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## **Auctions of Rights to Public Property**

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Auctions are used by governments for a variety of purposes. Government debt is managed in many countries by the auctioning of government securities. Foreign-exchange auctions are run by many governments, including Jamaica, Bolivia, Nigeria, and Romania. Reforming governments, from the Czech Republic to Mexico, have used auctions to privatize state-owned firms. Developing countries use auctions in franchising infrastructure projects to private firms, in sectors such as water, telecommunications, transport, waste disposal, and power. Governments occasionally use auctions to implement policy: for example, in the 1980s the governments of New Zealand and Australia auctioned import quotas as part of a process of trade liberalization, and in 1993 the government of Russia began auctioning licenses for exports and imports.

Private-party access to public property is the subject of this entry. Although governments have usually given away the rights to public resources, in the 1990s there has been a worldwide trend toward auctioning them. Auctions are used to allocate various publicly owned natural resources: rights to extract oil, minerals, and timber, rights to farm public land, and rights to use the electromagnetic spectrum. Pollution licences are being auctioned as part of environmental policy, essentially auctioning the public resource of clean air. Auctions are also used to sell physical property, such as real estate and surplus

equipment. In what follows we discuss the various methods that are used, including auctions, to allocate public resources; who gains and who loses from auctioning; and why auctions have not been used more in the past and why they have been used increasingly of late.

### **Alternative Methods of Allocation**

Members of the public regularly petition the state for the right to use public resources for their private ends. The government must determine the selection mechanism for deciding who has access to public resources. Governments have relied upon four methods to allocate to private parties the rights to use public property: administrative process, lottery, first-come-first-served, and auction.

Administrative processes are the most commonly used method for deciding who receives the right to use a public resource. The decision on the allocation of the public resource is made by politicians or bureaucrats, either by some ad hoc process or through formally constituted hearings. Administrative processes have the advantage of flexibility. The government can impose whatever decision criteria it chooses, and can thereby use the process to address its policy goals. Policy makers can detail an array of desirable dimensions along which selection will be made. Administrative processes have significant drawbacks, however. They are usually slow and cumbersome. They entail assigning valuable public resources for less than their full value, and often for free. They lack transparency: the decision criteria are usually vague or unstated. It is hard for applicants to determine the basis for the government's decision. The public, also, lacks the information needed to judge whether the award was made fairly. The winner, it sometimes seems, is the firm that has paid the biggest bribes or hired the most effective lobbyists.

Lotteries are an assignment of public resources through a random drawing. Some examples of public resources allocated randomly among citizens who apply for them include hunting and fishing licences, cellular-telephone licences, alcohol distribution or dispensing licences, and citizenship lotteries. The military draft and jury duty are also allocated randomly, but with mandatory participation. Lotteries are attractive because they are relatively quick and low-cost to administer, and they are perceived as a fair process, in that every applicant has an equal chance of winning. These benefits can also be drawbacks. Lotteries also attract frivolous applicants and speculators, and the state cannot be assured that the lottery winner has adequate technical competence to develop, maintain or operate the public resource efficiently. The United States experience of allocating cellular-telephone licences by lottery during the 1980s is a prime example. The lotteries succeeded in assigning licences quickly, but the prospect of a windfall gain attracted large numbers of applicants: there were nearly 400,000 applications. Many lacked the technical expertise to run a cellular-telephone service, and were merely seeking speculative profits. Assigning public property at random does not ensure that the property is placed into the hands of the parties who are able to make the best use of them.

First-come-first-served involves a public announcement of the type of queue to be used, as well as the number of people at the front of the line who will receive public property access. First-come-first-served, like a lottery, has the advantage of working quickly and cheaply, but has the same random character and inefficient outcomes as a lottery. Depending upon the designated queuing mechanism, first-come-first-served can be perceived as more or less fair. Since applicants most willing to stand in line are those who have the lowest opportunity costs, queuing actually favours those with access to few alternative resources. Mineral rights--with prospectors staking their claims--and land--as

in the Oklahoma land rush--are examples of public property being allocated to the first claimant.

Auctions have long been used by governments for purposes such as disposing of physical assets (ancient Rome auctioned booty and slaves plundered by its conquering armies), but their uses have broadened recently into novel areas such as pollution rights and spectrum licences.

Surplus land and equipment is commonly sold at auction. The United States government regularly sells surplus military equipment and office equipment to the highest bidder. State governments sell parcels of land left unused after highways have been constructed. The Federal Deposit Insurance Corporation and the Resolution Trust Corporation have auctioned large amounts of undeveloped land, residential housing, and commercial real estate. Other auctioned public property includes private property that has been seized by the state for legal offence: contraband, unclaimed property, undeclared foreign imports, assets of persons and firms negligent in paying fees or taxes, and assets used in illegal activities. Examples of such property being offered at auction include aircraft, apparel, boats, cars, carpets, electronics, industrial goods, jewellery, and real estate.

The Russian government in 1993 auctioned artifacts from three decades of Soviet space exploration. The Hong Kong government auctions personalized car licence plates, with numbers regarded as lucky (especially the number eight, which in Cantonese rhymes with "prosperity") fetching bids in the millions of dollars. Airport landing slots have occasionally been auctioned in the United States. New York City has begun auctioning taxi-cab medallions. Singapore auctions car-ownership rights as a way of controlling road congestion. China selected managers for some of its state-owned enterprises during the late 1980s by calling for bids from potential managers.

The list of publicly owned natural resources that are auctioned is quite long. In the United States it includes grazing rights, or permission to graze private livestock on state lands, stumpage rights, or the right to cut timber on federal and state lands for private use, spectrum rights, or the right to broadcast over specified electromagnetic frequencies, and pollution rights, or the right to inject pollutants into the air. Oil and gas retrieval rights and mineral extraction rights have been auctioned by the United States federal government since 1954. The British government announced a plan to introduce auctioning for offshore oil and gas licences in 1996, to replace the traditional system of awarding licences on the basis of official assessments of oil companies' development plans. The Russian region of Sakhalin has auctioned oil-extraction rights. Mexico, Colombia, New Zealand, Canada, Hungary, and Australia began auctioning spectrum rights in the 1990s. The Canadian province of New Brunswick auctions exclusive salmon-fishing privileges to wealthy anglers, and New Zealand has investigated an auction for commercial deep-sea fishing quotas.

Whatever the initial allocation method, whether the rights to a public resource are auctioned or given away, the government might decide either to allow, or to prohibit, the recipients to resell them in a secondary market. The government's choice of allocation method matters less if it permits resale than if it does not. With a perfectly operating secondary market, the resource would eventually find its way into the hands of the firm best able to use it, so an efficient allocation would emerge regardless of the initial allocation. In practice, however, the government's allocation method does matter. First, giving the resource away rather than auctioning it means the government misses out on revenue; often it entails subsidizing large corporations at the taxpayers' expense. Second, the assumption that the secondary market works frictionlessly often is not met. Secondary markets for public resources are typically thin markets with significant

transaction costs, so there are gains to using a well-designed auction so as to achieve an efficient allocation from the beginning.

### **Economic Advantages of Auctions**

Auctions achieve several purposes. An auction can not only raise revenue for the government, but also generate an efficient allocation: that is, assign the licences to the firms able to make the best use of them. The government can also design the rules of the auction to address various policy goals, such as avoiding monopoly and directing licences to minority-owned firms. In addition, the results of an auction can provide policy makers with useful information.

The government needs to know how highly firms value the public resource if it is to allocate it efficiently. A bid reveals the bidder's approximate valuation of the resource. The bid underestimates value, since the bidder is bidding for some profit. Bids are quite close to values, however, as the theory of auctions shows, if (a) there are enough bidders to generate significant bidding competition; and (b) bidders are reasonably confident of the precision of their value estimates. An auction, therefore, is not just about raising money. An auction reveals information: how valuable the bidders believe the resource to be, and which bidder values it the most.

The social value of a public resource, to a first approximation, is equal to the most efficient firm's valuation of it. This statement needs careful qualification. If there are externalities associated with exploiting the resource--that is, some of the costs and/or benefits of the firm's activities fail to be reflected in prices--then social value is not the same as private value. Furthermore, if the firm acquires some monopoly power upon obtaining access to the public resource, social and private values diverge. These caveats

are specific and quantifiable. If they are important, these effects can be estimated and added to private values, as revealed by the bids, to produce an estimate of the social value. If the externalities are small or nonexistent, on the other hand, the bids directly represent social-value estimates. In either event, the bids reveal useful information. In the case either that externalities are small or that they are of a similar size across the different firms, the high bidder is the efficient firm--that is, the firm that, from a social point of view, should exploit the resource--and so the auction process picks the right firm.

The size of the winning bid can also reveal useful information about costs. The spread of bids for a public resource tells policy makers how the market values a public resource, and can help show whether the public resource is being exploited efficiently. In a regulated industry, auction prices can be used to give the government an estimate of the costs of regulation. Electric-utility plants in the United States have long been compelled to install air-pollution abatement equipment. Because electricity prices were set by public commissions, utility firms had an incentive to overstate the costs of meeting the environmental standards. When the US Environmental Protection Agency introduced an auction of allowances to pollute and gave the electric industry the option of either installing the mandated equipment or purchasing rights to pollute, prices of the pollution permits were much lower than predicted. If compliance costs were truly as high as the industry had claimed, utilities would have been willing to pay more for the right to pollute. The price of the compliance alternative gave policy makers a hint of the true costs of abatement.

The bids in the US pollution-rights auctions also revealed another kind of valuation. Environmental groups submitted bids; by winning the bidding they ensured that those licences would not be utilized. Through being willing to pay for the licences, the environmentalists were able to express their preference for cleaner air.

Auctions, unlike administrative processes, are transparent. Auctioning forces the government to be explicit about its criteria, since in an auction the rules must be stated fully in advance. After the auction, the applicants know why they won or lost. In this sense, auctions are more fair than administrative allocation. The openness of auctions prevents the suspicion of undue influence, impropriety, or even corruption that can arise when decisions involving large sums of money are made behind closed doors.

Auctions achieve more than raising revenue and generating an efficient match of public resources to private firms. Auctions are a flexible policy tool. The government need not run an auction simply as high-bidder wins, but instead can use it to address a variety of policy goals. Policy makers can adopt a range of criteria for awarding access to public resources via auction.

If the government wants to redress past wrongs by assigning some of a public resource to minority-owned and women-owned firms, it can design the auction to account for this, in several ways. It can set some of the resource aside, and permit only the designated firms to bid on the set-aside resources. It can permit the designated firms to pay on generous installment terms. Further, it can give the designated firms a price preference, under which a designated firm wins if its bid is within some pre-set amount of the highest nondesignated-firm bid. The US Federal Communications Commission used all three of these methods in its spectrum-licence auctions to ensure that some licences went to minority-owned firms, women-owned firms, small businesses, and rural telephone companies. In an auction for paging spectrum, for example, the designated firms were offered a 40 percent preference, so if they won a licence they paid 40 percent less than their bid.

Still other public-policy goals can be addressed while using auctions. If the government judges that the market system does not sufficiently reward technological innovation, it can offer incentives to innovators similar to the set-asides or preferences for minority-owned firms. If the government wishes to ensure local ownership and control of a public resource, it can reserve some or all of it for domestically owned firms, or it can offer a price preference to domestic bidders over foreign bidders.

The government can design auctions in such a way as to guard against market dominance . Monopoly can be prevented by imposing rules limiting how much of the public resource can be controlled by a single firm. Even without such a safeguard, auctions automatically help prevent undue industry concentration, for it is usually easier for new firms to enter industries where auctions rather than administrative processes determine entry.

Besides constraining auction outcomes, the government can also attach conditionality riders that successful bidders must meet in order to exploit the public property. The United States and Mexican spectrum-licence auctions, for example, had a use-it-or-lose-it provision: on penalty of forfeiting their licences, winning bidders were given a prespecified time within which to begin offering telecommunications services to the public.

Auctions are not just about raising revenue; they can be used as a public-policy tool. Auctioning requires merely that the rules be set in advance so that the firms understand at the time of bidding what the government will require of them should they win. Any criterion used in the awarding of resources by administrative processes can also be used within the auction method, provided only that that criterion is capable of being stated

explicitly and precisely, and is announced before the auction. Auctioning is consistent with managed competition.

Auctions do not automatically work smoothly: there are numerous examples of auctions of public resources that were botched because the auction mechanism was not well designed. A public resource can be auctioned using sealed bids, where auction participants bid blind to the offers of competing buyers, or open bids, where the offers are seen by all participants. If multiple units are for sale, the winning bidders can pay a uniform price, where all successful bidders pay a single, market-clearing price, or winners can each pay the price they bid. The different resources can be sold in sequence, or simultaneously. There is a wide range of possible auction rules. Depending on how the rules are written, the auction can work badly or well.

An auction, then, can be an effective method of allocating a public resource. As well as raising revenue for the government, auctions can achieve an efficient allocation; they work in a transparent and fair way; and they can be designed to address a variety of public-policy goals.

### **Political Resistance to Auctions**

The question arises: if auctions achieve such efficient and fair results, why then do we not see them used more in public policy arenas? The answer is that while auctions often are economically superior to the alternatives, they may not be politically preferred. In the political arena, neither the demanders of policy--constituents and interest groups--nor the suppliers--politicians and bureaucrats--typically prefer auctions to other methods of allocation, such as administrative processes. While auctions have a strong economic rationale, the political incentive to establish auctions is often lacking. In fact, some of the economic benefits of auctions translate directly into political losses.

Auction outcomes are determined independent of policy-makers' preferences. No matter how much legislators favour a corporation or interest group, it will not win at auction unless it is the highest bidder. The auction takes the control over the disposal of a valuable resource, and the associated political benefits, out of the hands of politicians and turns it over to an arms-length market process.

Politicians could still influence the auction outcome to the benefit of specific bidders, however, if the rules of the auction were written so as to favour certain individuals or groups. For example, the requirement that all auction participants must pass certain qualifications could screen out potential bid rivals and increase the chances of an earmarked few. Government contracts are often awarded to a single firm that can meet multiple requirements buried deep in legislative language. This is less easy to do with auctions, a relatively transparent selection mechanism. Losing bidders know the identity, as well as the bid, of the winner. This transparency discourages back-room deals that obscure the amount of governmental pork transferred via access to public property.

Transparency does not always prevent manipulation of the auction outcome. The state of Idaho has for many years auctioned 1.9 million acres of grazing land. Bids were very low, because the ranchers had an agreement not to bid against each other; as one rancher put it, "You've got to neighbor with people." The collusion was shattered when environmentalists started bidding in the auctions, with the intention of halting grazing on any land they won and letting the land revert to its natural state. Whenever an environmentalist bid highest, however, Idaho's Land Board overturned the auction result in favour of the ranchers. The money from the lease auctions was to go to public education, but state officials argued that keeping ranchers in business was more important.

The transparency of auctions can sometimes be a political drawback, through revealing the bidders' valuations. For example, import trade quotas give relief to domestic producers. Policy makers

might be reluctant for the public to discover the extent of largesse given to local firms by these trade barriers. If trade quotas were auctioned, then voters would gain some estimate of how much they were losing through the trade restrictions. The price-discovery function of the auction could lead to widespread constituent dissatisfaction; this might explain why import quotas are rarely auctioned. It was reliance upon this price transparency that led New Zealand, in a reversal of this logic, to auction trade quotas in an attempt to pry open markets previously tied down by trade barriers. Import quota auctions brought in revenues, but a supplementary purpose for selling quotas was to make the losses from trade barriers more apparent to consumers, who would then press for freer markets. Consumer demand for trade liberalization gave politicians the political will to resist calls by domestic producers for protected markets.

Those who receive the benefits from a policy decision might be no more eager than politicians for those benefits to be distributed through an auction. The efficiencies of selection through auction produce three results that discourage policy consumers from demanding this type of market. First, auctions produce uncertain winners. The firm that bids highest and wins access to public property in an auction presumably has the lowest costs. Because firms' costs are proprietary, no one auction participant can have a prior assurance of winning. Politically influential firms might prefer more predictable methods of distributing public resources. A second reason why policy consumers shy away from auctions is the cost. Firms are reluctant to pay for what they have been accustomed to getting for free. (Against this, however, is the fact that an apparently free allocation is not really free, once the costs of lobbying and other inefficiencies of administrative allocation are taken into account.) A third source of resistance to auctions is that auctions mean easier entry for new firms. To be able to bid in an auction for a public resource, a firm must merely have sufficient funds or be able to persuade a lender of the viability of its business plan. To participate in an administrative allocation process, a firm might need political connections and inside knowledge of the system. To the extent that auctions foster the entry of new competitors, they will be resisted by the politically influential incumbent firms.

The main beneficiaries of the introduction of auctions for public resources, apart from newly entering firms, are the taxpayers at large. The main losers are the incumbent firms that now have to pay for the resources they used to get for free. Auctions of public resources are therefore subject to the standard political-economy logic that says that a relatively small group of concentrated interests will tend to dominate a larger group of diffuse interests, even if the diffuse group's total stakes in the decision exceed the concentrated group's.

Political considerations, then, mean that auctions often are unwanted by policy makers, because they are unwanted by the most influential of the policy recipients. This explains the historically limited use of this mechanism. However, the range of applications of auctions in public policy is widening, and more nations are using auctions for resource allocation. What accounts for this?

Auctions sometimes are introduced in industries subject to major technological innovation, such as telecommunications. This might be because these industries, being in a state of flux, do not have established political representation or an effective lobbying group to block the auction. A more elementary reason for the growing use of auctions in the 1980s and 1990s is the increasing pressure of government budget deficits, and the resulting search for new revenue sources. The United States federal government received \$96 billion between 1954 and 1990 in bids and royalties from offshore-oil auctions, and \$20 billion between 1994 and 1996 from spectrum-rights auctions. Sums like that attract politicians' attention.

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