

3G RACE

Spectrum on the Block

Hong Kong has made the right decision. Auctions treat companies fairly and yield greater benefits for consumers and taxpayers.

BY PAUL KLEMPERER

In choosing an auction over a beauty contest to allocate third-generation mobile services, Hong Kong's Office of the Telecommunications Authority has clearly made the right decision. While the exact details of the auction's design will be crucial to its success (and some parts of the government's consultation paper do give cause for concern), there is no question that auctions are almost always the best way to allocate radio-spectrum licenses.

Why? First and foremost, a well-designed auction is the most likely method of allocating resources to those who can use them most valuably. Rather than rely on government bureaucrats to assess the merits of the business plans of competing firms, an auction forces businessmen to put their "money where their mouths are" when they make their bids. The auction, therefore, extracts and uses information unavailable to government.

Second, even if government did have access to good information (the lamentably poor estimates of governments of the money that spectrum auctions would raise are just one illustration of how little government knows), allocation by bureaucrats leads to the perception—if not the reality—of favoritism and corruption. In fact, some governments have probably chosen beauty contests precisely because they create conditions for favoring "national champions" over foreign competitors. This is unlikely to benefit consumers or taxpayers.

Third, an auction can raise staggering sums of money to support public finances. The United Kingdom's 3G auction yielded \$34 billion, about 2.5% of gross national product, or enough money to build 400 new hospitals. A beauty contest, by contrast, can give away valuable assets at a fraction of what they are worth.

Those who advocate beauty contests should say how they would prefer to fund government. Do they prefer higher income taxes? The distinguished economist Martin Feldstein recently estimated that every extra \$1 of income tax raised in the U.S. costs the economy an additional \$2 in deadweight losses caused through the disincentives to earn, and the misallocation of resources to avoid taxes. Mr. Feldstein's estimates may be overstated, but charging companies for spectrum incurs none of these additional costs.

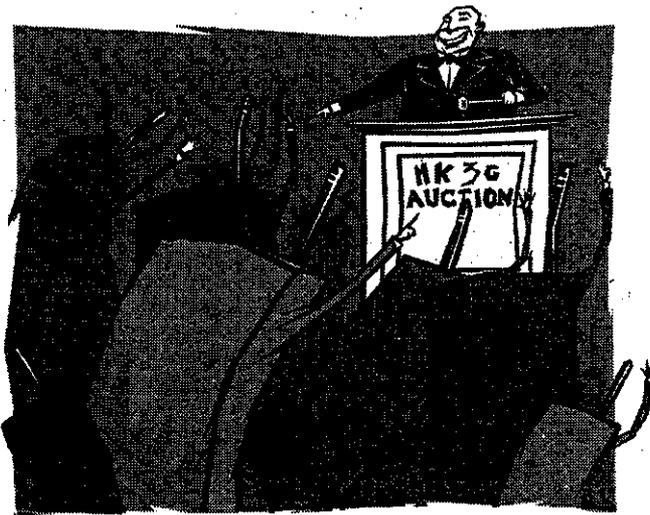
Some have argued that costs of an auction will be passed on to consumers from operators in the form of higher prices. This would probably be true, in part, if the auction method were based on royalty payments. But the argument doesn't hold if the auction requires firms make once-and-for-all lump-sum payments.

Like any other businesses, telecom compa-

nies will charge prices that maximize their profits, independent of what the spectrum cost them in the first place. Take a more familiar example: housing prices. The price of new housing is no lower when the developer had the good fortune to obtain the land below its current market value (i.e., because it was bought before planning permission was available) than when the developer paid the full market value.

In either case, the housing market determines the price at the time the new housing is sold. There is no more sense in handing out free spectrum to telecom companies than in handing out free land to developers in the belief that this will lead to cheaper houses.

Of course, telecom companies (and land developers) have enormous incentives to argue the opposite, since they obtain large windfall



ILLUSTRATION/H. HARRISON

profits if they can obtain a scarce resource for free. And it is true that consumer prices could be affected (even by past lump-sum payments) if, for example, an auction somehow allows firms to tacitly coordinate on higher prices. Or if companies fool politicians and regulators into agreeing that the auction is a reason for allowing artificially high prices (so, for example, permitting collusion). But with intelligent regulation these effects should be small.

Finally, how practical is a beauty contest? Technology guru Nicholas Negroponte has argued that winners should be chosen according to which would guarantee the lowest costs to consumers, invest the most in infrastructure and stimulate creativity the most.

But how can firms guarantee consumer prices for five to 20 years in the future for products that we may not yet even be able to imagine? Infrastructure investment costs can be determined, but will it all be useful? How can government possibly determine which companies will be most creative? And how could gov-

ernment monitor and enforce any commitments made by those companies? How should government penalize a firm that turns out to be insufficiently creative?

And what should government's response be to a firm that is creative and develops a product with valuable unforeseen features but that is above the previously guaranteed price? It is hard to think of a more serious drag on innovation than pre-specifying future prices for products that don't yet exist.

Compared with the efficiency and transparency of an auction, the difficulties of specifying and evaluating criteria make the beauty contest a time-consuming and opaque process. So even a well-run beauty contest is likely to generate a legal challenge after the fact.

Of course, the companies are taking huge risks, just as others do, for example, that invest in developing new aircraft. They might become huge croppers or make huge fortunes. Only time will tell. But in both the U.K. and Germany some licenses were won by companies who had no previous presence in those respective markets, proving that companies who were under no pressure to compete saw the risks as worth taking. (Indeed, in the U.K., one winner has already sold a share of its license at a profit.)

Whether the large license costs will speed or slow investment is ambiguous; arguments can be made in both directions. But what is clear is that the companies that have invested in licenses have done so because they believe it is in their own business interests to do so.

Certainly an auction needs careful design to work well. Occasionally—for example, when there are too few potential bidders, or large costs supplying necessary information to them—a form of structured negotiations may be better. But the general rule is that auctions treat firms fairly and transparently, and yield the greatest possible benefits for consumers and taxpayers.

Since the full details of Hong Kong's procedures have yet to be established, it's difficult to speculate how successful its auction will be. Lump-sum bidding should yield lower consumer prices and less economic distortion than royalty bidding, although royalty bidding might encourage entry into the auction. Incorporating a sealed-bid element into the design would also encourage entries and reduce scope for collusion. But the devil is in the details.

We will need to see OFTA's final package before making a definite judgment. In the meantime, however, it is to be congratulated on a very big step in the right direction.

Mr. Klemperer is Edgeworth professor of economics at Oxford University. He was the principal auction theorist advising the U.K. government on its 3G auction design. His papers can be found at <http://www.nuff.ox.ac.uk/economics/people/klemperer.htm>.

REVIEW & OUTLOOK

Designing Asia's Auctions

Selling spectrum is a tricky business.

Hong Kong's decision to reverse course and auction off licenses for third-generation mobile phone systems is symbolically important for Asia. The arguments that bureaucrats were better able to decide which companies would best serve customers' needs ultimately didn't hold water. Governments everywhere are now under pressure to abandon "beauty contests" and capture revenue from the sale of radio frequencies. This would be good for Asia's taxpayers and its consumers—the treasuries would take more of the value for the use of a common resource, and licenses would go to those firms which value them most highly and so are likely to put them to best use.

However, Hong Kong's consultation paper shows it is leaning toward a complex system that would require network operators to open up part of their capacity to other companies. It's hard to see the point of this, since it disadvantages the bidders. They are taking the risk of plunking down the money for the right to build out a new, unproven technology, and then if things go well they will have to allow in competitors who didn't take that risk. That seems a recipe for depressing the value of the franchises on offer.

Even if Hong Kong goes for a more straightforward auction, there are plenty of pitfalls ahead. Auction expert Paul Klemperer, who writes nearby on this issue, often says that the devil is in the details. He helped design the United Kingdom's spectrum auction back in the spring, the one that brought in \$34 billion. After deciding on such a process, the characteristics of the individual market must be taken into account. The U.K. set three goals for its auction, in descending order of priority: efficiency, competition and revenue. Those seem like a worthy starting point for any government. But how to achieve them?

The first step is to recognize some corresponding problems: predation, entry deterrence and collusion. Where there is a small number of licenses available, incumbent firms may try to intimidate new entrants from bidding aggressively by signalling their intention to top all bids. Firms may band together into coalitions to

match the number of licenses available, or use other signalling methods, all in order to divide up the spoils and spend less.

Problems often arise because auctions are "asymmetric," meaning the participants are not all created equal. Since an incumbent has certain advantages, like the ability to sell the new technology more quickly to its existing customer base, it's accepted that it can afford to bid higher. Knowing this, new entrants may assume that if they outbid the incumbent they are overpaying, and so may choose not to participate at all.

Thus in some cases it may be best to use a sealed-bid auction, since challengers must come to their own calculation of the value of a franchise. As a result they have a chance of winning and may be more aggressive, which in turn raises more revenue. This compromises efficiency, however, since it is more likely that the winning bidders will overpay. Mr. Klemperer has suggested one solution is to use a hybrid "Anglo-Dutch" auction, in which participants typically bid in the open until two are left, and they then submit sealed bids for the final prize.

If governments do decide on ascending auctions, it's generally a good idea to offer more licenses than the number of incumbents. This means that challengers know they have a chance, and so are more willing to participate. Competition among the new entrants reduces the power of the incumbents to dominate the field.

It's important to remember that auctions are actually information-gathering exercises—when they work, they allow governments to discover how much something is worth, and to charge that fair price. The object is not to gouge companies and consumers, as proponents of beauty contests like to charge. A properly run auction will not drive companies into bankruptcy, because it will encourage them to behave rationally, but neither will it allow them to rig the result and pocket windfall profits. That's why it's advisable that as Hong Kong and other Asian countries sell 3G licenses—yes, others will likely follow the trend—they pay close attention to the mechanics of the process.

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The Bishop and Beijing

China moves to restrict Catholicism in Hong Kong.

Bad habits are hard to break, but Beijing seems intent on intensifying its worst traits. It has stepped up its attack on the Roman Catholic Church in China since Pope John Paul II canonized 120 Chinese martyrs on Sunday. Now it has emerged that China is even throwing its anti-religious weight around in

state-sponsored Patriotic Association. The clerics have been sent to "study camps" for brainwashing exercises where they are quizzed on the proper way to behave and speak in China.

The renewed crackdown also manifests itself in the resurrection of hyperbolic communist rhetoric. Beijing responded to the canonization

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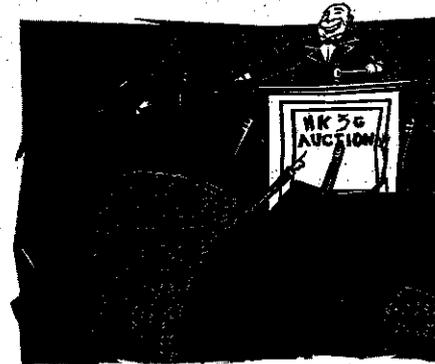
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COMMENT & ANALYSIS

Efficient, equitable and highly lucrative

Critics of government auctions of third generation mobile telephone licences have got it wrong



MARTIN WOLF

The auction of so-called "third generation" mobile telephone licences has turned into a treasure trove. In the UK, the Treasury won £22.5bn from its auction of five such licences. The German government is expected to raise up to DM120bn (\$59bn) from its auction of six licences. But some complain that these governments have made a terrible mistake. These critics are wrong: selling the spectrum is exactly what governments should do. Nobody has been more

forceful than Nicholas Negroponte, director of the Media Laboratory at the Massachusetts Institute of Technology. He has attacked the British government for imposing what he calls an "economically unsustainable" tax on internet technology and urged other countries not to follow this example. The core of his complaint is that the sums raised will be just a tax on consumers and on innovation. He would have preferred a beauty contest in which bureaucrats reward

companies for their promises to offer the lowest prices, install the most infrastructure and put the most telephones in schools and public places.

Prof Negroponte is mistaken. A well-designed auction is both the most efficient and fairest method of allocating a scarce resource, such as radio spectrum. It is the most efficient, because licences will go to those who value them most. It is the fairest, because it ensures that the economic value goes to the community, while eliminating the favouritism and corruption inherent in bureaucratic discretion.

In the UK, there were five third-generation licences, four incumbent operators and a limit of one licence per operator. The designers of the auction reasoned that, with one new entrant bound to succeed, there would be several aspirant entrants – in the event there were nine.

They also concluded that there would be little opportunity for collusion.* In the event, 150 rounds of bidding ended up delivering roughly 10 times as much money as the government had expected.

In setting their limits, bidders had to work out the profit-maximising use of a licence, while taking into account the impact of not possessing one on an existing business. The maximum sum worth paying for a licence is the present value of the expected net cash flow to be derived from it, discounted at the company's own cost of capital (with the cost of the licence itself omitted).

As the government said: "Bidders will be paying a cost determined by the auction . . . instead of a licence fee fixed by the government. This allows the market to determine the commercial value of scarce radio spectrum. The amount

that operators will bid is determined by their overall business plans and the expected prices for third generation services and not the other way round."**

When critics complain about such auctions, 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 of 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.

A company maximises profits by trying to equate incremental costs to incremental revenue. But a licence can have no impact on incremental costs, because its price is invariant, once obtained.

Even if the cost of licences had been zero, the prices companies would charge would be the same. They would then merely be able to earn vast excess profits from the scarcity of the spectrum. Similarly, if it turns out that they have overbid for the licences, these unhappy winners will make negative excess profits – good old-fashioned losses, in other words. But again the prices they charge will be determined by the

intersection of incremental costs and revenue. They will be unaffected by something that they are no longer in a position to change.

Since bygones are bygones, companies will be unable to save themselves from any prospective losses on the cost of the licences, unless – heaven forbid – the government gives them their money back. In this case, the size, diversification and value of these companies make bankruptcy almost inconceivable, not that that would matter much either. Instead, shareholders will not receive the spectacular returns that underpin current market valuations.

If the companies have overbid, then, as John Kay has argued (FT, May 1) "the government will, with exquisite luck and timing, have raised £22.5bn of revenue, from frenzied buyers of technology stocks". This is wonderful: £22.5bn is close to £400 for

every British citizen; used to lower debt, it will save the government some £750m a year in today's prices, in perpetuity.

Imagine the outrage if the government had suggested giving £22.5bn outright to the five winners of the auction. Not to have held this auction would have been the exact equivalent of that giveaway. The government has done exactly the right thing. It deserves the highest praise.

* *Paul Klemperer, What Really Matters in Auction Design, www.nuff.ox.ac.uk/economics/people/klemperer.htm.*

** *Auction of Third Generation Mobile Telecommunications Licences in the UK: Frequently Asked Questions, www.spectrumbauctions.gov.uk/index.htm.*

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This article, based in part on the newspaper article appended below “Are Auctions Always Best?” will become part of “The Biggest Auction Ever” (joint paper with Ken Binmore).

Auctions vs Beauty Contests

Arguments for Auctions

Most importantly, a well-designed auction is the method most likely to allocate resources to those who can use them most valuably.¹ Rather than rely on government bureaucrats to assess the merits of competing firms’ business plans, an auction forces businessmen to put their “money where their mouths are” when they make their bids. An auction can therefore extract and use information otherwise unavailable to the government.²

Secondly, the difficulty of specifying and evaluating criteria for a beauty contest³ makes this a time-consuming and opaque process that leads to political and legal controversy, and the perception, if not the reality, of favoritism and corruption.⁴ Indeed, some governments make no secret of choosing beauty contests precisely because of the possibilities for favouring their “na-

¹Allowing resale is not a perfect substitute for an efficient initial allocation, because resale is itself generally inefficient. See Myerson and Satterthwaite (1983) and Cramton, Gibbons, and Klemperer (1987).

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³Nicholas Negroponte (the technology guru who is one of the most prominent advocates of beauty contests), for example, argues that 3G licences should be allocated to those who would guarantee the lowest costs to consumers, invest the most in infrastructure, stimulate most creativity, etc. But how can firms guarantee consumer prices for 5-20 years in the future for products that we may not yet even be able to imagine? Infrastructure investment can be costed, but will it all be useful? How can the government possibly decide who will be most creative? And how could the government monitor and enforce any commitments made by firms? How should the government penalize a firm that turns out to be insufficiently creative?, and what should the government’s response be to a firm that is creative and develops a product with valuable unforeseen features but above the previously guaranteed price? It is hard to think of a more serious drag on innovation than pre-specifying future prices for products that don’t yet exist!

⁴The Spanish and Swedish 3G beauty contests, for example, provoked litigation and substantial and still-continuing political debate. By contrast, a losing bidder complained the U.K. on its auction process.

tional champions” over foreign firms. But such protectionism is unlikely to benefit consumers or taxpayers.

Thirdly, of course, an auction can raise staggering sums of money to support the public finances—the UK auction yielded about two and a half per cent of GNP, or enough money to build 400 new hospitals. A beauty contest, by contrast, can give away valuable assets at a fraction of what they are worth. The winners of the UK’s previous “second-generation” licences paid “administration fees” of just £40,000. Economists argued that those who advocated beauty contests should say how they would prefer to fund the government. Did they want higher income taxes?⁵

Some have argued that auctions are unfair to firms who are “forced to bid”. It is true that incumbent mobile-phone operators might feel forced to win a new licence, or see the value of their previous investments sharply reduced. But in no European 3G auction have there been fewer licences than incumbents,⁶ so the prices of licences were set by new entrants who had nothing to lose if they failed to win a license. And in the U.K., Germany, Italy and elsewhere, some licenses were won by companies who had no previous presence in those markets, proving that companies who were under no pressure to compete saw the risks as worth taking. (Indeed in the U.K. case one winner quickly re-sold a share of its licence at a 37% profit!⁷) Of course, the companies are taking huge risks in bidding in an auction, just as, for example, firms take huge risks when they invest in developing a new aircraft or a Channel Tunnel. They know that they are buying into a lottery that might result in huge losses or huge gains. Although the media now say that

⁵Martin Feldstein (1999) recently estimated that every extra \$1 of income tax raised in the U.S. costs the economy an additional \$2 in deadweight losses caused through the disincentives to earn, and the misallocation of resources to avoid taxes. True Feldstein’s estimates may be greatly overstated—[?] 30 c in deadweight loss would be a more typical estimate—but charging companies for spectrum incurs none of these additional costs.

⁶although such an auction seems likely in Hong Kong.

⁷See Section 8.1.

the winners of the British 3G auction “paid too much”, only time will tell whether their gamble was a good one.⁸

Price Effects

The media continues to argue that firms’ costs in the auction will be passed on to consumers in the form of higher prices. This would be at least partly true for an auction in which firms bid royalties (see Section 5.2). But the argument is mistaken for an auction in which firms make once-and-for-all lump sum payments. Like any other firms, telecom companies will charge the prices that maximise their profits, independently of what the spectrum cost them in the past.

One way to explain how sunk costs work to journalists is to imagine we are now in 2010 and the new cellular telephone services are being sold at whatever prices it turns out maximise their profits. How would these prices change if the government were to refund with interest the payments the operators made for their licences, so that the situation became the same as if the licences had been given away? Other things being equal, the prices would remain exactly the same, because a company would be irrational to lower its price below what the market will bear; the only result of the refund would be to increase the profit of the shareholders of the operating companies.

To take a more familiar example, consider housing prices. The price of new housing is no lower when the developer had the good fortune to obtain the land below its current market value (e.g. because it was bought before planning permission was available) than when the developer has paid the full market value. In either case, the price is determined by the housing market at the time the new housing is sold. There is no more sense in handing out free spectrum to the telecom companies than in handing out free land to developers in the belief that this will lead to cheaper houses.

⁸It is because entrepreneurs take such risks that caution must be exercised in taxing away their profits when things turn out well.

Of course, telecom companies (and land developers) have enormous incentives to argue the opposite, because they obtain large windfall profits if they can obtain a scarce resource for free. And it is true that consumer prices can be affected (even by past lump sum payments). For example, paying auction fees could somehow create “focal points” that allow firms to tacitly co-ordinate on charging higher prices. Paying auction fees also makes firms poorer, so perhaps more willing to risk collusion, especially if they believe they are too poor to afford any fines. And an auction will, in principle, select those firms that are better able to collude (hence are more profitable). But all these effects seems small, and certainly avoidable with proper competition policy.

Much more worrying is that companies’ specious arguments may fool politicians and regulators into agreeing that the auction is a reason for allowing artificially high prices.⁹ If we do see higher prices in countries that ran auctions, it will be because of these political effects.

Investment Effects

Another possible concern is that large auction fees may slow investment because of capital-market constraints. Giving licences away to firms at discounted prices would certainly relax firms’ capital-market constraints, just as any other state handouts would. There may perhaps be good grounds for subsidising this industry, but advocates of giveaways need to explain quite a lot: Why subsidise this industry rather than others? Why subsidise the mobile-phone operators (rather than, for example, providers of content to be transmitted over the mobile-phone networks)? Why subsidise them to this extent?

Furthermore, even a government that accepted (as the British government

⁹Oftel (the U.K.’s telecoms regulator) will be doing just this if it accepts operators’ arguments that it should permit firms to set higher call-termination fees to “reflect” firms’ sunk auction costs.

did not) that auctions would have significant deleterious investment (or price) effects might find it in its own national interest to run an auction, because the auction revenues accrue only to the country itself while any investment effects apply to other countries too—the fact that Telefonica’s consortium spent over \$7 billion on a licence in Germany and almost nothing on its Spanish licence is obviously not an argument for Telefonica to invest less in Germany than in Spain.¹⁰ (In fact some commentators have suggested the opposite, arguing that internal-organisational incentives will drive firms to rollout their services faster in Germany to demonstrate that they can quickly recoup their auction costs, though we doubt this effect is large.)

Conclusion

Occasionally—for example, when there are too few potential bidders, or large costs of supplying necessary information to bidders—a form of structured negotiations may be better. However the general rule is that auctions treat firms fairly and transparently, and yield the greatest possible benefits for consumers and taxpayers.

Royalties or Lump Sum Payments?

Payment for licences using a royalty rather than a lump-sum fee is another way of promoting entry, both because it allows the government to share the risk with an operator, and because new entrants are likely to make smaller payments for any given royalty rate, but we were unenthusiastic about using royalties. They must necessarily be levied on some genuinely observable variable, for which profit is not a candidate. They are therefore usually based on some correlate of revenue. For example, in some American oil-tract auctions, the royalty is based on an independent metering of the oil pumped to the well-head, valued at that day’s market price.

However, a royalty based on revenue corresponds to a “value added tax”

¹⁰The Spanish government may have noticed this. It is belatedly trying to levy large fees on the winners of its beauty contest.

and so creates deadweight losses in an oligopolistic industry such as telecoms, for exactly the same reason that a sales tax makes a monopoly or oligopoly worse. A royalty of the form x cents per phone call corresponds to a specific tax and is even more distortionary.¹¹ By contrast oil has, roughly speaking, a “world price” that is largely unaffected by any one country levying a royalty.

Royalty payments also allow possible default, or attempts at renegotiation if optimistic predictions of demand turn out to be mistaken. One therefore faces the risk that a buyer may treat his purchase only as an “option to buy”. Many of the U.S. spectrum auctions suffered from this kind of behaviour—winners were not required to make payments upfront and some simply never paid—which caused the FCC much administrative difficulty and political embarrassment.

All these problems arise when royalties are pre-set by the government. If firms bid royalties, the problems are even worse: the US Department of the Interior ran a very unsuccessful experiment with royalty-based auctions for oil-tracts about 20 years ago, in which the government fixed a relatively small up-front “bonus” payment, and the companies bid percentages of their revenues. The result was that many speculators bid enormous royalty rates in order to win licences. If the oil-fields turned out to be highly productive they could make money even at the high royalty rates, but most fields were simply not developed, even when it was economically efficient to do so. (For example, a winner paying an 80 percent royalty would develop a field only if it yielded a return more than five times the production cost.)

And, of course, further distortions would be created in an oligopolistic market like telecoms if different winners paid different royalty rates.

¹¹To see that a proportional tax (or royalty) on revenue is less distortionary than a per-unit (specific) tax, observe that the former corresponds to the sum of (i) a non-distortionary proportional tax on profits (= revenues - costs) *plus* (ii) a distortionary proportional tax on costs. For a given amount of tax raised, this is less distortionary than a per-unit tax provided marginal costs are not too high.

(This is the original article written in October 2000, from which the El Pais article was translated.)

Are Auctions Always Best?

In March 2000 the U.K. government was the first to auction third-generation mobile-phone licenses. Although analysts predicted the licenses might perhaps be worth \$5 billion, the auction actually raised around 7 times as much---around \$34 billion. Not surprisingly, the U.K.'s example has now been widely copied across the world. Even countries who had originally chosen 'beauty contests' (administrative hearings) to allocate their licenses have been having second thoughts. The rules of the Italian beauty contest turned it into an auction by another name (albeit a very badly-designed one); Hong Kong recently switched from a beauty contest to a 'hybrid' that will probably in effect be an auction; there are rumours that the Irish beauty contest may also look more like an auction; and there have been calls for the result of the Spanish beauty contest to be nullified and the licenses to be reallocated by an auction.

But are auctions the best way to allocate radiospectrum licenses?

To an economist the answer is almost always "Yes!"

AUCTIONS ARE BEST

Most important, a well-designed auction is the most likely method to allocate resources to those who can use them most valuably. Rather than rely on government bureaucrats to assess the merits of competing firms' business plans, an auction forces businessmen to put their "money where their mouths are" when they make their bids, so the auction extracts and uses information unavailable to the government.

Second, even if the government did have access to good information---and the lamentably poor government estimates of the money that spectrum auctions would raise are just one illustration of how little the government knows---allocation by bureaucrats leads to the perception, if not the reality, of favoritism and corruption. In fact some governments may well have chosen beauty contests precisely because of the possibilities for favoring, e.g., "national champions" over foreign firms. But such protectionism is unlikely to benefit consumers or taxpayers.

Third, of course, an auction can raise staggering sums of money to support the public finances---the UK 3G auction yielded about two and a half per cent of GNP, or enough money to build 400 new hospitals. A beauty contest, by contrast, can give away valuable assets at a fraction of what they are worth. Those who advocate beauty contests should say how they would prefer to fund the government. Do they prefer higher income taxes? (The distinguished economist Martin Feldstein recently estimated that every extra \$1 of income tax raised in the U.S. costs the economy an additional \$2 in deadweight losses caused through the disincentives to earn, and the misallocation of resources to avoid taxes. True Feldstein's estimates may be overstated, but charging companies for spectrum incurs none of these additional costs.)

Some have argued that firms' costs in the auction will be passed through to consumers in the form of higher prices, and this would probably be at least partly true for an auction in which firms bid royalties. But the argument is mistaken for an auction in which firms make once-and-for-all lump sum payments. Like any other firms, telecom companies will charge the prices that maximize their profits, independent of what the spectrum cost them in the past. To take a more familiar example, consider housing prices. The price of new housing is no lower when the

developer had the good fortune to obtain the land below its current market value (e.g. because it was bought before planning permission was available) than when the developer has paid the full market value. In either case, the price is determined by the housing market at the time the new housing is sold. There is no more sense in handing out free spectrum to the telecom companies than in handing out free land to developers in the belief that this will lead to cheaper houses.

Of course, telecom companies (and land developers) have enormous incentives to argue the opposite, because they obtain large windfall profits if they can obtain a scarce resource for free. And it is true that consumer prices could be affected (even by past lump sum payments) if, for example, an auction somehow allows firms to tacitly coordinate on higher prices, or the companies' specious arguments fool politicians and regulators into agreeing that the auction is a reason for allowing artificially high prices, e.g. through permitting collusion. But with intelligent regulation these effects should be small.

Finally, how practical is a beauty contest? Technology guru Nicholas Negroponte, for example, has argued that winners should be chosen according to who would guarantee the lowest costs to consumers, invest the most in infrastructure, stimulate most creativity, etc. But how can firms guarantee consumer prices for 5-20 years in the future for products that we may not yet even be able to imagine? Infrastructure investment can be costed, but will it all be useful? How can the government possibly decide who will be most creative? And how could the government monitor and enforce any commitments made by firms? How should the government penalize a firm that turns out to be insufficiently creative?, and what should the government's response be to a firm that is creative and develops a product with valuable unforeseen features but above the previously guaranteed price? It is hard to think of a more serious drag on innovation than pre-specifying future prices for products that don't yet exist!

And the difficulty of specifying and evaluating the criteria for a beauty contest make this a time-consuming and opaque process relative to the rapidity and transparency of an auction. So even a well-run beauty contest is more likely to generate a legal challenge after the fact.

Of course, the companies are taking huge risks in bidding in an auction, just as, for example, firms take huge risks when they invest in developing a new aircraft or a Channel Tunnel. The companies might come huge croppers; or they might make huge fortunes. Only time will tell. But in the U.K., Germany, and Italy, some licenses were won by companies who had no previous presence in those markets, proving that companies who were under no pressure to compete saw the risks as worth taking. (Indeed in the U.K. case one winner has already sold a share of its license at a profit!) Whether the large license costs will speed or slow investment is ambiguous---arguments can be made in both directions. But what is clear is that the companies have invested in licenses because they believe that it is in their own business interests to do so.

...BUT AUCTIONS DO NEED CAREFUL DESIGN

Certainly an auction needs careful design to work well, and must be tailored to the specific country's context---auction design is a matter of 'horses for courses', NOT 'one size fits all'.

(See my paper 'What Really Matters in Auction Design' at www.nuff.ox.ac.uk/economics/people/klemperer.htm.)

The Netherlands and Italian auction designs, for example, both foolishly aped the U.K.'s ascending-auction rules in contexts in which the U.K. system was clearly inappropriate. The crucial difference is that there were far fewer bidders in Holland and Italy. Both the Netherlands and Italian auctions would have been much more successful if bidders had been forced to

make sealed "best and final" offers rather than participating in an ascending auction---and this was predictable (and predicted) in advance.

Last week, in Italy, for example, there were just six bidders for five licenses. Because one of the bidders, Blu, looked weak, the other bidders did not need to bid aggressively in the ascending auction which always allowed them to come back and top any bid that Blu made. When Blu dropped out just a few rounds after the auction began, the result was per capita revenues below 40% of the British and German levels. But if the government had asked for sealed, final offers that the bidders could not revise, the other bidders could not have taken the risk of bidding so low. They would have felt forced to make serious offers in case Blu had turned out to bid more strongly (e.g., Blu might just have been pretending weakness), so the government would have raised much more money. Indeed, Blu itself might perhaps have made a reasonable offer even if---as was the case---it didn't feel able to bid up to the level required to be a winner in the ascending auction. And this possibility would also have encouraged more aggressive bidding from the others. In addition, a sealed-bid design might have attracted more entry into the Italian auction, and further improved the outcome.

It has been alleged that the Italian auction also suffered from collusion. That may or may not turn out to be true. But if it was the case, it is yet another reason why a sealed-bid auction (in conjunction with proper anti-collusion measures) would probably have worked better---an ascending design facilitates collusion by making it easier for firms to check that their collaborators are sticking to the collusive agreement.

The Netherlands also had just six bidders, one of whom seemed very weak, for five licenses, with results similar to Italy's; in fact, the Netherlands per capita revenues were less than 30% of the U.K. levels.

But even the badly-designed Netherlands and Italian auctions probably performed no worse than beauty contests which would most likely have yielded the same winners and no more revenue for the government. Very occasionally---for example, when there are too few potential bidders, or large costs of supplying necessary information to bidders---a form of structured negotiations may be better. However the general rule is that auctions treat firms fairly and transparently, and yield the greatest possible benefits for consumers and taxpayers.

.....Paul Klemperer was the principal auction theorist advising the U.K. government (the first in the world to run a third-generation mobile-phone license auction) on its auction design. He is Edgeworth Professor of Economics at Oxford University, and also advises the U.S. Federal Trade Commission on antitrust matters. His papers on auctions can be found at www.nuff.ox.ac.uk/economics/people/klemperer.htm .

LICENCIAS DE TELEFONÍA

¿Son las subastas lo mejor?

PAUL KLEMPERER

En marzo de 2000, el Gobierno británico fue el primero en subastar las licencias para teléfonos móviles de tercera generación. Aunque los analistas habían predicho que las licencias podían valer 5.000 millones de dólares (unos 970.000 millones de pesetas), la subasta en realidad multiplicó casi por siete esa cantidad: unos 34.000 millones de dólares (casi 6,6 billones de pesetas). No es sorprendente que el ejemplo de Reino Unido se haya copiado ampliamente en todo el mundo. Incluso países que en un principio habían optado por los concursos de belleza (vistas administrativas) para asignar sus licencias, se lo han vuelto a pensar. Las normas del concurso de belleza italiano se convirtieron en una subasta con otro nombre (aunque muy mal diseñada); Hong Kong cambió recientemente del concurso de belleza a un híbrido, que probablemente será en efecto una subasta; hay rumores de que el concurso de belleza irlandés podría también parecerse más a una subasta; y ha habido peticiones de que se anulen los resultados del concurso de belleza español y se reasignen las licencias mediante subasta.

¿Pero son las subastas la mejor manera de asignar las licencias de radiofrecuencia? Para un economista la respuesta es casi siempre "¡Sí!".

Las subastas son lo mejor

Lo primero y más importante: una subasta bien diseñada es el método más adecuado para asignar recursos a quienes los pueden utilizar de una manera más valiosa. En lugar de fiarse de los burocratas del Gobierno a la hora de evaluar los méritos de los planes de negocio de las empresas que compiten, una subasta obliga a los empresarios a "poner el dinero en lo que dicen" cuando hacen su oferta, por lo que la subasta extrae y utiliza información no disponible para el Estado.

En segundo lugar, aunque el Gobierno tuviese acceso a buena información —y los lamentablemente pobres cálculos públicos sobre el dinero que las subastas de las frecuencias aportarían son sólo un ejemplo de lo poco que sabe el Estado— la asignación por parte de los burocratas crea la impresión, si no la realidad, de que existe favoritismo y corrupción. De hecho, algunos Gobiernos bien pueden haber escogido los concursos de belleza precisamente por las posibilidades de favorecer, por ejemplo, a los paladines nacionales frente a las empresas extranjeras. Pero no es probable que dicho proteccionismo beneficie a los consumidores ni a los contribuyentes.

En tercer lugar, una subasta puede naturalmente obtener impresionantes cantidades de dinero para sostener las finanzas del Estado: la subasta 3G de Reino Unido obtuvo una cantidad equivalente aproximadamente al 2,5% del PNB, o sea, suficiente dinero para construir 400 nuevos hospitales. En cambio, un concurso de belleza puede ceder valiosos activos por una fracción mínima de lo que valen. Los partidarios de los concursos de belleza deberían explicar cómo

preferirían aportar fondos al Estado. ¿Prefieren impuestos sobre la renta más elevados? (El distinguido economista Martin Feldstein calculó recientemente que cada dólar adicional de aumento en el impuesto sobre la renta en Estados Unidos cuesta a la economía otros dos dólares en pérdidas improductivas causadas por los incentivos para ganar más, y la asignación desacertada de recursos para evitar impuestos. Es cierto que los cálculos de Feldstein pueden ser exagerados, pero cobrar a las empresas por la frecuencia no incurre en ninguno de estos costes adicionales).

Algunos han alegado que los costes de las empresas en la subasta pasarán a los consumidores en forma de precios más altos, y esto sería en parte cierto en una subasta en la que las empresas pujan por los derechos de patente. Pero el argumento es equivocado para una subasta en la que las empresas deben hacer un único pago de cantidades globales. Como las demás empresas, las empresas de comunicación cobrarán

los precios que maximicen sus beneficios, independientemente de lo que la frecuencia les haya costado en el pasado. Para poner un ejemplo más conocido, consideremos los precios de la vivienda. El precio de la vivienda nueva no es más bajo cuando el promotor ha tenido la buena suerte de conseguir el terreno por debajo de su precio actual de mercado (por ejemplo, porque lo compró antes de que dispusiese de licencia para construir) que cuando el promotor ha pagado un precio de mercado completo. En ambos casos, el precio está determinado por el mercado inmobiliario del momento en que se vende la nueva vivienda. Ceder frecuencias gratis a las empresas de telecomunicaciones no tiene más sentido que ceder terreno gratuito a los promotores, con la creencia de que eso va a hacer que las viviendas sean más baratas.

Por supuesto, las empresas de

telecomunicaciones (y los promotores inmobiliarios) tienen enormes incentivos para argumentar lo contrario, porque obtienen grandes beneficios caídos del cielo si consiguen obtener gratuitamente un bien escaso. Y es cierto que los precios al consumidor se podrían ver afectados (incluso por pasados pagos de montos totales) si, por ejemplo, una subasta permite de alguna manera que las empresas coordinen tácitamente precios más elevados, o si los argumentos corporativos de los empresarios engañan a políticos y reguladores para que acepten que la subasta es una razón para permitir precios artificialmente elevados, por ejemplo, permitiendo la connivencia desleal. Pero con una regulación inteligente, el impacto debería ser pequeño.

Precios futuros

Finalmente, ¿es práctico un concurso de belleza? El guru de la tecnología Nicholas Negroponte, por ejemplo, ha afirmado que se debería elegir a los ganadores que garanticen los costes más bajos para los usuarios, inviertan más en infraestructura, estimulen más la creatividad, etcétera. ¿Pero cómo pueden las empresas garantizar los precios al consumidor durante un plazo de 5 a 20 años en productos que quizá no seamos capaces de imaginar? ¿Se pueden calcular los costes de la inversión en infraestructura, ¿pero servirá para algo? ¿Cómo puede el Gobierno decidir quién va a ser más creativo? ¿Y cuál podría el Gobierno controlar y obligar a las empresas a cumplir con sus compromisos? ¿Cómo podría el Gobierno penalizar a una empresa que resulta poco creativa? ¿Y cuál debería ser la respuesta del Gobierno a una empresa que es creativa y crea un producto con características valiosas y no previstas pero por encima del precio previamente garantizado? ¿Es difícil pensar en un lastre más grave para la innovación que la especificación previa de los precios futuros para productos que todavía no existen?

Y la dificultad de especificar y evaluar los criterios para los concursos de belleza se convierte en un proceso opaco y en una pérdida de tiempo en relación con la rapidez y

transparencia de una subasta. Por tanto, incluso los concursos de belleza bien llevados tienen más probabilidad de generar problemas legales después de resueltos.

Naturalmente, las empresas corren un riesgo enorme al pujar en una subasta, de la misma forma, por ejemplo, que corren un gran riesgo al idear un nuevo avión o un túnel del Canal. Las empresas podrían convertirse en grandes fracasadas; o podrían ganar enormes fortunas. Sólo el tiempo lo dirá. Pero en Reino Unido, Alemania e Italia algunas de las licencias las obtuvieron empresas que antes no tenían ninguna presencia en esos mercados, lo que demuestra que empresas que no estaban presionadas para competir consideraban que valía la pena asumir los riesgos. (De hecho, en el caso de Reino Unido, uno de los ganadores ya ha vendido una parte de su licencia con beneficio). No está muy claro si los elevados costes de la licencia van a acelerar o reducir la inversión; se pueden presentar argumentos en ambos sentidos. Pero lo que sí está claro es que las empresas han invertido en las licencias porque creen que es algo de interés para su negocio.

Diseño cuidadoso

Ciertamente, una subasta necesita un diseño cuidadoso para funcionar adecuadamente, y debe adaptarse al contexto específico del país. Es una cuestión de "cada oveja con su pareja", no de "talla única". (Véase mi artículo *What Really Matters in Auction Design* en www.nuff.ox.ac.uk/economics/people/klempere.htm). Los diseños de las subastas de Holanda e Italia, por ejemplo, copiaron absurdamente las normas de subasta ascendente de Reino Unido en contextos en los que el sistema británico era claramente inadecuado. La diferencia crucial es que había muchos menos concursantes en Holanda y en Italia. Las subastas holandesa e italiana habrían tenido

mucho más éxito si a los concursantes se les hubiese obligado a realizar "las mejores y definitivas" ofertas selladas que a participar en una subasta ascendente; y esto era predecible (y se predijo) de antemano.

En Italia, por ejemplo, había sólo seis concursantes para cinco licencias. Dado que uno de los concursantes, Blu, parecía débil, los otros no tenían que pujar muy al alza en la subasta ascendente, porque siempre podían volver y superar cualquier oferta que Blu presentase. Cuando Blu se retiró, sólo unas cuantas rondas después de comenzada la subasta, el resultado fue unos ingresos per cápita inferiores al 40% de los británicos o los alemanes. Pero si el Gobierno hubiera pedido ofertas definitivas y selladas que los concursantes no pueden revisar, los otros concursantes no se habrían atrevido a pujar tan bajo. Se habrían sentido obligados a realizar ofertas más serias por si Blu hubiese pujado más alto (por ejemplo, Blu podría estar fingiendo su debilidad), y por tanto el Gobierno habría conseguido mucho más dinero. De hecho, la propia Blu podría quizá haber presentado una oferta razonable incluso aunque —como era el caso— no se sintiese capaz de pujar al nivel requerido para ser ganadora en la subasta ascendente. Y esta posibilidad también habría animado una oferta más atrevida de los otros. Además, un diseño de oferta sellada podría haber atraído una mayor entrada a la subasta italiana, y mejorado más el resultado.

Se ha alegado que la subasta italiana también padeció de connivencia desleal. Eso puede ser o no cierto. Pero si fue así, es una razón más por la que la subasta con oferta sellada (en conjunción con medidas adecuadas para evitar la connivencia) probablemente habría funcionado mejor: un diseño ascendente facilita la connivencia al hacer más fácil para las empresas comprobar que sus colaboradores cumplen el acuerdo de connivencia.

En Holanda había también seis concursantes, uno de los cuales parecía muy débil, para cinco licencias, con un resultado similar al de Italia; de hecho, los ingresos per cápita en Holanda fueron inferiores al 30% de los alcanzados en Reino Unido.

Pero probablemente, ni siquiera las subastas mal diseñadas de Holanda obtuvieron un resultado peor que los concursos de belleza, que casi con seguridad habrían llegado a los mismos ganadores y sin más ingresos para el Estado. Muy de vez en cuando —por ejemplo, cuando hay excesivamente pocos concursantes potenciales, o los costes de proporcionar la información necesaria a los concursantes son muy elevados— puede ser mejor un sistema de negociaciones estructuradas. Sin embargo, la norma general es que las subastas tratan a las empresas de manera justa y transparente, y rinden los mayores beneficios posibles para los consumidores y los contribuyentes.

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