A GUIDE TO AUCTIONS: SPECIAL REFERENCE TO SPECTRUM AUCTIONS

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Abstract

Auction is a mechanism for selling goods and services. Today, auctions are employed in a variety of transactions that extend from online sales to sales of public resources such as spectrum. The ubiquity of auctions has generated tremendous interest among economist and public alike. It has also led to many open questions about the auction design.

The paper reviews the seminal literature on auctions, focusing on its basic models, and issues involved in auction design. The primary objective of the review is to offer some critical thoughts on auction design for its application in spectrum allocation.

Keywords: Auction, Spectrum, Revenue, Attrition, Bidder

1. Introduction:

The word auction is derived from the Latin word augere, which means “to increase” (Krishna, 2010). In simple terminology, auction can be defined as a system for allocating some asset or rights to a buyer and/or seller based on price competition between the buyers and/or sellers. Auctions are employed when one party to transactions say a seller is uncertain about the value of an item that the buyer places on it. Other mechanism for allocating the resources include posted price and negotiated transactions. Posted price can be employed for the products that are standardized and inexpensive. On the other hand, negotiated transaction is time consuming way to determine price. The auctions combine the better of these two methods and are viable mechanism to determine price when competitive market fails.

Generally, the word auction generates a picture of a hall with well dressed men and women sitting on chairs and an auctioneer doing a countdown with ascending prices. Such a visual description appears because of the fact that this is the most common type of auction format that we encounter in cinemas and TV serials. However, auctions are not confined to this format only. Typically, a standard auction is assumed to be one in which there is a single seller and several bidders. Further, it is also assumed that the seller acts as a monopolist. However, in actual practice sellers often do not have monopoly rights. Instead, in some auctions like online auctions they have to compete with fellow sellers, selling almost indistinguishable goods.
There has been a surge in the variety of auction formats being employed the world over. This is basically due to the ability of auctions to cater to the various needs of businesses and customers. Its application in spectrum auction has brought it to the centre stage. Although, it is worth mentioning that the process of auction has been used for thousands of years as reported by as documented in Shubik (1983). The Babylonian practise of auctioning off of brides-to-be about 2500 years ago is also reported by Greek historian Herodotus.

Swinkels (2001) has cited two reasons for interest in auction. First, auctions are a pervasive feature of the economy: Oil leases, T-bills, paintings, wine, cattle, used cars, real estate, and new share issues are all sold to varying degrees by auction. Second, auctions, broadly defined, are an excellent model of price formation in other market settings. Klemperer (1999) points out the importance of auctions on the basis of three points. First, a huge amount of economic transactions are conducted through them. Second, auctions provide a natural testing ground for economic theory – especially game theory with incomplete information. Third, auction theory has helped in developing insights into other methods of price formation like posted prices and negotiations.

Auctions have recently come into spotlight because of their use in deregulation and their explosive propagation on the Internet (Pekeè and Rothkopf, 2003). Pinker et al. (2003) summarises the reports of various researchers and organizations, in which the popularity of electronic markets, in particular online auctions, has been highlighted. And finally, online auction sites like eBay, have made the auctions much more democratic and ubiquitous (Dixit and Nalebuff, 2008).

The review of the literature reveals that despite the visibility and growth of auctions, the applications of auctions as a mechanism for allocation of public resources such as spectrum leave many contentious questions. It embraces decisions such as type of auction to be employed and issues such as reserve price, winner’s curse and formation of collusion etc.

2. Objectives of Study:

The objective of the paper is to review the literature in this regard. The review is confined to representative literature on auction theory and its application in spectrum allocation. Specifically, the objectives of the study are:

- To describe the basic auction theories and models
- To identify the issues in auction as allocation mechanism
- To evaluate the advantages of auctions over beauty contests
- To review the applications of auction in spectrum allocation

3. Research Methodology:

The research methodology used in this study is descriptive-cum-exploratory in nature. It can be labeled as descriptive as it describes the basic auction models and key assumptions. It also falls under
the rubric of exploratory research as it identifies and delves into the issues involved in auction theory and design. The rest of the paper proceeds as follows: the first section describes basic models of auctions. Section II discusses the revenue equivalence proposition and its assumptions. The section III brings out the issues in auction. The IV section discusses the pros and cons of beauty contest vis-à-vis auction in allocating public assets such as spectrum and reviews the experiences of spectrum auction both in India and abroad. The last section concludes.

4. Section I - Theory, Model and Types:

4.1 Auction Theory:

As of now Auction theory is a mature field. It has come a long way since the times of Vickrey (1961). Vickrey, an economist from the Columbia University of New York, studied private value auctions, in which each bidder’s value for the object for sale is independent of the values of other bidders. However, much of the practical work on auctions was done in 1990s, when new formats for auctions were developed. The auctions from this period onwards have generated much hype around them, mainly because they have generated revenues much higher than the expected ones.

Auctions are an important class of mechanisms for resolving multi agent allocation problems of various types (Byde, 2002). Theory of Auctions is concerned with the problems related to designing the auction formats so as to achieve the desired results for the auctioneer. These desired results could be revenue maximization in case the auctioneer is a seller and minimization of procurement price when the auctioneer is acting as a buyer.

4.2 Basic Models of Auctions:

Auctions take many forms however they always satisfy two conditions:

(i) They are used to sell any item; this item can be an object or the right of mining over some geographical area; and so are universal

(ii) The identity of the bidder has no effect on the outcome of the auction; i.e., auctions are anonymous.

Apart from this, a key feature of auctions is the presence of asymmetric information (Klemperer, 1999). In auctions, there is always an uncertainty for both the buyer and the seller regarding the price of good being sold. If the seller knows the exact value of the item then there will be no need for having an auction. Seller will offer that item to the highest valuation bidder at a price that is equal to or below the bidder’s valuation.

On the basis of informational asymmetry, auctions are categorised as private value auctions and pure common value auctions. In the basic private value model each bidder knows how much she values the object(s) for sale, but her value is private information to herself (Klemperer, 1999). Private values of (e.g. antique collectors and contractors) are independently distributed.
In the pure common value model, by contrast, the actual value is the same for everyone, but bidders have different private information about what that value actually is (Klemperer, 1999). The finest example of common value is the oil-lease. The value of oil lease depends on how much oil is underground as ascertained by geological estimates carried by different bidders. In this case the bidder will change her estimate if she learns the other bidder’s estimate, as against the private value model in which her estimate would not be affected by other bidder’s preferences or estimates.

In addition to private and common values, one more model of auctions is possible, called as correlated or interdependent value model. The interdependent value comes in when there are fair chances that the item can be resold. This model encompasses both the private and common values of the bidder. A bidder receives a private value signal but allows each bidders value to be a general function of all the signals. For example, a person’s value for a painting may depend mostly on his/her private information (how much one likes it) but also somewhat on others’ private information (how much they like it) because this affects the resale value and/or the prestige of owning it (Klemperer, 1999).

4.3 Types of Auction:

The four basic standard types of auction are: Ascending-bid auction, Descending-bid auction, First-price sealed bid auction and Second-price sealed bid auction.

4.3.1 Ascending-bid Auction:

This is the most common type of auction (Dixit and Nalebuff, 2008). In this type of auction, the price is successively raised until only one bidder remains, and that bidder wins the object at the final price. These types of auctions are also known as open, oral, or English auction. The process followed can be one in which the seller might announce the prices or the one in which the bidders raise their prices by calling out or the one in which bids are submitted electronically. The dominant strategy in such an auction as outlined by Dasgupta and Hansen (2006) is to stay in the auction until the bid exceeds one’s value. The items being mostly sold through ascending-bid auctions are antiques, art works and at times houses also.

The important properties of English auctions are the decision of any bidder to drop out of the auction process and its irrevocability (Krishna, 2003). Suppose an active bidder – who is willing to buy at the current price – decides to drop out. Then the identity of this bidder along with the price at which he drops out is commonly known to other bidders. Moreover, once a bidder has dropped out of the auction, he cannot re-enter the auction at a higher price.

4.3.2 Descending-bid Auction:

In this type of auction also called as Dutch auction, the auctioneer starts at a very high price. This price is lowered continuously, until any one of the bidders calls out that she accepts to
buy the object at the current price being quoted. These auctions are also known as open-first price auction because the winners pay their own bid price. This format is commonly employed in selling of flowers in Denmark, fish in Israel and tobacco in Canada.

4.3.3 First-price Sealed-bid Auction:

This format requires each bidder to independently submit a single bid, without knowing the bids of other bidders. The object or contract is sold or granted to the highest bidder. The winner pays her price, i.e. the highest or the first price bid. These auctions are used in auctioning the procurement contracts where the lowest bidder wins the auction. This type of auction is also used in selling of treasury securities and auctioning of mineral rights in government-owned land.

4.3.4 Second-price Sealed-bid Auction:

This type of auction runs in similar fashion as the first price auction, except that the object is sold to the highest bidder who pays the second highest bidders price. This mechanism of auction is also called as “Vickrey auction” after Vickrey (1961) who for the first time explored its properties. According to Dixit and Nalebuff (2008) the magical thing about second price auctions is that the dominant strategy is to submit a bid equal to one’s valuation, that is, to bid one’s true value. Singer (2002) points out that unlike other forms of auction, in second price auction, one’s bid doesn’t affect the price which one pays.

5. Section II - Theorem, Asymmetries, Correlation and Affiliation:

5.1 Revenue Equivalence Theorem:

One of the major findings of Auction Theory is the celebrated Revenue Equivalence Theorem (RET). Dasgupta and Hansen (2006) states that RET ensures, in many cases, the results for one auction form extends to others. In simple terms RET as explained by Dixit and Nalebuff (2008) implies that in private value settings when bidders doesn’t care what others think the item is worth, the seller would make the same amount of money by employing any of the four basic auction formats.

Klemperer (1999) has defined RET as: any allocation mechanism/auction in which (i) the bidder with the highest type/signal/value always wins, (ii) the bidder with the lowest possible type/value/signal expects zero surplus, (iii) all bidders are risk neutral and (iv) all bidders are drawn from a strictly increasing and atom-less distribution will lead to the same revenue for the seller (and player i of type v can expect the same surplus across auction types). Myerson (1981) has also confirmed that if bidders are symmetric and all revision effects, \( e_i = 0 \) and all lowest possible values, \( a_i = 0 \), then the Dutch auctions and progressive auctions both results in (i) object going to highest valuation bidder, and (ii) every bidder with lowest value estimates expects zero utility.

RET holds good under a set of basic assumptions. The four key assumptions underlying this principle
as identified by Krishna (2010) are:

i. Independence - the values of different bidders are independently distributed;

ii. Risk-neutrality - all bidders seek to maximize their expected profits;

iii. No budget constraints - all bidders have the ability to pay up to their respective values;

and

iv. Symmetry - the values of all bidders are distributed according to same distribution function. Relaxation in any of these assumptions will lead to results which will not support RET.

5.2 Asymmetries:

One of the important assumptions of RET is symmetry – the values of all the bidders are distributed according to the same distribution function. However, in practice, it happens that bidders’ valuations are drawn from different distribution functions. Hafalir and Krishna (2006) state that in first price auctions – asymmetries among bidders’ results in inefficient allocations. Fibich and Gavious (2003) have also proved that outcome of asymmetric first price auction is inefficient; i.e., in equilibrium, the winning probability of the bidder with the highest valuation will not be one. On the contrary, asymmetry does not affect the equilibrium bids in second price auctions.

Krishna (2003) reports about Vickrey’s (1961) observation that English auctions always allocate the object efficiently whereas, when bidders are asymmetric, the first price sealed bid auction may not. In asymmetric settings, English auctions will result in efficient outcomes only when bidders’ value functions satisfy a ‘single crossing’ condition – every bidder’s signal has a greater influence on his own value than any other bidder’s value. However, Cantillon (2008) found that asymmetries in bidders’ valuation can reduce the expected revenues both in first price and second price auctions. This fall in revenues can be attributed to reduced competitive pressure on bidders in case of asymmetries between them.

5.3 Correlation and Affiliation:

In case of interdependent value settings, when a bidder’s valuation is affected by the valuations of other bidders, the possibility arises that bidders’ signals are correlated. Affiliation means that when some signals are large, the others are also likely to be large. Affiliation leads to dilutions in revenue equivalence theorem. Milgrom and Weber (1982) propounded the idea that in affiliations others’ estimates will rise along with one’s own valuations. Kwasnica et al. (2005) reflects that when there are affiliations in values of bidders, than sealed bid auctions are assumed to be less efficient than ascending auctions. Wolfstetter (1996), as referred by Guillotreau and Jimenez-Toribio (2008), also confirms that affiliation leads to higher prices in ascending auctions. Dasgupta and Hansen (2006) consider affiliation as the generalized notion of
positive correlation among the signals. However, Klemperer (2003) is of the view that the effects of affiliation are often very tiny. To support this premise, he reports the findings of Riley and Li (1997) that the revenue difference between ascending and first price auction are very small unless the information is very strongly affiliated.

6. Section III - Issues in Auction Theory:

6.1 Winner’s Curse:

The winner’s curse is a phenomenon when the bidder who most overestimates the value of an item wins the bidding. This can occur in common value settings—when the actual values to the different bidders are unknown but correlated, and the bidders make bidding decisions based on estimated values. In such cases, the winner will tend to be the bidder with the highest estimate, and that winner will frequently have bid too much for the auctioned item. Dasgupta and Hansen (2006) calls winner’s curse as a form of adverse selection in common or interdependent-value settings. In equilibrium condition of an auction game, the winner’s curse does not occur because the bidders account for the bias in their bidding strategies. The highest bidder will adjust downward her estimate of the value of item, through the signals received from other bidders.

Krishna (2010) has stated that the magnitude of winner’s curse increases with increase in number of bidders. This is so because overestimating the value of an object among 10 bidders seems much worse when compared to overestimating when only 5 bidders are there. However, the winner’s curse occurs only when a bidder fails to calculate the correct value of the object.

6.2 Reserve Prices:

Reserve price is the minimum price set by seller (Maasland and Onderstal, 2005). Such a price is the threshold amount, $r > 0$, below which the seller will not part away with the item. Suppose that in second price sealed bid auction there are only two bidders: $A$ and $B$. Bidder $A$ is having valuation $v_a > 0$ and bidder $B$’s valuation $v_b = 0$. In such a scenario, bidder $A$ will win the auction but will have to pay nothing for that. A more prudent option for the seller would have been when he or she would have set a price $r \ (0 < r < v_a)$ below which no bids were allowed. The only difficulty is that it’s very difficult for the seller to determine $r < v_a$. If the seller chooses to keep $r$ too high then there are fewer chances that the item will not be sold and a small value of $r$ might result in a loss to the seller. Therefore, a revenue maximizing seller is always expected to set a reserve price that exceeds his or her value (Krishna, 2010). Krishna (2010) has also provided a proof that the expected gain from setting a small reserve price exceeds the expected loss. This condition is termed as exclusion principle according to which it is optimal for seller to exclude some bidders, whose valuations are below the reserve price, from the auction process even if their valuations are more than the seller’s own value.
6.3 Buyer’s Premium:

In an auction three different groups of entities are involved: the sellers; the buyers; and the facilitators or auctioneers. The role of auctioneer is to facilitate the auction, put forth a mechanism for it and to bring both the sellers and buyers to one platform. Sotheby and Christie are some of the renowned brick-and-mortar auction houses while eBay can be considered as the largest online auction platform. The revenue for these auction houses comes from the fees they charge from the sellers and the buyer’s premium they collect from buyer once the auction is over. The commission charged from the buyers is called the ‘buyer’s premium’.

Dixit and Nalebuff (2008) ponder over the problem as who actually pays this buyer’s premium: the buyer or the seller. The obvious answer, as the name suggest, seems to be buyer but actually it is the seller who pays this premium. Suppose the rule says that whosoever will win the auction, will have to pay 10 percent of the winning bid to the auction house as buyer’s premium. So if one’s valuation for an item is say Rs 1100, then the highest bid would not be more than Rs 1000 in any case. In case one bids true value of Rs 1100 and wins the item then one is obliged to pay a total amount of Rs 1210, which would have been much higher than one’s valuation. So, in reality it is the seller who has to pay the buyer’s premium because the buyers incorporate the impact of premium in their bids.

6.4 Jump Bidding or the Pre-emption Game:

Sometimes it is observed that in ascending auctions a bidder places a sudden high bid called ‘jump bid’ which substantially raises the price of the item being auctioned. Klemperer (1999) has quoted that such jump bidding is observed generally in takeover battles. Dasgupta and Hansen (2006) have defined pre-emptive bidding in the context of corporate takeovers as one in which a bidder submits all cash bid instead of a debt financed bid, signalling all the other bidders that their likelihood of winning the auction is low. The other bidders inferring from such a signal may decide not to incur the cost of learning their signals and do not bid at all.

6.5 War of Attrition:

Klemperer (1999) has equated war of attrition with an all pay auction while Dixit and Nalebuff (2008) considers it to be opposite of pre-emption game. War of attrition can be understood as an auction in which all the bidders pay for participating and keep on paying until they quit. In war of attrition game instead of seeing ‘who jumps first’, the game here is ‘who gives in first’. Suppose there are two bidders who are competing for being the only player in a market. To do so they enter into an intense competition with each other on the product itself, the services, advertisement, etc and as a result end up in incurring losses. Now the game is who gives up first. If anyone quits the market then the other will became the only player. Both are incurring losses but prize of winning is also much more.
6.6 Collusion and Rings:
In case of sale of multiple units by auctions, some of the bidders can often reduce the price they have to pay by coordinating their bidding strategies. Milgrom (2004) explains rings in auctions as organization of bidders that choose a single member to bid on their behalf. After winning the auction, these bidders hold some private auctions amongst them to distribute the goods and divide profits.

6.7 Entry Deterrence and Predation:
For getting an efficient outcome of an auction, it is very much crucial to have an optimal number of bidders participating in the process. Ascending auctions are often blamed for discouraging weak bidders from participating in auctions because it is assumed that such auctions results in the highest valuation bidder winning the auction. As observed by Klemperer (2002), not only ascending auctions but other forms of auctions can also suffer from entry deterrence problem, if the cost of entry and the asymmetries between bidders are too large.

7. Section IV - Spectrums:
7.1 Auctioning of Public Resources - Spectrum:
Traditionally, the most popular method to allocate the spectrum has been through administrative process, also labelled as ‘beauty contest’. The companies in this process submit business plans and the government agency evaluates this plan on certain laid down criteria and license are awarded to the companies that best meet the criteria. The main advantage of this process is flexibility. However, selecting and specifying criteria is a time consuming process. Further, it results in lack of transparency and can breed corruption and favouritism. Auctions, on the other hand, are transparent. It forces the government to be explicit about the criteria as the rules of the auction have to be announced in advance. Post auction, the applicants know, why one won or lost. The transparency and openness of the auction cuts at the root of suspicion that undue influence has been in play in award of license and impropriety has been committed. It may be noted that in politics perceptions are very important in stroking controversies.

Moreover, a carefully crafted auction allocates the resources to those who value it most by extracting information which otherwise is not available. Further, auction can generate astronomical sum of money that can be utilised for public finances (Klemperer, 1999). Despite these merits of auction, one the main argument against auction is that the cost of auction will be passed on to consumers resulting in higher price. However, this argument misses the distinction between fixed costs and variable costs. A firm whose objective is to maximise profit arrives at the price based on the marginal cost. Another argument levelled against auction is that high fee may slow or choke off investment stemming from capital market constraints (Klemperer, 1999). This possibility may be
valid theoretically as more the borrowing, the higher interest rate one must pay. However, it is debatable whether firm will be reluctant to raise funds even although coming at higher interest rate in the face of profitable opportunities.

The Technology guru Nicholas Negroponte has advocated that winners of auction should be chosen that would guarantee the lowest cost to consumers, invest the most in infrastructure and give fillip to the creativity. The problem with this argument is that how can government choose the most creative company and how can it penalise if the awardees of auctions renegade on commitments. Taken together, auctions as a spectrum allocation mechanism emerge as superior to beauty contest as they are transparent, fair, equitable, and generate revenues for the government.

However, the success of auction depends on the auction design. Whether open or sealed bid auction will work better? Whether spectrum should be sold simultaneously or sequentially? Whether to impose an appropriate reserve price or not? How to prevent collusion among? Auction of spectrum can also be disastrous like the experience of New Zealand. It conducted spectrum auction employing Vickrey auction- a second price sealed bid auction in which winner pays the runner-up’s bid. As reported by McMillan (1994) the winning bid was NZ$ 7 million but paid the runner up’s bid of NZ$ 5000.

7.2 Experience of Spectrum Auctions Abroad:

In the year 1993, United States decided to switch to auctions for granting new mobile communication licences. The Federal Communication Commission (FCC) was asked to design and operate the auction process for granting licences. The commission came up with a novel method of auction termed as the electronic simultaneous multiple round bidding auction. This method has been copied round the world to sell over US$100 billion in radio spectrum (McAfee et al.).

Binmore and Klemperer (2002) while advocating for auctions over beauty contests argued that the ‘second generation’ licenses fetched the UK government only 40,000 pounds as compared to 3G spectrum auctions which yielded about two-half percent of GNP. Spectrum auctions proved that they can play a vital role in nation building by reducing the government debts and lowering the income taxes on public. They extract and provide information to governments which can’t be accessed through beauty contests.

Simultaneous Ascending Auction (SAA) was considered by Klemperer (1999) as the most important new auction design. According to him the germs of SAA can be traced to Vickrey, 1976 but the credit of practically designing such auctions for the first time goes to Milgrom, Wilson and McAfee who proposed the rules that were necessary to make the SAA effective in the context of US radio spectrum auctions.
Cramton (1997) analysed the six spectrum auctions conducted by FCC from July 1994 to May 1996. Cramton points out that SAA auction format had theoretical virtues which were never proven. FCC chose to innovate. The auctions went on smoothly with some minor hitches and were termed as very successful. However, Cramton adds a note of caution also that the success of these auctions doesn’t imply that alternative methods were less successful and that the success is assured in future also. Although, allocation of spectrum by auctions is a huge improvement over allocation by lottery or comparative hearings.

The British government raised twenty-two billion and half a million pounds in the auction of five telecom licenses (Binmore and Klemperer, 2002). These auctions and a few subsequent European auctions along with FCC auctions can be termed as the greatest auctions after the auction of Roman Empire to Julianus in 195 A.D. Klemperer (2002) while commenting on Börgers and Dustmann (2002) results endorsed that the UK 3G telecom auction of 2000 was the most successful of the Western European 3G auctions in terms of revenue raised per capita and efficiency. In this auction, aspect of revenue was most obvious but the efficiency dimension was unsettled. The efficiency aspect was probed by different researchers and found to be efficient or close to be efficient, in the sense of maximizing the sum of the valuations of the license holders. The pre-auction and post-auction data suggest that the four-incumbent firms in UK auction were having the highest valuations, so were the efficient winners. Moreover, Vodafone was having the highest incremental value for a large license and so the allocation of spectrum among the winner’s was also efficient.

Lueck (1998) describes the opinion of S. Moreton and Pablo T. Spiller deduced from their empirical study of the Personal Communications Service (PCS) auctions of 1995 and 1996 in USA, wherein they have shown that the bidder behaviour is consistent with conceptions of competitive markets. They have also shown that firms competing in these auctions were able to aggregate licenses, thus offering vindication for simultaneous multiple-round auctions.

A detailed description of why auctions were used in spectrum allocations and which format of auction best suited such an allocation is given by Börgers and Damme (2003). They have argued that a seller wants to get the best price for the item which he/she is selling. This objective gets slightly modified if the seller happens to be the government instead of a private-sector seller. Compared to revenue generation, the government will be more interested in achieving an efficient outcome – placing the license into the hands of those who value them the most. Although more revenues are also desired as they help the government to reduce the fiscal deficits and taxes. An ascending auction provides an attractive alternative, which itself can be modified to suit the particular need.

By empirically analysing the data from the 1995 US Broadband PCS auctions Klemperer and Pagnozzi (2002) have concluded that when the number of objects available exactly equals the
number of “advantaged” bidders, revenues will be lower in an ascending auction. A fall in revenues is because of the reluctance of the weaker bidders to participate in the auction, and those that are present bid extremely cautiously because of the enhanced ‘winner’s curse’ they face. In US, revenues were lower when there were exactly two “advantaged” bidders among the bidders for the two licences in an area, than when there were either few or more than two advantaged bidders. They have estimated a revenue loss of around 15% to the government in such cases.

7.3 Indian 3G Spectrum Auction:

The government of India begin auction of 3G spectrum on April 09, 2010. This auction saw nine players bidding for 71 slots with 3 slots each in 17 telecom service areas and four each in rest of 5 service areas. The reserve price was Rs 3500 crore for a pan-India license. Out of the nine bidders, six were large telecom players, and so fierce competition was expected for each service area having 3 or a maximum of 4 slots (Rishabh, 2010).

The Department of Telecommunications (DoT) granted global consultant NM Rothschild the contract for being the lead auctioneer (TOI, July 15, 2010). Government owned telecom players MTNL and BSNL which had already started 3G services in 2008 were not allowed to bid in the auction. They were asked to pay for the slot of spectrum allotted to them earlier, at the final market price determined by the auction.

These auctions were designed to be simultaneous for all the 22 services areas using multiple rounds clock format to be executed online through a secured website. The auction was to start from reserve price in round 1, then a 10% increase in price in round 2, then 5% increase in round 3 and then an increase of 1% in price for every subsequent round, until the number of bidders equals the number of slot available (‘3G and BWA spectrum auctions’, DoT).

The expected revenue target by Government in its budget was Rs 35,000 crore but looking at the intensity of competition, this figure seemed to be very pessimistic even before the start of auction. All the 71 slots up for sale were sold in 183 rounds running over 34 days and enhancing the government kitty by Rs 50,968.37 crore. After including the amount to be paid by MTNL and BSNL, this figure touched a whooping Rs 67,719 crore. Guha and Krishna have reported in Wall Street Journal (May 19, 2010) that Finance Minister Pranab Mukherjee has declared that this will help India in limiting its budget deficit to 5.5% of GDP.

Even after shelling out 12,295.46, 11,617.86 and 8,585.04 crore rupees Bharti Airtel, Vodafone and Reliance, respectively - the top three telecom players of India - couldn’t manage to get a pan India license. The other winners were Aircel (Rs 6,499.46 crore), Tata Teleservices (Rs 5,864.29 crore), Idea (Rs 5,768.59 crore) and S Tel (Rs 337.67 crore).
Such payouts are expected to strain the balance sheets of winners’, as was pointed by Rishabh (2010). Building a case for weak form of winner’s curse in such a situation, Rishabh has drawn analogy from UK and German 3G spectrum auctions of 2000. A weak form of winner’s curse occurs when the true value of the object is greater than the price paid but is less than the value estimated by the winner, so that the winner earns less than what is expected initially.

According to a report by Market Publishers (2010), the winner will have to re-jig their balance sheets in order to cope with rising debt level. Bharti Airtel, Vodafone and MTNL have strong cash reserves to cater to debt needs but Reliance, Idea and Aircel will have to depend on external borrowing to finance their bid obligations and 3G rollout investments. These operators can only get out of this debt trap by quickly making their 3G offering profitable and curbing the falling Average Revenue Per User (ARPU) figures.

8. Conclusion:

The auctions have evoked tremendous interest as a resource allocation mechanism. It is the fertile ground for testing of information and game theory. Politically, the scandals in allocation of public resources has underlined its importance and its advantage over beauty contest as auctions are transparent and fair in allocation; generate revenues for the government and reveals firms’ estimate of the license values. However, the success of the auction depends on the mechanism design. It encompasses the set of rules and procedures that will govern the interactions of the bidders; choice of the type of auctions: ascending, descending or sealed bid, and taking into account the issues of reserve price, collusion among bidders, winner’s curse and entry deterrence. The classic failure of spectrum auction in New Zealand documented by McMillan (1994) where the winning bid was NZ$ 7 million but winner paid the runner up’s bid of NZ$ 5000 stresses the fact that one-size-fits-all design will not do and theoretically elegant auction models such as Vickrey may perform disastrously. The success of auctions warrants that the pitfalls of the auction should not be glossed over as the devil lies in its details.

References:


30. The Times of India, (2010)“Wrong Auction Format Led to Artificial Shortage”, The Times of India.