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The Dutch UMTS-Auction

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THE DUTCH UMTS-AUCTION

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THE DUTCH UMTS-AUCTION

Abstract

In this paper I review the Dutch UMTS-auction that took place in the summer of 2000 and which, in contrast to the UK and German auctions, was generally considered to be a major flop. I analyse the policy process leading to the auction as well as the bidding behaviour in the auction, and provide an evaluation of both. I demonstrate that the case contains several useful lessons for other auction design problems.

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1. INTRODUCTION

Shortly after the UK had organised "the biggest auction ever", the Netherlands was the second European country to auction UMTS-licenses. The auction took 306 rounds to complete and lasted from July 6 to July 24, 2000. In contrast to the UK-auction, which was viewed as a big success, the Dutch auction was generally considered to be a major flop. In an opinion piece in the *Financial Times*, published two days after the closing of the Dutch auction, Paul Klemperer forcefully argued that the Dutch had failed. As Paul posed the question:

> *"So why did the Netherlands' auction, using similar bidding rules to the UK one, attract so few competitors and such feeble bidding, and raise barely a quarter of the per capita revenue of the UK auction?" (Klemperer, 2000a)*

In Paul's view, the Dutch had done two things wrong. Most importantly, they had used the wrong auction design: in a market with five incumbent 2G-operators, they should not have sold the five 3G-licenses in a simultaneous multi-round ascending auction as such an auction gives newcomers little chance to win a license. A different auction format, such as the "Anglo-Dutch" design, would have been more favourable for newcomers, hence, it would have led to more auction participants, to more aggressive bidding and to higher revenues for the government. Secondly, through a tougher competition policy, the Dutch should have prevented competitors to team up with each other before the auction. While these points may be valid, they need not, however, be relevant. The Dutch auction should be judged on the basis of whether it achieved the goals that it was supposed to achieve and neither attracting many bidders, nor establishing new market entry, nor obtaining high revenue were official goals of the Dutch government. Of course, one may question whether the goals that were specified are the appropriate ones and one might argue that revenue maximization and generating entry *should* have been explicit goals. Be that as it may, in retrospect, in terms of revenue, the Dutch government did not do so badly after all, as the European comparison from the next table shows.

Country	2G	3G	Revenue	Country	2G	3G	Revenue
UK	4	5	650	Austria	4	6	105
Netherlands	5	5	170	Switzerland	3	4	20
Germany	4	6	620	Belgium	3	4	45
Italy	4	5	210	Denmark	4	4	95

Auction revenues in € per capita (2G denotes the number of incumbent operators, 3G the number of 3G-licenses auctioned; countries are listed in the order in which they auctioned the 3G-licenses)

Unfortunately, answering the question of whether the goals were achieved is somewhat difficult since these goals were never stated explicitly. In its reaction to the evaluation of the auction that researchers of Erasmus University did on behalf of the Dutch parliament (Janssen et al, 2001), the government states that policy was supposed to achieve two goals; the auction should:

(i) Efficiently allocate the available spectrum, and

(ii) Contribute towards having a competitive telecommunications market[1].

The first goal relates to the spectrum that is allocated and to the allocation process that is used for doing this; the second relates to the market resulting from the allocation. Both these goals are stated in vague terms and, as we will discuss in more detail below, in the policy documents of the Dutch government, the term "efficiency" was not always used in a consistent way. Furthermore, in many of these documents there is generic reference to *the* auction mechanism and frequently there is an implicit belief that any auction will produce an efficient outcome, no matter how efficiency is defined. As a consequence, even though information is lacking to judge whether the stated goals were achieved, we can definitely state that the designers of the Dutch auction showed insufficient awareness of the precautions that needed to be taken to assure achievement of these goals.

In this paper, I review the Dutch UMTS-auction and discuss those aspects on which there has been extensive debate in Dutch newspapers and journals. The paper builds on my previous publications on this topic in Dutch and makes these arguments

[1] See Tweede Kamer (2001b)

available to a larger audience.[2] At the same time the paper adds to the earlier material by making some of the bidding data available and by analysing these. While most of the discussion in the popular press has concentrated on the supposedly low revenue that was generated, several other aspects of the Dutch auction are really more interesting and, hence, deserve more attention. In this paper I will discuss and explain the following six aspects:

(i) The auction attracted only six bidders, of which only one was not yet active on the Dutch mobile market,

(ii) The auction did not allocate a license to a new entrant,

(iii) There were "strange bids" in the opening phase of the auction, with all bidders but one issuing waivers, so as to drive the minimum price to zero, and this led to questions of whether there was coordinated behaviour (tacit collusion),

(iv) There were allegations of collusion in the auction with the Dutch competition authority investigating this issue after the auction,

(v) There were allegations that in the auction's final phase at least one bidder could benefit from "insider information", hence, that there was not a level playing field and that the auctioneer should have suspended the auction, and

(vi) The auction ended in turmoil with the newcomer claiming that it could no longer bid as it was threatened by one of the incumbents (predation).

This long list suggests that indeed a lot may have been wrong with the Dutch auction. This makes it an interesting object for study as it may contain several useful lessons for other auction design problems. By providing a detailed overview and analysis of the Dutch UMTS-auction, this paper indeed allows to draw several such lessons.

The remainder of the paper is organised as follows. Section 2 describes the Dutch 2G-market and the goals of Dutch spectrum policy. It focuses on the question of whether revenue should be a goal when auctioning spectrum, on different aspects of efficiency and on how to obtain an efficient outcome in case there are asymmetries between incumbents and entrants. Section 3 describes the process leading to the Dutch 3G-auction, with special emphasis on asymmetries between incumbents and

[2] Specifically, this paper builds on Van Damme (2000a, b) and Van Damme (2001).

entrants, and on the lobby of incumbents for auction rules that favour them. This Section explains the first two observations from our list. Section 4 describes the playing of the 3G-auction and the simultaneous developments outside of the auction; it provides a detailed discussion of the last four points mentioned above. Section 5 concludes by making several recommendations for practical auction design problems.

2. THE DUTCH DCS-1800 AUCTION AND THE DUTCH 2G-MARKET

Within Europe, the Netherlands was rather late in introducing second generation (2G) mobile telephony. In March 1995, two licenses to operate 2G-networks using frequencies in the 900 MHz band were given out. One license was given to the incumbent monopolist, KPN; the second one was awarded by means of a beauty contest and was won by Libertel, at that time a joint venture of Vodafone and ING-Bank. At the same time, the Dutch government decided that it was desirable to quickly license additional mobile operators using spectrum in the 1800 MHz band, and that it was desirable to award such additional licenses by means of an auction. In July 1995, the government took the decision that auctions were the preferred mechanism for allocating spectrum. As a change in the telecommunication law was needed to award licenses through auctions rather than by means of beauty contests, considerable time elapsed, till February 1998, before the DCS-1800 auction actually took place. In Van Damme (1999) I provided a detailed description of the process that led to that auction, the auction rules and the auction outcome. I now review the salient aspects that are relevant for a proper understanding of the Dutch 3G-auction.

Why auction the spectrum?

During the parliamentary year 1996-1997, there was extensive discussion about the pros and cons of using auctions to allocate spectrum. The major advantage that the government saw was that an auction is a transparent allocation mechanism that guarantees that the spectrum is efficiently used. Using auctions as the allocation mechanism may thus contribute to reaching the main goal of Dutch spectrum policy, which is to allocate spectrum such as to have a communications market that contributes optimally to overall Dutch welfare. It was realised that auctions may lead

to considerable revenue for the government, but revenue as such was said not to be a goal. Parliament agreed about the pros of auctions, but fuelled by concerns voiced by the European Commission (1994) that auction prices might be passed on to consumers and that high prices might delay innovation, it expressed a preference for low revenues. While the government argued that these fears were not justified, it did not insist too much, and a consensus position was then adopted that revenue generation, let alone revenue maximisation, should not be a goal. When specifically asked about the goals associated with spectrum allocation, the Minister responded that it was to create a strongly competitive mobile telecommunications market.[3]

Dutch economists did not challenge the stated government objective, they did not point out that raising revenue could be a valid goal. The argument in favour of this position, of course, is that, since auction prices are sunk cost, auctions might be the least distorting way of raising taxes, hence, that raising taxes in this way might contribute to higher welfare, see Klemperer (2000b). In other words, just as a competitive telecommunications market contributes to the overall Dutch welfare, so might high auction revenue, and therefore both objectives should be considered. It is to the discredit of Dutch economists that, up to this very moment, they have not yet gotten this message across.

When reading the Dutch parliamentary documents about spectrum auctions and telecommunications policy that have appeared during the period 1995-2002, one notices three things:

(i) The objectives are described in vague terms ("creating a competitive and innovating market"),

(ii) The goals are linked to (economic) efficiency, but it is not always clear what type of efficiency one has in mind, especially not since the term efficiency appears to be used in an inconsistent way, and

(iii) There is generic reference to *the* auction mechanism.

For example, even in the evaluation of the 3G-auction that the government sent to parliament on September 4, 2000, we read statements like "In general the auction mechanism is to be preferred as it is economically efficient and generates optimal

[3] Tweede Kamer (1997), pp. 16-17.

revenue".[4] Similarly, in the response of the government to the evaluation of the 3G-auction in Janssen et al. (2001) we read: "The auction is an open, transparent and non-discriminatory allocation instrument which ensures that the object is allocated to that bidder that values it most. It is assumed that this bidder will then also make the most efficient use of that object".[5]

Note that in the last sentence from the quotation above there is reference to what might be called "spectrum efficiency": an auction will select a party that uses the spectrum efficiently. In the sentence before, the reference, instead, is to "value efficiency": an auction will select that party that attaches the highest value to a license. Both these efficiency concepts, however, are different from "market efficiency" (an auction will select those parties that contribute most to total welfare), which, given the overall policy goal stated above, is the only one that is relevant. In the policy documents, there seems little appreciation for the possibility that one type of efficiency need not imply another, that whether or not a certain type of efficiency is reached might depend on the type of auction that is used, or that efficiency might not be reached at all. The impression that remains after having read these government documents is that those who wrote them have studied papers about standard auctions and that they believe that the statements made in those papers (about efficiency and revenue equivalence) apply to the context at hand, hence, that there is little need to devote much energy to the question of how the auction should be designed.

How to auction the spectrum?

There are, however, at least two reasons why the standard auction model need not be relevant in the context of allocating spectrum.[6] First of all, in this case no end products are auctioned, but licenses to be active on a market, and the bidders are firms, not the final consumers of the product. To put it differently, this is not an auction of consumer products, but of license, in which bidders are guided by shareholder value and not by consumer surplus, or total welfare. Hence, at best one can expect an auction to produce an allocation that is "value efficient", it need not be

[4] Tweede Kamer (2000b).
[5] Tweede Kamer (2001b), page 4.
[6] Also see Jehiel and Moldovanu (2000) and Klemperer (2000b)

"market efficient". Secondly, while in practical situations there may be strong asymmetries between incumbents and newcomers, the basic auction model assumes symmetry between the bidders. For both these reasons the standard auction model does not apply, an auction need not produce an efficient outcome and the government needs to carefully think about what instrument it should use to reach its objectives.

Gilbert and Newbery (1988) appears to be the first paper that stresses that, in license auctions, if there are asymmetries between incumbents and entrants, efficiency may be non-trivial to achieve. The intuition is easily conveyed. Consider a monopolistic market and suppose a second license is auctioned. For the incumbent monopolist, the value of the license is his future monopoly profit; for the entrant, the value is the profit that he can obtain when competing with the monopolist. As the latter is smaller, in an ordinary ascending auction, the monopolist will win the second license, the monopoly will remain and the benefits of competition will not be realised. Furthermore, the higher the potential benefits of competition, the lower the value to the entrant, hence, the lower the auction price. In fact, since he knows he cannot win, a forward-looking entrant will not participate in the auction and the monopolist will get the second license for free. In this situation, if the government really wants to achieve market efficiency, then it may have to discriminate against the monopolist: if the playing field is not level, the rules of the game have to favour the weaker players in order to reach the efficiency goal. This point is extremely important in this special case at hand, and we return to the issue in the next section.

The Dutch DCS-1800 Auction

At the beginning of 1998, the Dutch DCS-1800 auction took place. Spectrum in the 1800 MHz band was sold by using a variant of the simultaneous multi-round ascending auction. Important for our discussion here is that the number of licenses that could be won in this auction was endogenous and that the auction produced three winners. Dutchtone and Telfort won the two large lots (of 15 MHz each) and Ben was able to acquire 16.8 MHz of spectrum by buying several smaller lots in the auction and by buying spectrum from losing parties after the auction. Note, therefore, that while other European countries typically have either 3 or 4 2G-operators, the Netherlands is special as it has 5 of them. The 2G-licenses were given out in the

spring of 1998, hence, at the time of the 3G-auction, these DCS-1800 operators had been on the market for only two years, so that, in a certain sense they were still relative newcomers. This is also reflected in their market shares. In the summer of 2000, KPN had 49% of the subscribers, Libertel 31%, Telfort 7.3%, Dutchtone 6.9% and Ben 5.8%.[7]

In Van Damme (1999), I have argued that this auction was badly designed and that, because of the large variation in prices, it might not have achieved the efficiency goal that was specified. In the evaluation of the auction that the Dutch government sent to parliament on January, 11, 1999, the responsible vice-Minister rejected that criticism and instead concluded that the simultaneous multi-round format had functioned well and that the goal of the auction, "to allocate scarce spectrum in a transparent way" had been achieved[8]. Note that the goal that is mentioned here is a very minimal one. It is fair to say that the civil servants, having prior beliefs based on their reading of the auction literature, being satisfied with the outcome of the 2G-auction and expecting there to be a lot of demand for the 3G-licenses, did not see much need to change a design that had already proved itself.

3. THE PROCESS LEADING TO THE 3G-AUCTION

Immediately, after the 2G-auction had taken place, the government started preparing for the 3G-auction. A consultation document was published on July 16, 1998 and discussed with market parties later that year. These discussions led to a policy proposal that was published on March 25, 1999. In line with the recommendation of the UMTS-Forum (Report number 5, September 1998), the plan was to allocate 4 licenses, each containing 2×15 MHz of paired spectrum and 5 MHz of unpaired spectrum. These licenses would be auctioned, they would last for 15 years, incumbents (i.e. existing 2G-operators) would not be excluded from participating, no license would be reserved for a newcomer, and newcomers would not receive special roaming rights on existing 2G-networks. The document did not specify details about which auction mechanism would be used, however, it was stated

[7] Data from Mobile Communications (2001)
[8] Ministry of Public Works and Transport (1999)

that the design would take into account the lessons learned from the DCS-1800 auction. Note that this proposal would have made a simple multi-unit auction (of 4 identical, abstract lots) possible. Of course, the proposal would also have implied that at least one of the existing players would have to leave the market.

The goal of the 3G-auction

Quite interestingly, the UMTS policy proposal formulates a very general goal "to give the Netherlands a leading position in Europe". Equally interesting is the observation that, during the process leading to the auction, this goal was never discussed explicitly, nor made more specific. We may thus conclude that the overall goal of spectrum policy that had been formally agreed upon before, "maximising welfare", remained the relevant one. In the previous section, we have, however, seen that asymmetries between incumbents and newcomers may make this goal non-trivial to reach and, hence, may make for an interesting auction design problem.

A simple back of the envelope calculation may give an indication about how large in this context the value differences between incumbents and entrants can be.[9] Assume, for example, that ARPU (average 3G-revenues per subscriber) is €40 per month and that the discount rate (WACC) is 1% per month. If it takes two years to roll out the network, hence, before revenue starts to flow in, total discounted revenue is about €3000 per subscriber. If one counts on 6 million subscribers and a market share of one-third, then one gets expected revenue of €6 bln. From this one has to subtract the cost of actually building and maintaining the network, say €1 bln., to get to the value of €5 bln. The value is lower for an entrant as he can expect only a smaller market share, can start later and has higher cost for constructing the network. Fortis (2000) estimates that network cost for an entrant to be one-third higher. Then with an expected market share of 10%, which is on the high side, one can calculate value to be €0.5 bln, hence, an order of magnitude less.

[9] The numbers used in the calculation correspond to "realistic (lower end) estimates" of market analysts at the time of the auction. Note that for incumbents we have not included the value of business lost, hence, if anything, the extent of asymmetry is underestimated.

The above calculation raises the question of why any newcomer would want to participate in a symmetric ascending auction in which at most 5 licenses are offered, a question that we answer below. An even more important question is whether a new entrant winning a license is a necessary condition for "maximising welfare" or for "giving the Netherlands a leading position in Europe". There are several reasons why a new entrant might be a more aggressive player on the market: it has to gain market share and does not cannibalise its own existing 2G-product. On the other hand, capital market constraints might inhibit new entrants. Furthermore, the three DCS-1800 operators had entered the market only relatively shortly before the 3G-auction; they were fiercely competing for market share, hence, in a certain sense they were still relative newcomers. Given this market situation, we are not able to answer this second question.

In its advice on the policy proposal, the Dutch telecom regulator, OPTA, hinted at the desirability to favour newcomers to the market in the auction. OPTA actually criticised the government proposal on two points. First, it argued that, if feasible, it would be desirable to allocate more than 4 licenses, in order not to create a (too) tight oligopoly. Secondly, it recommended giving newcomers explicit rights to roam on existing 2G-networks. The government, however, was convinced that new entrants did not need special roaming rights as EU-regulations would force 2G-operators with significant market power to honour reasonable requests for special access, and since requests for roaming would fall under these regulations.

Lobbying for favourable rules

Within economics two different theories of regulation are distinguished. According to the public interest theory, the government supplies regulation to correct for market failures. The private interest theory holds that regulation is demanded by incumbents to protect against entrants. The equilibrium on this market determines the actual regulations. In the Netherlands, this market for regulation is organised in a somewhat formal way, and this is known as the Dutch "poldermodel". In line with the customs of the "poldermodel", the Dutch government consulted with the sector about its March 25 proposals. The discussions took place within the OPT, the consultation group of operators in the post and telecom sector. The minutes of the

OPT-meetings, which were published after the 3G-auction, give detailed insight into how this market worked in this special case[10]. In these minutes, one sees lobbies in action and one can see how successful lobbies work. Obviously, one may expect the sector to lobby in favour of rules from which it will benefit. Furthermore, one may also expect differences of opinion between incumbents and entrants. The incumbents in the Dutch market were very effective in keeping newcomers out of the formal lobby process, at one point it was simply argued that the OPT meeting room was already very crowded, hence, too small to admit newcomers to the market.

One can imagine that the proposal to auction only 4 licenses was not greeted with great enthusiasm by the incumbents. As also NMa (the Dutch competition authority) and OPTA were not happy with the prospect of a rather concentrated market, the discussion moved to whether 5 or 6 licenses could and should be offered. Most parties actually favoured awarding 6 licenses, presumably based on the idea that a larger supply would imply a lower price. The better economists, or at least the more experienced ones, were to be found with KPN and they lobbied for 5 licenses. As KPN had had an interest to acquire a license in the UK, it had participated in the preparations of the UK-auction a year before. From the UK-discussion of the problems associated with a 4-to-4 scenario (4 incumbents, 4 licenses), KPN had learned that a situation with as many licenses as incumbents was very unfavourable for newcomers and, hence, most desirable for incumbents. Consequently, KPN argued strongly in favour of 5 licenses, 2 large ones and 3 small ones, and in the end, that proposal was adopted. It is noteworthy that, while the UK-discussions about the 4-to-4 scenario had been very open and extensive, and had taken place almost a year before the Dutch came to discuss the 5-to-5 scenario that presents equal difficulties, the Dutch government officials never showed any awareness of this problem, let alone of the possible ingenious way out (the Anglo-Dutch auction) that had been identified by the academic advisors to the UK-government. As a result, alternative auction designs were never discussed, and the outcome of the lobby game was very favourable for the Dutch incumbents.

[10] See the Appendices 8, 11, 14, 16, 21 and 23 to Tweede Kamer (2000b)

Based on the consultation rounds and the advice received, the government published its definite plans on January 26, 2000. The decision was to award 5 licenses (two of 2×15 + 1×5, and three of 2×10 + 1×5), to have a license duration of 15 years, to not reserve a lot for a newcomer, and to not attach special roaming rights to a license. This plan was discussed in parliament in March 2000, where no major comments were made. At that point in time, the details of the auction rules were not yet revealed, however, given the positive evaluation of the DCS-1800 auction, one could aspect that a simultaneous multi-round auction would be used. Indeed, in the end, the adopted auction format was ascending and symmetric and, not surprisingly, no newcomer won. As we have already stated, since three of the incumbents had entered the market only relatively shortly before the 3G-auction, this by itself does not prove that the goals of the auction have not been achieved.

The Auction Design Stage

After the parliament had given the go ahead, the actual preparations for the auction started. When making the design, the people in the ministry relied on their own past experience with the DCS-1800 auction and on the evaluation of that auction. It is fair to say that the civil servants, being satisfied with the outcome of the 2G-auction and expecting there to be a lot of demand for the 3G-licenses, did not see much need to change a design that had already proved itself. They nevertheless asked economists associated with CREED, University of Amsterdam, for advice on the optimal extent of transparency, on the best minimum bid and on the proper size of the bid increment. The request for advice was, however, stated in very general terms, hence, the response was rather general as well. We discuss here the minimum opening bid in some detail, as that played an important role in the auction.

A positive minimum price is desirable as it may shorten the duration of the auction. On the other hand, a minimum price that is too high may deter potential bidders from participating, hence, may have a negative effect on efficiency or revenue. Obviously, imposing a minimum price can also have the consequence that some frequencies are left unsold. In the reading of the government, the Dutch Telecommunications Law forced it to always allocate all available spectrum, which

ruled out imposing a hard minimum price. Indeed, in one parliamentary discussion, the vice-Minister openly acknowledged that the licenses would go for free in case there would be only 5 interested parties.[11] In order not to risk violating the law, the government thus adopted a soft minimum price: there was a minimum price in round one, but this would be lowered (ultimately to zero) if there would be no bidding on the lot. While the reader may wonder about this peculiar feature of the law, he can now at least better understand the opening phase of the Dutch auction. I should note that since the Dutch government has adopted a law that makes a hard minimum bid possible.

The detailed auction rules were discussed in at least one OPT-meeting, that of March 28, 2000. Parties were concerned to have a transparent procedure, that is, in contrast to the earlier DCS-1800 auction, the identities of the parties having the highest bids should be revealed. Furthermore, the parties argued against having a final auction round. It is also interesting to note that Dutchtone advocated using the German design, and that KPN volunteered to develop software to assist the government in detecting flaws in the design. One such (serious) flaw, that was discussed extensively, was the proposal concerning the re-auction that would be used in case one of the first winners did not honour its commitments. The NextWave-situation in the US shows how serious the difficulties can be if one of the winners does not honour its commitments. As a result of these discussions, the design was changed somewhat, although the final design did not fully take away the concerns.

The 3G-Auction Rules

The auction rules were published in April 2000. For our purpose, the following aspects of the rules are relevant:

(i) Five licenses are auctioned; licenses A and B involve 2×15 MHz of paired spectrum, and 1×5 MHz of unpaired spectrum, the licenses C, D, E each involve 2×10 MHz of paired spectrum, and 1×5 MHz of unpaired. The license duration is 15 years.

(ii) The licenses are sold in a simultaneous multi-round auction.

[11] Tweede Kamer (2000a), page 6.

(iii) Each bidder can bid on each license, however, in each round one can bid on at most one license, and if one is standing high on lot *L* one is not allowed to bid on a different lot, hence, each bidder can acquire at most one license.

(iv) In the first round, the minimum required bid on the lots A, and B is *f*100 million; it is *f*90 million on the lots C, D, E. If there is no bid on a lot, the minimum price for the next round is reduced to 70 (resp. 60) and if also in the next rounds there is no bid, this minimum is further reduced to 35 and next to 0 (resp.30 and 0).

(v) Each bidder has three waivers (or pass cards); waivers can only be used in one of the first 30 rounds of the auction.

(vi) A bidder who is not standing high on a lot, and who is not bidding, or not using a waiver, is no longer eligible to bid.

(vii) Bidders know who is standing high on each lot.

(viii) The auctioneer determines the bid increment; at the maximum it is 10% of the previous highest bid on this lot, or 200,000 guilders if that is higher.

(ix) Bidders are not allowed to disturb the proper course of the auction, they are not allowed to prevent competition from taking place in the auction.

(x) The auction ends when no more bids are made, with parties having the highest bids at that time winning the licenses; the winners have to pay their final bid.

The Interest in the Auction

Parties that wanted to participate in the auction had to register before June 5. Ten parties expressed such an interest. In addition to the 5 incumbent mobile operators, these were NTL, Hutchison, T-Mobile, Sonera and Versatel. The latter is a small firm that at the time was investing in a high speed fixed (glass fibre) data network connecting the major cities in Western Europe. The Dutch competition authority was asked for advice concerning the “independence” of several of these parties. France Telecom, who is the major shareholder incumbent Dutchtone, is also a minority shareholder in NTL. Furthermore, at the time France Telecom had an interest in Vodafone (resulting from the sale of Orange). The competition authority didn’t see any problems in the links between these companies; hence, all parties were eligible to

bid. Already a couple of days after having filed its application, Sonera, however, already withdrew.

Of course, frequently it is better to cooperate rather than compete. On June 27, T-Mobil announced its cooperation with (takeover of) the incumbent Ben, while at the same time withdrawing its independent application. As Ben was generally considered to be the financially weakest incumbent, this move substantially reduced the chance of a newcomer winning a license.[12] On July 3, KPN and Hutchison formally announced that they were considering cooperation in UMTS-auctions in Germany and Belgium and two days later Hutchison withdrew its independent application. In the morning of the first auction day, 20 minutes before the auction was about to start, NTL announced that it would not bid. This left only 6 bidders for 5 licenses.

Given that the design adopted by the Dutch government was unfavourable for new entrants, why did any entrant take the trouble to participate in this auction? Why did the auction take place? Why wasn't the government forced to give the licenses to the incumbents for free? These are the questions that the government should have been thinking about in the months before the auction. All signs, however, are that, after the UK-auction raised so high revenues, the Dutch government was thinking about exactly the opposite "problem" of how to prevent a too high price (Bennett and Canoy, 2000). At least one economist had warned the government that an unfavourable scenario, with only 5 bidders for 5 licenses might become reality (Maasland, 2000), but this possibility seems not to have been taken seriously.

Versatel

So why then did Versatel participate? I note that also Versatel was well aware that, under normal conditions, it could not win a license in the auction. In fact, Versatel had clearly communicated to the other parties that it was aware of having no chances to win in the auction: it had started formal legal complaints about the auction design against the Dutch government. In these legal procedures, which were taking place both in the Netherlands and at the EU-level, Versatel had given the full

[12] Given, as argued above, that incumbents will attach a higher value to a license, only budget constraints can tilt the competition in favour of an entrant.

arguments for why it could not win.[13] Hence, Versatel did not participate to win a license. Instead it participated since it had not yet gotten the concessions from the incumbents that it wanted. Just to make completely sure that the incumbents understood its motivation to play, Versatel openly displayed its motives for participation on its web-site the day before the auction started. Versatel's CFO is there quoted as saying:

> *"Versatel fears it is defining the success or failure of the auction. We would however not like to see that we end up with nothing whilst other players get their licenses for free. Versatel invites the incumbent mobile operators to immediately start negotiations for access to their existing 2G networks as well as entry to the 3G market either as a part owner of a license or as a mobile virtual network operator."*[14]

The message should be clear: Versatel is willing to share a license (and, hence, not participate as a bidder in the auction) provided that the terms are right and that access to an existing 2G-network is offered at reasonable terms. Incumbents might thus expect Versatel to drop out of the auction if an agreement is reached. As part of its strategy, Versatel had also provided itself an exit option. In the days before the auction, it had stated in several press releases that it would bid only if it had found a strategic partner, and on the day the auction started, such a partner had not yet been announced.[15] With other newcomers withdrawing from the auction, the scenario obviously developed in the way most favourable to Versatel. Being the only entrant, Versatel has bargaining power over the incumbents, which it is fully aware of, as the opening sentence of the prese release makes clear. The longer Versatel stays in the auction, the higher the price the incumbents have to pay; if an agreement is reached immediately, only 5 bidders are left for 5 licenses, and the incumbents can get their licenses for free. Note, however, the free rider problem on the side of the incumbents: all of them benefit from Versatel dropping out, but only one party has to conclude an agreement. Which party should this be? Note that Ben, Dutchtone and KPN each have already taken out a newcomer, which leaves Libertel and Telfort as obvious

[13] For example, see Versatel (2000a)
[14] Versatel (2000b); an MVNO is a mobile operator that does not have its own network, but that in all other respects appears to the consumer as a regular operator.

candidates. On the morning of the second day of the auction, the Internet journal Planet Multimedia was openly speculating on Versatel sharing with Dutchtone; this journal was excluding Libertel as Vodafone wanted to focus on mobile telephony while Versatel had its main interests in fixed. (Planet Multimedia, 2000)

4. THE 3G-AUCTION

The auction started on Thursday July 6. That morning, the government was surprised by there being only six bidders, but it was too late to call off the auction. The auction lasted for 13 days and in total had 305 bidding rounds. It came to a halt when, in round 306, Versatel decided not to bid again. For the largest part, the auction was uneventful. Below, we analyse in some detail the more interesting stages in which there was bidding on the larger lots. This includes the beginning and the end of the auction. Throughout this section, we will use the following abbreviations:

K = KPN
L = Libertel
B = Ben
D = Dutchtone
T = Telfort
V = Versatel

With the exception of former monopolist KPN, all the incumbents are affiliated with major European players: Vodafone is the majority shareholder in L; for B, one may read Deutsche Telekom, for D France Telecom and for T British Telecom.

The Opening

Since the government was of the opinion that it could not charge a strictly positive price in case there was no scarcity, the rules specified that players could use "pass cards" at the beginning of the auction and that, on lots receiving no bids, the minimum price would be (stepwise) reduced to zero. At the start of the auction, the players faced considerable uncertainty about the actual number of serious bidders.

[15] See Versatel (2000c) and Financieel Dagblad (2000).

Possibly there were only 5 serious bidders for 5 licenses; hence, by using the "pass cards", it might be possible to actually get a license for free. All players, apart from Libertel, realised that it was sensible (a dominant strategy?) to use the pass cards in the opening rounds and to first drive the minimum prices to zero, instead of starting to bid immediately. The following table gives the bids that were made in these opening rounds, with all prices listed in millions of Dutch guilders[16]. (In round 4, there were two bids on A, and also two on C.) In effect, since Versatel turned out to be an active player as well, the bidders were in a kind of prisoners' dilemma; the only effect of using the waivers was that that auction lasted a week longer than it would otherwise have. (Of course this also gave the parties more time to come to an agreement.)

Rounds	A		B		C		D		E	
1	---	---	L	100	---	---	---	---	---	---
2	---	---	L	---	---	---	---	---	---	---
3	---	---	L	---	---	---	---	---	---	---
4	K	0	L	---	B	0.1	T	0	V	0
5	K	---	L	---	D	0.3	T	---	V	---

The opening phase of the auction.

In rounds 6, 7 and 8 there is then some activity on the small lots, but in round 9, Telfort switches to lot A to compete with KPN. In light of the talks (negotiations?) that are taking place between T and V (see below), this is understandable: since K is the largest player on the market, since L is occupying a large license and since lot A is cheap, T may expect K to stay bidding on A, which implies that the price on the small lots remains low, hence, that, if the negotiations are successful, a large cake can be divided between T and V. In the next rounds, K and T then drive up the price on lot A. With a minimum increment of 0.2 (million) or 10% of the previous highest bid, it obviously takes a long time before the price is back at its original level. In fact, it takes till round 60 before Libertel is eventually outbid by KPN. The next table describes the state of the auction at that time.

[16] 1€ = 2.20 guilders

State	A		B		C		D		E	
60	T	110.1	L	110	D	0.5	B	0.4	V	0.6

The table should be read as follows: on lot A, T has made the highest bid up to now and the current minimum bid on that lot is 110.1; and similar for the other lots. In the following rounds, there is then bidding on the large lots A and B. The next table provides details

State	A		B		Bidder	Lot	Bid
60	T	110.1	L	110	K	B	110
61	T	110.1	K	121	L	A	110.1
62	L	121.1	K	121	T	B	121

The pattern that is displayed in this table, with K, L and T driving up the prices on A and B is maintained in all rounds till round 95, when K outbids T on lot B (with a bid of 556). The state that T faces in round 96 is:

State	A		B		C		D		E	
96	L	612.2	K	611.6	D	0.5	B	0.4	V	0.6

The prices on the small lots are still the same as they were in round 8, and, with this large price difference, T decides not come back on A or B, but instead to switch to the smaller lots. In fact, T bids on the cheapest lot, D, and this then starts a process in which B, D, T and V drive up the prices on the smaller lots by bidding only on these. As a result of this, K and L do not have to bid again until round 177.

The middle play

Something very interesting and surprising happens on Friday June 26 when the auction has been going on for a week, Versatel has to bid and is confronted with

State	A		B		C		D		E	
176	L	612.2	K	611.6	D	14.1	T	12.2	B	11.1

Even though the price difference between the small and the large lots is still very large, V decides to bid on A and to replace L there. What is Versatel trying to achieve? One possibility is that it is signalling its willingness to pay; that it is communicating that it could possibly drive up the prices of the smaller lots to more than 600 million. Hence, the signal might be that now it is still possible to get these small lots cheaply, but they might get very expensive as well. Being overbid by V, in the next round, L is confronted with the following state

State	A		B		C		D		E	
177	V	673.4	K	611.6	D	14.1	T	12.2	B	11.1

and, quite interestingly, L bids on E. In the next rounds, the game that was played on the small lots from rounds 96 to 176 is continued, but with L replacing V as an active player. It takes till round 219 when T is confronted with the following state and decides to displace K by bidding (the minimum needed) on B

State	A		B		C		D		E	
219	V	673.4	K	611.6	D	96.8	B	88	L	66

In round 220, K immediately takes back B, by bidding the required minimum amount 672.7. In the next round, 221, T then takes A from V by bidding 673.4. In round 222, V is then confronted with the state displayed in the line below, and it decides to switch back to the smaller lots: it bids the minimum on E.

State	A		B		C		D		E	
222	T	740.7	K	740	D	96.8	B	88	L	66

V thus displaces L and L decides to continue bidding on the smaller lots. This has the consequence that there is only biding activity on the smaller lots until round 248 when Libertel is confronted with the following state, and decides to bid on B.

State	A		B		C		D		E	
248	T	740.7	K	740	D	302.5	V	223.9	B	277.2

For a couple of rounds, there is then activity on the large lots again. This lasts until round 253, when K overbids T on A, where after, in round 254, T switches to the small lots. The details of the rounds 248-253 are given in the next table

State	A		B		Bidder	Lot	Bid
248	T	740.7	K	740	L	B	741
249	T	740.7	L	815.1	K	A	740.7
250	K	814.8	L	815.1	T	A	814.8
251	T	896.3	L	815.1	K	B	815.1
252	T	896.3	K	896.6	L	B	896.6
253	T	896.3	L	986.2	K	A	896.3

The following line gives the situation that T is faced with in round 254

State	A		B		C		D		E	
254	K	985.9	L	986.2	D	302.5	V	223.9	B	277.2

In this situation, T decides to enter a (minimum) bid on D, starting another bidding war on the smaller lots, which K and L can watch till round 275. In round 275, the auction is in state

State	A		B		C		D		E	
275	K	985.9	L	986.2	D	539	B	588.5	V	489.7

and T decides to bid 985.9 on A. For a couple of rounds, there is then again activity on the larger lots. The details are given below.

State	A		B		Bidder	Lot	Bid
275	K	985.9	L	986.2	T	A	985.9
276	T	1084.4	L	986.2	K	B	1080
277	T	1084.4	K	1188	L	A	1084.4
278	L	1192.8	K	1188	T	B	1188
279	L	1192.8	T	1306.8	K	A	1192.8
280	K	1312	T	1306.8	L	A	1312
281	L	1443	T	1306.8	K	B	1306.8

Note the jump bid by K in round 276, which is one of the few really serious jump bids that occur throughout the game. From this bid one may infer that K was not completely indifferent between the lots A and B. Confronted with this situation in round 282, T then decides to move again to the small lots: T bids on C

State	A		B		C		D		E	
282	L	1443	K	1437	D	539	B	588.5	V	489.7

This again leads to bidding only on the small lots in the rounds 282 up to and including 300. At that time, we are already in the end game, which in our opinion starts around round 297, which is the final round that is played on Friday and in which Versatel overbids Telfort on lot D.

Before moving to this end game, however, we briefly discuss some aspects of the players' strategies.[17] We have already outlined Versatel's strategy and will come back to it below. From the description above, it is clear that the market leader, K, bids only on the large lots. As may be inferred from K's behaviour in round 276 (a jump bid that is approximately 10% above the required minimum), K is not indifferent between the lots A and B. Of the smaller players, B and D only bid on the smaller lots. With few exceptions, B always bids on the cheapest of these lots. On the other hand, D expresses a clear preference for lot C: throughout the auction, it makes only two bids on a different lot, and both these bids are on E. The explanation may be that

[17] We follow the approach first outlined in Börgers and Dustman (2000)

D wants to signal that it is (or that it wants to be perceived as) the third player in the market; it is willing to pay a price for that, but this should not be too high. Indeed, in the two rounds in which D bids on E, this price difference between C and E is relatively large; in round 286 it is 111.5 and in round 296 it is 76.6. Libertel and Telfort bid on both the small and the large lots. From the description above it can be inferred that, up to round 278, T prefers to bid on a large lot as long as this is not more than (approximately) 600 more expensive than bidding on a small one, however, in round 278, the price difference is approximately 700 and T bids on B. In round 282, the difference is 900 and then T bids on a small lot. In the first part of the middle phase of the auction, L bids on the smaller lots when A and B are not more than 535 more expensive, when prices reach higher levels, L is, however, willing to pay a premium of more than 800 for a large lot, hence, it is somewhat difficult to pin down this player's indifference curve.

The End Game

We now analyse the end game in greater detail. The following table provides the play of the game. Although it is not evident from the table, this part of the game beyond doubt is the most interesting part of the Dutch auction.

State	A		B		C		D		E		Bidder	Lot	Bid
296	L	1443	K	1437	B	867.9	T	861.5	V	791.3	D	E	791.3
297	L	1443	K	1437	B	867.9	T	861.5	D	870.4	V	D	861.5
298	L	1443	K	1437	B	867.9	V	947.6	D	870.4	T	C	867.9
299	L	1443	K	1437	T	953	V	947.6	D	870.4	B	E	870.4
300	L	1443	K	1437	T	953	V	947.6	B	955	D	C	960
301	L	1443	K	1437	D	1045	V	947.6	B	955	T	B	1437
302	L	1443	T	1567	D	1045	V	947.6	B	955	K	A	1443
303	K	1573	T	1567	D	1045	V	947.6	B	955	L	A	1573
304	L	1703	T	1567	D	1045	V	947.6	B	955	K	B	1567
305	L	1703	K	1697	D	1045	V	947.6	B	955	T	D	947.6
306	L	1703	K	1697	D	1045	T	1042	B	955	V	---	---

The reason that the table does not reveal why the end game was so interesting is that most of the action actually took place outside of the formal auction. On Friday, July 21, 2000 around 4 p.m., just when Versatel is about to overbid Telfort on lot E in round 293, the bidding team of Versatel receives a letter from one of Telfort's lawyers, which states, among others

> *"Expert opinion indicates to Telfort that you will soon reach a bid level that is not in the interest of your company and its shareholders. If a bid at or above such a level would succeed, it might possibly be considered misconduct vis-à-vis these shareholders and could lead to personal liability of the directors of Versatel ... Telfort is of the opinion that the only conceivable reason why Versatel would place a bid at or above such level is that your company believes that its bids will always be surpassed by bids of the other participants in the auction. Press statements and your appeal against the government's decision to hold this auction support this view. As a result, the ulterior motive for such a bid must be that Versatel is attempting to either raise its competitors cots or to get access to their 2G or future 3G networks. Versatel's own press release of July 5 even appears to link its behaviour in the auction to gaining concessions from other participants. A bid strategy with such a motive constitutes a tort towards Telfort, who will hold Versatel liable for all damages as a result of this... To conclude, Telfort intends to treat the matter as strictly confidential in the interest of the proper course of the auction."*[18]

Hence, Telfort claims that Versatel is bidding only to raise its rivals' costs or to get concessions from them, that such behaviour constitutes a tort towards Telfort, and that Telfort will hold Versatel and its managers liable for all damages resulting from this. Perhaps it is not surprising that Telfort intends to keep this letter secret, but the argument given (" in the proper course of the auction") is remarkable.

Versatel, however, does not keep the letter secret. Immediately after having received it, Versatel informs Telfort that it considers this letter to be a violation of the

[18] The letter has been published by the Ministry of Public Works and Transport, see Tweede Kamer (2000b), Appendix 26.

auction rules, intended to influence Versatel's bidding behaviour, and that it considers informing the Minister about this letter. The same day, Telfort responds that Versatel misreads the letter, that it has not been the intention to influence Versatel's behaviour and that precisely not to damage Versatel and to keep Versatel's options open, the letter was sent confidentially. It takes till Sunday when Versatel indeed takes formal action, and one may wonder what has happened during the weekend. That evening, around 10.40 p.m., Versatel sends the letter to the Minister and to the auctioneer (with a copy to Telfort). It is accompanied by the request to exclude Telfort from the auction. Specifically, Versatel argues that Telfort's intention is to deter Versatel from further bidding ("Deze brief heeft tot doel of effect om Versatel te verhinderen verder in de veiling te bieden") and that this threat is very serious, hence, that competition in the auction has been damaged, that Telfort has violated the rules and should, therefore, be punished by exclusion from the auction.

The auctioneer and the representatives of the Dutch state study the material received from Versatel on Monday morning. At 9.33 a.m. they send a fax to Versatel announcing that they will study the case. In the meantime, they decide to let the auction continue, and in the first round on Monday morning, round 298, Telfort bids on C. When Versatel learns that the auction has continued, it writes the auctioneer that it is now no longer in the position to bid, and that it considers all bids made on Monday to be vacuous. Somewhat later, around 10 a.m., the Minister informs Versatel and Telfort that it does not consider Telfort's behaviour to be a violation of the auction rules. Around 12.20, Versatel appeals the decision not to exclude Telfort. Simultaneously, Versatel requests to suspend the auction. At 1.40 p.m. the auctioneer responds that a party can be excluded from the auction only after a formal warning has been issued first and that such a warning has not yet been given. At 2.06 p.m., when Versatel has to bid, it informs the auctioneer that it is not in a position to bid, which ends the auction.

Note that on Monday morning, Telfort can infer that Versatel will no longer bid. Now that the negotiations have obviously broken down, Versatel's only chance of winning a license is by having Telfort eliminated from the auction. Since Versatel's case now rests on it demonstrating that Telfort's threat is credible, Versatel has to act

as if it is deterred by the threat.[19] The auctioneer and the Minister are informed directly that Versatel will no longer bid. This crucial piece of information, however, is not available to the other bidders. Furthermore, neither the auctioneer, nor the government informs these bidders of the fact that Versatel will no longer bid, they do not even inform about the communication that has taken place between Telfort and Versatel. On the contrary, they let the auction continue as of nothing has happened. Hence, on Monday, July 24, Telfort can profit from insider information. In fact, Telfort's bid on lot C in round 298 can be interpreted as an attempt to profit from this additional piece of information.

Recall from the discussion above that Libertel had shown a willingness to move to the smaller lots in order not to have a too large price difference between the small and the large lots, but that it was unclear what price difference it was willing to accept. It is reasonable to assume that, if Libertel moves to the smaller lots, it will bid on the cheapest of these. Consequently, T's strategy of first (in round 298) bidding on C and next (in round 301) on B might be interpreted as first making Versatel's lot, D, the cheapest and next inducing L to end the auction by bidding on it. This strategy is also risk free, since, if Libertel remains on the large lots, the prices on the small lots remain unchanged; hence, T can still buy C cheaply. This theory of manipulation is supported by T's behaviour in round 298. Recall that above we have seen that T is willing to bid on a large lot, provided that the premium is not more than 700. In round 298, however, while the price difference is only 570, T nevertheless bids on a small lot. This behaviour is not in line with that earlier on in the auction. In contrast, the behaviour in rounds 301 and 305 is consistent with the original plan: in round 301, the difference is 490 and T bids on a large lot; in round 305, when Telfort has seen the plan failed, the difference is 750 and T bids on a small lot.

Whether or not one accepts this theory of insider trading, it is clear that bidding behaviour is distorted during the last day, and that the auctioneer should have

[19] In my view, Telfort's letter cannot be viewed as a credible threat. First of all, it is hard to see how getting concessions in this way could be against the interests of Versatel's shareholders. Secondly, according to Versatel's own information, the letter was received shortly before Versatel had to bid in round 293,so that Versatel has bid twice after having received Telfort's letter: in round 293 and in round 297. This behaviour considerably weakens Versatel's position that it could no longer bid, and it might be classified as a strategic mistake. To counter, Versatel might, perhaps, argue that, upon receiving the letter, these bids had already been prepared, that it was too late not to bid.

suspended the auction and should have created a level playing field as far as information is concerned. It is still very surprising that that course of action was not taken, especially since bidders suffered considerably: at the closing of the auction total revenue was *f* 857 million (22%) higher than it was on Monday morning. Apparently, the auctioneer and the government were not prepared very well for this contingency.

Collusion?

It is unclear how closely the Dutch competition authority, NMa, has watched the bidding process. The NMa did not act at the start of the auction, apparently it did not view Versatel's July 5 press release to be a violation of the competition law. On the final day of the auction, the Ministry asked the NMa for its opinion on Telfort's letter and the NMa concluded that this letter did not violate the rules. When after the auction, on November 1, 2000 during a hearing at the Ministry, Telfort voluntarily revealed that already on the day the auction started, talks had taken place between representatives of Telfort and Versatel, the the Dutch competition authority became active[20]. Two days later, on November 3, it raided the offices of both companies in search for evidence. A large collection of documents were confiscated, but in the end the NMa concluded that no evidence was found that the talks had as their aim or effect to influence competition in the auction. Hence, there was no proof of violation of the competition act and meanwhile the file has been closed. (See NMa, 2000.) In other words, even if the case does not smell well, it is not clear that it was rotten. What is surprising is that the NMa became active only four months after the event. Clearly, after such a long time it is very difficult to find any evidence. Given the small number of bidders, the high stakes involved, and the press release of Versatel, the Dutch competition authority should have monitored the game much more closely.

To an economist, the conclusion reached by the NMa that there was no collusion may appear surprising. However, it indeed is not clear that the behaviour that Telfort and Versatel engaged in is a violation of the competition law. To be concrete, suppose Telfort would make the following proposal to Versatel "I offer you to

[20] It has remained somewhat unclear who took the initiative for these talks (Telfort points to Versatel and vice versa) and what exactly was discussed there.

become an MVNO on my network, as well as access to my 2G-network on such and such conditions, provided that the price I pay for my license is not more than €0.1 mln". Suppose Versatel decides not to participate in the auction, prices drop to zero and Versatel accepts Telfort's offer. Is this collusion? The question is for lawyers to answer, but personally, I think it is not. What the example shows is that the competition law is not sufficiently powerful to prevent all behaviour that one might consider anti-competitive, or undesirable. If one wants to prevent such behaviour it has to be done through the auction rules. It is at this point that the Dutch auction rules were especially weak; they provided almost no possibilities to exclude players from the auction in the case of anti-competitive behaviour. In any case, players suspected of such behaviour had to be given warnings first by the Minister, and he obviously will be reluctant to issue warnings as eliminating players can be expected to reduce revenue. The lesson for the government is that it should commit itself by writing stronger penalty clauses in the auction regulation. Given the allegations of collusion in several other European UMTS-auctions, this lesson appears to have broader relevance.

5. CONCLUSION

One way of summarizing the Dutch UMTS-auction is that it was a game between a somewhat naive government and sophisticated market players. The government was naive in its belief that, in order to realise its goals, it did not have to pay much attention to the details of the auction rules, nor to assuring that the game was played according to these rules. For the bidders, this auction was just one subgame of a large overall game with high stakes. At least one market party was sophisticated in that it realised that, even though it could not win in the auction, it could use the auction as a means of trying to achieve its overall goal. There are two general lessons. First, a license auction such as this one is not an isolated event; it takes place in a certain context and this context should be taken into account when designing the auction rules. Second, and related, auction design is an art in itself of which the difficulty should not be underestimated.

At a more detailed level, based on this specific case, one can draw the following conclusions and make several recommendations:

(i) The goal to be achieved by this auction was said to be efficiency, not generating revenue. There are, however, good arguments for why revenue might be a valid goal. Since these two goals might conflict, choices have to be made. The goals should be explicit so that the auction design can be targeted towards reaching it.

(ii) Market efficiency was confused with cost efficiency and value efficiency. These concepts, however, are very different in nature, and one type of efficiency need not imply another. In particular, if a license auction awards the licenses to those bidders that value them most (value efficiency), the resulting allocation is not necessarily market efficient, i.e. it need not maximise welfare or consumer surplus.

(iii) Asymmetries between incumbents and newcomers may drive a wedge between value efficiency and market efficiency. While consumers may prefer a newcomer to win the auction, symmetric rules favour incumbents. These value differences may be surprisingly large and may make it virtually impossible for newcomers to win licenses in ordinary ascending auctions.

(iv) Policy makers are not (yet) fully aware of the richness of the set of auctions, that is, of the many degrees of freedom that the auction mechanism allows. Furthermore, there appears too little recognition of the fact that it is important to get the details right in order to ensure that the goals are reached.

(v) Market parties lobby for those auction rules that suit them best and the lobby game is biased in favour of incumbents. In order not to become a puppet of the vested interests, the government should ask independent experts for advice on the auction design.

(vi) An auction is not an isolated event, but it typically is a subgame of a larger game. Players will bid in the auction not necessarily to win the auction, but rather to reach their goal in the overall game. Participating in an auction may make sense, even if one cannot win in the auction, as long as it yields benefits elsewhere in the game.

(vii) As competition in an auction is very intense, participants have strong incentives to reduce this intensity, either through cooperation (merging, or making agreements) before the auction or collusion within the auction. Special attention

of the competition authorities is therefore warranted, but the general competition laws may be too weak to effectively prevent all anti-competitive behaviour. Collusion could be tackled through specific auction provisions, but it seems very difficult to prevent cooperation and contracts before the auction.

(viii) Since, being the seller, the government will not always have the correct incentives to strictly enforce the auction rules, an independent auctioneer should conduct the auction. Of course, the auctioneer should be knowledgeable so that it is well prepared for the different contingencies that may arise during the auction.

While one may definitely conclude that several things were wrong with the way the Dutch UMTS-auction was designed and conducted, the large amount of criticism that it has drawn has had at least two positive consequences. First of all, in the "official evaluation" of the UMTS-auction that was done on behalf of parliament (Janssen et al., 2001) several recommendations for improvement were made, and in its reaction to that evaluation, the government has stated that it accepts these recommendations and that it will take the lessons at heart. [21] Secondly, within its overall project of structural reform, the government has started a general project on auctions and beauty contests that aims to provide a general framework for how to select and implement the appropriate instrument for allocating licenses and scarce commodities.[22] The report, which is prepared by a committee that includes both policy makers and academics, and which incorporates input from leading auction experts, is scheduled to appear this spring. Hence, it may be expected that the Dutch will do better next time. It is only somewhat unfortunate that the UMTS-auction was such an expensive occasion so learn the lesson that auction design matters.

[21] Tweede Kamer (2001b).
[22] Tweede Kamer (2001a).

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