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Raising rivals' cost in multi-unit auctions[☆]Maarten Janssen^a, Vladimir Karamychev^{b,*}^a University of Vienna, Austria, and Higher School of Economics, Moscow, Russia^b Erasmus University Rotterdam and Tinbergen Institute, Rotterdam, The Netherlands

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ABSTRACT

The objective many telecom regulators want to achieve when they decide to auction spectrum is that acquiring firms pay a market price (based on the opportunity cost principle). The simultaneous ascending auction may fail in this respect, as it provides bidders with an opportunity to engage in strategic demand reduction. This paper asks whether the combinatorial clock auction (CCA) fares better in this respect. We show that the answer to this question depends on the objectives bidders have. If bidders have only the slightest preference to raise rivals' cost, they will use the opportunities the CCA provides them to engage in strategic demand expansion. This is even the case when the clock phase ends with excess demand.

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1. Introduction

Auctions are used around in the world to allocate scarce spectrum to telecommunication companies. Until recently, the more traditional simultaneous ascending auction

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(SAA) was the predominant auction form in telecom auctions, but over the past years the combinatorial clock auction (CCA) is presented as a strong alternative (see, e.g., Cramton, 2012). There is an ongoing debate about which of these two, or other, auction formats is best suited to allocate multiple units of heterogeneous objects to interested parties?¹

The answer to this question depends on two issues. First, what are the objectives of the auctioneer? Second, how do bidders behave in a given auction design? With respect to the first question, much of the academic literature takes it for granted that auctioneers (or, in the context of spectrum auctions, regulators) aim at maximizing revenues. We note, however, that regulators are bound by their statutory duties, which express that (i) they should maintain a competitive and innovative market, and that (ii) they should allocate spectrum efficiently. Usually, an important secondary goal is that companies acquiring spectrum pay a fair, or market-oriented, price. The goal of maximizing revenue is, as far as we are aware, rarely mentioned.² In other contexts, e.g., when regulators have to determine annual license fees (as Ofcom recently did in the UK) or fees that companies have to pay to extend the right to use spectrum beyond the expiration date of the former license (as in the Netherlands in 2013), regulations specify that these fees should be set at market oriented levels.³ Regulators typically benchmark the fees they choose with reference to recently held auctions. In particular, in determining its annual license fees (ALFs), Ofcom (2015) discussed in great detail the outcome of many recent European spectrum auctions (both SAAs and CCAs) with an eye on whether or not the prices that had been generated could be interpreted as market prices. In fact, the first point of the Executive Summary of Ofcom (2015) mentions that the decision “...implements the Government’s directions to Ofcom of December 2010 to revise ALFs to reflect full market value...” In this paper, we ask the question whether auctions get it right, in the sense of whether they generate market prices. Market prices are defined in the standard way as the prices that reflect opportunity costs, which are bidders’ true marginal willingness to pay for spectrum units they did not acquire.

This brings us to the second question. Auction theory is typically presented as the prime example of the success of game theory.⁴ In other applications in industrial organization where firms compete in the market place, the rules of the real world game are

¹ A forthcoming book is dedicated to this theme; see Bichler and Goeree (2016). Workshops of the European telecom regulators (IRG) are also dedicated to this theme.

² Loertscher et al. (2015, pp. 863) mention that “in 1993 Congress granted the FCC authority to auction licenses with multiple objectives, including “efficient and intensive use of the electromagnetic spectrum” and recovering “a portion” of the value of the licenses for the public”. The Netherlands explicitly stated that it organized an auction to have companies pay a market-oriented price; see <http://www.agentschaptelcom.nl/actueel/digitale-nieuwsbrief/ontwikkelingen-de-markt-juni-2012/multiband-frequentieveiling-meer>. In Austria, the regulator TTK announced, “the minimum bid set will be towards the lower end of the estimated market price of the frequencies” indicating that the auction itself can bring the prices to their market oriented level (see, <https://www.rtr.at/en/pr/PI18032013TK>). The National Audit Office (NAO, 2014) noticed that in the 2013 UK auction “maximizing proceeds for the taxpayer was not an objective”.

³ The Dutch decision by the Minister of Economic Affairs is based on SEO (2013) where they benchmark the fees using proceeds of previously held auctions.

⁴ E.g., Ausubel (2008) observes “Auctions have become the clearest success story in the application of game theory to economics”. At the time of the first FCC auctions in the mid 1990s, Fortune (February 6,

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