

EU Business Law Working Papers

1/2019

**Initial Thoughts on Influence of
Artificial Intelligence on Bid Rigging**

Mária T. Patakyová

Széchenyi István University | Faculty of Law and Political Sciences

Centre for European Studies

Győr

ISSN 2631-0348

ces.sze.hu

Initial Thoughts on Influence of Artificial Intelligence on Bid Rigging

Mária T. Patakyová

1. Introduction	2
2. Bid rigging	3
2.1. Bid rigging as a form of horizontal agreements.....	4
2.2. Bid rigging and its enforcement.....	5
3. Algorithms and Artificial Intelligence.....	5
3.1. AI and algorithms as a tool for detection	5
3.2. AI and algorithms as a tool for collusion.....	6
3.2.1 Four categories of collusion with the help of computers	7
3.2.2 Bid rigging with the help of computers.....	7
4. Conclusion.....	8
References	8

Initial Thoughts on Influence of Artificial Intelligence on Bid Rigging *

Mária T. Patakyová **

Abstract:

Collusions within a public procurement procedure have a significant effect on both proper functioning of competition and proper outcome of the procurement procedure. This paper aims to elaborate on the role of artificial intelligence within bid rigging. It shortly presents how algorithms may mitigate investigations conducted by competition authorities. On the other hand, the paper briefs on difficulties which might be brought into competition law enforcement by application of algorithms and artificial intelligence by undertakings. The initial thoughts on these issues discussed in this paper are that artificial intelligence has both positive and negative effects on the bid rigging enforcement.

Keywords:

competition law, horizontal agreements, 101 TFEU, bid rigging, artificial intelligence, algorithm

1. Introduction

The world has been significantly changing over the past few decades. Computers have been able to shift our personal and professional work to a completely new perspective. I am writing this paper on a notebook, as a document saved on a cloud. You probably find this paper through an online research engine using some key words which were then processed by the engine. Meanwhile, we are both checking our omnipresent smartphones.

Technology has a tremendous impact on a way how business is done. Human beings are being replaced by algorithms and artificial intelligence. This may lead to higher efficiency and, consequently, to lower prices for products and services. On the other hand, it creates a space for easier commitment of prohibited activities.

One piece of such prohibited activities is discussed in this paper. Cartels represents one of the most severe infringement of competition law. It leads to an increase of prices and it is very difficult to discover. The negative consequences of cartels are more complex when it comes to horizontal agreements in tendering procedures. Bid rigging has destroying effects on both the level of competition and the outcome of public procurement.

* This article was supported from a Grant project of "Agentúra na podporu výskumu a vývoja v rámci projektu č. APVV-17-0641 "Zefektívnenie právnej úpravy verejného obstarávania a jej aplikácie v kontexte práva Európskej únie"."

This article was partially presented on the conference "EU Business Law through the lens of Digital Revolution" 2nd EU Business Law Forum held in Centre for European Studies of Faculty of Law and Political Sciences of the Széchenyi István University, Győr, Hungary, 14 June 2019.

** Assistant professor at Institute of European Law, Faculty of Law, Comenius University in Bratislava, Slovakia, maria.patakyova2@flaw.uniba.sk.

This article deals with positive and negative effects of use of algorithms and artificial intelligence in relation to bid rigging. In particular, the paper zooms in on methods of competition law enforcement using new technologies, especially in relation to public procurement. Apart from the use of artificial intelligence as a tool for detection, the artificial intelligence is analysed as a tool which ease collusion.

In order to discuss these issues, the paper is organised as follows. First, bid rigging as a form of horizontal agreement is briefly presented. Subsequently, the algorithms and artificial intelligence are discussed, as assistants for investigation as well as assistants for collusion. Concluding remarks are presented in the conclusion.

2. Bid rigging

Horizontal agreements are prohibited by competition law. Article 101 para. 1 TFEU stipulates as follows:

“The following shall be prohibited as incompatible with the internal market: all agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between Member States and which have as their object or effect the prevention, restriction or distortion of competition within the internal market, and in particular those which:

(a) directly or indirectly fix purchase or selling prices or any other trading conditions;

(b) limit or control production, markets, technical development, or investment;

(c) share markets or sources of supply;

(d) apply dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage;

(e) make the conclusion of contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.”

In other words, any agreement which distorts competition on the market is prohibited. It is possible that a prohibited agreement is exempted by a general block exemption regulation or by Article 101 para. 3 TFEU.

Furthermore, this type of agreements is also prohibited by national law. Taking Slovak law under scrutiny, Section 4 of Act No. 136/2001 Coll. on protection of competition, as amended, prohibits anti-competitive agreements as well. The Slovak regulation is *de iure* and *de facto* very similar to the EU regulation.¹

As it flows from the wording cited above, agreements can have two forms – by object and by effect. The prohibition of by object agreement is rather self-explanatory. It means that the agreement has as its very

¹ Mária Patakyová, “Vplyv Európskej únie na legislatívu Slovenskej republiky v oblasti hospodárskej súťaže” (Conference Mílniky práva v stredoeurópskom priestore, Častá-Papiernička, 2015), 124.

purpose to prevent, restrict or distort competition. In general, letters a), b), and c) from the quotation above is considered to address by object agreements.² Bid rigging is also a type of by object agreement.³

The other type of agreements requires rather detailed analysis of the agreement's effects on the market. Although a presentation of certain economic thoughts is required in a decision fining by object agreement too, the detail required in a decision prohibiting by effect agreement is on a different level.⁴

Moving on to the procedural aspects of competition law, it must be underlined that cartels are truly difficult to spot and enforce. The undertakings involved in a cartel agreement are usually aware that they are committing an illegal pursuit, which explains their intention to hide all the possible evidence. There are several ways on how to detect a cartel. To mention but two, first, competition authorities have at their disposal strong investigatory powers. Right to perform inspection is a very effective, yet highly controversial investigatory tool.⁵ Second, competition authorities may be given a helping hand by a whistle-blower. Under the leniency program, one party of a cartel agreement "*blows a whistle*", in other words approaches the competition authority by giving them evidence on the existence of cartel. The whistle-blower is then pardon from a part or whole of the fine for the cartel.⁶

2.1. Bid rigging as a form of horizontal agreements

Zooming in on cartels in procurement procedures, bid rigging is considered to be a hard-core cartel. Even more, it may be understood as one of the most serious form of competition law infringements, as it destroys both the competition on the market and the incentives under public procurement law. The goal of efficient spending of public money comes into vain.

From a practical point of view, bid rigging is usually hidden from the sight of the authorities. The undertakings agree among themselves who would be the winning participant in the particular procurement. In order to cover their behaviour, there is usually more participants in the tendering procedure, therefore, there is not only the intended winner involve. Rather the opposite, it appears at first glance that undertakings compete against each other, whereas in reality the winner is set in advance and the other participants put so called cover bids into the process.⁷

The principle of rotation may be based on various factors. For example, the geographic division of market may be implemented in this manner.

² Richard Whish and David Bailey, *Competition Law* (7th edn, Oxford University Press, 2012), 124.

³ Katarína Kalesná, "Tendrové kartely a ich špecifiká" (Conference Aktuálne otázky súťažného práva v Európskej únii a na Slovensku, Bratislave, 2015), 23, 30.

⁴ Mária Patakyová, "Cieľové vertikálne dohody" (Conference Aktuálne otázky súťažného práva v Európskej únii a na Slovensku, Bratislave, 2015), 59.

⁵ See, for instance: A. Steen "Nexans, Deutsche Bahn, and the ECJ's Refusal to Follow ECHR Case Law on Dawn Raids" (2016) 7 *Journal of European Competition Law & Practice*, 180.

⁶ Richard Whish and David Bailey, *Competition Law* (7th edn, Oxford University Press, 2012), 281.

⁷ Katarína Kalesná, "Tendrové kartely a ich špecifiká" (Conference Aktuálne otázky súťažného práva v Európskej únii a na Slovensku, Bratislave, 2015), 23, 27.

In any case, the breaking point of a cartel lies in the participants. It is assumed that there is a need for a majority of tenderers to collude, otherwise the bid rigging will be inefficient.⁸

2.2. Bid rigging and its enforcement

Cartels related to tendering procedures may have several forms. All of them are usually well hidden and difficult to spot. Giannino presents a way on how to detect and investigate a bid rigging.⁹ A competition authority may detect certain abnormalities on the market, which may lead to a suspicion that a cartel has taken place. Subsequently, external evidence is searched in order to support the suspicion. The existence of the cartel may also be supported by internal evidence, for example by decision making procedure within an undertaking concerned. If the undertaking participated in certain public procurements, but not in the other, which were the reasons for its absence in the latter and not in the former? Last but not least, there is always a room for undertaking's defence, in which the undertaking may present reasons for its activity (or lack of it).¹⁰

3. Algorithms and Artificial Intelligence

Utilisation of software has significantly changed the *modus operandi* of states, public bodies, firms and people in general. The change has been shifted to a new level by employment of artificial intelligence. How has the use of AI and algorithms influenced the bid rigging?

3.1. AI and algorithms as a tool for detection

As mentioned above, abnormalities on the market may be one indicator of a cartel. Naturally, these abnormalities may be better detected with algorithms and AI. In the following text, we will briefly present several methods of bid rigging's detection.

One of the basic methods of detection lies in the use of econometrics and statistics.

A specific tool for detection of cartels was presented by Porter and Zona. The tool was related to the knowledge of relationship between bids and costs. The bids presented by undertakings involved in bid rigging were not so strictly related to the measurement of the costs.¹¹

Not all the tools are based on econometrical and statistical methods. Indexing methods may be used as well. These methods concentrate on spotting "*suspected*" markets based on certain signals or signals sets.

⁸ D. Raus, A. Oršulová, *Kartelové dohody* (1st ed., C.H.Beck, 2009), 122, in Katarína Kalesná, "Tendrové kartely a ich špecifiká" in Kristína Považanová (ed.), *Aktuálne otázky súťažného práva v Európskej únii a na Slovensku* (Univerzita Komenského v Bratislave, Právnická fakulta, 2015), 23, 27.

⁹ Michele Giannino, "Collusion in Public Contracts Procurement: Suppliers of School Cleaning Services Fined for Bid Rigging (Italy)" (2017) 8 *Journal of European Competition Law & Practice*, 247.

¹⁰ *ibid*, 248-250.

¹¹ R.H. Porter, J.D. Zona, "Ohio School Milk Markets: An Analysis of Bidding" (2017) 30 *RAND J. Econ.*, 263 in Andrzej Foremny and Wojciech Dorabalsky, "Review of collusion and bid rigging detection methods in the construction industry" (Creative Construction Conference, Ljubljana, 2018), 946, 947.

For example, Harrington¹² showed a set of indicators based on price behaviour and market shares of undertakings. Subsequently, the indicators may be used for application of screening tests which may reveal a cartel environment, or, alternatively, an environment after a cartel was broken.¹³

A new level of bid rigging detection may be brought by wide implementation of E-procurement. A significant advantage of moving the tendering procedure online is the availability of data for further analysis. The Artificial intelligence may be well employed in the processing of the data. Various important information may be learned through such data processing, for example personal ties, market concentration, geographical variability of ordered contracts etc.¹⁴

3.2. AI and algorithms as a tool for collusion

In general, digitalised markets have many advantages from competition point of view. Markets are more transparent and more effective.¹⁵ Digitalised markets brought new products for the customers, for example social networks, as well as they make already existing products more available. The latter is related, for instance, to online shopping.

On the other hand, digitalised markets are accompanied by various competition threats. To mention but one, availability of prices online may facilitate the sustainability of a cartel. If the market is transparent, cartelists do not need sophisticated tools for control of other cartelists' compliance with the cartel. Necessary information is easily and publicly available.

Besides, digitalised markets may lead to new competition law infringements. For instance, harvesting of data on large scale by a dominant undertaking can result in abuse of dominant position in this specific form. We may mention Facebook, which was under scrutiny by the German competition authority and the decision was issued at the beginning of 2019.¹⁶

Once undertakings dispose with large scale data, they may implement data analysis tools and self-learning mechanisms in order to enhance their business strategy.¹⁷ The use of specific algorithms has already

¹² Joseph E. Harrington, Jr. "Behavioral Screening and the Detection of Cartels" (EU Competition Law and Policy Workshop/Proceedings, 2006) <

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.63.4196&rep=rep1&type=pdf>> accessed 30 July 2019.

¹³ Andrzej Foremny and Wojciech Dorabalsky, "Review of collusion and bid rigging detection methods in the construction industry" (Creative Construction Conference, Ljubljana, 2018), 946, 948.

¹⁴ *ibid*, 952.

¹⁵ Ariel Ezrachi, Maurice E. Stucke, "ARTIFICIAL INTELLIGENCE & COLLUSION: WHEN COMPUTERS INHIBIT COMPETITION" (2015) *Oxford Legal Studies Research Paper No. 18/2015*, 1 < https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2591874> accessed 31 July 2019, 3.

¹⁶ Bundeskartellamt, "Bundeskartellamt prohibits Facebook from combining user data from different sources"

(Bundeskartellamt.de, 7 February 2019) <

https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2019/07_02_2019_Facebook.html> accessed 31 July 2019

¹⁷ Ariel Ezrachi, Maurice E. Stucke, "ARTIFICIAL INTELLIGENCE & COLLUSION: WHEN COMPUTERS INHIBIT COMPETITION" (2015) *Oxford Legal Studies Research Paper No. 18/2015*, 1 <

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2591874> accessed 31 July 2019.

resulted in anticompetitive practices, for instance in the case of price fixing by Amazon Marketplace in USA. This case is dated to 2015.¹⁸

3.2.1 Four categories of collusion with the help of computers

Returning to the issue of collusion, Ezrachi and Stucke¹⁹ elaborated, among others, on the following questions: how may computers be involved in the process of collusion? Is competition law strong (and flexible) enough to cover these types of Article 101 infringements? In answering the questions, they presented four categories of collusion.

The first category is characterised by using computers as “*Messengers*”. In this case, computers are used to execute the will of humans who decided to collude. For example, a software is created which serves as a forum to exchange sensitive information. The use of competition law is quite straightforward.²⁰

The second category is characterised as “*Hub and Spoke*”. This form is based on a use of a single algorithm which determines the price. If several undertakings use the same algorithm, it will logically lead to the similar prices charged by these undertakings. The result is, therefore, the same as the implementation of a price cartel. An evidence on the intention of the undertakings using the same algorithm may be used.²¹

The third category is named as “*Predictable Agent*”. In this scenario, undertakings use not the same, but similar algorithms. If similar algorithms are implemented throughout an industry, anticompetitive effects may follow. However, in this case, such “*collusion*” is not, as presented by Ezrachi and Stucke, automatically illegal. A proof of intention is required according to the authors. Moreover, use of similar algorithms may lie directly on the edge between tacit collusion and conscious parallelism.²²

The final, fourth category, is connected to “*Autonomous Machines*”. Software, backed up by artificial intelligence, determine the price independently from the will of the undertakings, with the aim of optimisation of profit. If there are more such machines on the market, there may communicate between each other and, through self-learning and experiment, commence to collude, totally independently from the will of the undertakings. In such case, liability is, in the view of the authors, unclear.²³

3.2.2 Bid rigging with the help of computers

After outlining the four categories, we may now briefly assess how would the bid rigging stand in this context. It is undoubted that tenderers use certain types of algorithms when calculating the costs of providing of the particular goods or services, and, consequently, their bids. It cannot be excluded that

¹⁸ Department of Justice, “FORMER E-COMMERCE EXECUTIVE CHARGED WITH PRICE FIXING IN THE ANTITRUST DIVISION’S FIRST ONLINE MARKETPLACE PROSECUTION” (Justice.gov, 6 April 2015) <

http://www.justice.gov/atr/public/press_releases/2015/313011.docx> accessed 31 July 2019

¹⁹ Ariel Ezrachi, Maurice E. Stucke, “ARTIFICIAL INTELLIGENCE & COLLUSION: WHEN COMPUTERS INHIBIT COMPETITION” (2015) *Oxford Legal Studies Research Paper No. 18/2015*, 1 <

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2591874> accessed 31 July 2019.

²⁰ *ibid*, 10-14.

²¹ *ibid*, 14-16.

²² *ibid*, 16-22.

²³ *ibid*, 22-25.

participants will use the same software to calculate their costs; such behaviour might fall into the second category. The assessment of such collusion should be, from material point of view, a little bit tricky, especially if the software was available online.

What is even trickier is the case when several undertakings develop their own software, however, the result will be so similar as to lead *de facto* unification of bids. Such situation, falling into the third category, may bring troubles on the side of competition law enforcement.

4. Conclusion

The aim of this paper was to present the initial thoughts on the correlation between bid rigging and use of algorithms or artificial intelligence. It is undisputed that AI may be used for detection of bid rigging and, therefore, make the life of competition authorities easier. On the other hand, AI is more and more used by undertakings. It would be naïve not to expect them to utilise algorithms for illegal purposes, collusion included. Yet, how to determine whether this is the case? The use of the same algorithm, or the development of the similar algorithms, may possibly breach Article 101 TFEU, however, the infringement is not crystal clear. It seems to be a challenge for the future to avoid false positive and false negative errors related to use of algorithms in bidding process.

References

- Bundeskartellamt, “Bundeskartellamt prohibits Facebook from combining user data from different sources” (Bundeskartellamt.de, 7 February 2019) < https://www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2019/07_02_2019_Facebook.html> accessed 31 July 2019.
- Department of Justice, “FORMER E-COMMERCE EXECUTIVE CHARGED WITH PRICE FIXING IN THE ANTITRUST DIVISION’S FIRST ONLINE MARKETPLACE PROSECUTION” (Justice.gov, 6 April 2015) < http://www.justice.gov/atr/public/press_releases/2015/313011.docx> accessed 31 July 2019.
- Ezrachi, Ariel and Stucke, Maurice E., “ARTIFICIAL INTELLIGENCE & COLLUSION: WHEN COMPUTERS INHIBIT COMPETITION” (2015) *Oxford Legal Studies Research Paper No. 18/2015*, 1 < https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2591874> accessed 31 July 2019.
- Foremny, Andrzej and Dorabialsky, Wojciech, “Review of collusion and bid rigging detection methods in the construction industry” (Creative Construction Conference, Ljubljana, 2018).
- Giannino, Michele, “Collusion in Public Contracts Procurement: Suppliers of School Cleaning Services Fined for Bid Rigging (Italy)” (2017) 8 *Journal of European Competition Law & Practice*, 247.
- Harrington, Joseph E. Jr., “Behavioral Screening and the Detection of Cartels” (EU Competition Law and Policy Workshop/Proceedings, 2006) < <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.63.4196&rep=rep1&type=pdf>> accessed 30 July 2019.
- Kalesná, Katarina, “Tendrové kartely a ich špecifiká” (Conference Aktuálne otázky súťažného práva v Európskej únii a na Slovensku, Bratislave, 2015), 23.
- Patakyová, Mária, “Cieľové vertikálne dohody” (Conference Aktuálne otázky súťažného práva v Európskej únii a na Slovensku, Bratislave, 2015), 59.

- Patakyová, Mária, “Vplyv Európskej únie na legislatívu Slovenskej republiky v oblasti hospodárskej súťaže” (Conference Mílniky práva v stredoeurópskom priestore, Častá-Papiernička, 2015), 124.
- Steen A., “Nexans, Deutsche Bahn, and the ECJ’s Refusal to Follow ECHR Case Law on Dawn Raids” (2016) 7 *Journal of European Competition Law & Practice*, 180.
- Whish, Richard and Bailey, David, *Competition Law* (7th edn, Oxford University Press, 2012), 124.

© Mária T. Patakyová

EU Business Law Working Papers

Publisher: Centre for European Studies of Faculty of Law and Political Sciences of Széchenyi István University

Seat of the publisher: 9026 Győr, Áldozat u. 12.

Responsible publisher: László Milassin, Head of Centre for European Studies

Editor in Chief: Judit Glavanits

Editorial board: Balázs Horváthy, László Knapp, László Milassin

Website: ces.sze.hu

Email: ces@sze.hu

ISSN 2631–0348
