

COMMENT

AUCTION THEORY CAN COMPLEMENT COMPETITION LAW: PREVENTING COLLUSION IN EUROPE'S 3G SPECTRUM ALLOCATION

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1. INTRODUCTION

With the advent of wireless technology for personal and individualized communication,¹ radio frequencies have become valuable property.² European Union ("EU")³ member states will in-

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¹ Although the popular press claims the current wireless revolution is a personal communication revolution, radio spectrum in fact began its life as a medium for personal communication through ship-to-shore radio. *See* discussion *infra* note 18. The current wireless revolution reverts back to this two-way usage: the current revolution involves the targeting of wireless communications between two points and the ability for mass use of a narrow bandwidth by multiple users and services (e.g., voice, data, fax, and video).

² Stephen Labaton, *Clinton Orders a New Auction of the Airwaves*, N.Y. TIMES, Oct. 14, 2000, at A1.

³ The terminology used by European institutions is troublesome, because of changes in the name of Europe's confederation and the complexity of its founding and major treaties. Technically, EU competition law is derived from the Treaty of Rome, which authorized enforcement of competition law by the European Economic Community ("EEC"). TREATY ESTABLISHING THE EUROPEAN ECONOMIC COMMUNITY, Mar. 25, 1957, arts. 85-86 (now arts. 81-82), 298 U.N.T.S. 11, 47-48 [hereinafter TREATY OF ROME]. The EEC later changed its name to the European Community ("EC"). The Treaty of Maastricht established (or re-named the body)

crease their provision of radio bandwidth substantially over the next five to ten years.⁴ To manage this amplified demand, the wireless telecommunications industry is now adopting the Universal Mobile Telecommunication System ("UMTS") standard,⁵ commonly referred to as Third Generation ("3G") wireless technology.⁶ The spectrum bandwidth necessary to operate 3G systems is being allocated across the globe. Finland led this process by allocating spectrum bandwidth in March 1999.⁷ Currently, allocation is taking place in North America, Asia, and Europe.⁸ EU member states

the European Union. TREATY OF MAASTRICHT ON EUROPEAN UNION, Feb. 7, 1992 O.J. (C 191) 1, art. A. Competition law remains part of the EC, but this is a subtle distinction. For simplicity, conformity, and in acknowledgement of the progression of European integration, "EU" will be used throughout this work to refer to the EEC, the EC, and the EU.

⁴ Council Decision 128/1999/EC of 14 December 1998 on the Coordinated Introduction of Third-Generation Mobile and Wireless Communications System (UMTS) in the Community, 1999 O.J. (L 17) 1 (calling for increased spectrum, according to the guidelines of the European Radiocommunications Committee ("ERC") and the European Conference of Postal & Telecommunications Administration ("CEPT"), to ensure a competitive 3G market); ERC Decision ERC/DEC/(97)07 of 30 June 1997 on the Frequency Bands for the Introduction of the Universal Mobile Telecommunications System (UMTS), available at <http://www.ero.dk/documentation/docs/docfiles.asp?docid=1519> (last visited Feb. 1, 2002).

⁵ The non-profit UMTS Forum provides general and technical information about the technology. UMTS Forum, *Home Page*, at <http://www.umts-forum.org> (last visited Jan. 13, 2002). The non-profit is an industry association providing its members information and research on "market, regulatory, spectrum, services, business and technology topics." UMTS Forum, *About Us*, at http://www.umts-forum.org/who_are_we.html (last visited Jan. 13, 2002).

⁶ The first wireless wave was analog and the second was digital ("2G"). The technical difference between 2G digital and 3G is that 2G transmits data at 10 kilobytes per second ("kbps"), while 3G runs at speeds between 384 kbps and 2 megabytes per second ("Mbps"). Thomas Sidenbladh, UMTS Forum, *Current Status of 3G Licensing* [hereinafter Sidenbladh, *Current Status of 3G Licensing*], at <http://www.umts-forum.org/information.html> (last visited Oct. 13, 2000) (on file with author).

⁷ In fact, Finland led the rest of the world by a year. The presence of Ericsson and Nokia in Finland has led to that nation's leading role in the wireless services industry. Spain was the next nation to allocate spectrum bandwidth in March 2000. UMTS Forum, *3G Licensing Overview*, at <http://www.umts-forum.org/licensing.html>.

⁸ For a comprehensive and up-to-date list, see Financial Times, *European 3G Auction Guide* [hereinafter *3G Auction Guide*], at <http://news.ft.com/ft/gx.cgi/ftc?pagename=View&c=Article&cid=FT3Y9A6QXBC> (last modified Nov. 23, 2000) (describing the current state of countries in North America, Europe, Asia and the Middle East that have begun the allocation process); UMTS Forum, *IMT-2000 Licensing Conditions & Status* (2000) [hereinafter *Licensing Conditions & Status*] (describing countries in North America, Europe, Asia, and South Africa), at

generally favor the use of auctions to allocate 3G spectrum rights. Over time, the process by which governments distribute bandwidth allocations is likely to become more complex. Auctions bring their own problems and solutions to spectrum allocation.

The EU's originating treaties, the Treaty of Rome⁹ and the European Coal and Steel Community ("ECSC"),¹⁰ contain articles that prohibit collusion in Europe's economic markets. In addition to collusion by sellers, European case law suggests that buyer cartels are also illegal under Article 85(1) of the Treaty of Rome.¹¹

<http://www.umts-forum.org/information.html> (last visited Dec. 19, 2000); Sidenblad, *Current Status of 3G Licensing*, *supra* note 6.

⁹ See TREATY OF ROME, *supra* note 3, arts. 85-86 (as in effect 1957) (now articles 81-82). Article 85 states in relevant part:

1. The following shall be prohibited as incompatible with the common market: all agreements between undertakings . . . which have as their object or effect the prevention, restriction or distortion of competition within the common market, and in particular those which:

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

(c) share markets or sources of supply; . . .

3. The provisions of paragraph 1 may, however, be declared inapplicable in the case of any agreement . . . any decision . . . any concerted practice . . . which contributes to improving the production or distribution of goods or to promoting technical or economic progress, while allowing consumers a fair share of the resulting benefit . . .

Article 86 states in relevant part:

Any abuse by one or more undertakings of a dominant position within the common market or in a substantial part of it shall be prohibited as incompatible with the common market in so far as it may affect trade between Member States. Such abuse may, in particular, consist in:

(a) directly or indirectly imposing unfair purchase or selling prices or other unfair trading conditions;

(b) limiting production, markets or technical development to the prejudice of consumers

¹⁰ The ECSC competition rules are mostly of historic significance and only pertained to the coal and steel industries. See TREATY ESTABLISHING THE EUROPEAN COAL AND STEEL COMMUNITY, Apr. 18, 1951, arts. 65-66, 261 U.N.T.S. 140, 195-205. The ECSC, unlike the Treaty of Rome, provides for merger review by the Commission. The Maastricht Treaty formally merged the ECSC, the EEC, and the Euratom Treaty (Europe's atomic energy coalition) into the EU.

¹¹ TREATY OF ROME, *supra* note 3, art. 85 (as in effect 1957) (now article 81); see also *Shearson Lehman Hutton Inc. v. Maclaine Watson & Co.*, 2 Lloyd's Rep. 570, 621 (Q.B. 1989) (positing that EU competition law would be violated when an

Government investigations and prosecutions of buyer collusion are cost and time intensive.¹² Because it is difficult for the governments to punish ex post buyer violations of competition law, ex ante methods of averting buyer cartels are critical.

The Merger Regulation of 1989,¹³ established under Articles 3 and 86 of the Treaty of Rome,¹⁴ provides an example of an ex ante approach to prevent anticompetitive activities. The regulation established the Mergers Task Force ("MTF"), which reviews large-scale mergers and joint ventures for anticompetitive effects.¹⁵ The MTF may recommend action to block or amend a proposed merger in order to prevent sellers from merging with the sole purpose of forming a monopoly.¹⁶ The MTF recommendation is then subject to approval by the European Commission.¹⁷

This Comment suggests that appropriate auction design can be used in tandem with competition law to prevent buyer cartels in auctions. Auctions, like other markets, are susceptible to collusion, yet competition law is not able to punish all violations of competi-

auction ring distorted antique auction bids); RICHARD WHISH & BRENDA SUFRIN, *COMPETITION LAW* 260 n.11, 396 n.7 (3d ed. 1993) (noting the effects of Articles 85 and 86 on the buyers' side). *But see* Case C-250/92, *Gøttrup-Klim Grovvareforening v. Dansk Landbrugs Grovvarereselskab AmbA (DLG)*, 1994 E.C.R. I-5641, 5687 (holding that a cooperative purchasing association that forbids its members from participating in competing organizations is not in violation of Article 85(1) when the cooperative allows for more effective competition and where the restrictions go no further than are necessary for the proper functioning of the cooperative).

¹² Empirical studies on this subject in the EU have not been conducted, to the Author's knowledge. However, the United States enforcement mechanism against Sherman Act antitrust violations is notoriously expensive and time-consuming for the government and defendants. *See* MILTON HANDLER ET AL., *TRADE REGULATION* 139-42 (4th ed. 1997) (citations omitted).

¹³ *See* Council Regulation 4064/89 of 21 December 1989 on the Control of Concentrations Between Undertakings, 1989 O.J. (L 395) 1 [hereinafter Regulation 4064/89].

¹⁴ *See* TREATY OF ROME, *supra* note 3, arts. 3, 86. Article 3(g) states that the activities of the European Community shall include "the institution of a system ensuring that competition in the common market is not distorted." *Id.* art. 3(g).

¹⁵ *Id.* arts. 3, 86; Regulation 4064/89, *supra* note 13. The MTF has prosecutorial discretion similar to that given to the Department of Justice and the Federal Trade Commission under the Hart-Scott-Rodino filings and the Horizontal Merger Guidelines (1992). Hart-Scott-Rodino Antitrust Improvement Act of 1976, 15 U.S.C. § 18a (as amended 2001); U.S. Dep't of Justice & FTC, 1992 Horizontal Merger Guidelines [hereinafter Horizontal Merger Guidelines], *available at* <http://www.ftc.gov/bc/docs/horizmer.htm> (last visited Jan. 14, 2002).

¹⁶ Regulation 4064/89, *supra* note 13.

¹⁷ *Id.*

tion law or oligopolistic market distortions. This is further discussed in Section 5. Auction design is not just a cost effective complement to competition law; it is also the only way to regulate tacit collusion that is either legal or difficult for the prosecution to prove in court.

1.1. *Spectrum Bandwidth Distribution Mechanisms*

Countries that have already allocated spectrum bandwidth for non-3G systems have used one of three distribution mechanisms: (1) licensing by application (otherwise described as a beauty contest); (2) lottery; or (3) auction.

1.1.1. *Beauty Contests*

Licensing by application is the traditional method for allocating bandwidth,¹⁸ and is the mechanism that the United States Federal

¹⁸ Changes in a society's allocation scheme for spectrum portray a key shift in how society views intangible public goods. In the United States, radio spectrum was first used for ship-to-ship and ship-to-shore communications. No license was needed. The "ether" (spectrum) was free to all. The U.S. Navy lobbied for regulation because multiple use of the same frequency diminished the quality of its communications. Distress signals and normal day-to-day uses of the spectrum were disrupted. In response, the government regulated radio activity. See R. H. Coase, *The Federal Communications Commission*, 2 J.L. & ECON. 1, 1-5 (1959) [hereinafter 1 Coase] (citing H.P. WARNER, RADIO AND TELEVISION LAW (1948) and LAURENCE F. SCHMECKEBIER, THE FEDERAL RADIO COMMISSION: ITS HISTORY, ACTIVITIES AND ORGANIZATION (1932) (citations omitted)).

Radio and television changed the regulatory nature of spectrum. First Amendment issues became an important consideration. Licenses were distributed for the good of the nation and for efficient spectrum usage. Ronald Coase described the history of the early FCC in his 1959 article, *The Federal Communications Commission*. 1 Coase, *supra*, at 6-12.

Along with the ascension of the Coase Theorem in law, see, e.g., *United Hous. Found. v. Forman*, 421 U.S. 837, 863-64 (1975) (Brennan, J. dissenting); *In re Boodrow*, 126 F.3d 43, 60 n.9 (2d Cir. 1997); *Spur Indus. v. Del E. Webb Dev. Co.*, 494 P.2d 700, 705-08 (Ariz. 1972) (failing to cite Coase, but utilizing his ideas in a unique remedy) and economics, society shifted its view of radio spectrum. Originally, society viewed the "ether" as belonging to all, for use by all. Then Coase's Theorem, which stated that properly defined property rights would lead to the efficient allocation of resources regardless of the initial allocation, entered the fray. See 1 Coase, *supra*, at 25-35; R. H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 10, 15-19 (1960) [hereinafter 2 Coase]. Government now views itself as the original owner of the public's good, i.e. spectrum. By initially allocating the property right to itself, it can sell the property right, for profit, to private entities that can use the assets in its product. This initial assignment of the property right to the government both creates revenue for the government and avoids the main transaction costs that plagued original ship-to-shore communications. Private parties without clearly defined rights to sections of the bandwidth could not properly or-

Communication Commission ("FCC") uses to allocate radio and television broadcast rights.¹⁹ As compared to other distribution methods, licensing by application allows the government the most control over both the type of property right owner and the usage of the bandwidth.²⁰ A beauty contest extends licensing by application by charging an estimated value for the asset instead of a simple licensing fee.²¹ In a beauty contest, prospective operators file technical plans through which they attempt to prove their qualifications for running an efficient high-tech wireless system.²² In a basic licensing scheme, operating fees are meant to cover administrative costs.²³ However, a beauty contest charges the winner of the spectrum rights a fee based on the bandwidth's value or on attempts to generate revenue separate from the value of the bandwidth.²⁴

1.1.2. Lotteries

Lotteries are the least widely used. In a lottery, the regulator evaluates applicants on their ability to pay the license fee and on any other criteria the regulator deems necessary (for example, technical ability, free speech considerations, or political motivation may be assessed). In the early 1990s, the FCC ran a lottery system

ganize a private system of usage. *But see* Eli Noam, *Spectrum Auctions: Yesterday's Heresy, Today's Orthodoxy, Tomorrow's Anachronism. Taking the Next Step to Open Spectrum Access*, 41 J.L. & ECON. 765 (1998) (criticizing the government's presumed ownership of spectrum).

¹⁹ See John McMillan, *Selling Spectrum Rights*, 8 J. ECON. PERSP., Summer 1994, at 145, 145-46; see also Audio Servs. Div., FCC, *How to Apply for a Broadcast Station*, at <http://www.fcc.gov/mmb/asd/getstat.html> (last visited Feb. 2, 2002).

²⁰ *The Price is Right*, ECONOMIST (London), July 29, 2000, at 21 (comparing beauty contests and auctions).

²¹ See *Only Fakirs Need Apply*, ECONOMIST, Feb. 3, 2001, at 63. A beauty contest in this case is similar to the well known beauty contests between law firms. The key difference is that in licensing allocation, the government announces a price and then takes applications, rather than having the contest include a price and quality review. The term comes from John Maynard Keynes' discussion of the behavior of judges in a beauty contest. JOHN MAYNARD KEYNES, *THE GENERAL THEORY OF EMPLOYMENT INTEREST AND MONEY* 156 (1965).

²² See *Fin. Times*, *3G Country Information* [hereinafter *3G Country Information*], at <http://news.ft.com/ft/gx.cgi/ftc?pagename=View&c=Article&cid=FT3BK8YPXBC&live=true> (last visited Jan. 13, 2002).

²³ *Only Fakirs Need Apply*, *supra* note 21; *3G Country Information*, *supra* note 22.

²⁴ *3G Country Information*, *supra* note 22.

to distribute the spectrum rights for wireless phone services.²⁵ The lottery was a dismal failure, as small corporations without the capacity to operate wireless services won the lottery and then sold the assets, for seven-figure profits, to established telecommunications companies in a private market auction.²⁶ In allocating 3G spectrum rights, countries have ignored this long-established distribution method in favor of either a beauty contest²⁷ or an auction.²⁸

1.1.3. *Competitive Tendering*²⁹

Auctions were first used to distribute spectrum rights for radio and television stations in New Zealand in 1990.³⁰ In an auction, the government sells the property rights to the highest bidder at prices that are not known *ex ante* by the government or, presumably, by the participants. This system of bandwidth allocation has been adopted by the United States³¹ and by several European and Asian countries.³²

A properly-designed auction provides the most efficient allocation of rights and revenue generation for national governments. An auction provides efficiency both by delivering the spectrum rights to the most efficient user and by quickly allocating the rights

²⁵ McMillan, *supra* note 19, at 146; Peter Passell, *Administration Seeks Profits in Plan to Auction Airwaves*, N.Y. TIMES, May 30, 1991, at A1 (discussing the Bush administration's proposal to switch from lotteries to auctions).

²⁶ See McMillan, *supra* note 19, at 146; Peter Passell, *Big Brother Wants to Manage the Broadcast Spectrum Again*, N.Y. TIMES, Feb. 6, 1997, at D2. For further discussion of this predicted Coasian outcome, see discussion *infra* Section 2.4.

²⁷ Beauty contests are being used in France, Finland, Ireland, Malaysia, Norway, Poland, Portugal, Spain, South Korea, and Sweden. *Licensing Conditions & Status*, *supra* note 8.

²⁸ See Paul D. Klemperer, *Why Every Economist Should Learn Some Auction Theory*, Presentation at 8th World Congress of the Econometric Society, at 31-32 (July 2000) [hereinafter 1 Klemperer], available at <http://www.econ.washington.edu/worldcongress/klemperer.pdf>; McMillan, *supra* note 19, at 146; *3G Auction Guide*, *supra* note 8.

²⁹ Government auctions are referred to as competitive tendering in the British and European competition literature.

³⁰ McMillan, *supra* note 19, at 148 (describing the dismal failure of using second price sealed bids because only a few bidders participated).

³¹ Omnibus Budget Reconciliation Act of 1993 (Application for License), 47 U.S.C. § 309 (West Supp. 2001) (allowing the FCC to allocate spectrum space by auction).

³² See *3G Auction Guide*, *supra* note 8; Sidenbladh, *Current Status of 3G Licensing*, *supra* note 6.

to the user.³³ Additionally, auctions can provide higher possible revenues for a government than a beauty contest.³⁴ Auction theory is important for the wireless telecommunications market, as well as for other industries. This is because auction design can prevent collusion between buyers more cheaply and efficiently after the auction and violation have occurred than investigations and prosecutions under competition law can.

1.2. *The Importance of Auction Design*

Once a national government makes the decision to auction its spectrum bandwidth, several complications can arise. First, auctions can cause what is known as a "winner's curse."³⁵ Second, auction outcomes are dependent on the number and type of participants that the auction attracts.³⁶ Third, collusion can occur among the bidders, which may or may not violate EU competition law.³⁷ A properly-designed auction in the EU must deal with all three of these issues.

Ex ante auction design provides a key complement to and substitute for ex post competition law enforcement. EU competition law enforcement, like its American antitrust counterpart, is costly.³⁸ A properly-designed auction can prevent, or at least

³³ Paul Klemperer, *Sold! The Case for Auctions*, WALL ST. J. EUR., Nov. 9, 2000, at 11.

³⁴ Because the spectrum bandwidth sold in auctions will be used for purely commercial applications, revenue generation is considered an appropriate public policy goal. This is different from prior uses of radio frequencies. Radio and broadcast television bandwidth combined concerns of content, free speech, information dissemination, and commercial applications. Auctions may not have been appropriate for radio and television because societies and governments (sometimes even constitutions) decided that content and speech issues predominated over revenue concerns.

³⁵ See E.C. Capen et al., *Competitive Bidding in High-Risk Situations*, 23 J. PETROLEUM TECH. 641, 641-53 (1971); see also James Surowiecki, *The Agony of Victory and the Thrill of Defeat*, NEW YORKER, Jan. 8, 2001, at 31 (using the record-setting contract settlements of Alex Rodriguez with the Texas Rangers and Hillary Clinton with Simon & Schuster to provide a basic, light-hearted explanation of the winner's curse).

³⁶ See Jeremy Bulow & Paul Klemperer, *Auctions Versus Negotiations*, 86 AM. ECON. REV. 180, 180-94 (1996).

³⁷ See *Restrictive Practices Re Industrial Timber*, [1976] 1 C.M.L.R. D11 (1976) (holding that private groups that colluded to fix prices are not permitted to take steps to restrict competition).

³⁸ See HANDLER ET AL., *supra* note 12, at 104-05, 113-17, 139-42; W. KIP VISCUSI, *ECONOMICS OF REGULATION AND ANTITRUST* 33-38, 64-67 (2d ed. 1995).

lower, the probability and effectiveness of collusion. An auction will increase efficiency by lowering government monitoring and prosecution costs, in addition to providing the traditional efficiency gains associated with auctions: increased sales price and quick distribution of assets to the most efficient user.³⁹

It should be noted that this Comment uses 3G spectrum auctions in Europe to display an example of auction theory's application as a means of complementing competition law enforcement through a low-cost regulatory allocation system. Auction design must, of course, be tailored to the industry and commodity being allocated. The goal of this Comment is to suggest a process that can be generally adopted by governments and private entities in order to design auctions in a variety of fields outside of spectrum bandwidth.

Section 2 of this Comment addresses the governments' major goals in allocating 3G spectrum rights to the private sector. These goals are both pro- and anticompetitive. Section 3 provides a basic model of a firm's decision to enter an auction. The key determinative factor in preventing collusion may be the ability to attract a sufficient number of bidders. Section 4 discusses problems inherent in all auctions (including "winner's curse," risk aversion, number of firms, and collusion) and the features of auction design that can solve a problem that is unique to the 3G market. Since the most perfect form of an efficient auction may not be able to incorporate all of these solutions, Section 4 also focuses on collusion, the most complex legal dilemma of an auction. This Section discusses: (1) the factors that facilitate collusion; (2) the elements of a cartel; (3) the form auction collusion may take; and (4) auction design solutions to combat these problems. Section 5 of this Comment discusses basic EU competition law governing cartels. It attempts to provide a background on the hearing process and the problems inherent in the EU's approach toward prohibiting cartels. Most importantly, this Section discusses an anticompetitive practice that is illegal in most countries but legal under EU competition law. Section 6 compares and critiques the auction regulations that have been promulgated and used by the United Kingdom, Germany, and Italy in allocating their 3G spectrum. This Section attempts to answer why the British and German auctions raised substantially

³⁹ See McMillan, *supra* note 19, at 159-60; "Auctions Are a Better Way to Raise Revenue than Taxes," BUS. WK. ONLINE, Nov. 29, 2000, at <http://www.businessweek.com/>.

more revenue per capita than the Italian auction. Section 7 provides simple solutions to the problems discussed in those three auctions.

2. GOVERNMENT GOALS WHEN DISTRIBUTING SPECTRUM RIGHTS

In allocating 3G spectrum rights to the private sector, governments have both pro- and anticompetitive goals. Auctions will meet the pro-competitive goals, but ignore the desired anticompetitive goals.

2.1. *Efficient and Competitive Markets*

Governments have an interest in efficiently allocating wireless services in their domestic markets. Additionally, governments wish to ensure that the benefits of selling public property (spectrum) are used to provide low-cost services. To this end, governments want to ensure that the most efficient firms own the spectrum rights. If 3G service prices rise, then wireless services will be under-utilized while other goods will be over-utilized. In economic terms, the efficient firm will have low costs and can potentially provide low competitive prices.⁴⁰

Governments desire not just potentially competitive prices but actual competitive and efficient markets that provide low prices and technical advances.⁴¹ Because of the limited bandwidth and the limited number of firms technically capable of providing 3G wireless services, governments have sold rights to an oligopoly. The largest European market, Germany, sold six spectrum blocks, which resulted in the highest number of competitors.⁴² Most

⁴⁰ The firm will be a "price taker" in the sense that any single firm's output will not affect price and the firm must take the market price as given. See HAL R. VARIAN, *INTERMEDIATE MICROECONOMICS* 362-64 (3d ed. 1993).

⁴¹ See C.V. BROWN & P.M. JACKSON, *PUBLIC SECTOR ECONOMICS* 28-30 (4th ed. 1990).

⁴² Sidenbladh, *Current Status of 3G Licensing*, *supra* note 6, at 6 (2000). A six-firm market will have a minimum 1666 Herfindahl-Hirschman Index ("HHI") value. The HHI index describes the market concentration in numerical form. A high HHI is evidence of a high price-to-cost ratio. See Ian Domowitz et al., *Business Cycles and the Relationship Between Concentration and Price-Cost Margins*, 17 *RAND J. ECON.* 1, 1-17 (1986). The HHI is used by the EU and the United States antitrust authorities. See Commission Decision Case 2000/276/EC of 22 September 1999 Declaring a Concentration to be Incompatible with the Common Market and the EEA Agreement (Case IV/M.1524 - Airtours/First Choice), 2000 O.J. (L 93) 1 (preventing a merger between two travel tour operators because of anticom-

European countries have sold only four spectrum blocks.⁴³ Whether tacit or explicit collusion results, there is still a risk of above competitive prices. The distribution system should be designed to minimize the risk of future collusion.

2.2. Revenue Generation for the Sale of Public Property

Spectrum rights represent a valuable asset that is initially owned by the public.⁴⁴ The revenues earned by the sale of spectrum rights can have a significant impact on a country's budget deficit.⁴⁵ During the period in which the European governments were deciding on a method for allocating their spectrum rights, Europe had generally high unemployment and debt levels. Unemployment may worsen if governments attempt to reduce budget debts or deficits by raising taxes.⁴⁶ However, raising revenue through the sale of assets avoids the negative effects of taxation due to crowding out and dead weight loss.⁴⁷

Revenue generation is a parallel goal to the efficient use of an asset and to an efficient market.⁴⁸ The most efficient firms will place the highest valuations on the spectrum rights. They will be

petitive impact); Horizontal Merger Guidelines, *supra* note 15, § 1.5, nn.17 & 18 (as amended 1994).

⁴³ The U.K., the Netherlands, and Italy have each distributed five blocks. Belgium, Czech, Denmark, Finland, France, Spain, Sweden, and Switzerland have each distributed four (note that Switzerland is not a member of the EU and therefore not subject to EU competition law). Austria is planning to provide between four and six blocks. Ireland is planning to distribute three to five blocks. *Licensing Conditions & Status*, *supra* note 8, at 3-5. Four firms have a minimum 2500 HHI rating and five firms have a minimum 2000 HHI rating.

⁴⁴ See *supra* text accompanying note 18 (describing the intellectual change as to ownership of radio frequencies in light of the Coase Theorem). But see Noam, *supra* note 18, at 765.

⁴⁵ For example, the U.K. government debt was a declining £305 billion as of November 2000, with a government surplus of £35.4 billion including the 3G wireless proceeds. The British 3G auction raised £22 billion, which is equivalent to 7.2% of the government's debt. See *Record UK Budget Surplus*, BBC NEWS, Nov. 20, 2000, available at http://news.bbc.co.uk/hi/english/business/newsid_1032000/1032126.stm.

⁴⁶ N. GREGORY MANKIW, *MACROECONOMICS* 103-09 (3d ed. 1997).

⁴⁷ See Paul Klemperer, *What Really Matters in Auction Design*, at 12-13 & n.7 (preliminary draft) (forthcoming 2002) [hereinafter 2 Klemperer], at <http://www.nuff.ox.ac.uk/economics/people/klemperer.htm>.

⁴⁸ *Id.* But see PATRICE GEOFFRON, *PARIS TELECOM, THE GRANTING OF UMTS LICENSES IN EUROPE: INDUSTRIAL AND MACROECONOMIC EFFECTS* 9-10 (2001) at <http://www.enst.fr/egsh/news/fichiers%20pdf/IR15.pdf> (arguing that revenue generation violates the EU's goal of efficient 3G markets and rate schedules).

the most willing to pay for the assets because they would have the lowest costs and, therefore, the highest potential profit margins.⁴⁹ Optimal revenue generation coincides with an efficient market.⁵⁰

2.3. Revenue Generation as a Fee for Franchise Tendering

Government revenue generation may be a goal in itself, but it may also replicate the value of licensing an oligopoly. For instance, many economists propose auctioning off the rights to operate a monopoly rather than employing a regulatory body to enforce an artificial market through price and quality controls.⁵¹ Franchise bidding forces potential monopolists to submit bids and purchase the rights to the monopoly franchise. The most efficient potential monopolist will have the highest valuation and the highest bid, and will win the right to operate the monopoly.⁵² Alternatively, the auction could award the rights to the firm that bids the lowest rates for customers rather than the highest fee paid to the government.⁵³ The winner, as the most efficient firm, would be able to submit the lowest consumer rate schedule. The goal of this auction is to force the firms to bid their marginal cost as their rate schedule. Submission of consumer price schedules would work well in a technologically stagnant industry selling a homogeneous product. However, the 3G wireless services market has continual technological change, and spectrum space can be used to supply various products. The correct monopoly franchise price will be an unknown to the government and the firms. Therefore, if a 3G auction is to replicate a franchise bidding situation, the auctioneer should charge an up-front sales price plus a continuing royalty fee. The winning bid will be the one offering the most lucrative royalty fee. The royalty fee will more properly allocate the risk of the in-

⁴⁹ William Vickery, *Counterspeculation, Auctions and Competitive Sealed Tenders*, 16 J. FIN. 8 (1961), available at <http://links.jstor.org>.

⁵⁰ Revenue generation should be optimal and not maximizing. Maximizing would entail using the winner's curse (discussed in Section 4.1) to inefficiently inflate the price above the asset's value. This distortion will lead to higher input prices, lower profitability, and higher wireless services prices. Wilson, *infra* note 83, at 446-48.

⁵¹ See, e.g., JOHN CULLIS & PHILIP JONES, PUBLIC FINANCE AND PUBLIC CHOICE 134-36 (1992); Martin Cave & Peter Williamson, *The Regulation of British Broadcasting*, in THE REGULATORY CHALLENGE 160, 171-87 (Matthew Bishop et al. eds., 1995).

⁵² See CULLIS & JONES, *supra* note 51, at 134-36.

⁵³ *Id.*

vestment and will act as a discriminatory pricing method for the government.

Franchise bidding is generally used to privatize those traditionally state run operations that are viewed as natural monopolies.⁵⁴ A spectrum rights auction may have, as its goal, revenue generation to compensate the public for post-allocation tacit collusion. A well-designed auction aims, in part, to reduce asymmetric information. However, the government and the other firms do not know each firm's private valuation. In an oligopoly, firms have a private estimate of their post-auction profits. Competition laws can police for illegal explicit collusion. But collusion is often tacit, unknown, and legal under EU competition law.⁵⁵ The government's lack of accurate information will prevent adequate policing of the market. Furthermore, even when collusion is explicit, it may be hard to reveal and costly to prosecute. In an auction, the firms will reveal their valuation (willingness to buy) to regulators. An ascending auction ends when the firms that value other investment opportunities more than they value the oligopoly position in the 3G market leave the auction. As the auction price rises, a firm's costs (mostly sunk costs, but there may be variable costs if royalty charges are part of the sales agreement) will also rise. Thus, potential profits are reduced with each bidding round and the proceeds go to the government treasury. With each bidding round, the revenue generated would approach the oligopoly overcharge that results from collusion.⁵⁶ There would be less need for post-distribution competition law enforcement because the public was compensated *ex ante* through an auction rather than *ex post* through litigation.⁵⁷

⁵⁴ See MICHAEL KLEIN, BIDDING FOR CONCESSIONS 1-3 (World Bank Group, Working Paper No. 1957, 1998) (providing an overview of privatizing and franchise bidding), available at <http://econ.worldbank.org/view.php?type=5&id=777>; Harold Demsetz, *Why Regulate Utilities?*, 11 J.L. & ECON. 55 (1968) (advocating competitive tendering of government run utilities).

⁵⁵ 2 Klemperer, *supra* note 47, at 2-3; *cf. id.* at 17-18 (calling for improved anti-trust enforcement by the EU to prevent explicit collusion in the form of joint ventures).

⁵⁶ As the bidding price increases, the auction price will tend to increase towards the asset's value to an oligopolist rather than to a competitive operator. This is the maximum price an oligopolist will pay before the capital would yield higher returns in another investment.

⁵⁷ The public may only be compensated for an oligopoly or tacit collusion overcharge because an explicit collusion has not yet formed and was not taken into account by the bidders. The explicit collusion will result in higher profits and

2.4. Speed of Implementing an Efficient Market

If spectrum rights are quickly allocated to the most efficient firms, consumer and producer surplus will be maximized.⁵⁸ The public's utility (consumer surplus) will be increased because it will be able to use new 3G wireless services sooner. Profits (producer surplus) will be maximized by reducing transaction costs associated with an inefficient initial distribution of spectrum rights. If the spectrum rights are transferable (like other property rights) but are initially distributed to less efficient firms, then the efficient firms will purchase the assets by merger or acquisition after the auction.⁵⁹ This delay in the process will cost firms, capital markets, and ultimately the consumer, transaction costs in the form of legal and financial services.

A well-designed auction provides the quickest means of distributing assets to the most efficient firms.⁶⁰ Under a licensing system, lottery system, or beauty contest, the asset may, and likely will be, allocated to a less efficient firm. Two outcomes may occur in this setting. First, in line with the Coase Theorem, the most efficient firm will eventually purchase the assets in the private market.⁶¹ Depending on the market structure or regulation, these more efficient firms will purchase the assets directly,⁶² merge with the winning owner,⁶³ or form joint ventures.⁶⁴ The transaction costs

prices than tacit collusion. Otherwise, there would be no incentive to form explicit collusion once the rights to an oligopoly have been purchased.

⁵⁸ 2 Klemperer, *supra* note 47, at 15-16 & n.35 (citing Roger B. Myerson & Mark A. Satterthwaite, *Efficient Mechanisms for Bilateral Trade*, 29 J. ECON. THEORY 265, 265-81 (1983)).

⁵⁹ See ROGER D. BLAIR & JEFFERY L. HARRISON, *MONOPSONY: ANTITRUST LAW AND ECONOMICS* 28-29, 76-77 (1993) (describing a bidding ring where a low bidder resells to a purchaser for a higher value after the auction has taken place).

⁶⁰ McMillan, *supra* note 19, at 145, 147, 159-60.

⁶¹ 2 Coase, *supra* note 18, at 1.

⁶² McMillan, *supra* note 19, at 146 (discussing how a lottery system awarded an unknown company exclusive cellular rights to Cape Cod and then sold the rights to Southwestern Bell for \$41 million).

⁶³ The day after the German auction ended, BT announced plans to double its ownership of Viag, one of the auction winners, from forty-five percent to ninety percent. *BT Deal Strengthens Control Over European Telecoms Network*, FIN. TIMES, Aug. 18, 2000, at 18.

⁶⁴ The winner of the largest U.K. license was TIW, a Canadian company in which Hutchinson Whampoa, the Hong Kong trading group, has a small stake. TIW paid £4.38bn for the license. Hutchinson said it was forming a joint venture with TIW to offer next generation services on TIW's network. See *3G Country Information*, *supra* note 22; see also *infra* note 94.

associated with the redistribution of the assets will delay the efficient use of the spectrum.

The second possible outcome would be a sub-optimal use. If the transaction costs of redistribution are larger than the difference in valuation between the original owner and the most efficient owner, the spectrum rights will not be redistributed to the most efficient firm.⁶⁵ The market will be stagnant on a sub-optimal, yet Pareto-efficient, outcome.

An auction that initially distributes the spectrum rights to the most efficient firm will avoid the transaction costs of delay and a potentially sub-optimal outcome.

2.5. Domestic Favoritism

Although not always an economically efficient goal, governments may prefer to award spectrum rights to domestic firms.⁶⁶ Specifically, governments may have a preference for former state-owned monopoly telecommunications companies. This suspicion has been reinforced by the distribution of 3G spectrum blocks thus far. Sweden, using a beauty contest, was the first and only country to deny a 3G license to its biggest domestic telecom.⁶⁷ Eleven of the other twelve European countries that distributed spectrum rights awarded at least one license to its former state-owned monopoly.⁶⁸ The EU forced a cross-border deregulation of Europe's telecommunications industry.⁶⁹ This deregulation forced EU member states to accept applications or bids from non-domestic firms.⁷⁰ Governments may forgo the auction system in favor of a beauty

⁶⁵ See James M. Buchanan, *Politics, Property, and the Law: An Alternative Interpretation of Miller et al. v. Schoene*, 15 J.L. & ECON. 439, 445-48 (1972) (showing how high transaction costs will stifle the competitive transfer of property rights).

⁶⁶ See *German Phone Auction Bonanza*, BBC NEWS, Aug. 17, 2000, available at http://news.bbc.co.uk/1/hi/english/business/newsid_884000/884203.stm.

⁶⁷ Sweden's former state-owned monopoly, Telia, was denied one of the four 3G blocks. *Swedes Set for Early 3G Phone Coverage*, BBC NEWS, Dec. 17, 2000, available at http://news.bbc.co.uk/1/hi/english/business/newsid_1074000/1074894.stm. Telia later entered the 3G market by forming a joint venture with 3G spectrum winner NetCom AB. Nicolas George, *Swedish Groups Link Up Over 3G*, FIN. TIMES, Jan. 24, 2001, available at http://globalarchive.ft.com/globalarchive/article.html?id=010124001_279; see also *3G Country Information*, *supra* note 22 (summarizing the events of Sweden's 3G spectrum allocation).

⁶⁸ See *3G Auction Guide*, *supra* note 8.

⁶⁹ Viktor Mayer-Schonberger & Mathias Strasser, *A Closer Look at Telecom Deregulation: The European Advantage*, 12 HARV. J.L. TECH. 561, 574-75 (1999).

⁷⁰ *Id.*

contest, despite the Swedish result. A beauty contest provides government discretion and allows the government to ensure that at least one license goes to a domestic telecommunications company.⁷¹

Even when an auction is used, the former state-owned monopoly could still have an advantage. First, it may receive tax advantages, deferred taxation, accelerated depreciation, grants, soft loans, or direct subsidies.⁷² Second, the former state-owned domestic companies may be too big to fail. If the domestic firm has a substantial presence in the domestic economy, it may be politically and economically untenable for the firm to enter bankruptcy. If that is the case, large domestic carriers may be able to inflate their bids well above their true valuation of the asset. If and when the over-payment causes losses, the government may provide assistance.⁷³

⁷¹ Sometimes governments may favor foreign firms. There have been accusations that South Africa awarded a Saudi-backed consortium, Cell-C, the rights to the country's third 3G services license in an obscure auction and beauty contest hybrid, in order to meet various goals. Cell-C is sixty percent owned by Saudi Oger, a Saudi Arabian group, and forty percent owned by thirty-two domestic black empowerment groups. South Africa's President Thabo Mbeki was due to travel to Saudi Arabia the day after the license was awarded to discuss an arms deal between a government-owned arms manufacturer, Denel, and Saudi Arabia. Some of the thirty-two black empowerment groups are now under investigation for arms sales to Saudi Arabia. See Nicol Degli Innocenti, *Mbeki Denies Saudi Influence*, FIN. TIMES, Feb. 19, 2001, available at <http://globalarchive.ft.com/globalarchive/article.html?id=010219008289>.

⁷² Anticompetitive taxes and direct subsidies that favor one corporation or domestic industries over other European competitors are illegal under EU competition and state aid law. See TREATY OF ROME, *supra* note 3, arts. 73, 90, & 92-94 (as in effect 1957) (now articles 86-89); Eighth Survey on State Aid in the European Union, COM(2000)205 final paras. 1-5, 90-92 [hereinafter Eighth Survey on State Aid], available at http://europa.eu.int/eur-lex/en/com/rpt/2000/com2000_0205en01.pdf. "State aid can frustrate free competition by preventing the most efficient allocation of resources and pose a threat to the unity of the single market." *Id.* para. 1.

⁷³ For example, the EU approved state aid to cover losses to the segment of the maritime transportation industry operating "thinly serviced routes." See Eighth Survey on State Aid, *supra* note 72, para. 68 (citing Community Guidelines on State Aid to Maritime Transport, 1997 O.J. (C 205) 5). The two most famous corporate bailouts in the United States are the 1989 savings and loan bailout, and the government assistance offered to Chrysler. See Timothy Canova, *The Transformation of U.S. Banking and Finance: From Regulated Competition to Free-Market Receivership*, 60 BROOKLYN L. REV. 1295, 1330 (1995) (discussing banking industry change, the high rate of bank failures in the 1980s, and the Financial Institutions Reform, Recovery and Enforcement Act of 1989 (FIRREA)); Cheryl D. Block, *Overt and Covert Bailouts: Developing a Public Bailout Policy*, 67 IND. L. J. 951 (1992) (discussing the bailouts of Chrysler and Lockheed).

2.6. Auction as the Best Option

The previously mentioned government goals (other than the anticompetitive domestic favoritism and political goals) can be best satisfied by an auction. In an ideal auction, several goals will be realized because the firm with the highest valuation will pay the highest price and win the auction. First, the winning firm will be the most efficient and the 3G services will be allocated quickly to the most efficient service provider. Second, the government will earn revenues on an asset that costs the public nothing to own.⁷⁴ Third, the revenue will fund government expenditures (whether debt repayment, goods, or services) while avoiding the need to raise the auction revenue amount through taxes. The revenue will also compensate the public ex ante for the ex post oligopoly service overcharge to the consumer.

Once an auction is chosen, auction-specific problems arise. The design of the auction is essential to fulfilling the goals listed above. Game theory, and, more specifically, auction theory, must be used to identify and solve auction pitfalls. No one auction may be appropriate for all industries or commodities, but a properly designed auction provides the best outcome.

The mere fact that applications in a lottery, licensing, or beauty contest scheme outstrip the supply of auction blocks shows that the free market value of the asset is higher than the government's posted price. In an efficient auction, the winner pays a market clearing price. This is the price where supply equals demand and no other bidder is willing to pay more. While a beauty contest may attempt to allocate the assets to the most efficient firms, an auction provides information. Each new bidding round of an auction forces the firm to reevaluate its willingness to pay for the asset. Regulators distributing assets in a beauty contest face an asymmetric information problem that an auction can solve.

3. A BASIC MODEL OF AUCTION ENTRY

Economists Cournot and Bertrand began to model oligopoly behavior in the late 19th century.⁷⁵ The basic lesson of their static

⁷⁴ There will be opportunity costs. The licensee secures the use of the band only for wireless communication services for a set period of time, usually twenty years. The government will be unable to allocate the asset for itself or for other purposes during the length of the license.

⁷⁵ See VARIAN, *supra* note 40, at 472-79; VISCUSI, *supra* note 38, at 108-09, 113.

models is that as the number of competitors rises, the individual firm's effect on price decreases and the market tends towards competitive prices.⁷⁶ At a basic level, auctions are similar to these models. As the number of participants rises, the auction price will tend to rise.⁷⁷ The key difference is that oligopoly market prices tend towards competitive prices while auction prices tend to rise with the efficiency of the price in dispute.

As this Comment will discuss, one of the key factors, if not the key factor, in a successful 3G services auction is whether there is a sufficient number of participants. Firms will make a decision to enter an auction based on the expected value of its outcome as determined by a cost benefit equation:

$$\text{Prob}(B_i > B_j) * (V_i - B_i) > C$$

In the preceding equation, B_i represents the bid of firm i ; B_j represents the bids of all other firms; V_i represents the value of the asset to firm i ; and C is the cost of entering the auction. Firm i will enter the auction if firm i 's expected value of entering the auction outweighs the costs. The expected value of entry is firm i 's perceived probability that its bid will be larger than all other bids times the profit margin of operating the license.

In most introductory game theory literature on auctions, all bidders are assumed to be similarly situated. In the 3G services market, there are known dominant players. Depending on the country, these may include the former state-run monopoly telephone company, existing domestic wireless operators, or the typical line-up of international heavyweight telecommunications companies (AT&T, NTT DoCoMo, BT, Deutsche Telekom, etc.). As a result, the probability of securing a license depends, in part, on the number of dominant firms in relation to the number of spectrum blocks. The number of dominant firms in relation to the number of spectrum blocks determines the revenue potential for the auction.

Third Generation spectrum auctions are games of partially incomplete information.⁷⁸ Potential bidders will know the dominant

⁷⁶ See VISCUSI, *supra* note 38, at 112-15.

⁷⁷ The key difference is that oligopoly models tend towards efficient prices while auction prices rise; the end price in relation to an efficient price is debatable.

⁷⁸ The following assumptions will be used in the ensuing discussion: first, all firms are risk neutral, but risk adverse to a winner's curse; second, each player knows its own valuation of the asset; third, each non-dominant firm's valuation is

firms participating in an auction and may even know the order in which the firms value the spectrum blocks. However, potential bidders are unlikely to know the rank order of the non-dominant firms.⁷⁹ The following table shows the probability that each type of bidder will win a license as the number of dominant firms ("D") changes in relation to the number of spectrum blocks ("N").

	Non-Dominant Firm	Dominant Firm
$N < D$	Prob=0	$0 < \text{Prob} < 1$
$N = D$	Prob=0	Prob=1
$N > D$	$0 < \text{Prob} < 1$	Prob=1

The government is the monopoly seller of the spectrum rights. To maximize profits, the government, as the monopoly seller, would set marginal revenue equal to marginal costs. In a spectrum auction, there are no marginal costs because the government is distributing a public good and not producing a good. Radio spectrum also has unique features. The government owns a set amount of the frequency to distribute. As the number of spectrum rights increase, the size of each block decreases, and so does its quality and value. The change in quality will shift the demand curve horizontally. If the government wishes to maximize profits, it will need to compare profit margins between different demand curves with shifting marginal revenue curves rather than setting marginal cost equal to marginal revenue.

However, when the number of blocks equals the number of dominant firms, the outcome will be known by all potential bidders *ex ante*. The blocks will simply sell at the reserve price. If the auction has fewer blocks than dominant firms, the price of an individual block, absent collusion, will be higher and the bidding will

independently and uniformly distributed; fourth, dominant bidders have low costs to gather information; fifth, non-dominant firms are independent, but are distributed at the upper end of the distribution (possibly as high statistical outliers); sixth, bids are constrained to be no less than the reserved price. All of this is common knowledge. Cf. ROBERT GIBBONS, *A PRIMER IN GAME THEORY* 155 (1992) (listing assumptions in a second price Vickery auction between two independent and uniformly distributed bidders).

⁷⁹ Each bidder assumes that the valuations of non-dominant firms lie on a distribution. This occurs because each non-dominant firm's valuations are independent of each other, and bidders are risk-neutral because this is incomplete information. See GIBBONS, *supra* note 78, at 155-57.

occur only among the dominant firms.⁸⁰ When the number of blocks is larger than the number of dominants, then a non-dominant is guaranteed a block and the bidding will stop when only one non-dominant is left in the bidding. The revenue will be smaller per block than when $N < D$, but it is unclear whether government profits will go lower or higher.

Once risk aversion is taken into account, dominant firms have an advantage. Since they are likely to have superior information about the domestic market (because they are likely to be incumbent firms), they have access to more accurate information than non-dominant firms. Non-dominant firms will discount their bids by varying degrees in relation to the perceived quality of a firm's own information. Two possible outcomes may occur. First, if they overestimate the winner's curse, underbid, and shave their bids more than dominant firms, non-dominant firms' probabilities of winning will decrease. Second, if their information leads them to a private valuation that is higher than the market value, although their probabilities of winning the auction increase, the firms are more likely to suffer the winner's curse. This would further dissuade entry unless the number of spectrum rights up for auction exceeds the number of dominant firms.

As mentioned earlier, government profit maximization is just one goal of the auction. Given adequate frequency space and a small number of incumbent firms, the government should auction more blocks than the number of dominants to counter collusion in the auction and in the 3G services after-market. Decreasing the concentration of the services market will complicate the formation of a seller's cartel by increasing transaction costs.⁸¹

In discussing auction concerns and solutions, governments should focus on factors that affect the decision to enter the auction. Governments need to lower entry costs, ensure a profitable investment from an auction block, and increase the perceived and actual chance that the non-dominants will win an auction block.

⁸⁰ This assumes no firms know the rank order of the dominant firms.

⁸¹ See George J. Stigler, *A Theory of Oligopoly*, 72 J. POL. ECON. 44, 58-61 (1964) (concluding that there is a positive relation between concentration and price).

4. AUCTION CONCERNS

There are three major problems commonly discussed by auction theorists that can markedly affect the outcome of auctions.⁸² The first, the winner's curse, involves the overestimation of the auctioned asset's value and leads to large financial losses for the winner. Second, the number of participants in an auction may be the key factor in determining profitability for the government. Finally, collusion can affect the auction's outcome as well as the efficiency of the 3G services market. The primary focus of this Comment is the last concern, collusion. Auction design can minimize a government's need to rely on competition law to prevent anticompetitive behavior. As such, collusion receives the bulk of the treatment.

4.1. Winner's Curse

This simple and intuitive concept was first observed in a 1971 oil industry journal describing the unprofitable ventures when oil companies won Gulf of Mexico drilling rights at an auction.⁸³ When a firm enters an auction, there are two types of information asymmetries: private values and common values.⁸⁴ Private values are the firm's estimates of its capital stock, labor, and technical knowledge.⁸⁵ Common values are estimates of the technical capabilities of the industry, assets, and consumer demand.⁸⁶ Since no firm currently operates 3G services, all of the exact measurements are uncertain and contain statistical error. The possible estimations

⁸² Although theorists also discuss risk aversion, its relevance to this Comment is minimal because it has a minor effect on bids or participation in bidding unless a descending Dutch auction is used. In a Dutch auction, the auctioneer announces a high price and lowers it until one bidder accepts the price. See John G. Riley & William F. Samuelson, *Optimal Auctions*, 71 AM. ECON. REV. 381, 381-82 (1981). Auction theory literature is quite extensive. For literature guides, see Paul Klemperer, *Auction Theory: A Guide to the Literature*, 13 J. ECON. SURV. 227 (1999), available at <http://nuff.ox.ac.uk/economics/people/klemperer.htm>; Eric S. Maskin & John G. Riley, *Auction Theory with Private Values*, 75 AM. ECON. REV. 150 (1985); or R. Preston McAfee & John McMillan, *Auctions and Bidding*, 25 J. ECON. LIT. 699 (1987).

⁸³ See Capen et al., *supra* note 35, at 641-53 (documenting the winner's curse for the first time); Robert B. Wilson, *Competitive Bidding with Disparate Information*, MGMT. SCI., Mar. 1969, at 446-48.

⁸⁴ See 2 Klemperer, *supra* note 47, at 7, 15-16.

⁸⁵ McMillan, *supra* note 19, at 132 n.7.

⁸⁶ *Id.*

lie on a statistical distribution.⁸⁷ If the true, but a priori unknown, valuation lies within the distribution, the winning high bid has a positive chance of overbidding the asset's true value.⁸⁸ The winner's curse refers to the possibility that the winner will lose money on the venture by overbidding.⁸⁹

Auction participants' fears of falling victim to the winner's curse make them discount their bids based on the perceived risk of the winner's curse.⁹⁰ To this end, increasing information about the spectrum's true economic value and the information's accuracy reduces the possibility and fear of the winner's curse. If the winner's curse is realized, the market is injured. At a minimum, higher wireless prices and sub-optimal usage may result and, at worst, bankruptcy of industry competitors may occur. If the fear of the winner's curse is overcompensated for in the bids, the bids will be lower than the actual value of the asset and government revenue is reduced. Additionally, firms that discount their bids unequally to avoid the winner's curse may cause a less efficient firm to win the auction. Firms discount their valuations differently because each firm discounts based on its belief about the accuracy of its own information and its own risk aversion to the winner's curse.⁹¹

Firms need information on the cost and demand functions of the 3G wireless market. Even information sharing between bidders would reduce the winner's curse. But information sharing causes separate problems of collusion. This will be discussed in Section 4.3.

4.2. *The Number of Participants*

While the winner's curse results in inefficiently high bids that may cause the financial ruin of an industry, attracting too few bidders can cause inefficiently low bids and the loss of potential gov-

⁸⁷ Wilson, *supra* note 83, at 446-48.

⁸⁸ *Id.*

⁸⁹ *Id.*

⁹⁰ Maria Vagliasindi & Pietro A. Vagliasindi, *The Economics of Auctioning and Related Regulatory Issues: The Economic Viability of the Auction Provision of the Bill and Alternatives for Direct-to-Home Licenses*, 5 CARDOZO J. INT'L & COMP. L. 467, 478 (1997).

⁹¹ See McAfee & McMillan, *supra* note 82, at 719 (discussing how different risk-aversions to the winner's curse may cause different discounting of bids). But see Stuart E. Thiel, *Some Evidence on the Winner's Curse*, 78 AM. ECON. REV. 884, 884-86 (1988) (displaying evidence that, in repeated games, the discount rate used to avoid the winner's curse tends towards a standard industry custom rate).

ernment revenues for taxpayers. Government and private auctions have been plagued by a low number of participants.⁹²

First, the winner's curse may dissuade marginal potential entrants from entering the market. Competition theory often discusses contestable markets as a check on anticompetitive behavior.⁹³ If profits rise, the market will attract entrants. Thus, incumbent firms have an incentive to keep prices down to discourage entry. Likely entrants are often those in industries similar to the incumbent firms.⁹⁴ For wireless services, other high tech communication and information providers, such as cable and fiber optic firms, may be potential entrants. However, the fear of informational advantages about the value of the spectrum block by incumbent firms and the possibility of a winner's curse may dissuade their entry.

Second, the technology involved in 3G wireless services creates a situation in which few firms have the ability to operate a 3G network.

Third, bidders do not wish to enter an auction that they expect to lose.⁹⁵ The costs of entering an auction are not trivial. The costs associated with researching the market, developing technology, and purchasing legal and financial services can be excessive.⁹⁶ In a one asset sale, one dominant firm can dissuade other bidders from entering. Without the entrance of other bidders, the final sale to

⁹² See McMillan, *supra* note 19, at 148 (describing how a winning firm bidding NZ\$7 million paid only NZ\$5,000 in a second price sealed bid auction because only two bids were entered); Bulow & Klemperer, *supra* note 36, at 180-96 (showing the value of additional bidders in an ascending auction).

⁹³ Horizontal Merger Guidelines, *supra* note 15, §§ 1.321, 3 (discussing likely entry into the market as a means of ensuring competition); William J. Baumol, *Determinants of Industry Structure and Contestable Market Theory*, in COMPANION TO CONTEMPORARY ECONOMIC THOUGHT 507, 507-22 (David Greenaway et al. eds., 1991).

⁹⁴ See Elizabeth E. Bailey, *Contestability and the Design of Regulatory and Anti-trust Policy*, 71 AM. ECON. REV. 178, 178-83 (1981).

⁹⁵ See 2 Klemperer, *supra* note 47, at 6-7, 10-11 (discussing deterrence in general). As an example, Klemperer presents Glaxo's 1995 takeover of Wellcome for \$9 billion. Both Hoffman LaRoche and Zeneca expressed an interest in excess of \$10 billion. However, the expectation of Glaxo's ultimate success kept these bidders away and Wellcome's shareholders sold out for nine instead of fourteen billion dollars. Bidding incurs non-negligible costs on the participants. Estimates place Glaxo's costs associated with the bidding at \$30 million. *Id.*

⁹⁶ *Id.*; cf. Giddy Bidding, *ECONOMIST*, Apr. 15, 2000, at 36 ("Add to that the fact the bidding companies have spent huge sums already on working out how much a third-generation license is worth to them, and the risk that they are overpaying to get one looks smaller again.").

the dominant firm may be at a price lower than the valuation of the non-participating firms. Their abstention dampens the bids received. This is similar to liquid markets. The greater the number of participants, the more accurate the market clearing price will be.⁹⁷

Auction designers need to structure the auction to attract bidders. To prevent the winner's curse from dissuading entry, the auction or the regulators must provide information about the asset's value. Yet, the auctioneers have an interest in reducing the information given to firms about other firms' valuations of the spectrum rights. Auctioneers may even wish to add a bit of randomness to the auction's outcome to reduce inevitable outcomes.⁹⁸ By auctioning several blocks at once, potential bidders will no longer be dissuaded by one dominant firm. Knowledge as to the four or five most dominant firms may be more asymmetric. Potential firms attempting to be the second or even fifth highest bidder will bid up the price and force the highest bidder to raise its bid above what it would need to bid in a one block auction. In a multi-block auction, each spectrum block is a substitute for every other one. If there is fierce bidding on a block, a bidder may switch to another lower priced block and drive up its price.⁹⁹ The dominant firms will be forced to stay above the bidding prices of the non-dominant firms to secure the blocks that they are expected to secure. In order to attract bidders and to avoid the winner's curse, a balance must be struck between providing information on common values and reducing information on private values.

4.3. Collusion

The harmful effects of attracting too few bidders can be replicated or exaggerated by collusion. Collusion by the bidders depresses prices and lowers the government's revenue. Collusion may also delay the efficient implementation of the market as the cartel members allocate spectrum rights in the secondary market for spectrum rights. This anticompetitive behavior threatens both the 3G auction and the provision of wireless 3G services. Auction structure must hinder and discourage collusion. The following

⁹⁷ VARIAN, *supra* note 40, at 362-64, 448-68.

⁹⁸ 1 Klemperer, *supra* note 28, at 18-19, 19 n.45-46.

⁹⁹ See Paul Milgrom, *Game Theory and the Spectrum Auctions*, 42 EUR. ECON. REV. 771, 777 (1998) (discussing simultaneous ascending auctions in the United States).

Section discusses the factors that facilitate collusion and the structure of a successful cartel and offers auction recommendations to attack each element.¹⁰⁰

Both tacit and explicit collusion may exist. Explicit collusion is punishable under EU competition law only after it has occurred. An oligopoly without collusion is not illegal, but it will cause both price distortions and above competitive profits. Tacit collusion produces similar anticompetitive effects to explicit collusion, but the evidentiary requirements for finding a violation and preventing the anticompetitive effects of an enjoined activity necessitates a different treatment in the law.¹⁰¹ The effects of explicit or tacit collusion and of oligopoly need to be discouraged.¹⁰²

Collusion can influence an auction by lowering prices or, in the market for 3G wireless services, by raising prices and reducing output. Auction design is most useful in preventing auction collusion, but may also be helpful in preventing the facilitating factors of after-auction collusion on the 3G services.

4.3.1. *Factors Facilitating Collusion*

Certain aspects of a market structure can increase the likelihood of a cartel's formation and stability.¹⁰³ Facilitating factors are inherent in the wireless communications industry, but a well-designed auction can reduce their effects. There are three¹⁰⁴ main collusion-facilitating factors: (1) homogeneity of the auction blocks; (2) inelastic supply; and (3) the number of bidders.¹⁰⁵ The

¹⁰⁰ See *infra* Section 5.3.

¹⁰¹ See Robert F. Lanzillotti, *Coming to Terms with Daubert in Sherman Act Complaints: A Suggested Economic Approach*, 77 NEB. L. REV. 83, 93 n.27 (1998) (describing characteristics that predispose a market to price fixing).

¹⁰² Compare BLAIR & HARRISON, *supra* note 59, at 29-30, 44 (arguing that sealed bids stabilize a cartel), and 2 Klemperer, *supra* note 47, at 3-4 (arguing that sealed bid auctions with multiple items and uniform price increase collusion), with McMillan, *supra* note 19, at 152-53 (arguing that multi-round sealed bids reduce collusion as compared to oral multi-round bidding), and 2 Klemperer, *supra* note 47, at 4-5, 10 (adding that sealed bid auctions with various prices paid for the items will attract additional bidders and complicate collusion).

¹⁰³ See also HANDLER ET AL., *supra* note 12, at 520-22; RICHARD POSNER, *ECONOMIC ANALYSIS OF LAW* 287-88 (4th ed. 1992) (listing and characterizing facilitating factors).

¹⁰⁴ Typically, a fourth facilitating factor, industry history, would suit this Section, but European telecommunications industry competition is in its infancy and no history of collusion has occurred or been discovered.

¹⁰⁵ Most literature on facilitating factors discusses cartels in light of the theory of monopoly. Auctions are not selling cartels, but buying cartels. Therefore, the

literature is divided as to whether sealed bids or open bids facilitate buying cartels.¹⁰⁶

4.3.1.1. Homogeneity

Homogenous products allow a simple agreement on price because the auction blocks are fungible.¹⁰⁷ One market clearing price exists. If the good is heterogeneous, the cartel agreement requires both price and quality agreements, which expands the number of dimensions on which the cartel must agree.¹⁰⁸

By differentiating the spectrum blocks' quality¹⁰⁹ and bandwidth size,¹¹⁰ the government can create heterogeneity. This will confuse the cartel. Price cannot be determined by a simple price per frequency. Larger bandwidths allow a firm to provide more wireless services.¹¹¹ Each additional service provides increased economies of sale. Varying the services provided allows for product differentiation in the post-auction market. At the same time, the higher value of larger bandwidth may be unstable because technical progress may one day allow additional services on the limited bandwidth of the smaller spectrum blocks. Cartel mem-

structure of a buying cartel seeks to replicate a monopsony. The change of vantage point and terminology should be kept in mind, particularly when discussing inelastic supply.

¹⁰⁶ Compare 2 Klemperer, *supra* note 47, at 12-13 (arguing in favor of closed bids), and BLAIR & HARRISON, *supra* note 59, at 44, with McMillan, *supra* note 19, at 151-52 (arguing that open bids reduce collusion and decrease the winner's curse).

¹⁰⁷ BLAIR & HARRISON, *supra* note 59, at 44.

¹⁰⁸ *Id.*; George A. Hay, *Facilitating Practices: The Ethyl Case (1984)*, in THE ANTITRUST REVOLUTION: THE ROLE OF ECONOMICS 182, 186-87 (John E. Kwoka & Lawrence J. White eds., 3d ed. 1999).

¹⁰⁹ The government may offer paired or unpaired spectra. A paired band requires more frequencies but contains two portions. One portion sends information to the user while the other simultaneously sends information back. An unpaired band uses less frequency space, but leads to slower service, as the band must switch back and forth between upstream and downstream data traffic. See U.K. RADIOCOMMUNICATIONS AGENCY, INFORMATION MEMORANDUM: AUCTION OF LICENSES FOR UK THIRD GENERATION MOBILE SPECTRUM D.126, D.132 (2000), at <http://www.spectrumauctions.gov.uk/3gindex.htm>; Ericsson, *3G Glossary*, at <http://www.ericsson.com/3g/glossary.shtml> (last visited Jan. 13, 2002).

¹¹⁰ See *id.*; Sidenbladh, *Current Status of 3G Licensing*, *supra* note 6.

¹¹¹ Various uses for 3G wireless services have been recommended: phone, video, fax, data, internet, game devices, etc. See Peter Landers, *Dick Tracy, Meet '3G'*, WALL ST. J., Jan. 18, 2001, at B1 (showing examples of 3G devices); Ericsson Australia, *Third Generation Mobile Systems* (same), at <http://www.ericsson.com/3g/terminals/index.shtml>.

bers would need to agree on a complicated pricing scheme and assign each individual block to a certain cartel member.

4.3.1.2. *Inelastic Supply*¹¹²

Third Generation rights are perfectly inelastic¹¹³ because the government sets a fixed quantity of rights to disperse. Regardless of how low the winning bids are, the government will be selling the same number of 3G blocks. The cartel needs only decide on price and not quantity purchased. The cartel members cannot defect from the cartel by purchasing a greater number of blocks. This simplification facilitates the creation and performance of the cartel. Collusion will increase the already above competitive prices caused by the inelastic supply of spectrum rights.¹¹⁴

The auction structure can reduce the effect of collusion by utilizing a reservation price.¹¹⁵ A cartel may still be successful by paying only the reservation price, but the damages will be mitigated. The reservation price will be set low to attract bidders. If inaccurate information causes the government to set the price too high, bidders will be dissuaded from entering the auction. The reservation price will be deliberately discounted to attract bidders.

4.3.1.3. *Number of Bidders*

The fewer the number of bidders, the lower the transaction costs associated with organizing and monitoring the cartel.¹¹⁶ There are few firms that have access to significant capital and possess the technical ability to purchase a 3G block and operate a 3G service.¹¹⁷ But the inelastic supply means the cartel must organize so that the membership equals the number of auction blocks. Firms will form joint ventures to reduce the number of bidders without excluding members. The cartel must incorporate enough

¹¹² Inelastic demand facilitates the founding of a seller cartel. See McGee, *infra* note 138, at 197.

¹¹³ When a commodity is inelastic, a change in the price has little effect on supply. A commodity is perfectly inelastic when supply stays constant regardless of price. See VARIAN, *supra* note 40, at 265-75.

¹¹⁴ See BLAIR & HARRISON, *supra* note 59, at 44.

¹¹⁵ See McMillan, *supra* note 19, at 148.

¹¹⁶ See BLAIR & HARRISON, *supra* note 59, at 43; cf. Hay, *supra* note 108, at 196-97 (discussing market concentration among oligopoly sellers).

¹¹⁷ Cf. McGee, *infra* note 138, at 197 (associating the number of bidders with low transaction costs to organize cartel behavior and facilitate its founding).

members to include all firms with the willingness, capital, and technical knowledge to purchase a block.

To attack this, the auction rules should prevent joint ventures from bidding. Competition law can be used to police pre-auction mergers, but the EU may not wish to use this preventative method.¹¹⁸ By preventing joint ventures, each individual firm must bid to ensure involvement in the 3G market.¹¹⁹ Because there is an inelastic supply of spectrum rights, joint ventures should be the greatest cause for concern to government auctioneers in 3G wireless auctions.

4.3.1.4. *Industry History*

Industries that have experienced collusion in the past are likely to repeat such behavior.¹²⁰ The relatively recent deregulation of the European telecommunications industry means that collusive behavior among such firms is unlikely. The EU now allows cross-border telecommunication activity and prevents member states from denying foreign competitors access to their markets. History is not a facilitating factor because the European wireless services industry is relatively new.

Still, to prevent incumbents from colluding at auction, the auction should encourage the entry of new participants. As discussed below, the U.K. partitioned its auction by reserving one block (the highest quality block) for ownership by a new entrant and complicated the formation of a cartel.

4.4. *Requirements for Successful Explicit Collusion*

An agreement, a monitoring system, and a sanctioning system are the three key ingredients for a successful cartel. Competition law tries to prevent the existence of all three ingredients. Europe's

¹¹⁸ WHISH & SUFRIN, *supra* note 11, at 702-29 (detailing the EU's pre-merger regulatory regime); *see also* discussion *infra* Section 5.1.

¹¹⁹ A counterargument can be made to the use of such a strategy. Auction rings are discussed below and provide a traditional reason for members not to participate in a government auction.

¹²⁰ *See* VISCUSI, *supra* note 38, at 121-22 (discussing Robert Porter's case study of railroad collusion in the 1880s); Lanzillotti, *supra* note 101, at 102-08 (providing an empirical study displaying the solidification and increased success of duopolists in school milk contract auctions in the Cleveland area). *See generally* RICHARD B. TENNANT, *THE AMERICAN CIGARETTE INDUSTRY: A STUDY IN ECONOMIC ANALYSIS AND PUBLIC POLICY* (1950) (chronicling the history of collusion in the cigarette industry).

wireless auctions need to hinder agreement and monitoring, but should encourage sanctioning.

4.4.1. Agreement

At the most basic level, spectrum bandwidth is fungible. Cartel members can either agree which member will purchase each block or decide on the bids to offer.¹²¹ Because there is perfect inelasticity of supply, setting price and setting quantity cause the same result. The fixed supply forces one of three types of cartel structure. The firms will create joint ventures, organize an auction ring, or engage in bid rigging.

4.4.1.1. Joint Ventures

Because of the inelastic supply of spectrum blocks, a price-fixing cartel cannot include the entire industry. Instead of allocating the quantity of items exchanged, the cartel will organize the number of competitors. The cartel will use joint ventures and mergers to fix the number of cartel members to be no larger than the number of blocks up for auction. The cartel must ensure that the final number of dominant firms is less than or equal to the number of auction blocks.

Auction rules cannot simply block all joint ventures. Some joint ventures may have procompetitive effects.¹²² Mergers and joint ventures may be evidence of the complexity of the industry and the need for capital accumulation, cross-products, customer information, and technical expertise.¹²³

¹²¹ In an ascending bid auction, the cartel will set a price ceiling. In a first or uniform price sealed bid auction, the members will set an exact price. In a second price sealed bid auction, known as a Vickery auction, one cartel member's bid will approach infinity while the other members' bids will approach zero or the reservation price. The highest bidder will win the auction block and pay the second highest price. McMillan, *supra* note 19, at 147-48.

¹²² See TREATY OF ROME, *supra* note 3, art. 85(3) (allowing procompetitive exemptions from horizontal agreements); Regulation 4064/89, *supra* note 13 (allowing approval of procompetitive mergers and joint ventures that support the concept of a unitary European market); Patrick Del Duca & Duccio Mortillaro, *The Maturation of Italy's Response to European Community Law: Electric and Telecommunication Sector Institutional Innovations*, 23 *FORDHAM INT'L L.J.* 536, 560-602 (2000) (describing the requirements for the EU Commission to find a procompetitive exemption under Article 85(3)); see also Horizontal Merger Guidelines, *supra* note 15, § 4 (allowing approval of procompetitive mergers and joint ventures).

¹²³ See Melpomeni Styliadou, *Applying EC Competition Law to Alliances in the Telecommunications Sector*, 21 *TELECOM. POL'Y* 47 (1997) (analyzing telecom joint

Legitimate procompetitive joint ventures and mergers may facilitate the coordination of tacit collusion or serve as circumstantial evidence of an explicit cartel. Both reduce the number of bidders in the auction and can depress prices.

Auction rules against joint ventures or mergers may, at worst, be adverse to the goals of the auction. Joint ventures and mergers may reduce the number of telecommunications firms but may increase the number of firms capable of winning an auction because of accumulation of capital. The low revenues raised in the Dutch 3G auction have been blamed on the approved joint venture between KPN, the former Dutch monopoly phone company, and three of the largest potential entrants, Deutsche Telekom, DoCoMo and Hutchinson.¹²⁴ Since there were five dominant domestic firms, several other dominant firms likely to enter, and five spectrum blocks up for auction, the cartel needed to reduce the number of bidders to five. The Dutch auction had low prices because the eight cartel members organized as five independent actors.¹²⁵

Auction theory may have to rely on competition law's regulatory structure of monitoring mergers and joint ventures. Joint ventures between telecommunications companies fall within the scope of Article 85.¹²⁶ Mergers between telecommunications and non-telecommunications companies are regulated under the MTF.¹²⁷ Mergers under Article 85 have been given lenient exemptions because of economic and political concerns, while MTF mergers and "concentrative joint ventures" have been given closer scrutiny.¹²⁸ Unfortunately, the EU and the MTF more readily allow mergers that pose the greatest possibility for collusive behavior.

Relying on joint venture and merger regulation adds an extra step that can cause delay in the auction and allows joint ventures between dominant and experienced firms. Auctioneers in the individual countries must bar large-firm joint ventures in the auction

ventures approved by the EU for their procompetitive effects in a complicated, competitive, and ever-changing sector).

¹²⁴ Paul Klemperer, *The Flaws of a Dutch Auction*, FIN. TIMES, July 26, 2000, at 19 [hereinafter Klemperer, *Flaws*].

¹²⁵ 2 Klemperer, *supra* note 47, at 20; Klemperer, *Flaws*, *supra* note 124, at 19.

¹²⁶ Styliadou, *supra* note 123, at 48-49.

¹²⁷ *Id.* at 49.

¹²⁸ *Id.* at 49-50, 55, 57-58.

rules and rely on EU oversight only as a backup.¹²⁹ EU and domestic competition authority oversight may be the only way to prevent cartels where members refrained from competitive bidding during the auction but agreed to form mergers or joint ventures after the auction. If the EU and domestic authorities give rigorous oversight of wireless concentration after the auction and if this stringency is known *ex ante*, then cartels may be prevented. Alternatively, the auction rules may specifically restrict transferability of the assets for a period of time unless market conditions change or bankruptcy of a winning firm occurs.

4.4.1.2. Auction Rings

Auction rings agree that only one member will bid to win each auction block.¹³⁰ The auction ring later holds a second auction amongst itself.¹³¹ The illicit profits from the second auction are distributed among the cartel members.¹³² Auction rings still allocate the spectrum blocks to the most efficient winner. However, the ring causes a wealth transfer from the government to the auction ring and delays the implementation of 3G services. There are two ways an auction can prevent auction rings. First, the rules should bar the transferability of the rights to another firm for a set period of time. Second, the rules must prevent the monitoring system needed by the cartel to detect cartel defection.

4.4.1.3. Bid Rigging

Bid rigging supports collusion in the after-market.¹³³ Major bidders will fix their bids to ensure that each member pays the

¹²⁹ 2 Klemperer, *supra* note 47, at 10, 17-18 (noting the detrimental effect of large-firm joint ventures on the Swiss 3G auction, and arguing for more strict government oversight).

¹³⁰ Kathryn M. Fenton, *Antitrust Counseling on Group Buying Issues*, ANTITRUST, Spring 1998, at 23, 23 (citing *United States v. Seville Indus. Mach. Corp.*, 696 F. Supp. 986, 989-90 (D.N.J. 1988) (finding a *per se* violation of Sherman Act § 1 when firms formed an agreement not to bid competitively at a bankruptcy auction and then held a later auction)).

¹³¹ Fenton, *supra* note 130, at 23.

¹³² *Id.*

¹³³ BLAIR & HARRISON, *supra* note 59, at 28-31. Blair and Harrison describe the bid rigging at issue in *American Tobacco Co. v. United States*. The "Big Three" of the American tobacco market fixed prices at tobacco leaf auctions. The companies would only bid on tobacco leaf if the other members were present and all three would pay the same prices. This harmonized cigarette production costs and facilitated a price-fixing cartel. The anticompetitive behavior depressed auction

same price.¹³⁴ The price may or may not be determined ex ante, but the members' bids stay in lockstep with each other.¹³⁵ This is meant to simplify collusion in the 3G services market¹³⁶ rather than in the auction. By fixing the input price of the spectrum blocks, a seller cartel can monitor each member's cost structure more easily and therefore fix the sales price more easily. Bid rigging becomes a facilitating factor of a larger explicit cartel. Bid rigging does not depress the prices of an individual auction.

Because the 3G auction will occur once and is not a repeated series of auctions,¹³⁷ all members of the cartel will be present for the 3G auction. Therefore, depressed prices will not occur and government revenue will not be injured. Spectrum rights will be allocated to the most efficient firms because any successful bid rigging scheme includes them.

However, the auction will facilitate later collusion. To this end, the auction must still prevent bid rigging from creating a future facilitating factor. Avoiding bid rigging requires the auction rules to prevent the monitoring system and encourage a sanctioning system.

4.4.2. Monitoring

The cartel requires a monitoring system to prevent cheating and the loss of the cartel's illicit benefits.¹³⁸ In a standard buying cartel, an individual firm has an incentive to expand its purchas-

prices when less than all of the members were present. The removal of the other two from bidding at other auctions lowered the prices farmers received for tobacco leaf while increasing the price consumers paid for cigarettes. *See also* *Am. Tobacco Co. v. United States*, 328 U.S. 781, 814-15 (1946) (holding that the "Big Three" conspired to establish a monopoly).

¹³⁴ BLAIR & HARRISON, *supra* note 59, at 28-31; Leonard W. Weiss, *The Concentration-Profits Relationship and Antitrust*, in *INDUSTRIAL CONCENTRATION: THE NEW LEARNING* 184, 189-90 (Harvey J. Goldschmid et al. eds., 1974).

¹³⁵ BLAIR & HARRISON, *supra* note 59, at 28-31.

¹³⁶ *Id.*

¹³⁷ The licenses are for twenty years. After that, license renewal may be a forgone conclusion or another auction may be required. Either way, members will view the auction as a one-time transaction.

¹³⁸ *See* BLAIR & HARRISON, *supra* note 59, at 45 (citing Kenneth G. Elzinga, *New Developments on the Cartel Front*, *ANTITRUST BULL.*, Spring 1984, at 3, 3-26); John S. McGee, *Ocean Freight Rate Conferences and the American Merchant Marine*, 27 *U. CHI. L. REV.* 191, 198-201 (1960) (discussing the monitoring behavior of a cartel and the rise in costs associated with a rise in the number of participants).

ing.¹³⁹ This increases demand and price. The benefits of the cartel are diminished.

Due to the inelastic supply of bandwidth in 3G auctions, expansion of the quantity purchased will not occur. Cheating entails raising prices above the agreed-upon price or bidding on a spectrum block not assigned to that firm. The specific type of cheating depends on the type of cartel organized. Cheating in bid rigging is caused when bids are non-identical and the costs of the inputs are changed. Joint venture and merger defection occurs when the joint ventures or mergers collapse and the number of bidders increases, which in turn drives up prices towards the competitive level.

Defection in an auction ring may occur in several ways. The members who agreed to leave the auction early (or not participate at all) may remain in the auction and submit potentially winning bids. Alternatively, those members assigned to win the government auction may refuse to participate in the agreed after-market, or they may bid on a block not assigned to them.

To monitor joint venture and merger defections, the cartels need only follow the business press. Because this type of cartel organizes by fixing the number of bidders rather than sellers, the auction design cannot prevent monitoring. Defection would occur before the auction even begins. To monitor defections in auction rings and in bid rigging, the cartels must observe the bids and the identity of which participants made which bids.¹⁴⁰ No other monitoring device can be used effectively during an auction.¹⁴¹

First, to prevent the monitoring system, the auction should utilize sealed bids. Defection will be more likely among auction rings and bid rigging cartels because the identity of the defector will be protected. Non-bidding members of an auction ring will be able to bid without discovery until the spectrum blocks are allocated to the winning bidders. The bidding members will be able to

¹³⁹ McGee, *supra* note 138, at 202.

¹⁴⁰ An alternative would be a monitoring of capital accumulation or credit options by participating firms as a proxy measure of their bids. This is a poor substitute for observing the bids; accumulation of capital or credit options may be ways of scaring off non-cartel member competition. Alternatively, capital accumulation could be for use in other ventures. Telecommunications companies tend to be complex entities operating in several geographic and product markets, and such activity in the financial markets may be for other ventures.

¹⁴¹ Traditional selling or buying cartels can monitor market prices, market or individual sales (quantity), or input purchases (a proxy for production quantity). Because there is a fixed number of spectrum blocks, the only action that can be taken by the firms is their bid.

bid on a block they preferred but were not assigned to by the auction ring. For the bid rigging cartel, the members will not know the exact price paid by each member. This will cause differentiated input prices and make the formation of a seller cartel in the 3G services market more difficult.

Second, once sealed bids are used, participants will use alternative means of identifying themselves. One common communication method during multi-round auctions is to use the numbers in the bids to signal a player's identity. For instance, in the U.S. PCS auctions, GTE submitted bids ending in the digits 438, which spells out GTE on a telephone keypad. Auctions can easily avoid this by rounding all bids to a standard bid increment. Bidders will constantly attempt to use alternative signaling devices in the bidding and auction designers will need to monitor for new methods.

Third, to reduce the information disseminated, only the highest bids of any one round should be announced. In this way, a signal based on the amount bid will not appear in each and every round. This allows a defecting firm to remove its signal, thus implying a lower bid or a defection from the cartel.

4.4.3. Sanctioning¹⁴²

In any of the three types of buying cartels, sanctioning defection will include the reversion to independent action and competitive prices. Sanctioning auction defection may also result in a traditional sanctioning¹⁴³ action in the 3G services market, or in the prevention of the formation of a later 3G market cartel. In a normal selling cartel, sanctioning commonly includes periods of predatory pricing to force the reformation of the cartel.¹⁴⁴ In an auction, predatory behavior would constitute higher than optimal bids and inevitably lead to a winner's curse. Because the auction is

¹⁴² For examples of seller cartel sanctioning, see William B. Burnett, *Predation by a Nondominant Firm: The Liggett Case (1993)*, in THE ANTITRUST REVOLUTION, *supra* note 108, *passim* (comparing single firm predatory pricing to sanction defection); and Kenneth G. Elzinga, *Collusive Predation: Matsushita v. Zenith (1986)*, in THE ANTITRUST REVOLUTION, *supra* note 108, at 229 (analyzing collusive predatory behavior).

¹⁴³ For example, sanctions for temporary predatory pricing, refusals to deal, or refusal to enter a future seller cartel.

¹⁴⁴ See *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.*, 509 U.S. 209, 243-51 (1993) (Stevens, J., dissenting) (arguing that Brown had engaged in temporary predatory pricing against Liggett (Brooke Group) in the generic cigarette market until Liggett returned to the cartel practice of bi-annual price raises).

a one-time¹⁴⁵ event with a fixed number of auction blocks,¹⁴⁶ the sanctioning system cannot contain predatory behavior during the auction.

The auction rules aim to encourage defection so that the sanction will result. The government's goals are fulfilled by a competitive auction.

5. RELEVANT EU COMPETITION LAW

European competition law¹⁴⁷ and its enforcement by the EU¹⁴⁸ are the central focal points of the following discussion. Although this paper discusses events that occurred in the U.K., Germany, and Italy, analyzing each state's competition law would be outside the scope of this paper and would focus unintended attention on those systems at the expense of other European systems. Additionally, an analysis of each individual country's competition law would be redundant after a discussion of EU competition law. The majority of Europe's national competition laws, both of members of the EU and of countries waiting to join, mirror the EU's competition laws.¹⁴⁹ Further, the EU is now decentralizing competition

¹⁴⁵ If an auction occurs on a regular basis, like for construction contracts or government treasury bonds, the cartel may be more stable. Predatory action may occur in the next round or several rounds before the cartel is reformed. See 1 Klemperer, *supra* note 28, at 29 (describing a U.S. Treasury auction cartel solidified by repeated play); Lanzillotti, *supra* note 101, at 102-08.

¹⁴⁶ Normally when predatory pricing occurs, output increases as the price drops. This causes losses on all firms in the market. Because the 3G spectrum auctions have an inelastic supply of blocks and a homogeneous product, predatory behavior will only effect the price and cannot effect quantity or quality.

¹⁴⁷ For a text on Competition Law in Europe and the U.K., see generally WHISH & SUFRIN, *supra* note 11. The Italian competition law is in its infancy, dating back to only 1990, and it mirrors EU competition law. See DAVID J. GERBER, LAW AND COMPETITION IN TWENTIETH CENTURY EUROPE: PROTECTING PROMETHEUS 408-10 (1998).

¹⁴⁸ The Treaty of Rome did not establish a structure for enforcing the competition law provisions. Later European Council regulation provided an institutional structure. The initial regulations required national governments to cease a competition law investigation or prosecution under the competition laws if the EU began an investigation. This provided national governments with grave disincentives to begin investigations or to take competition law enforcement seriously. See Council Regulation 17 the First Regulation Implementing Articles 85 & 86 of the Treaty, 1962 O.J. 13/204 (establishing the original procedures for the EEC to enforce Treaty of Rome articles 85 and 86).

¹⁴⁹ Henriette Tielemans et al., *Proposed Reforms of EC Competition Law*, ANTITRUST, Fall 2000, at 65, 66; see also GERBER, *supra* note 147, at 392-416 (discussing the recent trend towards convergence of national competition laws towards the EU model). For example, Italian competition law specifically references EU

law;¹⁵⁰ the EU is shifting much of competition law prosecution from the EU courts to the member state court systems.¹⁵¹ As such, member states will enforce EU competition law instead of their domestic competition law.¹⁵² This account is only meant to provide a limited overview of EU competition law as it relates to this Comment.¹⁵³

5.1. Collusion

EU competition law prohibits collusion on prices, quantities, or in any form that distorts competition.¹⁵⁴ This includes buyer and seller cartels.¹⁵⁵ Collusion may be tacit or explicit. Both require a cartel to: (1) affect price, output, or distort competition; (2) monitor member behavior; and (3) sanction cartel defectors. Explicit collusion involves an illegal agreement such as the recent Christie's and Sotheby's price fixing agreement. In the EU, explicit cartel agreements are found to have as their objective¹⁵⁶ a distortion of competition.¹⁵⁷

competition law and states the statute "shall be interpreted in accordance with the principles of the European Community competition law." Competition and Fair Trading Act, Gazz. Uff. No. 240, Law No. 287 of 10 Oct. 1990, § 1.4 (Italy), available at <http://www.agcm.it/eng/tema0151.htm>; see *id.* § 1.1.

¹⁵⁰ EUROPEAN COMM'N, WHITE PAPER ON MODERNISATION OF THE RULES IMPLEMENTING ARTS. 85 & 86 OF THE EC TREATY, Comm'n Programme No. 99/027, v. 28.04.1999, at 20-21, 30-36, available at http://www.europa.eu.int/comm/competition/antitrust/wb_modernisation_en.pdf/.

¹⁵¹ *Id.*

¹⁵² *Id.* at 32-37.

¹⁵³ For a general overview of competition law, see CHRISTOPHER BELLAMY & GRAHAM CHILD, EUROPEAN COMMUNITY LAW OF COMPETITION (5th ed. 2001); SIMON BISHOP & MIKE WALKER, THE ECONOMICS OF EC COMPETITION LAW (1999); WHISH & SUFRIN, *supra* note 11. For a more general overview of the historical development of European competition law, see GERBER, *supra* note 147, at 334-416.

¹⁵⁴ See TREATY OF ROME, *supra* note 3, art. 85; see also Commission Notice of 6 January 2001 of Guidelines on the Applicability of Article 81 of the EC Treaty to Horizontal Cooperation Agreements, § 4, paras. 115-38, 2001 O.J. (C 3) 2 (describing enforcement guidelines against buyer cartels and the correct interpretation of Article 85(1)). Like the Sherman Act, Articles 85 and 86 were brief and their function was to provide the basic law that would be given content in practice. See GERBER, *supra* note 147, at 344-45.

¹⁵⁵ MARTIN COLEMAN & MICHAEL GRENFELL, THE COMPETITION ACT 1998: LAW AND PRACTICE § 7.11 (1999); WHISH & SUFRIN, *supra* note 11, at 396 n.7, 409.

¹⁵⁶ This is analogous to finding an action per se illegal under the Sherman Act. See WHISH & SUFRIN, *supra* note 11, at 16-20, 203-07.

¹⁵⁷ See *id.* at 203-07.

Article 85 of the Treaty of Rome requires an "agreement" to find a competition violation.¹⁵⁸ "Agreement" has been read expansively by the Court of Justice of the European Communities ("ECJ") to include "concerted practices"¹⁵⁹ and not just explicit oral or written agreements. Basic microeconomic theory suggests that oligopoly markets tend to have higher prices and reduced output.¹⁶⁰ The distinction between the natural consequences of oligopoly and the illegal consequences of concerted action is shown via a continuum rather than by a bright line rule. Firm behavior may be parallel or similar, but must be independently reached by each firm. Inefficiencies are the natural result of an oligopoly market, but can be exaggerated by tacit collusion. This exaggeration would be the result of concerted practice by the cartel. The parties can tacitly agree by exhibiting repeated behavior that is commonly described by a repeated prisoner's dilemma game.¹⁶¹ When there are few firms, there are fewer organizational problems for the cartel.¹⁶² This, in turn, means less evidence for prosecutors. Yet, markets with few competitors have the power to form the most egregious anticompetitive cartels through tacit parallel behavior. Without the concerted practices doctrine, the most successful cartels would go unpunished.¹⁶³

It is difficult to establish the line between independent action and tacit collusion.¹⁶⁴ Prosecution of tacit collusion relies on cir-

¹⁵⁸ See TREATY OF ROME, *supra* note 3, art. 85(1); WHISH & SUFRIN, *supra* note 11, at 191-92.

¹⁵⁹ Concerted practices are a broad category of cooperative actions between firms that fall short of an outright agreement. Proving a concerted practice requires direct or indirect evidence of cooperation that is substituted for actual competition. No definitive line separates agreements from concerted practices; both lie on a spectrum of behavior. WHISH & SUFRIN, *supra* note 11, at 191-92, 195-97.

¹⁶⁰ Markets with few competitors are susceptible to higher-than competitive prices, even when the competitors act independently. For a basic analysis of Cournot and Bertrand duopoly, see HAL R. VARIAN, MICROECONOMIC ANALYSIS 285-301 (3d ed. 1992). Oligopoly theory is an extension of the basic Cournot and Bertrand duopoly. *Id.*

¹⁶¹ See DOUGLAS G. BAIRD ET AL., GAME THEORY AND THE LAW 165-67 (1994); GIBBONS, *supra* note 78, at 88-100.

¹⁶² See BISHOP & WALKER, *supra* note 153, at 80-81.

¹⁶³ *Id.*

¹⁶⁴ See Donald F. Turner, *The Definition of Agreement Under the Sherman Act: Conscious Parallelism and Refusal to Deal*, 75 HARV. L. REV. 655, 663-66 (1962) (noting the difficulty in distinguishing independent profit maximizing firm behavior in an oligopoly market from tacit or explicit agreement to increase profits by concerted

cumstantial evidence of parallel behavior.¹⁶⁵ Because an industry with few firms may normally have higher than competitive prices and profits, observed parallel behavior may or may not rise to the level of knowing intent to collude. The European Commission has been overturned several times by the ECJ or Court of First Instance ("CFI")¹⁶⁶ when the courts found insufficient proof of concerted practices.¹⁶⁷ The ECJ has stated that procompetitive or alternative explanations can refute a finding that parallel behavior proves a concerted practice.¹⁶⁸ There are several explanations for why the Court places a high burden of proof on the Commission. Many concerted practices contain no enjoinable activities or agreements. Concerted practices may not involve any illicit behavior (*mens rea*) aside from independent profit maximizing and competitive behavior.¹⁶⁹ The courts are unable to prevent future behavior if no enjoinable activity has taken place.

action); *see also* BAIRD, *supra* note 161, at 166 (discussing models of collusion and parallel behavior in repeated games in relation to antitrust laws).

¹⁶⁵ *See* WHISH & SUFRIN, *supra* note 11, at 197-99 (discussing the proof required by the CFI and ECJ in Article 85(1) cases).

¹⁶⁶ The CFI was established in 1989 to aid the heavy case load burden on the ECJ. In September 1989, the CFI began to hear appeals from Commission competition law cases under Arts. 85 and 86. (State aid in violation of competition laws may be directly appealed to the ECJ.) The ECJ now hears appeals from the CFI in competition cases on points of law but not of fact. *See* WHISH & SUFRIN, *supra* note 11, at 33.

¹⁶⁷ *See* Joined Cases T-79/89 etc., *Re the PVC Cartel: BASF AG and Others v. Commission*, [1992] 4 C.M.L.R. 357 (1992) (finding by the CFI that the Commission failed to prove concerted action); Case 29-30/83, *Compagnie Royale Asturienne des Mines S.A. & Rheinzink GmbH v. Commission*, [1985] 42 C.M.L.R. 688 (1984) (finding by the ECJ that parallel behavior can be circumstantial evidence of concerted action, but is not conclusive when alternative explanations account for the behavior).

¹⁶⁸ Case C-67/96, *Albany International BV v. Stichting Bedrijfspensioenfonds Textielindustrie*, [2000] 4 C.M.L.R. 446 (1999) (preliminary ruling) (citing Commission Notice Concerning Agreements, Decisions and Concerted Practices in the Field of Co-Operation between Enterprises, 1968 O.J. (C 84) 14); *see also* EUR. COMM'N, 14th Annual Report on Competition Policy, point 126 (1994).

¹⁶⁹ Professor Turner concludes that:

Conscious parallelism is meaningless, and in no way indicates agreement, in the absence of some evidence indicating that the parallel decisions of the alleged conspirators were contrary, on the hypothesis of independent individual decision, to their apparent individual self-interest. Conscious parallelism contains no element of agreement where what is involved is simply the independent responses of a group of competitors to the same set of facts, "independent" decision meaning a decision that would have been taken regardless of what competitors decided to do.

EU competition law has been successfully used against collusive behavior by auction participants. In the *European Sugar Industry* case, the Commission found that several different industry practices were incompatible with the Community.¹⁷⁰ In the Italian sugar market, the sugar producer cartel colluded on a tender system. The domestic Italian sugar producers could not adequately supply the Italian market.¹⁷¹ The Italian authorities devised a tender system for other EU sugar producers to supply the domestic sugar producers with adequate quantities to supply the Italian market.¹⁷² This insulated the Italian market from foreign competition by preventing foreign competitors from directly supplying wholesalers or retailers.¹⁷³ French, Belgian, and German producers with excess sugar were forced to sell their sugar to their Italian competitors instead of entering the market directly.¹⁷⁴ The French and Belgian producers organized their tender offers through one company, Sucres et Denrees, so that one price would be submitted.¹⁷⁵ Additionally, the French, Belgian, and German producers divided the quantities they would provide to the Italians through a quota system before submitting their bids.¹⁷⁶ All of these activities were held to be violations of Article 85. This decision established that Article 85 covered collusion among bidders in a tender offer.

More recently, in *Building and Construction Industry in the Netherlands*, the Commission extended its review of bidder behavior to other common anticompetitive behavior.¹⁷⁷ Twenty-eight independent construction associations formed the Statutes of the Vereniging van Samenwerkende Prijsregelende Organisaties in de Bouwnijverheid ("SPO") to regulate contractor bids on tender of-

Turner, *supra* note 164, at 681-82.

¹⁷⁰ Commission Decision 73/109/EEC of 2 Jan. 1974 Relating to Proceedings Under Arts. 85 & 86 of the EEC Treaty (Case IV/26-918, *European Sugar Industry*), 1973 O.J. (L 140) 17 [hereinafter *European Sugar Industry*].

¹⁷¹ *Id.* § I.A.7.

¹⁷² *Id.* § II.A.2.

¹⁷³ *Id.* § II.A.

¹⁷⁴ *Id.* § II.A.2.

¹⁷⁵ *European Sugar Industry*, *supra* note 170, § II.A.2.

¹⁷⁶ *Id.* § II.A.2.

¹⁷⁷ Commission Decision 92/204/EEC of 5 Feb. 1992 Relating to a Proceeding Pursuant to Article 85 of the EEC Treaty (Case IV/31.572 & 32.571 *Building and Construction Industry in the Netherlands*), 1992 O.J. (L 92) 1 (only Dutch text authentic) [hereinafter *Building and Construction Industry*].

fers for construction jobs.¹⁷⁸ When a tender offer is promulgated by a client, the SPO arranges for the construction companies to meet before the bids are submitted.¹⁷⁹ The meetings are overseen by an SPO employee/chairman. The participants then decide by a majority vote on the “entitled undertaking” – the sole contractor allowed to negotiate with the client.¹⁸⁰ The contractors then discuss relevant “technical and economic” data.¹⁸¹ After this discussion, each contractor tells the chairman his intended tender price. The chairman then announces the result to the participants.¹⁸² This decides which contractor will ultimately win the tender at the actual auction, but it will not be at the price that the contractor submitted to the chairman. Instead, the price is subject to certain percentage price increases based on the average tender price submitted. The price increases compensate the SPO and the other contractors for their participation.¹⁸³ This case more clearly defines competition law in competitive tenders to match traditional horizontal collusive behavior. *European Sugar Industry* involved outright price fixing and market division. *Building and Construction Industry in the Netherlands* demonstrates that the Commission will also take action against information sharing and anticompetitive behavior that falls just short of overt price fixing.

Building and Construction Industry in the Netherlands nevertheless shows a basic reason why optimal auction design is needed in 3G auctions. The sheer volume of evidence provided by elaborate meetings and bylaws of the SPO does not actually reveal a very efficient cartel. Instead, the evidence shows the difficulty of running a cartel with 4,200 individual contractors organized into twenty-eight associations. The vast number of participants requires an elaborate monitoring and sanctioning system, which the SPO provides. Third Generation auctions involve very few participants. Microeconomic theory suggests that this market would not need an elaborate sanctioning and monitoring system, nor does it need an explicit agreement to function as a cartel. There would simply be less evidence for the Commission to gather to prove a conspiracy.

¹⁷⁸ *Id.* §§ I.A.-B.

¹⁷⁹ *Id.* § I.D.a.

¹⁸⁰ *Id.* § I.D.b.

¹⁸¹ *Id.*

¹⁸² *Building and Construction Industry*, *supra* note 177, § I.D.b.

¹⁸³ *Id.* § I.D.b.(6).

5.2. *An Anticompetitive Practice Left Legal by EU Competition Law*

Lastly, and most importantly, EU competition law may not even consider all anticompetitive behavior in 3G auctions to be illegal. As discussed in more detail in Sections 3 and 4, there are two types of anticompetitive auction behavior. In addition to buyers' collusive behavior, limited block auctions create an incentive for bidders to merge or form joint ventures before the auction starts. Government asset auctions, like the 3G auctions, have a set number of auction blocks. For example, Country X tenders three 3G licenses. If there are initially four bidders, it would be advantageous for two of the bidders to form a joint venture. That way, there would be three bidders for three licenses, and therefore no reason to bid over the reserve price.

In competitive tenders, the competitors do not compete *in* a market for sales. Instead, they compete in an auction *for* the market. If they win a license, they can participate in the 3G services market. If they do not, they are completely out of the market. In traditional mergers, DG Comp and the Commission look to entry, market shares, market structure, and the HHI index to determine whether the merger will significantly reduce competition.¹⁸⁴ In a bidding market, market shares may not truly represent a firm's power.¹⁸⁵ The presence of even small market share firms in an auction can significantly affect the sale price by driving up the bidding.¹⁸⁶

The EU is quite receptive to the unique characteristics of bidding markets and has approved mergers that would normally raise competition concerns under the HHI index test. In *SNECMA/TI Group*, the Commission allowed SNECMA and TI to form a joint

¹⁸⁴ See, e.g., Commission Decision of 22 Sept. 1999 Declaring a Concentration to be Incompatible with the Common Market and the EEA Agreement (Case No. IV/M.1524-Airtours/First Choice) (only English text official) (exemplifying the EU merger control's use of entry analysis, market share, market concentration and the HHI index), available at http://europa.eu.int/comm/competition/mergers/cases/decisions/m1524_en.pdf; Commission Decision of 3 Apr. 1999, Applying Regulation 4064/89 (Case 399M1365 FCC/Vivendi) (only Spanish text authentic) (discussing the same analysis as above), at http://europa.eu.int/comm/competition/mergers/cases/decisions/m1365_es.pdf; Regulation 4064/89, *supra* note 13, arts. 2, 3.

¹⁸⁵ BISHOP & WALKER, *supra* note 153, § 13.06.

¹⁸⁶ *Id.* § 13.02.

venture to produce airplane landing gear.¹⁸⁷ The approval of this joint venture reduced the number of competitors in the market from four to three, leaving one European and two American companies in the market. The airplane landing gear supply market is similar to a 3G auction. When a supplier bids for a contract with a manufacturer, the supplier submits both a design proposal and a price. Once the contract is awarded, the supplier becomes the sole supplier for that type of aircraft and the manufacturer may not turn to another supplier. The Commission believed that a reduction from four to three competitors would not change the market, because of the presence of the two American competitors.¹⁸⁸

In *Mercedes-Benz/Kässbohrer*, the Commission allowed a merger that reduced the number of bus manufacturers competing in Germany from four to three.¹⁸⁹ It also allowed Mercedes-Benz to create a dominant position in Germany. The Commission noted that bus supply tenders are open to all community manufacturers.¹⁹⁰ Therefore, the high market share of Mercedes-Benz and the high market concentration are not representative of the power small firms have in auctions.

The *Mercedes-Benz/Kässbohrer* decision combines the contestable market theory and the political element of EU competition law. The contestable market theory allows for potential competitors to be taken into account because if the market begins to exhibit rising profit margins, new competitors will be encouraged to enter the market.¹⁹¹ This will, in turn, restore the competitive market. The political element refers to the EU's market integration goals. Mario Monti, EU Commissioner for Competition, stated that competition policy—and specifically merger control—must be enforced to encourage pan-European integration.¹⁹² The Commission has al-

¹⁸⁷ Non-opposition to a Notified Concentration (Case No. IV/M.368-SNECMA/TI Group) 1994 O.J. (C 42) 12; BISHOP & WALKER, *supra* note 153, § 13.11.

¹⁸⁸ *Id.*

¹⁸⁹ Commission Decision 95/354 of 14 Feb. 1995 Relating to a Proceeding Pursuant to Council Regulation (EEC) 4064/89 (Case IV/M.477-Mercedes-Benz/Kässbohrer) 1995 O.J. (L 211) 1 (only German text official) [hereinafter *Mercedes-Benz/Kässbohrer*].

¹⁹⁰ *Id.* para. 106.

¹⁹¹ WHISH & SUFRIN, *supra* note 11, at 11-12.

¹⁹² Commissioner Mario Monti, Remarks at the EC Merger Control 10th Anniversary Conference on the Main Challenges for a New Decade of EC Merger Control (Sept. 15, 2000), available at http://www.europa.eu.int/rapid/start/cgi/guesten.ksh?p_action.gettxt=gt&doc=SPEECH/00/311|0|RAPID&lg=EN.

lowed normally anticompetitive mergers to be consummated if they form pan-European corporations.¹⁹³

Mergers by the bidding firms¹⁹⁴ in 3G tender offers may be similarly outside the reach of EU competition law. If the EU continues to give deference to bidding market mergers because of: (1) the number of competitors mattering more than their market concentrations; (2) a contestable market theory; or (3) political and economic integration promotion, then one of the gravest anticompetitive dangers in 3G auctions will go unregulated. In this area, auction design is not only the most efficient preventative measure against anticompetitive behavior, it is the only preventative measure.

If only a few firms decide to compete in an auction, the EU will approve a joint venture under the contestable market theory and permit the numerous wireless or telecommunications companies to participate in the current or the next 3G auction if they wish. After all, the EU would note that 3G license tenders are open to all EU member state telecommunications companies, and the market may be defined as the entire list of wireless and telecommunications firms.¹⁹⁵ Under this pan-European market definition, the merger for Country X's auction would not be a market contraction from four to three firms, but, for example, from thirty to twenty-nine European firms that are capable of participating in the auction. Under this market definition, the merger would not strengthen or create a dominant position (or significantly alter the HHI).

¹⁹³ Compare Commission Decision of 14 March 2000 Declaring a Concentration to be Incompatible with the Common Market and the Functioning of the EEA Agreement (Case No. COMP/M.1672 Volvo/Scania) (only English text official) (denying the proposed merger when it created a dominant position in five of fifteen member states and combined two Scandinavian based companies), available at http://europa.eu.int/comm/competition/mergers/cases/decisions/m1672_en.pdf/, with Commission Decision of 1 Sept. 2000 Declaring a Concentration to be Compatible with the Common Market (Case No. IV/M.1980-3 Volvo/Renault) 2000 O.J. (C 301) 23 [hereinafter Volvo/Renault] (approving a merger despite creating a dominant position in four of fifteen member states because it was a pan-European merger creating a Swedish-French corporation).

¹⁹⁴ See *supra* Sections 4.3.1.3., 4.4.1.1.

¹⁹⁵ Cf. Mercedes-Benz/Kässbohrer, *supra* note 189 (defining the geographic market for potential abuse as Germany, but discussing the supply-side substitutes as a Europe wide market); Volvo/Renault, *supra* note 193 (allowing a merger for its integration qualities).

However, there is a reasonable distinction between *Boeing/McDonnell Douglas*,¹⁹⁶ *SNECMA/TI Group*, *Mercedes-Benz/Kässbohrer* and the 3G license tenders. In each of these three cases, the number of firms remained greater than the number of contracts up for tender in a given auction.¹⁹⁷ The tenders gave the remaining firms an incentive to compete.¹⁹⁸ In 3G auctions, joint ventures and mergers may result so that the number of remaining auction participants equals the number of 3G licenses on offer. If a merger or joint venture is referred to the EU for pre-merger approval under Regulations 4064/89 or 1310/97, the Commission may find that the reduction in competitors does substantially lessen competition.¹⁹⁹ To the Author's knowledge, no EU case or decision thus far has looked into this question.

5.3. Prosecutorial Inefficiencies

Auction design is crucial to preempt collusion by auction bidders. First, not all violations will be prosecuted because the European Commission has limited resources.²⁰⁰ Second, oligopoly markets without collusion still exhibit anticompetitive effects. Third, even when prosecuted by the Commission, not all violations will be remedied. The ECJ and the CFI require a higher burden of proof in parallel behavior and concerted action cases than in explicit collusion cases. Fourth, even when prosecuted, the court system is overburdened with cases²⁰¹ and preliminary rulings on

¹⁹⁶ Commission Decision of 30 July 1997 Declaring a Concentration Compatible with the Common Market and the Functioning of the EEA Agreement (Case IV/M.877 Boeing/McDonnell Douglas) 1997 O.J. (L 336) 16.

¹⁹⁷ See also *supra* Section 4.3.1.3.; *infra* Section 6.3.

¹⁹⁸ See BISHOP & WALKER, *supra* note 153, §§ 13.03-.04.

¹⁹⁹ Compare Regulation 4064/89, *supra* note 13 (denying EU approval to a merger that "creates or strengthens a dominant position"), with Horizontal Merger Guidelines, *supra* note 15, §§ 0.1, 1.0, 2.0 (using the "likely substantially to lessen competition" standard for pre-merger reviews). The EU standard seems to set a higher bar for the antitrust regulator to block a merger.

²⁰⁰ The Commission only published thirty-nine cases under Articles 85 and 86 in 1999. See generally EUROPEAN COMMISSION, COMPETITION: ANTITRUST CASES CLOSED BY FORMAL DECISIONS 85/86 1999, at <http://europa.eu.int/comm/competition/antitrust/closed/en/ind1990.html#1999> (last visited Jan. 11, 2002) (listing the formal decision cases).

²⁰¹ The CFI has fifteen judges that sit in chambers (panels) of three or five judges. See Court of Justice, *Composition and Organization*, at <http://curia.eu.int/en/pres/co.htm>. The CFI's competition caseload has increased from 25 to 36 filed cases. The CFI's total caseload also increased; from 220 cases filed in 1996 to 387 cases filed in 2000. See Court of Justice, *Statistics of Judicial Activity of the Court of*

competition law.²⁰² Fifth, tacit collusion is probably more common than explicit cartels, which are easier to prosecute.²⁰³ Auction design, rather than competition law, is the best preventative method.

Auction design is also needed because competition law is bureaucratically inefficient. The Directorate of Competition ("DG Comp")²⁰⁴ is responsible for investigating competition violations and reporting its findings to the European Commission.²⁰⁵ The Commission then decides how to proceed with the information. Because of the Commission's heavy workload (only 68 cases out of 1013 open cases were formally decided in 1999),²⁰⁶ only the most serious violations end in a finding of violation by the Commission.²⁰⁷ Since the reform of the European Court system in 1988,²⁰⁸

First Instance 2000, Table 5, at <http://curia.eu.int/en/stat/st00tr.pdf>; Court of Justice, *Statistics of Judicial Activity of the Court of First Instance 1998*, tbl. 5, at <http://curia.eu.int/en/stat/st98tr.pdf>.

The ECJ has fifteen judges that sit in chambers of three or five judges, but may also sit in plenary session (en banc) when a member state government is a party and requests a plenary session. See Court of Justice, *Composition and Organization*, *supra*. In 2000, the ECJ received twenty-two competition case filings of the 500 total filings (4.4%) and 803 pending cases on Dec. 31, 2000. See Court of Justice, *Statistics of Judicial Activity of the Court of Justice 2000*, tbls. 11 & 14, at <http://curia.eu.int/en/stat/st00cr.pdf>.

²⁰² National courts can ask for preliminary rulings on points of EU competition law. However, the ECJ has warned member states that about half of its docket is taken up by preliminary rulings, and that the court structure and resources can no longer cope. Ian Forrester, *Modernization of EC Competition Law*, 23 *FORDHAM INT'L L.J.* 1028, 1056-57 (2000).

²⁰³ See 2 Klemperer, *supra* note 47, at 1-4, 14.

²⁰⁴ DG IV is headed by Directorate-General Alexander Schaub, a German career bureaucrat, and overseen by Commissioner Mario Monti, an Italian academic. Monti is the Commissioner for Competition Policy, one of the seventeen commissioners of the European Commission. The Commission is the executive branch of the EU and operates as a cabinet containing commissioners from all EU member states. See EUROPEAN COMMISSION, COMPETITION DIRECTORATE-GENERAL (providing an overview of the EU Commission and DG Comp), at http://europa.eu.int/comm/dgs/competition/index_en.htm (last visited Jan. 11, 2002).

²⁰⁵ See WHISH & SUFRIN, *supra* note 11, at 32.

²⁰⁶ EUROPEAN COMMISSION, XXIXTH REPORT ON COMPETITION POLICY 1999, at 57-58 figs. 2-3 (1999) (displaying caseload statistics from 1993 to 1999), at http://europa.eu.int/comm/competition/annual_reports/1999/ (last visited Feb. 8, 2002). Domestic courts of the member states can also allow prosecution under EU competition law subject to appeal to the ECJ. Forrester, *supra* note 202, at 1034.

²⁰⁷ WHISH & SUFRIN, *supra* note 11, at 285 n.5 (showing monetary fines against violators ranging from 57.85 million to 75 million ECU).

²⁰⁸ Council Decision 88/591/ECSC, EEC, Eurotom of 24 October 1988 Establishing a Court of First Instance of the European Communities, 1988 O.J. (L 319) 1.

Commission decisions are subject to appeal to the Court of First Instance.²⁰⁹ The CFI's main role is to monitor fact-finding disputes, but it also writes opinions of law. Points of law are then subject to appeal to the Court of Justice. Generally, the ECJ upholds CFI decisions.²¹⁰ The ECJ itself has a tremendous workload, stemming from its work on competition law cases and the other matters in its jurisdiction, and is therefore unable to cope with all of the appeals.²¹¹

²⁰⁹ See generally Court of Justice, Rules of Procedure of the Court of Justice of the European Communities of 19 June 1991, 1991 O.J. (L176) 7 (establishing allowable appeals from the Commission to the CFI and from the CFI to the ECJ).

²¹⁰ WHISH & SUFRIN, *supra* note 11, at 32-33.

²¹¹ *Id.* at 32-33, 285-88; see also *supra* note 201 and accompanying text.

6. EVALUATING THE U.K., GERMAN, AND ITALIAN AUCTION REGULATIONS²¹²

²¹² The Dutch auction would have also been appropriate for comparison, but is not analyzed because of the difficulty in obtaining a publicly available English language text of the auction rules. The Dutch auction occurred after the British and German auctions. The Netherlands auctioned five blocks in two sizes (three of the five bands were larger than the other two). Initially, eight firms decided to enter the auction and everything looked as if it were going as planned. See *3G Country Information*, *supra* note 22. Minutes before the start, two bidders pulled out. Hutchinson 3G, a dominant firm in wireless services, pulled out by forming a joint venture with KPN (the former Dutch telephone monopoly) and NTT DoCoMo (the major Japanese wireless provider) for all future European 3G auctions. Such a loss put the auction in jeopardy because five dominant Dutch incumbent competitors and one newcomer remained in the auction for five licenses. The outcome was clear. After 297 rounds of bidding on July 21, 2000, Versatel, the newcomer, withdrew from the auction. See Eric van Damme, CPB Netherlands Bureau for Economic Policy Analysis, *The Dutch UMTS Auction in Retrospect*, at 28-29, available at http://www.cpb.nl/nl/cpbreport/2001_2/s2_2.pdf. Versatel accused Telfort (British Telecom's Dutch subsidiary and one of the winning firms) of: (1) illegally trying to fix bids during a meeting between Versatel and Telfort representatives in the days before the auction; and (2) threatening legal action if Versatel continued to bid in the auction. See Clayton Hirst, *Threat to BT as Regulators Probe Dutch Phone Auction*, INDEPENDENT (London), Jan. 14, 2001, at 1, available at 2001 WL 2787360. Versatel also claimed that such a communication during the auction amounted to a violation of the auction rules. See *Versatel Goes to Court Over UMTS Licence [sic]*, HET FINANCIEELE DAGBLAD, Apr. 10, 2001, available at 2001 WL 4346151 (dismissing Versatel's suit when the court found that the communication during the auction did not violate the rules and that it had no effect on the auction outcome). For its part, Telfort believed that Versatel remained in the auction to drive up the cost of the 3G licenses for the winners while not actually wanting a license. Telfort accused Versatel of manipulating the cost structure of 3G service providers while Versatel remained a 2G provider. Some commentators believe that Versatel's strategy was to enter the auction to force a dominant firm to form a 3G joint venture with it. See van Damme, *supra*, at 28. This was obviously legal as Hutchinson 3G, KPN and NTT DoCoMo had done just that. Also, in the days preceding the auction, Versatel's website expressed its desire to form a 3G alliance in the Netherlands. See *id.*

The Netherlands Competition Authority ("NMa") raided the offices of both companies in November. See Press Release, Netherlands Competition Authority, *NMa Starts Investigation into the Situation Surrounding the UMTS Auction* (Nov. 3, 2000) [hereinafter NMa Press Release], at <http://www.nma-org.nl/english/press/pr0024.htm>. The authorities operated under the theory that the two companies had met in the days before the auction to coordinate their auction behavior. To add to NMa's suspicion, Versatel and Telfort were already partners in a fixed-line telephone venture in the Netherlands. Telfort and BT claim that the purpose of the suspicious meeting was to discuss issues related to the joint venture and not to discuss the auction. See Hirst, *supra*. In fact the raids occurred two days after a Telfort representative, testifying at a government hearing, stated that representatives of the two parties had met. See van Damme, *supra*, at 28; NMa Press Release, *supra*; *3G Country Information*, *supra* note 22. Three months later the NMa closed the investigation because it had found no antitrust violations. See "*Versatel and*

Each of the three auction systems discussed below contains flaws. The U.K. system successfully prevented collusion, but suffered from the winner's curse. Germany offered a somewhat elastic supply of spectrum blocks at the risk of collusion in both the auction and the 3G services market. The German auction also suffered from the winner's curse. The Italian auction's disastrous outcome exemplifies the need for proper auction design. Each country's regulation was passed by its relevant telecommunications authority rather than by its legislature, which allowed those with greater expertise to design the auction. Each country also provided a highly detailed regulation. The following analysis highlights the key provisions that made successful outcome more or less likely.

6.1. *The United Kingdom*

Britain was the first country to competitively tender 3G spectrum rights.²¹³ After seven weeks and 150 bidding rounds, five spectrum blocks were distributed.²¹⁴ The British auction successfully prevented collusion. The tendering raised £22.5 billion (\$36 billion or 630 Euro per capita),²¹⁵ three hundred percent above the government's original expectation.²¹⁶ Several key auction design elements provided such an impressive outcome.

First, the auction offered one more block for sale than the number of domestic incumbents. Four firms operated wireless services in the U.K. and five blocks were auctioned.²¹⁷ This ensured a positive probability of success for potential new entrants and encouraged their participation in the auction. It also ensured greater competition in the wireless services market after the auction, which is especially important given that the four current U.K. firms are

Telfort Did Not Conspire During UNITS [sic]-Auction, DE VOLKSKRANT, Feb. 23, 2001, at 2, available at 2001 WL 4717384.

²¹³ *Licensing Conditions & Status*, *supra* note 8, at 5.

²¹⁴ *3G Country Information*, *supra* note 22.

²¹⁵ *Id.*; 2 Klemperer, *supra* note 47, at 20.

²¹⁶ *Mobile-Phone Commerce and Europe's Licence Auctions*, ECONOMIST, July 8, 2000, available at 2000 WL 8142756.

²¹⁷ The Wireless Telegraphy (Third Generation Licenses) Notice 1999, § 4.3.37 (Dep't of Trade & Indus.) (Dec. 22, 1999) [hereinafter *The Wireless Telegraphy Notice*] (detailing the auction rules promulgated by the Patricia Hewitt, the Minister for Small Business and E-Commerce), at http://www.spectrumbauctions.gov.uk/wireless_telegraphy.htm.

under investigation by the Office of Telecommunications (“OfTel”) for price fixing.²¹⁸

The fifth block encouraged nine potential entrants to join the four incumbents in the auction. TIW, a Canadian company, won the rights to the fifth block and joined the four domestic firms, One-to-One, BT, Orange, and Vodafone-Airtouch,²¹⁹ in providing 3G wireless services.

Second, the blocks were not homogeneous. One large block, three identical small blocks and one mid-sized block were auctioned.²²⁰ This reduced the ability of a cartel to organize and collude on the prices of each block. It also reduced cartel behavior in 3G services because inputs would not be homogeneous for competitors.

Third, the largest block was reserved for a non-incumbent firm,²²¹ and each bidder could only purchase one block.²²² This ensured new entry and guaranteed the new entrant the highest quality block, giving the new entrant a quality advantage to successfully enter the 3G service market. However, new entrants were allowed to bid on any block. Therefore, the unreserved blocks were substitutes for the reserved block. This ensured a high price for each auction block and not just for the reserved block.²²³

Fourth, the auction regulators monitored for anticompetitive joint ventures and cross-ownership. As discussed in Section 5.2., such behavior may be beyond the reach of EU competition law. In order to be eligible to enter the auction, firms had to submit ownership forms that listed all entities that owned at least fifteen percent of the firm.²²⁴ The regulator could have blocked joint ventures deemed anticompetitive. This prevented cartels from narrowing the field of bidders.

²¹⁸ The present U.K. wireless market is the focus of a competition law investigation for possible collusion. See Ben Hunt, *UK Regulator Questions Mobile Phone Pricing*, FIN. TIMES, Feb. 7, 2001, available at <http://globalarchive.ft.com/globalarchive/article.html?id=010207006939>.

²¹⁹ *3G Country Information*, *supra* note 22, at 9.

²²⁰ The Wireless Telegraphy Notice, *supra* note 217, § 4.3.37(b).

²²¹ *Id.* § 3.4.

²²² *Id.* § 4.7.1.

²²³ BISHOP & WALKER, *supra* note 153, §§ 13.03-.04.

²²⁴ The Wireless Telegraphy Notice, *supra* note 217, § 3.7 (requiring the listing of all persons, consortiums, or companies that owned over 15% of the cooperation or group).

Fifth, the auction prevented cartel monitoring. At the end of each round, the highest current bid was announced. However, the identity of the winner was not disclosed,²²⁵ and submitted bids were rounded up to the nearest £10,000 to prevent signaling.²²⁶

Lastly, the auction would not have taken place if less than seven bidders were approved to participate in the auction.²²⁷ This ensured that the auction would not proceed unless there was sufficient interest and liquidity. Thirteen bidders entered the U.K. auction, ensuring a high price for the government assets.²²⁸

The U.K. auction was hailed a success in the press. Yet, earning three hundred percent above expectations is evidence that a winner's curse probably occurred. Third Generation wireless provision is a high risk venture. The market demand, costs, and technical developments are all unknowns. Bids should have been shaved, not exaggerated, to ensure the financial health of the industry. Following the analysis of the German and Italian auctions, this Comment will discuss the winner's curse problem in the U.K. and German auctions.

6.2. Germany

Like the U.K. auction, the German spectrum rights sold well in excess of their expected value. Germany raised DM98.8 billion (\$46.26 billion, or 615 Euro per capita).²²⁹ After fourteen days and 173 rounds of bidding, six firms won spectrum rights.²³⁰ Unlike the U.K. auction, the German bidding rules did not seem to fully prevent collusion during or after the auction. However, Germany raised \$10 billion more than the U.K.²³¹

Germany used an unlimited multi-round auction.²³² Before the auction began, potential bidders had to pass a preliminary stage.

²²⁵ *Id.* § 4.3.11.

²²⁶ *Id.* §§ 4.3.17, 4.3.26.

²²⁷ *Id.* § 3.6.1.

²²⁸ 2 Klemperer, *supra* note 47, at 19-20.

²²⁹ Sidenbladh, *Current Status of 3G Licensing*, *supra* note 6, at 9; 2 Klemperer, *supra* note 47, at 32.

²³⁰ 3G Country Information, *supra* note 22.

²³¹ Despite this impressive difference, the German auction only raised 98% of the per capita revenue raised by the U.K. auction. See 2 Klemperer, *supra* note 47, at 23.

²³² Rules for Conduct of the Auction for the Award of Licenses for the UMTS/IMT-2000: Third Generation Mobile Communications, v. 18.2.2000 (BK-1b-98/005-2), § A(3.2) (F.R.G.) (translated by President's Chamber for promulgation,

Regulators based approval on the technical and financial ability to purchase the spectrum and operate a 3G network.²³³ Each bidder was required to submit ownership and joint venture statements as well as applications listing its wireless operations in other countries.²³⁴ This allowed pre-auction monitoring for cartel attempts to reduce the number of bidders through joint ventures.

To prevent cartel monitoring, the auction separated the bidders into several rooms in the auction building.²³⁵ The bidders submitted their bids through an auction computer system and fax machines.²³⁶ The bids were to be submitted in DM100,000 increments.²³⁷ These combined measures prevented monitoring, signaling, and communication between bidders during the auction. However, the auction failed to fully prevent monitoring. At the end of each forty minute round the identity of the highest bidder was announced.²³⁸ This could enable a cartel to monitor member behavior.

The German auction was unique because it auctioned a varied number of licenses, but a fixed number of blocks. Twelve spec-

only German text shall prevail) [hereinafter German Rules for Conduct of the Auction], at <http://www.regtp.de/en/index.html>.

²³³ Determinations and Rules for the Award of Licenses for the UMTS/IMT-2000: Third Generation Mobile Communications, v. 18.2.2000 (BK-1b-98/005-1), §§ 1, II.Re 1 (F.R.G.) (translated by President's Chamber for promulgation, only German text shall prevail) [hereinafter German Determinations and Rules for Award], at <http://www.regtp.de/en/index.html>; German Rules for Conduct of the Auction, *supra* note 232, § A(1).

²³⁴ German Determinations and Rules for Award, *supra* note 233, § 1; *see also id.* at 12-13 (stating the need for would-be bidders to guarantee availability of means of production so as to prove that they have the financial means to acquire a license).

²³⁵ German Rules for Conduct of the Auction, *supra* note 232, §§ A(3.1)-(3.2). Germany used a former United States military base to house the auction. *See Germany Starts Mobile Auctions*, BBC NEWS, July 31, 2000, available at http://news.bbc.co.uk/1/hi/english/business/newsid_856000/856099.stm/.

²³⁶ German Rules for Conduct of the Auction, *supra* note 232, § B(8). However, it seems from the press that this was not adequate. Since the bids were so high, the last several allowable digits were no longer of consequence to the auction value. Attempts at signaling by Vodafone-Mannesman have been alleged. Vodafone-Mannesman was ending its bids in a non-zero number. *See* 2 Klemperer, *supra* note 47, at 2-3, 23-24; Bertrand Benoit et al., *Italy Demands Inquiry into 3G Phone Auctions*, FIN. TIMES, Oct. 31, 2000, at 1 (reporting that Germany has declined to investigate the charges due to the high revenues of the auction and the difficulty of proving that the signal was intended, received and effective under competition law).

²³⁷ German Rules for Conduct of the Auction, *supra* note 232, §§ B(3.6), B(5.3).

²³⁸ *Id.* § A(3.8).

trum blocks were auctioned, but participants had to bid on two or three blocks in each round.²³⁹ Therefore, four to six firms would win a license of either two or three blocks. Each block was a narrow paired band of frequency. The multiple combinations of frequency meant the spectrum quality was variable. This reduced the facilitating factors for collusion by varying quantity and quality of the spectrum.

Having only five dominant firms in Germany meant that if six licenses were to be awarded, a new entrant was guaranteed. The after-market would be more competitive.²⁴⁰ The auction would attract non-dominant bidders and drive up the price of all blocks because each block was a substitute for every other block.²⁴¹ However, if only four licenses were purchased, then the five domestic wireless companies would compete for the rights to a four member oligopoly.²⁴² This would have driven up the auction revenues, but would have reduced later competition. A danger would exist if the five dominant firms were to signal their intent to divide the available blocks into five groupings. This would dissuade non-dominant firms from entering the auction because their probability of success would be extremely low.²⁴³

Perhaps collusion was prevented by the confusion of the variable four-to-six winner system. Having four or six winners meant having identical quality spectrum purchases (all two or all three blocks each). Five winning firms would have resulted in two firms owning three blocks and three firms owning two blocks. A cartel would have a difficult time organizing which members were to own two or three blocks and at what relative prices each were to be fixed. Varied spectrum size would also complicate a services mar-

²³⁹ German Determinations and Rules for Award, *supra* note 233, at 70-73; German Rules for Conduct of the Auction, *supra* note 232, § B(1).

²⁴⁰ To further facilitate 3G competition, phone numbers were assigned in blocks to each winning telecom. However, once a number is assigned to a customer, the customer owns the number. When the customer decides to switch telecoms, the phone number is portable. German Determinations and Rules for Award, *supra* note 233, at 25. This may seem small, but it is an important facilitator of competition in the 3G services market.

²⁴¹ German Rules for Conduct of the Auction, *supra* note 232, §§ B(3.2)-(3.4).

²⁴² 2 Klemperer, *supra* note 47, at 22, 23 n.54 (declaring the German auction lucky despite risking an overly concentrated services market by possibly awarding only four blocks).

²⁴³ *Id.* at 22-24.

ket cartel because the difference in bandwidth would lead to differences in cost structures and the quality of services.

The greatest prevention against collusion may have been the "Prohibition of Collusion" section of the 3G auction regulation.²⁴⁴ The "Prohibition of Collusion" exists separately from the EU or German competition laws.²⁴⁵ If the regulator discovers collusion, the spectrum is revoked, and the fine equals the amount bid by that company in securing a license.²⁴⁶

To protect the government from discovered or undiscovered cartel effects, the auction used both a reserve price and a version of a royalty scheme. The reserve price of each block was DM200 million (\$185 million or 204 million Euro).²⁴⁷ The royalty scheme would charge firms an operations fee if the auction earned the government less than the government's administrative cost.²⁴⁸ The reimbursement for administrative cost was set at only DM5 million per license, well under the reserve price. This would have only become an issue if the auction was a disaster and needed to be rerun at a lower reserve price.²⁴⁹

The German auction succeeded in preventing the occurrence of collusion. The revenues greatly exceeded expectations. As in the U.K. case, the auction design did not adequately account for the winner's curse. The winner's curse did not dissuade entry from either the British or German auctions because they were the first two auctions of 3G services. However, their excess prices have already hurt the industry, as share prices in Europe's telecom sector continue to fall and corporate debt burdens rise. The high prices in Germany's auction were exaggerated because the minimum bid in any one round had to exceed the previous high bid by ten percent.²⁵⁰ Bids escalated quickly and were difficult to control. This may prove fatal for the German and British wireless markets. They may suffer from a delayed launch of 3G services and reduced tech-

²⁴⁴ German Rules for Conduct of the Auction, *supra* note 232, § B(9).

²⁴⁵ *Id.* §§ B(9.3), Re B(9.3).

²⁴⁶ *Id.* §§ Re B(9.1)-(9.2).

²⁴⁷ *Id.* § A(1.3).

²⁴⁸ German Determinations and Rules for Award, *supra* note 233, at 26-27.

²⁴⁹ *Id.*

²⁵⁰ German Rules for Conduct of the Auction, *supra* note 232, § Re B(5) (forcing the minimum bid to be 10% until the auctioneer determines bids are high enough and wishes to reduce the increment to 5% or 2%).

nical development because of the capital resources diverted to auction debts.

6.3. Italy

The Italian 3G tender raised little revenue. The auction collected only 12.16 billion Euro as opposed to the 20 to 30 billion Euro that Italy had expected (240 Euro per capita, and only 40% of the per capita U.K. revenues).²⁵¹ The auction design contained several flaws. Not all of the flaws played a role in the outcome because the auction ended after just ten rounds. The joint venture between British Telecomm ("BT"), seven non-telecom Italian companies, and Blu, an Italian telecom, pulled out of the auction over a shareholder dispute.²⁵² This left only five bidders for five licenses.²⁵³

Italy had four incumbent firms: Blu, Telecom Italia Mobile, Omnitel, and Wind.²⁵⁴ Blu was such a small firm that only the other three should be considered dominant. Therefore, the number of bidders exceeded the number of blocks. As discussed earlier, having more blocks than dominant firms would encourage entrance by ensuring new telecom firms access to the wireless market.

The Italian auction, like the German and British auctions, was a multi-round auction.²⁵⁵ However, the bids were only partially sealed.²⁵⁶ Bidders were placed in individual rooms and were barred from communicating with each other.²⁵⁷ After each round, a list of all participants and their current bids was announced to each bidder.²⁵⁸ This could obviously facilitate collusion by providing the cartel with a monitoring system.

²⁵¹ *Italian Mobile Licenses Go Cheap*, BBC NEWS, Oct. 23, 2000, available at http://news.bbc.co.uk/1/hi/english/business/newsid_986000/986193.stm/. The value was about one-third the revenue per capita as the German or British auctions. *Id.*; see also 2 Klemperer, *supra* note 47, at 21, 32.

²⁵² *Id.*

²⁵³ *Id.*

²⁵⁴ *3G Country Information*, *supra* note 22 (detailing the Italian 3G experience).

²⁵⁵ Tender Regulations, Gazz. Uff. No. 117, Part II, § 7.1.2(c), July 25, 2000 (It.) (translation by Committee of Ministers, only Italian text shall prevail), at <http://www.agcom.it/provv/3generaz.htm/>.

²⁵⁶ *Id.* §§ 8.1.4(d)-(f).

²⁵⁷ *Id.* §§ 7.1.2(e), 7.2.6-2.7.

²⁵⁸ *Id.* §§ 8.1.4(d)-(g).

Unlike the German and British auctions, the Italian statute set up homogeneous blocks. Each winning firm would receive one paired and one unpaired block.²⁵⁹ Having a homogeneous product would facilitate collusion in the auction and in the 3G services market.

On the positive side, the Italian auction did limit the potential effects of an auction ring. It was the only auction analyzed that restricted the transferability of the spectrum block after the auction; firms could not resell their blocks until four years after purchase.²⁶⁰

There were two fatal flaws in the auction design. Both occurred before the monitoring system could aid collusion, as the bidding ended after only ten rounds. First, the regulation contained a prohibition on "Anti-Competitive Activities."²⁶¹ The problem with this provision is that it did not provide sufficient punishment for collusion; it did not impose fines for an infraction of the rules as the German regulation did. Bidders were merely excluded from participating in the auction.²⁶² Since the bidding had only one more participant than blocks available, any exclusion for anticompetitive behavior would bring the auction to a close. Without a monetary penalty or a reduction in the number of blocks on offer, exclusion would seriously dampen government revenues.

Second, the Italian auction mainly failed to raise revenue because of joint ventures. Unlike the British and German regulation which barred certain joint ventures, the Italian regulation specifically allowed all joint ventures to form.²⁶³ Consequently, collusive behavior was evident at the auction. Four of the winning five bidders were joint ventures of at least two major telecom companies.²⁶⁴ As discussed earlier, the key to affecting the auction price

²⁵⁹ *Id.* § 8.1.2 (providing 2X10 MHz paired and 5MHz unpaired).

²⁶⁰ Tender Regulations, Gazz. Uff. No. 117, Part II, § 2.2, July 25, 2000 (It.) (translation by Committee of Ministers, only Italian text shall prevail), at <http://www.agcom.it/provv/3generaz.htm/>.

²⁶¹ *Id.* § 7.3.

²⁶² *Id.* § 7.3.5.

²⁶³ *Id.* § 4.1.

²⁶⁴ (1) Omnitel is owned by Vodafone and Verizon. (2) Wind is owned by France Telecom and Enel, the Italian power group. The winning new entrants were also joint ventures. (3) Ipse is a consortium of several firms. Its largest owners are Telefonica of Spain and Sonera of Finland. (4) Andala is owned by Tiscali-IMI and the Hong Kong holding company Hutchinson-Whampoa (which subsequently formed a pan-European joint venture with NTT DoCoMo of Japan). See *3G Country Information*, *supra* note 22.

is reducing the number of bidders to equal the number of auction blocks.

The bidding came to a halt when Blu pulled out of the auction after only two days of bidding, amid shareholder in-fighting. Although a majority of its shareholders voted to remain in the auction, its internal by-laws required an eighty percent majority to submit bids. It was obvious from the start that Blu was a weak auction participant. Blu was only eighteen months old and held under one percent of the Italian cellular market. While Blu included the telecommunications giant BT, BT had only a twenty percent stake, and none of its other participants were telecommunications companies. Many of them were worried about BT's debt level from previous 3G auctions and the anticipated high price of Italian 3G licenses.²⁶⁵ The Italian government withheld Blu's four trillion lira (\$1.7 billion or 2.1 billion Euro) auction deposit fee for its early withdrawal,²⁶⁶ claiming that Blu was not a serious participant and disrupted the auction. Italy subsequently returned the money to Blu after a court battle.²⁶⁷

The Italian competition authority, Antitrust, launched a major investigation into collusive behavior following rumors of price fixing.²⁶⁸ In July 2001, Antitrust closed the investigation after finding no violations.²⁶⁹ The EU is also monitoring collusion across all of Europe's 3G auctions following antitrust allegations in Italy and the Netherlands.²⁷⁰ Italy has raided twenty offices to investigate the alleged collusion.²⁷¹

²⁶⁵ Madaleine Dyer, *Auction Blues*, COMM. INT'L, Dec. 1, 2000, at 4546, at 2000 WL 10977419.

²⁶⁶ *Id.*

²⁶⁷ Liz Vaughan-Adams, *BT's Italian Job Turns Investors Blu*, INDEPENDENT (London), Dec. 6, 2001, at 21, at 2001 WL 27726321.

²⁶⁸ Dyer, *supra* note 265, at 4546; Benoit, *supra* note 236, at 1; James Blitz, *Brussels Monitors 3G Auctions*, FIN. TIMES, Nov. 1, 2000, available at <http://globalarchive.ft.com/globalarchive/articles.html?print=true&id=001101001682/>; Press Release, Antitrust, The Competition Authority Has Opened an Investigation Into the UMTS Tender (Oct. 27, 2000) at <http://www.agcm.it/eng/tema04.htm>.

²⁶⁹ *Competition Watchdog Closes Italian UMTS Auction Probe*, CORRIERE DELLA SERA, July 21, 2001, at 22, available at 2001 WL 6005570.

²⁷⁰ *Id.*

²⁷¹ Dan Roberts et al., *Italy Calls for 3G Auction Inquiry*, FIN. TIMES, Oct. 31, 2000, available at <http://globalarchive.ft.com/globalarchive/articles.html?print=true&id=001031000617/>.

Italy provides a clear example that expresses the importance of ex ante auction design. Collusion would have been prevented or discouraged if Italy regulated joint ventures better, prohibited monitoring, and differentiated the product (spectrum). Instead, Italy has lost government revenue and conducted a lengthy and costly competition law inquiry.²⁷²

7. SOLUTIONS AND IMPROVEMENTS ON THE U.K. AND GERMAN SYSTEMS

The German and U.K. auctions led to high corporate debt levels.²⁷³ The markets have devalued telecommunications stocks²⁷⁴ and banks have tightened telecommunications loan requirements²⁷⁵ in response to a perceived winner's curse.²⁷⁶ BT's former CEO, Sir Peter Bonfield, even admitted that his company overpaid for its 3G auction procurements by £10 billion (\$15.7 billion).²⁷⁷

Nevertheless, the German and British systems are far superior to the Italian auction. Britain and Germany raised impressive amounts of government revenue, prevented collusion, and reduced the need for competition law investigations. Their problem lies in risk allocation. Third Generation services are a high-risk industry, as the government and the firms do not know the potential demand, the start up costs, or future changes in technology. Forcing up-front fixed payments has led to the winner's curse.²⁷⁸ The

²⁷² *Id.*

²⁷³ *Killer Applications: Investors are Beginning to Worry About the Financial Viability of Europe's Free-Spending Telecoms Giants*, *ECONOMIST*, Aug. 26, 2000, at 61.

²⁷⁴ *Id.*; *Davos: Fears for Europe*, *BBC NEWS*, Jan. 26, 2001, available at http://news.bbc.co.uk/1/hi/english/business/newsid_1137000/1137765.stm/.

²⁷⁵ Dan Roberts et al., *Finance Fears Haunt 3G*, *FIN. TIMES*, Dec. 8, 2000, available at <http://globalarchive.ft.com/globalarchive/article.html?id=001208000445/>.

²⁷⁶ Philip Coggan, *Winner Takes All the Risk*, *FIN. TIMES*, Feb. 19, 2001, at 15.

²⁷⁷ Alan Cane, *BT Considers Full Demerger of Wireless*, *FIN. TIMES*, Feb. 19, 2001, at 16.

²⁷⁸ There are, of course, alternative explanations for the high price of the British and German auctions. Although they followed the Finnish allocation, they were the next two auctions and the first set of auctions in major markets. The British and German auctions may have experienced high prices because they collected an "entry fee" for the following auctions. To have a successful Europe-wide 3G service, any competitor needed to enter these two major markets. In the following auctions, the losers from the earlier auctions would not submit bids because they had already lost the opportunity to become a major European player. Even if they enter future auctions, they would seek to be a local 3G provider; their bids will not be as high as the pan-European suppliers. This phenomenon will

winner's curse has three future effects. First, it will hurt the financial health of the country that has caused the winner's curse. Second, the winning firms will suffer high debts, which will affect their ability to participate in other 3G auctions. Third, future 3G auctions will have fewer participants because firms that suffered the curse will be unable to enter, and other firms will be dissuaded by the possibility of a winner's curse.

To prevent the winner's curse from occurring and dissuading future entry, a royalty system needs to be used.²⁷⁹ A royalty payment would resemble a lease rather than a sale of assets. Instead of announcing a dollar amount for their bids, firms would bid by offering the government a set percentage of revenue (not profits). Each firm would quote a continually higher percentage as bidding progressed.

A royalty system would have a number of benefits. First, it would spread payment over time. Second, the risk would be spread between the government and firms. Thus, the winner's curse would be less likely, as consumer demand would determine the firm's price, instead of highly unreliable market projections. After monitoring the situation in Europe, Hong Kong plans to use a hybrid royalty system to avoid the winner's curse while ensuring government revenues.²⁸⁰ Under the Hong Kong system, the auction winners will pay a set price for five years. Their bids will be the percentage of revenue that they offer the government over the remainder of the license.²⁸¹ As for the Italian system, stronger oversight of joint ventures is needed.²⁸²

lower auction prices in future European tender offers. See van Damme, *supra* note 212, at 4.

²⁷⁹ See John G. Riley, *Ex Post Information in Auctions*, 55 REV. ECON. STUDIES 409-30 (analyzing the oil industry and arguing that in high risk auctions where the true value of the object is only discovered ex post, a royalty system provides a more accurate value and avoids the winner's curse).

²⁸⁰ Rahul Jacob, *Royalty System for HK Mobile Auction*, FIN. TIMES, Feb. 14, 2001, available at <http://globalarchive.ft.com/globalarchive/articles.html?print=true&id=010214001151>.

²⁸¹ *Id.*

²⁸² The Czech system is learning from the Italian experience. Instead of allowing the domestic telecommunications companies to compete in Czech's auction, they will be charged a mandatory fee to operate a 3G system. A one block auction will be held amongst new entrants.

8. CONCLUSION

This Comment has shown the importance of auction design in impeding collusive behavior before it hurts auctions of government assets. Auctioneers must take preventative measures against the winner's curse and collusion. As more countries around the world begin to auction off 3G spectrum rights, they can learn from Europe's experience. In particular, countries outside of Europe and North America need to institute anti-collusive measures, as few have competition laws on which to rely. Ex ante auction design regulations provide a cost effective alternative to ex post competition law inquires.

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