



A Severance Tax on California Oil?

By Dr. Mason Gaffney

This article was first published in *GroundSwell*, a publication from Common Ground, USA. The Robert Schalkenbach Foundation has received approval from Common Ground, USA to republish this article at no cost for educational purposes.

Article citation:

Gaffney, Mason. "A Severance Tax on California Oil?" *GroundSwell*, Jul. 2006.

The Robert Schalkenbach Foundation's Digital Collections and Archives is an extension of the Robert Schalkenbach Foundation's Engel Georgist Library. It collects, organizes, preserves, and provides free online access to researchers and the general public of Georgist literature including books, newspapers, pamphlets, scholarly articles and archival materials.

RSF is particularly proud to offer free online access to the works of the late Georgist scholar Mason Gaffney, made possible through the generosity of the Danica Foundation.

Robert Schalkenbach Foundation: <https://schalkenbach.org/>

Engel Georgist Library: <https://www.librarycat.org/lib/EngelGeorgistLibrary>

RSF Digital Collections and Archives: <https://schalkenbach.starter1ua.preservica.com/>

A Severance Tax on California Oil?

Mason Gaffney, July 2006

California has long been and remains a major oil-extracting state. It is the largest gasoline consumer by far, at the highest prices. Its fields were yielding up hydrocarbons not long ago when oil was at \$10/bbl or less, and natural gas was a drug on the market. There is much economic rent there. And yet California is the only state, major or minor, with no severance tax.

This November voters will turn thumbs up or down on Prop. 87, a severance tax measure. Besides the usual suspects, its backers include some leading venture capitalists from Silicon Valley, with interests in greentech. Two of the leading contributors are Vinod Khosla (Sun Microsystems) and John Doerr (Kleiner Perkins Caulfield and Byer).

Alaska, as is well known, distributes a generous social dividend annually from its oil revenues, and also keeps building a "Heritage Fund" for the future. Alberta does the same. Less known are the heritage funds of smaller producers Wyoming and New Mexico. All three of these U.S. states are red, bright red, on the current political map. And yet their representatives in Washington have urged Congress and the Administration to follow their lead in rebuilding Iraq (not long ago, when that was a dream rather than a nightmare), and to export the idea to various African and other nations where we might sway policies. Colin Powell, when Secretary of State, took them seriously. They seem unconcerned that such an idea might "blow back" on us and influence U.S. policy. It's an anomaly that a cynic—i.e. a reasonable observer of politics—can only explain by postulating that these red state reps knew their idea never had a chance, while they played to neocon fantasies. If someone has a more upbeat idea, I'm listening.

In California the last time anyone pushed hard for a severance tax was 1981, when Jerry Brown was still Governor. Certain California local governments had been taking healthy revenues from oil fields. California's State Board of Equalization had been doing an outstanding job of helping counties assess oil fields for property tax purposes (showing, among other things, that it can be done). Prop. 13 (1978) had cut off most of that property tax revenue, so it was a good time to get some back. The effort failed, but one major backer, Bill Lockyer, is now our A.G., a traditional rung up the ladder to the top.

Georgists are of mixed minds on severance taxation. Some oppose it as being a tax on production, and prefer a property tax based on assessed value. Others say that extracting a natural deposit is not the same as production, and assessing underground values is impracticable anyway. There are elements of truth in both views. The following is an attempt to sort them out and come to a firm recommendation. The gist of it was written for the California State Assembly Committee on Revenue and Taxation.

Introduction

PROP. 87 would impose tax at rate of 6% of gross wellhead value "for the privilege of severing oil." The tax would be in addition to the property tax, and to any yield tax imposed in lieu of an "ad valorem" (meaning property) tax.

Proceeds would go into a fund to promote greentech energy (the 1981 bill was earmarked for schools).

I. Assumptions

A. *A state severance tax on oil is constitutional.*

That is *stare decisis*. Various such state taxes have been challenged as bearing on interstate commerce. The U.S. Supreme Court resolved this in *Commonwealth Edison Company v. Montana*, 2 July 1981. Montana imposed a severance tax on coal, at a rate of 30%. Most of the sales were to out of state buyers like the plaintiff: Commonwealth Edison is a large utility in Chicago. However, Montana buyers are also subject to the tax so it was ruled not to violate the Commerce Clause of the U.S. Constitution.¹

In addition, much or most of the tax is not shifted forward at all, but is borne by owners of coal lands in Montana. It is almost certain that Commonwealth Edison is one of those owners: most consuming utilities do acquire their own energy reserves.² This may be the real reason behind their lawsuit.

Sometimes the argument is made of an implied contract, or moral obligation, not to raise taxes above existing levels, because purchasers are "innocent," and bought in the faith taxes would not rise. However, no California owner can reasonably claim to be "innocent" of the possibility such a tax might be imposed at any time. The severance tax is legal, and adjudicated, and has long been imposed in all other states. Major owners are sophisticated investors. All major companies have tax departments and legal staff. They are in the business of taking risks; one such risk is that of higher taxation.³

150 years ago, most of California was either public domain or in old Spanish or Mexican grants. Spanish and Mexican land grants routinely reserved mineral rights for the crown or its successor, on the "regalian principle."⁴ The U.S. Government accepted and validated all such grants, with their conditions, at the Treaty of Guadalupe-Hidalgo, 1848.

As for the U.S. public domain, Congress granted lands from it to individuals and corporations for the primary public purpose of developing agriculture, transportation, irrigation, and towns. Minerals were included mainly by oversight. Their early discovery was a windfall; their value at modern levels is the acme of a series of windfalls. If they were on the OCS (Outer Continental Shelf) the U.S. Government would still be the owner, auctioning off exploration rights for high prices. Riparian owners along the coastline were never given title to offshore minerals; by analogy, it seems only accidental that overlying landowners were given special rights to underground minerals. Accordingly, public sentiment in this country, and in most others, has long viewed mineral rights as being peculiarly affected by a public interest.

B. *A tax must have a public purpose.*

¹For a legal history of the issue, see Walter Hellerstein, 1983, "Legal Constraints on State Taxation of Natural Resources." In Charles McLure and Peter Mieszkowski (eds.), *Fiscal Federalism and the Taxation of Natural Resources*. Lexington, MA: Lexington Books.

²They do so in order to expand their rate bases, and to protect themselves against potential upstream monopolists in an imperfect market.

³to be consistent and symmetrical, as well, the argument implies that when taxes fall, owners should compensate the State. That would imply massive amounts due from all property owners following Prop. 13, a point on which the owners have not insisted at all.

⁴Warren Roberts, 1967. "Mine Taxation in Developing Countries." In M. Gaffney (ed.), *Extractive Resources and Taxation*. Madison: University of Wisconsin Press.

There are new, high, legitimate demands on the California State Treasury. It is ground between the lower millstone of Prop. 13, causing localities to require more State funds; and the Administration in Washington, cutting back on national revenue-sharing.

Before and independent of Prop. 13, there was and remains a need to supply a higher share of school funding from the State level, as mandated in the Serrano decision in California, and similar decisions in other states.

C. There is a large taxable surplus, or rent, in California oil and gas that is privately owned.

Rent has been characterized as "fat in the private sector." It is private income in excess of that required as an incentive to evoke production.

1. Most of the fields were brought in, and remained producers, at much lower prices than those now obtaining.
2. Many fields have recently been acquired by large, wealthy international major oil firms, at high prices. Mergers and acquisitions at high valuations are clear evidence of high rents. It is the surplus in lands that attracts wealthy outside buyers.
3. The rent of California oil and gas is currently untapped for public purposes. California is the only major mineral-rich state lacking any form of state severance tax.
4. Some California oil and gas is publicly owned, and is known to yield large surpluses to the public. The State owns its "tidelands," the strip of coastal land inside the three-mile limit. Outside that limit, the Federal government sells leases for high prices, even in deep water and with limited competition among a few major buyers. It seems to follow that upland oil, privately owned, yields surpluses too.
5. Oil and gas extractors as a group show much higher profits per employee than any other major industry. They receive something like 40% of all profits in the Fortune 500, with only 10%⁵ of the employees. High profits per employee are a sure indicator there is high rent.
6. There has been talk that Kern County oil is played out, and of low quality. Yet, Philip Anschutz, legendary wildcatter and leasehound, in 1999 completed the costly Pacific Pipeline connecting Kern County oilfields with refineries in El Segundo and Wilmington.

II. There is a case for higher taxation of energy deposits.

A. Effect of Prop. 13.

Before Prop. 13, California had used its property tax in lieu of a severance tax, to get public revenues from oil and gas. California alone among oil-producing states had no severance tax. On the other hand, it almost alone had an effective property tax on oil and gas *in situ*. Only a few counties benefited, but one of them was the largest, Los Angeles.

California's property tax was effective because the State Board of Equalization in Sacramento maintains an office of specialists to give professional aid to localities needing to assess reserves of oil *in situ*. The head of that office, Robert Paschall, testifying before the Alaska State

⁵These figures are only roughly correct; check specific source before publishing.

Legislature,⁶ stated from his California experience that it is as feasible to assess the value of oil reserves as any ordinary parcel of real estate. He stated that the uncertainty regarding the physical quantity of oil in the ground is considerably less than the kinds of uncertainty that bear on the price of any other real estate: concerns about the future price of the product, and costs of production. With oil and gas, besides, the time horizon is shorter; and there is only one highest and best use to consider.

Accordingly, California before 1978 got substantial revenues from its localities' property taxes levied on reserves of oil and gas. Mr. Paschall later consulted in the Appalachian States, and has told me that California is a hundred years ahead of those states in assessing hydrocarbons for property tax purposes. It assesses oil and gas accurately, while they fail to assess coal—a much easier job, technically—accurately. The difference is political, or worse. Mr. Paschall says his life was threatened.

In 1978, of course, Prop. 13 changed all that, lowering our property tax rate to 1/3 or so of its previous level, while also rolling back and freezing assessed valuations of property.⁷

B. Prop. 13 was directed to property taxes on homes.

Most of what Howard Jarvis and Paul Gann said and published, in advancing their Prop. 13 in 1978, was about abating property taxes on homes, both owner-occupied and rented. Neither they, nor other advocates, said anything about abating property taxes on deposits of oil and gas in the ground. It is fair to infer that there was no voter intent to untax oil and gas. Such tax relief was, from the voters' view, incidental and unintended: it slipped by in the heat of the moment and general ignorance of relative values involved. This is relevant because the courts, in interpreting voter intent, rely on language used by proponents during elections. There is no evidence that voters intended to relieve oil and gas. Their minds and visions were directed elsewhere, and they fell for it. It follows that the voters' intent would not be violated now were we to use severance taxes to tap the rent surplus from California's mineral wealth.

C. Ownership of oil and gas is highly concentrated, so any tax on this industry will have progressive consequences.

D. Ownership is largely absentee.

Beneficial ownership of the shares of the international major oil and gas corporations that own much of California oil and gas is routinely concealed, but much of it is known to be distributed nationwide, and worldwide. Thomas Mellon Evans, for example, is headquartered in New York; Jean Paul Getty was an expatriate resident in England; Philip Anschutz lives in and works from Denver, having no California residence or address; Texaco is in Houston; Chevron in Chicago; shareholders are everywhere. The rents are therefore spent, in large part, elsewhere. Tapping those rents for public purposes means spending the money in California instead, thus improving our balance of payments and our economic base.

E. Recent price hikes, and ongoing deregulation, are bringing huge increases in wealth to owners of California oil and gas.

⁶Paschall testified before the Alaska State Legislature at the time it was considering a tax on the value of locked-in oil reserves in the Sadlerochit Formation at Prudhoe Bay. I have a copy of his testimony on that occasion.

⁷The property tax levy is the product of the rate times the base. Prop. 13 lowered *both* the rate and the base. 1/3 the original rate times 1/2 the original base equals 1/6 the original tax revenue.

F. It is a first step to taxing offshore extraction.

California derives no revenue from Federal OCS lands, for they are outside the State's boundaries. It is possible that if the State puts in place a working, active tax-gathering mechanism for upland oil and gas, it can be adapted to the tricky job of taxing offshore extraction through a "first-use" tax.

G. The State gasoline tax fails to capture rent.

There is a State gasoline tax. Some of this is shifted backwards, to sellers. However, it fails to tap much of our mineral rents, for at least three reasons.

1. The real value of the State gas tax has fallen over many decades now, because of "reverse bracket creep." That is, it is a "specific" tax, so much per gallon, rather than ad valorem. So it fails to keep up with inflation. On an ad valorem basis it is now much lower than it was 90 years ago. In 1920, incredible as it seems, it was our largest source of State revenue.
2. The tax bears the same on gas from high cost wells as from low-cost wells. Thus, it cannot begin to tap the economic rent from the low-cost wells. It may be a tolerably good way to tap the taxable surplus from some of the highway users, to the extent it is shifted forward to them. It is no way at all to tap rent from low-cost producers, even to the extent it is shifted back to producers: it hits the high-cost fields as hard as the low-cost fields.
3. The State subsidizes gasoline consumption by building and policing and maintaining and replacing its huge highway network. The gasoline tax falls short even of paying for that.

III. Concern the severance tax would be regressive.

Some voice concern that a severance tax would simply be shifted forward to California consumers, and therefore be regressive, like a retail sales tax. The concern is unfounded in this case. The severance tax comes out of the surpluses now received by equity owners of the natural resource: it is largely a tax on rents from the natural resource in situ. Let us explain why.

There are four conditions that let producers shift a tax forward to consumers. These are:

A. Inelastic demand

B. Elastic supply

1. Lots of production from marginal fields
2. High elasticity of production

C. A high share of world production comes from the taxed jurisdiction

D. The tax is based on activity (unit-of-production tax base), and structured so as to hit marginal production.

The first three of these conditions are not met in this case, as we will now see; the fourth is only partially met. Let us look at them one at a time.

A. World demand is price-sensitive.

World demand for oil is sensitive to price; it once proved to be quite so. That is why there was an oil glut, and sinking prices following the initially successful Arab Oil Embargos, and in spite of OPEC's strong hold over world production.

To be sure, following these successes Americans foolishly let suburban sprawl run wild again, so now demand is elastic from a higher base. Clearly Americans collectively, represented by their governments and intellectual leaders, need to take permanent measures to curb sprawl and the excess demand for fuel that it generates. This calls for “shock therapy”, such as we have sought to impose on Poland and Russia. Natural scarcity has just administered the shock to us. We must respond by throwing out the pro-sprawlers and re-compacting our settlements. Pro-sprawlers, or “the road gang”, are a highly organized lobby led by oil firms, auto firms and dealers, cement and asphalt firms, civil engineering firms, certain law firms, various allied firms, and (tragically) certain universities and think tanks whose personnel dance to their tune.

B. Supply is fairly inelastic

1. California was a major producer long before the Oil Embargo, at a much lower price level than that prevailing today. Much of our production is not, therefore, from fields that are marginal at today's higher prices. California is not primarily an active margin of new exploration and production, like the Overthrust Belt that was brought in by high prices.⁸

California does extract a good deal of "heavy," low-quality oil. This fact is often cited in opposition to severance taxes. For two reasons, this is not a reason for opposing this tax.

- a. The extra refining cost needed for heavy oil takes place "after the Christmas-tree (wellhead)." The severance tax is imposed on the value of oil *at the wellhead*, thus exempting any value-added after the Christmas-tree.
- b. Heavy oil is dirty oil. Refining it pollutes air severely, so it should pay a special tax as a pollution charge. (Economists call this a “Pigovian” charge, after A.C. Pigou, a British economist and advocate.) In this case, it would actually make more sense to impose the severance tax on value-*after-refining*. PROP. 87 might be faulted for having too narrow, rather than too broad a base, in this special case. In general, though, it would work better to impose a Pigovian pollution charge on its own merits separately. It should be tuned to pollution damages, rather than value-added in refining.

With increased awareness that global warming is real, and a problem, the case for taxing combustion, and the fossil hydrocarbons that fuel it, is now so strong that many people would favor severance taxes for this reason alone.

Some oil is now being extracted using costly advanced recovery techniques, like steam injection. This is another matter, because these costs are undertaken before the Christmas tree, and add to wellhead value, the tax base. It is against our interest to discourage advanced recovery by taxing the values it conserves. Objective facts are needed concerning the relative importance of this special cost factor. Where oil revenues are 95% consumed by costs of extraction, there is little net rent remaining to tax at the wellhead.

⁸These high prices work in tandem with the peculiar dynamics of utility rate regulation, which lets high-cost overthrust belt supplies be melded with low-cost Permian Basin supplies, and sold below the cost of Overthrust Belt production.

Evidence cited above suggests that the marginal portion of California oil and gas production is not so great as to make most California production untaxable. It is only traditional, in any industry it is proposed to tax, for industry speakers to exhibit marginal firms and marginal lands as though they were typical. These are the "widows and orphans" of every tax debate, advanced to distract attention from the high taxable surpluses received by the more rentable (rent-yielding) fields.

2. The basic resource is supplied originally by nature, not man. Like other forms of land, it comes in a fixed quantity.

Most oil has a low "elasticity of production." That is, marginal variable costs of O&M per unit are low relative to the value of the unit. In economese, the marginal product of the current variable inputs is low relative to their average product. That implies you could cut back on O&M by, for example, 10%, and by so doing lower output only by, say, 2%. This is at the other extreme from a labor-intensive operation where lowering the labor input by 10% would lower output by 9% or even 10%. The difference is because oil to some extent produces itself, with minimal help from man: this is why oil in the ground sells for such fancy prices.

The points above may be expressed equally well in terms of costs per barrel of oil. Costs/barrel are simply the reciprocal of value-of-product/unit-of-input. The above reasoning says that the costs of squeezing out the marginal barrel, and converting it to high-quality oil, may be high, while the average cost per barrel (including the low-cost barrels) remains much lower.

C. California is not a big oil-supplier.

Only a little of world supply comes from California. In fact, only part of California supply comes from California: much comes from Alaska. The middle east and Latin America stand ready to move in were California prices to rise much. Hugo Chavez is more than eager to supply American demands, and only doctrinaire bigotry would bid us refuse him. Alberta's fabled tar sands, containing more reserves than Saudi Arabia, have at last come on line. Shale oil in the central Rockies, with even more reserves, may be next in line as prices rise. The giant machines needed are made in Milwaukee, abating any balance of payments problem. Thus, even if world demand were inelastic, demand for California oil would be highly elastic.

D. The impact on marginal production can be offset.

The proposed tax (severance) does hit marginal production. We will see (IV, *infra*) that this fault would be considerably offset by a drop in private royalties. These, like the severance tax itself, are a variable cost. They are based on units-of-production, and have the same disincentive effects as the severance tax. Private lessors, anticipating the severance tax, would offer about that much less to landowners in the form of royalties.

The remaining faults of a severance tax may be corrected by modifying it, as will be shown, to allow deduction of some costs.

IV. Concern about disincentive and anti-conservation effects.

The severance tax does have some disincentive and anti-conservation effects on producers. However, these are only moderate compared with excise taxes on other bases. This is owing to the nature of the resource, and the institutions of the industry.

A. The tax has little effect in the first "bonanza" years of an oil well.

It is the nature of oil and gas fields to yield very high returns, with little variable cost, in a few "bonanza" years, followed by a long "tail" of dwindling yields over many years or decades. Then finally they go on a "stripper well" basis at the end of a long cycle. During the bonanza years, a 6% tax on yields has little effect. During the stripper years, it is possible and, in some jurisdictions, routine to lower severance tax rates.

If the explorer for oil finds nothing, it is no matter. If he does find something, revenues are so much greater than variable costs that a severance tax has little impact. After production declines, variable rates may be renegotiated, and often are. It is generally feasible to distinguish the bonanza years from the stripper years, as a practical matter.

B. Existing oil and gas leases are already subject to much higher royalty rates.

Much oil and gas is produced by lessees who have negotiated payment packages with private, public, or aboriginal landowners. Part of the payment is always a "royalty" element. Like the severance tax, the royalty is a share of well-head value. The lowest royalty rates are 1/8, or 12.5%, more than double the severance tax rate proposed in Prop 87.

Such rates have been standard since the beginning. In the last 50 years they have risen well above the old standard of 1/8. In Saudi Arabia they have long since risen above 50%, with no noticeable disincentive effects—direct controls are the effective limit on extraction. Many other private and public lessors, following the Saudi lead, have broken out of the old mold (imposed and long enforced by a unified group of major lessees) and raised royalty rates to high levels. Alaska, for example, takes a royalty from Prudhoe Bay, plus a 12.25% severance tax, plus a transit tax on use of the Trans-Alaska Pipeline, plus a tax on profits of oil corporations.

In such perspective, the 6% severance tax proposed in PROP. 87 seems trivial as a variable cost. The existence and prevalence of high royalty rates within the industry itself, voluntarily negotiated by private parties, indicates that they do not regard variable charges on production as significantly aborting economic surpluses.

Where a severance tax does drag down the rate of extracting oil, the loss is not total. Deferring is not destroying or aborting. The power of falling water, if not used today, is lost forever. Oil is different: less now means more later. Mis-timing may indeed result in substantial net economic losses, considering the time value of money. I do not minimize such losses, which most people, and even petroleum engineers, undervalue. However, many conservation-minded people, including some inside the industry, make the case that such deferral is a net social gain. One of its benefits is alleged to be, and may actually be, that slower extraction rates increase the total quantum ultimately recovered. On such grounds, engineers have traditionally referred to a slow rate, that maximizes ultimate recovery while disregarding the time-value of money, as the "Maximum Efficient Rate", or MER.

On balance, tax-induced deferral is a net social cost. However, in the larger context, tax-induced drag offsets subsidy-induced acceleration of extraction rates, and is not obviously, on balance, a net social loss. For example the "depletion allowance" of the Federal income tax, which still applies to stripper wells, is a kind of "negative severance tax", i.e. a subsidy to rapid extraction. It is at tax rates much higher than the 6% severance rate we are considering here.

C. On new leases, taxes would be offset by lower royalties.

In negotiating *new* leases on private land, lessees would probably offer lower royalties than now, in light of anticipated severance taxes to fall on the lessee. Lessors would have to accept

them. Thus the variable charge imposed by the State would probably be offset by lowering the variable charge paid to lessors.

It is true that lessors would then have lesser incentive to produce, but their incentives are hardly relevant. In the standard lease, production rates are determined by lessees. Lessors' incomes are almost purely parasitic, and useless as incentives. The standard lease terms simply recognize that lessors serve no economic function. The State might tax *their* royalties 100%, with little disincentive effects.

There are other possibilities, which lawyers writing the fine print in leases will want to cover, but we will leave the elegant variations to them. In general, lessees subject to future taxes might lower either the royalty rate, as above; or the "bonus bid" paid up front. If they lower bonus bids it is another social gain, because it tends to ease entry into the industry, and increase competition. Thus, either way the market goes, imposing the new tax would lead to an offsetting gain.

D. Severance taxes could be structured to come entirely from royalty income.

It is an interesting question how a new severance tax would be split between lessees and lessors under existing lease contracts. It seems most likely that existing contracts, if not simply silent on the matter, provide that a royalty owner receiving X% of wellhead value would also bear X% of the tax; and also that contracts that are silent would be interpreted in that same manner.

With incentives in mind, it would be most desirable to structure the proposed severance tax so that it would all come out of royalty-owners' shares, and none out of lessees' shares. This would eliminate disincentive effects on extraction rates, since royalty recipients have no control over such rates.

With distributive consequences in mind, however, the matter is not so clear. It is possible that lessees as a group are fewer, and wealthier, than royalty-recipients as a group. Facts are needed on concentration of ownership. A full-scale study is called for. Ownership of resources, and of corporate shares, are both traditionally shrouded in secrecy. Indeed, proposing and carrying out such a study might be more of a public benefit than the proposed tax itself. Perhaps the most politic way to proceed is first to impose the tax at a high rate, on the assumption that ownership is highly concentrated; then let those taxed press, if they will, for a study of the concentration of ownership. Of course, that assumes an administration not dominated by the industry, something we have not seen for a while.

E. Intergovernmental relations.

1. The severance tax, like many other state taxes, would be deductible from the Federal income tax bases, both corporate and individual. Thus, from the State view, its disincentive effects are partly abated by an added contribution from Washington. In this respect it is superior to the most likely alternative state taxes, on retail sales. These are not deductible.
2. Federal income tax treatment of income from minerals, especially oil and gas, is generally very lenient on the taxpayer.⁹ In tax lingo, this tax source is "unpreempted." There is vast "tax space," a vacuum this or any State might reasonably occupy.

⁹Mason Gaffney, 1984. "Oil and Gas: the Unfinished Tax Reform." Unpublished ms.

This answers the concern that might be raised about any tax on minerals, however structured: will it erode motives to find new mineral sources through exploration? The U.S. Congress is so unreasonably generous in this regard, the rents are there for the State to take.

F. Refiners and distributors.

Most of the oil industry is vertically integrated, so shifting a tax from one stage to another is mostly arbitrary, determined by internal transfer pricing policies. To the extent that competition prevails, however, tax incidence depends on the relative supply elasticities. Whichever stage of production has the most inelastic supply conditions will bear most of any tax. In this case, for reasons given, elasticity of supply of oil and gas *in situ* is probably less than that of refining services. As to distribution involving pipelines, these operate everywhere under quasi-monopoly conditions, mostly in vertically integrated form. Questions of shifting are primarily institutional, depending on the facts and agreements of each case. There is no general simple theoretical answer to the outcome in such cases.

In one sense a drag on extraction rates may benefit refineries. They may save capital by building less capacity, and using it over a longer period.

G. Air pollution

A severance tax has been advanced as a surrogate for a Pigovian pollution charge. It is not a good surrogate, in general, because it only slows down the flow of California oil. Unlimited foreign oil lies in wait to replace it.

On the other hand, see comments on heavy oil, *supra*.

V. The severance tax may be improved by allowing certain cost offsets.

The idea of a severance tax is to tap the *rent* from oil and gas. Rent is the value given by nature, before man adds value. Ideally, a severance tax would be imposed not at the well-*head*, as now proposed, but at the well-*foot*, before the costs of lifting.

There are several standard approaches to allowing cost offsets, to move from simple wellhead value to something approximating what we may call a true or pure severance tax. I will mention three.

A. Sliding rate based on flow.

The idea here is that low-cost (high-rent) wells flow faster than high-cost (low-rent) wells, so the tax rate rises with the flow per well. This is clearly an approximation based on an incidental attribute of most low-cost wells, rather than low cost itself. Like any approximation, it will give results that only approximate a sought-for outcome. In some cases it will be far off target.

B. Use of rate classes, based on known standard recovery techniques.

Under this system, wells are divided discretely into those using primary, secondary, and tertiary techniques. Oil from steam injection, a costly advanced technique, would be taxed at the lowest rate; modern gushers, if any, at the highest. The workability of the system depends in part on there being no "gray areas" between the standard recovery techniques. Its even more general weakness is that it is based on distinguishing among techniques, rather than the natural resource to which applied.

C. Redefining the tax base to exclude costs of extraction.

This is getting to the "well-foot" basis of valuation cited above. The common American term for this tax base is "net proceeds." It is used in Nevada, Idaho, Utah, and South Dakota.¹⁰ It has eloquent expositors in Australian economists Ross Garnaut and Anthony Clunies-Ross,¹¹ who have helped implement the system in Papua-New Guinea.

The net proceeds tax has something in common with an income tax, but with important differences. The ordinary income tax is *in personam* (human or corporate), so funny things may happen en route to the tax base. For example, overhead from headquarters in Houston or New York may be over-allocated to a California field, wiping out much of its net income. The net proceeds tax avoids this. It is based on the facts of particular fields or deposits, regardless of the owners' other circumstances. Only expenditures *in situ* are deductible.

The theoretical purist may prefer some scheme for perfect allocation of overhead to specific fields, for otherwise such overhead is not recognized as a legitimate cost. There are practical reasons, however, for preferring the net proceeds-*in-situ* approach. These are:

1. Local tax authorities are not equipped to audit the books and evaluate the allocations made by multinational firms, nor would the firms want them to;
2. There are strong sociological, anti-trust, pro-competitive, and local reasons for embedding some bias against large, absentee owners;
3. It is widely believed that almost all large American firms would gain by cutting their administrative overhead. In addition, field operations are more purely productive. Some of the expenditures of central offices are for machinations that may benefit the firm at the expense of the public good.

Any of those modifications of the severance tax will lower the tax base. The lost revenue may be more than regained, however, by raising the tax *rate*. This, indeed, is a major purpose of removing non-land costs from the tax base: it allows the Treasury to tap more of the pure surplus from low-cost fields, without jeopardy of aborting production from high-cost fields, or marginal production from all fields.

A tricky question with taxing net proceeds is that of *when* to let capital costs be deducted. The subject deserves more time and space than available here; the writer has addressed it elsewhere.¹²

VI. Conclusion

Rent has been informally defined as "fat in the private sector." To tap rent for public purposes there are two requirements. First, the tax base must be a source of rent; second, the tax itself

¹⁰Robert Paschall, 1977. "A Comparison of Minerals Tax Systems." *The Assessors' Journal*, 12(4), December, pp. 221-37; also, his "The 'Net Proceeds to Mines' Approach to Taxation." A paper presented at National Convention, American Institute of Mining Engineers, February, 1976.

¹¹Ross Garnaut and Anthony Clunies-Ross, 1977. "A Tax on Mineral Rents." In Andrew Thompson and Michael Crommelin (eds.) *Mineral Leasing as an Instrument of Public Policy*. Vancouver: Univ. of British Columbia Press, 1977.

¹²M. Gaffney, 1977. *Oil and Gas Leasing Policy: Alternatives for Alaska in 1977*. A Report to The State of Alaska, Jay S. Hammond, Governor; Alaska Department of Natural Resources, Guy Martin, Commissioner; and Alaska State Legislature, Interim Committee on Oil and Gas Taxation and Leasing Policy. Juneau: The Committee, 1977. Pp. i-ix, 1-132, plus Technical Appendices A-K, 8 of them by myself. Others by Michael Crommelin, Richard Norgaard, and Robert Rooney.

must not abort or destroy rent. Oil and gas are indeed a source of rent. The severance tax would abort only a minor share of it, and this flaw may be remedied by modifying the tax to allow reasonable cost deductions. These would permit raising the rate to secure more of the rent from low-cost fields.