



CPI Antitrust Chronicle

June 2015 (2)

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Antitrust Compliance 2.0: The Use of Structural Analysis and Empirical Screens to Detect Collusion and Corruption in Bidding Procurement Processes

Rosa M. Abrantes-Metz & Elizabeth Prewitt¹

I. INTRODUCTION

Collusion among bidders is a recurring problem in both public and private procurements. This is evident from recent U.S. enforcement actions and those of other jurisdictions across the globe targeting bid-rigging cartels and resulting in substantial fines, civil damages, and terms of incarceration for individuals in jurisdictions with criminal penalties. The harm caused by such cartels is perhaps most keenly felt by government entities in emerging markets with limited budgets to develop and maintain infrastructure and obtain necessary goods and services. But private companies making significant purchases through tender or bidding processes are similarly vulnerable.

Moreover, collusive conduct between horizontal competitors is not the only means by which the integrity of such procurement processes can be undermined; individuals with purchasing authority have facilitated bid-rigging cartels in return for bribes or kickbacks. Such corruption can therefore operate hand-in-hand with bid-rigging, often increasing the potential harm and likelihood of detection by enforcers and civil litigants.

Instead of waiting for the proverbial “knock on the door” by an enforcer, companies are increasingly adopting proactive detection methods to assess risk and target compliance efforts—a trend that will arguably be encouraged by recent statements by the U.S. Department of Justice (“DOJ”) warning that compliance programs are expected to incorporate auditing and testing functions. Similarly, in recent years some enforcers have eschewed waiting for leniency applicants to come forward with evidence of a cartel in favor of examining market structures and behavioral patterns to detect collusive conduct.

This article explores how the increase in enforcement actions targeting bid-rigging and corruption globally raises the risk of detection, and how screens can be used as a proactive tool to successfully uncover this conduct.

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II. INCREASED DETECTION RISKS

A. Increased Antitrust Enforcement Directed at Bid-Rigging Cartels Raises the Risk of Detection

Bid-rigging poses a substantial risk of large administrative and criminal fines and penalties, as demonstrated by recent enforcement actions across the globe. In Fiscal Year 2014 alone, the Antitrust Division of the DOJ collected \$1.3 billion in criminal fines and penalties,² and approximately \$760 million of this total—59 percent—came from cases involving at least some allegation of bid-rigging.³

Penalties arising from such conduct can extend beyond fines and civil damages to include debarment from future government procurements. For example, the World Bank proscribes behavior that is corrupt, fraudulent, collusive, coercive, or obstructive,⁴ and actions that amount to “collusion”—such as bid-rigging—can therefore lead to debarment from contracts funded by the World Bank.⁵

While historically examples of bid-rigging cartels have most frequently appeared in infrastructure industries such as construction and road paving, cartels have been found in a number of industries and taken a number of forms. In connection with the DOJ’s ongoing investigation into market allocation, price-fixing, and bid-rigging in the automotive parts industry, as of June 2015, 55 individuals have been charged and 35 companies have pleaded guilty or agreed to plead guilty with fines totaling more than \$2.5 billion.⁶ In those matters, bid-rigging presented with a range of other anti-competitive conduct. But bid-rigging in its most classic form has been the core or sole antitrust allegation in a number of other DOJ investigations, such as in the food distribution industry, where the NYC Board of Education’s school food contracts to serve 1.1 million schoolchildren were rigged by competing suppliers.⁷

And enforcement actions have also been directed at less traditional forms of bid-rigging, often called “atypical” or “hub and spoke” cartels.⁸ For example, the DOJ filed a number of charges in the financial service industry in connection with its investigation of

² Bill Baer, Assistant Attorney General, Antitrust Division, DOJ, Statement before the Subcommittee on Regulatory Reform, Commercial and Antitrust Law, Committee on the Judiciary, U.S. House of Representatives 2-3 (May 15, 2015), *available online at* <http://www.justice.gov/atr/public/testimony/313877.pdf>.

³ This percentage was calculated by reviewing all DOJ press releases during this period.

⁴ World Bank, *Guidelines on the Procurement of Goods, Works, and Non-Consulting Services*, Art. 1.16(a) (Jan. 2011, rev. July 2014), *available online at* http://siteresources.worldbank.org/INTPROCUREMENT/Resources/Procurement_GLS_English_Final_Jan2011_revised_July1-2014.pdf.

⁵ For example, in 2008 and 2009, the World Bank debarred seven firms, including two for up to eight years, for alleged bid-rigging in the Philippines. *See* Bob Davis, *World Bank Bans Chinese Firms Due to Bid-Rigging Allegations*, WALL ST. J. (Jan. 15, 2009), *available online at* <http://www.wsj.com/articles/SB123200130285285123>.

⁶ DOJ, Press Release, *Current and Former Executives of an Automotive Parts Manufacturer Indicted for Roles in Conspiracy to Fix Prices—Investigation Has Resulted in Charges Against 90 Individuals and Corporations* (May 21, 2015), http://www.justice.gov/atr/public/press_releases/2015/314206.htm.

⁷ *See* Indictment, *United States v. Penachio*, No. 00 CR 583 ¶¶ 27-29 (S.D.N.Y. May 31, 2000).

⁸ Elizabeth Prewitt & Greta Fails, *Indirect information exchanges to hub-and-spoke cartels: enforcement and litigation trends in the United States and Europe*, 1 COMP. L. & POL’Y 63, 63-64 (2015).

brokers conspiring with competing providers to rig bids for municipal bond investment contracts, and as of May 2015, seventeen individuals have been convicted or have pleaded guilty.⁹ Moreover, states have filed their own actions targeting bid-rigging conduct even when there has been no parallel DOJ enforcement action, as we have seen perhaps most notably in New York State's insurance brokerage rigging investigation.¹⁰

Investigations targeting bid-rigging have become increasingly prevalent over the last few years. In the DOJ's ongoing real estate foreclosure auction-rigging investigation over 50 individuals have pleaded guilty or agreed to plead guilty, and 20 other real estate investors have been charged.¹¹ And in connection with an ongoing DOJ investigation into the rigging of municipal tax liens in New Jersey over 20 individuals and entities have been charged, with 15 guilty pleas to date.¹² And, in recent weeks, we have seen both a Georgia real estate investor plead guilty to conspiring to rig bids at public real estate foreclosure actions¹³ and five school bus owners in San Juan, Puerto Rico indicted for participating in a conspiracy to rig bids in a Caguas municipality auction for public school bus contracts.¹⁴ But these recent U.S. actions are only part of a global enforcement trend.

Worldwide enforcement trends also show an increased focus on bid-rigging. For example, in 2013 South Korea's Fair Trade Commission ("KFTC") formed an investigative

⁹ See, e.g., DOJ, Press Release, *Former Bank of America Executive Sentenced to Serve 26 Months in Prison for Role in Conspiracy and Fraud Involving Investment Contracts for Municipal Bond Proceeds* (May 18, 2015), http://www.justice.gov/atr/public/press_releases/2015/314127.htm (former managing director of Bank of America's municipal derivatives group was sentenced to serve 26 months in prison); DOJ, Press Release, *Three Former UBS Executives Sentenced to Serve Time in Prison for Frauds Involving Contracts Related to the Investment of Municipal Bond Proceeds* (July 24, 2013), http://www.justice.gov/atr/public/press_releases/2013/299604.htm (former UBS AG executives sentenced to serve 18 months in prison with a U.S. \$1 million fine, 27 months in prison with a \$400,000 fine, and sixteen months in prison with a \$300,000 fine).

¹⁰ In October 2004, the New York State Attorney General filed a civil complaint against Marsh & McLennan ("Marsh"), an insurance broker, alleging that Marsh had solicited rigged bids for insurance contracts and had received improper contingent commission payments in return for steering its clients to a select group of insurers. Complaint, *State v. Marsh & McLennan Cos.*, No. 04-43342 (N.Y. Sup. Ct. Oct. 14, 2004); see also William Kolasky & Kathryn McNeece, *Contingent Commissions and the Antitrust Laws: What Can We Learn from the In re Insurance Brokerage Antitrust Litigation?*, Bloomberg BNA Antitrust & Trade Regulation Report (Apr. 10, 2015), available online at <http://www.hugheshubbard.com/Documents/Contingent%20Commissions%20and%20the%20Antitrust%20Laws.pdf>.

¹¹ DOJ, Press Release, *Two Northern California Real Estate Investors Agree to Plead Guilty to Bid Rigging and Fraud Conspiracies at Public Foreclosure Auctions* (Apr. 23, 2015), http://www.justice.gov/atr/public/press_releases/2015/313378.htm.

¹² DOJ, Press Release, *Former New York Tax Liens Investment Company Executive Pleads Guilty for Role in Bid Rigging Scheme at Municipal Tax Lien Auctions* (May 12, 2014), http://www.justice.gov/atr/public/press_releases/2014/305817.htm.

¹³ DOJ, Press Release, *Georgia Real Estate Investor Pleads Guilty to Bid Rigging and Fraud Conspiracies at Public Real Estate Foreclosure Auctions* (June 5, 2015), http://www.justice.gov/atr/public/press_releases/2015/314842.htm. The investor also pled guilty to mail fraud. *Id.*

¹⁴ DOJ, Press Release, *Five School Bus Owners Indicted for Bid-Rigging and Fraud Conspiracies at Puerto Rico Public School Bus Action* (May 21, 2015), http://www.justice.gov/atr/public/press_releases/2015/314217.htm. The school bus owners were also charged with mail fraud and conspiracy to commit mail fraud. *Id.*

division focusing exclusively on bid-rigging,¹⁵ and in 2014 the Malaysia Competition Commission (“MyCC”) announced the launch of new initiatives to detect bid-rigging.¹⁶ In the last few weeks alone, we have seen examples of enforcement actions directed at bid-rigging, including the Russian Federal Antimonopoly Service (“FAS”) announcement of fines against four companies for bid-rigging cartel behavior,¹⁷ and an individual who participated in a bid-rigging conspiracy related to Canadian government contracts was sentenced.¹⁸ These are just recent anecdotal examples of enforcement actions resulting from the increased scrutiny of procurements for anti-competitive conduct.

Patterns of enforcement actions occurring over the last decade warn that future enforcement actions should be anticipated in jurisdictions that embrace leniency programs and in industries that have already experienced aggressive enforcement. This is, in part, because companies implicated in existing investigations may be rewarded with immunity from fines in exchange for being the first to report on any separate undisclosed conspiracy, as well as a reduction in fines related to the prior conspiracy. The policy, known as amnesty plus, has been extremely successful in incentivizing targeted companies to race to disclose any additional misconduct they have undertaken before their co-conspirators¹⁹ and that trend is expected to continue.

B. The Rise in Anti-Corruption Enforcement Further Increases the Risk of Detection

While collusion and corruption both pose their own challenges to the integrity of procurements, they “may frequently occur in tandem, and have a mutually reinforcing

¹⁵ Jae-Chan Jeong, *Korea: Korean Fair Trade Commission*, Global Competition Review Asia-Pacific Antitrust Review 2015, <http://globalcompetitionreview.com/reviews/69/sections/235/chapters/2755/korea-korea-fair-trade-commission/>. In February 2014, Korean courts sentenced three individuals to six months’ imprisonment for rigging bids on tenders to supply cables to nuclear power plants under the Penal Code and one individual for two years’ imprisonment for rigging bids on tenders for construction projects under the Construction Industry Regulation Act.

¹⁶ Press Release, Malaysia Competition Commission, *MyCC Launches Two Handbooks on Bid Rigging* (Nov. 4, 2014), http://mycc.gov.my/wp-content/uploads/2014/07/News-Release-MyCC-Launches-Two-Bid-Rigging-Handbooks_041114_kch.pdf. In addition to the handbooks, the MyCC launched a number of seminars attended by procurement officials country-wide. *Id.* at 2. Some of these materials are available in English. See, e.g., Malaysia Competition Commission, *Help Us Detect Bid Rigging* (June 2014), http://mycc.gov.my/wp-content/uploads/2014/06/MYCC_Handbook_HelpUsDetectBidRigging.pdf; Malaysia Competition Commission, *Overview of Bid Rigging Under the Competition Act 2010* (June 2014), <http://mycc.gov.my/wp-content/uploads/2014/06/BID-RIGGING-UNDER-THE-CA2010-Final-iskandar.pdf>. The MyCC announced in 2015 that—working with the Malaysian Anti-Corruption Agency—it intended to focus on bid-rigging. Veena Babulal, *MyCC to enforce anti bid-rigging laws soon*, NEW STRAIT TIMES ONLINE (May 16, 2015), <http://www.nst.com.my/node/84442>.

¹⁷ MLex, *Russian antitrust watchdog to fine bid-rigging cartel* (June 8, 2015). FAS also announced that it had forwarded information on the companies’ executives to the pertinent authorities to pursue criminal charges against them. *Id.*

¹⁸ MLex, *Former Microtime employee sentenced after pleading guilty to bid-rigging* (May 21, 2015). The employee must serve an 18-month conditional sentence, perform 60 hours of community service, and pay a \$23,000 fine. *Id.*

¹⁹ See Scott D. Hammond & Belinda A. Barnett, U.S. DOJ Antitrust Division, *Frequently Asked Questions Regarding the Antitrust Division’s Antitrust Program* 8 (Nov. 19, 2008) (“A large percentage of the Division’s investigations have been initiated as a result of evidence developed during an investigation of a completely separate conspiracy.”), <http://www.justice.gov/atr/public/criminal/239583.pdf>.

effect.”²⁰ Over the last several years we have seen a rise in U.S. Foreign Corrupt Practices Act (“FCPA”) charges targeting bribery of foreign officials, along with increased anti-corruption efforts worldwide.²¹

The policy argument for increased enforcement is plain to see. A 2012 study by the European Commission estimated that corruption could be responsible for increasing the cost of public procurement in Europe by 20-25 percent.²² And such incremental costs associated with corruption are perhaps even more deeply felt in emerging markets where funds to build and service critical infrastructure are more limited.²³

Given the potential impact on government budgets, enforcers around the globe are increasingly turning the microscope on public bidding to uncover evidence of corruption involving the public officials overseeing the bidding process and the companies submitting bids. These investigations have revealed evidence of agreements between competing bidders to rig bids and fix prices, at times paying bribes to officials to facilitate these collusive agreements.

When bribery payments are made to local government officials to facilitate the allocation of contracts as part of a bid-rigging conspiracy, these can and have given rise to FCPA violations. And in circumstances where the Antitrust Division has discovered evidence of corrupt payments in the course of international cartel investigations, it has charged violations of both the Sherman Act and the FCPA simultaneously. For example, in 2011 Bridgestone Corporation was charged with conspiracy to rig bids and to violate the FCPA because Bridgestone’s employees bribed sales agents at state-owned enterprises in Argentina, Brazil, Ecuador, Mexico, and Venezuela, among other countries, to secure the confidential information necessary to effectuate the bid-rigging scheme.²⁴ While this matter stands as an atypical example of an Antitrust Division enforcement action directed at a FCPA violation, the Criminal Division of the DOJ has a dedicated FCPA unit with a mandate to detect and prosecute such offenses.

It should be noted that there are other types of corruption schemes operating hand-in-hand with schemes to rig bids, but that are not charged as violations of the FCPA or the Sherman Act. Most often these enforcement actions involve persons within the contracting authority or entity engaging in improper communication with one or more of the bidding companies and transmitting sensitive bidding information to secretly assist one or more companies to win contracts. For example, in March 2015, the DOJ announced a plea agreement with Asem Elgawhary, a former vice president of Bechtel Corporation and the

²⁰ OECD, Report, *Collusion and Corruption in Public Procurement* 1 (2010), available online at <http://www.oecd.org/competition/cartels/46235884.pdf>.

²¹ See generally Hughes Hubbard, *FCPA/Anti-Bribery Alert Winter 2015* 1-4 (February 2015), <http://www.hugheshubbard.com/PublicationDocuments/FCPA%20Anti-Bribery%20Alert%20Winter%202015.pdf>.

²² European Commission, *Frequently Asked Questions: How corruption is tackled at EU level* (Feb. 12, 2012), http://europa.eu/rapid/press-release_MEMO-12-105_en.htm?locale=en.

²³ OECD, Report, *Collusion and Corruption in Public Procurement* (2010), available online at <http://www.oecd.org/competition/cartels/46235884.pdf>.

²⁴ Plea Agreement, *United States v. Bridgestone Corporation*, No. 4:11-cr-00651 ¶ 4(k)-(p) (S.D. Tex. Oct. 5, 2011) (No. 21).

general manager of a joint venture with Egypt's state-owned electrical company. Elgawhary accepted \$5.2 million in kickbacks from three power companies to manipulate the bidding process for state-run power contracts and was ultimately sentenced to serve 42 months in jail.²⁵ While Elgawhary was not charged by the DOJ with bid-rigging or a FCPA violation, these facts depict a typical mixture of corruption and collusion.

In a somewhat prototypical case involving kickbacks and bid-rigging prosecuted by the Antitrust Division, *United States v. McDonald*, a project manager for a prime contractor facilitated a bid-rigging conspiracy between subcontractors to create the false appearance that the competitive bidding process required for the government-funded projects was followed.²⁶ McDonald accomplished this by providing confidential information to the subcontractor paying him kickbacks to effectuate the bid-rigging scheme.

Still other examples and variations of this hybrid of corruption and collusion conduct exist and will be uncovered by enforcers or entities employing tools to detect the telltale patterns.

In situations where bribery appears in connection with bid-rigging, whether as a violation of the FCPA or as commercial bribery, an overlap in U.S. enforcement efforts should be expected. Moreover, the rise of anti-corruption enforcement in other jurisdictions means that the long arm of U.S. law is not the only enforcement threat capable of reaching this conduct. We are seeing more and more countries adopt and aggressively enforce their own foreign corruption laws. In fact, TRACE International recently found that the number of non-U.S. enforcement actions involving the bribery of foreign officials nearly doubled between 2013 and 2014.²⁷

Other jurisdictions are recognizing the connection between bid-rigging and corruption, and are directing their enforcement resources to examine procurements accordingly. For example, in an investigation of corruption and collusion relating to the procurement of combat boots for the German Armed Forces, it was discovered that an employee of the Armed Forces Procurement Agency passed on confidential information to facilitate collusion among bidders in return for kickbacks. The German state prosecutor's office pursued corruption charges while the German Competition Authority (Bundeskartellamt) issued fines after it found that six companies used the information from the official to submit their bids. Notably, this behavior was investigated after an internal procurement agency review found irregularities. Other enforcers are also adopting a coordinated approach to detect collusion and corruption.²⁸ It is in this context

²⁵ DOJ, Press Release, *Former Bechtel Executive Sentenced to 42 Months in Prison and Ordered to Forfeit \$5.2 Million in Connection with Kickback Scheme* (Mar. 23, 2015), <http://www.justice.gov/opa/pr/former-bechtel-executive-sentenced-42-months-prison-and-ordered-forfeit-52-million-connection>. He was sentenced to 42 months in prison, and to forfeit the \$5.2 million he received, after pleading guilty to mail fraud, conspiracy to commit money laundering, obstruction, and tax offenses. *Id.*

²⁶ DOJ, Press Release, *Former Project Manager Sentenced to Serve Time in Prison for Role in Bid Rigging and Other Fraudulent Schemes Involving Two EPA Superfund Sites in New Jersey* (Mar. 3, 2014), http://www.justice.gov/atr/public/press_releases/2014/304133.htm.

²⁷ TRACE International, *Global Enforcement Report 2014*, Fig. 3 (June 2015).

²⁸ See MLex, *Canada's competition enforcers tapping police about links between bid-rigging, bribery* (June 9, 2015).

that screens are considered a means to uncover both forms of conduct. In fact, the Swedish Competition Authority (Konkurrensverket) issued a statement last month that it has begun employing a number of screens to analyze procurement data searching for tell-tales of cartel behavior with the goal of increasing the likelihood of detection, and specifically noted its collaboration with the Swedish National Anti-Corruption Unit by exchanging anonymized information regarding suspected markets and pre-studies.²⁹

Given the long list of competition and anti-corruption enforcement authorities turning the microscope on procurement processes, the risk of detection for both collusion and corruption has increased dramatically. A compliance audit that detects a bid-rigging scheme therefore offers the potential of detecting related corruption conduct in time to remediate or mitigate before being uncovered by others.³⁰ Systems for review of public procurement, however, are typically designed largely to make sure that the rules for bidding processes are followed, and detecting bid-rigging is often not the primary objective. The use of screens as part of a procurement review should be explored as a means to detect patterns consistent with collusion and corruption rather than competition.

C. The Use of Structural Analysis and Empirical Screens to Detect Collusion

There are essentially two different types of economic analyses that flag the possible existence of a conspiracy to rig bids.³¹ The first can be classified as a “structural approach,” which looks at the structure of the industry at hand, “scoring” the likelihood of collusion based on factors such as homogenous products, few competitors, stability of demand, and other commonly acknowledged markers of environment conducive to collusion.³² The second is empirical and adopts a “behavioral,” “outcomes,” or “empirical” approach. Here economists look at markets’ and participants’ behaviors as translated into observable data and then apply screens for conspiracies and manipulations to address whether the observed behavior is more or less likely to have been produced under an explicit agreement. It is in connection with this approach that “screens,” or sometimes “empirical screens,” are used. These rely on time-series, cross-sectional data, and/or panel data sets with variables that measure market outcomes—including prices, volumes, and market shares—to detect potential anticompetitive behavior.

In brief, “screening” refers to the method for flagging collusive behavior through economic and statistical analyses. A screen uses statistical tests based on econometric

²⁹ Konkurrensverket Swedish Competition Authority, *Screening for Cartels in Procurement Procedures and the Importance of Inter-agency Cooperation* (May 7, 2015), available online at http://www.konkurrensverket.se/globalassets/press/tal-artiklar/150507_dan-sjobloms-anforande-ecd.pdf.

³⁰ Gary R. Spratling, Deputy Assistant Attorney General, Antitrust Division, Remarks at the American Conference Institute 7th National Conference on Foreign Corrupt Practices Act, *International Cartels: the Intersection Between FCPA Violations and Antitrust Violations* (Dec. 9, 1999), available online at <http://www.justice.gov/atr/public/speeches/3981.htm>.

³¹ Joseph Harrington, *Detecting Cartels*, HANDBOOK OF ANTITRUST ECONOMICS (P. Buccirossi, ed. 2008).

³² A general list of these factors is further detailed in *Proof of Conspiracy under Antitrust Federal Law*, AMERICAN BAR ASSOCIATION EDS., Ch. VIII (April 2010). A non-exhaustive “check list” of characteristics that influence the susceptibility of a market to tacit or explicit collusion includes: number of firms and market concentration, differences among competitors, product heterogeneity, demand volatility, barriers to entry, benefits of cheating, transparency, and multi-market contact.

models and a theory of the alleged collusion designed to: (1) identify whether collusion, manipulation, or any other type of cheating may exist in a particular market; (2) who may be involved; and (3) how long it may have lasted. Screens typically use available data such as prices, bids, quotes, spreads, market shares, volumes, and other data to identify patterns that are anomalous or highly improbable other than as a product of collusion.

Over the last few years, economic analysis in general, and empirical screens in particular, have been increasingly relied upon to detect behavior consistent with collusion and manipulation.³³ Competition authorities and other agencies worldwide have begun using screens to detect possible market conspiracies and manipulation, and defendants and plaintiffs have begun adopting them as well.³⁴

Focus and interest in this area have increased dramatically in recent years. For example, in October 2013 the OECD held a policy roundtable on “Ex Officio cartel investigations and the use of screens to detect cartels.”³⁵ In this discussion we see how the adoption of screens has become increasingly popular with several countries but yet, at the same time, we have learned that other jurisdictions have not yet adopted screens, alleging these are “too resource” intensive, provide “too many false positions,” or simply that “screens don’t work.” In a previous article summarizing her participation at the 2013 OECD Policy Roundtable, Abrantes-Metz (2014)³⁶ rebuts these and other arguments against screens and makes the case for their effectiveness.

III. HOW STRUCTURAL AND EMPIRICAL ANALYSES CAN HELP DETECT COLLUSION IN BIDDING

A. Applying Economic Analyses to Available Data—Using What You’ve Got

A lack of robust data is the greatest challenge to detecting collusion in bidding through economic analysis. This is particularly problematic for companies who are on the

³³ A trend detailed, for example, in Rosa Abrantes-Metz & Patrick Bajari, *Screens for Conspiracies and their Multiple Applications*, 24(1) ANTITRUST MAG. (Fall, 2009); Rosa Abrantes-Metz & Patrick Bajari, *Screens for Conspiracies and their Multiple Applications*, 6(2) COMPETITION POL’Y INT’L, 129-144 (2010); and Kai Hüscherlath, *Economist’s Note: How are Cartels Detected? The Increasing Use of Proactive Methods to Establish Antitrust Infringements*, J. EUR. COMPETITION L. & PRACTICE, 1-7 (September 2010).

³⁴ Surveys of screening methodologies and their multiple applications can be found in Harrington, *supra* note 2; Joe Harrington & Joe Chen, *Cartel Pricing Dynamics with Cost Variability and Endogenous Buyer Detection*, 24 INT’L J. INDUS. ORG. 1185-1212 (2006); and Abrantes-Metz & Bajari, *Id.* The use of these methods in antitrust litigation is detailed in the American Bar Association’s *Proof of Conspiracy under Antitrust Federal Laws*, which specifically describes in Chapter VIII the role of the economic expert in proving a conspiracy and details the use of screens in this context. Rosa Abrantes-Metz & D. Daniel Sokol, *Antitrust Corporate Governance and Compliance*, HANDBOOK OF ANTITRUST ECONOMICS (forthcoming) and Rosa Abrantes-Metz, Patrick Bajari, & Joseph Murphy, *Enhancing Compliance Programs through Antitrust Screening*, 4(5) ANTITRUST COUNSELOR (September 2010) makes the case for the use of screens in corporate antitrust compliance programs.

³⁵ See generally OECD, *Ex officio cartel investigations and the use of screens to detect cartels* (2013), available online at <http://www.oecd.org/daf/competition/exofficio-cartel-investigation-2013.pdf>. The panel consisted of Rosa M. Abrantes-Metz, William E. Kovacic, and Maarten Pieter Schinkel.

³⁶ R. Abrantes-Metz submission, OECD, *Guidelines for Fighting Bid Rigging in Public Procurement 2-3* (2009), available online at <http://www.oecd.org/daf/competition/cartels/42851044.pdf>.

sales side, but yet seek to ensure that their employees are not engaged in anticompetitive conduct. Typically, their compliance programs canvas a company's organizational structure to identify which employees are likely to have contacts with competitors, and then train them on the "do's and don'ts."

If audits are conducted, the focus is on available internal information, and such audits frequently involve reviewing documentation from trade association meetings or surrounding sales transactions with competitors, or even sampling emails for improper contacts with competitors. Little focus is placed on reviewing externally available information, which is often a fruitful avenue to assess risk.

Running background checks on individuals is one way to draw upon externally available data to help assess risk, and these types of audit are now more routinely conducted than previously in our current era of increased anti-corruption enforcement. But now we are also seeing such audits in connection with public procurement. For example, China's NDRC and Supreme People's Procuratorate announced this year that they would be running criminal background checks on the winners in any project that requires a bidding process.³⁷

As noted earlier, there are numerous ways to assess the degree of risk of anti-competitive conduct by looking at the structure of an industry and its participants. Collusion among potential contracting firms can be facilitated where certain market characteristics prevail, and these "industry, product, and service characteristics" include:

- a small number of companies,
- little or no entry,
- market conditions,
- industry associations,
- repetitive bidding,
- identical or simple products or services,
- few if any substitutes, and
- little or no technological change.³⁸

For this reason, structural patterns should be examined. And, as noted earlier, future enforcement efforts can sometimes be anticipated in jurisdictions that embrace leniency programs and have experienced aggressive enforcement in an industry. By analyzing these factors together, an entity is better equipped to assess its risk and what further measures can and should be taken.

In addition to examining structural patterns and the enforcement environment, entities procuring goods or services through bidding may have the requisite data readily available to help make the use of behavioral screens effective. Other entities may be able access that data externally, especially in connection with certain public procurements.

³⁷ PaRR Alert, *China imposes criminal bribery background checks on bidding and tendering activities* (June 9, 2015).

³⁸ OECD, *supra* note 35.

Bid-rigging in competitive tenders is a productive setting to apply screens for three reasons:

1. Competitive tenders account for a large volume of economic output. Public sector procurement, which often uses some form of competitive bidding, on average accounts for about 10-15 percent of an economy's output.³⁹ In addition, competitive bidding is widely used in financial markets, privatization of public assets, real estate, and many other transactions.
2. Bid-rigging is a common antitrust offense. As noted above, bid-rigging has been alleged in nearly 60 percent of the criminal cases filed by the DOJ in the last year.
3. Markets that use competitive bidding are frequently rich in data, containing not just the final price but also the individual bids and, in many cases, information related to the components of the bids themselves. In many countries, statutes require the public disclosure of bids.

There is a large body of empirical literature on collusion in auctions that discusses the implementation of various types of screens.⁴⁰ While these papers span a wide variety of industries, researchers have identified common patterns that exist when collusion is known or suspected. One common analysis involves identifying bidding patterns that are very unlikely to be generated in a true competitive bidding process, and another compares the market suspected of bid-rigging against a comparable unsuspected benchmark. As discussed below, both methods should be considered.

B. Screening for Bids That are Highly Correlated Even After Controlling for Legitimate Market Conditions

This type of screening looks for specific improbable events that can be rationally explained only by the existence of collusion. In sealed-bid settings, firms usually submit their bids simultaneously to be later read at a fixed date. In the public sector, the contract is typically then awarded to the lowest bidder. If there is no collusion between firms, then the bidders have not formulated each of their bids in consideration of the others' bids. As a result, we should expect the bids to be independent across bidders after we control for

³⁹ World Trade Organization, *WTO and government procurement*, https://www.wto.org/english/tratop_e/gproc_e/gproc_e.htm.

⁴⁰ P. Bajari & G. Summers, *Detecting Collusion in Procurement Auctions*, 70 ANTITRUST L. J. 143 (2002). See Robert H. Porter & J. Douglas Zona, *Detection of Bid Rigging in Procurement Auctions*, 101 J. POL. ECON. 518 (1993) (examining auctions for highway construction projects in Long Island); Laura H. Baldwin, et al., *Bidder Collusion at Forest Service Timber Sales*, 105(4) J. POL. ECON. 657-699 (1997) (examining timber auctions in the Pacific Northwest); Robert H. Porter & J. Douglas Zona, *Ohio School Milk Markets: An Analysis of Bidding*, 30 RAND J. ECON. 263 (1999) (examining the procurement of school milk in Ohio); Martin Pesendorfer, *A Study of Collusion in First-Price Auctions*, 67 REV. ECON. STUD. 1 (2000); Peter Crampton & Jesse Schwartz, *Collusive Bidding: Lessons from the FCC Spectrum Auctions*, 17 J. REG. ECON., 229-252 (2000); Patrick Bajari & Jungwon Yeo, *Auction Design and Tacit Collusion in FCC Spectrum Auctions*, forthcoming in INFORMATION ECON. & POL'Y; Patrick Bajari & Lixin Ye, *Deciding Between Competition and Collusion*, 85(4) REVIEW ECON. STAT., 971-989 (2003); John List, Daniel Millimet, & Michael Price, *Inferring Treatment Status when Treating Assignment is Unknown: with an Application to Collusive Bidding Behavior in Canadian Softwood Timber Auctions*, mimeo University of Chicago (2004); John Asker, *A Study of the Internal Organisation of a Bidding Cartel*, 100(3) AMER. ECON. REV., 724-762 (2010); Robert Marshall & Leslie Marx, *The Vulnerability of Auctions to Bidder Collusion*, forthcoming in Q. J. ECON (2007).

information that is observed by all bidders, such as variables that influence cost or market power.

On the other hand, if firms collude, they are coordinating their bids. This coordination tends to destroy the independence of the bids and can be detected through the use of statistical hypothesis testing. Collusion is suspected when bids are “too correlated” with each other to be the result of independent actions by bidders.

Clearly identical bids would be flagged through this sort of screen as being “too correlated.” But, absent identical bids, how high should the correlation be among bids to raise suspicion? The answer is that “it depends” on typically several factors. But sometimes the correlation is so high, even perfect, that the likelihood of the correlation occurring without coordination is essentially zero. A famous example was seen in bids received by the Tennessee Valley Authority to install conductor cables in the 1950s. Seven firms submitted identical bids of \$198,438.24. The chances of seven bidders, acting independently, arriving at bids that agree to eight significant digits is statistically zero and thus offered a very strong signal that firms had explicitly or implicitly arrived at a mechanism for coordinating bids.

Porter & Zona (1993)⁴¹ utilized this type of screen in a case involving bids to supply school milk in Ohio between 1980 and 1990, although producing a less striking pattern than seen in the Tennessee Valley Authority case. In Ohio, firms submitted sealed bids for contracts to supply schools with pint-size portions of milk. The bidders were typically processors or distributors of milk with school milk typically representing less than 10 percent of their annual revenues. Based on evidence presented in court, Robert Porter and Douglas Zona argued that a bidder’s costs are easily explained by only a small number of variables, which are readily observed, and include the price of raw milk and transportation costs, which represent 7 percent of total costs. Competition in the school milk market is localized due to transportation costs, so firms that are close to a particular school have a cost advantage because of shorter delivery routes.

Porter and Zona constructed econometric models of submitting a bid and bid levels. Economic theory suggests that both decisions should depend on two factors. The first is costs, which the authors measured using data on the distance between a public school, the bidder’s location, and the number of deliveries made by the bidder. The second is local market power, which the authors controlled for by variables measuring the locations of competing firms. The first screen proposed by Porter and Zona examined the correlation in bidders’ entry decisions. After controlling for information that was publicly observed at the time of bidding, the authors found that the bidding decisions of some firms in the sample was too high to be explained by pure randomness, which supported the hypothesis that many accused colluders in fact coordinated their decisions to submit bids.

Next, Porter and Zona constructed econometric models that expressed bids as a function of costs (controlled for by the distance between a public school, the bidder’s location, and the number of deliveries made by the bidder) and local market power

⁴¹ Robert H. Porter & J. Douglas Zona, *Ohio School Milk Markets: An Analysis of Bidding* (NBER Working Paper No. 6037 (1997)).

(controlled for by variables measuring the locations of competing firms). Porter and Zona found that bids for the non-colluding firms were explained using these regression models while, in comparison, the bids of the alleged cartel members were too highly and persistently correlated to be explained by the data. The authors concluded that it was difficult to reconcile this high and persistent correlation in bids with the hypothesis that firms were bidding independently. This high degree of correlation is similar to a gambler in a casino who has “correctly guessed” which bet to place in roulette twenty times in a row. These events appear to be too improbable to have occurred at random.⁴²

C. Screening for Bid Prices That Are Disconnected from Costs or Other Market Factors

A key prediction of economic theory is that bids should closely reflect costs in reasonably competitive markets. The act of collusion, on the other hand, attenuates the relationship between bids and costs so that conspirators can earn profits above a normal competitive rate and prices do not tend to decrease when costs are reduced. Therefore, a second screen proposed in the literature is to determine how well bids reflect costs.

One example of such an attenuation between costs and bid prices as a marker of collusion was found in a concrete cartel operating under the direction of organized crime in New York City in the 1980s that rigged bids on contracts of over \$2 million. The distance between prices and costs for concrete in New York City was over 70 percent. This was compared to other large cities but the difference could not be explained by local market conditions. This marker, taken together with other structural factors facilitating collusion in this market, was highly suggestive that a cartel was in place.

In contrast with the example above, Bajari & Ye (2003)⁴³ examined bids by highway contractors in the upper Midwest during the 1990s and their findings indicated the data was inconsistent with collusion. This finding supported the belief from market observers in general that the industry was generally free of bid-rigging, despite that three firms had been previously convicted of collusion.

Bajari & Ye used bids for a type of road repair known as seal coating where the standard job in their data was fairly small—the winning bids were approximately \$175,000. State highway departments prepared cost estimates before bidding occurred and these estimates were largely based on bids made in other geographic markets. The study found that the ratio of the winning bid to cost estimate was almost equal to one with a fairly small standard deviation. The authors found that this suggested that bids were

⁴² Other studies have performed similar tests with similar results in markets where collusion is strongly suspected. This includes Porter & Zona’s (1993) analysis of paving contracts on Long Island in the 1980s, List et. al.’s (2004) examination of bids for Canadian timber, and Marshall & Marx’s (2008) study of bidding decisions for Russian Oil and Gas leases. Taken together, these papers demonstrate the usefulness of a screen that tests for the independence of bid submissions and bid levels. In the introduction, we argued that a good screen should have few false positives. Bajari & Ye (*infra*) demonstrate that this screen appears to have this property in their study of bidding by contractors in Minnesota, North Dakota, and South Dakota during the late 1990s.

⁴³ Patrick Bajari & Lixin Ye, *Deciding Between Competition and Collusion*, 85(4) REV. ECON. STAT., 971-989 (2003).

comparable to properly deflated bids from other markets and took this as evidence that most bids in the market were competitive.

In this market, distance and backlog were both important determinants of prices. When studying their relationships with bids, the authors found that bids increased with both these measures, which they considered to be consistent with competition. Next, the authors modeled firms' bids using regression analysis, using control variables such as the engineer's cost estimate, distance from the project, and backlog. The regression also controlled for competitive factors, such as the distance of the closest rival to the project. The models were separately estimated for each of the 11 largest firms in the market, which allowed the analysis of whether bids were determined differently across the firms. The authors then screened for collusion by comparing the regressions described above for pairs of firms.

The intuition behind the screen was simple; if firms A and B were not colluding, then their bids would only depend on cost and competitive factors; but, on the other hand, if firms A and B colluded, these (legitimate) factors alone could not explain their bids to a large extent. The authors found evidence consistent with collusion only for 2 out of the 11 firms studied; the same firms that were among the group previously sanctioned for bid-rigging.

Thus, if market factors such as costs are capable of explaining the levels of the bids for many of the bidders, but they seem to be unable to do so for a subgroup of the bidders, then this empirical evidence is indicative of possible bid-rigging. But it is important to control for other legitimate factors that may be common to that subgroup of firms and not to the remaining bidders, and which could potentially justify the empirical finding.

More generally, when analyzing whether bidding patterns are likely to be due to collusive behavior, one must realize that the failure to control for relevant components of costs or competitive factors may provide misleading empirical evidence in support of collusion.

D. Screening for Changes in Bidding Patterns That Are Unexplained by Market Conditions

When sudden changes in bidding patterns cannot be justified by legitimate changes in market conditions this may be indicative of bid rigging. A recent case pursued by the Mexican Competition Authority ("Commission") is an example of the success of this type of screening of bidding patterns. As discussed in Labarthe (2012),⁴⁴ the Commission has seen screens as an excellent tool to focus resources in particular investigations, but also to help provide evidence in cases.

This bid-rigging investigation started from an informal 2006 complaint by the Mexican Social Security Institute, which is Mexico's largest public medicine procurer. The screens employed by the Commission were based on improbable events as well as on control groups (among other interesting approaches) that were consistent with theoretical

⁴⁴ Carlos Mena-Labarthe, 2012, "Mexican Experience in Screens for Bid-Rigging," Antitrust Chronicle March (2).

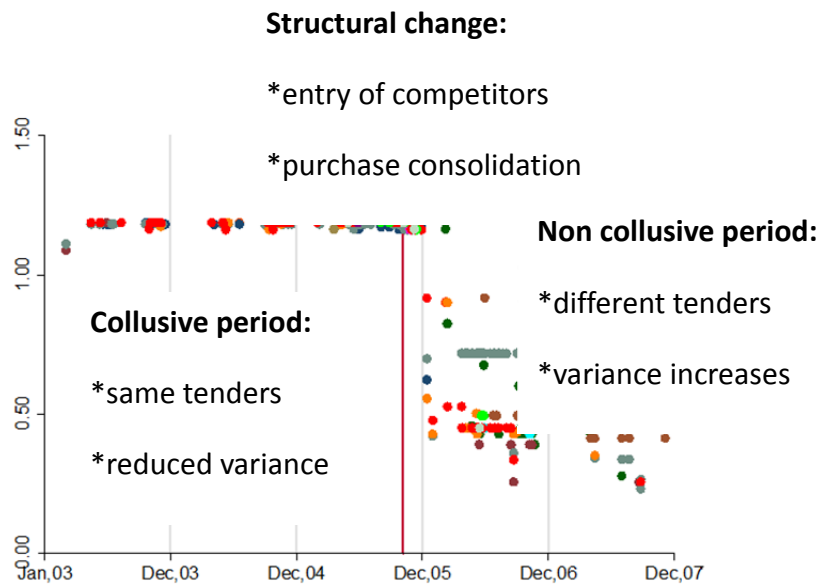
models of cartels. Data covered 2003 through 2007, and some of the patterns that emerged were highly suggestive of a cartel, especially in two groups of medicines: insulin and serum.

It was determined that the structural design of the process through which the IMSS acquired the medicines created incentives among pharmaceutical companies to collude in the sale of such products. These design elements included:

1. product homogeneity;
2. contract allocations to diverse bidders, which permitted the cartel members to divide the contract and designate certain cartel members as winners within a specific bid, allowing for the distribution of collusive earnings;
3. information exchange among bidders, which led to the cartel's ability to verify any variations in the agreed bids so that the cartel could punish aberrant cartel members in future bids;
4. permanent bid rules maintained through time, which stabilized the cartel agreements to set forth, agree, or coordinate tenders, so that the cartel members did not have to periodically redesign their agreement conducts; and
5. entry barriers which inhibited new bidders from taking part in the auctions.

Jointly with these structural factors, the Commission identified certain behavioral patterns through the time line directly related to the tenders of pharmaceutical companies. These patterns were deemed as preliminary evidence of the existence of cartels in public bids. The referred patterns included:

1. annual average of the winning and losing bids presented by the pharmaceutical cartel members was extremely similar and only changed with the entrance of a new winner or upon the consolidation of bids some years later;
2. average price was much higher during the years identified as the collusion period, sometimes 72 percent higher (see figure 1);
3. the bids were too similar to each other during the collusive period, while presenting significant variations during the non-collusive period;
4. a clear structural break occurred in the bidding process which could not be justified by legitimate conditions and which occurred at the end of the cartel (figure 1);
5. prices of winning and losing bids were always the same, with the only variations in the identity of the winner—which, after winning, kept participating but with losing bids, waiting for their turn to win again (bid rotation); and
6. the amount of the allocated contracts for each of the identified medicines was concentrated in the pharmaceutical companies involved in the cartel and, in some cases, the achieved portion for each was practically the same. Likewise, such participation rapidly converged in time, at the same level.

Figure 1. Medicine 1 average price 1⁴⁵

In a decision dated April 8, 2015,⁴⁶ the Mexican Supreme Court of Justice confirmed that Baxter, Fresenius, Eli Lilly, and Pisa laboratories engaged in monopolistic practices between 2003 and 2006 with regard to the public procurement of human insulin and intravenous solutions carried out by the Mexican Institute of Social Security (“IMSS”). Furthermore, the Supreme Court Ruling acknowledged the Commissions’ economic analysis as valid indirect proof in detecting cases of collusion, which is an important recognition of the value of screens in assisting in the proof of collusion. The screens were considered powerful evidence in court when the Commission defended its case. As Labarthe explains, “[w]hen we showed some graphics to our judges they were amazed and saw the whole picture clearly.”

Another example of a break of a bid-rigging cartel causing a drastic price drop that was unexplainable by legitimate market conditions is discussed in Abrantes-Metz, Froeb, Geweke and Taylor (2006).⁴⁷

Similarly, looking for bids that do not react in an expected way to changing market conditions is another way of screening for bid-rigging.

⁴⁵ Extracted from Labarthe (2012).

⁴⁶ COFECE 009-2015, “The Supreme Court of Justice Decides on Bid Rigging in Social Security Public Tenders Case,” April 2015.

⁴⁷ Abrantes-Metz, R., Luke M. Froeb, John F. Geweke and Chris T. Taylor “A Variance Screen for Collusion,” *International Journal of Industrial Organization*, 24, 467-486, 2006,

IV. THE USE OF STRUCTURAL ANALYSIS AND EMPIRICAL SCREENS AS PART OF AN “EFFECTIVE” COMPLIANCE PROGRAM

The Sentencing Guidelines state that an entity needs periodically evaluate the effectiveness of its compliance and ethics program.⁴⁸ There have been a number of Antitrust Division speeches specifically referencing this requirement, noting that a “company should regularly evaluate the compliance program itself to understand what it can improve.”⁴⁹ Deputy Assistant Attorney General Brent Snyder has elaborated that a company “should ensure that it has a proactive compliance program,” meaning that “in addition to providing training and a forum for feedback, a company should make sure that at risk activities are regularly monitored and audited.”⁵⁰ The United States Sentencing Guidelines also call for companies to conduct risk assessments.⁵¹ The concept here is that organizations have limited resources and need to focus those resources where the risk is greatest. This means that companies are expected to be proactive, determining both which risks are most likely to occur and which have the greatest potential impact and modify their compliance programs accordingly on a periodic basis.

Though there are several possible avenues to address these risks, as discussed in Abrantes-Metz, Bajari, & Murphy,⁵² screens are a key option to be considered. Screens identify the areas of a business that are high-risk and therefore allow for efficient and strategic targeting of those areas, allowing for a more efficient allocation of resources. Specifically, screens employ techniques designed to highlight which parts of the company merit closer scrutiny, where there should be intensive reviews, and which units may call for intensive monitoring of internal communications and the like. Empirical screens fulfill this role by looking at certain quantifiable red flags and applying statistical analysis to determine the priority areas for further focus. While screens cost money, in the end they can potentially save the corporation a whole lot more than their cost.

Going forward, the effectiveness of compliance programs will be judged according to a higher standard than they have been previously. As companies become increasingly able to amass and mine data, it soon could be expected that such capabilities are utilized to monitor and test the effectiveness of compliance programs. Therefore, a failure to set up an effective screen may be seen as falling below this standard, especially for sophisticated corporate entities. In fact, the OECD has already noted the benefits of economic screening as a means of strengthening a compliance program, particularly in high-risk industries.⁵³

⁴⁸ Federal Sentencing Guidelines Manual § 8B2.1(b)(5)(B) (2014) (“The organization shall take reasonable steps . . . to evaluate periodically the effectiveness of the organization’s compliance and ethics program.”).

⁴⁹ Brent Snyder, Deputy Assistant Attorney General, Antitrust Division, Remarks as Prepared for the International Chamber of Commerce/United States Council of International Business Joint Antitrust Compliance Workshop, *Compliance is a Culture, Not Just a Policy* 6 (Sept. 9, 2014), <http://www.justice.gov/atr/public/speeches/308494.pdf>.

⁵⁰ Id.

⁵¹ U.S. Sentencing Guidelines Section 8B2.1(c).

⁵² Abrantes-Metz, Bajari, & Murphy, *supra* note 33.

⁵³ OECD, Background Note by the Secretariate, in *Ex Officio Cartel Investigations and the Use of Screens to Detect Cartels* 19, DAF/COMP(2013)27 (citations omitted) (citing various Abrantes-Metz papers, among

There is another immediate and practical reason for adopting screens as part of a compliance program. A compliance program, with the use of screening, helps position a company to win a race for leniency. A leniency program offers tremendous benefits to implicated companies, potentially permitting them to avoid liability altogether if certain requirements are met. Even if a company fails to qualify for leniency because it is not the first in the door, the DOJ considers “early acceptance of responsibility and meaningful cooperation” in determining the appropriate consequences.⁵⁴ Given the scores of enforcement regimes that have similarly adopted leniency programs, or that otherwise heavily credit early cooperation, such detection offers tremendous benefits. And, as noted earlier, in the course of uncovering a bid-rigging scheme, a company may also be able to uncover bribery conduct. Such early detection may allow them to remediate or seek mitigation from the relevant anti-corruption enforcer(s) in a timely manner. The ability to be the first to detect the conduct offers tremendous advantages to both companies and enforcers.

Beyond their utility to detect anti-competitive or corrupt schemes, screens can serve as a powerful tool for deterrence. Once knowledge of their implementation spreads, the existence screens alone can have a chilling effect on would-be offenders. And, in the words Benjamin Franklin, “an ounce of prevention is worth a pound of cure.”

others) (noting that the “implementation of screens as part of compliance programmes can be especially effective because the screening exercise can rely on internal company data which is not necessarily always available to competition agencies”), *available online at* <http://www.oecd.org/daf/competition/exofficio-cartel-investigation-2013.pdf>.

⁵⁴ Bill Baer, Assistant Attorney General, Antitrust Division, DOJ, Remarks as Prepared for the Georgetown University Law Center Global Antitrust Enforcement Symposium 5-6 (Sept. 10, 2014), *available online at* <http://www.justice.gov/atr/public/speeches/308499.pdf>.