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Governance and game theory: When do franchise auctions induce firms to overbid?

Richard D. French

Graduate School of Public and International Affairs, University of Ottawa, Desmarais 11147, 55 Laurier Avenue East, Ottawa, Ontario, Canada K1N 6N5

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ABSTRACT

The use of auctions as an instrument of public policy has been hailed as evidence of the utility and validity of game theory. In this paper, we focus on extreme cases – centrally, spectrum auctions in the UK and Germany in 2000 – to argue that the canonical game theoretic interpretations of firm behaviour in some (highly "successful") auction outcomes are inadequate, that the economics of governance critique of franchise bidding can be extended to provide a better interpretation, and that under specified conditions, notably high uncertainty, policy-makers should design franchise auctions to avoid overbidding, rather than attend to the more conventional challenge of underbidding.

1. Introduction

Auctions have become the conventional choice of governments seeking to assign public assets or rights to firms for commercial exploitation, especially for the assignment of spectrum for commercial wireless communications services. The success of these auctions – "success" measured most often by the public revenue generated – has been taken as a clinching demonstration of the validity and utility of the game theoretic foundations of the auction mechanism.

Following the adage that the "study of extreme instances often provides important leads to the essentials of the situation" (Behavioral Sciences Subpanel, quoted in Williamson, 1976, p. 75), this paper re-examines the two most spectacular of the so-called third generation (3G) or UMTS spectrum auctions held in Europe in 2000–2001: the British auction of April 2000 and the German auction of August 2000. The argument is that firm behaviour in these auctions eludes interpretation under the canonical game theoretic framework, that this outcome can be better understood under an extension of the economics of governance critique of franchise bidding, and that this revised understanding has policy implications.

In the second section, we summarize European 3G licensing, and in particular the British and German auctions, and the economic and political aftermath of these auctions. In the third section, we attempt to estimate the order of magnitude of spectrum value loss experienced by the winning firms. In Section 4, we consider the game theoretic interpretation of the auction results and identify overbidding, in this and other cases, as a challenge to such theory. In Section 5, we offer an alternative approach to franchise auctions based on the economics of governance. Section 6 examines alternatives to the fixed cash-maximand auction mechanism and other possible palliatives to overbidding. Section 7 concludes.

2. The European licence auctions of 2000–2001

The GSM (second generation) mobile telephony standard is regarded as one of the distinctive successes of European high technology, dependent among other things upon the European capacity for concertation (Bach, 2000; Pelkmans, 2001;

E-mail address: richard.french@uottawa.ca

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Sauter, 1996; Selian, 2002, pp. 1–19). In the mid-1990s, according to Cohen (2001, pp. 167–169), European equipment manufacturers such as Ericsson were anxious to duplicate in emerging mobile broadband technology the success of GSM and began to lobby the European Commission to promote an early pan-European initiative to introduce additional radio spectrum dedicated to 3G services. Accepting a rationale that was driven at least as much by industrial policy as it was by market needs (Carlberg, 2001, pp. 130–131, 142–145; Gassot, 2002, pp. 253–254), the Commission in 1999 required Member States to "take all actions necessary to allow…the coordinated and progressive introduction of the UMTS services on their territory by 1 January 2002 at the latest and in particular shall establish an authorization system for UMTS no later than 1 January 2000" (European Commission, 1999). Notwithstanding the reference to coordination, however, and in keeping with the principle of subsidiarity (Goodman 2006, pp. 132–156), it was Member States' National Regulatory Authorities which finally determined the precise nature of the "authorization system" for each state.

As it turned out, roughly half the countries chose to assign licences by tendering in an administrative process. The other half, including the United Kingdom, Belgium, Germany, the Netherlands, Denmark, Italy, Austria, and Greece, as well as (outside the EU) Switzerland, Hungary, Latvia, Slovakia, Slovenia and the Czech Republic, chose to assign licences by auction (Börgers & Dustmann, 2003; Curwen, 2000; Jehiel & Moldovanu, 2003; Klemperer, 2004; Maasland & Moldovanu, 2004; McKinsey, 2002, pp. 1–25; van Damme, 2002). These auctions raised just over €100B for EU treasuries from telecommunications firms (McKinsey, 2002, p. 15). The choice and results of the various licensing exercises were highly controversial (Björkdahl & Bohlin, 2004; Bohlin, 2001; Conseil de l'Analyse Économique, 2001, 2002; European Commission, 2001; Gruber, 2005a, pp. 243–287; Klemperer, 2002; McKinsey, 2002, pp. 11–12, 26–38; National Audit Office, 2001; Xavier, 2001). In this paper, we address the implications for policy and theory of the huge sums of money raised by the apparently technically sound auctions in the UK (about €35B) and in Germany[1] (about €50B), which were believed by some to cripple the winning firms and the industry of which they were major parts, and to raise the potential for collusion in the services market (Blackman, 2000, 2001; Cave & Valletti, 2000; Gruber, 2001, 2005b; Harrington, 2000; Hewitt, 2000; Melody, 2001; Ure, 2001, 2003).

The European spectrum auctions amounted to the largest field trial of applied microeconomics ever carried out. The total licence fees paid in Europe, irrespective of assignment method, amounted to "about half the total EU telecommunications revenue (fixed and mobile) in 1999" (OECD, 2001, p. 7). The British and German auctions raised sums equivalent to over 2% of their respective GDP's, from 11 firms. The architects of the British auction, Binmore and Klemperer (2002), celebrated their accomplishment with a certain exhilaration as "the biggest auction ever".

The European licensing processes of 2000–2001 operated in parallel with the bursting of the dot.com speculative bubble, and the combination of high licence fees and deteriorating investor confidence rapidly placed the European telecommunications industry in serious financial difficulty. Equity valuations of telecommunications firms declined dramatically. By the end of 2002, all of the firms had experienced a painful decline in share price relative to their 1999–2001 high: for example, KPN lost 97% of its market cap; British Telecom lost 70% of its market cap; France Telecom lost 88% of its market cap; Sonera lost 96% of its market cap. Debt ratios rose rapidly, spreads increased and ratings declined to junk status for many licencees. The OECD observed at the end of 2001 that "In the past year, 75% of European high-yield bond issues came from telecommunication firms" (2001, p. 15). European financial regulators warned banks in 2000 against overexposure to telecom debt (Lyon, 2001; Ure, 2003, p. 190).

Along with the effects of the global decline in the technology-media-telecom sectors, the licencees suffered from a crisis of confidence in the commercial potential of the 3G business model, itself intertwined with the now less attractive commercial prospects for Internet businesses. Forecasts of the financial performance of the winning firms in the years immediately following licensing were gloomy (Björkdahl & Bohlin, 2004). The network build would involve aggregate commitments comparable in size to the aggregate cost of the licences. The technology would be late. Its cost and performance characteristics were as yet imprecise. The killer application was as yet unknown. The market demand for mobile broadband was a matter of speculation. The conjugated effects of these factors drove a rapid restructuring of mobile operators, in the form of asset sales, mergers, bankruptcies and returned licences (Bornshten & Schejter, 2003; Geoffron & Pogorel, 2002; Gruber, 2007; Ure, 2003; Whalley, 2002, 2004; Whalley & Curwen, 2003, 2006).

The equipment providers who had been meant to benefit from the early introduction of 3G in Europe necessarily shared their customers' pain (McKinsey, 2002, pp. 33–36). For the first time in several years, handset sales declined, as did the network equipment market. According to Nokia (2005, pp. 52–53):

> In 2002, the size of the mobile infrastructure market declined from 2001 by approximately 20%, and a similar decline took place between 2002 and 2003. These declines reflected significantly reduced and/or delayed infrastructure investments by operators as they focused during those years on decreasing debt and improving their capital structure primarily due to the combined effects of the general economic slowdown and high 3G license costs.

[1] "Apparently" because notwithstanding the sum raised, the soundness of the German auction design was the subject of considerable debate. See Börgers and Dustmann (2003), Ewerhart and Moldovanu (2003), Grimm, Riedel, and Wolfstetter (2001), Hoppe, Jehiel, and Moldovanu (2006), Klemperer (2004), Moldovanu and Ewerhart (2002) and Seifert and Ehrhart (2005).