

# Spectrum Auction 2015: Is it a Winner's Curse or Users' Dilemma

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**Abstract--**The 2015 auctions of spectrum concluded with aggressive bidding seen from different operators. The bidding has generated a whopping approx. 1,10,000 crores for the exchequer. A windfall gain which is even higher than both its (GOI) own estimates for present auction as well as what the Government realized during its most successful spectrum auctions of 2010. But this has created a rather peculiar situation as for incumbent license holders, this auction was not meant for obtaining new spectrum but retaining the existing one and there is no option left before them other than to acquire the spectrum (at any cost), as for them it was a question of survival. Hence there is an external threat for winning this spectrum and under these circumstances, the price paid by them is not a market determined price but a price influenced by an external threat. The entire exercise (auction) is bad for the operators as well as consumers and the country in a longer run. Authors examine the current auction mechanism and observe that the current auction mechanism is forced bidding in which the operators are “forced to bid”, creating a situation of a winner’s curse.

*Keywords: Spectrum, Auction, Competitors, Strategy, Winner's curse, Telecom.*

## I. INTRODUCTION

Due to increase of user demand for communication services and broadband, the demand for spectrum has been increasing at a constant rate for couple of decades now. Despite India being one of the early adapters of spectrum auction process, recent auctions have created some questions regarding the methodology adapted. In spite of the growth slowed down of telecom sector, the spectrum auction bidding was on a record high.

This paper explores whether the current auction was actually a forced auction, or the auction was actually necessary for renewal of license.

This paper analyses the current auction methodology; analyses if the spectrum were overpriced. analyses key factors which can help in a better valuation of the spectrum.

## SELECTED LITERATURE REVIEW

Paper	Author	Topic	Methodology	Key points
1	Luke Hu, Elmar G. Wolfstetter	Spectrum license auctions with exit (and call) options: Alternative remedies for the exposure problem	Empirical	The author explores the efficiency problem of multi-round Auction and explores remedies for the same he ranks three auction types: a combinatorial Vickrey auction, a SMRA with exit option that allows the entrant to annul his bid, a SMRA with call option that lifts the spectrum cap.
2	Veronika Grimm, Frank Riedel, Elmar-Wolfstetter	Low price equilibrium in multi-unit auctions: the GSM spectrum auction in Germany	Empirical	The paper presents the events of the bids happened in Germany, the paper has shown that low price outcomes may be an equilibrium in multi-unit auctions
3	R.S. Jain*	Spectrum auctions in India: lessons from experience	exploratory	Cross Country analysis of spectrum auction comparison between USA, UK, and India.

5	Richard D. French	Governance and game theory: When do franchise auctions induce firms to over bid?	exploratory	When public assets essential to entry or sustained presence in a market are to be auctioned, high uncertainty and potential or actual asset specificity are indicators of potential overbidding
6	Rohit Prasad, Rajat Kathuria	The value of 1800MHz and 2100MHz spectrums in India and implications for auction design	Empirical	The author observes that spectrum design is not fully efficient
7	Bengt G. Mölleryd, Jan Markendahl	Analysis of spectrum auctions in India—An application of the opportunity cost approach to explain large variations in spectrum prices	exploratory	The results show that the opportunity cost of spectrum in relation to auction prices is lower than prices operators paid for 3G spectrum in the metro circles (service areas) while the value derived from the opportunity cost is higher than auction prices in the remaining circles.
8	Martin Bichler, Jacob Goeree, Stefan Mayer, Pasha Shabalin	Spectrum auction design: Simple auctions for complex sales	Empirical	The author observes that simplicity of the bid language has a substantial positive impact on the auction's efficiency and simplicity of the payment rule has a substantial positive impact on the auction's revenue. The currently popular combinatorial clock auction, which uses a complex bid language and payment rule, achieves the lowest efficiency and revenue among all treatment combinations.
9	Joost Poort, Marco Kerste	Setting licence fees for renewing telecommunication spectrum based on an auction	empirical	The paper presents methodology for setting fees for the renewal or extension of spectrum licences, by using the outcome of an auction for comparable licences but with a different licence period.
10	Rekhajain	Changing role of regulation: lessons from US spectrum auctions	exploratory	The case study documents the Federal Communications Commission's experience in auctioning C Block spectrum for provision of Personal Communication Services. The case study highlights the issues in managing the auction process.

There are articles that talk about type of auctions (Luke Hu, Elmar G. Wolfstetter), in which the author compares the existing auction types and ranks them as per performance. The paper also mentions that in SMRA auction mechanism, there are chances of two kind of losses :

1) The exposure problem that causes a low probability of successful entry: in equilibrium the entrant may win only one block yet pay more than the bundle value, and in both cases suffer a loss.

*What is a spectrum?* As per GSMA “spectrum are a form of electromagnetic radiation which, like visible light or infrared, make up a portion of the entire spectrum. They cannot be perceived by human eyes or ears, and they are not harmful in the environment. Depending on their frequency (measured

in hertz), radio waves can pass through solid objects and travel long distances. This makes them useful for mobile communications, broadcasting and many other wireless applications” [1].

*Why spectrum is auctioned:* The reason for auction can be understood by the nature of spectrum as a resource, they are limited in quantity, and government don't want any conflict between service providers.

*Minimum Reserve Price:* The minimum reserve price is generally fixed with the purpose of increasing revenue. Minimum reserve price is the minimum amount which the auctioneer is ready to auction the object for. The computing of minimum reserve price is a complicated affair. The computing of minimum reserve price requires knowledge about the

distribution of valuations of bidders [2].

### **Spectrum Auction 2015 Mechanism**

Government of India decided to allot the rights to use certain specified radio spectrum frequencies in the 2100 MHz, 1800 MHz, 900 MHz and 800 MHz bands by means of auction in various telecom Service Areas. The government decided to carry a single auction principle for the various spectrums.

The objective of the government was as follows:

- Obtain a market determined price of Spectrum in 2100 MHz, 1800 MHz, 900 MHz and 800 MHz bands through a transparent process;
- Ensure efficient use of spectrum and avoid hoarding;
- Stimulate competition in the sector;
- Promote rollout of the respective services;
- Maximise revenue proceeds from the Auctions within the set parameters.

The Auction was a Simultaneous Multiple Rounds Ascending (SMRA) e-auction. Bidders will be able to access the Electronic Auction System (“EAS”) to be used for participation in the Auctions.

Winner of the bid for spectrum block in each service area in the auction will be determined in two stages

- 1) A clock stage, this will allocate spectrum blocks simultaneously for the service area
- 2) A frequency identification stage, which will identify frequencies for the winner bidders.

### **Is Auction right method?**

Auction is one of the most widely used methods for spectrum allocation around the world, it allocates resource effectively, the problem here is that, the auction was for renewal of existing spectrum for those incumbent players whose spectrum licence was about to expire. When these blocks of spectrum which are actually auctioned in a competitive bid, this creates a condition for forced bidding, because the existing players will put maximum value to take back the spectrum. This creates a scenario of Winners’ curse.

### **The objective of most spectrum auctions is three-fold.**

- The primary objective is efficiency- the resource should be allocated to those who value it the most, is technologically most efficient and can create maximum utility out of it.

A Secondary objective is stimulating competition- encouraging entry and participation to induce effective demand and supply interaction in the market for generating market determined prices of the resource as well as provide maximum benefits to consumers from competitive market structure (to create competition for market).

Another important goal is to generate revenue- allocating spectrum to private entities creates private property (Auction Design and its Impact on Competition -With Reference to the Spectrum Auctions).

### **What is Winner’s Curse Problem?**

Auctions are used precisely because the seller is unsure about the values that the bidders attach to the object being sold. The values may be same to all but not known or the values may be private (known to the bidder) and independent of other bidders’ values. An issue that can depress bidding in some ascending auctions is the “winner’s curse”. This problem generates when the bidders have the same, or closely the same, actual value for the object, but they have different information about the actual value; this is the ‘common values’ (the ex-post value is common to all) case. The winner’s curse reflects the danger that the winner of an auction is likely to be the party who has most greatly over-estimated the value of the prize.

This knowledge of winner’s curse leads all bidders to bid cautiously (shade their bids), especially the weaker firms (small operators). The weaker firms should be extra cautious because they recognize that they are only likely to win when they have over-estimated the value by even more than usual. Therefore, given this scenario the advantaged firm can be less cautious. Since the winner’s curse affects weak firms much more than strong ones (and moreover the effect is self-reinforcing), the advantaged strong bidder win most of the time and because its rival plays extremely cautiously, it wins at a low price. However, this problem is pertinent to common values case. Auctions where there are bidders hold private values for the object, independent of other bidders’ valuation, this problem does not arise. In this case each bidder knows the value of the object to himself at the time of bidding and the knowledge of other bidders’ values would not affect the valuation of the object to any particular bidder. (AUCTION DESIGN AND ITS IMPACT ON COMPETITION -With Reference to the Spectrum Auctions)

## **II. ANALYSIS OF THE CURRENT AUCTION**

In the auction the available spectrum were too low in quantity with more number of players bidding and scarce spectrum available, it created scenario of overbidding which may not be good for the players, especially when most of the players are renewing their existing licence.

The players who are bidding to defend their spectrum are actually overpricing the bid due to the fact that new player like Reliance Jio has entered the same bid. The problem of auction of renewal of license is that the incumbent players are forced to bid high to win the bid creating the scenario of winners curse. This creates a scenario of users dilemma as the operator who wins the spectrum has overpaid and they may have to necessarily increase the tariff to the consumers

Let's take three scenarios

*Case 1:* If no existing player bid for the renewal of License. The license may go to the new player he will have to invest in deployment of new infrastructure, and the users of existing player whose license now went to the other player, will have problem in using the existing services so either they need to upgrade to new higher band which may weaken their signal reach. It will impact the service quality for the customer at least for some time. The old players will exit the market or will switch to higher band (if available).

*Case 2:* Existing player gets the licence renewed on reserve Price. It relieves the burden on the operator and also serves the customer well.

*Case 3:* If spectrum released for auction are very less, and competitors are high. It will lead to overpricing of the license, which is unjustifiable.

III. THE AUCTION RESULTS

Band	On Offer			Round 115 Realization				
	No. of Service Areas	Quantum of Spectrum (MHz)	Estmd Proceed at RP (Rs Cr)	No of Service Areas where blocks have been allocated provisionally	Provisionally Allocated (MHz)	At Reserve Price For the Provisionally Allocated MHz (Rs Cr)	At Provisional Winning Price (Rs Cr)	Service Areas where Premium Over RP
2100 MHz	17	85	17555.00	14	70.00	9620.00	10115.41	10
1800 MHz	15	99.2	8936.20	14	93.80	8292.40	9636.17	9
900 MHz	17	177.8	40223.80	17	168.00	37841.00	72964.54	17
800 MHz	20	108.75	13562.50	18	86.25	9710.00	17158.79	14
	<b>69</b>	<b>470.75</b>	<b>80277.5</b>	<b>63</b>	<b>418.05</b>	<b>65463.40</b>	<b>109874.91</b>	<b>50</b>

(Reference : <http://www.medianama.com/2015/03/223-spectrum-auction-india-ends/>)

In the above chart we can observe that the government targeted auction revenue was around 80277.5Cr , and the value which they have received was around 109874Cr which is 36.8% higher than expected .That means there is a very high probability that overbidding was done.

RECENT INTERNATIONAL EXPERIENCE ON LICENCE RENEWAL

Country	Licence Renewal Type
Pakistan	The renewal fee paid by the operator was based on the outcome price of a previous 2G auction for new licences held in April 2004
Bangladesh	Licences were extended for 15 years and renewal fees were based on the respective market shares of each operator.
Singapore	Determined by auction after feedback from across stakeholders, authority decided to give existing spectrum holders "right of first refusal" for their specific block positions

#### IV. CONSEQUENCE OF HIGH LICENSE FEE ON RENEWAL OF LICENCE

High license fee can impact government's objective of encouraging investment on next generation technology, as the current license auction has created financial burden on operators.

High fees may increase tariff to the end users.

The industry has invested more than 90% of the revenue in last two auctions which has to high amount of debt, this will led to increase in tariff and also it will affect the revenue targets for coming couple of years.

It can adversely impact the future investment capacity of incumbent players as they may not have the necessary financial strength to enter into new investment areas.

#### V. CONCLUSION

The paper is an attempt to understand the current spectrum auction and to understand whether auction is the right way of allocating spectrum for renewal of the license. Value of spectrum largely depends upon the Regulatory regime and Government policies and we don't observe any direct relation between license methods with the economical use of these national resources. Government can make it exorbitantly costlier by way of auction or renew it for further 20 years for existing players by fixing a price as per different criteria (market share). Spectrum allocation is only a process of assigning specific bands to Service providers who wish to own them and provide services to the consumers. In this case the Operators are already identified and they are holder of license which is required to be extended and have invested huge capital and network with millions of customers. Nobody can think of a situation where the auction can result in allocation of spectrum to a new entity and the network and subscriber is with another entity. This is not a favourable situation. This should not happen and will not happen. Hence it's an auction where winners are already decided or known. Put it differently the existing operators has to get back the spectrum at any cost. In such a situation the basic principle of any auction that the participants or bidders have equal opportunity to win and get the spectrum does not exist. Because this will result into a situation where network and subscribers can be with somebody and spectrum for running the service is owned by somebody else.

Ideally there should have been exit condition at the time of first awarding license. If either the Government or the existing licensor do not want to extend the license after the initial period of 20 years the entire network can be taken

over by the Government at a pre-determined price .It can be the market price and then award the network with spectrum to a new entity through auction. In such a case the auction is justified. In the present situation for renewal of licence of an existing operator, the best thing should have been to extend the license automatically and at the most fixing a minimum amount like reserve price for extension without converting it into a winners curse.

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