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The Swiss UMTS Spectrum Auction Flop: Bad Luck or Bad Design?

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Abstract

This paper gives an account of events, and explains some systematic reasons of the UMTS auction flop in Switzerland. Apart from general market developments, which could not have been anticipated, we argue that auction design which was introduced in England and adopted in Switzerland and elsewhere is a cause of the disappointing performance of many UMTS auctions in Europe, of which Switzerland is just one particularly pronounced example. The regulator would have been better advised to import some key ingredients of the auction design employed in Germany and Austria. This would have assured higher revenue or more competition. The paper closes with several proposals on how one should conduct future spectrum auctions.

JEL classifications: D43, D44, D45, H20, L13.
KEYWORDS: spectrum auctions, telecommunications, industrial organization

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1 Introduction

In some European countries the year 2000 will be remembered as the year of huge windfalls of tax revenue from their auctioning of third-generation (UMTS) spectrum frequencies for mobile communications. These auctions flooded €37.5 billion into the UK, and the record sum of €50.8 billion into the German treasury — four to five times as much as the staff of the German finance minister had expected.

However, this fountain of tax revenue dried out as quickly as it had erupted. Already before the still very successful German auction took place, the auction in the Netherlands closed at shockingly low prices. Interest in third-generation spectrum frequencies further stalled in subsequent auctions in Austria and in particular in Italy, which has one of the most profitable mobile phone markets in Europe. And as if this were not enough disappointment, the year ended with a flop in Switzerland, where revenue dropped to a nominal level, and the regulator desperately though in vain tried to patch up last minute changes in auction rules.

The present paper gives an account of events, puts the Swiss auction into a larger perspective, and explains some of the systematic reasons of auction design that may explain the Swiss UMTS auction flop. Apart from other aspects and current developments in telecom markets, we argue that the English design, which was adopted in most European countries including Switzerland, systematically gives rise to insufficient participation in the auction. After the main battles for the pan-European field have been settled, auctions with that design attract only the strongest bidders, and the number of bidders tends to be equal to the number of available licenses, as it did occur in Switzerland. By contrast, the auction design adopted in Germany does not completely predetermine the number and size of licenses and induces more competition. This design should perform better in the face of costly bidder participation, which indeed it did.

Nevertheless, both auction designs applied in Europe are far from perfect, and one should work out and test better mechanisms to be adopted in future frequency auctions. This may be particular urgent in the U.S., where third-generation frequencies become available at a larger scale as soon as the licenses of television stations, that currently occupy these frequencies, expire.

2 What Happened?

Everything looked very promising when the Swiss *Federal Office of Communications* screened prospective bidders for the upcoming UMTS auction. Altogether, 10 applicants qualified to bid for 4 identical licenses. This seemed like ample competition. And considering that each license was generously endowed with 2×15 MHz paired (plus 5 MHz unpaired) frequencies (more than in many other European countries), and that Switzerland is an attractive high income market, the auction promised a respectable outcome, to say the least.[1]

However, as the date of the auction approached, a major bidder meltdown was on its way. Just one week before the auction only 8 bidders were left; by Friday, that number had further melted down to 5; over the weekend another bidder withdrew; and so, on Monday morning, November 13, when the auction was scheduled to take place, only four bidders showed up to bid for four licenses.[2]

At this point the Federal Office of Communication panicked, called–off the auction, and announced that the auction will take place at an as yet unspecified future date, probably under somewhat different rules. Of course, the Swiss public was disappointed about the unexpected loss of tax revenue, and both the industry and the financial press questioned the legitimacy of last minute meddling with auction rules. During the subsequent weeks, several bidders threatened to go to court, and, finally, the regulator subdued, and carried out the auction at unchanged rules, on December 6, 2000.

The result was as expected: the four licenses were awarded at nominal prices to the four bidders *dSpeed* (associate company of diAX), *Orange Communications*, *Swisscom*, and *Team3G* (Telefonica). Each bidder paid the minimum bid of 50 Million Swiss Franks, except for Orange, who paid an extra 5 Million increment. (Orange bid higher in order to assure itself a particular frequency that matches the frequency it already acquired in a neighboring country.)

Interestingly, there were three incumbents in the Swiss mobile phone market: Swisscom, Orange, and diAX, one of which (diAX) merged with

[1] Incidentally, the Swiss engaged *Charles River Associates Inc.* as auction designer and administrator.

[2] The following approved candidates withdrew prior to the auction: *Teldotcom*, *Telenor Mobile Communications*, *Cablecom Management*, *Hutchinson 3G Europe*, and *T-Mobile International*. *Sunrise* also withdrew after its merger with *diAX*.

the service provider Sunrise to form dSpeed (under the direction of TeleDanmark), just before the auction. Therefore, after the UMTS auction one new entrant, Team3G (Telefonica), had entered into the Swiss market. With licenses in Spain, the UK, Germany, and Switzerland, Telefonica has established itself as a pan–European provider.

In order to put the Swiss auction into perspective, Table 1 summarizes the European auctions, in chronological order. The first column states the country (a star indicates that the German auction design was applied; all other countries applied the English rules). The second column states the month(s) when the UMTS auction took place, the third the number of bidders, the fourth the number of licenses, the fifth the number of incumbents,[3] and the last the revenue per population unit. Evidently, England raised the highest revenue per population unit, closely followed by Germany. However, considering that the English market has a higher penetration rate and thus is more profitable, and that Germany achieved a more competitive market structure (six vs. five licenses), it is fair to say that the German auction was the most successful.

Table 1: UMTS Auctions in Europa in the Year 2000

Where	When	# Bidders	#Licenses	#Incumb.	€/Pop
UK	03/04	13	5	4	630
Netherlands	07	9/6	5	5	170
Germany*	07/08	12/7	4-6	4	615
Italy	10	8/6	5	4	210
Austria*	10	6	4-6	4	103
Switzerland	11/12	10/4	4	3	19

The "bidder meltdown" and subsequent low revenue in auctions that employed the English design, which reached a high point in the year 2000 in Switzerland, extended also into the year 2001. It occurred in Belgium, where the auction was subsequently cancelled, and three of the four available licenses were then sold in early March 2001 at a fixed price.[4] Similarly, in Israel, the auction has been postponed due to an insufficient number of bidders. Both Belgium and Israel also employed the English

[3] In Switzerland the number of incumbents dropped from 4 to 3 during the preparation for the auction, due to the merger between Sunrise and diAX.

[4] Three licenses were issued to *Belgacom*, *Mobistar*, and *KPN Orange*.

design. The revenue in Belgium was €450 Million, which amounts to the ridiculously low level of €/Pop 44.

3 Which Auction Design?

In all third-generation (UMTS) spectrum auctions in Europe the supply of frequencies was more or less the same: a total band of 2×60 MHz (paired) frequencies,[5] plus some 20 MHz (in some countries 15 MHz) of unpaired frequencies.[6] Also, everybody employed the same simultaneous, ascending price auction format, which is well-known ever since the first spectrum auctions took place in the US.

However, there was one important broad difference between the different designs: Whereas the English auctioned a fixed number of licenses, each prepackaged with certain amounts of radio spectrum, the German regulator broke down the supply of paired frequencies into identical packages, and allowed bidders to aggregate frequency packages into a variable number of licenses, essentially ranging from 4 to 6 licenses.[7] Thus, *England completely specified the market structure, setting both the number and size of licenses, whereas Germany let the market decide, within narrow limits.*

With the exception of Austria, which followed the German example, all other European regulators basically copied the English design. Switzerland introduced a small deviation by choosing only four (rather than five) more generously endowed licenses, and by making all licenses identical.

[5] Spectrum is paired because one is used to send and the other to receive information. To see why this is important, just listen to radio communication in a taxi cab; there, only one party is able to speak, until the line is freed for the other party to respond.

[6] At the time of the auction, the unpaired frequencies were viewed as supplementary and of uncertain usefulness, which is why we ignore them here.

[7] Precisely twelve 2×5 MHz packages were supplied, and bidders were allowed to aggregate frequencies into up to six licenses (endowed with at least two and at most four 2×10 MHz). The auction was actually a sequential two auctions game: in the first auction, bidders could only bid on either three or two packages; any packages left-over from the first stage would have been auctioned in a second auction, where bidders could bid on only one frequency. Due to these restrictions, the relevant outcomes were either 4 or 5 or 6 licenses, even though an outcome with less than 4 licenses was conceivable in theory, though not in practice. For a detailed account and analysis of the German third-generation (UMTS) auction see Grimm, Riedel, and Wolfstetter [2001b].

Nevertheless, Switzerland followed the "one more license than incumbents" principle, which was only violated in the Netherlands (see Table 1).[8]

4 Why Revenue Matters

The *Federal Office of Communications* emphasized that efficiency was its foremost concern. However, tax revenue also mattered. Indeed, next to efficiency, the stated objective was to "establish market value", and the Federal Office of Communications nourished the expectation that "the auction is likely to raise the optimal revenue", even though "raising auction revenue by itself is not a primary objective" (FEDERALOFFICEOFCOMMUNICATIONS [2000, p. 5]).

And indeed, revenue should matter a great deal, for the following reason: The revenue from the efficient sale of radio spectrum is one of those rare examples of a distortion–free tax. Most other taxes, from sales to income tax, exert enormous efficiency distortions. FELDSTEIN [1995] estimated that every $ 1 increase in tax revenue, raised through an across the board increase in income taxes, causes a dramatic $ 2 welfare loss to society, mostly due to wasteful efforts to avoid or reduce taxes. The government has to finance its expenditures, one way or the other. Therefore, one should make full use of every opportunity to replace standard taxes by distortion–free methods of revenue collection.

The bottom line is that, even if efficiency is the primary objective, one should sell radio spectrum by a mechanism that maximizes revenue in the class of efficient mechanisms. Generally, this leads to a generalized Clark-Groves auction mechanism (see KRISHNA AND PERRY [1998]). However, since alternative taxes entail an enormous welfare loss, it is even optimal to accept some deviation from efficiency if this gives rise to more revenue.[9]

Altogether, the importance of revenue is not sufficiently appreciated by auction designers,[10] even though finance ministers and the general public judge the success of spectrum auctions by their revenue.

[8] KLEMPERER [2000] claims that the deviation from this principle was responsible for the embarrassingly low revenue in the Netherlands.

[9] For optimal regulatory mechanisms in the face of a high deadweight loss of alternative taxes, see DANA AND SPIER [1994] and GRIMM, RIEDEL, AND WOLFSTETTER [2000]).

[10] An early notable exception is ROTHKOPF AND HARSTAD [1990].

5 Why Interest in UMTS Frequencies Stalled

Several developments explain why interest in third-generation frequencies has stalled, after the first success stories in England and Germany. The enormous cost involved in buying frequencies and building new networks of base stations, combined with uncertain revenue projections have begun to worry investors. As debts have grown and overall technology stocks have plummeted, several telecom companies already experienced the downgrading of their debt. Having reached a borrowing constraint, telecom companies increasingly turn to the builders of network equipment for trade credits.[11]

Building third-generation networks and marketing and billing the new services is enormously costly. The UMTS technology works at a higher frequency than GSM (the current industry standard in Europe) to transmit and receive information. While the first and second generation GSM digital technology uses portions of the 900 and 1.800 MHz spectrum, the third generation (UMTS) technology operates in the range of 2.000 MHz. There, each base station has a much shorter range. Roughly, UMTS networks require 4-16 times as many base stations to manage a given data flow as the established GSM networks. In addition, the higher data flow associated with the new services that become available with UMTS require even more stations to serve customers in a given area. As if this were not enough trouble, more stations also raise health concerns about radio emissions, and objections against the littering of the environment with transmitters and radio masts.

After the main licenses have been awarded, industry observers predict a major consolidation of the industry. Only those telecom companies are expected to survive that have by now succeeded to establish a pan-European network, without drowning in debt.[12]

[11] Several suppliers from the US, such as Lucent, Nortel and Cisco Systems, have offered 100% financing, and European suppliers, like Nokia and Ericson, followed suit. The latter are particularly vulnerable to requests for trade credits, because they also benefit from a fast development of the UMTS network in their role as sellers of third generation telephones.

[12] This may be slightly mitigated by arrangements that allow a joint construction and use of base stations, especially outside major urban centers, which may save 20-40% of the cost of the UMTS network. Such arrangements have already been approved in Sweden, and some industry representatives now try to convince regulators to follow the Swedish example, while others rightly object that this violates the terms set at the auction.

These observations alone explain why the main action took place in the first auctions, which pretty much took the field, and attracted more competition, and fiercer bidding. However, there are also systematic reasons of auction design that explain why some of these European auctions, culminating in the Swiss auction, performed so poorly.

6 Bad Luck or Bad Design?

In order to "establish market value", as aimed at by the *Federal Office of Communications*, it is not sufficient that the demand for radio spectrum exceeds the supply. That demand must also give rise to sufficient bidder participation and bidding. The experience of the UMTS auctions in Europe indicates that competition is not a good that potential bidders provide for free. As a tendency, only those bidders will participate who anticipate that they stand a good chance to obtain a license.

If the English auction rules are adopted, as they were in Switzerland, one should expect that, as a tendency, the number of bidders is equal to the number of licenses. Once it is clear who are the strongest bidders, weak bidder should know beforehand that they will ultimately be squeezed out anyway. As a consequence, licenses tend to be sold at nominal prices, as it did happen in Switzerland.

During the first UMTS auctions in Europe there was still a great deal of uncertainty about the seriousness and perseverance with which international companies would try to penetrate the European market, and about who succeeds to establish a pan-European mobile phone network. In addition, the capital market offered easy access to debt, and various high flying business plans stimulated the imagination of potential bidders. In this "gold rush" atmosphere, an overwhelming number of thirteen bidders showed up in England to compete for just five licenses. In all later auctions that were conducted according to the English rules — in the Netherlands, in Italy, and finally in Switzerland — more and more weak bidders withdrew already before the auction took place, after they had learned with whom they would have to compete (see the third column in Table 1).

A similar bidder "melt down" occurred under the auction rules applied in Germany and Austria. In Germany, only 7 of the 12 qualified bidders did actually participate in the auction. Nevertheless, the auction generated

a more competitive market structure (six vs. five licenses) and more revenue than in England.[13]

The English auction rules raise several questions: First of all, why should a regulator know that precisely 5 licenses are welfare optimal? Of course, no regulator can know this beyond reasonable doubt. Second, even if one has some reason to desire that another competitor enters the market, why exclude a market size of six licenses? Third, in the face of the high distortions that are accompanied with regular taxes, the benefits of more competition must be weighed against the benefits of raising more revenue.

Without attempting to achieve an optimal mechanism that implements the optimal mix of market size and revenue, it is fairly easy to improve the English auction mechanism, by going in the direction of the rules adopted in Germany. In Switzerland one could have broken down the supply of spectrum into individual packages so as to allow bidders to aggregate packages into either 4 or 5 licenses. This way one would have assured *at least* four licenses, and yet would have reached more revenue or more competition. Of course, even with these modified rules, one would expect that, as a tendency, the number of active bidders is equal to the equilibrium number of licenses. Nevertheless, this generally leaves room for some competition for the size of licenses, which brings the price closer to the aimed at "market value" or brings about a more competitive market structure.

Altogether, this suggests that the Swiss UMTS auction flop was a result of bad design combined with some unfavorable events, from the general stalling of interest in UMTS licenses, to an apparently unanticipated merger of one incumbent mobile phone company (diAX) with an established service provider (Sunrise).

7 How to Improve Spectrum Auctions

In future auctions one should consider several modifications of currently used auction procedures. Some changes can be applied immediately, oth-

[13] It should be mentioned that the German auction rules were strongly criticized by Jehiel and Moldovanu [2000] and Moldovanu [2000a,b] as „an error with serious consequences". They predicted that "the auction would most likely lead to four licenses in the hands of the four incumbents". This prediction was proven wrong. Nevertheless, Klemperer [2000] echoed this negative verdict by claiming that the auction result was „good luck, not good design".

ers require more basic research, and still others call for a new approach to deal with the utilization of the radio spectrum.

There are at least three major problems and deficiencies that call for improvements:

1. The *coordination problem* associated with letting bidders aggregate their own licenses.
2. The *demand reduction problem* associated with the simultaneous, ascending bid auction format.
3. The *bidder participation problem* that plagues spectrum auctions, once bidders have a reasonably good idea of each others' strength.

When one auctions frequencies rather than licenses, one may create the coordination problems that have plagued the spectrum auctions in the U.S. where bidders tried to coordinate to acquire connecting (possibly nationwide) and neighboring frequencies (to minimize interference problems). In the face of these problems, several authors have advised to use combinatorial auctions, in which bidders are asked to bid on all relevant combinations of frequencies. However, this may raise the level of complexity of bidding beyond practical feasibility.

In this regard, the designers of the German UMTS auction rules made another useful contribution.[14] Instead of auctioning concrete frequencies, they auctioned "abstract" frequencies. In other words, the auctioneer assigned the concrete location of frequencies in the radio spectrum after the auction, and this in such a way that the interests of bidders are taken into account. Therefore, at the time of the auction, all frequencies were identical (except for possible differences in size).[15]

However, in the German spectrum auctions bidders still faced a coordination problem, because they had to decide on which of the numbered abstracts frequencies to place their bids. However, this coordination problem can easily be removed. Instead of asking for bids on the

[14] The auction was designed by *Wissenschaftliches Institut für Kommunikation* (WIK).

[15] While this worked very well in the second-generation GSM spectrum auction in Germany, it certainly was less effective in the German UMTS auction. Indeed, 8 months after the auction, the winners of the UMTS auction have not yet reached an agreement on the allocation of frequencies. Some industry representative even say that they would probably have preferred the auctioning of concrete frequencies, despite the resulting coordination problems.

numbered abstract frequencies, one should have employed an "ascending price clock auction" format. There, each bidder is asked to state his demand for frequencies at the current uniform price per frequency. If demand is equal to or below the given supply, the auction ends and bidders get what they demanded; whereas if demand exceeds supply, the unit price is raised uniformly by one increment, and the bidding procedure is repeated.

We conclude that in order to remove the coordination problems that plagued many spectrum auctions it is advisable to auction abstract rather than concrete frequencies and thereby use an ascending price clock format. However, prior to the auction, one should lay out clear and complete rules that govern the allocation of concrete frequencies, after the auction. In the absence of such rules, the allocation is only postponed, which may lead to costly delays.

Turning to the second problem, we mention that several observers of spectrum auctions in the US, such as Weber [1997], have observed that, in a simultaneous ascending-bid auction, bidders may find it in their interest to strategically reduce aggregate demand while prices are still low, relative to their valuations, and actually seemed to engage in such bidding practices. A particularly strong case of such demand reduction occurred in the GSM auction in Germany, where the two dominant firms split the available second-generations 1.800 MHz GSM frequencies equally at low prices. And indeed, an analysis of this auction revealed, that, under complete information, the simultaneous ascending-price auction has a unique perfect equilibrium that implements the efficient allocation at minimal prices (see Grimm, Riedel, and Wolfstetter [2001a]).[16] Somewhat similar results were obtained by Menezes [1996], Ausubel and Schwartz [1999], and Engelbrecht-Wiggans and Kahn [1998]. These results indicate, that the basic spectrum auction employed all over the world, is not satisfactory. This suggests that more basic research is needed to come up with a better basic design that generates more revenue.

Finally, the third problem – that of insufficient bidder participation — has already been on center stage in the present paper, because it was particularly obvious in Switzerland. We have already mentioned that changing the English auction rules by borrowing key ingredients from

[16]This is in contrast to Klemperer [2000] who interprets these events in the US and in Germany as evidence of collusion and concludes that discouraging collusion should be one of the two main issues of designing auction markets.

the auction format employed in Germany and Austria would palliate this problem. Indeed, starting for a given set of English rules, that predetermine the number and size of licenses, one can always improve these rules by unbundling the licenses and repackage frequencies in such a way that bidders can aggregate them into the same number of licenses or one more. The outcome will be superior, provided one is interested in more revenue or more competition. However, even if one intelligently borrows from the German rules, limited bidder participation is likely to remain a concern.

Rothkopf and Engelbrecht-Wiggans [1993] and Klemperer [2000] have proposed that in order to increase bidder participation one should consider switching from the open, ascending price auction to a one–time sealed bid. Even if a a weak bidder stands no chance to win in an open, ascending price auction, which is why he will not participate in the first place, a one-time sealed bid gives him some chance to win, and this chance may be sufficiently hight to justify participation. As long as there is some uncertainty about the weak bidder's valuation, the advantaged competitors balances the chances of winning against the profit from winning. As a result, in equilibrium there is some probability that an advantaged competitor loses and a disadvantaged bidder wins,[17] which may convince a weak bidder to participate, even though he would not do so in an open, ascending price auction.

However, switching to a one-time sealed bid has at least two drawbacks. First of all, it entails a deviation from efficiency. Indeed, the flip–side of inducing weak bidders to participate is that they win with positive probability — which destroys efficiency. Second, the open, ascending price format is generally advised on the ground that it maximizes the information available to bidders. In the final stages of the open, ascending auction the remaining bidders have observed the prices at which all other bidders quit the auction, and from this they can infer their private signals. In this sense, choosing an open, ascending auction format can be viewed as a commitment device to an open information policy, which minimizes the "winners' curse" and thus leads to more aggressive bidding, to the benefit of the auctioneer.[18]

[17]This intuition is confirmed by models of asymmetric auctions, where bidders' valuations are drawn from commonly known but distinct probability distributions (see Maskin and Riley [2000]), as well as in models which assume, perhaps more appropriately in the present context, a commonly known ranking of valuations (see Landsberger, Rubinstein, Wolfstetter, and Zamir [2001].

[18]While this principle works very well in the single-unit case, as shown in the seminal

Luckily, there is another solution of the bidder participation problem. However, it requires a radically new approach to deal with the utilization of the radio spectrum altogether.

The key observation is that only some fraction of the available radio spectrum is used for mobile communication. Other, far heavier, users are the radio broadcasting and especially television and satellite television broadcasting industries. Only the small portion of the radio that was made available for mobile communications, is auctioned; the bulk of the radio spectrum is still given away for free to the broadcasting industry.

This suggests a simple way to radically solve the bidder participation problem: *Governments should simply auction the radio spectrum available for all uses in one single auction.* This way, there would be competition not only among alternative suppliers of a mobile phone services, but also among alternative uses of the radio spectrum – from mobile communications to satellite television broadcasting. Another benefit of this new approach is that the partitioning of the radio spectrum to alternative uses would be determined by customers' willingness to pay, rather than by bureaucratic decree.

At first glance it may be the best procedure to *establish flexible property rights in spectrum*, and auction perpetual and transferable property rights, that allow its owners to freely adjust the use of the scarce radio spectrum. This is particularly desirable if technological change and product innovations bring about major but unpredictable reshuffling of the demand for particular uses of the radio spectrum. On the other hand, auctioning property rights does probably not contribute sufficiently to solve the bidder participation problem, because once potential bidders know each others' ranking of valuations, the weak bidders may withdraw, just like they did in UMTS auctions.

Keeping the bidder participation problem in mind, it is better to restrict bidders to particular uses of the spectrum, so that mobile phone operators and television stations can only use their frequencies for mobile phone services and television broadcasting, respectively. However, the entire radio spectrum must partitioned and leased in one auction,[19] so

contribution by Milgrom and Weber [1982], it does not always work in multi-unit auctions (see the counterexample by Perry and Reny [1999]).

[19]The leasing periods should be in the order of 10 to 15 years, in order to make sure that the allocation of the radio spectrum can respond to changes in the demand structure. Anyway, leasing is preferable to perpetual property rights also in order to share the revenue among several generations of citizens.

that the allocation of the radio spectrum to alternative uses becomes a result of the auction, instead of being predetermined by the regulatory process.

8 Conclusions

Altogether the Swiss UMTS auction flop has been caused by a combination of unfortunate events and bad design. After the spectacular success of the early UMTS auctions in Europe, interest in UMTS licenses stalled, and the market conditions for financing licenses and the construction of base station networks deteriorated. These developments could not be anticipated. However, it should have been clear in advance that the English design of the auction gives rise to insufficient entry, because once potential bidders have learned to assess each other, the weak bidders withdraw from the auction, leaving, as a tendency, only as many bidders as licenses.

The English auction design was not the best design available. In fact, it would have been fairly easy to improve this design, by borrowing some key ingredients from the auction rules employed in Germany and Austria.

Even though one can improve the auction rules developed in England and adopted in most European UMTS auctions, by borrowing from the auction rules employed in Germany and Austria, the task remains to design and test better rules that strike the right balance between revenue and market structure. In this regard, major improvements require the auctioning of flexible property rights in the radio radio spectrum, and not only in the portions of the spectrum set aside for mobile communications.

In any case, the poor performance of some European spectrum auctions is no reason to return to the old "beauty contest" allocation of licenses, even if it is combined with tough take-it-or-leave-it pricing, as it was tried, unsuccessfully, in France.[20]

[20]There, four licenses were offered at the fixed price of FFr 32.5 billion each, and the regulator promised to award these licenses to the four most qualified contestants. However, when the bidding closed on January 31, 2001 only two firms had submitted offers. (German Telekom and others withdrew already towards the end of the year 2000. France's Suez Lyonnaise des Eaux and its Spanish partner Telefonica backed off just one week before the deadline, and Bouygues Telecom, which has German and Italian partners, dropped out at the eleventh hour.) Evidently, once the number of contestants had dropped to four, some of the remaining firms began to play a rene-

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gotiation game with the regulator. The French finance minister already announced that a second contest would be held for the two remaining licenses, and some of those who dropped out, such as German Telekom, already indicated that they are still interested in obtaining a license. Evidently, France cannot permit that the market is left to the two already dominant operators. Thus, France has relearned the old lesson, that take-it-or-leave-it pricing is not a good alternative to a well designed auction.

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