

## 3G Auctions: A Change of Course

*John Ure*

### INTRODUCTION

From the viewpoint of the telecom industry, debacle is probably not too strong a word to use to describe the outcome of the European auctions for third generation (3G) mobile telephone licences during the summer of 2000. The United Kingdom and German governments raised close to US\$ 80 billion between them, a feat hailed as a great success at the time. Martin Wolf (2001: 23) of the *Financial Times* of London responded passionately to criticisms that high auction prices would cripple the industry and burden consumers with high costs:

When critics complain ... , they have to be saying one (or more) of four things: that the government should have made a present of the excess profits – or, more exactly, of the scarcity value of the spectrum – to the likes of Vodafone AirTouch and British Telecommunications; that the managers and owners of these companies are incapable of working out what a licence is worth to them; that taxpayers should protect shareholders against their own irrational exuberance; or that the interests of taxpayers should be sacrificed to those relatively well-off consumers. These propositions are ridiculous, outrageous, or both. ... It is perfectly possible that the victors have been over-optimistic and will suffer from the “winner’s curse”. But this should be of little concern, since the licences are “sunk costs” and are unlikely to have any long-term effect on pricing.

As a critic of the auctions, I believe that the managers and owners of these companies were incapable of working out the worth of a licence. The level of uncertainty that surrounds the business case for 3G is quite different from that of 1G or 2G or even 2.5G. Even in 2002, the technology is not fully known and nor are alternative technologies that can serve as broadband wireless substitutes, for example, the 802.11 standard. Still, no one knows what services will be available, which of them will sell, who will buy them or how the revenue will be collected along the value chain.

The 3G value chain is different from earlier mobile phone markets. 3G provides mobile access to the Internet. The demand for that access is derived from demand

for services delivered over the Internet. These services may not even be delivered to the same device used to make the request. Unlike in the case of voice-focused 1G and 2G, the range of services likely to be in demand is not intrinsic to the network.

It appears that the managers who paid such high auction prices had not stopped to think through the implications. What did they think they were buying when they bought licences? The right to provide access, yes, but what else? No licence is required to provide content. In the Internet world, the idea of locking customers into a 'walled garden' restricting access to the content and applications provided by a single 3G service operator is a non-starter, not to say illegal in France and unacceptable to the regulator in the United Kingdom.

Ken Binmore (2001), advisor to the British and Hong Kong governments on spectrum auctions, stated that 'nobody but a fool bids more in an auction than he thinks the licence is worth'. Had he not read the admission by Sir Peter Bonfield, British Telecom's CEO, that 'We spent £10 billion too much?' (*Sunday Times* 2001). Sir Christopher Gent, CEO of Vodafone, concurred: 'We wish we hadn't paid so much'. Paul Klemperer (2001), an architect of the United Kingdom auction process, commented that 'At £1 billion or £10 billion the psychology is the same'. After all, designers of auctions think their job is to raise as much money as possible for their client. Less convincing was *The Economist's* hindsight in May 2001. 'The real cause of the companies' troubles is that the market has changed. They did their sums before they made their bids. They knew the risks. Who else knows what the market is worth?' This nicely misses the point, as well as the irony of its own rhetorical question. If no one could know the sensible value to place on a 3G licence, then an up-front money auction was totally inappropriate.

The debate moved from the financial press to academic journals with Cave and Valletti (2000) arguing the orthodox position regarding sunk costs, responding in particular to Nicholas Negroponte's assertion that the United Kingdom auction fee imposed an 'economically unsustainable' tax on mobile Internet services. Already deeply engaged in the public debate in Hong Kong, I responded (Ure 2001).

### HONG KONG'S 3G DEBATE

The popular view in Hong Kong throughout the summer of 2000 was that the government should follow the United Kingdom and Germany. A turning point in the debate was William Melody's keynote lecture to the Telecom InfoTechnology Forum (TIF), a quarterly industrial roundtable in 2000. Representatives of the

Hong Kong regulatory authority and policy makers regularly participate in the TIF. At the 2000 forum, a member of the Legislative Council who had been leading the demand for a British-style auction admitted that the issue was more complex than it first appeared to be. To turn the Legislature from the idea that the primary purpose of a 3G auction was to raise as much money as possible was a precondition for clear thinking on the issue.

In his lecture, Melody reviewed the history of thinking about spectrum allocation and assignment, drawing on his experience at the US Federal Communications Commission. The purely administrative or beauty contest approach was inadequate and was usually determined by lobbying skills. As the supply of spectrum is not market determined and its public good aspects require the adoption of standards, market mechanisms were unlikely to solve all the problems. These arguments subsequently appeared in *info* (Melody 2001b) and they undoubtedly opened minds to my own contribution, first submitted in May 2000 in response to a regulatory Consultation Paper, with a follow-up in October which was published subsequently (Ure 2001)<sup>5</sup>.

First, the sunk cost problem. On the one hand, it is not true that sunk cost will have no impact in a competitive market. If there is a common denominator sunk cost, namely the lowest winning bid, then it makes good sense for operators to aim to recover at least that. They will build it into their annual forward-looking costs. If one firm breaks ranks and cleans up, then its resulting market power will give it the opportunity and, therefore, the incentive, to recoup at least this amount, even at the cost of slowing growth under certain circumstances. On the other hand, a large overhang of debt raises the risk premium on lines of credit and the cost of capital, and acts as a disincentive to build out the network to areas of marginal profitability.

The enormous 3G debt overhang in Europe entirely overshadows the arguments of economists. The outstanding corporate debt of British Telecom, Deutsche Telekom, France Telecom and KPN was a staggering €185 billion as of June 2001. As their credit ratings declined, their interest payments rose. 'This is the year 1929 for the telecom industry' was how one telecom executive put it to the *Asian Wall Street Journal*. It gives a very different meaning to telecom reform than is associated with Melody's work. Even lending banks have faced warnings from financial regulators in Europe. It is also true that this debacle coincided with recessionary trends in the United States and Europe. But the fact remains that consumer confidence has not been the principal problem facing would-be 3G operators, and their 2.5G progenitors. Consumer indifference is more the case,

compounded by technological glitches that disappoint those who have tried the new mobile phones, such as WAP handsets (*Asian Wall Street Journal* 2001).

My royalty auction proposal sought to achieve two objectives: to provide a guaranteed return on the use of spectrum to the community, and to avoid the large up-front costs of a 3G licence, the value of which was impossible to determine. The latter proposition is perhaps best underlined by reference to real options valuations (Alleman and Noam 1999). In my model, using a straightforward net present valuation of a hypothetical Hong Kong 2G operator with a 20% market share, and quite generous assumptions about future customer demand and average revenue per user (ARPU), the estimated value of a 3G licence turned out to be US\$ 72 million. This rose to US\$ 88 million if the capture of a 25% market share by 2010 was assumed. In reality there were only four bidders for four licences and they each went for an estimated net present value (NPV) reserve price of US\$ 50-60 million, depending upon the discount rate. The real option value, using the Black Scholes model that requires *inter alia* data on past share price variations, was six times this value. The collapse of share prices reduces the value of the real option exercise. Yet the real option underlines the possibility of valuing future business, in this case, on the basis of the options a 3G licence offers. Few in the industry doubt that over the long term 3G will become a successful business, but none can place a value on it.

## CONCLUSION

If the regulatory authorities view 3G as a business that will bring wider benefits to the community and economy, for example, by stimulating the sectors capable of producing content and applications, it makes sense not to second-guess the future. It makes better sense to synchronise the need to pay a fee for spectrum with the ability to pay. A royalty auction does exactly that. An alternative approach is to replace the guaranteed minimum payment to the public purse with an incentive to reduce prices to consumers. This would be justified if the public externalities were considered very important.

### Box III.11.1 – A Model

A tax rate or royalty payment on revenue, call it  $X$ , shall be bid such that  $X = x^*$  when  $B \leq L$ , where  $x^*$  is the auction reserve price,  $B$  is the number of bidders and  $L$  is the number of licences on offer; and  $X = X^*$  when  $B > L$ , where  $X^*$  is the auction bid price. An alternative is to set  $X = 0$  if income  $Y \leq Y^*$ , and  $X = X^*$  when  $Y \geq Y^*$ , where  $Y^* = P^* \cdot Q^*$ , where  $P^*$  is the ceiling price offered by the licensee, and  $Q^*$  the number of subscribers at the ceiling price that triggers  $Y^*$ , and where  $X^*$  is some positive tax rate or royalty payment on revenue.

NOTE:  $X = X^*$  if  $Y \geq Y^* = P^* \cdot Q^* \leq P^\wedge \cdot Q^\wedge$ ,  
 where  $P^\wedge = P^* \cdot [(P^* - P)/P^*]$  where  $[(P^* - P)/P^*] \leq 1$ ,  
 and  $Q^\wedge = Q^* \cdot [(Q - Q^*)/Q^*]$  where  $[(Q - Q^*)/Q^*] \geq 1$   
 so that  $P^* \geq P^\wedge$ , and  $Q^* \leq Q^\wedge$

This model says that as the licensee reduces  $P$  below the ceiling price  $P^*$  the number of subscribers required to trigger  $Y^*$  rises above  $Q^*$ . In cases where the price elasticity of demand is  $> 1$ , revenues and therefore royalty payments will increase as prices fall. In cases where the price elasticity of demand  $< 1$ , the benefits of price reductions fall exclusively to consumers.