

WHAT IS AN “OPTIMAL” TAX SYSTEM?

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Abstract - *A central issue in public economics is the appropriate design of a tax system. This paper argues that previous attempts to derive an “optimal tax system” are largely irrelevant to practical tax design, because they typically ignore a range of considerations reflecting fiscal and societal institutions that are essential elements in the normative and positive analysis of taxation. In particular, the standard optimal taxation methodology often ignores the equity and efficiency effects that arise because taxes must be collected, at some cost both to the tax agency and the taxpayer, and this collection must be enforced, again at some cost to the agency and the individual. However, the paper also argues that there are ways in which many of these relevant institutional features can be incorporated into a framework more general— but also more cumbersome, at least in its most general form —than that characteristic of the optimal taxation methodology. Such a framework will never be able to capture all of the incredible complexity that characterizes the real world and that must be considered in the actual design and reform of tax systems. However, the suggested framework can*

enhance our understanding of appropriate tax policy in several ways: it can illuminate and quantify with a common yardstick the various trade-offs that taxes necessarily create, it can highlight the areas that require additional research, and it can provide specific guidelines that tax policies should take in particular country circumstances, guidelines that seem often likely to be significantly different than those that emerge from the optimal taxation approach.

INTRODUCTION

A central issue in public economics is the appropriate design of a tax system. Such a system is usually viewed as balancing the various desirable attributes of taxation: taxes must be raised (*revenue-yield*) in a way that treats individuals fairly (*equity*), that minimizes interference in economic decisions (*efficiency*), and that does not impose undue costs on taxpayers or tax administrators (*simplicity*).

One way in which at least some of these attributes have been analyzed is in an area of research that is commonly known as “optimal taxation.” This is an explicitly normative approach to tax

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analysis that is based on standard tools of welfare economics, as applied in a world when the first-best allocation of resources and distribution of income cannot be achieved. There have been many insights from this literature (Auerbach, 1985; Stern, 1987). However, even its adherents would, I believe, admit that the practical applicability of its basic theorems has been remarkably limited to date. Indeed, there often seems a schism, if not an animosity, between those who work on the rarefied heights of optimal tax theory and those who toil in the trenches of practical tax design.

In this paper, I argue that optimal taxation as it has been practiced is in fact largely irrelevant to practical tax design, because it typically ignores a range of considerations reflecting fiscal and societal institutions that are essential elements in the normative and positive analysis of taxation. In particular, the standard optimal taxation methodology often ignores the equity and efficiency effects that arise because taxes must be collected, at some cost both to the tax agency and the taxpayer, and this collection must be enforced, again at some cost to the agency and the individual. Because most analyses in the optimal taxation tradition ignore these features, their basic policy prescriptions are unlikely to lead to an improvement in welfare, when compared to those policy rules derived from a less formal but more realistic perspective; in fact, they are even unlikely to be implemented or to be taken as serious guides to policy. Admittedly, this argument is not new (Slemrod, 1990; Bird, 1992). It is also somewhat overstated, especially given some recent work in the optimal taxation methodology that examines some of these issues. Nevertheless, I also argue that there are

ways in which many of these relevant institutional features can be incorporated into a framework more general—but also more cumbersome, at least in its most general form—than that characteristic of the optimal taxation methodology. Such a framework will never be able to capture all of the incredible complexity that characterizes the real world and that must be considered in the actual design and reform of tax systems. However, I believe that the suggested framework can enhance our understanding of appropriate tax policy by illuminating and quantifying with a common yardstick the various trade-offs that taxes necessarily create, by highlighting the areas that require additional research, and by providing specific guidelines that tax design and tax reform should take in particular country circumstances, all in a more comprehensive manner than previously undertaken. I also believe that the tax guidelines that emerge from this framework will often be significantly different than those that emerge from the optimal taxation approach. It is toward the establishment of this research framework that this paper is largely addressed.

In the next section, I discuss the standard optimal taxation methodology and present several of its more widely known results. The following sections outline some of the important considerations that have been largely ignored by this methodology and also discuss recent research on these considerations. I then present a suggestion for research that systematically incorporates the various institutional features. In the final section, I speculate on the ways in which the standard optimal tax results seem likely to be modified by these considerations.

THE OPTIMAL TAX APPROACH

The standard approach to optimal taxation is based on several methodological assumptions: the government is required to raise a specified amount of revenues; it is limited in the types of tax instruments that it has available to it, such as only commodity taxes, only income taxes, or both types; its decisions must be consistent with individual and firm optimization; and it makes its choices in order to maximize a "social welfare function," which indicates the value that society places on the welfare of different individuals.

The major results that have been derived from this framework can be classified according to the types of tax instruments that the government can select (see Auerbach [1985] and Stern [1987] for a detailed discussion of these results), as illustrated in the following subsections.

Optimal Commodity Taxes

On *efficiency* grounds, commodity tax rates should be chosen to achieve equal proportional reductions in the (compensated) demands for all commodities, so that goods with more elastic demands should be taxed at lower rates (the "Ramsey Rule"). However, on *equity* grounds, goods consumed more heavily by those with lower income (or, more generally, by those whose welfare is weighted more heavily by society) should be taxed at lower rates.

Optimal Income Taxes

On *equity* grounds, income taxes should be higher on those with greater income; indeed, under some special conditions, income taxes should be chosen to equalize after-tax incomes, thereby

implying marginal tax rates of 100 percent. However, on *efficiency* grounds, marginal tax rates should be lower the more responsive are individuals in their labor decisions, the smaller is the spread in the skills of the individuals, the less concerned with equality is society, and the lower is the amount of revenue that government must collect. In fact, the marginal tax rate on the single richest individual should be zero.

Optimal Tax Mix

On *efficiency* grounds, the optimal tax mix requires simply a lump-sum income tax, and commodity taxes are not used. On *equity* grounds, both income and commodity taxes should be used in general; however, under some restrictive conditions, the optimal form of commodity tax rates that are imposed in the presence of an optimal income tax requires that the commodity tax rates be uniform, so that taxation of commodities at different rates is not optimal and only the optimal income tax is used.

The framework discussed in the previous subsections is, of course, a highly stylized one that by necessity ignores a number of relevant considerations. Still, it is a useful framework, at least in part because it forces the analyst to make explicit the trade-off between equity (*via* the social welfare function) and efficiency (*via* an array of individual and firm behavioral effects) in the choice of taxes.

For example, consider optimal commodity taxes. Commodities with more inelastic demands should be taxed more heavily in order to reduce the excess burden of taxation; however, if these goods are consumed predominantly by those with lower incomes, then equity concerns argue for lower tax rates.

Similarly, optimal income taxes must balance the equity gains that higher marginal tax rates allow with the efficiency losses that higher tax rates generate. In general, the optimal tax rules involve balancing these equity and efficiency considerations.

However, there is little dispute that the standard optimal framework ignores, or at least does not adequately consider, a number of important considerations in the design of taxes. In particular, these optimal tax rules depend primarily upon the preferences of the individuals (as well as upon the tax instruments available to government). These rules neither consider the costs imposed upon the taxpayer and the government of collecting the taxes, nor do they consider the costs imposed on the respective agents of enforcing this collection. Now if it can be argued that these considerations are sometimes relevant but seldom central to the design of taxes, then the failure to model them systematically would be irritating but unimportant. However, as I argue in the next sections, the failure to address these different costs of taxes is far from inconsequential.

INDIVIDUAL AND FIRM COMPLIANCE COSTS

Implicit in much of the optimal taxation literature is the assumption that it is costless for individuals and firms to pay their taxes. There is little question that this assumption is simply wrong, for a number of reasons.

On a purely anecdotal basis, it has been evident for some time that there are substantial individual and firm "compliance costs" from taxation. Taxpayer complaints about keeping records throughout the year, deciphering

complicated tax forms, seeking professional advice, filling out returns, and the like are legion and legendary.

Furthermore, even casual economic analysis clearly indicates that we should always expect paying taxes to imply incurring costs. No one likes the loss of income from taxes, and people will clearly take actions to avoid (or reduce) their liability. It is a standard result in economics that agents will increase their actions up to the point where the marginal benefits of their actions—in this case, the reduced taxes—equals the marginal costs—or the compliance costs—of the actions. On the margin, then, the costs of paying taxes should be approximated by the tax savings from the array of legal tax avoidance schemes that taxpayers have pursued, the accuracy of the approximation depending largely upon the way in which the marginal costs of compliance increase with the extent of their magnitude.

Finally, and most importantly, there are now a number of estimates, derived from a variety of methodologies, of the actual magnitudes of the individual and firm compliance costs in the United States. For individuals, Slemrod and Sorum (1984) and Blumenthal and Slemrod (1992) use surveys of taxpayers to estimate that the compliance cost of the individual income tax may approach about seven percent of its revenues. Using a different approach based upon econometric analysis of individual tax returns, Pitt and Slemrod (1989) calculate that the compliance cost of itemizing deductions in 1982 totaled nearly 0.5 percent of revenues. On the corporate side, Blumenthal and Slemrod (1995) conclude from a survey of "large" corporations that corporate compliance costs are over three percent of total federal and state corporate

income tax collections. Evidence for the United Kingdom (Sandford, 1995), Australia (Pope, Fayle, and Duncanson, 1990), and Canada (Vaillancourt, 1989) suggests that compliance costs can range from 2 to 24 percent of revenues for selected taxes.

In total, these studies clearly indicate that the compliance costs of taxation are significant, often of comparable or even larger values than the more traditional calculations of the excess burden of taxation. In part because of these results, economists have begun to add compliance costs to their standard theoretical analyses of individual taxpayer behavior (Alm, 1988; Slemrod, 1995). There is also some theoretical work that has begun to incorporate some aspects of individual compliance costs in an optimal tax framework (Slemrod, 1994; Slemrod and Yitzhaki, 1994). However, despite the insights from this work, it is still subject to some limitations: it typically examines only a limited number of tax instruments, such as those that apply to individuals only; it is based upon very stylized assumptions about individual behavior; and it seldom deals precisely with the exact nature of the compliance costs to individuals. Clearly, there is more that needs to be done to model, as well as to measure, the compliance cost of taxes.

THE ADMINISTRATIVE COSTS OF TAXATION

Although there is considerably less systematic work on the costs to the government of collecting taxes (or the "administrative costs" of taxation), the available evidence from government budgetary information clearly indicates that the budget cost of collecting individual income, business income, and sales taxes is generally in excess of one percent of the revenues from these

taxes and can sometimes be substantially higher (Vaillancourt, 1989; Sandford, 1995). Unfortunately, there is little information on how these costs vary with various policy tools; that is, it seems likely that the administrative costs change in large and discrete amounts with the scale of collections (or they may exhibit "discontinuities") and that they may also display economies of scale in their collections (or they may exhibit "nonconvexities"), but these aspects of the collection cost technology are not known.

The administrative dimension of taxation has long been recognized by tax administrators, especially those working on tax policy in developing countries (Bagchi, Bird, and Das-Gupta, 1995). However, it has not been until recently that administrative costs have been formally incorporated in the analysis of optimal taxation. Mayshar (1991) assumes that there are costs to the taxpayer and to the government from collecting a generic form of taxes and determines the conditions that characterize the optimal use of the tax. Other work has examined the optimal choice of tax instruments in the presence of positive administrative costs. For example, Wilson (1989) examines the optimal number of commodities to be taxed, where there is some cost to government from the expansion of the optimal commodity tax base; he concludes that the optimal size of the tax base balances the extra administrative costs from taxing more commodities with the efficiency (and revenue-yield) gains from the base expansion. Different aspects of the optimal administration of the individual income tax have also been considered. Stern (1982) assumes that the characteristics of the taxpayers cannot be observed with certainty, and Slemrod and Yitzhaki (1994) analyze the trade-off between

more accurate measurement of income via itemized deductions and less costly measurement via the standard deduction.

These analyses have generated numerous insights. However, to repeat some points made about the analyses of compliance costs, they are also largely based on fairly arbitrary assumptions about such things as the available tax instruments (e.g., only commodity or income taxes can be used), the behavioral responses of taxpayers (e.g., taxpayers have only some particular and restrictive forms of preferences), the administrative costs to government (e.g., the administrative costs increase smoothly and continuously from policy changes), and the like. Clearly, there is more that needs to be done to model and, again, to measure the administrative cost dimension.

TAX EVASION AND ENFORCEMENT

The standard optimal tax approach assumes that individuals and firms voluntarily pay all of their tax liabilities. This assumption is wildly inaccurate. Individuals pursue many illegal avenues to reduce their payments, such as underreporting incomes, overstating deductions and exemptions, or failing to file returns. Despite obvious measurement difficulties, there is widespread evidence that tax evasion is extensive and commonplace in nearly all countries. For the United States, the most reliable estimates project the amount of unpaid federal income taxes at \$127 billion for 1992, with an annual growth rate of roughly ten percent since 1973 (U.S. Government Accounting Office, 1995). Other taxes at other levels of government are also subject to nonpayment. Evidence from other countries suggests that the American experience is not an isolated one.

Tax evasion is important for many reasons. In the context of the discussion here, it affects the efficiency of the tax system by creating misallocations in resource use as agents alter their behavior—and incur costs (or “noncompliance costs”)—to cheat on their taxes. Evasion also has equity effects because it alters the distribution of income in unpredictable ways. Because it causes the government to expend resources (or “enforcement costs”) to reduce its magnitude and it also reduces the taxes that individuals pay, tax evasion affects the tax rates that compliant taxpayers face and the public services that all citizens receive. More broadly, it is not possible to understand the true impact of taxation without recognizing the existence of evasion. It is clearly not possible to design an optimal tax system without appropriate consideration of tax evasion and its effects on individuals and on government.

In comparison to the other areas of research discussed above, there is an extensive literature devoted to the theoretical and empirical analysis of tax evasion (Cowell, 1990). The theoretical analysis of tax evasion most often builds on the economics-of-crime model first applied to tax evasion by Allingham and Sandmo (1972). The focus of nearly all of this work is on the behavior of a representative individual who faces an individual income tax. The individual is viewed as maximizing the expected utility of the evasion gamble, weighing the benefits of successful cheating against the risky prospect of detection and punishment, and the individual pays taxes because he or she is afraid of getting caught and penalized. This approach gives the plausible and productive insight that compliance depends upon audit and fine rates. Indeed, the central conclusion of this

approach is that an individual pays taxes only because of this fear of detection and punishment, and an increase in the fine or the audit rate can be shown to increase compliance. Surprisingly, an increase in the tax rate generally has an ambiguous effect on reported income in the standard model; under plausible assumptions, compliance actually rises with higher tax rates, in contrast to the common perception that higher tax rates have contributed to evasion.

However, it is clear to a number of observers that at least some forms of compliance cannot be explained entirely by the level of enforcement (Graetz and Wilde, 1985). The levels of audit and penalty rates are set so low that most individuals would either underreport income not subject to source withholding or overclaim deductions not subject to independent verification if they were purely "rational," because it is unlikely that such cheating would be caught and penalized.

In part because of this quandary, there have been numerous extensions of the basic theoretical model, to consider other factors not included in the basic theoretical model or to consider other factors not captured appropriately by the theory. These extensions include such things as government services, overweighting of low probabilities, social norms, and labor supply choices. Of particular relevance here, the theory has also expanded to include the following.

- (1) Uncertainty and complexity: Individuals may not know with certainty their tax liability or the tax agency's enforcement strategy (Cronshaw and Alm, 1995).

- (2) Endogenous audit selection rules: The agency may use information from the tax returns to determine strategically whom to audit, so that the probability of audit is endogenous, dependent in part on the behavior of the taxpayer and the tax agency (Reinganum and Wilde, 1985).
- (3) Use of paid preparers: Paid preparers may both reduce taxpayer confusion and encourage noncompliant behavior on ambiguous items (Erard, 1993).
- (4) Tax avoidance: An individual simultaneously chooses the amounts of tax evasion and tax avoidance (Alm, 1988).
- (5) Structure of taxation: Some kinds of taxes are easier to evade than others (Kesselman, 1989).

To date, however, no single theory has been able to incorporate more than a few of these factors in a meaningful way, and it seems unlikely that such a general model will be forthcoming.

Empirical analysis of individual behavioral responses has also grown dramatically in the last 20 years. The main difficulty in this work is finding information on the compliance behavior of individuals. Because of this problem, the empirical work draws creatively on a variety of data sources. The most extensively used source for the United States relies on information generated by the Internal Revenue Service. Other sources include taxpayer returns, survey data, national income accounts, and laboratory experiments. In its entirety, this work suggests the following conclusions relevant to the discussion here.

- (1) An increase in tax complexity leads to greater use of a tax practitioner, and the average level of noncompliance is higher for returns prepared with paid assistance (Erard, 1993).
- (2) A higher audit rate leads to more compliance, at least to a point, with an estimated reported income–audit rate elasticity ranging from 0.1 to 0.2 (Dubin and Wilde, 1988).
- (3) A higher fine rate leads to marginally more compliance, with an estimated reported income–fine rate elasticity less than 0.1 (Alm, Bahl, and Murray, 1993).
- (4) A higher tax rate leads to less compliance, with an estimated reported income–tax rate elasticity ranging from -0.5 to -3.0 . (Clotfelter, 1983).
- (5) Audit rates are endogenous, in that they depend in part on the choices of taxpayers (Feinstein, 1991).

There is now also some empirical work on corporate income tax compliance (Rice, 1992) and on firm sales tax compliance (Murray, 1995).

Given the underlying data problems, this empirical work needs to be treated cautiously. Still, these results indicate that individuals incur costs and change their behavior in response to enforcement activities and that the enforcement agency can increase compliance by taking advantage of these responses in its choice of an enforcement strategy. They also clearly indicate that there are limits to strategies based only on greater enforcement.

There has also been much work on optimal government policy in the face of tax evasion, including theoretical analysis of optimal tax *cum* enforcement

policies (Sandmo, 1981; Kaplow, 1990; Cremer and Gahvari, 1993; Boadway, Marchand, and Pestieau, 1994). The standard policy prescription has long been an increase in penalty and audit rates; indeed, at least the theoretical work suggests that sufficient—and draconian—increases in penalty and audit rates could substantially eliminate evasion.

However, it is unlikely that such extreme measures will actually be implemented, at least in part because there is a widespread belief that “the punishment should fit the crime.” Moreover, it should be remembered that, although higher penalty and audit rates generate benefits, they also entail costs, both to the government that must use real resources in its efforts and to the individuals who suffer a loss in utility from greater enforcement. These considerations clearly suggest that government should not expand its enforcement actions to the point where an additional dollar of enforcement costs yields an additional dollar of revenues: the former involves a real resource cost to the economy, while the latter is simply a transfer from the private to the public sector (Slemrod and Yitzhaki, 1987; Alm, 1988). Instead, most analyses of the optimal amount of government enforcement conclude that optimal enforcement must equate the marginal costs of enforcement with the marginal benefits, where these benefits should include the added revenues but should also reflect the impact of greater induced honesty and the loss in individual expected utility. Consequently, it seems clear that optimal enforcement should not eliminate all tax evasion (Polinsky and Shavell, 1984). As noted above, there is also clear theoretical evidence that the optimal enforcement policy should utilize information from the tax returns in the selection of

returns for audit (Reinganum and Wilde, 1985). Such “endogenous” audit selection rules are able to generate higher levels of compliance than equal cost rules in which returns are selected randomly (Alm, Cronshaw, and McKee, 1993).

A FRAMEWORK FOR ANALYSIS

It is obviously difficult to know how all these considerations will affect the standard optimal taxation rules. Indeed, it is difficult even to know where to start to analyze in a systematic way the effects of these factors on the appropriate design of tax systems.

Still, I believe that a careful examination of these factors suggests that they all involve trade-offs among essentially three main criteria:

- (1) How does the choice of taxes affect the yield of the tax collections, where the yield is defined broadly in terms of the gross collections in excess of administrative and enforcement costs (*revenue-yield*)?
- (2) How does the choice affect the distribution of the burden of taxation on individuals, where the burden is defined broadly in terms of the tax burden, the compliance cost burden, and the noncompliance cost burden on taxpayers (*equity*)?
- (3) How does the choice affect the decisions of individuals and firms, where the decisions are defined broadly in terms of the responses of the agents to the entire tax, compliance, and enforcement parameters (*efficiency*)?

Note in particular that I do not define a separate criterion for *simplicity*. Instead, simplicity is implicitly assumed to be

considered in its effects on the other three dimensions of a desirable tax system.

The omission of simplicity as an explicit measure and its incorporation in other goals is important and needs some justification; this justification also serves to illustrate the ways in which compliance, administrative, noncompliance, and enforcement costs can be incorporated in the analysis. The reasons for this omission are best illustrated by means of some examples. Consider, say, the introduction of some specific tax provision that affects individuals via the individual income tax (e.g., the deduction of business-related expenses). This change is often discussed as involving a balancing of simplicity, efficiency, equity, and revenue-yield effects. The change allows the tax to be imposed on a more accurate measure of an individual's ability to pay, and it encourages, or at least does not discourage, the individual from engaging in those business-related activities that generate income. However, there are clearly added costs imposed on individuals from this feature. There are compliance costs to the individual because records of these expenses need to be maintained, and these costs reduce the individual's income. There are also added administrative costs that lower net revenues, since these deductions complicate the administration of the tax. Further, individuals may fraudulently claim these expenses, which implies that the government must expend resources enforcing the provision, at some cost both to the government and to the taxpayer. Finally, the deduction itself will generate some revenue loss to the government.

However, these various aspects will be incorporated in the standard measures of equity, efficiency, and revenue-yield.

The direct effect of the deduction on revenues enters in an obvious way, as do the impacts of the extra administrative costs and enforcement costs on government revenues net of these costs. The effects on efficiency are reflected in any lost output that arises from behavioral responses to the tax provision itself, from the individuals' efforts to establish the legitimacy of the deductions, from the noncompliance actions of the individuals, and from the enforcement activities of government, all of which are represented by the standard measure of the excess burden of taxation. The effects of the tax provision on equity are captured by the differential impact of the provision on the income of different individuals and by the weights of those individuals in the social welfare function; that is, the provision both increases an individual's income (because it generates tax savings) and decreases income (because it produces compliance and noncompliance costs), and these equity effects are measured in the social welfare function by the combination of the change in individual income and the social weights on the welfare of those individuals who experience these changes. (Note that these comments pertain to the vertical equity of taxes. The effects on horizontal equity are more difficult to determine; indeed, as argued by Kaplow (1989), even the existence of a separate notion of horizontal equity is controversial.) A separate criterion for simplicity is therefore not needed.

Or consider a change in enforcement policy (e.g., an increase in audit coverage). There is a range of effects that determines the desirability of this policy change. The government will incur some added administrative and enforcement costs but will also generate some extra revenues. The level of output will be affected as individuals change their

behavior in the face of the stricter enforcement. Because different individuals will be affected in different ways, the distribution of income will also be altered, thereby creating equity effects. All of these effects will be captured by the usual standards of revenue-yield, efficiency, and equity.

Consequently, analysis of taxation requires balancing the trade-offs between equity, efficiency, and revenue-yield, where each is broadly defined and commonly measured. Still, analysis of even these three factors is obviously a daunting task. It seems to me that the best option involves a threefold strategy.

First, empirical work must continue to be performed to estimate both the magnitude of the compliance costs of different taxes and the determinants of those compliance costs (or the individual and firm "compliance cost function"). At least for the United States, most previous work has focused on the cost to individuals of the individual income tax and, to a lesser extent, on the cost to large corporations of the corporate income tax. However, there are clearly compliance costs from many other major taxes, costs that are borne largely by firms. Firms of all sizes incur costs in the collection of sales and excise taxes, payroll taxes, severance taxes, user fees, and so on; the costs incurred by "small" and "medium" size firms are largely unknown. Further, the ways in which these compliance costs are affected by different tax design features is essential in the determination of government policies but again is not known. How do compliance costs increase with special provisions of the taxes? Are compliance costs affected by progressive tax rates? What is the magnitude of the costs in the "start-up" phase of new taxes or of new tax provisions? How significant are scale economies in tax

compliance? How do individuals and firms respond in their decisions to changes in government tax policies, such as an increase in the standard deduction or a strengthening of reporting requirements? These and other questions are unanswered.

Similarly, although there is budgetary information on the administrative costs of various taxes, there has been little systematic analysis of the determinants of these administrative costs and the effects of these determinants on the quantity and the quality of tax administration (the “administrative cost function”). In particular, it seems likely that there are significant fixed costs when a new tax is imposed or when the features of an existing tax are changed. For similar reasons, it seems likely that the expansion of, say, an existing sales tax to include new commodities involves a stepwise, or discontinuous, increase in costs. Also, there may well be some economies of scale, or nonconvexities, in tax administration. However, these issues have received little attention, at least by economists. Similar questions surround noncompliance (the “noncompliance cost function” for taxpayers) and enforcement (the “enforcement cost function” for tax agencies). There is clearly much scope for empirical analysis, and such analysis is a necessary input in the design of taxes.

It is, however, important to emphasize that a focus on the measurement of compliance, administrative, noncompliance, and enforcement costs does not mean that empirical work on the more common behavioral responses to taxes should be ignored. There is an enormous—and surprising—amount that we simply do not know about how individuals and firms react to taxes. Empirical work on these aspects is the central

component of the optimal design of taxes, and the analysis of these responses must continue.

Second, the equity, efficiency, and revenue-yield effects generated by these behavioral responses must be incorporated into an analysis in which they can be measured on a common scale. As argued above, these effects are captured by standard measures, known and used by economists. Note again that the consideration of (vertical) equity effects requires that explicit judgments about the relative social worth of different individuals must be made by the analyst. Such judgments are always made, perhaps especially when they are not made explicitly.

Third, I think it unavoidable that rigorous analysis of the range of considerations relevant to tax design requires numerical analysis, perhaps in a computable general equilibrium framework, in which the different considerations are sequentially layered, one atop another, until the full model captures the relevant factors. The numerical analysis would necessarily incorporate the empirical analyses of compliance cost, administrative cost, noncompliance cost, and enforcement cost functions.

The reason for reliance upon numerical analysis is easily stated. Even simple theoretical models of optimal taxation quickly become unwieldy and incapable of interpretation or generalization. At best, these models only characterize the optimal tax rules by defining the numerous conditions that must be satisfied if taxes are to be optimal; that is, these models specify a system of equations that must hold simultaneously in order for the tax rates to be optimal. However, these models do not actually determine the precise pattern of the

taxes. Unless the exact forms of the various equations are specified, it is clearly impossible to solve analytically the system of equations for the actual tax rates; even with these specifications, there is obviously no guarantee that the equations can be solved for unique tax rates. Further, these models almost always assume that the various functions change smoothly and continuously, an assumption that allows the use of differential calculus. However, as discussed above, it seems likely that the various cost functions, especially the administrative and enforcement cost functions, are characterized both by large discrete changes and by economies of scale. The search for purely analytical solutions seems a dead end.

There are now many examples of numerical analyses in the optimal tax tradition. There is also a growing literature on general equilibrium modeling (Shoven and Whalley, 1992). The combination of these literatures seems a fruitful path of research. Like the standard optimal taxation approach, such a framework requires an explicit modeling of the behavioral effects of taxation, as well as an explicit recognition of the welfare weights placed on different classes of individuals. Importantly, it also requires explicit incorporation of the different cost functions. The numerical specification necessarily pertains to the characteristics and institutions of a particular country.

For example, consider the process by which optimal commodity taxes could be determined in such a framework. The analysis would begin with the simplest case, which forms the basis of the standard optimal commodity tax problem: How should tax rates on commodities be chosen to raise a specified amount of revenues when the government is concerned only with the

efficiency effects of taxes and when there are no compliance costs, administrative costs, noncompliance costs, or enforcement costs? This analysis would consider a numerical representation of a specific economy in which consumer and firm decisions are modeled with functional forms whose parameter values replicate the real world outcomes of that economy. The outcome of this simulation would be the standard optimal commodity tax result that tax rates should be higher on commodities with less elastic demands.

This analysis would then be modified to incorporate efficiency and equity concerns: If individuals differ and if government is concerned with raising revenues to meet efficiency and equity goals, how should commodity tax rates be chosen? Note that this analysis requires explicit assumptions about the social worth of different individuals.

A third layer of analysis would then add the compliance costs on firms (and, perhaps, on individuals) of commodity taxes. This analysis would be based on estimates of the compliance cost function generated from empirical studies of firm behavior, and its results would indicate the effects of compliance costs on the simple optimal tax rules. A possible complication in this stage is the potential for discontinuities and nonconvexities in the compliance cost function. These are difficult to analyze in theoretical models, but there are now methods for incorporating such factors in numerical models.

A fourth layer would incorporate administrative costs, using administrative cost function estimates that allow for discontinuities and nonconvexities. A fifth layer would consider noncompliance. Some commodity taxes are easier to collect, and some are easier to evade,

than others (e.g., commodities versus services). How does the presence of noncompliance with commodity taxes affect the optimal commodity tax structure? The enforcement of commodity taxes would then be added in a final layer, based on the individual noncompliance and the agency enforcement cost functions. Obviously, other sequences could be usefully considered.

Similar steps can be followed for optimal income taxes. The first stage would examine the optimal form of a (linear) income tax, when the government is concerned with equity only and when there are no compliance costs, administrative issues, noncompliance problems, or enforcement difficulties; transfer (or welfare) programs would also be separately incorporated. Then the following sequence of layering would be analyzed: equity only; equity and efficiency; equity, efficiency, and compliance costs; equity, efficiency, compliance costs, and administrative costs; equity, efficiency, compliance costs, administrative costs, and noncompliance costs; and equity, efficiency, compliance costs, administrative costs, noncompliance costs, and enforcement costs. The result of this (or some other sequence) would be a much more detailed and realistic set of policy prescriptions for the appropriate design of tax policies in a specific setting.

Conclusions: Optimal Taxation In The Real World

What would be the form of the tax rules that would emerge from such a framework? It is risky to make general statements. Indeed, I think it certain that the tax rules would vary, perhaps significantly, across the different economies subject to this analysis. Tax design must always consider the particular circumstances at hand, and at

present, we do not know many of the characteristics of the relevant functions. Still, my own guess is that a full analysis of these factors will lead to modification of the standard optimal tax rules, as discussed in the following subsections.

Optimal Commodity Taxes

Commodity tax rates should be largely proportional. Proportional tax rates reduce compliance costs and administrative costs because they eliminate the necessity of separate measurement of the tax bases. For similar reasons, they lower the enforcement costs to the government. Proportional tax rates also reduce the incentives for noncompliance, and they reduce the distortions from changes in the relative prices of commodities. Divergences from proportional commodity tax rates should be minimal and should largely take the form of marginally higher tax rates on goods that are unresponsive to price changes (e.g., necessities, for efficiency reasons), on goods that generate significant negative spillovers (e.g., alcohol or tobacco, also for efficiency reasons), on goods consumed by higher income groups (e.g., luxuries, for equity reasons), and on goods for which taxes can be easily and cheaply collected (e.g., goods versus services, for administrative cost and revenue-yield reasons).

Optimal Income Taxes

Income taxes should be imposed at constant marginal tax rates on broadly defined tax bases above some level of income determined by generously defined exemptions and (standard) deductions with minimal use of special tax incentives. Constant marginal tax rates reduce compliance costs by reducing the incentive to engage in tax shifting schemes; for related reasons,

they reduce administrative costs. Broadly defined tax bases allow lower marginal tax rates to generate a given level of revenue, and so reduce the distorting effects of taxes on behavior, including behavior related to noncompliance. Generously defined exemptions help achieve equity goals with reduced compliance and administrative costs and imply that lower income individuals will pay negative taxes. Standard deductions reduce the equity of the income tax but lower administrative, compliance, noncompliance, and enforcement costs; in contrast, tax incentives increase the range of taxpayer and tax agency costs with uncertain impacts on their desired ends. Income taxes should also be collected by source withholding, thereby lowering compliance and administrative costs.

Optimal Tax Mix

Both direct and indirect taxes should be levied. Use of both taxes allows each tax to be imposed at lower marginal tax rates, which reduces distortions and, most likely, noncompliance. Use of both taxes also gives the government more flexibility to achieve its equity and its revenue-yield goals, especially given the limitations that administrative considerations impose on the scope and even the use of some taxes.

The optimal tax mix guidelines are the most uncertain and the most in need of additional research. It is easily established that proportional income and commodity taxes are equivalent when each is imposed on a comprehensive base. Given such equivalence, only one of these taxes need be used; indeed, the incorporation of the range of costs discussed above clearly implies that only one should be used. However, it is also easily recognized that the equivalence of

direct and indirect taxes in theory is unlikely to hold in practice. "General" sales taxes are never general, due to difficulties in administration and enforcement. Similarly, income taxes are never imposed and collected on all incomes. When it is also recognized that compliance costs for income and commodity taxes differ in both their magnitude and their incidence, that the taxes differ in their costs of collection, that some individuals are better able to evade income taxes than others while most individuals are unable to cheat on commodity taxes, that enforcement of income taxes is generally more difficult than that for commodity taxes, then in such circumstances I think it plausible that both taxes should be used. In short, it is the fact that each tax is imperfect—and that each is imperfect in different ways—that suggests that both should be used.

Although it is comforting that these broad guidelines are similar to those suggested by others (Bird, 1992), more systematic analysis of these issues is obviously needed, and such analysis may well lead to different guidelines. There is clearly a pressing need for analyses in which specific features of a particular country are incorporated and analyzed in useful and usable simulation models. I believe that such analyses serve at least three ends: they indicate and quantify with a standard measure the trade-offs that taxes necessarily create; they indicate the areas in which our knowledge is incomplete; and they provide specific guidelines for tax design and tax reform, in particular country circumstances. I also believe that the guidelines that emerge from such analyses are in most cases likely to be significantly different than those that emerge from the optimal taxation approach.

It is, unfortunately, important to keep in mind that this exercise may ultimately prove futile. The informational requirements for the kind of analysis outlined here are daunting, and there is too much that we do not and, indeed, that we cannot know. It is also impossible to consider all possible aspects that are relevant in the optimal design of tax systems; even if all of the factors discussed at length above were to be incorporated, there would necessarily remain omissions. Perhaps most important among these omissions, the optimal taxation methodology does not consider the positive aspects of the enactment and the enforcement of tax rules. The individuals who pass the tax laws have interests that may not always coincide with the somewhat amorphous notion of social welfare that is used in optimal taxation; that is, there is a political dimension to tax policies that may well outweigh the purely normative considerations at the foundation of optimal taxation (Hettich and Winer, 1988). As one example, these interests may lead individuals in authority to enact complex tax rules because of the political gains from complexity, even though such complexity may have efficiency, equity, and revenue-yield costs. Appropriate government policy must also recognize that the individuals responsible for administering and enforcing the tax rules may well need oversight as well. There is widespread evidence of corruption by government officials, and the ways in which this corruption should be controlled must be considered (Chander and Wilde, 1992).

In short, the search for a general scheme that specifies, for all countries and all times, the details of an optimal tax system is certain to fail. There are simply too many details that must be known but that are unknowable to

implement fully the prescriptions of optimal tax theory. There are simply too many tax features that are possible candidates for action but that cannot be modeled to consider fully their use. Still, this should not discourage the search for specific tax design—and, especially, tax reform—guidelines that apply to a single country at a point in time and that incorporate the range of considerations discussed here. Such guidelines will necessarily be couched in general terms. However, if the guidelines are generated from models that incorporate the factors discussed here, I believe that they will offer a better map for tax policy than those derived from the standard optimal tax framework.

ENDNOTE

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