Telecom Spectrum Auctions in India: The Theory and the Practice

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Abstract

Telecom spectrum is a scarce natural resource whose misallocation is likely to have adverse impact on an economy. It is therefore crucial for a country to ensure

because Chinese policymakers viewed telecommunications as a necessity while their Indian counterparts looked at it as a luxury at least till 1997.

Spectrum (also sometimes referred to as airwaves or frequencies) is a scarce natural resource. Prior to 1995, it was believed to be a property of the Government. But a Supreme Court verdict in 1995 ruled that "The airwaves or frequencies are public property. Their use has to be controlled and regulated by a public authority in the interests of the public and to prevent the invasion of their rights. Since, the electronic media involves the use of airwaves, this factor creates an in-built restriction on its use as in the case of any other public property."[1] Therefore, like any other scarce public resources, its allocation needs to be efficient in order to protect the interest of the public by minimizing wastage and maximizing public utility. With this background, it seems useful to have a broad overview of the issues relating to telecom spectrum allocation in India along with the regulatory aspects of such allocations. The rest of the paper tries to provide this. The focus, however, is mainly on auctions as a method of telecom spectrum allocation, since this method has been in use in some countries and more and more countries are adopting this method replacing their earlier practices for allocating telecom spectrum.

The paper is organized as follows: section 2 discusses the different ways in which telecom spectrum can be allocated, sections 3 identifies the different forms of auctions along with their pros and cons, section 4 explains the various concerns regarding design of auctions, section 5 briefly discusses the experiences of some countries which have adopted auction as a method of allocating telecom spectrum, sections 6 and 7 are respectively about the telecom regulatory agencies and telecom spectrum auctions in India and finally section 8 outlines the policy directions and concludes the paper.

2. Different Methods of Telecom Spectrum Allocation

Telecom spectrum licenses can be allocated in various different ways e.g. comparative hearings, beauty contests, lotteries, first-come-first-served (FCFS) basis and auctions. The method of comparative hearings has been used by the Federal Communications Commission (FCC) for assigning spectrum rights in the US. Comparative hearings are "a quasi-judicial administrative process to select among competing applicants for spectrum licenses" in which the FCC "evaluates applicants under comparative criteria

[1] This Supreme Court judgment was delivered by Justice P.B. Sawant and Justice S. Mohan on 9.2.1995 in the case between the Union of India & Cricket Association of Bengal.
(Source: http://www.mib.nic.in/WriteReadData/documents/SUPREMECOURTJUDGMENTONAIRWAVES.htm)

[2] Kwerel, E. (Office of Plans and Policy) and W. Strack (Wireless Telecommunications Bureau), (2001): "AUCTIONING SPECTRUM RIGHTS" (http://wireless.fcc.gov/auctions/data/papersAndStudies/aucspec.pdf)

established by rulemaking prior to the hearing.[3] The beauty contest method, which has been used in Bangladesh, judges the applicants on "the basis of their proposed service offerings, e.g. roll out and coverage commitments"[4] i.e. the applicants are judged based on their proposals on how they intend to use the spectrum and selected accordingly. Lotteries as a method of allocating spectrum licenses were in use in the US during the early 1980s. The FCFS method, where earlier applicants are allocated the spectrum licenses, was in use in Bangladesh and in still use in Bhutan. Auctioning as a method of allocating telecom spectrum is now commonly used by many countries like the USA, the UK, Germany, New Zealand, Canada, Pakistan etc.

India is also among the early adopters of auction as a mechanism for telecom spectrum allocation. Among the various methods of spectrum allocation, first come first serve (FCFS), lotteries, beauty contest etc., auctions have gained ground as a more acceptable allocation mechanism due to greater transparency and less administrative discretion involved in the process. It is also likely to ensure better efficiency in the sense that it allocates licenses to those providers who can ensure services in the best possible way (i.e. the most efficient types), whereas the allocations under all the other mechanisms specified above are more random and therefore more likely to allocate licenses to less efficient providers .

3. Different Auction Formats

Depending on the associated payment rules, there can be different auction formats. These auction formats can be classified into open-bid and sealed-bid categories. Among the sealed-bid single unit auctions, the most commonly used formats are the first price and second price sealed-bid auctions. In both these auctions the highest bidder wins, but in first price auction, the winner has to pay his/her own bid, while in the second price auction, the winner pays the second highest bid or highest losing bid. Among the open auction formats, the most familiar ones are the English and Dutch auctions. In the English auction, either the bidders call out their bids which they keep rising upward, until only one bidder remains, or the auctioneer starts calling out bids and revises them upwards, while for higher prices the bidders drop out one by one and the auction terminates when only one bidder survives. Thus English auction is an open ascending auction. In the Dutch auction, the seller calls a very high price and asks the bidders whether they are interested to purchase at that price. If no one is interested then the price is revised downward and

[3] ibid.
[4] SATRC Report on SPECTRUM PRICING (2012)

in competition visible to the bidders. This induces them on one hand to stay in the auction for a long time as well as to gather information on the actual value of the asset. Both these effects contribute to higher revenue generation.

In the SAA, the bidders simultaneously quote bids, typically by posting their bids through internet. The highest bid in every round is disclosed after the completion of the concerned round without naming the bidder in order to avoid possibilities of tacit collusion among the bidders. Setting the highest bid of a particular round as the reserve price for the immediately following round, the auction continues till the number of licenses demanded by surviving bidders matches the number of licenses up for sale.

In case of SCA, there is a clock which marks the continuous increase in price of the objects up for sale. The bidders observe the prices on the clock and decide when to step out. The auction is concluded when

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bidders have less scope to manipulate the final prices as the sellers quote bids in the form of prices and the bidders have to just indicate their willingness to buy the concerned object(s) at those bids. He99 e 4686 468 1

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revenue is likely to somewhat address both the objectives, for which setting an appropriate reserve price becomes very important.

United States

The US Congress authorized the spectrum auctions in 1993. The auction format adopted here was the simultaneous multiple round ascending auctions (SMRA). Only 6 per cent of the US population had been using a mobile phone at that point of time. The Federal Communications Commission (FCC) initially had allowed no more than two providers in most markets. According one FCC report, in 2013, the penetration rate of wireless technology is more than 100 per cent since most of the US citizens have more than one mobile connection. Today, 97.2 per cent of the US consumers have the option to choose between three or more service providers and 80.4 per cent can choose among five or more providers.[10] This shows that the FCC has been successful in attaining its objective of ensuring competition in the telecom market. Overall, the US telecom auction is rated as a success story.

United Kingdom

The auction of 3G licenses in the UK which commenced in March 2000 was designed for two larger (2x15MHz paired), three smaller (2x10MHz paired) and four blocks of unpaired (5MHz) licenses, all non-tradable in secondary market. The wireless market incumbents were Vodafone, BT Cellnet, One2One and Orange. Competition was ensured through rules of bidding (no one could acquire more than one license); moreover one of the large licenses was restricted to new entrants. All five licenses were sold, raising $35.4 billion. “3UK” (TIW, the company backed by Hutchison) won the new entrant set aside licenses. Efficiency of the auction was questioned on the ground that discounted set-aside licenses generated less revenue due to less valuation by bidders (strongest new entrant and small existing telecom operators). Though ensuring competition was the primary objective of set-aside licensing in 2000 auction, in recent date UK telecom market is consolidated and is ruled by four players, the three major players are –Vodafone, Everything Everywhere, O2 and small market share is catered by 3UK.[11]

Germany

The German government auctioned national licenses for 120 MHz spectrum of paired spectrum and 25 MHz of unpaired spectrum in two consecutive phases in July and August 2000. Prior to auction four major players were in the market.[12] The regulatory authority imposed spectrum cap to limit the number of successful participants between four to six. While setting the eligibility condition, financial strength was the only criterion. Two new entrants were MobilCom (owned by France Telecom) and Group 3G (trade

[10] Earle and Sosa (2013)
[11] European Commission, Case No COMP/M.5650 – T---MOBILE/ ORANGE, pp.9,13,14,15,16
[12]

name Quam, a consortium between Spain's Telefonica and Finland's Sonera), won the 3G spectrum; however they failed to deploy the service. In 2002 Group 3G exited from the market and Mobile Com returned the license to the regulator in 2003 keeping the market serviced by four network operators. The unused paired spectrum was reassigned for 4G technology in 2010 spectrum auction. The auction rule of capping was unable to increase the competition and caused distortions in the market affecting the access of improved technology.

Austria

The Austrian auction of 3G spectrum of late 2000 tried to enhance competition by increasing the number of service providers from existing four.[13] German spectrum auction method of the same year closely followed to structure the auction with capping to facilitate the stated intention but the auction failed to increase carriers; only two new entrants Telefonica and Hutchinson 3G entered the market but Telefonica exited the market in 2003. After twelve years of Universal Mobile Telecommunications System (UMTS) technology auction, only three operators are there[14] in the Austrian network market.

New Zealand

The first spectrum auction in New Zealand took place in 1990. The New Zealand government adopted the simultaneous second price sealed bid auction format for each license. Four providers had taken part in this auction: Sky Network TV, BCL, Totalisator Agency Board, and United Christian Broadcast. However, the bid data clearly reflected that there was little connection between the demands expressed by the bidders, the licenses they obtained and the prices they ended up paying and therefore evidently the allocation was inefficient.[15] Another serious problem, as noted by McMillan (1994), was that in two separate cases, there had been a surprisingly large gap between the highest and the second highest bids: in one case the highest bid was NZ $ 1,00,000 and while the second highest bid was NZ$ 6; in the other the highest and the second highest bids were respectively NZ$ 7 million and NZ$ 5,000. So the NZ government ended up earning a revenue of NZ$ 36 million, while the projected figures were NZ$ 250 million. After that the NZ government switched to the more standard first price sealed bid auction formats for allocation of telecom spectrum.

6. Telecom Regulatory Agencies in India

[13] Mobilkom Austria, Connect Austria, Max.mobil (T Mobile) and Tele.ring.
[14] T mobile, Mobilkom and Hutchinson 3G.
[15] Milgrom (2004)

Prior to 1991, India was an economy under state command. It became a pro-market and a more open economy only with the reforms that unfolded during 1991. According to the Indian Telegraphs Act, 1885, the Government of India was to be the sole authority for operating or licensing others to operate in the telecommunications sector. Following this Act, till 1991, the Department of Posts and Telegraphs, along

Partnership was also mandated in 1995. During that period Code Division Multiple Access or CDMA[19] mobile network started to be deployed in various parts of the world.

In the first bidding round the government invited bids for each circle for basic wireless services but when the bids were opened in August 1995, Himachal Futuristics Communications Limited (HFCL) had the highest bid in 9 circles. In many cases its bid was more than double the second highest bid. At this point the government announced a cap of three circles for a single bidder in Category A and B circles excluding Category C circles and extending the cap to cellular bids. Also, the Government rejected the highest bids in ten telecom circles on the grounds that they were below the reserve price. The reserve price however, had not been announced prior to the auction. An obvious consequence of such policies was multiple rounds of bidding. The Government's decision to use the value of the bidders in each round of auction as an input for fixing the reserve price for the next round might have contributed to collusion among the bidders leading to lower bids in order to force the Government to reduce the reserve price.[20] Even though in 1995, the Indian Government reduced reserve prices in order to attract bidders, the licenses in eight of the 21 circles still remained unallocated.

The bidders selected for each circle were asked to match the license fee quoted by the highest bidder. As a result of this process 34 licenses were issued in 18 circles. The second bidding round also faced major problems. As more lucrative circles had been awarded in the first round there was lack of enthusiasm and only six bids were received. Naturally initial service rollout was slow, as a result of narrow licensing conditions and the high cost of license fees.

The payment rules in the auctions conducted in 1994 and 1995 required the second highest bidders to match the winning bids. In many cases the second best bidders failed to do so as the difference between the highest and the second highest bids were very high.[21]

8. Policy Directions

Indian mobile telecom industry has grown to an estimated ₹1,60,000 crores during the April-June quarter of 2013. But the nation's performance in terms of revenue generation is not at par with the global standard. A meager 2.3 percent of the estimated global telecom revenue of ₹70,80,800 crores (US$ 1.16 trillion), has been earned reflecting that the Indian operators are offering the lowest global tariffs.

The upcoming 2G bandwidth auction following the cancellation of 122 mobile licenses by the Supreme Court in February 2012 has thrown up several issues which have to be tackled by the regulatory authority. The Telecom Regulatory Authority of India (TRAI) is now trying to be transparent about the allocation

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Appendix

A. Results of 3G Auction in India, 2010

Winner	No. of Circles	Bid Amount (Rs. Crore)	Bid Amount (US$ mn)	
Idea	11	5765	1153	
Bharti Airtel	13	12290	2458	
[illegible]	[illegible]	[illegible]	[illegible]	
1717	Reliance Communcations	13	8583	
[illegible]	[illegible]	[illegible]	[illegible]	
Circle	3G Reserve (for 2×5 MHz)	3G Reserve (for 2×5 MHz)	3G Price (for 2×5 MHz)	3G Price (for 2×5 MHz)
[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	
(INR crore)	(US$ mn)			
os	760	152	7108	1422	Metr
A' Circles	1600	320	6752	1350	Cat '
3' Circles	960	192	2439	488	Cat 'I
[illegible]	90 - Cat 'C' Circles	[illegible]	36	45
1 3350	Total	3500	700	1675

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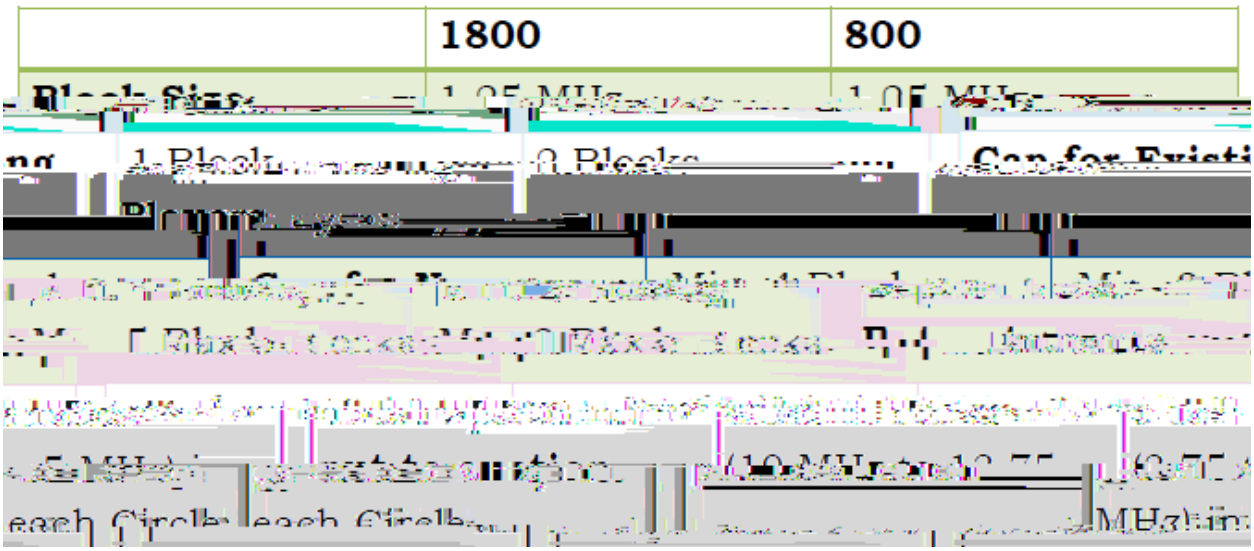
B. Spectrum to Be Allocated in the Forthcoming Auction in India, 2013



For any choice of eligibility points there exists bidder valuations and price histories such that the bidder is prevented from bidding its true value by an activity rule requiring monotonicity in eligibility points (this approach is also adopted in SMRA) and if bidder attempt to bid straightforwardly, the outcome will necessarily be inefficient.