Use of Case Studies in Securities Litigation:
- What Works After Halliburton

Presented To
The Bar Association of San Francisco

Presented By
The Brattle Group

June 13, 2017
The Brattle Group ("Brattle") provides consulting and expert testimony in economics, finance, and regulation to corporations, law firms, and governments around the world. We are distinguished by our credibility and the clarity of our insights, which arise from the stature of our experts, affiliations with leading international academics and industry specialists, and thoughtful, timely, and transparent work. Our clients value our commitment to providing clear, independent results that withstand critical review.

We advise clients and provide expert testimony in a range of matters involving alleged violations of federal securities laws. Our experience includes work in class actions, derivatives, executive compensation, stock options, asset-backed securities, ERISA actions, breach of fiduciary duty, valuation, and bankruptcy. Our expertise is grounded in a thorough understanding of finance and economic theory, accounting, financial products, capital markets, regulation, and industry custom and practice.
Disclaimer

This Presentation has been prepared for The Bar Association of San Francisco as a basis for general discussion. This Presentation has not been written, is not intended, and should not be read as either comprehensive or fully applicable to any specific audience member. The Brattle Group is an economic consulting firm, not a law firm. Nothing in this Presentation is intended to provide legal or strategic advice.

Further, this Presentation is not intended for and should not be used for investment purposes. Brattle and its affiliates, and their respective directors, employees, representatives and agents, do not accept any liability under any theory for losses suffered, whether direct or consequential, arising from the reliance on this Presentation, and shall not be held responsible if any conclusions drawn from this Presentation should prove to be inaccurate.

The views expressed in this Presentation are those of the presenter and do not necessarily state or reflect the views of Brattle.
Presenters:

**Pavitra Kumar**
Dr. Kumar has expertise in complex securities litigation and valuation. Her main areas of focus include pension plan and trust-related litigation, the use of high-frequency data and other advanced analytical techniques for damages estimation in securities class actions, and investigating trading patterns to quantify “but-for” damages scenarios.

**Torben Voetmann**
Dr. Voetmann has testified and consulted on issues related to financial econometrics (i.e., the application of statistical methods within an economic framework), testing asset pricing models, event-study analysis, stock market behavior, market microstructure, securities prices and capital markets, market efficiency, damages, and materiality in securities fraud cases. His securities experience includes Rule 10b-5 and Section 11/12 class actions, addressing market efficiency, loss causation, and estimation of aggregate damages. Dr. Voetmann has deposition and jury trial experience.
Background
Securities Class Actions

- Section 10(b) and Rule 10b-5 make it unlawful to make material misrepresentation or omission, with fraudulent intent, in connection with the purchase or sale of a security.

- There is no statutory private right of action under Section 10(b), but courts long ago recognized a common law private right to sue for violations.

- **Elements of proof:**
  - (1) material misrepresentation or omission,
  - (2) fraudulent state of mind,
  - (3) actual and reasonable reliance, and
  - (4) loss causation in connection with the purchase or sale of a security. *(Dura Pharms, Inc. v. Broudo, 544 U.S. 336, 342-42 (1985)).*

- **The class action problem:** Individual factual or legal issues involved in proving *reliance* usually foreclose class certification under FRCP 23(b)(3), which requires that “facts common to class members predominate over any questions affecting only individual member...”
Basic Solved the “Reliance” Impediment to Class Certification


- Resolved a circuit split on *materiality* and adopted the objective standard of whether the omitted information would have been viewed by a reasonable investor as having significantly altered the total mix of information available. *TSC Industries v. Northway, Inc.*, 426 U.S. 438 (1976),

- Adopted the *fraud on the market theory* as one way to demonstrate *reliance* on a class wide basis: “where materially misleading statements have been disseminated into an impersonal, well-developed market for securities [“efficient market”], the reliance of individual plaintiffs on the integrity of the market pace may be presumed.”

- To invoke the *presumption of reliance*, plaintiffs must show that
  - (1) the representations were public,
  - (2) material,
  - (3) the securities traded in an efficient market, and
  - (4) plaintiffs traded after the alleged misrepresentation and before its correction.
The Presumption Relies on the FOTM Theory

Courts may presume that:

- If a company’s stock trades in an efficient market, the market price rapidly impounds and reflects all new material public information about the company; and

- Investors rely on the integrity of the market price in buying and selling the stock
How Can Defendants Rebut the Presumption

The presumption is rebuttable:

“Any showing that severs the link between the alleged misrepresentation and either the price received (or paid) by the plaintiff, or his decision to trade at a fair market price, will be sufficient to rebut the presumption of reliance.”

Smorgasbord of strategies:

- the market for the stock was not efficient
- the information was not material (but see Amgen, below)
- the information had no impact on price
- plaintiff bought after the truth became public
- plaintiff sold before the truth became public
- plaintiff would have traded regardless of the stock price
The Supreme Court Elaborates: Halliburton I and Amgen

- Halliburton I took *loss causation off the table at class certification*.
  - Rejected the Fifth Circuit’s position that plaintiffs must prove “loss causation” to invoke the presumption of reliance.
  - Compare transaction causation—that the plaintiff traded in reliance on false information (impounded in the market price of the security)—with loss causation—that the plaintiff lost money on the security because of the alleged false statement, as opposed to other causes, such as changes in the market, the industry, the company, other events.
  - “The fact that a subsequent loss may have been caused by factors other than the revelation of a misrepresentation has nothing to do with whether an investor relied on the representation in the first place.”

- Amgen took *materiality off the table at class certification*.
  - The Supreme Court rejected the Amgen’s argument that plaintiffs are required to show materiality in order to invoke the presumption of reliance…and rejected argument that defendants could rebut the presumption with evidence of lack of materiality.

The Supreme Court Elaborates: Halliburton II

- Evidence of price impact takes center stage. Court reversed Fifth Circuit’s decision to preclude evidence of price impact at class certification. Unanimous decision that defendants are entitled to present evidence of lack of price impact to rebut the presumption of reliance.

- While plaintiffs need not prove price impact, defendants can disprove it. Evidence of lack of price impact may not only counter plaintiff’s predicate showing of market efficiency, but may rebut the presumption of class wide reliance altogether.

- p.s. Basic survives a full attack. Court declines to overrule the FOTM presumption of reliance.
  - Rejects dissenters argument that the efficient market theory has been debunked. Concedes that market efficiency is imperfect. Basic depends on the “fairly modest” presumption that “market professionals generally consider most publicly announced material statements about companies, thereby affecting stock price.” This goes for value investors too.
The Supreme Court Elaborates: Halliburton III

- Plaintiff must show the prerequisites to invoke the presumption of reliance on the integrity of the stock price to satisfy predominance for class certification under Rule 23:
  - Alleged misrepresentations were public (already established)
  - Alleged misrepresentations were material (assumed at certification stage, Amgen)
  - Halliburton traded on an efficient market (already established)
  - Plaintiffs traded after the misrepresentations and before revelations of truth (class definition)

- Defendant may rebut the presumption of reliance on the integrity of market price by showing that the misrepresentation had no price impact:
  - Court placed both the burden of production and the burden of persuasion on defense.
  - “It is incumbent upon the defendant to show the absence of price impact”
  - FRE 301 burden shifting for presumptions does not apply.
If ...“Any showing that severs the link between the alleged misrepresentation and...the [market] price...will be sufficient to rebut the presumption of reliance” because “the basis for finding that the fraud has been transmitted through the market price is gone.” Halliburton II at 2415-16, quoting Basic.

Then....May defendants show that the truth was public and hence there was no correction to the price?
- No: “Truth on the market,” “materiality” and “loss causation” go to the merits, and do not present issues of class wide predominance under Amgen, Halliburton I, and Halliburton II.
- For class certification, the District Court assumed that the alleged misrepresentations were, in fact, misrepresentations, and the alleged corrective disclosures were, in fact, corrective.
Class Cert on Remand:  Halliburton III, cont’d

- Price impact at the front end – essential to establish reliance (transaction causation):
  - Nothing to measure if an alleged misstatement maintains the price status quo rather than causes an increase.

- Price impact at the back end – cannot establish loss causation at class certification, so why relevant?
  - If the corrective disclosure yields a price impact, court will infer price impact at the front end.

- Court considered expert testimony and competing event studies. Set out the rules of the game:
  - To show “price impact,” an event study must reject, with 95% statistical confidence, “the null hypothesis that the corrective disclosure had no impact on price.”
  - To show “price impact, “ the impact must occur within one day of the corrective disclosure (two days is too late, consistent with the efficient market hypothesis).

- “Determination of whether lack of price impact has been shown largely turns on the completing methodologies of the parties’ experts.”
Market Efficiency and Price Impact
Market Efficiency in the Context of Presumed Reliance

Basic’s Reliance presumption is founded on general existence of this connection... but also concerns the existence of price impacts to the specific alleged misstatements.

Halliburton II re-affirmed that for Reliance, market efficiency is not about the “price is right” concept of efficiency.

- Focuses only on existence of link between news and corresponding price movements.
Pre-Halliburton

General

Events/News/Statements

Events/News/Statements affect expectations of cash flow, or behavior of the firm, or both.
The expectations/News/Statements are not widely expected by the market.

= “PRICE IMPACTS”

Specific

Alleged Misstatement

“Efficient” Market for the security

Alleged Misstatement affects expectations of cash flow or “risk” of the security + The Alleged Misstatement is not widely expected by the market

= “PRICE IMPACT”

IF YES: EXTRAPOLATE BY INVOKING PRESUMPTION OF RELIANCE

Reliance battle was generally fought here during class certification
Post-Halliburton

Battle is still technically here, but ...

new potential channel to rebut the presumption directly
- But not entirely clear what this looks like.
Open Questions

1. What constitutes strong evidence of a “lack of price impact”?

2. Can the defense bring price impact evidence when rebutting general market efficiency?

3. Who has burden of persuasion and how heavy is that burden?
Standard Price Impact/Inflation Examples

Ex. 1) Misstatements can overstate value and alter market’s information

Ex. 2) Price impact through “omission” – failure to disclose

Relevant price impacts occur when an allegedly improper action or inaction causes price to deviate from what it would have been otherwise (i.e., inflation)

Corrective Disclosure
Example 1: Front- and Back-End Price Impact

Misstatements can overstate value and alter market’s information

Realized prices
Corrective Disclosure
Back-End Price Impact
Front-End Price Impact
“But-for” prices

+I
- I
Example 2: No Front-End but Back-End Price Impact (e.g., Best Buy)

Price impact through “omission” (failure to disclose)
Example 3: Price Impact through “Price Maintenance”

“Bad News is discovered,” company immediately responds alleviating investor fears

Q: If the company reiterates the same statement later on (which the market now already believes), is this reiteration an example of “price maintenance”?

Corrective disclosure

Realized prices

The Bar Association of San Francisco – June 13, 2017
Example 3: Price Impact through “Price Maintenance”

“Bad News is discovered,” company immediately responds alleviating investor fears

Q: If the company reiterates the same statement later on (which the market now already believes), is this reiteration an example of “price maintenance”?

“But-for” prices

Price would have fallen if not for the company response – i.e., response prevents price from falling to its “correct” level [No front-end impact]
Economic Evidence of “Lack of Price Impact”

1. Evidence that credibly allocates price movements at the time of corrective disclosure to other factors
   - Not enough to just raise doubts – much stronger if one can produce quantitative analysis that supports the allocation
   - Intraday price data can be very helpful here
   - Careful timelining of news – including intradaily – is absolutely critical

2. In cases of alleged price maintenance, defense can also:
   - “try to present evidence that the alleged misstatement did not counteract a price decline that would otherwise have occurred”

[Best Buy (8th Circuit 2016), Dissenting opinion]
Economic Evidence of “Lack of Price Impact”

3. **Provide credible evidence that the information from the alleged corrective disclosure was already “priced-in”**
   - Effectively a variant of point 1, in that it says any observed price movements on the date of corrective disclosure must have been due to other factors.
     - If market really is efficient and there is a price impact from the alleged misstatement, this impact would have shown up around the time that the market started realizing the truth – not later
   - Again, news/event timelining (and review) is critical (Factiva, Bloomberg News, etc.)
   - Analyst reports can be helpful in providing insight into the market’s evolving mentality
Economic Evidence of “Lack of Price Impact”

4. **Classical event study?**
   - Defense should provide its own event studies, not argue through plaintiffs’
   - Analysis needs to be careful and complete
   - But worth noting that as a rebuttal tool, this has had mixed success since Halliburton II (was used with partial success in Halliburton (2015))
   - Implicit formula in Halliburton II may be a guide:

   “Suppose a defendant at the certification stage submits an event study...Suppose the district court determines that...plaintiff has carried its burden to prove market efficiency, but that the evidence shows no price impact with respect to the specific misrepresentation challenged in the suit. The evidence at the certification stage thus shows an efficient market, on which the alleged misrepresentation had no price impact.”

   [Halliburton II decision]
Sample Decisions
Sample of Post-Halliburton II Decisions

*Halliburton District Court Decision* (Northern District of Texas 2015):

- Stands out as a case where defense successfully reduced the number of alleged misstatements certified down to 1
- Defense expert followed the Halliburton II example
- Defense produced its own event study and successfully argued for use of “multiple comparisons adjustments” in evaluating price impact of various disclosure dates
  - Caused several disclosure dates to become statistically insignificant
- Interestingly, the decision agreed that the burden of persuasion should fall to defense...
  - But its application of the economic evidence (arguably) shifted the burden of persuasion back to plaintiffs to establish price impact, since this was all in the classical event study framework
Sample of Post-Halliburton II Decisions, cont’d

- **Goldman Sachs Grp., Inc. Sec. Litig., No. 10 Civ. 3461, 2015 (S.D.N.Y. 2015):**
  - Vague on what constitutes evidence of lack of price impact
  - “Defendants must demonstrate a lack of price impact by a preponderance of the evidence”

- **Carpenters Pension Trust Fund of St. Louis v. Barclays (S.D.N.Y. 2015):**
  - Price maintenance case
  - Decision noted that defense did not produce its own event study
  - Notably, the decision recognized that “the failure of an event study to disprove the null hypothesis with respect to an event does not prove that the event had no impact on the stock price”
Sample of Post-Halliburton II Decisions, cont’d

- **Barbara Strougo v. Barclays (S.D.N.Y. 2016)**
  - Price maintenance case
  - Decision noted that defense did not produce its own event study
  - “The fact that other factors contributed to the price decline does not establish by a preponderance of the evidence that the drop in the price of Barclays ADS was not caused at least in part by the disclosure of the fraud at LX”

- **IBEW Local 98 Pension Fund v. Best Buy (8th Circuit 2016)**
  - Price maintenance case
  - Defense successfully argued that there was no “front-end” price impact from the alleged misrepresentations – able to successfully allocate price increase on that day to an earlier, non-fraudulent press release
  - Subsequent price drop at alleged corrective disclosure was not found to reflect any artificial inflation maintained by the alleged misrepresentation
Evidence of a “Lack of Price Impact” at Class Certification

Classical event study could function as economic evidence to rebut presumed reliance IF the burden of persuasion is ultimately determined to lie with plaintiffs.

- But, harder to reconcile with the Basic presumption
- Plaintiffs may raise concerns over the ability of a litigation event study to identify price impact when there is one (low power issue)
  - Would this make the burden too high under standard statistical tests?

Conversely, if burden ultimately stays with the defense, use of classical event study evidence is more challenging and may face a high threshold

- Halliburton II’s new channel may become less viable as a practical matter
- Defense should consider use of the Bayesian event study to overcome the test asymmetry of the classical event study
  - Bayesian method provides a probability of price impact that classical event study does not.
Critical Issues in Light of Halliburton
Critical Issues in Light of Halliburton II: Economic Evidence of “Lack of Price Impact”?

Halliburton II retained Basic’s presumption, but changed the type of evidence that could potentially be used at class-certification to rebut the presumption:

- Evidence of lack of price impact can be used by defense at class certification stage as direct evidence to rebut the presumption

Economic methodology brought into the spotlight:

- Some analytical battles moved into class certification stage:
  - Connecting front and back end price impact to actionable statements
  - Developing and or rebutting price impact theory, e.g., price maintenance
  - Limitations of the event study methodology
  - Alternative approaches to measure price impact that can be helpful to defendants
Why the Mixed Success with the Traditional Event Study?

From an economic point of view Halliburton II’s example is problematic – especially when burden to show lack of price impact is on defense:

- As an economic matter, the traditional event study does not, strictly speaking, provide “evidence of a lack of price impact”

Traditional event study sits in the framework of classical decision theory and hypothesis testing, which is asymmetric:

- Assumes that null hypothesis is true (Ho: No price impact), and tests if the data provides “sufficient” evidence against this:
  - “Reject” the null or “fail to reject” it (proof by contradiction) – never “accept”

- Analogous to the distinction of finding someone “not guilty” versus finding them “innocent” in criminal matters
Fundamental Challenge for Traditional Event Study

“There is a lack of evidence of price impact”  [Traditional event study can say this]
≠
“There is evidence of a lack of price impact”  [Traditional event study cannot say this]

Strength of traditional event study in rebuttal is therefore affected by the burden:

- **On plaintiffs**: defense analysis showing there is “a lack of evidence” of price impact can help show that plaintiffs did not carry their burden, and can therefore be more effective

- **On defense**: more challenging to successfully rebut using the classical event study:
  - Defense has a burden to prove “a lack of” something that can be arbitrarily small
  - Partially explains the generally high bar that defense has consequently faced since Halliburton II in various decisions
  - Effectiveness will depend on how closely the court – implicitly, if not explicitly – adheres to a strict economic/statistical interpretation of the classical event study
  - May see alternative approaches (e.g. Bayesian or high-frequency event studies)
Classic Event Study
Traditional Event Studies Identify Significant Stock Price Movements In Response to New Information

Company announced greater-than-expected earnings

Company announced unexpectedly large drop in earnings: Alleged corrective disclosure

10/29/15-10/30/15: 24.93% price decline ($11.13)
Traditional Event Studies Account for Market and Industry Factors

Event studies measure statistical significance of “residual” stock returns. Significance indicates material company-specific information may have entered the market.

- Actual Return: -24.93%
- Total Return: -24.93%
- Residual Return: -12.47%
- Expected Return: -7.02%
- Industry Return: -5.45%
- Market Return: -7.02%

Statistically significant at the 1% level.
Traditional Event Studies Have Limited Ability to Test Actionable Statements

Statistically significant residual return consistent with arrival of new company-specific information but need not result from actionable statements.

- Residual Return
- Total Return
- Actual Return
- Expected Return
- Company-Specific Return
  - Statistically significant at the 1% level
- Non-Fraud-Related Return
- Fraud-Related Return
- Industry Return
- Market Return
- Industry Return
- Industry Return
- Market Return
- Market Return
- -4.99%
- -7.48%
- -5.45%
- -5.45%
- -7.02%
- -7.02%
Best Buy Case Study
Best Buy Case Study: Intraday Data Can Help Establish Lack of Price Impact

Not Actionable Statements:
- Price Impact

Actionable Statements:
- No Front-End Price Impact

Daily Return:
- Price Impact
Best Buy Case Study: Defense Argument on Appeal

The Defense presented intra-daily price data evidence on September 14, 2010, arguing that Best Buy’s overall price increase occurred in reaction to the pre-market press release (non-actionable statements)

Defense argued that none of the price increase that day could be specifically attributed to the investor conference statements (actionable):

- Specifically, Best Buy’s price within the day rose at the start of trading, prior to the 10 am investor conference
- After the 10 am conference, price remained relatively steady

Circuit Court found the intra-day price evidence compelling in identifying more precisely what had caused the day’s observed price impact:

- Court also noted that Plaintiffs’ expert agreed that the content of the two events were not materially different, so that all of the impact could be attributed to the non-actionable event
High-Frequency Data and Price Impact
High-Frequency Data Enables More Precise Measure of Price Impact

Event studies are a tool commonly used in securities class actions to determine whether alleged corrective disclosures are associated with significant price impact.

**Daily Data (Traditional)**

* Ignores *intraday* confounding events

**Intraday Data**

* Can *disentangle* impact of disclosure event from impact of other events on same day

**Realized Volatility Model**

* Uses *high-frequency data* to more accurately predict volatility accounting for *dynamic daily and intraday effects*
  - More precise identification of significant price impacts

**Traditional Event Study**

* Assumes *constant price volatility*
  - Can mis-state price impact significance
High-Frequency Data Enables More Precise Analysis of Prices and Volumes

Number of Trading Days: 2,013
Number of Total Trades (Tick Data): 21,042,477
Power Increases with Smaller Return Intervals in High-Frequency Data

- Judge Scheindlin stated that the power of single-firm event studies is limited:
  
  “The notion that event studies are the paramount tool for testing market efficiency comes from multi-firm event studies...However, when the event study is used in a litigation to examine a single firm, the chances of finding statistically significant results decrease dramatically.”

  Judge Scheindlin’s Opinion and Order in Strougo et al. vs. Barclays et al., p. 30, emphasis added

- However, MacKinlay (1997) explains that the power of statistical tests increases when return or sampling intervals decrease:
  
  “The clear message is that there is a substantial payoff in terms of increased power from reducing the sampling interval.”


- Thus, higher-frequency data increases statistical power of single-firm event studies relative to traditional tests using daily returns
Realized Volatility Model Uses High-Frequency Data to Predict Volatility

- Daily “Realized Volatility” is sum of squared intraday returns at minute or second increments.

- Realized Volatility model can be used to forecast dynamic volatility:
  - More precise measure of normal stock volatility against which to benchmark price impacts of alleged corrective disclosures.

- Market practitioners use Realized Volatility as a measure of risk because it:
  - Reflects true activity in the market.
  - Utilizes a large number of short-period returns in intraday trading.

- Also well established by top-level peer-reviewed academic articles.
Realized Volatility Model Accounts for Daily Volatility Fluctuations

Number of Minute Observations: 389,610

Realized Volatility based on 1-Minute Intervals

When true daily volatility is high (> RMSE) at around the event of interest, traditional event study using daily returns over-estimates statistical significance.

When true daily volatility is low (< RMSE) at around the event of interest, using daily returns under-estimates statistical significance.

Traditional Event Study Assumes Constant Volatility

Note: RMSE is calculated as the standard deviation of the daily closing price returns.
Realized Volatility Model Weights More Recent Data to Predict Daily Volatility Over Time

More recent observations carry more weight in calculating predicted daily volatility because they are included in more of the lags.

Source: Tick Data. Realized volatility is calculated based on squared returns in 1-minute intervals.
Realized Volatility Model Closely Predicts Volatility Over Time Using High-Frequency Data

Source: Tick Data. Realized volatility is constructed based on returns in 1-minute intervals.
Realized Volatility Model Can Predict Intraday Volatility Patterns Using High-Frequency Data

Example Date: September 21, 2014

Source: Tick Data.
Realized Volatility Model is More Precise Using Shorter Time Intervals of High-Frequency Data
Bayesian Event Study Can Address Halliburton II High Level Price Impact Standard

The critical weakness in using the Traditional Event Study as evidence for a “lack of price impact” is the test’s asymmetry:

- If you can reject the null, then there is strong enough evidence to conclude that the null hypothesis is not true (with a given statistical confidence in the test decision)
- If you fail to reject, the evidence is simply inconclusive

With a Bayesian Event Study, the output is a probability that a statement is true given the data observed:

- i.e., What is the probability that there was a price impact? Or, you can ask what is the probability distribution of the price impacts to the event
- In this sense, the Bayesian approach is much more aligned with the problem of a litigation event study in general
Key Takeaways From High-Frequency Data Case Studies

What to expect from defendant experts?

- Limitation of traditional event studies is that daily returns do not allow disentangling of alleged corrective disclosure impact from other events on same day:
  - By contrast, traditional intraday event study only assumes constant normal volatility, thus potentially mis-states significance of price impacts
- High-frequency data enables cleaner estimate of price impact of information disclosures by removing intraday confounding events:
  - Improves statistical power of single-firm daily event studies
  - Realized Volatility model accounts for dynamic daily and intraday effects in estimating normal volatility
- Affirmative event study opinions from Defense experts, connecting actionable statements with front and back end price impact:
  - Realized Volatility and Bayesian approaches can help overcome Halliburton II’s higher level standard (showing evidence of lack of price impact)
Conclusions
Conclusions

- An event study isolates price movements in response to new information:
  - Identifies price movements that are unlikely to be a result of chance based on normal volatility
- Daily returns do not allow disentangling of alleged corrective disclosure impact from other events on same day
- High-frequency data enables cleaner estimate of price impact of information disclosures by removing intraday confounding events:
  - Further, RV model accounts for dynamic daily and intraday effects in estimating normal volatility
  - By contrast, traditional intraday event study only assumes constant normal volatility, thus potentially mis-states significance of price impacts
Tools in the Defense Arsenal to Defeat or Limit Class Certification

- Get the best expert and get creative in rebutting the FOTM presumption
  - An event study may show that the relevant market is not efficient
  - Under the recipe in Halliburton III, an event study may limit or foreclose class certification
  - Analyze whether the market previously reacted (or not) to the same information
  - Analytics may identify large groups plaintiffs for exclusion
    - In and out traders
    - traders who rely on strategies to which price is irrelevant – high frequency traders and volatility seekers
    - shorten the class by picking a better “corrective disclosure” date
Questions