

Collusive Strategies in EC Cartel Cases and Implications for Antitrust Compliance Programs*

Rhea Padival[†]

Divya Srinivasan[‡]

November 9, 2019

Abstract

We review 33 European Commission decisions for cartel cases and analyze the various methods by which cartels carry out collusion, and the relation between these methods and the cartel duration. Based on these observations, we aim to provide guidance for the design of antitrust compliance programs. Our findings suggest that antitrust compliance programs should not be too hasty in dismissing the possibility of large cartels. They should be attentive to bilateral communication taking place between competitors and also the involvement of senior management.

Keywords: collusion, price fixing, antitrust compliance

JEL Classification: L41

*We thank Charlie Becker, Leslie Marx, and Edward Tower for helpful comments.

[†]Duke University. Email: rhea.padival@duke.edu. Rhea Padival is working as Product Manager at Velcro USA.

[‡]Duke University. Email: divya.srinivasan@duke.edu. Divya Srinivasan is an Associate Consultant at Ernst and Young LLP.

1 Introduction

Despite the efforts of enforcement agencies in the United States, Europe, and elsewhere to deter illegal price fixing conspiracies, cartels continue to be uncovered. For example, Ghosal and Sokol (2014) describe the evolution of U.S. cartel enforcement, and Wils (2016) describes the European experience. Neither, however, offers hope that enforcement efforts have been sufficient to deter collusive conduct going forward.

Given questions about the effectiveness of prosecutions, including fines and jail time, enforcement agencies have responded with an increased emphasis on antitrust compliance programs (see, e.g., the 2014 speech by U.S. Department of Justice Deputy Assistant Attorney General Brent Snyder). These are internal programs within firms designed to educate employees about the illegality of collusive conduct. Although the introduction of the leniency programs both in the United States and the European Union has helped to reveal the existence of several cartels, as described by Snyder (2014) as well as Wils (2016), the goal is to prevent antitrust violations in the first place. The hope is to promote that goal by encouraging compliance programs. As an incentive for firms to implement internal antitrust compliance programs, under the current U.S. Sentencing Guidelines, it is now possible for a company to obtain up to a three-point reduction in its culpability score as credit for an effective compliance and ethics program (Snyder, 2014).

As recognized by Snyder (2014), the design of an effective antitrust compliance program must account for the nature and structure of the firm using it. In this paper, we provide guidance for the design of antitrust compliance programs by analyzing how cartels are structured and what types of communications cartels have used to support their illegal conduct.

In order to be fully effective, antitrust compliance programs should be to deter collusion first, rather than to detect anticompetitive behavior after it has taken place. Implementation of such programs at the company level start with the top management and Board of Directors of companies, who lead by example and create an environment within the company that discourages collusion. If the top management themselves engage in anticompetitive behavior, no compliance schemes, however well structured, are likely to be effective in preventing collusion in the first place.

To inform the design of antitrust compliance programs, we analyze 33 European Commission (EC) decisions in cartel cases from 2010 to 2018. Two of our key observations are (1) authorities and antitrust compliance programs should not dismiss the possibility of large cartels, and (2) even bilateral contacts can sustain cartel conduct, although group meetings seem to be more effective. Thus, antitrust compliance programs would need to address the potential dangers of both large group meetings and bilateral communications.

The remainder of the paper is organized as follows: In Section 2, we describe our data

and methods. In Section 3, we present results. In Section 4, we conclude.

Related Literature

There is a related literature on how cartels operate, including other examinations of the EC decisions in cartel cases. Much of this literature draws on Stigler (1964) for its foundations. Here we highlight key papers in the literature that focus on lessons to be drawn from the EC decisions.

Marshall and Marx (2012) provide an organization of a subset of EC decisions according to whether the cartel organization relies on consumer, geographic, or market share allocations. Levenstein and Suslow (2006) describe the variety of cartel structures that ultimately can lead to the successful elevation of prices above what they otherwise would have been. Harrington (2006) reviews the collusive strategies used by 20 EC decisions in cartel cases and distills a number of collusive strategies used by these cartels, including punishment methods, frequency of meetings, and other collusive structures.

There is also a related literature on cartel enforcement. Ghosal and Sokol (2014) show the evolution of cartel enforcement in the U.S. Snyder (2014) talks about compliance and the importance of companies, especially the senior management, enforcing effective compliance mechanisms. Wils (2016) provides an assessment of the success of leniency as an enforcement tool from the European perspective.

2 Data and methods

The EC decisions in cartel cases that we examine in this study were investigations conducted between the years 2010–2018. For each of the cases, we collected the following information: duration of the cartel, size of the cartel, whether there were in-person meetings involving 3 or more firms, whether only bilateral communication was used, whether the cartel used secret code names to disguise interactions, what level of management was involved, and whether the cartel was detected through a leniency application.

We analyze the 33 EC decisions available on the EC website between the years 2010 and 2018. While selecting the cases for our analysis, we omit those involving financial services in order to have a more homogeneous sample of physical products. These cases provide evidence of the spectrum of methods cartels utilized to enable stability in the context of conducting illegal collusive activities.

We study and summarize the information from each of the cases. In order to understand the relations among the variables, we coded the variables numerically, and we analyzed a variety of descriptive statistics and regressions. The variables that represent

the presence of a qualitative attribute were coded as 1. We have used OLS and have not made specific adjustments for endogeneity.

The numerical values that we assign to the variables are shown in Table 1.

Table 1: List of variables

Variable	Interpretation
cartel duration	duration of cartel in years
cartel size	number of cartel members
used code name	0: did not use code names; 1: otherwise
bilateral communication	0: bilateral communication only; 1: otherwise
meeting held	0: no meetings; 1: otherwise
middle & lower management	0: middle & lower mgt not involved; 1: otherwise
senior & board level	0: senior & board level not involved; 1: otherwise
leniency application filed	0: no leniency application filed; 1: otherwise

We focus on the variables listed above because they cover the methods of communication and coordination within the cartel and they potentially provide insights as to which methods or circumstances contribute to cartel duration and cartel detection.

The information distilled from the cases is summarized in Table 2.

3 Results

Is detection a result of a leniency application?

A question of interest arises whether there is a relationship between the number of years and the detection of the cartel. Is there a causal relationship? More importantly, was the leniency application the biggest reason behind the European commission detecting these cartels? Based on the data collected and the cases that were investigated between 2010 and 2018, there were only 3 cartels detected based on an investigation of the European commission. These cases were Animal Feed Phosphates (34 years, the longest duration in the data set), CRT Glass Bulbs (5 years), and Paper Envelopes (5 years).

This is consistent with Wils' (2016) observations regarding leniency that the Commission relies on leniency applications to detect cartels and that even multi-decade cartels need not be vulnerable to being disrupted by a leniency application. It is also consistent with the EC's offers to participants who file a leniency application of total immunity or substantial reductions in fines.

Table 2: Cartel data summary

Case Name	No Code Name Utilized	Bilateral Communication	Meeting Held	Involvement of Senior & Board	Cartel Duration	Cartel Size	Leniency Application
Prestressing steel	1	0	0	0	18	17	1
Animal feed phosphates	1	1	1	0	34	5	0
Airfreight	1	1	1	1	7	14	1
LCD	1	1	1	1	5	5	1
Refrigeration compressors	1	1	1	0	3	5	1
CRT glass bulbs	1	1	0	0	5	3	0
Exotic fruit (bananas)	1	0	0	0	0	2	1
Consumer detergents	1	1	1	0	3	2	1
TV and computer monitor tubes	1	1	0	0	10	7	1
Water management products	1	0	0	0	2	3	1
Freight forwarding	0	1	0	0	5	14	1
Shrimps	1	0	0	0	9	4	1
Automotive wire harnesses	1	1	1	0	8	4	1
Paper envelopes	0	1	0	1	5	5	0
Steel abrasives	1	1	1	0	4	1	1
Mushrooms	1	1	1	1	1	3	1
Power cables	1	1	1	0	6	21	1
Power exchanges	1	1	0	1	0	2	1
Automotive bearings	1	1	0	0	7	6	1
Polyurethane foam	1	1	0	1	5	10	1
Optical disc drives	1	0	0	0	4	8	1
Blocktrains	1	1	0	0	8	3	1
Parking heaters	1	1	0	1	10	2	1
Retail food packaging	1	1	0	0	7	10	1
Rechargeable batteries	1	1	1	0	3	4	1
Trucks	1	1	0	1	14	5	1
Steel abrasives	1	1	0	0	4	1	1
Occupant Safety Systems	1	1	0	0	6	5	1
Lighting Systems	1	1	0	0	3	3	1
Thermal systems	1	1	0	0	5	6	1
Maritime car carriers	1	1	0	0	6	5	1
Spark Plugs	1	0	0	0	11	3	1
Braking Systems	1	1	1	0	4	3	1

Is it hard to organize a large cartel?

Turning our attention to the relation between various variables and cartel duration, we show the relation between cartel duration and the number of cartel members in Figure 1. The vertical axis denotes the number of years of existence of the cartel and the horizontal axis denotes the number of conspirators within the cartel.

Each dot that you can see represents the number of years a cartel has lasted based on the numbers of conspirators the cartel consists of. The positive slope is an indicator that duration of a cartel is increasing despite there being a greater number of conspirators.

As can be seen in Table 3 and Figure 1, the coefficient on the number of conspirators is positive. This could mean that contrary to the belief, a greater number of participants in a cartel does not necessarily lead to the duration of the cartel being cut short. This will be further discussed in the next section.

With our small sample, the coefficient on cartel size is not statistically significant. This is a common problem for this kind of study because there are a limited number of

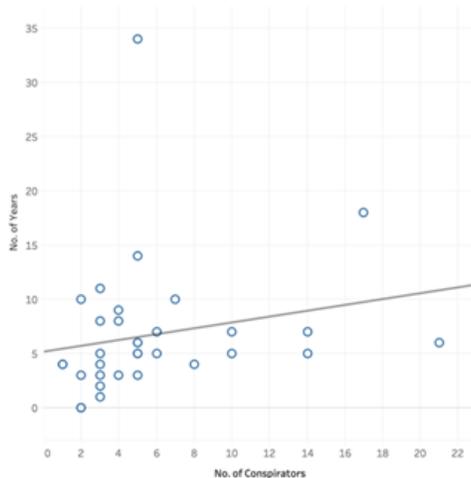


Figure 1: Relation between Cartel Duration and Cartel Size.

Table 3: Regression of Cartel Duration on Cartel Size.

Cartel Duration	Coefficient	P-value
Cartel Size	0.269	0.253
Constant	5.167	0.005

detailed EC cartel decisions to work with and no corresponding detailed U.S. decisions. Until time passes and more of large cartels are discovered and prosecuted, and their workings detailed, there remain limits on the available data. We use the data that we have collected to see what lessons might emerge, and what might be done with larger data sets in the future. A potentially fruitful agenda for future research involves expanding the sample size to test the robustness of our results.

With additional data, one could consider approaches to address the endogeneity concern that a longer lasting cartel might be larger simply because more firms are added to the cartel over time. Data on the evolution of the cartel size over time might help to distinguish effects. In addition, another endogeneity issue is that if it is harder to organize a larger group of colluding firms, then such a cartel might invest in more robust collusive structures to overcome these concerns, ultimately resulting in a longer lasting cartel. One way to investigate this would be to look for evidence that cartels engaged a third-party facilitator to help manage the cartel and then control for this effect.

Investigation other factors that may affect the duration of a cartel

In order to understand the effect other variables may have on the cartel duration, we regress the number of years of a cartel’s duration on the following variables: cartel size,

bilateral communication, meeting held, and involvement of senior level & board members. The results are in Table 4.

Table 4: Factors contributing to cartel duration.

Cartel Duration	Coefficient	P-Value
Cartel Size	0.264	0.286
Bilateral Communication	-0.576	0.859
Meeting Held	0.628	0.806
Senior & Board Level	-1.008	0.713
Constant	5.704	0.070

Table 4 shows not only that there is a positive coefficient of the number of conspirators, but also that there is a negative coefficient of the involvement of senior level and board members. This tells us that when senior management is involved, there is higher likelihood for a cartel to be discovered. Also, the negative coefficient with the bilateral communication tells us that cartels that rely solely on bilateral communication tend to have a shorter duration, holding fixed other factors.

As with Table 3, with our small sample none of the coefficients is statistically significant. As mentioned above, a potentially fruitful agenda for future research involves expanding the sample size to test the robustness of our results. Additional data would potentially allow one to address endogeneity concerns related to whether greater communication and high-level involvement follow from the long-lasting nature of a cartel or rather cause that long duration.

4 Discussion

Key Result #1: Do not dismiss the possibility of large cartels

It has historically been perceived that a cartel that has a greater number of participants would be easier to detect. In fact, Baker (2002) argues that economists have relied on “dinner party stories” that argue that it would be easier to detect a larger cartel because collusion and organizing the cartel becomes more difficult. This is interesting in light of arguments that larger cartels are more fragile, which suggests that we might expect a negative and significant coefficient.

Our analysis, however, of the EC cartel cases helped us identify a few trends. Firstly, the relation between the number of conspirators and the duration of the cartel: the more conspirators there are, the longer the cartel is likely to last. An average cartel lasts 5–7 years, but cartels with a very large number of members lasted much longer than cartels with fewer members.

For instance, Prestressing Steel had 17 conspirators and lasted 18 years. When looking at the Animal Feed Phosphates case, it lasted 34 years with 11 conspirators. In the Water Management Products Case, however, there were only 3 conspirators and the cartel only lasted for 2 years. Several instances can test the strength of a cartel like cheating and internal conflict among members and it may seem like these conflicts are more likely to arise when there are more participants in the cartel. Larger cartels can be perceived as more difficult to manage and sustain over a long time. As highlighted by Wils (2016), mechanisms to monitor and maintain consistent behavior and discourage cheating and rewards and punishments need to be put in place. A more complex hierarchy and organizational structure can potentially make a cartel harder to maintain.

However, as seen in table 3, when running a regression on the cartel duration on the cartel size (although insignificant), the coefficient of the cartel size is positive and close to significant.

This suggests that it is best to be cautious while dismissing the possibility of the existence of a cartel simply because the number of members is “too large.” An effective antitrust compliance program must ideally deter the formation of such cartels altogether, and reveal existing cartels sooner. The impact of large cartels on competition in an industry is adverse, and it is damaging if collusion continues for a long period of time without being detected.

Key Result #2: Bilateral communication alone may not be sustainable

To quote Marshall and Marx (2012, pp. 9–10), “[A] fundamental question remains—what do communication and/or transfers allow firms to accomplish in terms of increased profitability that they could not accomplish otherwise? The converse question may be easier to link to the case histories of cartels—if one removes communication and transfers from inter-firm interaction, does firm conduct become more competitive and do profits fall?”

Based on a regression run on the duration on the cartel with independent variables being number of conspirators, bilateral communication, meetings and management involved, the bilateral communication variable is accompanied by a negative coefficient. This tells us that if the cartel members were only relying on bilateral contacts, the duration of the cartels was shortened. For instance, the Water Management Product cartel had 3 participants who exchanged commercially sensitive information bilaterally, and the cartel only lasted from June 2006 to May 2008. The Optical Disc Drives cartel also only had a network of bilateral contacts among the 8 members and lasted from June 2004 to November 2008.

This shows that for a cartel to last longer, the firms might have to engage in more

multilateral communications, including emails, phone calls and meetings. Possible reasons why some cartels only wish to engage in bilateral communications are that they attract less attention from the authorities and they are also easier to coordinate. It is common for multilateral meetings to take place on the pretext of a trade association meeting or conference, where conspirators meet at venues like airport lounges, restaurants, or hotels during the conferences. At times, trade associations may be formed for assisting collusion and giving the participants a chance meet on the fringe of trade association meetings.

Key Result #3: Cartels can be detected more easily with the involvement of senior leaders

Another trend we identified was that the involvement of the Senior Management was associated with a shorter duration before detection by the antitrust authorities. In 8 out of 33 cartel cases that were analyzed, there is involvement of Middle and Senior Management, or the Board of Directors. Our hypothesis is that the easier detection can take place because of the greater scrutiny that senior leaders and the Board of Directors come under because of their influence on key decisions and changes in the company. In contrast, junior level executives managing the cartel by themselves might be easier to sustain over a long period of time.

This can be backed with the regression shown in Table 5, wherein cartel duration is the dependent variable and “management involved” was the independent variable. As you can notice, the coefficient for “management involved” is negative. This shows that when there is senior management involved, the number of years a cartel can exist decreases.

Table 5: Regression of Cartel Duration on Management Involvement. $N = 33$. $R^2 = 0.0063$.

Cartel Duration	Coefficient	P-value
Management Involved	-1.125	0.661
Constant	7.000	0.000

5 Conclusion

In spite of the efforts undertaken by enforcement agencies to deter collusion and price fixing, cartels continue to operate around the world and their existence often goes undetected. Agencies like the U.S. DOJ and the EC have their procedures for prosecution including fines and imprisonment but there is an increasing emphasis on antitrust compliance programs, to be adopted within firms to deter collusion before it even begins. This was suggested in the 33 EC cartel cases that we analysed, in order to better understand the various methods by which cartel members engage in collusion.

Our key observations were: antitrust authorities and compliance programs should not dismiss the possible existence of a cartel solely because the number of participants is large; while bilateral contacts by themselves are enough to sustain a cartel, group meetings seem more effective; cartels can be detected more easily when the senior management is involved.

One topic that we would like to do more research on in the future is what happens to these companies and industries after a cartel is detected and broken up and the fines are paid. Do these companies re-form the cartel? Do they continue breaching antitrust laws in a different way? Do they use legal measures like mergers and acquisitions to still try to suppress rivalry? Does transparency between companies contribute or actually hinder the long term sustainability of these cartels? If companies did not share too much information and rather just stay away from each others markets, would this protect the cartel? These are some of the questions that we would like to find more information on in the future.

A Appendix: EC decisions considered

The following list contains the EC cartel cases that we analyzed, including the name of the case, case number, description of the product which the cartel was formed for, and the link on each case on the EC website.

1. Prestressing Steel, COMP/38344, Metal wires and strands made of wire rod: http://ec.europa.eu/competition/antitrust/cases/dec_docs/38344/38344_5856_3.pdf
2. Animal Feed Phosphates, Chemical compounds of phosphorus used to balance phosphorus and calcium contents of feed for animals: http://ec.europa.eu/competition/antitrust/cases/dec_docs/38866/38866_1676_3.pdf
3. Airfreight, COMP/39258, Airfreight transport services: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39258/39258_7008_7.pdf
4. LCD, COMP/39309, Liquid crystal display panels: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39309/39309_3643_4.pdf
5. Refrigeration compressors, COMP/39600, Refrigeration compressors: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39600/39600_2147_3.pdf
6. CRT glass bulbs, COMP/39605, Glass supplied to manufacturers of Cathode Ray Tubes: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39605/39605_2700_3.pdf
7. Exotic fruit (bananas), COMP/39482, Bananas: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39482/39482_3130_4.pdf
8. Consumer detergents, COMP/39579, Laundry detergents: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39579/39579_2633_5.pdf
9. TV and computer monitor tubes, COMP/39437, TV and computer monitor tubes: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39437/39437_6784_3.pdf
10. Water management products, COMP/39611, Water management products: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39611/39611_2354_3.pdf
11. Freight forwarding, COMP/39462, Organisation of transportation of items: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39462/39462_6408_3.pdf
12. Shrimps, AT.39633, Shrimps: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39633/39633_2636_9.pdf

13. Automotive wire harnesses, AT.39748, Assembly of cables transmitting signals linking computers to various components: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39748/39748_3911_5.pdf
14. Paper envelopes, AT.39780, Paper envelopes: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39780/39780_3528_6.pdf
15. Steel abrasives, AT.39792, Loose steel particles used for cleaning or enhancing metal surfaces: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39792/39792_2603_3.
16. Mushrooms, AT.39965, Canned mushrooms: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39965/39965_1431_7.pdf
17. Power cables AT.39610 Cables used for transmission and distribution of electrical power http://ec.europa.eu/competition/antitrust/cases/dec_docs/39610/39610_9899_5.
18. Power exchanges AT.39952 Services provided by power exchanges to facilitate trading of spot electricity products http://ec.europa.eu/competition/antitrust/cases/dec_docs/39952/39952_1517_5.pdf
19. Automotive bearings AT.39922 Automotive bearings http://ec.europa.eu/competition/antitrust/cases/dec_docs/39922/39922_2067_2.pdf
20. Polyurethane foam, AT.39801, Flexible polyurethane foam: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39801/39801_2468_8.pdf
21. Optical disc drives, AT.39639, Optical disc drives used in Personal Computers produced by Dell and HP: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39639/39639_3631_8.
22. Blocktrains, AT.40098, Rail cargo transport services in connection with blocktrains: http://ec.europa.eu/competition/antitrust/cases/dec_docs/40098/40098_827_7.pdf
23. Parking heaters, AT.40055, Fuel-operated parking heaters and fuel-operated auxiliary heaters for cars and trucks: http://ec.europa.eu/competition/antitrust/cases/dec_docs/40055/40055_713_11.pdf
24. Retail food packaging, AT.39563, Polystyrene foam and polypropylene rigid trays used for packaging food: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39563/39563_6945_3.pdf
25. Rechargeable batteries, AT.39904, Rechargeable lithium-ion batteries: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39904/39904_1110_5.pdf

26. Trucks, AT.39824, Trucks: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39824/39824_6567_14.pdf
27. Steel abrasives, AT.39792, Loose steel particles used for cleaning or enhancing metal surfaces: https://ec.europa.eu/competition/antitrust/cases/dec_docs/39792/39792_2737_3.pdf
28. Occupant Safety Systems, AT.39881, Seatbelts, airbags and steering wheels: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39881/39881_2123_5.pdf
29. Lighting Systems, AT.40013, Headlamps, daytime running lights, rear lights, fog lights and auxiliary lights: http://ec.europa.eu/competition/antitrust/cases/dec_docs/40013/40013_1084_2.pdf
30. Thermal systems, AT.39960, Climate control components and engine cooling components for passenger cars: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39960/39960_2370_3.pdf
31. Maritime car carriers, AT.40009, Provision of deep-sea car carriage of new motor vehicles: http://ec.europa.eu/competition/antitrust/cases/dec_docs/40009/40009_2427_7.pdf
32. Spark Plugs, AT.40113, Spark Plugs: http://ec.europa.eu/competition/antitrust/cases/dec_docs/40113/40113_987_3.pdf
33. Braking Systems, AT.39920, Hydraulic braking systems and electronic braking systems: http://ec.europa.eu/competition/antitrust/cases/dec_docs/39920/39920_738_3.pdf

References

- BAKER, J. B. (2002): “Mavericks, Mergers, and Exclusion: Proving Coordinated Competitive Effects Under the Antitrust Laws,” *New York University Law Review*, 77, 135–203.
- GHOSAL, V. AND D. D. SOKOL (2014): “The Evolution of U.S. Cartel Enforcement,” *Journal of Law and Economics*, 57, S51–S65.
- HARRINGTON, JR., J. E. (2006): “How Do Cartels Operate?” in *Foundations and Trends in Microeconomics*, Essence of Knowledge, vol. 2, 1–105.
- LEVENSTEIN, M. C. AND V. Y. SUSLOW (2006): “What Determines Cartel Success?,” *Journal of Economic Literature*, 44, 43–95.
- MARSHALL, R. C. AND L. M. MARX (2012): *The Economics of Collusion: Cartels and Bidding Rings*, MIT Press.
- SNYDER, B. (2014): “Compliance is a Culture, Not Just a Policy,” Remarks as Prepared for the International Chamber of Commerce, United States Council of International Business Joint Antitrust Compliance Workshop, September 9, 2014, New York, NY.
- STIGLER, G. J. (1964): “A Theory of Oligopoly,” *Journal of Political Economy*, 72, 44–61.
- WILS, W. P. J. (2016): “The Use of Leniency in EU Cartel Enforcement: An Assessment after Twenty Years,” *World Competition*, 39, 327–388.