery cost
- Recovery speed

Improving the disruption management process



- Have you done a post-mortem or review of your risk management processes and framework?
- Have you evaluated the effectiveness of your process?
- What worked and what did not?
- What can be improved?
- Have the key lessons been recorded for other members of your firm to learn from?