

Licensing Third Generation Mobile

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Economists are privileged people. We can interpret the world through abstractions, as Martin Cave and Tommaso Valletti demonstrate when they discuss the virtues of the UK auction for 3G licences. As an economist I find myself pulled to the logic of the sunk cost argument which states, quite simply, that enormous upfront costs of buying licences have zero impact on the future prices 3G operators will be able to charge their customers. Well, my economics training taught me to be counter-intuitive but isn't this pushing things a little too far off the edge? Are Cave and Valletti really telling me that the stakeholders of the successful bidders will be laughing all the way to penury, happy to write off all those dollars, pounds sterling, marks, etc?

Let us at least pause for a sanity check here. They tell us that firms will set prices according to forward looking costs and revenues, and if firms collude to recover sunk costs then only one firm has to break ranks to clean up the market. OK, let's stop there for a moment. Do these forward looking costs include an amortization markup to recoup the upfront investment? Again they tell us no, because any collective action to do so will be instantly undermined by a breakaway firm swimming against the tide. OK, sounds sound. But let's take the argument one step further, what happens when that breakaway firm cleans up? By that time the market looks decidedly oligopolistic, and then what? Won't the stakeholders start demanding their pound of flesh? Prices will reflect this, and unless the market at that point in time *is entirely price inelastic*, driven totally by other factors, things will start to slow up. Maybe that is a small price to pay because the market won't necessarily stop altogether, but it is a price.

Now suppose that doesn't happen, and the collective action is dropped, and markets remain highly competitive, we are still left with the question, who picks up the check? Who paid for the upfront investment? Was this a charitable donation? The obvious answer is that all firms will include annual repayments as forward-looking costs, and that the competitive price floor will be raised. This will be true at least up to *the lowest upfront cost (auction price) incurred*, and will happen, for example, if the debts were repaid from a public stocks issue. The implications for market build-out are equally obvious. The argument that an upfront lump sum payment will put pressure on operators to roll out their networks faster, and the larger the payment the faster the rollout will be, is misguided. First, large upfront payments increase the cost of capital financing, and this acts as a disincentive to roll out networks to areas of marginal profitability. Indeed, it raises the margin. Second it hothouses or incubates industrial restructuring leading to oligopoly and/or collusion. Third, it weakens the authority of the regulator, especially when large multinational companies are involved who are under enormous pressure to address the interests of their shareholders and financiers, and keep an eye on the price of their stock.

An alternative scenario is that other assets are sold off to repay these debts, and this is certainly happening. The state's decision to licence by upfront auctions is triggering a restructuring of capital. Further, in response to those who support auctions on the grounds that markets know better than bureaucrats, it also prompts the question: which market got it right? The industrial market that bid for the licences or the financial market that has downgraded the credit ratings of the successful bidders and has wiped value off their shares?

I take a different perspective. Unlike 2G which is a voice business, and 2.5G which is a packet-switched extension of the voice business, 3G offers broadband mobile Internet access. The real jump in technological paradigm is of course, packet-switching, but the real jump in business model is 'always-on' broadband. No one needs a licence to provide content and applications, and, if spectrum is wholesaled, no one needs a 3G licence to use spectrum either. So one wonders just what the high-rolling auction bidders thought they were buying, unless it was just expensive frequency to add to their 2G business. The uncertainty attached to any broadband business model is exactly how revenues will be generated and who will benefit from them. There is no 'model' out there. NTT's DoCoMo of Japan is not a model that will be easily replicated because the market is specifically Japanese. Home PC penetration is relatively low in Japan, Internet and fixed phone access fees are relatively high, the market for the iMode phone is predominantly young people, but also the travelling public who have to spend hours each day commuting on trains and buses and have nothing much else to do, and as yet there is little competition to DoCoMo. A great advantage of DoCoMo's iMode phone is that it uses html and avoids WAP. The disadvantage is that it may not translate to future global standards.

But there is one important lesson which is that DoCoMo has stimulated the content and applications market, using its own content and the content of companies with whom it contracts to bill the end user. This simplifies the payment system and does away with the need for credit cards, and allows DoCoMo to charge a commission. But users of the iMode phone also have access to other content providers' websites if they wish to transact with them directly. Something along these lines elsewhere seems a feasible revenue model, but only if there is mass takeup, and revenue comes from usage rather than access. DoCoMo had no upfront licence fees to cripple its efforts. The whole model works on the basis of minimizing the costs of access and making access ubiquitous.

Broadband mobile Internet access needs to be commoditized from the outset if the broadband content and applications industry is to get off to a quick start, but there is no guarantee that the access network providers will be the ultimate beneficiaries. This is because the commoditization of access requires a highly competitive market structure as an outcome of licensing policy. This is consistent with a low valuation placed on licences, not a high one; it is consistent with many licences, not just a few; and it is consistent with several mobile means of access, not just one. In my view the only sensible approach to 'facilitating and promoting' 3G – assuming this is seen to

be a public policy initiative – is the relate 3G licence payments, such as royalty payments, to the ability of the business to pay. Below is such a proposal.¹

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 $Y^* = P^* \cdot Q^*$, 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.

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 $Q^* \leq Q^\wedge$

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

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. 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 $Y = P \cdot Q$, 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:

¹ I made this proposal in response to the first consultation paper by the Hong Kong regulator, OFTA. See **Error! Bookmark not defined.** for the two consultation papers and responses. See **Error! Bookmark not defined.** for the detailed debate in Hong Kong on how to licence 3G network operators.

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

where λ is the marginal rate of tax; π^\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, π^\wedge , fall short of π^* , no tax is paid; but as realised profits, π^\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 the regulator'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.