



Determining Whether a Stock (or Stocks) Traded Efficiently

Alan J. Cox, Ph.D.

Senior Vice President

Ludwig B. Chincarini, Ph.D.

Professor of Finance, USF

Latham & Watkins

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Insight in Economics™

Efficiency in the Market for a Stock



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An efficient market

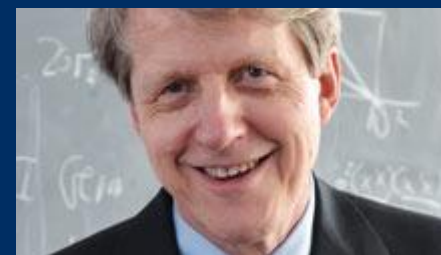
- A market “in which prices always ‘fully reflect’ all available public information is called ‘efficient’”
 - *In re PolyMedica Corporation Securities Litigation*, 453 F.Supp.2d 260 D.Mass., September 28, 2006.



Eugene Fama



Lars Hansen



Robert Shiller

The Relevance of Market Efficiency



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- Market efficiency is required for reliance on a stock's price as incorporating all relevant information
 - Commonality, reliance, and typicality

The absence of a showing of fraud-on-the-market “would ordinarily preclude certification of a class action seeking money damages because individual reliance issues would overwhelm questions common to the class.”

—*Amgen, 133 S. Ct. at 1193*

The Relevance of Market Efficiency



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- Market efficiency is required for reliance on a stock's price as incorporating all relevant information
 - Commonality, reliance, and typicality
 - Measuring causation and harm in the absence of an efficient market
 - 10(b)-5 damages
 - Sentencing in white collar crimes

Efficiency in the Market for a Stock



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An efficient market

- A market “in which prices always ‘fully reflect’ all available public information is called ‘efficient’”
 - *In re PolyMedica Corporation Securities Litigation*, 453 F.Supp.2d 260 D.Mass., September 28, 2006.
- Prices respond rapidly and without bias to new information
- According to the law, the price of a security can deviate from fundamental value and still be efficient (the Fama vs. Shiller debate)

Market Inefficiencies

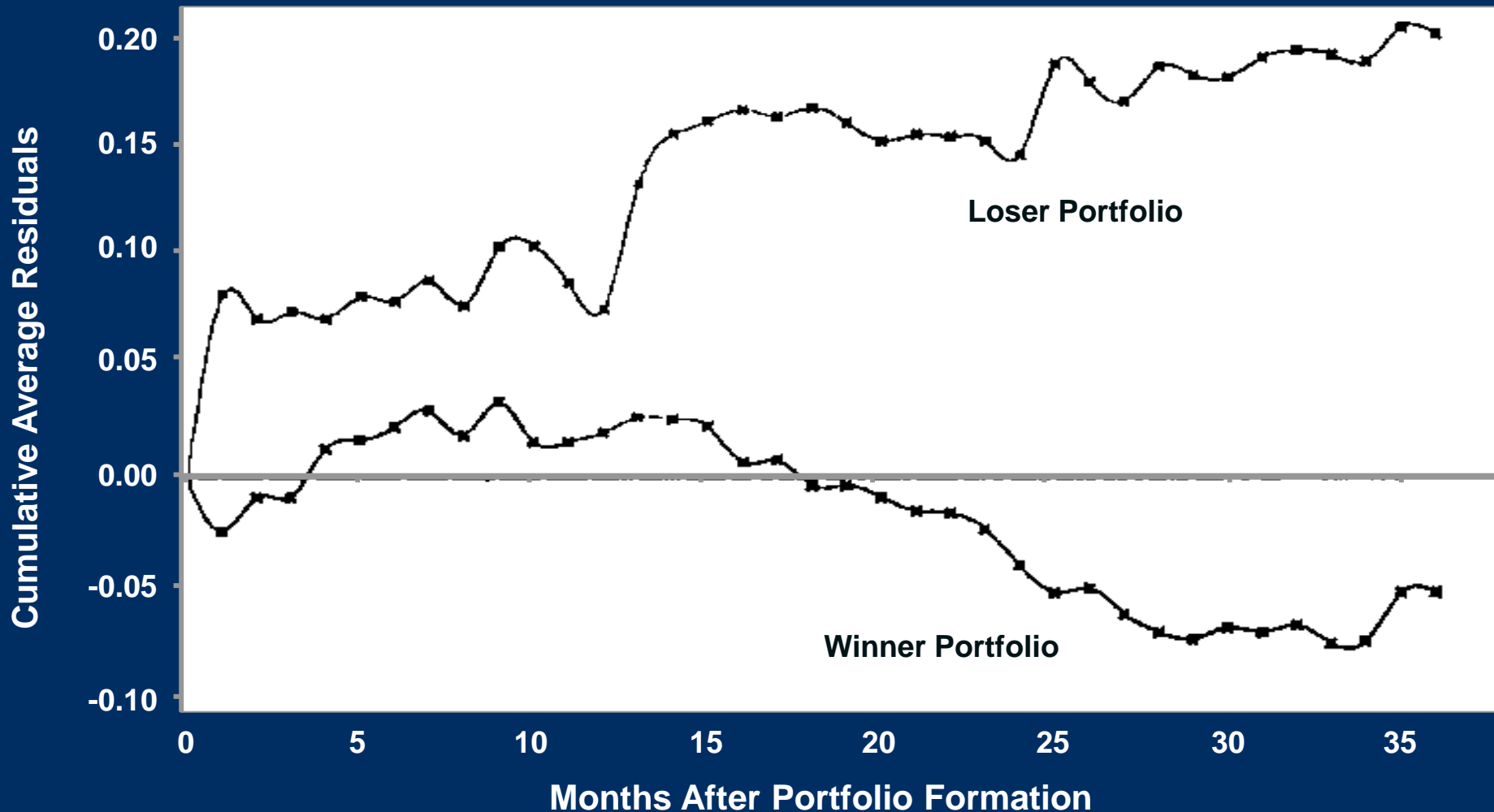


- Can arise in the market for individual stocks
- Market inefficiencies can also arise in entire markets for a large number of stocks

Early Study on Inefficiency of Markets



Cumulative Average Residuals for Winner and Loser Portfolios of 35 Stocks



Tests of Market Efficiency in Litigation



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- Tests of an efficient market
 - Cammer criteria
 - Volume/Liquidity (typically measured as bid-ask spread)
 - Followed by analysts
 - Eligible for S-3 registration (shelf registration)
 - Number of market makers
 - Price Responsiveness to News
 - Additional tests
 - Reliability of responses
 - Predictability of stock prices / Randomness of stock prices
 - Constraints on arbitrage and short selling



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Testing for the Price Responsiveness to News & Reliability

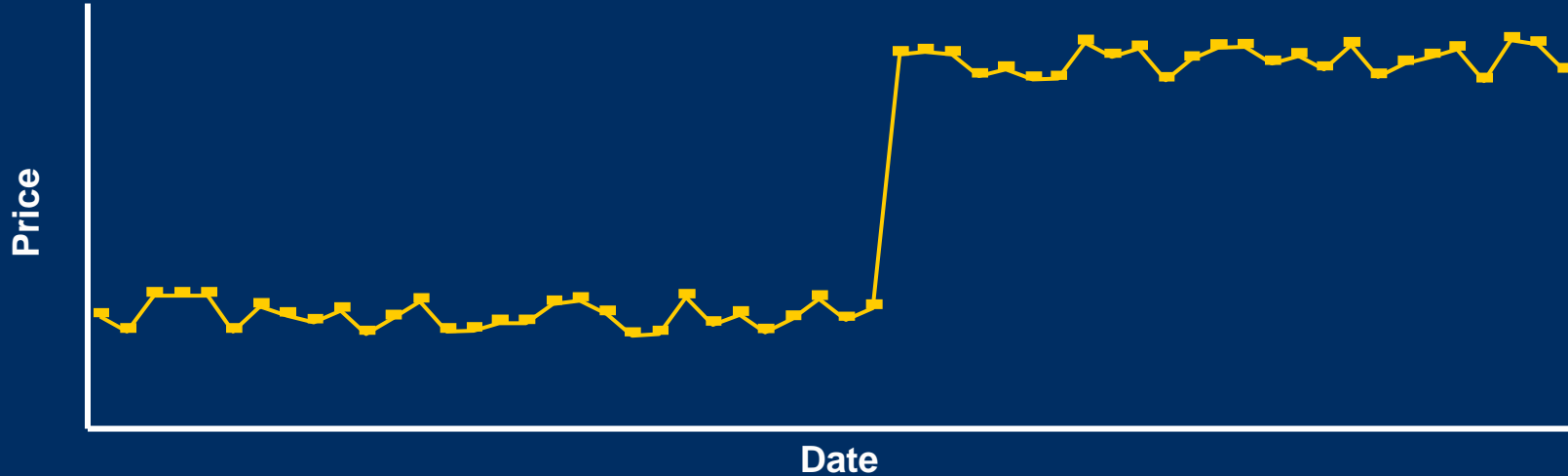


- Does the stock price respond to news?
- Does it respond reliably?
- Does the stock price move significantly when there is no news?

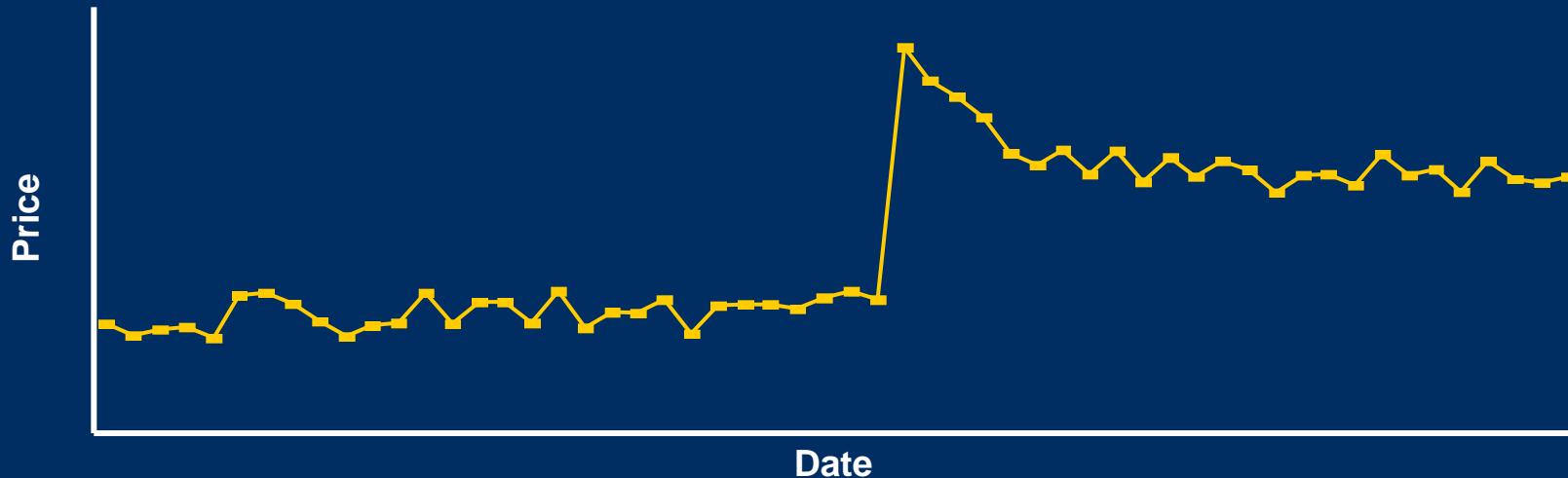
Test of Accurate Responsiveness: Do prices overreact to news? (Reliability)



Efficient Market



Inefficient Market





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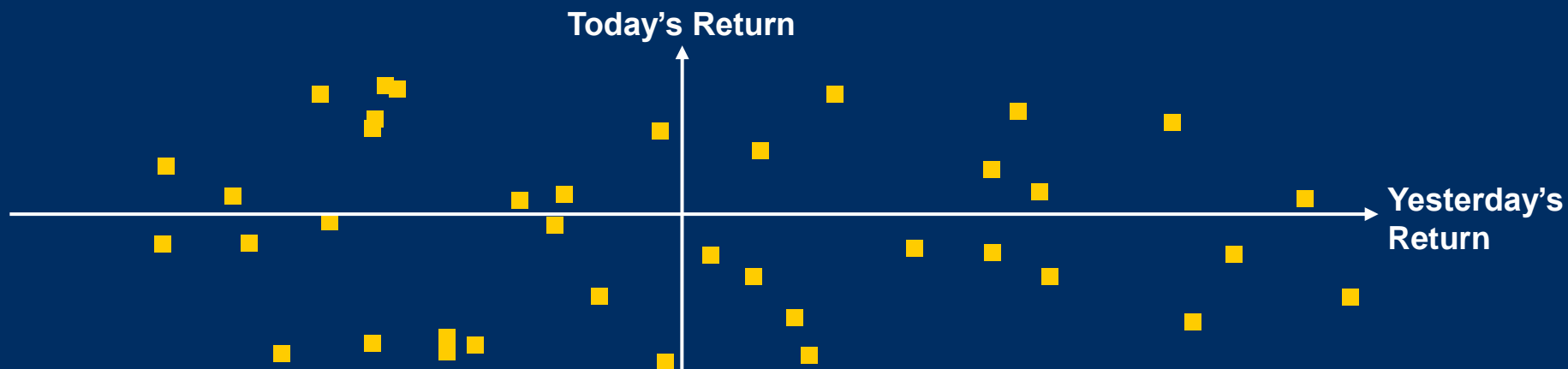
Test of Random Walk:

Predictability of Stock Prices (serial correlation)/Randomness

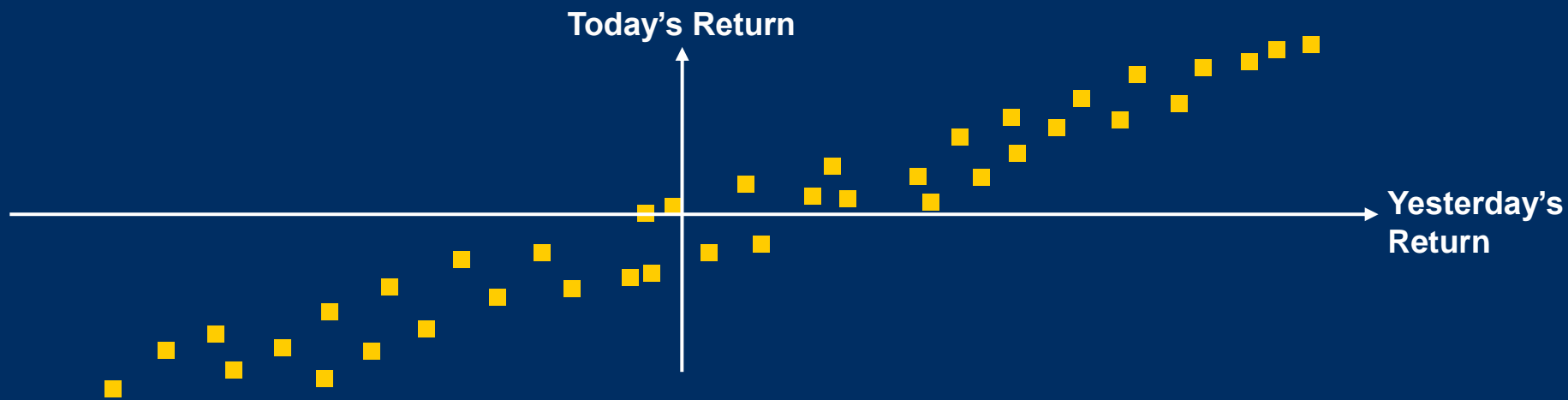


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Efficient Market



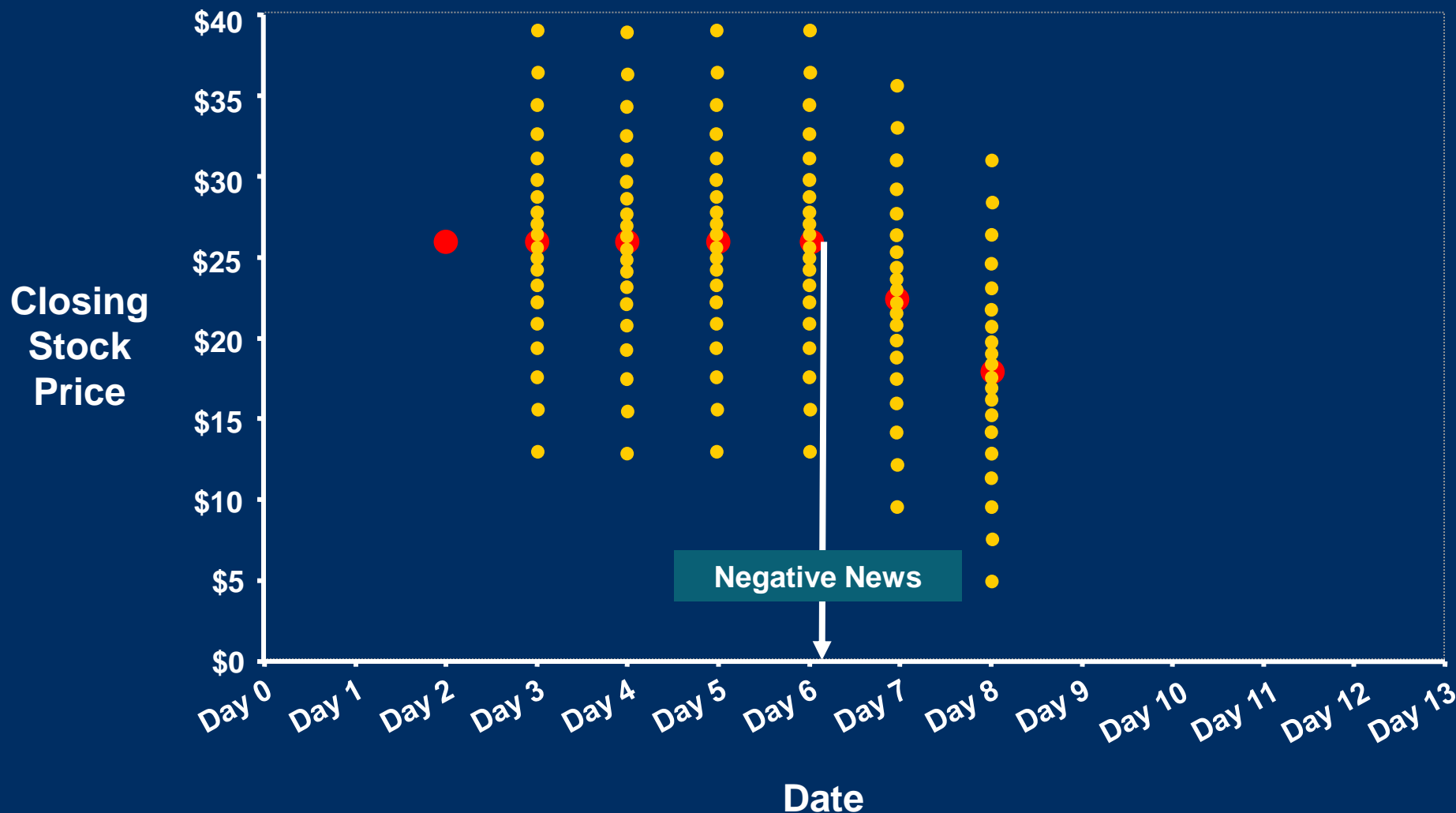
Inefficient Market



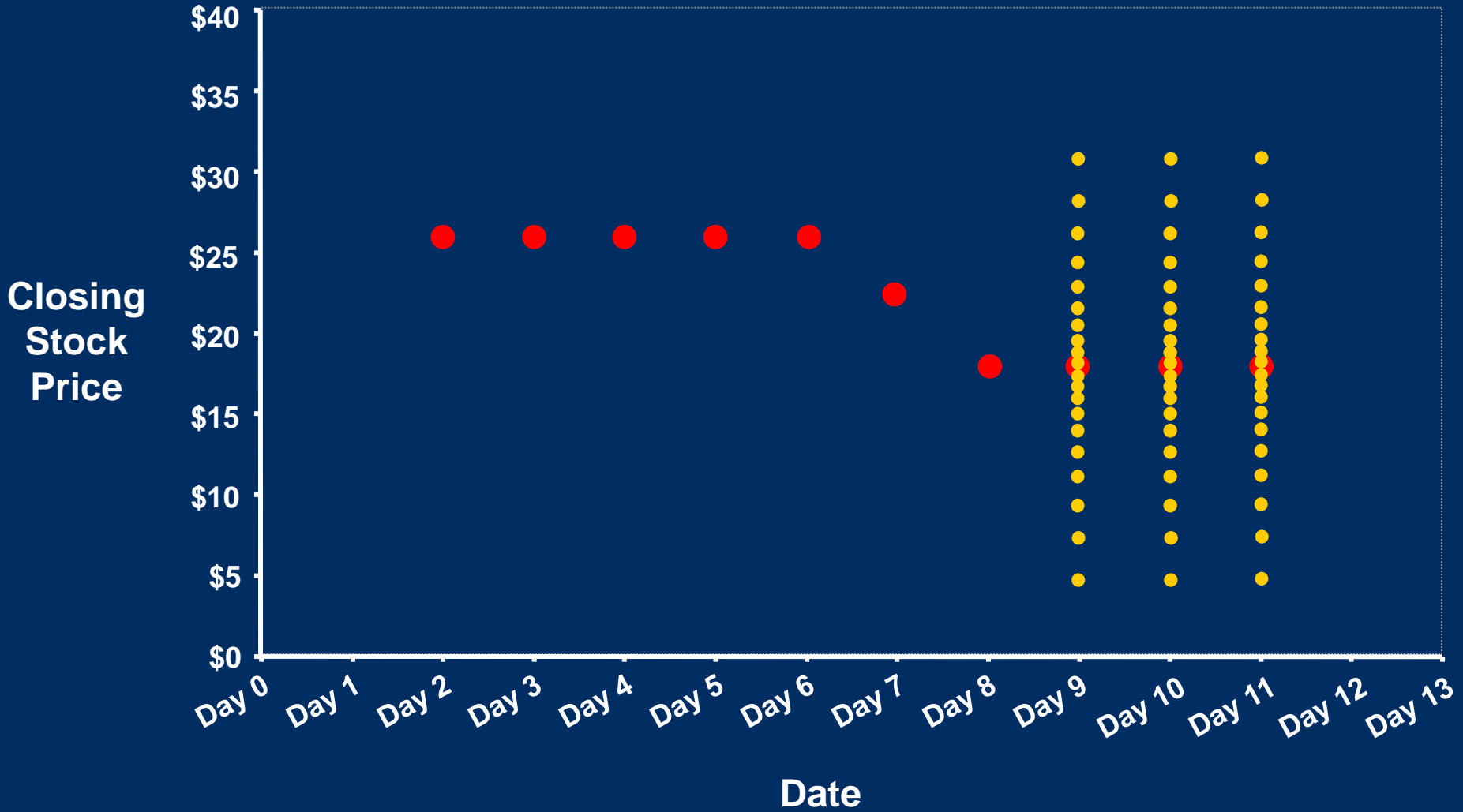


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 - **Constraints on arbitrage and short selling**

Price Setting is Determined Through Interaction of a Range of Opinions



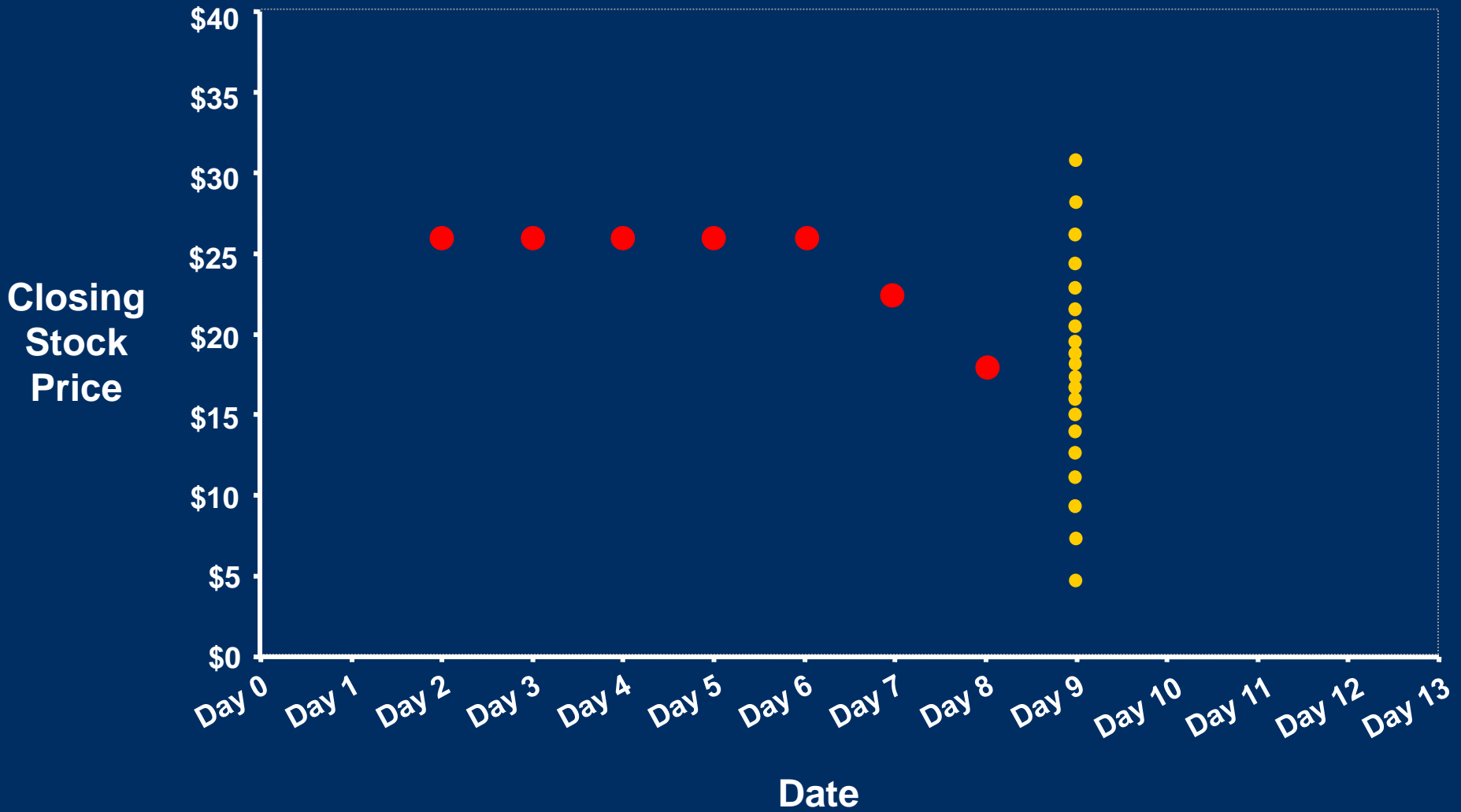
Biased Irrational Behavior Causes Deviations From the Rational Price



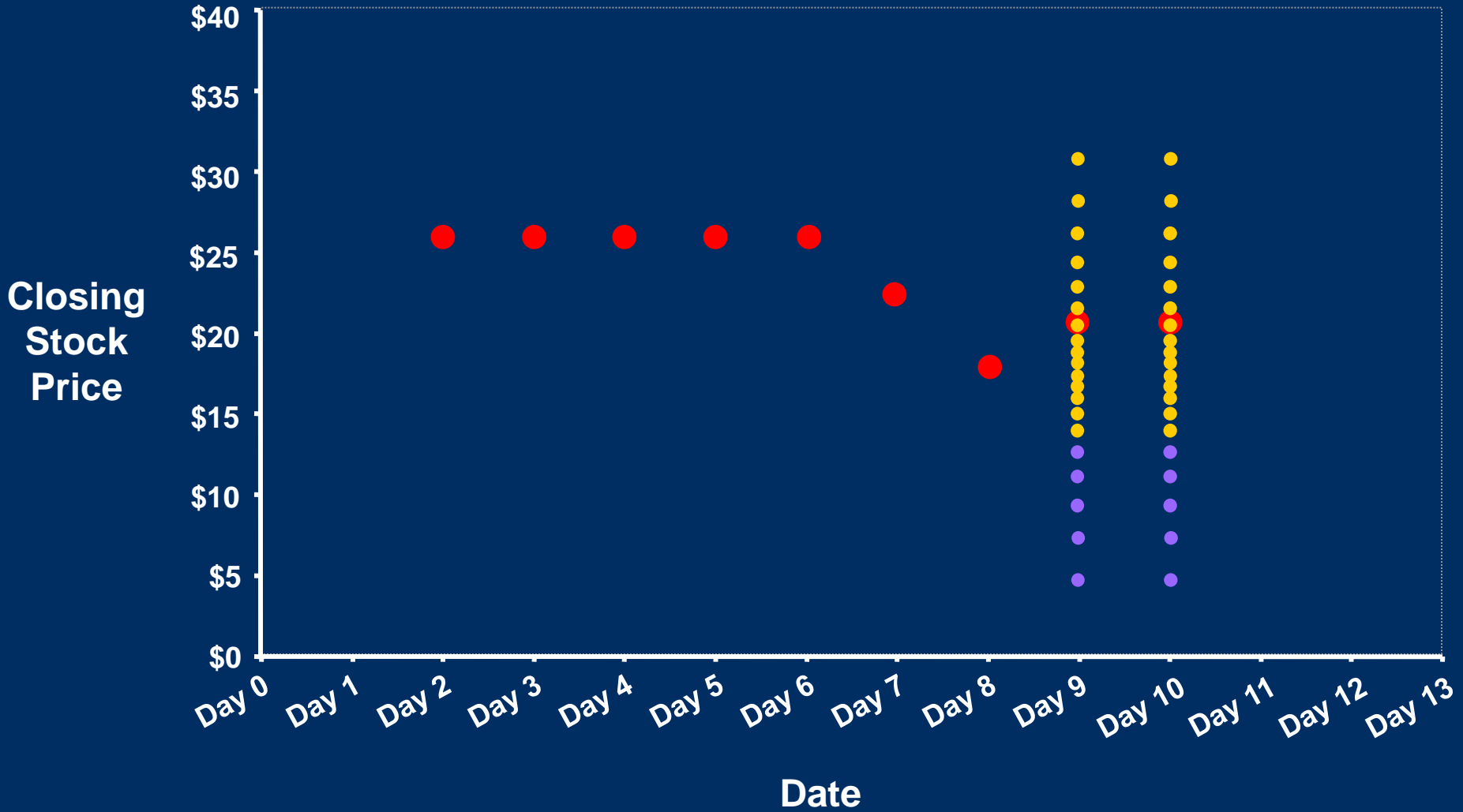
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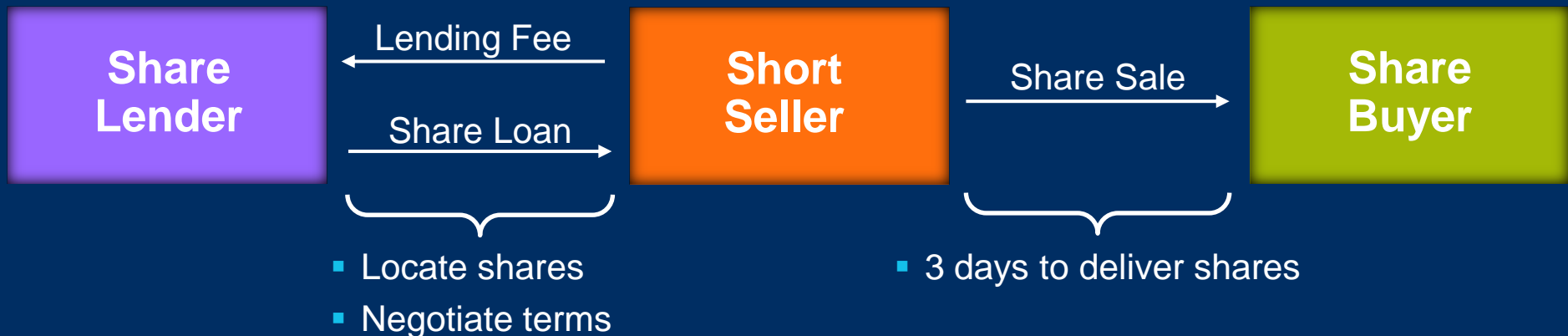
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Biased Irrational Behavior Causes Deviations From the Rational Price



Constraints to Trade in a Security



- **3COM and the PALM spinoff**



PolyMedica Corp. Sec. Litig (D. Mass. 2006)

- Concluded that "evidence suggest[ed] significant barriers to short selling, a mechanism...to fundamental value efficiency"

- Cited:
 - Short interest:
 - "Shares outstanding represented by the short interest rose from 7.8% at the end of 2000 to 66% in April 2001"

 - High lending fees
 - "Stocks are labeled "special" if their loan fee rises above 1% per annum...PolyMedica's loan fee...was reported as anywhere from 15% to 35%"

Other Observable Indicators of Constraints to Trade in a Security



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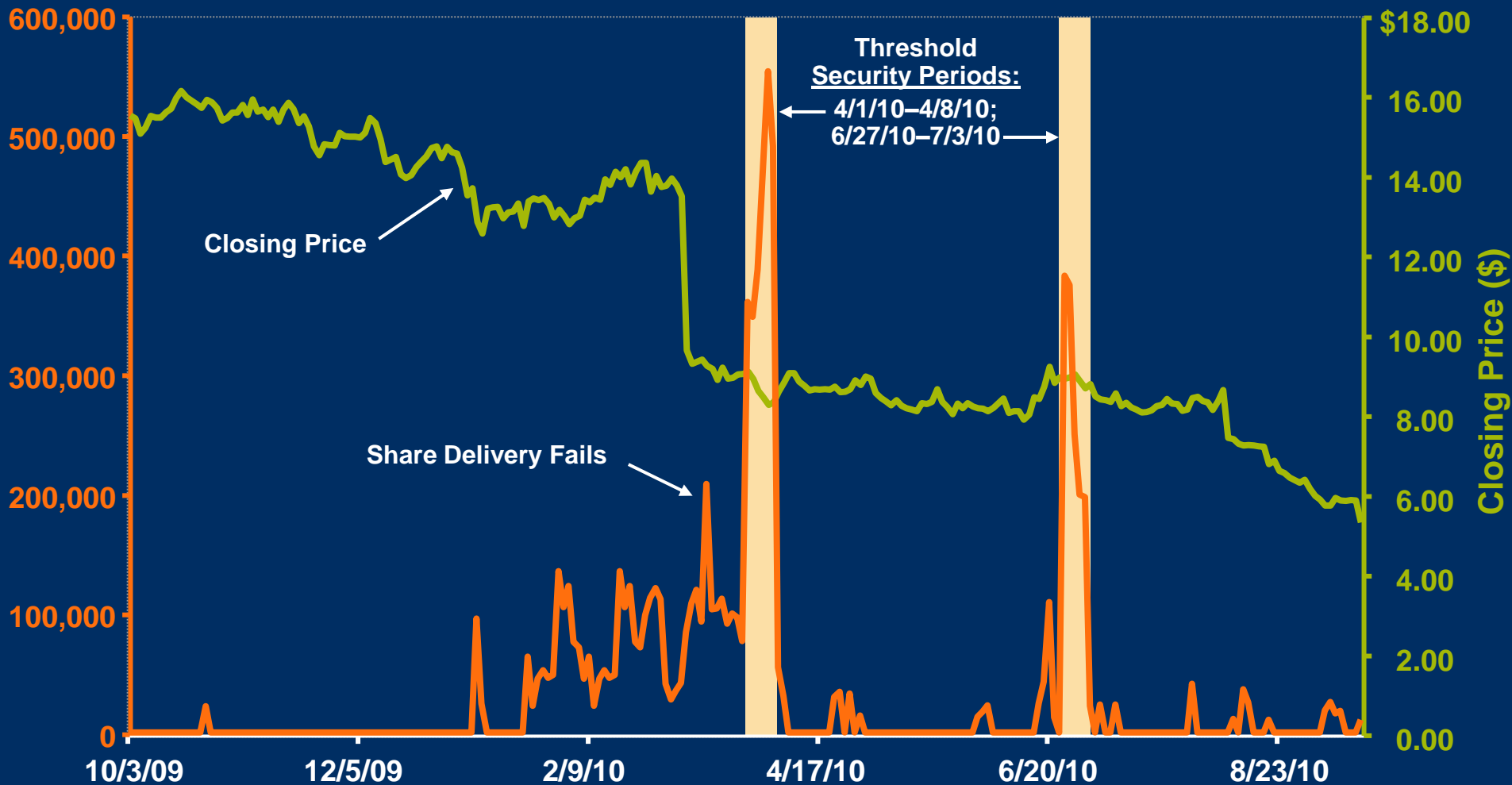
- ***Delivery Failure***
 - Violation of the 3-day delivery rule
 - Related to difficulty in locating shares and high share lending fees
- ***Threshold Security Designation***
 - SEC designation triggered by a large number shares have failed to be delivered for a long period of time

Constraints to Trade in a Security



Delivery Failures

Acme Gear, Inc. Share Delivery Failure October 1, 2009–September 15, 2010



Examples of Effects of Constraints on Entire Markets



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- The 2008 imposed short-sale constraints.

Empirical Evidence of the Effects of Constraints



- Government imposed short-sale constraints...

| Country | Ban Start Date | Duration (Days) |
|----------------|----------------|-----------------|
| United States | 19-Sep-08 | 19 |
| United Kingdom | 19-Sep-08 | 119 |
| Japan | 30-Oct-08 | 236 |
| Italy | 22-Sep-08 | 252 |
| Ireland | 19-Sep-08 | 277 |
| Germany | 20-Sep-08 | 276 |
| Canada | 19-Sep-08 | 19 |
| Austria | 26-Oct-08 | 240 |
| Australia | 22-Sep-08 | 245 |

Empirical Evidence of the Effects of Constraints



- ...causes market inefficiency/illiquidity

Percentage Bid-Ask Spread

| Country | Average Bid-Ask Prior to Ban | Average Bid-Ask During Ban | Percent Increase |
|----------------|---------------------------------|-------------------------------|---------------------|
| United States | 0.49 | 1.68 | 242.9% |
| United Kingdom | 0.14 | 0.46 | 228.6 |
| Japan | 0.6 | 0.7 | 16.7 |
| Italy | 0.57 | 2.77 | 386.0 |
| Ireland | 0.42 | 1.4 | 233.3 |
| Germany | 0.29 | 0.68 | 134.5 |
| Canada | 0.19 | 0.62 | 226.3 |
| Austria | 0.29 | 0.48 | 65.5 |
| Australia | 3.33 | 5.26 | 58.0 |
| Average | 0.71 | 1.42 | 100 |

Empirical Evidence of the Effects of Constraints



- Did it change serial correlation? Yes.

Weekly Autocorrelation

| | Correlation |
|---------------|-------------|
| No Ban Stocks | 0.08 |
| Banned Stocks | 0.1 |
| <hr/> | |
| Difference | 0.02 |

Empirical Evidence of the Effects of Constraints



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Knowing what we know now...the costs [of the short-selling ban] appear to outweigh the benefits

—Christopher Cox, telephone interview to Reuters, 31 December 2008

Summary



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1. Efficient markets important determinant in class certification and damages.
2. The techniques in this space continue to evolve (Kaplan et al. (2013)).



Contact Us

Alan J. Cox, Ph.D.

Senior Vice President
NERA—San Francisco
+1 415 291 1009
alan.cox@nera.com

Ludwig B. Chincarini, Ph.D.

Professor of Finance, USF
www.ludwigbc.com
703-585-0336
chincarini@hotmail.com