



Screens for Conspiracies and Manipulations and their Multiple Applications

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Lisboa, June 15, 2011

What is a Screen?

- **A screen is a statistical test designed to identify:**
 - Whether collusion exists in a particular market
 - Who is involved
- **Screens use commonly available data such as prices, bids, spreads, costs or volumes**

Proof of Conspiracy under Federal Antitrust Law, 2010, Chapter 8 on the Role of the Economic Expert, American Bar Association Editions

Multiple Uses of Screens

- **Detection by competition authorities and market regulators**
- **Litigation**
 - Effects analysis: evidence of collusion (or lack thereof)
 - Motions to dismiss
 - Class certification
 - Damages estimation
- **Pre-Litigation**
 - Leniency application decision
- **Corporate counsel**
 - For internal monitoring, auditing and increased compliance robustness

Abrantes-Metz and Bajari (2009, 2010), Abrantes-Metz and Froeb (2008) and Abrantes-Metz, Bajari and Murphy (2010)

Experience with Conspiracies & Manipulations

- **Worked on and developed empirical screens for:**
 - Cartels involving bid-rigging, price-fixing, market allocation
 - Manipulations of inside spreads in major trading exchanges
 - Manipulations of stock prices
 - Accounting manipulations (e.g., revenue management)
 - Conspiracies among brokers of large financial institutions

Experience with Conspiracies & Manipulations

- **Worked on and developed empirical screens for:**
 - Manipulations of commodities indices (Platts, NYMEX)
 - Manipulations of gold, platinum and palladium, silver, and oil futures contracts prices
 - Conspiracies among business partners of major institutions
 - Manipulations of hedge funds accounts
 - Manipulations of interest rates

Presentation Outline

- **Screening Strategies & Properties of a Good Screen**
- **Types of Screens**
 - Screening for Price-Fixing and Bid-Rigging
 - Using Screens for Detection
 - The Power of Screens to Detect Explicit Collusion
- **Economic Analyses, Screening and Leniency Programs**
- **Screening for Manipulations in Commodities and Financial Markets**
 - Alleged Collusion and Manipulation in the Libor Rate?

Screening Strategies

1. Improbable events

- Similar to a casino looking for cheats:
 - Highly unlikely to win 20 red/black roulette bets in a row
 - Probability less than 1 in 1,000,000

- Classic Example: Tennessee Valley Authority price-fixing conspiracy:
 - Seven companies submitted identical “sealed” bids of \$198,438.24 for conductor cable services

Screening Strategies

2. Control group

- Benchmark a firm's behavior against others in the same or related markets
- Compare prices, quantities, market shares to those of other firms and markets
- Search for anomalous patterns- e.g. concrete prices in New York in 1980's were 70 percent higher than other markets

Properties of a Good Screen

- 1. Low false positives and negatives**
- 2. Easy to implement**
- 3. Costly to avoid**
- 4. Empirical and/or theoretical support**

NOTES: A screen is not a proof of existence neither absence of collusion
False positives and negatives are possible (similar to medical screens)

Examples of Screens

- 1. Relationships between auctions' bids**
- 2. High average price**
- 3. Low price variance**
- 4. Existence of a structural break at the beginning and/or at the end of the cartel**

Examples of Screens

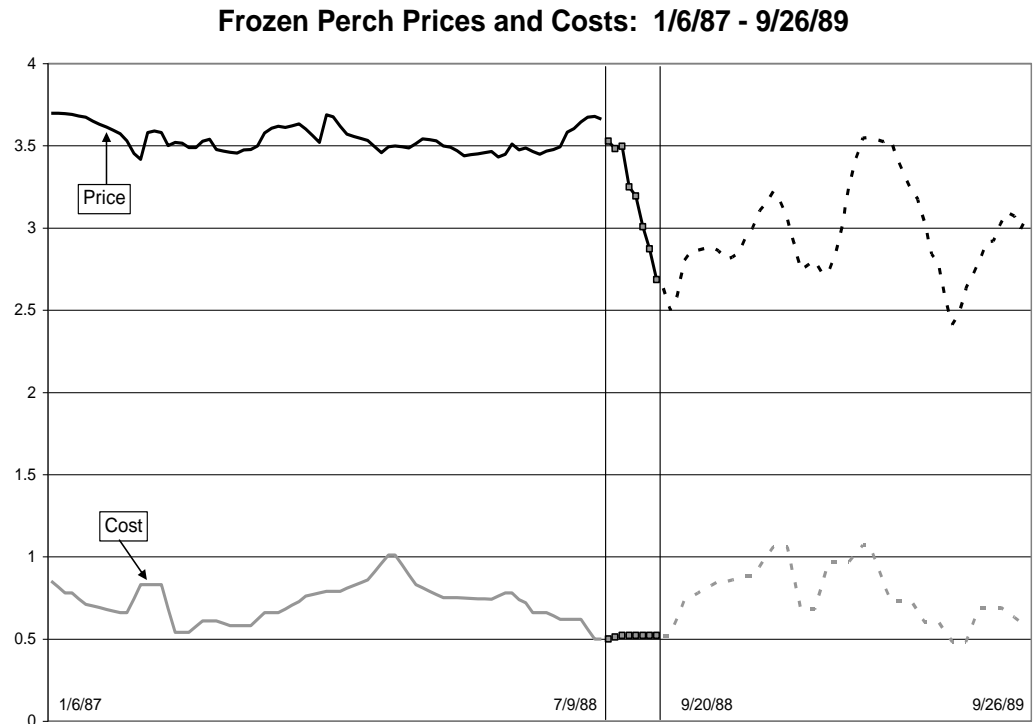
5. Low pass-through rate from costs to prices
6. Market shares stability within alleged cartel members
7. Negative serial correlation of market shares for alleged cartel members
8. Price distributions violating mathematical laws (e.g., Benford's Law)

Screening for Price-Fixing

A Variance Screen for Collusion: Evidence

Features of Collusion vs. Competition

1. More stable prices under collusion
2. Structural break when the cartel collapsed, marked by a sudden drop in prices
3. Higher average price under collusion
4. Prices followed costs movements more closely under competition

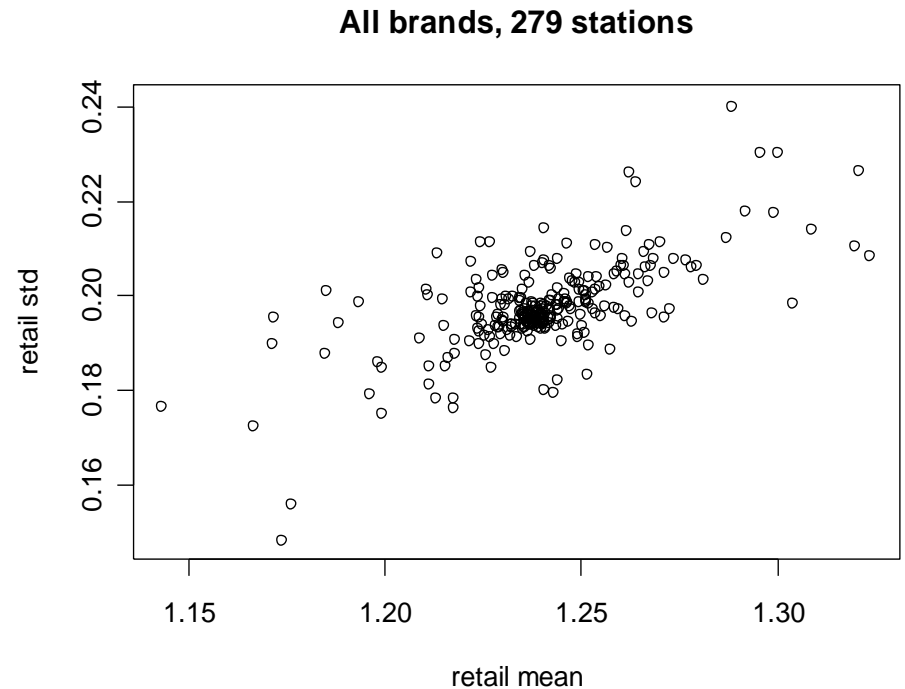


Abrantes-Metz, Froeb, Geweke and Taylor (2006)

Screening for Price-Fixing

A Variance Screen for Collusion: Detection

- Use for detection of collusive behavior among retail gasoline stations
 - 279 gasoline stations studied in Louisville, KY
 - Searched for a group of stations in the lower right-hand-side corner of the figure (high mean and low price variance), consistent with possible collusive behavior
 - No such group was found



Abrantes-Metz, Froeb, Geweke and Taylor (2006)

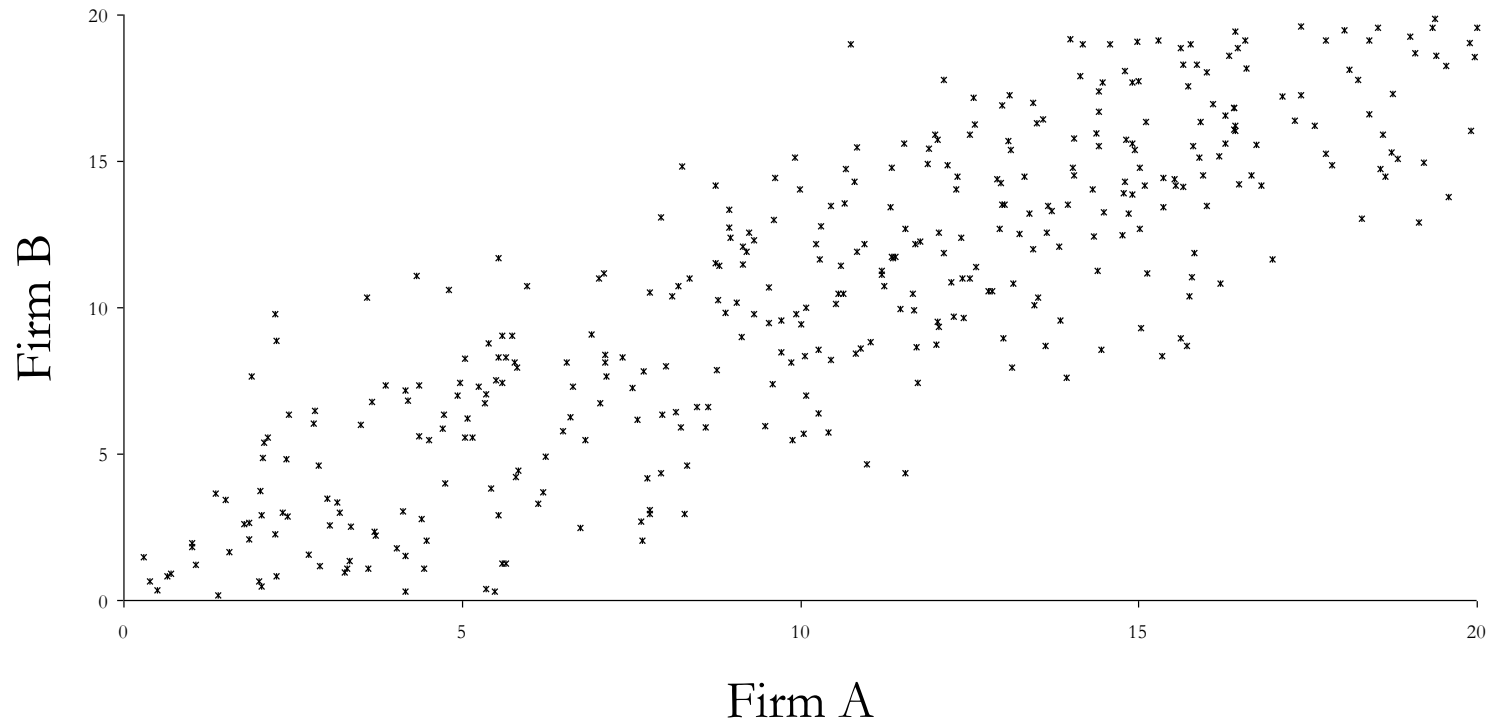
Screening for Bid-Rigging

- **Economic models of competitive bidding have two robust predictions:**
 - Non-collusive bids should reflect costs
 - Non-collusive bids should be independent across bidders after controlling for costs and competitive factors

Screening for Bid-Rigging

Collusive Bids are Highly Correlated

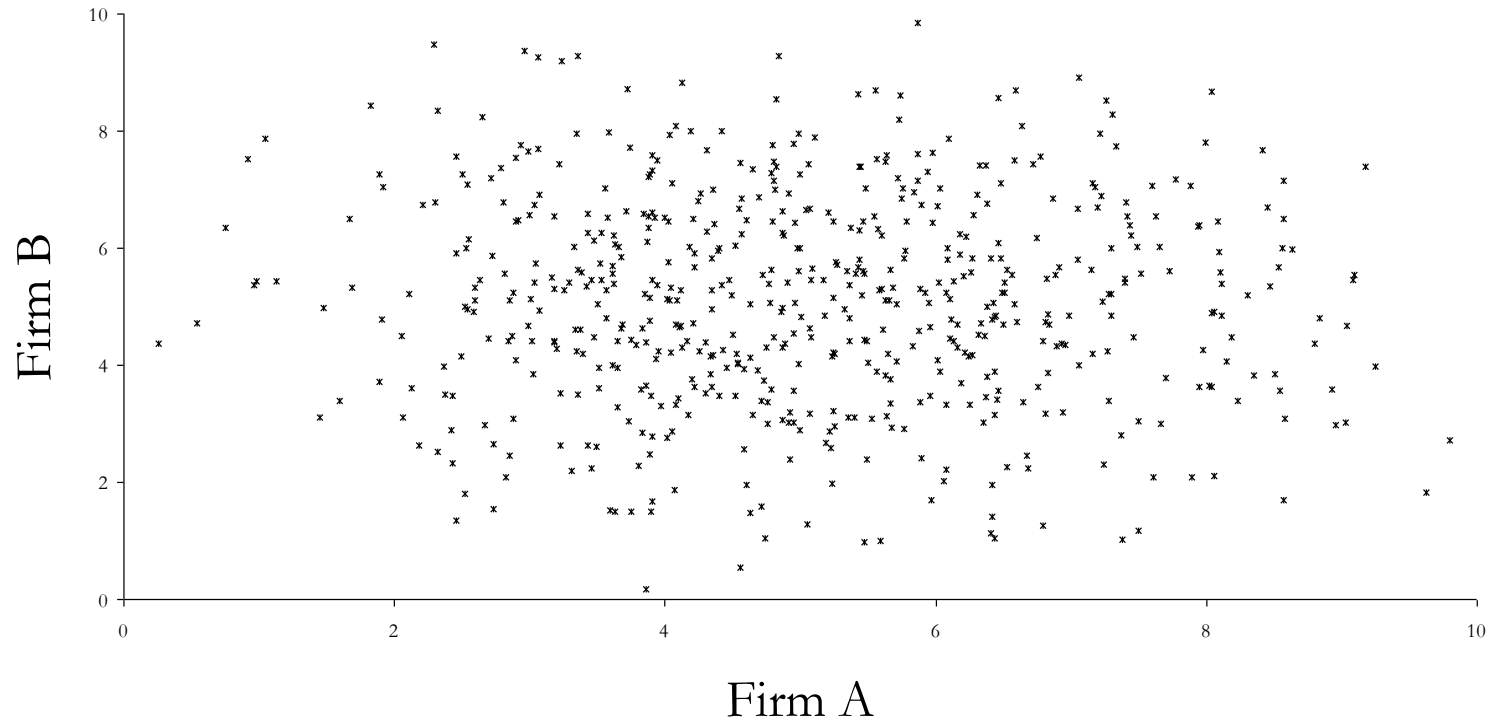
Panel A: Bids for Firms A and B



Screening for Bid-Rigging

Non Collusive Bids are Not Correlated

Panel B: Bids for Firms A and B



Using Screens for Detection

- **Competition Authorities Worldwide:**
 - Federal Trade Commission
 - Department of Justice
 - European Commission
 - Office of Fair Trading, UK
 - Canada
 - The Netherlands, Austria, Italy Turkey, Ireland
 - Brazil, Mexico, India

- **Also in the US:**
 - Securities and Exchange Commission
 - Commodity Futures Trading Commission

Power of Screens to Detect Explicit Collusion

- **Esposito and Ferrero (2006) tested the power of the Variance Screen to detect two well-known cartel cases, with success:**
 - Tested the Variance Screen in two markets: (1) motor fuel (gasoline and diesel) and (2) personal care and baby milk sold in pharmacies
 - Among all market participants, in both cases the authors found that the Variance Screen would have correctly identified those participants and regions belonging to the known conspiracies
- **On going testing**
 - Abrantes-Metz, Judge and Villas-Boas

Economic Analysis and Screening

- **Economic analysis and screening can play an important role in cartel detection**
- **OECD Roundtable Conference (2006) –Two reasons for an increasing role of circumstantial evidence, and in particular economic evidence:**
 - Increasingly difficult to find direct evidence – need for circumstantial evidence
 - Economic evidence is important to trigger investigations

Power of Screens to Trigger Investigations

- **Most recently:**
 - The Alleged Manipulation and Conspiracy of the Libor Rate
 - Wall Street Journal (April 2008)
 - Abrantes-Metz, Kraten, Metz and Seow (August 2008, forthcoming at the *Journal of Banking and Finance*)
 - Abrantes-Metz, Villas-Boas and Judge (January 2011, *Applied Economic Letters*)

Power of Screens to Trigger Investigations

- **Several countries have triggered antitrust investigations based exclusively on economic indicators:**
 - Italian baby milk (cross-country price benchmarking)
 - Dutch shrimp (structural indicators)
 - Mexican pharmaceuticals (bid –rigging screening)
 - Economic criteria to prioritize complainants in the Brazilian gasoline retail market (margin increase and reduction of price dispersion across regions)

Leniency Programs and Empirical Screens

- **Leniency Programs in the US and in Europe have been extremely successful in detecting cartels, but some collusion remains undetected**
- **Likely bias in Leniency Programs – cases based on leniency are likely to be cartels close to the break-up point**
 - Cartels with low consumer benefits linked to detection
- **Cartels with incentive constraint far from binding are less likely to be detected by leniency**
 - Cartels with high consumer benefits linked to detection

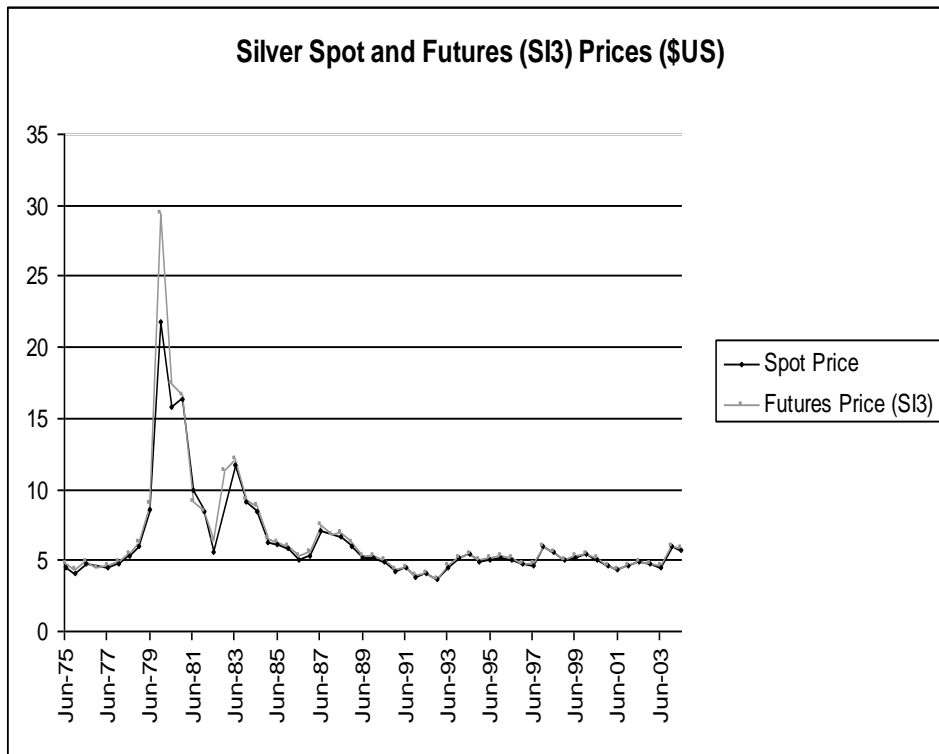
Leniency Programs and Empirical Screens

- Empirical screens and leniency programs exhibit strong complementarities with respect to cartel deterrence
- The implementation of empirical screens by competition authorities acts as a deterrence tool

Commodities Prices Manipulations

Silver Manipulation: 1979-1980

- Hunt Brothers and their alleged allies had started buying or taking delivery of silver in 1973, and by January 1, 1979 held 37 million troy ounces
- By late 1979, they held more than 60% of the silver officially available for transactions and severely restricted silver supply (type of manipulation called a “squeeze”)

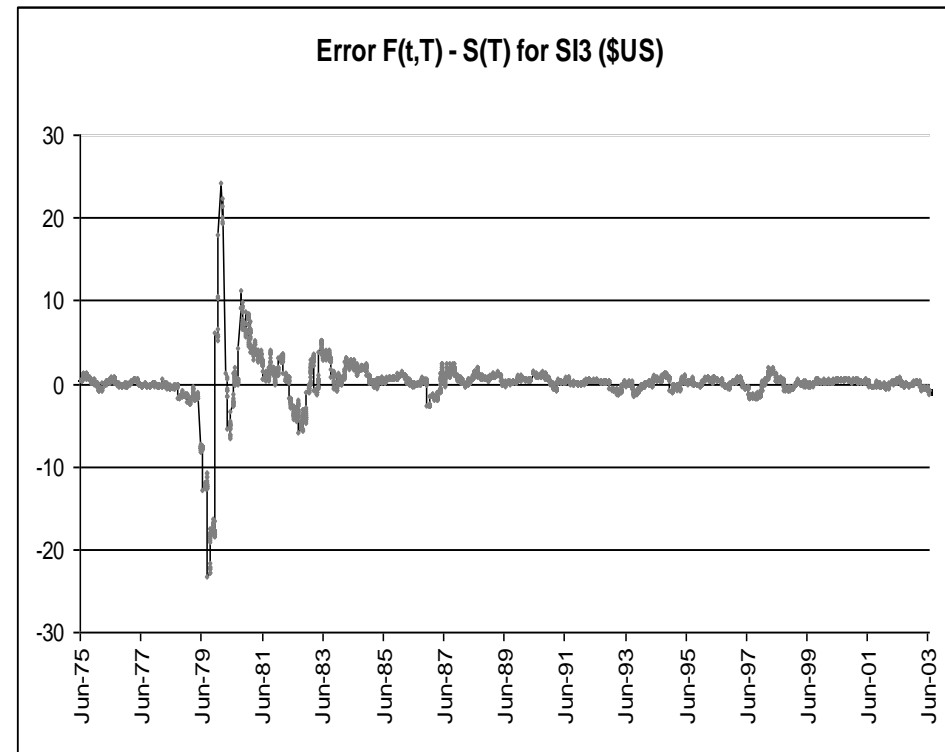


Abrantes-Metz and Addanki (2007)

Commodities Prices Manipulations

Error-Based Screen for Manipulation

- Manipulation implies the market is being fooled: when market participants form their expectations about what prices will be in the future, these are based on erroneous information: Their forecasted prices lose precision and are more frequently wrong
- Taking the futures prices as the market's forecast for the spot prices at the maturity of the contract, the difference between these two prices is a good measure of the error in prediction
- This error should be more volatile under manipulation, even after controlling for relevant market factors



Abrantes-Metz and Addanki (2007)

Power of Screens in Financial Markets

- **Stock Options Backdating Cases (e.g., Countrywide)**
 - Market model on companies' stock returns flagged situations in which stock excess returns tended to be negative before executive option grants and positive after such grants; a similar pattern with respect to the release of favorable company news and excess returns was also found (Lie (2005))

- **NASDAQ dealers odd-eighths avoidance**
 - Christie, Harris and Schultz (1994) could not explain why odd-eighths were avoided by dealers

Abrantes-Metz (2010)

Libor Alleged Conspiracy and Manipulation

- **WSJ allegation:**
 - On May 29, 2008, the Wall Street Journal printed an article that alleged that several global banks were reporting unjustifiably low borrowing costs for the calculation of the daily Libor benchmark, since January 2008
 - These banks may “have been low-balling their borrowing rates to avoid looking desperate for cash”

Libor Alleged Conspiracy and Manipulation

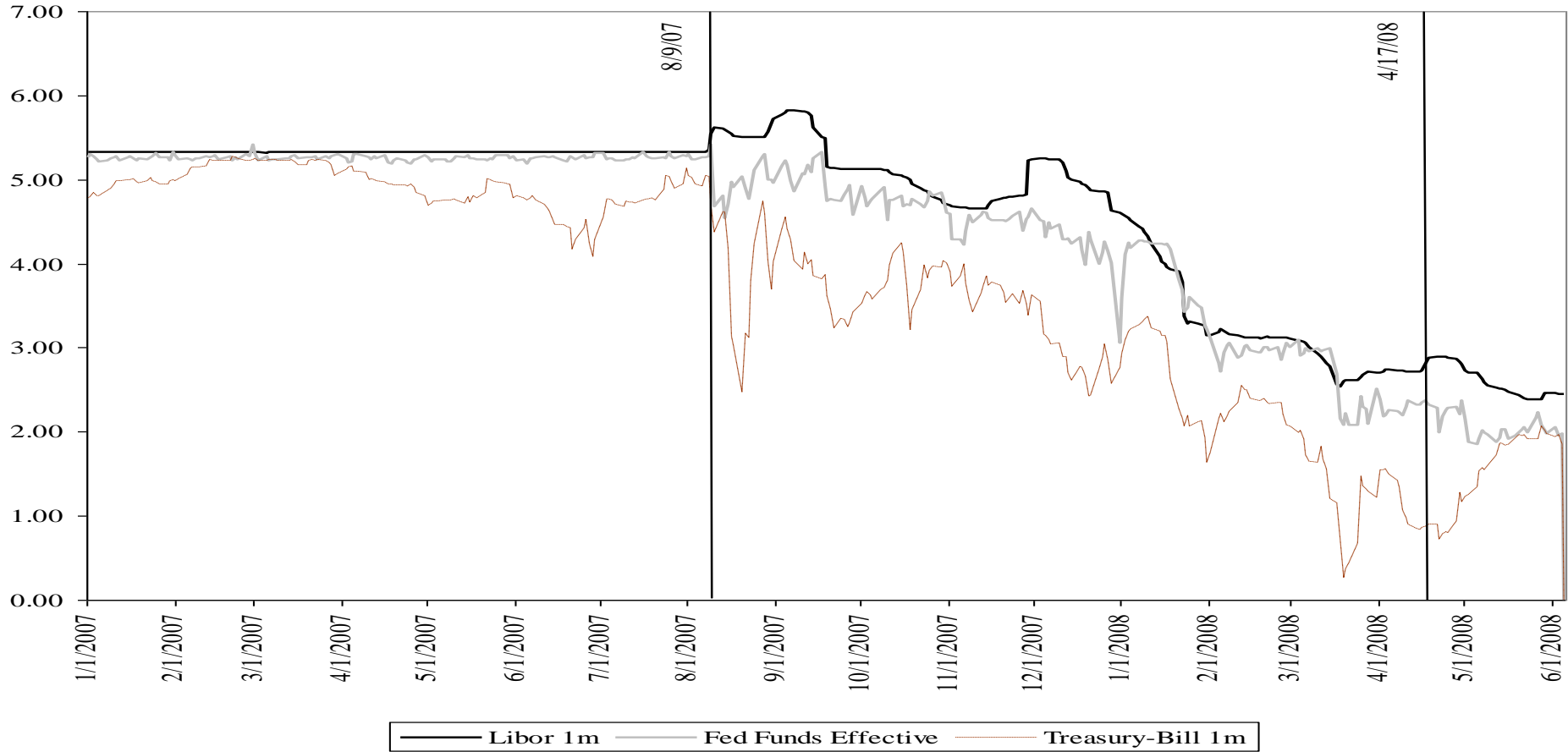
- **Our analysis extends that of the WSJ:**
 - Compare Libor with other rates of short-term borrowing costs
 - Evaluate the individual bank quotes that were submitted to the British Banker's Association (BBA) for a longer period of time
 - Compare these individual quotes to individual CDS spreads on an ordinal basis and with market capitalization data

Libor Alleged Conspiracy and Manipulation

- **What is the LIBOR and how is it set**
 - The British Banker's Association (BBA)'s website states that the Libor is the primary benchmark for short term interest rates globally. It is used as the basis for settlement of interest rate contracts on many of the world's major futures and options exchanges, as well as most Over the Counter and lending transactions
 - The Libor quotes are supposed to reflect each bank's cost of borrowing
 - 16 banks provide daily quotes on the Libor
 - The "middle 8" quotes are converted into Libor through a simple arithmetic mean calculation

Libor January 2007 through May 2008

Libor 1m, Fed Funds Effective Rate and Treasury-Bill 1m



Current Public Investigations

- **US Department of Justice**
- **Securities and Exchange Commission**
- **Commodity Futures Trading Commission**
- **Other countries' agencies as well**

Wall Street Journal articles March and April 2011, Financial Times article March 2011

Conclusion

- **Screens are very useful, but the usual “garbage-in garbage-out” rule applies**
 - Need to understand data, industry and the properties of a screen
 - The inappropriate use of screens will increase false positives and negatives
- **Empirical screens for conspiracies have started being used as detection tools by competition authorities, and their popularity and adoption is increasing over time**
- **They have also been used by both plaintiffs and defendants at various stages of litigation, and in internal monitoring**

Thank you very much!

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Dr. Rosa M. Abrantes-Metz's experience includes work in consulting and banking, as well as in government. Her main areas of specialization are econometrics, financial economics, monetary economics, and applied industrial organization. Dr. Abrantes-Metz is a visiting scholar at Leonard N. Stern School of Business, New York University, where she teaches industrial economics. She has taught econometrics at the department of economics at the University of Chicago, and various other fields of economics at Universidade Católica Portuguesa, in Lisbon, Portugal. Since working as a staff economist at the Federal Trade Commission, Dr. Abrantes-Metz continued serving as a consultant for special projects with the Commission's Bureau of Economics. She is the author of several articles on econometric methods, conspiracies and manipulations, gasoline, pharmaceuticals and healthcare, event studies, and has published in peer-reviewed journals such as the *International Journal of Industrial Organization*, the *Journal of Pharmaceutical Finance, Economics and Policy*, and *Applied Economics Letters*, with forthcoming publications in the *Journal of Futures Markets* and the *Journal of Banking and Finance*. Her work has also appeared in trade publications including the *ABA Economics Committee Newsletter*, *The Antitrust Source*, *The Antitrust Magazine*, *The Antitrust Counselor*, *Derivatives Litigation Reporter*, and *Securities Litigation Report*. Dr. Abrantes-Metz is a co-drafter of the chapter on the role of the economic expert in proving conspiracy cases under federal antitrust laws, a recent volume by the American Bar Association, and a contributor to other books on antitrust and international arbitration with a focus on event studies. Dr. Abrantes-Metz has developed numerous empirical screens for conspiracies and manipulations, and is a pioneer in the field, contributing to the increased adoption of these methods. Her screens are used by competition authorities worldwide and also by defendants. In pharmaceuticals, she has co-developed a model to estimate the likelihood of drugs failing and succeeding each of the clinical stages of the Food and Drug Administration, and their expected durations in each of these phases. This model has become one of the two most used by industry analysts to value pharmaceutical and biotechnology pipelines. Her research on pharmaceuticals and conspiracies has been discussed in books on how to value pharmaceutical and biotechnology companies, and on publications pertaining to healthcare, intellectual property and cartels. She has presented her work to competition authorities all over the world. Dr. Abrantes-Metz's work has been featured in the press such as the *Wall Street Journal*, *Financial Times* and *Investor's Business Daily*. Dr. Abrantes-Metz has provided testimony related to alleged bid-rigging and price-fixing, and in international arbitration on the valuation of expropriated assets. Dr. Abrantes-Metz holds a Ph.D. and a Masters in Economics from the University of Chicago. She also holds a Masters in Economics from the Universitat Pompeu Fabra in Barcelona, Spain, and a *Licenciatura* in Economics from Universidade Católica Portuguesa. She is a member of the *Who's Who* of Competition Lawyers & Economists.