Brave New World of ‘Robot’ Cartels?

AntitrustConnect Blog

March 9, 2017

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Please refer tot his post as: Monika Zdzieborska, 'Brave New World of ‘Robot’ Cartels?', AntitrustConnect Blog, March 9 2017, http://antitrustconnect.com/2017/03/09/brave-new-world-of-robot-cartels/

Earlier this year, Libratus – an artificial intelligence system developed by Carnegie Mellon University – conquered four of the world’s top professional poker players in a Head’s-Up No-Limit Texas Hold’em tournament (one of the most complicated forms of poker). [1] This might not sound all that surprising to those recalling Gary Kasparov’s defeat at the ‘hands’ of IBM’s supercomputer, Deep Blue, but Libratus’ victory goes one step further. The system was programmed with only basic knowledge of poker rules and, over time, developed winning strategies independently from any human influence. Now imagine that Libratus was playing a different ‘game’, the aim of which would be the long-term maximisation of profit. What if, in pursuit of this goal, the system engaged in interdependent pricing with other machines of its kind to ‘optimise’ profitability for mutual benefit? Are competition authorities ready to deal with a new age of ‘robot-enhanced’ price setting?

Algorithmic price fixing – state of play

So far, algorithmic price setting has been examined in only a handful of cases. [2] In these cases, algorithms were used to execute a pre-existing agreement between competitors to fix prices, so there was no doubt that the traditional ‘meeting of the minds’ had taken place. Uber’s ongoing dispute in the US over its ‘surge pricing’ algorithm may offer clarification as to the potential anticompetitive effects on the market of using such algorithms and the extent to which their use can be caught by antitrust law. [3]

To date, no cases appear to have been reported involving the use of autonomous pricing algorithms that, like Libratus, are programmed to achieve an outcome via self-learning and experimentation. Pending any such cases, the question remains: could the use of such algorithms trigger competition law enforcement?

Beyond human control

According to the recently published E-Commerce Preliminary Sector Inquiry Report, almost 10% of online retailers already use price monitoring software to adjust their prices automatically to those of their competitors. [4] Moreover, the current trend is for companies to create truly autonomous algorithms. In terms of human involvement, this may involve nothing more than providing machines with an order to satisfy one goal – long-term profit maximization. Once machines are provided with simple starting instructions and datasets, humans might have no control over how the algorithm actually evolves.

It is at least possible in these circumstances that algorithmic pricing could create a market environment in which competitors can engage in a kind of automated price fixing without running the risk of being held liable under competition law. [5] Indeed, it seems that no agreement, or even

communication, between the competitors is necessary for their algorithms to engage in interdependent pricing. Are conventional antitrust laws able to address such scenarios?

Outside the competition toolbox?

Algorithms can result in competitors engaging in continuous parallel market conduct. Parallel market conduct, however, is not unlawful as long as competitors adopt their pricing strategies as a result of rational, unilateral and independent reactions to market dynamics. The use of autonomous algorithms appears to involve exactly such strategies. In fact, companies failing to develop such technologies are at risk of losing their competitive advantage and falling behind competitors.

Some commentators note, however, that the widespread use of autonomous algorithms may result in the same negative effects as cartels: reduced competition and higher prices. [6] By being able to process and analyse high volumes of data in real time, algorithms are able to increase transparency of the market (at least among the machines running the algorithms) and respond swiftly to competitive initiatives (such as discounting prices) by other firms. This may mean that algorithms are disinclined to lower prices, as they will realise there is a minor (if any) chance that doing so will reap any profit-maximizing benefits. It has been argued, moreover, that the negative effects could spread beyond prices, in that companies using pricing algorithms may become less likely to improve their products, enter new markets, etc. [7]

Does this mean that a re-think of the current competition framework is needed? If so, who should be held responsible for the anticompetitive effects of autonomous algorithms? Punishing companies simply for designing such technology would clearly go too far – in the same way that you wouldn't sentence a gun manufacturer for someone else committing a murder with a gun the manufacturer produced. It might be argued that, in determining antitrust liability, competition authorities should consider competitors' motives for deploying such technology. But motives are one thing – establishing the requisite collusion is quite another. Would the fact that anticompetitive price movements by autonomous machines are being monitored and evaluated by human agents, in each case with the aim of maximizing profit, suffice? In the absence of evidence of some form of communication between those human agents, it seems difficult for an antitrust regulator to argue that the use of such algorithms in setting prices has a collusive nature.

What next?

It seems that competition authorities are trying to get to the bottom of how this new technology actually works – they appear to be analysing the nature of algorithms, their effects on markets and the extent of human involvement behind their actions. The Federal Trade Commission has even created a separate department – the Office of Technology, Research and Investigation – with the purpose of, among other things, exploring the effect of algorithms on the markets.

One thing is clear – if artificial intelligence continues to develop at the current rate, the above issues merely scratch the surface of the challenges that companies and competition authorities are likely to face in the near future.

This post originally appeared on Kluwer Competition Law Blog. The author is an associate at Sidley Austin LLP. The views expressed in this article are exclusively those of the author and do not necessarily reflect those of Sidley Austin LLP or its partners. This article has been prepared for informational purposes only and does not constitute legal advice.

1. www.wired.com/2017/02/libratus/, accessed on 2 March 2017.

2. In the US, (i) Case3:15-cr-00201-WHO, *United States of America v. David Topkins*; and (ii) Case 3:15-cr-00419-WHO, *United States of America v. Daniel William Aston and Others*. On 28 July 2016, the UK CMA issued a decision against two online sellers – Trod Ltd (in administration) and GB eye Ltd – who used an automated re-pricing software to implement their price-fixing cartel.

3. Case 1:15-cv-09796-JSR, *Spencer Meyer v. Travis Kalanick*. Oral arguments in the case are scheduled to take place on 24 March 2017.

4. Preliminary Report on the E-commerce Sector Inquiry, paras. 125 and 522.

5. A. Ezrachi and M. E. Stucke, "*Virtual Competition, The Promise and Perils of the Algorithm-Driven Economy*", Harvard University Press, November 2016, chapters 7 and 8.

6. *Ibid.*

7. Ezrachi and Stucke, op. cit., page 73.