# Winner's Curse in 3G Spectrum Auctions: What is expected in India?

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Traditionally, 3G licenses have been distributed either using 'Beauty Contests' or Auctions. Through beauty contests licenses are awarded to applicants that meet certain criteria laid down by the government. Auctions on the other hand allocate licenses to the applicants who outbid others in competitive bidding<sup>i</sup>. In some cases, governments simply assign 3G spectrum to the existing telecom operators, for example in Japan, 3G spectrum licenses were issued to all existing telecom operators<sup>ii</sup>. In the last decade, auction of 3G spectrum licenses has become the preferred mode to assign licenses to telecom operators across the world. It is argued that auction allocates the spectrum efficiently by allocating them to those who use them most valuably in contrast to the beauty contests where the government bureaucrats decide the allocation and in most cases through opaque processes<sup>iii</sup>. Though it might be true that auction allocates licenses to the bidders who value it the most, it may fail to ensure that those who get the licenses do not pay more than the true value of the licenses— the phenomenon called 'Winner's curse' in the auction theory literature.

India is the second largest market for telecommunication companies in terms of number of subscribers<sup>iv</sup>. The country is about to see one of the most expensive auctions in the history of telecommunication sector. This round of auction will decide the winners and losers in the Indian telecom industry as telecom operator have been relying on 3G auctions to arrest the fall in ARPU and improve profit margins. There are nine companies participating in this auction with maximum of only four spots to bid for. So the question is whether this auction will see aggressive bidding and winners ending up paying much more than expected.

Auctions were widely used for distributing 3G licenses in Europe between 2000 and 2002. Governments in many countries employed auction theorists to design auctions so as to maximize their revenue. Some of these auctions raked in a huge amount of revenue for the governments while some failed to do so. (Table 1)

The two biggest auctions in Europe were the U.K. and the German auctions. The U.K. auction generated a little more than USD 35 billion for the government while the German auction fetched USD 46 billion— both generating much more revenue than expected initially, for example, U.K. auction revenue was seven times higher than expected<sup>v</sup>.



				License fee	License fee
Country	Auction Date	Number of Winners	Total license fee (USD Mn)	per capita (USD)	to GDP ratio (percent)
United Kingdom	April 2000	5	35411	576.5	2.34
Germany	August 2000	6	46323	561.7	2.43
Netherlands	July 2000	6	2515	156.5	0.65
Italy	October 2000	5	10084	193.6	1.01
Austria	Nov 2000	6	716	76.2	0.31
Switzerland	Dec 2000	4	121	16.1	0.05

#### Table 1: Revenue generated in European 3G spectrum auctions

Source: Towers Watson calculations based on data from ITU<sup>vi</sup> and ICRA<sup>vii</sup>

U.K. auction was much bigger than the German auction in terms of the license fee per capita. License fee per capita in U.K. auction stood at USD 576.5 which was higher than per capita license fee in Germany at USD 561.7. In contrast to this, in the Dutch and Italian auctions the winners got away with much smaller payments which translated into just around USD 157 and USD 194 of per capita license fee respectively. This variation in the auction prices across countries can be explained by factors like competition in the market, timing of the auctions and the difference in the designs (such as reserve prices and bidding process).<sup>viii</sup> For example, in U.K. the guarantee that a new player would surely win a license created strong incentives for new players to fight with the existing 2G incumbents leading to aggressive bidding. On the other hand in Netherlands, where joint bidding agreements were allowed and with five licenses up for sale and all five incumbents in the fight, it became more rewarding for new entrants to partner with the strong incumbents in bidding for the licenses than to fight with them. This left eventually only six competitors fighting for five licenses. The sixth one being a weak entrant did not sustain in the auction for long<sup>ix</sup>.

British and German auctions were considered 'successful' as they generated a lot of wealth for the governments. Or did bidders in U.K. placed a much higher value on 3G licenses as compared to its true value? The next sections discuss whether bidders in U.K. and Germany suffered from the winner's curse and what can Indian companies expect in the near future.

### Winner's Curse in common value auctions

A common value auction is one in which the object up for sale has the same true value for all the bidders but the true value is not known. In a competitive set up each bidder tries to estimate this true value but does not reveal their estimates to other bidders. Though collectively these bidders

might have a lot of information about the actual value of the object, their estimates remain private information. These estimates may also vary significantly across bidders with some undervaluing the object while some overvaluing it. In such a scenario even if bidders bid less than their estimated value aggressive bidders, who overestimate the value, end up paying much higher than the true value of the object. This is called Winner's curse<sup>x</sup>.

A weak form of winner's curse occurs when the true value of the object is greater than the price paid for the licenses but is less than the value estimated by the winner, so that the winner earns less than what it expected initially<sup>xi</sup>. Winner's curse is more likely to happen in a sealed bid first price or second price auction where bidders only have to rely on their estimates while bidding as they do not get to know how much others are bidding<sup>xii</sup>. However, it may also arise in the ascending price auction which is widely used for assigning 3G licenses. In an ascending price auction, the winner pays the price (bid) at which the last rival withdraws itself from the auction. In this case too even though to some extent rivals' valuations are revealed through their bids, it may not be ensured that the last one to drop out of the auction had not overvalued the object.

3G spectrum licenses though can not be called a pure common value good as the value of 3G spectrum for existing 2G operators is much higher than a new entrant because such bidders have the advantage of existing customer base and infrastructure. Usually common value of 3G spectrum is determined by the success of the 3G technology and the readiness of the market for 3G services<sup>xiii</sup>.

### What happened to U.K. and German auction winners?

If we look at the performance of a few top winners in both the auctions we find that share prices of these winners tumbled after the news of their wins. Indeed, we found a declining trend in the share prices of these winners. For example, in figure 1 and figure 2 below we see that the share prices of the two major players in the European market, who participated in both the U.K and the German auctions, fell after they won the auctions or at least the stock markets did not perceive the news of the wins as enthusiastically as probably the winners thought they would.





Source: Towers Watson calculations based on data from Bloomberg

The negative abnormal returns after the auctions, even under the assumption of semi- strong market efficiency, is a proof that winner's curse exists in the telecom industry. In fact, Mackley did find an evidence for winner's curse in the German 3G auctions<sup>xiv</sup>.

The strongest hit due to these auction wins was the debt position of the winners. The debt size of these winners increased in some cases manifold making it difficult for them to roll out the services in time. These winners went in a debt spiral as they needed to take on more debt to introduce new services and upgrade their infrastructure. One of the European players who won both the auctions (Germany and U.K.) saw debt levels increase 10 times between 2001 and 1999 (Figure 3).



Figure 2: Share price movement of a winner in U.K. and German auction

Source: Towers Watson calculations based on data from Bloomberg



#### Figure 3: Debt and Returns to assets of a winner in U.K and German auction

Source: Towers Watson calculations based on data from Bloomberg

The winner not only increased its debt position, but also posted negative return on assets (ROA)<sup>xv</sup>. A similar trend is observed for another winner of the German auction shown in figure 4 below. Debt of this French giant in December 2000 was three times that of December 1999 level. ROA also showed a strong negative decline.



Figure 4: Debt and Returns on assets of a German auction winner

Source: Towers Watson calculations based on data from Bloomberg

The financial position of these winners deteriorated so much that S&P and Moody's rated down the long term ratings of some of these winners. For one of the big winning firms in both U.K. and German auctions, S&P downgraded its long term rating of AA plus to single A with 'negative implications'<sup>xvi</sup> while Moody's downgraded it from A2 in FY 2000 to Baa1 in FY 2001<sup>xvii</sup>. Other winners also had the same fate experiencing a cut in the long term credit ratings from both S&P and Moody's.

A classic case of winner's curse seem to have been confirmed in U.K. 3G auction when one of the five winners significantly reduced the value it put on the spectrum licenses it won. In 2003 this firm following a bad financial performance confirmed that the value it put on the licenses were just half of what it paid in 2000 as license fee<sup>xviii</sup>. Considering that it would have paid less than its estimated value in the 2000 U.K auction means that the company eventually reduced its valuation to less than half of what value it had put on the licenses at the time of auction!

#### What is expected in Indian 3G auction?

India, after a long delay, is going to auction 3G spectrum licenses to private players on April 9, 2000. The Empowered group of Ministers has fixed a reserve price of USD 770m million (Rs 35 billion) for a pan India license<sup>xix</sup>. A total of 71 slots are up for sale with 3 slots each in 17 telecom services areas and four each in rest of the five services areas. Delhi, Mumbai, Kolkata and Chennai— the four metro cities have three slots each up for sale<sup>xx</sup>. There are nine telecom companies competing for the licenses. Out of these nine telecom firms six biggest firms have applied for a pan India licenses while the rest three have applied for a few areas only<sup>xxi</sup>.

The government is expecting to collect around USD 7.7 billion as revenue from the auctions<sup>xxii</sup>. Given the already highly competitive market with at least six firms fighting for three to four slots and in some cases more than six, we may expect a fierce bidding and probably much larger revenue than what the government expects. However, there have been cases when firms bidding for auctions have invented ingenuous ways and have got away with quite inexpensive deals. For example, in the US spectrum ascending price auction, bidders used last three digits of their bids to signal the ID numbers of the areas they wanted. This auction was expected to generate USD 1800 million in revenue but finally yielded only USD 14 million<sup>xxiii</sup>.

India has also chosen to do the auction in the ascending price format like many other countries. However, given the cut throat competition in the Indian telecom market it is possible that bidders fear that their decision to drop out of the auctions will result in negative perception about them in comparison to their rivals<sup>xxiv</sup>. In other case bidders might put a higher value on the spectrum and bid aggressively just because their competitors are still in the fight as happened in the U.K.

auction<sup>xxv</sup>. The analysts in India are expecting each winner to spend between USD 1 billion to USD 1.5 billion<sup>xxvi</sup>.

Whatever, the final outcome may be the winners are certainly going to face some tough time. Their debt is going to increase due to sharp increases in their funding requirements on account of license fee and in setting up 3G network and infrastructure. Also, there will be a higher expenditure on marketing 3G services. All this may lead to a low return on investments at least in the initial years. The problems may worsen if the stock markets attach negative sentiments to their worsening debt positions. The chances of at least a weak form of winner's curse cannot be ruled out, more so when one of the biggest existing 2G players has expressed its skepticism over the demand for high speed data services in India and has decided to stay away from the auction<sup>xxvii</sup>.

<sup>ii</sup> Ibid.

<sup>iv</sup> See N. Mookerji, "Calling for a Triple Treat," *DNA*, Feb. 5, 2010, <u>www.dnaindia.com/money/report\_calling-for-a-triple-treat\_1343386</u> (accessed April 7,2010)

<sup>v</sup> See Thane Peterson, ed., "Auctions Are a Better Way to Raise Revenue than Taxes," *Business Week Online*, Nov. 29, 2000, <u>www.gqq10.dial.pipex.com/PressArticles/spectrumauctions.pdf</u> (accessed April 7, 2010)

<sup>vi</sup> See International Telecom Union, "Third-Generation (3G) Mobile— a status report," *ITU News*, no.6, (July/Aug. 2003), <u>www.itu.int/itunews/issue/2003/06/thirdgeneration.html</u> (accessed April 7, 2010)

<sup>vii</sup> See footnote i.

<sup>ix</sup> Ibid

<sup>xi</sup> Ibid.

<sup>&</sup>lt;sup>i</sup> See A. Ghosh, V. Aggarwal, M. Singh, and N. Marwaha, "3G Telephony Services: Implications for Indian Operators," *ICRA*, December 2009, <u>www.icra.in/Files/PDF/SpecialComments/2009-December-</u><u>3G%20Telephony%20Services%20Implications%20for%20Indian%20Operators.pdf</u> (accessed April 7, 2010)

<sup>&</sup>lt;sup>iii</sup> See P. Klemperer, "Auctions vs. Beauty Contests," (n.d.) <u>www.nuff.ox.ac.uk/users/klemperer/biggestpais.pdf</u> (accessed April 7, 2010)

<sup>&</sup>lt;sup>viii</sup> See Peter Cramton, "Appendix 3: Lessons Learned from the UK 3G Spectrum Auction," in *The Auction of Radio Spectrum for the Third Generation of Mobile Telephones* (London: May 2001): 47-55, http://works.bepress.com/cgi/viewcontent.cgi?article=1135&context=cramton (accessed April 7, 2010)

<sup>&</sup>lt;sup>x</sup> See J.R.K. Mackley, "European 3G Auction: Using a Comparative Event Study to Search for a Winner's Curse," *Utilities Policy* 16, no.4 (Dec. 2008): 275-283.



<sup>xii</sup> In a first price auction the winner pays whatever it bids while in the second price auction winner pays the highest loosing bid (which is the second highest bid in a single good case).

<sup>xiii</sup> See footnote x.

<sup>xiv</sup> See footnote x.

<sup>xv</sup> Return on assets (ROA) is defined as the ratio of Net Income to total assets. It tells how much profit the company is able to generate out of the assets it owns.

<sup>xvi</sup> See Financial Times, "S&P to Re-Rate 3G Auction Winners," *Financial Times*, Aug. 21, 2000, Factiva and R. Gribben, "BT's Credit Rating Cut as Pressure Rises," *Telegraph*, Aug. 25, 2000, <u>www.telegraph.co.uk/finance/4462971/BTs-credit-rating-cut-as-pressure-rises.html</u> (accessed April 7, 2010)

<sup>xvii</sup> See footnote i.

<sup>xviii</sup> See G. Wearden,, "O2 Halves the Value of its UK 3G Licence," *ZD Net UK*, May 21, 2003, <u>www.zdnet.co.uk/news/mobile-working/2003/05/21/o2-halves-the-value-of-its-uk-3g-licence-2135006/</u> (accessed April 7, 2010)

<sup>xix</sup> See The Economic Times, "India 3G Airwave Gathers Pace, Bids in April," *The Economic Times*, Mar. 18, 2010, <u>http://economictimes.indiatimes.com/news/news-by-industry/telecom/India-3G-airwave-race-gathers-pace-bids-in-April/articleshow/5699264.cms</u> (accessed April 7, 2010)

<sup>xx</sup> See S. Joshi, "3G Auction: all 9 Firms Cleared for Financial Bidding," *The Hindu*, Mar. 31, 2010, www.thehindu.com/2010/03/31/stories/2010033153981300.htm (accessed April 7, 2010)

<sup>xxi</sup> See J. Thomas Philip, "Nine Telcos Get Nod to Participate in 3G Bids," *The Economic Times*, Mar. 31, 2010, <u>http://economictimes.indiatimes.com/news/news-by-industry/telecom/Nine-telcos-get-nod-to-participate-in-3G-bids/articleshow/5744954.cms</u> (accessed April 7, 2010)

<sup>xxii</sup> See footnote xix.

<sup>xxiii</sup> See Business Standard, "OKONOMOS Going, Going Ouch!" *Business Standard*, May 12, 2001, www.gqq10.dial.pipex.com/PressArticles/spectrumauctions.PDF (accessed April 7, 2010).

<sup>xxiv</sup> See footnote viii.

xxv See footnote viii.

<sup>xxvi</sup> See footnote xix.

<sup>xxvii</sup> See M. Srivastava, "Telenor Skips India Spectrum Auction Expected to Raise Billions," *The Business Week*, Mar. 19, 2010, <u>www.businessweek.com/news/2010-03-19/telenor-skips-india-spectrum-auction-expected-to-raise-billions.html</u> (accessed April 7, 2010)