

What are Consumption Taxes and Who Bears Them?

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Introduction

Tax debates are usually plagued by ignorance, and the debate about consumption taxes is no exception. Participants often mean different things by the term "consumption tax". Even when they mean the same thing, they often fail to understand the different ways that same thing may be implemented. When the discussion turns to who will bear the tax, the critically important details of how consumption tax rules might be introduced are typically overlooked. Thus, confusion about exactly what is under consideration is added to the already very difficult problem of determining the incidence of even a well-defined tax structure.

To illustrate the complexity of the subject, consider the case of introducing the accelerated cost recovery system (ACRS) to the income tax system in 1981. By shortening the time period over which the cost of newly constructed equipment and structures could be deducted from a

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company's revenues in calculating income subject to tax, ACRS reduced the tax liabilities of businesses. Most people probably regarded this step as regressive, that is, as relatively favoring the well-to-do. People liked the new policy who (a) thought the tax system was too progressive to begin with or (b) thought the stimulus to economic prosperity would buy general benefits that offset the distributional change.

However, economic analysis suggests a surprising twist to the story (See, e.g., Auerbach, 1983; Auerbach and Hines, 1986; Auerbach and Kotlikoff, 1983, 1987). Increasing the depreciation allowances on newly constructed capital makes new assets cheaper than old. Since new and old assets must command the same prices, the introduction of ACRS presumably imposed a windfall loss on owners of existing assets, that is, on the wealthy, particularly compared with the alternative of lower rates of tax. Conversely, the changes implemented in 1986, eliminating the investment tax credit, lengthening depreciation lives and lowering tax rates, probably generated windfall gains for owners of existing assets, in contrast to the conventional view that these changes increased the burden on wealth owners. (Other changes on the corporate side worked in the other direction).

I shall return to these ideas below. Before that, though, we must deal with matters of definition and of specifying the assumptions underlying the incidence analysis.

What are consumption taxes?

Although the term **consumption tax** is widely used, there is very little uniformity of view about exactly what is meant by it. Most people seem to have in mind a tax like the sales taxes familiar in the states fiscal armories. Followers of tax policy would add to the list value-added taxes (VATs) of the sort widely employed in other countries, along with the

business transfer taxes (BTTs) that have been under discussion here and in Canada. The real aficionados recognize the possibility of a consumption tax that looks much like the existing income tax, variously referred to as a cash flow income tax or consumed income tax. (See, e.g., Aaron and Galper, 1984; Bradford, 1986; Bradford et al, 1984; Kaldor, 1955; U.S. General Accounting Office, 1986; U.S. Treasury Dept., 1984).

I associate two properties with taxes based on consumption: Property 1 may seem obvious, namely, that a consumption tax relates tax liabilities to a measure of a household's or individual's consumption. This contrasts with the theoretical idea of an income tax, which relates liabilities to a measure of the algebraic sum of a household's consumption and saving during a year (since saving may be negative, income may be either larger or smaller than consumption). A tax on consumption might be levied at a flat rate or at graduated rates. It might be based on an annual aggregate of a household's consumption, or it might be based on a discounted flow of such expenditures.

Property 2 of a consumption tax is derived from the idea that consumption tax burdens should not be influenced by the level of saving. In other words, the reward to saving obtained by the saver should be equal to the payoff society obtains by investing the saved amount. Thus, a second defining characteristic of a consumption tax is equality between the "before tax" and "after tax" rates of return on saving.

Both of these properties are often but not always present in taxes commonly thought of as consumption taxes. Thus, a flat-rate tax on some annual measure of consumption will also imply a zero tax on the normal return to saving. However, a graduated-rate tax on an annual measure of consumption will generally not do so (because amounts set aside in a time of low consumption, and hence low marginal

tax rate, may pay off in a future period of high consumption, and hence high marginal tax rate). Furthermore, some taxes (e.g., a tax on consumer purchases of gasoline) which do not affect the return to saving and are often thought of as consumption taxes do not attempt anything like a comprehensive measurement of consumption.

The X-Tax as typical consumption tax

Rather than picking any one of the existing possible consumption-type taxes to analyze here, I would like to emphasize the range of institutional arrangements that would constitute introduction of a broad-based consumption tax. To draw attention to the elements that link and distinguish the various possibilities, I shall describe here a hypothetical consumption-type tax, which I call the X-Tax. In addition to having properties that might make it interesting as an actual policy option, the X-Tax provides a convenient framework for discussion of who bears the burden of alternative forms of consumption tax.

The basic mechanics explained

The X-Tax can be viewed as a variant of a value-added tax (VAT) with adjustment for vertical distribution; it is also a close relative of the Simple Flat Tax that has been promoted by Robert Hall and Alvin Rabushka (1983, 1985). The basic X-Tax is a system with two components: a business tax (paid by all businesses, whether corporate, proprietorship or partnership) and a compensation tax (paid by all who receive compensation for services as employees or the equivalent). All businesses pay tax --to be specific, let us say at a rate of 7 percent-- on a base consisting of the receipt from sales of all types (including sales out of inventory or sales of other existing assets) less the outlays for purchases from other businesses and less payments to workers, whether for current, past, or future services. All workers pay tax on the amount received from businesses (or payments of the same character from

non-taxpaying entities such as governments). Payments from more than one employer are added together. The resulting total is taxed at graduated rates, with an exempt amount and marginal rates of, say, 3 percent, 5 percent and 7 percent on successively higher levels of compensation. No other receipts of the workers (e.g., interest, dividends, etc.) are included in the compensation tax base. The top rate of compensation tax is the same as the single flat rate of business tax.

The X-Tax could be administered in conjunction with the existing income tax. Virtually all of the needed information is either entered on in the existing tax forms or is necessarily required by the taxpayer to derive such figures. The X-Tax would thus not require an army of new administrators.

The left-hand panel of Table 1 describes the operation of the X-Tax in a simple two-firm, three-worker economy. The table indicates how, under the assumed schedule of rates, profits are taxed at a flat 7 percent and worker compensation is taxed at graduated rates ranging from 0 percent for the first \$10,000 to 7 percent on amounts exceeding \$50,000. In the illustrative case, firm A's bottom line profits after tax are \$27,900; firm B's, \$4,650. Worker 1 gets \$14,850 after taxes; worker 2, \$34,050; worker 3, \$71,550. A total of \$2,450 is collected in tax from businesses and \$4,550 from individuals, for an overall total of \$7,000.

Policy choices in consumption taxes

The X-Tax is a consumption tax. To see why this is so in both senses I have described above, it will help to back up and consider an X-Tax in which the compensation tax component is not on a graduated rate basis, but instead is assessed at the same 7 percent rate applicable to business "income". Such a tax would be exactly the same as one levied only on businesses, but with no deduction at the business level for payments to employees. Because all

transactions among businesses are netted out (what one business includes as a receipt the paying business deducts as a business expense), the result would be a flat tax on sales to non-businesses. (The result would also be a 7 percent VAT with business capital outlays expensed, which is why a such VAT is a tax on consumption).

We can see, therefore, that the X-Tax, including the graduated-rate treatment of compensation, amounts to an annual tax on the aggregate of a household's purchases from firms, combined with a graduated relief from that tax based on the year's earnings from employment. The X-Tax is thus a combination of a consumption tax in the first sense (a tax on a broad measure of consumption) with a subsidy to employment for relatively low earners. Furthermore, because businesses immediately deduct the cost of their purchases on capital account, the rate of return received by the investor is the same before and after tax. In effect, the government is a full partner in the investment, sharing, via the deduction, in 7 percent of all costs and, via the tax on receipts, in 7 percent of all returns. The X-Tax is thus also a consumption tax in the second senses mentioned above (a tax that adds nothing to the spread between before - and after-tax returns to savers).

Definition of consumption. It may be asked, however, whether the aggregate of sales to household is what we **really** mean by consumption. As I have emphasized elsewhere (Bradford, 1986), there is no scientific answer to this question. What we mean by consumption in this context (as in the income tax context: income is the sum of consumption and saving) is necessarily a policy choice, made to effect the discriminations among taxpayers that we deem desirable as a matter of equity in sharing the aggregate tax burden.

There are many policy issues hidden in the question of how consumption ought to be defined for tax purposes, and the simple system described above

adopts implicit positions on many debatable points (for example, the taxation of such institutions as universities). To pursue all of these points would take us too far afield, and many of the particulars are not critical to the subject of this article. However, three issues, the treatment of consumer durables, inheritances, and transfer payments merit mention here.

In including all sales of newly constructed consumer durables, a category within which I include owner-occupied housing, the aggregate of sales to households clearly diverges from consumption as we usually use the term. We would not normally include in a household's annual consumption the amount paid for a new house in a given year. Instead, we would impute to the owner-occupied house a flow of services over time. The X-Tax applies what has come to be called the "tax prepayment" approach to these outlays (Bradford et al, 1984). In effect, the tax paid on the acquisition of a newly constructed house or automobile constitutes payment in advance of the expected present value of taxes that would otherwise be collected over time on the flow of services if they were actually measured. This characteristic of the X-Tax provides an administratively simple solution to the problem of applying the same rate of tax to housing services as to other forms of consumption.

The X-Tax ignores inheritances and bequests. It may be described as taxing amounts inherited when they are consumed. This characteristic is a contentious property of many consumption taxes. One way to think about the matter is to ask whether amounts given away should be regarded as consumed by the donor. If so, bequests and other gifts would need to be added to the X-Tax base, presumably by levying a flat 7 percent tax on them. (For more extended discussion of this issue, see Bradford, 1986, esp. Ch. 8).

Not only does the X-Tax ignore private transfers (gifts and bequests), it ignores public transfers as well (e.g., unemployment compensation, welfare benefits). There is nothing that says such transfers could not be included in the compensation tax schedule. More probably, policymakers would be concerned not about the undertaxation of transfers, but about their overtaxation. Intuitively, imposition of a VAT might be thought of as imposing a burden on transfer recipients. However, since both sides of the transfer --giver and receiver-- are affected alike, they can presumably adjust. In the case of public transfers, this means holding benefits constant in real terms as the price level may vary under the influence of the tax. It is in this sense that the critical element of a correction for vertical distributional effects in the tax system is with respect to labor earnings. Private transfers will take care of themselves, and public transfers are subject to explicit public policy choice.

Consumption tax a tax on wages? Finally, a word is in order on the distinction between a consumption tax and a tax on labor earnings, sometimes called a wage tax. If we think of the way people acquire claims to goods as divided into payments for working (labor earnings) and payments for providing capital services (capital income), then the observation that the X-Tax, like most consumption taxes, has the effect of eliminating the difference between the yield on investment and the reward to the saver makes it natural to describe it as a tax on earnings. In the formal sense just described (putting aside public and private transfers as other sources of claims to goods) the characterization is surely correct. However, it may also be misleading in conjuring up a tax imposed only on the ordinary wage-earner. In fact, the X-Tax would apply to such unconventional sources as new technological inventions, discovery of new mineral deposits, increased rental value of urban land, and many other types of increase in market value we do not normally have in mind when we describe the world as divided into labor and capital income.

The economics literature makes a second distinction between a wage tax and a consumption tax which has nothing to do with the question just discussed (See, e.g., Auerbach and Kotlikoff, 1983, 1987; Davies and St-Hillaire, 1986). This difference turns out to hinge critically and non-obviously on the manner in which a consumption-type tax is **introduced**. Intuitively, a wage tax is levied on payments to labor, whereas a consumption tax is one levied on the purchases of consumption goods by the household, whether the source of funds is labor earnings or yield from capital. We know, though, that the two taxes, which sound very different, once in place have the same effect on the household's options over time. That is, the household's budget constraint over time makes the two types of tax into the same thing. Since ownership of capital is obtained by saving out of labor earnings, the household that must pay a flat 25 percent of its earnings in tax will face the same opportunities as does the household that pays no tax on its earnings, but a flat 25 percent tax on outlays for consumption (the outlays understood as including the tax itself).

In spite of this equivalence via the budget constraint, there is a useful distinction that we can associate with the labels "consumption" tax and "wage" or "earnings" tax as they are employed in the technical economics literature. That distinction is a matter of transition, that is, a matter of the way the new budget constraint is introduced. A wage tax can be said to result when the return flow from capital existing at the time of introduction is exempted from the new tax; a consumption tax can be said to result when the return flow from capital existing at the time of introduction is included in the new tax base. It is probably fair to say that most taxes of the consumption type that are discussed as serious policy options --for example, the usual VAT-- would also be called consumption taxes in the theoretical economics literature. It is evident that the transition rules by which a consumption-type tax is introduced are of critical

importance, because the incidence in the course of transition to the new policy can differ greatly between two taxes that amount to the same thing once in place.

An alternative way to offset regressivity

Equivalences and near-equivalences abound in the world of consumption taxes and distinctions without a difference in economic terms may be very important in political terms. An illustration is the following equivalent to the X-Tax, a system that apparently levies much higher taxes on business and includes much more liberal treatment of workers: Instead of allowing businesses to deduct their payments to workers under the X-Tax, oblige them to pay a flat tax of 7 percent on the entire amount of the difference between their receipts from sales and their purchases from other businesses. Instead of the tax on compensation, provide workers an earned income credit of 7.53 percent (for the lowest-earners), with the credit reduced to 4.30 percent on earnings in excess of the level at which the 3 percent compensation tax bracket was reached under the original plan, to 2.15 percent on earnings in the next bracket, and with no credit at the margin for earnings in the top bracket of the original compensation tax. (The odd percentages result from the necessity to base credits on what amounts to before-tax earnings).

Taking into account the reaction of the economic system, this tax-plus-credit system is exactly equivalent to the original X-Tax combination of business and compensation taxes. The second panel of Table 1 puts the earned-income credit system side by side with the basic X-Tax, illustrating the way in which the two systems produce the same outcome for both workers and owners of firms. From the table we can see that changes in the pre-tax levels of salaries permit all economic actors --workers and owners of the firms-- to achieve exactly the same after-tax results under the two apparently very different systems. Thus, the

after tax profits of firms A and B are \$27,900 and \$4,000, respectively, and the after-tax earnings of workers 1, 2, and 3 are \$14,850, \$34,050, and \$71,550, just as in the basic X-Tax case. The **burdens** under the two systems are the same (since workers and firms come out at the same place). However, the distribution of tax **payments** is different, with the firms paying \$11,200 in the aggregate (compared with \$2,450) and the workers receiving **credits** totaling \$4,200 (compared with taxes of \$4,550). The net collection of the government remains \$7,000.

Relationship of the X-Tax to the major consumption tax alternatives

Value-added tax

Subtraction vs. invoice method. In introducing the X-Tax I described it as a variant of a value-added tax. More precisely, it is a variant of what we would normally call a value-added tax of the consumption type (because capital outlays are immediately expensed) administered by the subtraction method, coupled with an employment subsidy to modify the distributional effects of the flat-rate tax. The more familiar European style VATs differ from the hypothetical X-Tax in many details, including importantly the method of administration. To emphasize the connection with the familiar income tax and the potential for simplified administration through being piggy-backed on the income tax, the firm's base under the X-Tax is calculated simply by adding together all sales and subtracting all purchases from other firms. (Payments to employees are treated differently under the two alternative X-Tax approaches). The European VATs employ the so-called invoice method, whereby the firm claims a rebate on purchases from other firms not on the basis of amounts paid to those firms but on the basis of VAT identified on the purchase invoices. (For a good discussion see Aaron, 1981, or McLure, 1986). If a single rate of tax is employed, the invoice and subtraction methods are evidently

equivalent, so the economic analyses of the flat-rate VAT and the X-Tax (putting to one side the graduated earnings offset) will also be identical.

The invoice method facilitates levying different tax rates on different commodities. In theory, one could also employ different rates of tax in the subtraction method as well (just as one could oblige firms to include different fractions of the receipts from sales of specific commodities and subtract different fractions of the purchases from other firms in calculating income subject to tax). Our interest, however, is in incidence and not administration. I shall comment in the discussion below on the effect on the incidence effects of differentially taxing various commodities. As far as terminology is concerned, once multiple rates and exclusions become part of the system, the tax ceases to be a consumption tax in the first sense I described, namely, one based on a concept of annual consumption, although it typically continues to be a consumption tax in the second sense, in preserving the equality between the yield on investment with the rate of return earned by savers.

Origin vs. destination basis. The description of the X-Tax implies that the firm will be taxed on the proceeds of all sales and may deduct all purchases from other firms. Since either the sale or purchase transactions might be with foreign residents or firms, the X-Tax would be regarded as on an origin basis. It would, however, be perfectly feasible to specify that sales to foreigners would be excluded from tax and purchases from foreigners disallowed as deductions. That would place the X-Tax on the destination basis common to most VATs. Despite the great political importance attached to the distinction, there is little reason to expect there to be much economic difference. (See, e.g., Bradford, 1986, pp. 328-29; Grossman, 1980). Consequently, the incidence analysis of the basic X-Tax will apply to a VAT on a destination basis.

Business-transfer tax

Various versions of business-transfer tax have been discussed recently in the United States and Canada. (See, e.g., Davies, 1985; Boadway and Mintz, 1987). The term generally refers to a VAT administered by the subtraction method, in other words, a very close relative of the X-Tax. Indeed, the X-Tax can be described as a BTT with employment subsidy. A BTT is normally conceived of on a destination basis.

Some versions of BTT differ from the X-Tax in drawing the line around the taxpaying firms more narrowly, stopping at the wholesale stage, for instance. The significance of such characteristics for incidence is probably minor.

Retail sales

A retail sales tax differs from the business tax component of the X-Tax in being administered only at the point of the sale to the public. The two taxes would be identical in economic effect if the definition of firms and final sales subject to tax were the same. In practice, it seems that retail sales taxes often exclude professional services and new housing construction. Also, just as typical VAT applies lower rates for commodities believed to be particularly important in the budgets of poor people, such commodities may be exempt from retail sales tax.

Others

A broad-based consumption tax can be thought of as composed of a series of separate taxes on the various individual commodities or services embodied in the relevant consumption concept. We have noted that a VAT or retail sales tax may provide for lower or zero rates on particular commodities or services. It is obviously a small step to any arbitrary collection of excise taxes on particular commodities.

A specific commodity tax that is frequently mentioned as a revenue source is one on energy, sometimes more narrowly targeted at imported petroleum. To the extent these taxes are organized so as to impinge only on final sales to consumers, they fall within the general class of consumption taxes, and the analysis is a simple subset of the cases just described. If producer uses of energy are included, these taxes pose more complicated issues of incidence (and efficiency) analysis, issues that go beyond the scope of this article.

Long Run Burdens

Preliminaries: Basic ideas of incidence

Nominal vs. effective incidence

Incidence analysis concerns the real burden of taxes. For this purpose, the person or institution that sends the check to the Treasury is of little or no relevance. Just as, in the familiar textbook analysis of a commodity tax, it does not matter whether the tax is levied on the buyer or seller side of the market, it is of no economic importance whether taxes are nominally paid by individuals or firms. The two versions of the X-Tax, economically identical in spite of dramatically different nominal incidence, provide a good illustration. However, there may be very different political feelings about economically identical taxes. Those who would choose a form of tax because it is "hidden" and apparently fools the public and those who look for taxes that are most obvious to the public, and therefore resisted, agree that form, as well as substance according to our usual models of incidence, matters. If they are right, our usual models of incidence may be wrong. Apparently equivalent taxes may have different real effects. I am skeptical on this point, but one should recognize the alternative possibilities. (For an exploration of the issue in the context of labor supply, see Rosen, 1976).

Differential incidence

In the example of the incidence of introducing ACRS, discussed at the beginning of this article, there was an implicit assumption that the reduced tax receipts due to shortening depreciation lives were made up in increased income tax rates. Actually, as we know, the receipts were made up through increased issue of debt. Because the government must operate on a budget constraint over time, it is not possible to change one tax without changing the deficit or spending or another tax. Just which other instrument is varied will have a bearing on the incidence of burdens.

Among the more likely uses of a consumption tax in the present situation is to reduce the outstanding government debt. Ideally, we would like to analyze the incidence of the policy option "consumption-tax cum reduced deficits" relative to the option "no reduced deficits". However, since I have very little to say about the incidence of deficit financing, I shall take as the base case here the assumption that the consumption tax revenue will be used to finance a wasteful increase in government expenditure. Obviously, I do not regard this as an interesting policy, but it can be taken as a convenient standard against which to compare alternatives.

Lifetime perspective

A more fundamental matter in incidence analysis is the choice of time perspective. Most readily available information about the distribution of tax burdens does something like attempt to allocate to existing individuals the equivalent of a current year's installment on their tax burdens. Treasury data showing tax burdens on households classified by current year's income are the standard fare of workaday incidence analysis.

Data of this kind are often less than satisfactory for two reasons. First, they frequently incorporate over-simple

conceptions of incidence. For example, tables purporting to show the beneficiaries of tax expenditures typically equate reduced payments to the Treasury with reduced tax burdens (thus committing the fallacy mentioned above). Second, even where greater attention is given to matters of economic modeling of incidence (as, for example, in Pechman 1983, 1985; Pechman and Okner, 1974), an annual "snapshot" may give a misleading impression of both the tax burdens and the economic positions of households. Tax burdens may be misrepresented because of the difficulty of taking into account currently such phenomena as the income taxes payable at the time of retirement on savings set aside in a tax-sheltered account. Economic position may be misrepresented because of the life cycle relationship among earnings, return to savings, transfer payments, and age. Thus, for example, those whose income is currently low include a preponderance of the young (just embarking on their careers of earnings) and the old (in their retirement years). But the same person is once young, once middle-aged, and once old, and presumably some measure that takes into account this fact is needed for incidence analysis. This issue is of particular importance in the context of analysis of consumption taxes, a point to which I shall shortly return.

Distinguishing transition and steady-state incidence

It is desirable not only to take a long view about the incidence of tax in place, but also to recognize the important incidence effects of the introduction of a tax, sometimes called "transition incidence". Actually, a full description of a tax policy includes not only the rates and base but also the time path and conditions with which the rate and base are introduced. Although we tend to take up transition incidence as a separate phenomenon because the analysis is otherwise simply too complex, it would be preferable to conceive of tax policy in terms of variation in the time paths

of instruments such as rates and deductions. A stronger tradition of thinking in dynamic terms would perhaps lead us to pay more attention than we customarily do, for example, to the difference in investment incentives generated by a permanent and an on-again-off-again investment credit. (See Auerbach and Hines, 1986; Bradford and Stuart, 1986).

In any case, the phenomenon of transition incidence is important, as may be illustrated by reference to the wage tax vs. consumption tax distinction discussed above. A wage tax and a consumption tax, as there distinguished, have the same steady-state properties. However, introduction of a consumption tax imposes a windfall loss on owners of capital (on average, the older generations) whereas introduction of a wage tax bestows a windfall gain on them. Intuitively, the consumption tax applies to the accumulated capital, and in a sense confiscates a fraction of it. The wage tax instead imposes the burden only on those in the earning phase of the life cycle. Exactly this phenomenon is referred to in the opening section of this article.

Vertical distributional effects

Probably most interest centers on the vertical distribution of consumption tax burdens. In this connection, the contrast between the "snapshot" and the long-run or lifetime perspective is of particular importance, as is the related question of how we classify people according to level of economic well being. If we neglect wealth redistributions that take place upon transition, a proportional tax on a broad-based measure of consumption will be regressive measured against a single year's income. That is, the ratio of consumption tax burden to income will be a declining function of the amount of income.

The picture changes if the standard of well-being is lifetime resources, understood to be the discounted value of a

person's labor earnings and transfers received. If individuals are uniform in the ratio of bequests they leave to lifetime resources, a proportional consumption tax will also be in the same proportion to lifetime resources for all households. Although we know remarkably little about the bequest behavior of U.S. families (See Bradford, 1986, pp. 169-173), it is likely that the well-to-do bequeath on average a larger fraction of lifetime resources than do poorly endowed families. In that sense, a flat consumption tax will also be regressive in some degree when measured against lifetime resources, although not when measured against the resources of the sequence of individuals in a bequest chain. Davies, St. Hillarie and Whalley, 1984, who explored these issues in the context of a simulation model based on Canadian data, found surprisingly little increase in the ratio of bequests to lifetime resources with increasing resources. Their study also supports the intuitive expectation that lifetime incidence calculations indicate more progressivity of the tax system as a whole than do annual snapshots, and the calculations are much less sensitive to variations in the assumptions made about the incidence of the major taxes.

The vertical distribution can also be affected by selectively reducing the rate of tax applicable to commodities making up a relatively large portion of the consumption of the poor. However, virtually no broad category of consumption is wholly absent from their expenditures, there are distinct limits to what can be done to modify the vertical distribution through these means. Davies, 1985, again referring to Canadian data, found that the usual sorts of special rates (on food, clothing, and shelter) do rather little to change the vertical distribution of burdens, with an exemption for clothing actually reducing progressivity because it forms a larger fraction of the budgets of the rich than of the poor. By contrast, the application of graduated rates to a consumption base or to an earnings base, as in the X-Tax, permits wide latitude to vary the vertical distribution of burdens.

Horizontal distributional effects

All taxes discriminate among individuals with different characteristics. For example, an earnings or income tax imposes a larger burden on individuals with high earning power or a taste for working long hours than would a uniform lump-sum tax. A consumption tax shares this property of an income tax.

Taste for saving

The most obvious way in which a consumption tax differs from an income tax is in the variation of burdens among people with different tastes or necessities to save. In the context of the assumption that people with the same lifetime resources as defined above have access to the same consumption possibilities ("perfect capital markets"), a consumption tax that satisfies the second property (no tax on savings) is neutral among equally endowed individuals. By contrast, an income tax places a relatively heavy burden on those who save, or rather on those whose lifetime resources are paid to them relatively early and on those whose tastes favor later consumption.

Taste for goods

In much the same way, consumption taxes that differ in their inclusion of different commodities create differences in burdens among individuals according to their taste for the goods that are relatively heavily taxed. A non-smoker, I find the burden of the tax on tobacco quite bearable, but I would welcome relief from the tax on wine.

Specialized production factors

The discussion thus far has stressed the commodity consumption side of the story. But people differ in their ownership of productive factors as well. Anyone owning resources with specialized application to particular commodities will naturally suffer relatively

heavily from taxes on those commodities. The taxation of energy, involving significant amounts of rent obtained from ownership of resources of little value in alternative uses, is a particular case in point.

The Burdens Imposed in Transition

Age/generation differences: The case of directly owned capital

Differences in ownership of specialized resources is of particular importance in connection with the short-run transition, when careers and other long-lived commitments are difficult to change. In the long run, resources of talent and labor supply are quite flexible in their uses, and capital can be directed to a variety of applications. However, the length of the adjustment period is doubtless very long in some cases. In the short run human, intellectual, and physical capital are fixed, and transition incidence is a significant phenomenon.

The most-studied such effect is the tendency, mentioned above, of the introduction of rules that favor new capital over old to induce a loss in value of existing assets. In the simplest case, with highly durable capital and no costs of adjusting the level of the capital stock, introduction of a consumption tax at some flat fractional rate effectively expropriates the same fraction of the existing capital stock. (This account for the finding in several studies that introduction of a flat rate consumption tax leads to higher long-run living standards than does introduction of a flat rate wage tax. The wealth expropriated by the consumption tax is used to finance lower tax rates and higher consumption for future generations. See Auerbach and Kotlikoff, 1983, and, especially, 1987). This effect is moderated if adjustment cost give existing capital owners an advantage in exploiting the newly profitable investment opportunities.

Because it imposes an implicit windfall tax on wealth, introducing a consumption tax also has intergenerational incidence effects. It is usual to model the economy as though the older generation owns the existing stock of capital, planning to sell it to the younger generations to finance retirement consumption. To the extent this model is accurate, the transition effect of introducing a consumption tax results in a redistribution from the old to the young and future generations.

Portfolio differences

However, the story is complicated by the availability of financial assets. It is quite possible for the young to own the real assets, having issued debt to the old. In this case, introducing a consumption tax will not affect the consumption of the old; the young will bear the cost.

One may think that owners of debt will bear the consumption tax by virtue of price inflation that its introduction will induce. However, this confuses two things: the effect of the tax and the determinants of the terms of borrowing and lending. If appropriate inflationary expectations are built into the terms of the loan, creditors will not lose from introduction of the tax. To put the matter more simply, if the lending is carried out in real purchasing power terms (indexed bonds would work if they existed, but there are alternative ways to hedge against inflation, lenders will be unaffected by the introduction of the tax.

Specialized production factors

Finally, we should note that the differential effect on owners of specialized resources applies in particular to the introduction of different rates of tax on different commodities. In an elegant extension of general equilibrium modeling techniques, Summers and Goulder (1986) have put plausible quantitative dimensions on the differential impact

on the value of firms in broad industry categories of introducing a variety of tax alternatives. Their figures show substantial differences in capital value changes across sectors, with considerable sensitivity to the degree to which the policy change is anticipated in capital markets.

Concluding Comments

In this essay I have emphasized three themes:

First, there are several quite different methods of implementing a consumption tax. Economically these approaches are very similar, if not identical, in their effects, but they appear very different to many of those involved in the policy debate. Once the connection among the different methods is understood (for example, the two forms of the illustrative X-Tax discussed in the article), it becomes clear how policy decisions in one (for example, the treatment of owner-occupied housing) translate into the same decisions in the others. Analysis suggests that some politically contentious choices such as that between an origin and a destination basis for a value-added tax may be of little economic significance. Similarly, some hopes raised by consumption taxes, such as the expectation of dealing with the underground economy, are not supported by economics.

Second, because they are so similar economically, in their flatrate form all of these taxes spread the burden of taxation similarly, namely, in proportion to a household's discounted lifetime consumption. The most commonly employed approach to introducing progressivity to these taxes, namely, exemption of purchases of particular commodities or services from tax, is very limited in its power to alter the vertical distribution of burdens. However, alternative methods are available to introduce any degree of progressivity desired by policymakers.

Third, although the various consumption taxes are similar in their long-run incidence, they may differ significantly in "transition incidence", the effective taxation of wealth implied by their introduction. Intuitively, we can think of a choice between taxing or not taxing consumption funded out of past saving. Some care is required, however, to determine the transition incidence of a particular tax, and such matters as the choice of financial portfolio by a household (between stocks and bonds, for example) may make a critical difference.

Policy positions on the various forms of consumption tax are often based on inadequate models of incidence, and public discussion suffers from confusion about the alternative approaches that might be taken to taxation based on consumption. We badly need a greater appreciation in the policy debate of, on the one hand, the basic similarity of the alternative approaches to taxation based on consumption, and, on the other hand, the important differences that may exist in transition. The essential similarity of the various alternatives should allow us to avoid the need for hordes of new administrators and inches of new tax code. Appreciation of the transition effects should permit us to achieve a fair balance between old and young, should we elect to use the consumption approach, either to balance the budget or to moderate the use of other tax instruments.

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Table 1
The X-Tax Illustrated in a Simple Economy

Basic X-Tax (Employee pay deducted)		Alternative X-Tax (Earned income credit)	
<u>Firm A</u>		<u>Firm A</u>	
Receipts from sales less	100000	Receipts from sales less	100000
Purchases from firm B	20000	Purchases from firm B	20000
Salary to worker 1	15000	Salary to worker 1	13950
Salary to worker 2	35000	Salary to worker 2	32550
Business tax base	30000	Business tax base	80000
Tax (a7%)	2100	Tax (a7%)	5600
<u>Profits after tax</u>	27900	<u>Profits after tax</u>	27900
<u>Firm B</u>		<u>Firm B</u>	
Receipts from sales less	80000	Receipts from sales less	80000
Salary to worker 3	75000	Salary to worker 3	69750
Business tax base	5000	Business tax base	80000
Tax (a7%)	350	Tax (a7%)	5600
<u>Profits after tax</u>	4650	<u>Profits after tax</u>	4650
Total business tax	2450	Total business tax	11200
<u>Worker 1</u>		<u>Worker 1</u>	
Salary	15000	Salary	13950
Tax:		Tax credit:	
7% of amount over 50000,	0	7.53% of amount below 9300,	700
5% of amount over 25000		4.30% of amount over 9300	
and less than 50000,	0	and less than 23250,	200
3% of amount over 10000		2.15% of amount over 23250	
and less than 25000	150	and less than 46500,	0
Total tax:	150	Total credit:	900
<u>Disposable income:</u>	14850	<u>Disposable income:</u>	14850
<u>Worker 2</u>		<u>Worker 2</u>	
Salary	35000	Salary	32550
Tax:		Tax credit:	
7% of amount over 50000,	0	7.53% of amount below 9300	700
5% of amount over 25000		4.30% of amount over 9300	
and less than 50000	500	and less than 23250,	600
3% of amount over 10000		2.15% of amount over 23250	
and less than 25000	450	and less than 46500	200
Total tax:	950	Total credit:	1500
<u>Disposable income:</u>	34050	<u>Disposable income:</u>	34050
<u>Worker 3</u>		<u>Worker 3</u>	
Salary	75000	Salary	69750
Tax:		Tax credit:	
7% of amount over 50000,	1750	7.53% of amount below 9300	700
5% of amount over 25000		4.30% of amount over 9300	
and less than 50000,	1250	and less than 23250,	600
3% of amount over 10000		2.15% of amount over 23250	
and less than 25000,	450	and less than 46500	500
Total tax:	3450	Total credit:	1800
<u>Disposable income:</u>	71550	<u>Disposable income:</u>	71550
Total compensation tax	4550	Total credit:	4200
<u>Total of compensation and business tax</u>	7000	<u>Total business tax less credit</u>	7000