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Some Implications of Federal Grazing, Timber, Irrigation, and Recreation Subsidies

It is frequently asserted that livestock permittees and timber harvesters are heavily subsidized in their use of forage and stumpage taken from the public lands. It is also widely believed that farmers using irrigation water from federal projects receive a large government subsidy. The alleged unfairness of these subsidies has been used by environmental and conservation groups as a rationale for increasing government-administered water, grazing, and timber prices. Of course, the ultimate aim of these groups in recommending price hikes is probably to eliminate some of these users altogether. Here, I define "subsidy" and examine the degree to which grazers, irrigators, timber harvesters, and recreationists are subsidized by federal policy.

The relationship between economic efficiency and distributional equity flowing from federal subsidies will be introduced up front. That subsidies redistribute income and wealth is obvious, since that is presumably their primary purpose. But if subsidies distort relative prices, then resources will be misallocated (or inefficiently used) in the sense that less than the maximum output will be produced by the economy. This inefficiency is often referred to as "deadweight" loss by economists. Research results conclusively show that significant deadweight losses have been caused by subsidies to users of the public lands and to irrigators using federal water. Since social welfare is generally considered to be a function of output produced by the economy (efficiency) and its distribution among claimant groups (equity), it might be argued that efficiency losses are justifiable as long as subsidies produce a more egalitarian distribution of income by helping truly disadvantaged individuals and groups.

A working definition of "subsidy"

Webster defines subsidy as "any gift made by way of financial aid, ... and a government grant to assist a private enterprise deemed advantageous to the

public; a subvention." Therefore, a government subsidy involves a "gift" or "grant" to some recipient. In short, a subsidy conveys goods, services, or favors that are worth more to recipients than they pay for them and hence comprises a transfer of real wealth from the government to the recipients. Of course, for purposes of this discussion the "government" is simply a surrogate for the composite citizenry and taxpayers.

by B.
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Federal water subsidies

Costs for federal water projects are generally grouped into two broad classes: (a) the *joint* costs for facilities that are utilized to produce multiple project outputs such as electric power, recreation, flood control, and irrigation, and (b) the *separable* costs which can be identified solely with a given use. Because of their nature, joint costs (for example, reservoirs, dams, and spillways) are analytically impossible to impute to their joint outputs in a way that is not arbitrary. If they could be imputed reliably they would not be classified as "joint." Since they cannot be imputed accurately we will simply ignore them. Separable irrigation costs would include such items as construction and O&M costs for canals, ditches, pumps, drainage facilities, and power.

The separable costs for irrigation projects (for example, the Central Valley in California, the Columbia Basin in Washington, the Central Arizona, and the Central Utah) built by the Bureau of Reclamation (Bu Rec) are generally between \$250 and \$500 per acre-foot of water delivered. Since water projects are capital intensive, the construction costs are very large and are incurred at the beginning of the project. Of course, these costs must include interest charges on capital investment, since this capital could have been utilized in the economy to produce valuable alternative investment goods.

Pricing rules utilized by the Bu Rec, however, do not require that all of the separable costs attrib-

utable to irrigation be repaid by the irrigators. Irrigators have always been exempted from paying interest on the government's capital costs. In addition, some costs are considered to be nonreimbursable because they are assigned to general public purposes such as flood control and recreation. Clearly, numerous people benefit from flood control and recreation without paying anything and therefore receive a subsidy from cost-bearing taxpayers. But what about the remaining portion of the irrigation separable costs?

To obtain access to federal water on a long-term contract, an irrigator typically repays the government less than even the separable costs assigned to irrigation. But is it valid to describe the difference between what irrigators pay and the separable cost to society as a subsidy to the water users? The answer to this question is complex.

If a subsidy is a transfer of real wealth from the government to the water users, it is crucial to know what water is worth to the irrigators. For example, empirical studies indicate that the average value of

water in California agricultural use is roughly \$50 per acre-foot, although much variation exists among farmers and geographic areas. In short, farmers on average capture a net benefit (subsidy) amounting to the difference between what water is worth to them and what they pay. Assume a separable water-project cost to the taxpayers of \$300 per acre-foot of irrigation water, an average water value to the irrigators of \$50, and a payment (fee) to the government by the irrigators of \$20 per acre-foot. It would appear to be valid to regard this net value of \$30 per acre-foot of water transferred to irrigators as a subsidy.

Even this conclusion, however, may be misleading if not wrong. This \$30 of net value per acre-foot is unsustainable because of what happens in the land market. Land is the asset that provides entitlement to water priced below its value. In the long-run, a competitive land market capitalizes expected future differences between water fees and values into land values. That is why project-irrigated land sells for more than irrigated land with a higher water bill. This capitalization process, which occurs very quickly after the terms of water deliveries are decided, gives the original land owner receiving cheap project water the bulk of the beneficial wealth effects. Subsequent land owners do not receive any water subsidy at all, since they pay for the capitalized differentials between water costs and values when they purchase the land.

All of this is old news for users of federal water. But this is not the whole story, and the remainder is *not* commonly understood. What about the huge difference between the separable costs borne by the taxpayers (\$300 per acre-foot) and what the water is worth to the farmers (\$50 per acre-foot)? Isn't this \$250 per acre-foot of water a subsidy to somebody? Clearly not, since nobody receives it as a wealth transfer unless some unknown beneficiaries can be identified. Most of the taxpayer investment in irrigation capital cannot be recovered economically and converted to other uses. So most, if not all, of the \$250 per acre-foot of net costs to society simply vanishes as a consequence of inefficient resource allocation and is, therefore, pure "deadweight" loss. This inefficiency is the consequence of political decisions that have produced economically infeasible projects.

I would argue that this situation fails both efficiency and equity criteria for an improvement in social welfare. Original owners of project land gained wealth from the capitalized rents as their land values appreciated, but most have since sold out to new owners who are very limited in the subsidies they can capture. In sum, there are almost no continuing equity gains to offset the huge efficiency losses.





Subsidies in federal grazing

Livestock grazing on the public lands is very similar analytically to the irrigation picture just described. The quantity of allowable federal grazing is fixed by the regulatory agencies, the Forest Service, and the Bureau of Land Management, ostensibly to prevent depletion of range vegetation and soil resources. The forage is allocated to eligible livestock producers via a permit system. Eligibility is determined primarily by whether the rancher is a bona fide livestock producer and has sufficient private ranch property to support the livestock during the period when they are not on the public ranges.

The grazing permit normally has a ten-year life, is generally renewable, and specifies the location of the grazing allotment, the class of grazing livestock permitted, the quantity of allowable grazing, and the season of use. For example, a permit might specify that only cattle can be grazed on a given allotment, that 100 cows and their calves are allowed, and that the grazing season will extend from May 15 to October 15.

The entitlement to federal grazing, of course, is the permit itself. Because of the enormous pressures on the agencies to reduce the quantity of grazing, very few "new" permits are issued. Therefore, if an eligible rancher is to obtain federal graz-

ing he or she must purchase a permit from an existing permittee. Normally the government allows existing permits to be transferred among ranchers who can meet the eligibility requirements, although sometimes the permit transfer must be accompanied by either the ranch base property to which the permit was previously attached or the livestock previously under permit. Active markets for grazing permits in all the public land states attest to at least some degree of competition among eligible ranchers for the federal forage.

For the past few decades the grazing fee has been set by a formula which has priced the forage below its value to the permittees. The fact that permits have market value proves that the fee is less than the value of the forage. The permit's value represents the capitalized value of expected future differences between the fee and the value of the forage. Therefore, it would appear that at least a short-run subsidy was granted to permittees. However, these public grazing systems have been used for at least sixty years on the public domain and even longer on the national forests. The original recipients of subsidized grazing captured a wealth windfall when their permits were created and traded. But, except in rare cases, these original permittees have long since passed from the scene.

In recent years, grazing fees have been set at approximately \$1.50 per animal unit month (AUM) of forage. Permit values are highly variable, however, implying that AUMs of grazing have highly disparate values in different locations. Mostly this disparity reflects differences in the quality of grazing on different allotments. Assuming that permits are renewable so that grazing is perpetually available, the permit should be worth the AUM value to the rancher net of the fee divided by a discount rate. Since permitted livestock numbers can be cut at the discretion of the government, however, the discount rate should incorporate a high risk premium. Assuming a discount rate of 10 percent and a net grazing value of \$2 per AUM, the market permit value could be expected to be about \$20 per AUM.

As was the case with federal water, however, caution is advised in asserting that the subsidy involved in federal grazing is a continuing and long-run phenomenon. As suggested above, ranchers who wish to avail themselves of the "low-priced" federal grazing must purchase the entitlement from an existing permittee. The cost of the permit becomes part of production costs for these purchasers. Therefore, there is really no continuing transfer of wealth to the purchaser of a grazing permit if the permit market is competitive, the costs of becoming permit-eligible are low, and the value of the grazing remains unchanged.

I have estimated the rancher wealth in federal grazing permits to be about \$4 billion. This is why raising federal grazing fees is so controversial politically and explains why existing permittees are vigorous lobbyists for maintaining the current fee structure.

The environmental community has strongly pressed for elimination of the grazing subsidy by insisting that the government raise the grazing fee to "fair market" value, which is taken to mean the going rental rates on private pastures. These rentals per AUM are generally much higher than the government fee, at least partially because the nonfee costs of grazing are higher on public land than on private land. Calf crops tend to be lower, death loss is higher, herding and fencing costs are higher, and livestock transport costs are higher than on private pastures.

Raising the government grazing fee to the level of private rentals would have two consequences: (a) it would greatly reduce grazing on the public lands since the value of the grazing on most allotments would be less than the inflated fee, and (b) it would eliminate the existing difference between the fee and forage value and thus drive permit values to zero. The first outcome is precisely what the environmentalists want. The second would mean huge wealth losses for existing permittees. I have estimated the rancher wealth in federal grazing permits to be about \$4 billion. This is why raising federal grazing fees is so controversial politically and explains why existing permittees are vigorous lobbyists for maintaining the current fee structure.

Subsidies in selling federal timber

Timber sales from the public lands are different in one important respect from federal water and grazing. Standing timber is a stock resource that is sold just once, not a flow resource like water and forage that is produced and harvested annually. Furthermore, there is nothing equivalent in timber sales to a water right or a renewable grazing permit that allows the user to take the resource over a long time period. This means there is no entitlement asset to take on the values of any capitalized subsidies, as we have seen with federal water and grazing.

Federal timber is sold in competitive markets, sometimes by oral auction and sometimes by sealed bid. The factor that determines whether a subsidy might exist is the degree of competition among buyers. If timber buyers are limited in number, or if they collude with each other to prevent the bid from approaching the value of the timber, then some subsidy may exist.

When timber is sold on the basis of an oral bid, and bidding competition is highly restricted, a bidder might offer no more than the appraised price set by the government. In practice, the appraised price seems more related to the government's expectation of what the timber should be worth to the potential buyer than to the government's costs of offering the sale. If the appraised price is below the value of the timber to the bidder, and the bid goes for the appraised price, then a subsidy, as we have defined it, will exist.

Even if competition is keen as the bids rise from lower to higher amounts, bidding will stop at the level which leaves only the high bidder in the competition. Because no one really knows how high the winning bid might have been, the winner may capture a "surplus" by virtue of superior efficiency. However, this is the way that all markets work and if this is a subsidy, it is of a different sort than irrigation or grazing subsidies in which no direct

competitive bidding was utilized.

When the bidding is sealed, the applicant is likely to bid against unknown competition. At the limit, when competition is vigorous, a sealed bidder is likely to offer a price near the level of his or her valuation of the timber rather than risk losing the bid. In this case, any subsidy will be small.

I come now to a point about which there is much confusion: the relationships between government costs of a timber sale, the bid price, and subsidy. Government costs incurred in offering timber for sale might include timber inventory and appraisal, advertising the sale, all or part of the road costs, and administering the sale. What if the costs to the government of offering the sale exceed the bid price of the buyers? Does this mean there is subsidy to timber buyers as commonly argued? Not at all. As argued earlier, subsidy has to do with the price paid for the timber and the value of the timber to the highest bidder. Government costs of offering the sale have nothing to do with subsidy. Rather, government costs are relevant to the question of whether the sale should have been offered at all. Just as was the case with federal water, society cannot be wealthier if a timber sale costs the taxpayers more than the benefits captured by the timber buyers, unless there are other beneficiaries of the sale. Below-cost timber sales may produce deadweight losses for the economy, but have very little to do with subsidies to timber buyers.

Auction theory suggests that the value of the winning bid tends to be higher the larger the number of bidders participating in the auction. A large number of buyers will find it costly to collude with each other and fix the bid price below timber value. Therefore, the volume of timber in the allowable cut may be a critical issue in the determination of the bid price. If the allowable cut is very large, then only the largest timber processors may be able to compete since they alone have financial resources and plant capacity to deal with the large supply. On the other hand, if only small sales are allowed, they may not be attractive to larger operators because of inherent economies of scale in harvesting, transporting, and processing timber. A great deal depends on the general competitive situation in a specific geographic area and on the quantities of timber to be sold. Since it is not at all obvious whether larger or smaller harvesters are more efficient, the primary consideration in determining the volume of the allowable cut should be maximizing the competition for bids by increasing the number of participants.

The federal regulations provide for set-asides in some sales that give preferential treatment to small businesses. If this precludes the most efficient buyers from competing, then government revenues will

be reduced. But it is difficult to see how the difference between the bid by "eligible" small businesses and the timber value is affected. Therefore, this regulation will not increase subsidy as long as bids among eligible buyers are competitive. It might, of course, produce significant deadweight losses.

The important implication for public land and irrigation policy is that "equity" is a weak rationale for decreasing federal grazing and water subsidies by increasing prices.

Likewise, the log export prohibition which requires that timber buyers use local processors might reduce the bid price and deprive the government of revenues, but the subsidy to timber buyers will not be affected. However, this regulation could provide benefits to local processors and communities if lower log prices and increased log availabilities are the result. It could be said that the regulation benefits local processors and communities, but not timber buyers, unless they are one and the same.

Because of the structure of competitive bidding, the degree of subsidy is an empirical question. Either timber sales are competitive and the difference between timber value and bid prices is small, or the opposite is true. Buyers of timber from the public lands may capture some subsidy when the number of buyers is somehow constrained by the terms of the sale, or when no reservation price is announced by the seller, but to my knowledge there is little convincing empirical evidence that these subsidies are common or of substantial magnitude.

Recreation subsidies

This topic can be discussed quickly since there is little institutional structure complicating recreational consumption. We do know that a tremendous increase in the use of the public lands for recreation purposes has occurred in recent years. From 1967 to 1993 recreation use approximately doubled, from about 169 million to more than 330 million visitor-days.

Valuing nonmarket outdoor recreation has always been a knotty conceptual and empirical problem, but at just \$5 per day, the value of recreation on the public lands would be over \$1.6 billion in 1993, clearly an amount that dwarfs the value of other uses. Nominal fees are commonly charged for using federal campgrounds and entering national parks, but no fees are charged for most other recreational activities except those assessed for state fishing and hunting licenses. In 1994, the Forest

Service and the Bureau of Land Management collected less than \$0.05 per recreational visitor-day, while the National Park Service collected less than \$0.25 per visitor. Occupation of extremely scarce camping sites by retired persons who are subsidized with free lifetime passes to the national parks and monuments is a common occurrence in the West.

Since the fees paid by recreational users of the public lands are so very low, subsidies captured must be very large. And since there is no mechanism to gain entitlement, like purchasing water rights or grazing permits, the subsidies are captured each time recreationists use these resources.

Whether public-land recreation subsidies produce a more egalitarian distribution of income depends on the type of recreation and its location. In general, however, outdoor recreation participants are not disproportionately numbered among the nation's poor.

Arguments for elimination of most subsidies not compelling

Studies have shown that regulations governing the pricing and allocation of federal livestock grazing, irrigation water supply, and outdoor recreation have wasted resources. However, it is not at all clear that, with the exception of recreationists, subsidies to existing user groups have been anywhere near alleged levels, and, therefore, a valid argument for their elimination on equity grounds does not exist.

This is especially true for timber harvesting where competitive bidding has been used to allocate stumpage. As long as stumpage markets are reasonably competitive, prices have been bid up to levels reflecting at least the value of the timber to the next highest bidder, a characteristic of all competitive markets.

Setting grazing fees by formula below the value of the forage certainly conveys short-run subsidies to permittees. But if permits can be transferred to other eligible permittees with minimal restrictions, any short-run subsidies tend to get capitalized into per-

mit values. If grazing fees were raised to "fair market" value in order to eliminate short-run subsidies, the effect on efficiency might be salutary since less-efficient permittees would presumably be forced to give up their grazing privileges. However, raising fees would reduce the value of grazing permits and thus diminish permittee wealth. And since grazing permits are in different hands now than when originally issued long ago, the equity impact would be to reduce the wealth of a different set of ranchers than those who might have received a windfall when the permit system was originally implemented.

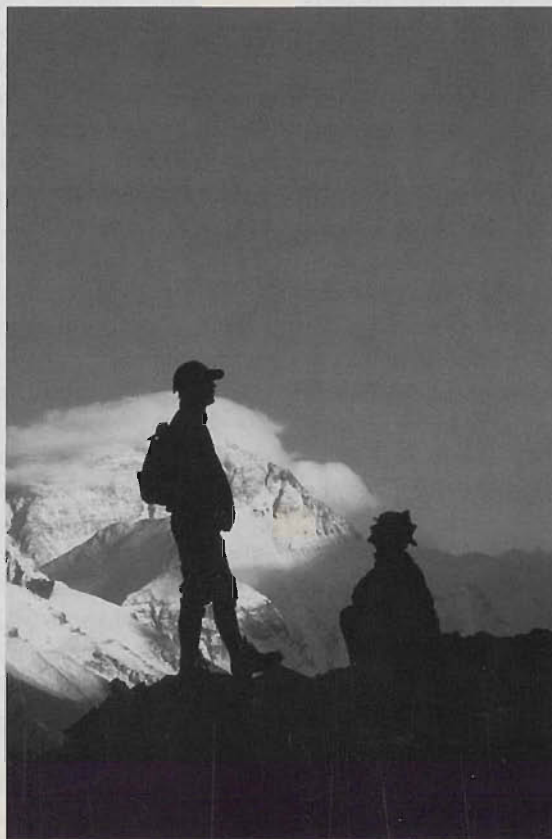
The same conclusion holds for pricing irrigation water below its value on federal projects. Resulting short-run subsidies get capitalized into land values

so subsequent purchasers of project land pay higher land prices. Arbitrarily raising the price of project water may induce irrigators to use it more efficiently, but they will suffer wealth losses as land values decline.

It is recreational users of public land and water who capture continuing subsidies when recreation services are priced below their value. No mechanism like a grazing permit or agricultural land exists that can soak up the subsidies that subsequent users must pay to obtain access to the "under-priced" services.

The important implication for public land and irrigation policy is that "equity" is a weak rationale for decreasing

federal grazing and water subsidies by increasing prices. In fact, raising forage and water prices to "efficient" levels would impose substantial wealth losses on existing irrigated land owners and grazing permittees. At the same time, price distortions creating federal subsidies are undoubtedly significant resource misallocators and should be firmly resisted on "efficiency" grounds, particularly as applied to recreation uses, new irrigation projects, and new issuances of grazing permits where subsidies have not already been capitalized into existing wealth positions. ■



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