Response to OFTA's Consultation Paper on 3G

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My comments are restricted to two issues, how spectrum licences should be awarded and how to encourage competition.

A. 3G as a Business and the Problem of Auctions

Third generation mobile (3G) technology is broadband ('always-on') and commercially it is, in its fundamentals, an Internet business. This raises several complications.

1. 3G is a means of Internet access with special characteristics ('always-there') which makes it an imperfect substitute for broadband access in general. Imperfect because it has limitations preventing it becoming a perfect substitute for other forms of broadband, and it has special features of its own (mobility) which prevents other forms of broadband access being perfect substitutes for it. This means it is a differentiated service as such, but does not necessarily imply that each 3G operator will be able to differentiate themselves from other 3G operators.

2. 3G operator differentiation is unlikely to be based - and certainly not *sustained* - on network coverage, especially in a small territory like Hong Kong, nor on network quality. There may be innovative intelligent network functions that can be used to differentiate one network operator from another, but this is unlikely to be a strong market differentiator, and again not a *sustainable* one. This seems to leave two options.

3. Option 1 is to develop a significant content and applications business, bundled as far as possible with network access. The problem here is with the idea of bundling. It would be unacceptable for consumers to be denied access by the network to any Internet service, content or applications provider over their 3G handset, and indeed impractical. So bundling is confined in practice to the denial of content or applications to the customers of other networks, but this is hardly a good business proposition. The whole idea of offering a Web-based service is presumably to maximize 'hits' to encourage advertisers, sponsors and online transactions. At best (or worst) 3G operators may 'capture' the customer through a default home page and surreptitiously siphon off traffic to pre-selected Web pages, but this is likely to backfire. So the bundling option does not seem to have much of a future. A variant of Option 1 is for 3G operators to keep control of customer billing for Web-based services downloaded over 3G. This would offer them the opportunity to advertise and promote their own services. This seems to be the principal means by which 3G network operators who want to enter the contents and applications business will have any real advantage over ICPs and IAPs who do not have a 3G network licence.

4. Option 2 is to confine their activities to offering network access services, wholesale or retail. What amounts to the same thing is to operate their access network and their content and applications businesses quite separately.

5. Conclusions:

(i) 3G is an Internet business in its essentials. The demand for 3G is derived from the demand for Internet content.

(ii) For purely voice and even low capacity Internet services 2G or 2.5G will be sufficient, although this does not rule out the prospect of 3G becoming a mass commodity market, embracing the basic functions of 2G

(iii) 3G resembles 2G only in its function as an access network, but the business case is quite different because the source of demand is different.

(iv) Therefore, in an auction, if the bidders were bidding only for a 3G access network licence the bids could be expected to be far lower than they were, for example, in the UK where five licences were auctioned for approximately 2.5 per cent of UK GDP (equivalent to HK$35 billion in Hong Kong). In fact, in the UK bidding was clearly influenced by a blurring of the distinction between the access and the content/applications markets, and compounded by a 'prisoner's dilemma' whereby each of the major cellular operators placed a value on their brand being out there ahead of the others. This approach inevitably leads to a speculative binge where 'bounded rationality' operates with a vengeance.

(v) The argument that the highest bidder offers the service most likely to do well is clearly not necessarily true. Prices in an imperfect market (where, like the game of poker, entry is restricted by resource limitations) are not reliable indicators of quality (or a good hand of cards).

B. Monopoly Rent and the Problem of Auctions for 3G
The argument for auctions is threefold. First, it passes the valuation onto those who are supposed to understand the business best, and who are prepared to take the risk. Second, by implication this allocates the spectrum in the most efficient manner, that is, to the highest value use. Third, it raises pots of money for the Treasury by creaming off the monopoly rents which are likely to arise from ownership rights over the use of a scarce resource where competition is restricted by barriers to entry.

1. Points one and two above can be true for markets where information is more or less equally available to all bidders. Asymmetric information will distort the process. In the case of 3G information is quite imperfect because 3G is an Internet business and uncertainty is the only certainty. Unlike risk, from which companies can insure themselves (for example, hedging against currency risk) uncertainty is an unknown outcome, and therefore the opportunity costs (i.e. the costs and benefits of alternative

courses of action) are unknowable. Guesswork and tactics replace calculation and strategy. Under these circumstances, auctions cannot be guaranteed to closely reflect (*post hoc*) discounted future values, and the good consequences that flow from auctions, as mentioned above, cannot be guaranteed. The UK-style auction process is only appropriate if the auction is confined to access network licences which are clearly distinguished from service licences, where the latter are more freely available. (Unless the objective is to raise money for the Treasury.)

2. Monopoly rents arise when the right to use scarce resources benefits from commercially restricted entry that prevents effective competition and leads to sustained abnormal profits. If steps are taken to ensure effective competitive entry in the 3G network services market, for example the licensing of 'virtual network service operators', then the issue of scarce network spectrum can be (a) alleviated through spectrum re-use and dynamic assignment, and (b) the power of the 3G licence holders will be reduced with respect to customers. This does not do away with the possible long-term problem of spectrum scarcity, but that is not the matter under immediate consideration. Many alternative remote and mobile access systems may become available in the future, as well as more efficient ways of using spectrum, and the use of other parts of the spectrum.

C: Proposal for Spectrum Licensing

The following is a proposal how to license 3G operators in a manner that can capture monopoly rent should it arise.

1. Bidders for a 3G-spectrum licence would be required to provide a fully costed network build-out programme for 1, 3 and 5 years ahead, and a price ceiling.

2. A tax rate, call it X, shall be made known to bidders, where $X = 0$ if income $Y \leq Y^*$, and $X = X^*$ when $Y \geq Y^*$, where $Y^* = P^* \bullet Q^*$, where P^* is the ceiling price offered by the licencee, and Q^* the number of subscribers at the ceiling price that triggers Y^*, and where X^* is some positive tax rate.

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

   which says that as the licencee reduces P below the ceiling price P^* the number of subscribers required to trigger Y^* rises above.

3. Alternatively, X, and the level of Y that triggers X, can be set as part of the bidding proposals. This could take place as round two, where round one is a pre-qualification process. (Note: Italy has opted for a two-round procedure, although round two will be a UK-type auction.) Either way, a view is required on what is a 'competitive' rate of return and how this translates into revenues at certain numbers of subscriber, and for

how long a super-normal profit may persist in a competitive environment. (A super-normal profit is distinguished from an abnormal profit – monopoly rent - by virtue of some transitional advantages, such as first-mover advantage, or an ability to differentiate the product or service for a period of time. As such it is a signal to encourage entry or emulation, not the result of a barrier to entry.)

4. Since $Y = P \bullet Q$, monopoly rent passed onto customers when $P \leq P^*$ will avoid or reduce the tax payment. (See above). If costs are kept low or reduced, a reduced P will reduce revenues but not profits.

5. Where costs are not reduced, Government could choose to encourage price reductions to customers by imposing a formula along the following lines:

   Let $X = \lambda [\pi^* + \max (\pi^\wedge - \pi^*; 0)] = X^*$

   where λ is the marginal rate of tax; $\pi^\wedge$ is the actual level of profits realised; and π^* is the estimated level of monopoly profits which triggers $X = X^* > 0$. When $\pi^\wedge \leq \pi^*$ then $X = \lambda (\pi^* + 0)$ and when $\pi^\wedge \geq \pi^*$ then $X = \lambda [\pi^* + (\pi^\wedge - \pi^*)]$

   This says (a) when realised profits, $\pi^\wedge$, fall short of $\pi^\wedge$, no tax is paid; but as realised profits, $\pi^\wedge$, exceed monopoly profits, π^*, the marginal rate of taxation, λ, will increase and so therefore will X. Under this scheme the disincentive to maintain prices grows as monopoly rents grow.

6. The tax, X, will be levied at the margin, so only the revenues brought in by each new subscriber over and above the number of subscribers, Q, needed (at any given level of P) to raise revenues to Y^* will be taxed.

7. The calculation of X shall be based upon OFTA's estimates of the likely monopoly rent that could arise within the industry only with respect to the operation of the 3G access network, and not from revenues (and profits) arising from Internet and Web-based services.

8. Monopoly rents are those abnormal profits that arise from a level of output and pricing which would not be normal in a fully competitive market, and which are likely to persist beyond a limited initial period when the business is immature and risk on investment is high.

D: Appendix
The most persuasive view put forward in Hong Kong in favour of auctioning has come from the SCMP columnist, Jake van der Kamp. Among his points is the argument that as most cellular network costs are upfront it becomes virtually impossible to pass on to customers a fixed overhead, such as a licence fee unless and until the demand for

spectrum exceeds supply. I reproduce my own response in a column piece (SCMP, 13 May 2000). There is inevitably a degree of repetition of some of the points above.

'I was the "among others" on RTHK's radio programme to which Jake van der Kamp refers (SCMP 6 May) during which he once again outlined his arguments in favour of auctioning third generation (3G) mobile telephone licences. His point that radio spectrum is a scarce resource for which the public should derive benefit is not contentious. What is contentious is (a) how to derive that benefit, and (b) perhaps even more fundamentally, how to determine the benefit.

His underlying assumptions, it seems to me, are twofold. First, the economics of a mobile telephone business hinge upon most costs (network costs) being upfront, so every new customer produces net revenue. Second, operators can only charge what the market will bear (a tautology, of course) so however high the cost of the auctioned licence the cost cannot be passed on to the end user until the point is reached when demand outstrips the supply of spectrum. *Ergo*, OFTA is wrong in its arguments. Conclusion: government should grab what it can from auctioning.

But it ain't necessarily so. First, 3G is all about the Internet business, unlike 2G which is about mobile voice. Internet businesses are full of uncertainties, but one certainty is that to sell 3G as a network service the operators will need either their own Web-based content and applications or access to plenty of others' content and applications. Only in the latter case, where the operators simply provide the access network, does the economics of 3G resemble that of 2G, yet this is the basis of Jake's case. But it is unimaginable that a 3G licence holder will limit their business to access only, which in some business models is given away for free. The speculative prices bid in the UK (approximately 2.5 per cent of GDP, equivalent to $35 billion in Hong Kong!) were certainly not based upon such an assumption. Yet without that assumption Jake's argument that most costs are upfront simply evaporates. The cost of content and applications will be substantial, and ongoing. The only way to reinstate Jake's argument in favour of auctioning is to separate network provision from service provision, but then the auction prices bid for spectrum will be far lower.

Second, it is true that costs cannot be easily passed onto customers if supply outstrips demand, and especially if there is effective competition. Without the latter, high costs may simply result in deferred investment and a slackening of innovation. There is therefore a strong argument for licensing service providers who will wholesale spectrum from the network operators to provide 'virtual network services'. This is an option in OFTA's consultation paper. It is clearly OFTA's fear that higher infrastructure costs would damage or limit Hong Kong's pace of development in these new services, and it is true that these new services are proportionally more vital to Hong Kong's economy than to, say the economies of the UK or Germany. In effect, we are talking here about an industrial policy issue.

I would propose a third way. If it is thought that monopoly rents will arise – they should not if Jake's faith in the market is fully justified – then tap them as the business develops rather than pre-empt them. The idea that private companies are better than government at prediction is wrong; they are just as bad. Of course, if there is risk, why not let them carry it? But is it not preferable to see if monopoly rents do arise and then tax them if public policy dictates. How to do that? A mechanism needs to be devised whereby the difference between the ceiling price and costs is determined at the time of bidding, and a tax, call it X, is levied when the number of subscribers reaches a trigger point. However X will be reduced as the actual price charged subscribers falls below the ceiling price, so there is an incentive to pass monopoly rent to the consumer even in the case where competition is not fully effective.

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