

PUBLIC FINANCE

GOVERNMENT REVENUES AND
EXPENDITURES IN THE UNITED STATES ECONOMY

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CHAPTER 13

THE TAXATION OF INCOME

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CHAPTER 13

THE TAXATION OF INCOME

The most significant source of tax revenue in developed economies is the income tax. The general principles of taxation presented in chapters 10 and 11 apply to income taxation just as they apply to other types of taxes. Income taxes discourage people from earning income, causing a substitution from income to leisure activities not subject to the tax. However, an offsetting effect can occur if people work harder to make up for income lost to the income tax. One of the important topics covered in this chapter is the income and substitution effects of the income tax.

The discussion of the income tax encompasses a number of other significant issues. One is whether the tax discourages saving and capital formation. Certainly, a tax on consumption rather than income would encourage more saving, but there may be equity reasons for favoring an income tax over a consumption tax. Equity issues tend to loom larger in a discussion of income taxation because, first, it is such a large component of the tax system and, second, there are so many options that must be evaluated in designing an income tax code. Perhaps that is one reason why relatively major changes have been made frequently in the provisions of the income tax laws. But despite frequent and large changes, the overall philosophy of the income tax in the United States has remained roughly the same since the tax was established.

Income taxation is a broad enough topic that it will be covered over the next several chapters. This chapter deals with the theory of income taxation, to lay a foundation for understanding the effects of income taxes and how a desirable tax system might be designed. Chapter 14 deals specifically with personal income taxation in the United States. Taxes on business income are covered along with other taxes in chapter 15. This discussion of income taxation will begin by looking at the relationship between income taxation and other types of taxes that are aimed at similar tax bases.

SALES, CONSUMPTION, AND INCOME TAXES

In the previous chapter, general sales taxes were depicted as similar to excise taxes levied at the same rate on all goods sold at the retail level. As such, a sales tax has the effect of reducing consumption of the taxed goods and encouraging substitution into untaxed activities, so the substitution effect works exactly as it would for an excise tax on all retail goods. Although income effects probably will have little effect in the case of a narrowly based excise tax because such taxes will be a small percentage of the taxpayer's income, the income effects of a broadly based tax like a sales tax may be significant, as was illustrated in the previous chapter. This chapter extends the comparison of excise taxes and general sales taxes to include consumption and income taxes.

The tax base is defined as the object that is being taxed. Thus, for a gasoline tax, the tax base is sales of gasoline; for a general sales tax, it is retail sales; for an income tax, the tax base is income. A person's gross income is allocated to three basic spending categories: consumption, saving, and taxes. Assuming for the moment that there is no saving in the economy, this means that all income not paid in taxes is used for consumption. With no saving, a completely comprehensive retail sales tax would be equivalent to a tax on consumption, which would be equivalent to a tax on income. Within this framework, the tax base is the same for retail sales, consumption, and income taxes, so without saving, a sales tax amounts to a tax on income.

Although under these assumptions the tax base is the same for sales and income taxes, there is an important difference between the way that income and sales taxes are collected. Because a sales tax is collected at the time of the sale, there is no practical way to charge different tax rates to people with different income levels. Some goods might be exempt from the sales tax (or taxed at a different rate), but, for those goods that are taxed, all individuals will pay the same rate. By collecting a tax on income, however, progressive rates can be built into the system, so that individuals who earn more income can pay a higher proportion of their incomes in taxes.

An income tax taxes consumption plus saving

Sales and Consumption Taxes

A sales tax is one type of consumption tax, which is levied on consumption as the consumer buys the consumer good. Consumption can be taxed in other ways, though. One way of instituting a consumption tax might be to apply a tax on value added. As the previous chapter made clear, the tax base is the same for a value added tax and a retail sales tax, and both types of taxes on consumption levy a tax on a transaction as the transaction takes place. One way to overcome the difficulty of charging different rates to different individuals for such transaction-based taxes would be to add up consumption spending over the period of a year and then, as with the income tax, have the taxpayer remit the entire tax due on consumption over the year at one time. A consumption tax paid in this manner would resemble an income tax in collection method but would use consumption as its tax base.

A consumption tax could be collected in the same way as an income tax

Consumption and Income Taxes

Recall that if there is no saving in an economy, a tax on consumption will constitute a tax on income. But if saving is considered, the consumption tax is computed by

If consumption taxes were collected like income taxes, their progressivity could be more readily changed

totaling the individual's income, subtracting saving, and paying the tax on what remains. The tax base is the same as under the transactions-oriented sales tax; only the method of computation and collection is different. Computing the consumption tax in this way has the advantage of allowing different tax rates to be charged to different individuals. This might be desirable on equity grounds because a tax that collects a constant percentage of consumption spending is likely to be viewed as regressive with respect to income.

As chapter 12 noted, a consumption tax such as a retail sales tax or value added tax collects a constant proportion of consumption expenditures, but people who earn higher incomes tend to save a larger percentage of their incomes, making consumption taxes such as a sales tax or a value added tax appear regressive with respect to income. Thus, for equity reasons, income taxes tend to be favored over consumption taxes as a source of revenue. There are persuasive counterarguments to this view, however. When items like food, rent, and services are often exempt from the tax, low-income individuals do not pay sales taxes on a big share of their consumption expenditures. Furthermore, if a person's lifetime income is examined, rather than a person's income in one year, there is much less regressivity in a consumption tax. Nevertheless, there are many arguments for progressive taxation on equity grounds, so even if a consumption tax is not regressive, progressive tax rates on consumption might still be viewed as desirable. If this is so, then a consumption tax calculated periodically by subtracting saving from income would be preferable to a transactions-based consumption tax.¹

Taxes on Saving

Some features of the U.S. income tax resemble a consumption tax

The difference between a consumption tax of this type and an income tax is that the latter taxes income going toward saving in addition to taxing consumption. Because of this, the income tax is often viewed as providing an incentive to consume more and save less. We will discuss this issue in more detail later in the chapter. As previously noted, the United States could substitute a consumption-type tax for the income tax. Currently, the U.S. tax code contains provisions that, to a limited extent, adhere to the consumption tax framework by permitting some saving to be tax deferred. One type of plan is the individual retirement account (IRA), which allows taxpayers to exempt contributions into the IRA from taxation but fully taxes withdrawals from the IRA, including withdrawals of interest earned on the account. With a plan of this type, the taxpayer can save money at the present time without paying tax on it, like a consumption tax, but instead must pay tax on the money when it is withdrawn and used for consumption.

The only step necessary to move from the current U.S. income tax system to a consumption tax system would be to allow unlimited amounts of money to be placed in deferred pension plans and permit withdrawals at any time without paying a penalty. (Income tax would be paid at withdrawal, however.) Taxpayers would then have the alternative of paying tax in a consumption tax system rather than an income tax system.

¹ M. Kevin McGee, "Alternative Transitions to a Consumption Tax," *National Tax Journal* 42, no. 2 (June 1989): 155-66, discusses the implications of different methods for moving from income taxation to consumption taxation.

Tax-deferred savings plans in the current U.S. tax code will be discussed in more detail in chapter 14, which examines the specific provisions of the federal personal income tax. Note at this point that there is a close conceptual link between an income tax and a consumption tax. Consumption taxes could be paid like the current income tax, allowing standard deductions, progressive rates, and so forth, but more typically are paid as transactions-based taxes on sales or value added.

DEFINITIONS OF INCOME

To this point, discussion of income and consumption taxation has been greatly simplified because it assumed that there is no difficulty involved in determining what constitutes income for the purpose of taxation. On the surface, the definition of income seems relatively straightforward, but some ambiguities arise, especially concerning income in kind and the treatment of changes in the value of a person's wealth. Furthermore, it is not always clear what types of income should be exempt from taxation. Some income is exempt because of its source (e.g., interest on municipal bonds), while some income is exempt because of its use (e.g., medical expenses). All these issues add to the complexity of designing a fair and effective tax system.

In-Kind Benefits

When a person is paid in goods or services rather than in dollars, that person has received income in kind. For example, a company might provide an employee with a company car or provide a health insurance plan for employees as one of the benefits of employment. The company could pay the employee a larger salary and allow the employee to buy his own car and insurance, but the payment in kind might be preferred by both parties for a number of reasons. First, the company may find it cheaper to buy automobiles and insurance in quantity and pass some of the savings on to the employee as a benefit of employment rather than pay the employee additional salary to purchase such items. Second, the payment in kind might not be taxed as regular income to the employee, and avoidance of income taxes can provide a large benefit that can be shared between the employer and the employee to make both better off. The tax laws do not treat many types of payment in kind as taxable income to recipients, making payment in kind an attractive alternative to money income.²

To see how large this benefit can be, consider an individual in the 39.6 percent income tax bracket—the top bracket in 1995. If this individual receives an in-kind benefit worth \$100 that is not taxable, the individual would have to receive \$165.56 in taxable income to buy the \$100 benefit. (39.6 percent of \$165.56 is \$65.56, leaving \$100 in after-tax income.) This is a large tax wedge that is driven between the price of taxable income and nontaxed in-kind benefits, creating a big advantage for in-kind benefits. This is why companies provide tax-exempt health benefits for their employees,

The tax benefits from paying in-kind benefits rather than wages can be substantial

² Werner Z. Hirsch and Anthony M. Rudolfo, "Effects of State Income Taxes on Fringe Benefit Demand of Policemen and Firemen," *National Tax Journal* 39, no. 2 (June 1986): 211–19, suggest that the tax laws encourage a substantial substitution of in-kind benefits rather than taxable wages.

free parking at work, company cars, and other benefits instead of just paying their employees more.

There does not seem to be a good reason to treat payment in kind differently from monetary income for tax purposes, and although some types of payment in kind are excluded from taxation, others are supposed to be reported to the Internal Revenue Service (IRS) as taxable income. Often it is easy to determine the value of a payment in kind. The cost of a company's employee insurance program will be well documented, for example. But other times it is not so easy. How much in-kind income does a traveling salesperson receive by driving the company car home from work every day and using it on weekends? How much in-kind income should be reported to the IRS if a person borrows the company ladder to do some work around the house?

In principle, in-kind benefits should be taxed like income

Some fringe benefits, such as the company car and the company health insurance policy, are items that the employee would likely buy personally if the company did not provide them. Other fringe benefits, such as a large carpeted office and a reserved space in the company's indoor parking garage, might cost the company extra even though the employee would not pay for them personally. The company provides these benefits as a deductible expense of doing business. By offering a more pleasant work environment, companies can hire employees more cheaply because neither the employer nor the employee pays taxes on the fringe benefits.

In principle, these payments in kind and fringe benefits of employment should be treated no differently from ordinary income for tax purposes, but in practice it is often difficult to draw the line between payments in kind and ordinary costs of doing business. Even when some payment in kind clearly has been made, as when the traveling salesperson uses the company car for personal reasons, it is still not clear what portion of the expense of the car should be considered a business expense and what portion is personal income.³

Changes in Wealth

Another problem in defining income for tax purposes is deciding how changes in a taxpayer's wealth resulting from unrealized capital gains should be figured into taxable income. The Haig-Simons definition of income, named after Robert M. Haig and Henry C. Simons, regards income as the dollar value of the maximum amount that one can consume over a given period of time without reducing the value of one's wealth.⁴ The salary a wage earner brings home is included in income, as is any increase in the real value of property owned. For example, if the value of a person's home rises from \$100,000 to \$110,000 in a year with no inflation, the \$10,000 increase in the value of the home counts as income. Likewise, if a person owns stocks or bonds whose values go up, the increase in value is treated as income.

The Haig-Simons definition of income is the amount one can consume with no change in wealth

³ Charles T. Clotfelter, "Tax-Induced Distortions and the Business-Pleasure Borderline: The Case of Travel and Entertainment," *American Economic Review* 73, no. 5 (December 1983), argues that business travel and entertainment might be reduced by as much as half if it were not deductible as a business expense.

⁴ For the original sources of this definition, see Robert M. Haig, *The Federal Income Tax* (New York: Columbia University Press, 1921), and Henry C. Simons, *Personal Income Taxation* (Chicago: University of Chicago Press, 1938).

Using the Haig-Simons definition of income for tax purposes, one can imagine a case in which a person buys a business for \$100,000 that generates \$10,000 a year in net income. The discount rate, which determines the value of the business, here appears to be 10 percent. But if the person makes some changes in the business such that it now generates \$50,000 in income annually, at the same 10 percent discount rate the business is now worth \$500,000. In this case, the change in the flow of income from the business from \$10,000 to \$50,000 increases the worth of the business by \$400,000, which would be taxable income under the Haig-Simons definition of income.

Consider a similar example in which the interest rate is 10 percent and a person owns \$1 million in bonds, giving a yield of \$100,000 in interest income every year. If the interest rate drops to 5 percent, the person still receives the same \$100,000 in interest income, but the value of the bonds rises to \$2 million, giving the person \$1.1 million in taxable income. Clearly, the person's flow of income from the bonds would, in this case, be inadequate to pay the taxes on the capital gain.

Although the Haig-Simons definition of income has a certain theoretical appeal, problems can arise in implementing it. First, with some assets, such as homes, businesses, and artwork, it is not always clear what the value of the asset is until it is sold. Second, it is conceivable that a person who experiences a capital gain on an asset would have to sell the asset to raise enough money to pay taxes on the gain. From an equity standpoint, some would consider this unfair.

Irving Fisher defined income differently, as the sustainable flow of purchasing power available to an individual.⁵ Under Fisher's definition, a capital gain would not count as income because it would not represent a sustainable flow. Only the increased income from the increased value of wealth would be taxed. Consider again the example of the person who owns \$1 million in bonds and receives \$100,000 in interest income from them every year. Following Fisher's definition, the person's income would be a constant \$100,000, regardless of changes in the interest rate that might change the value of the bonds. Thus, the Fisher definition of income, as the sustainable flow of purchasing power, and the Haig-Simons definition, as the maximum amount one can consume without reducing the value of one's wealth, are two possible ways of defining income. Which is the better way for tax purposes is a normative question, but one that must be addressed in the design of a tax system. Chapter 14, which looks at the personal income tax, finds that the actual tax system does not strictly adhere to either definition.

Fisher defined income as a sustainable flow of purchasing power

Imputed Rental Income

Some increases in wealth can produce more monetary income subject to tax, while others may not. Assets provide a flow of services for their owners, for if they did not, the owners would not own them. An owner of a bond receives a flow of interest payments, which is taxable, while the owner of artwork receives a flow of benefits from enjoyment of the art but pays no tax on that enjoyment. Should the flow of services from all assets be taxed? One asset that is commonly owned and provides such services is the owner-occupied home.

⁵ Irving Fisher, *The Theory of Interest* (New York: Macmillan, 1930).

Owner-occupied housing generates a flow of income-in-kind for the owners

Consider two identical houses, side by side, one of them occupied by the owner and the other by a renter. The owner of the rental house will have rental income, which will be subject to tax. The owner who lives in the house, however, receives the value of the rental as an in-kind benefit of home ownership while not receiving any taxable income from the flow of services from the asset. Not only that, the renter must pay the rent out of after-tax income, while the services of the owner-occupied home flow to the homeowner tax free. The difference can be substantial. Assume that the renter and the owner of the rented house are in the 39.6 percent tax bracket and that the house rents for \$1,000 per month. To get the \$1,000 in after-tax income to pay the rent, the renter must earn \$1,655.60 in pretax income and pay income tax of \$655.60 to get the \$1,000 to pay the rent. (We figured this out earlier in the section on in-kind benefits.) Then, after the rent is paid, the owner of the rental house must pay \$396 in income tax on the rental income for a total income tax payment by the owner and the renter of \$1,051.60 on the income earned to pay the rent of \$1,000. Meanwhile, the owner who lives in his own house next door pays no income tax on the imputed rental value of housing services he consumes.

The rental home owner's share of this tax represents a double tax on saving because the house was paid for by after-tax income. The double tax on saving is discussed in a later section. The renter's share is payment for the services of the home, which the owner of the owner-occupied home enjoys tax free. One way to tax this individual would be to place a tax on the value of the rental services the homeowner receives from the home, which is the imputed rental income. The renter pays rent equal to the value of using the residence and also pays tax on the income that is earned to pay the rent. On equity grounds, the homeowner who receives the same flow of services from a home as the renter should, perhaps, pay taxes on the rental value of the owner-occupied home.

Note that the value of the home is a stock, and the rental service received from the home is a flow. If the stock were taxed, then an additional tax on the imputed rental income would constitute a double tax. In fact, the purchase price of the house was paid out of after-tax income, so income tax was paid on the money used to buy the stock of rental housing. But if the house appreciates so the imputed rental income goes up, no additional tax is paid on the unrealized capital gain. And as noted earlier, because both the renter and the owner of the rental house pay income tax, the income used to pay that rent is taxed twice, so perhaps the imputed rental income of owner-occupied housing should be treated the same way.

Under the current tax law, imputed rental income of owner-occupied homes is not taxed, and, given the political power of homeowners, it is unlikely that it ever will be. Should it be taxed? This not only is an interesting issue but also illustrates that in general, nonmonetary services from assets are not taxed, while monetary flows from assets are. This is but one of the complications that arise in trying to define income for tax purposes.

THE INCOME-LEISURE TRADE-OFF

A person can derive utility not only from income but also from nontaxed activities as well. These nontaxed activities are referred to here as leisure. This is a broader definition

of leisure than is typically used, and deliberately so. In this sense, leisure activities include not only fishing and golf but also doing volunteer work or painting one's own house rather than hiring a painter. For example, a mechanic may be able to work overtime for \$10 per hour and hire a painter for \$8 per hour. Assuming that the mechanic can paint as well as the painter and also that the mechanic is indifferent between working at one job or another, whether the mechanic should work overtime and hire a painter or do the job herself depends upon the tax rate at which the mechanic's wages are taxed.

Taxed versus Nontaxed Activities

If the mechanic pays no tax on her income, then the best alternative is to work for \$10 per hour, hire the painter for \$8 per hour, and be better off by \$2 per hour. However, if the mechanic is in the 28 percent tax bracket, then \$2.80 is taxed away from each hour's work, leaving the mechanic with only \$7.20 per hour after taxes, in which case the mechanic is better off doing her own painting. Note that a profitable exchange could be made were it not for the excess burden of taxes, which discourages the taxed activity. Using these numbers, the potentially profitable exchange of hiring a painter will not occur if the income tax rate is above 20 percent.

In general terms, the income tax gives an incentive to pursue nontaxed activities rather than taxed activities. As the house painting example suggests, this sometimes means doing work for oneself rather than hiring someone to do it, thereby forgoing the gains from trade that could have been produced, when those gains are less than the taxes that would have to be paid. The tax increases the amount by which the value of the output must exceed its opportunity cost in order for the output to be produced. It also might mean pursuing activities in the underground economy where taxes are not collected. One of the incentives for such illegal activities as drug dealing and prostitution is that the income from those activities is kept hidden from the government and therefore not taxed. Income taxes also provide an incentive for such traditional leisure activities as tennis and napping.

Income taxes cause people to substitute away from earning income and into leisure

Income versus Leisure

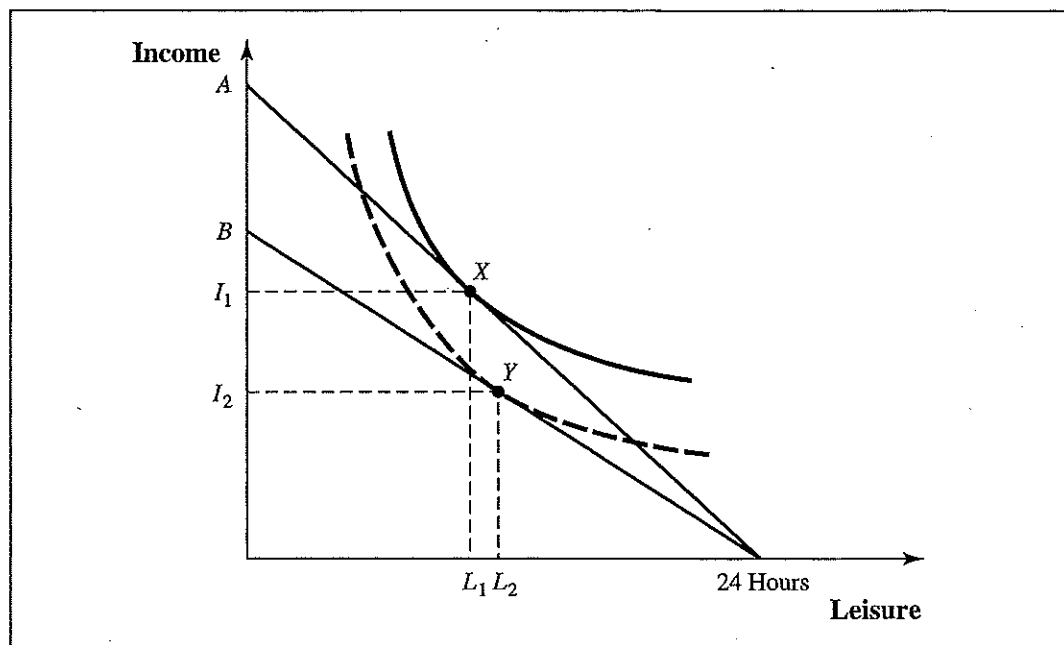
To illustrate the effects of an income tax, all these untaxed activities are lumped together into the category of leisure. The effects of the income-leisure trade-off are depicted in figure 13.1 through the use of indifference curves. Because the maximum amount of leisure that can be consumed each day is twenty-four hours, the budget constraint for any individual intersects the leisure axis at the point marked twenty-four hours.

The amount of income that a person can earn is determined by the person's wage rate. For example, with no tax, the person's budget constraint extends from the point marked twenty-four hours on the leisure axis to point A on the income axis, and, by taking no leisure, the person can earn a level of income marked A. Because the individual can take more leisure only in exchange for less income, the line from twenty-four hours to point A is the budget constraint. The slope of the line is the wage rate of the individual, or the rate at which leisure can be transformed into income.

The arcs in the diagram are two of the individual's indifference curves. With no taxes, and the budget constraint intersecting at A, the utility-maximizing point for the

■ **FIGURE 13.1**
THE INCOME-LEISURE
TRADE-OFF

An income tax, which rotates the budget constraint inward, causes the individual to substitute from income-earning activities into leisure.



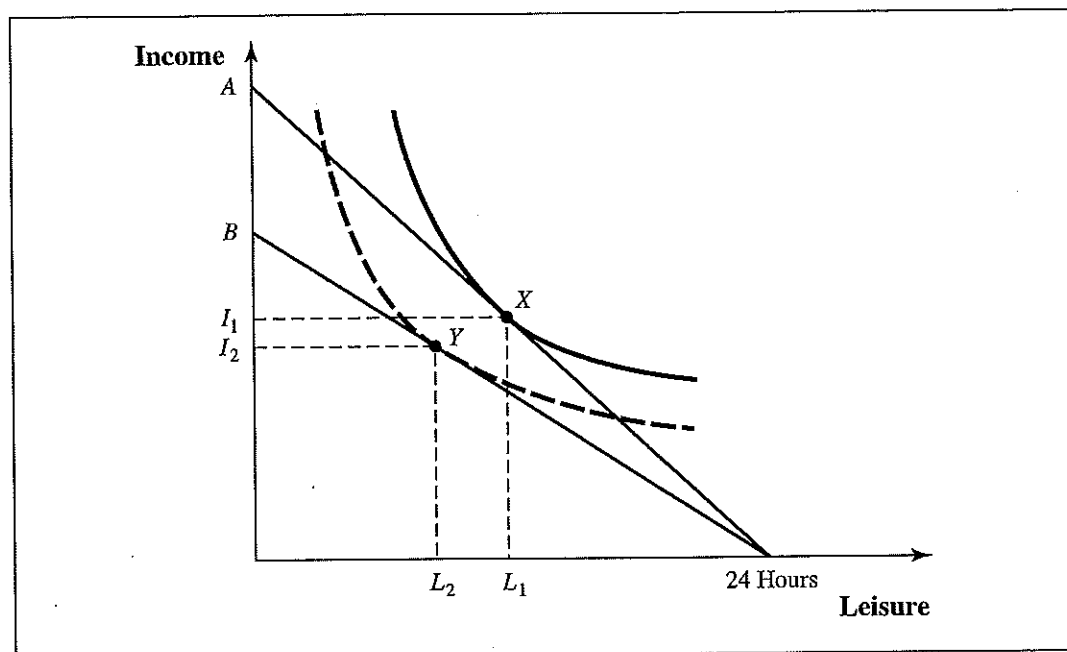
individual is at X, and the individual takes L_1 amount of leisure and earns income I_1 . But by adding the effects of the income tax, the rate at which leisure can be transformed into income is lowered, so that the budget constraint rotates down to intersect the income axis at B. There is still twenty-four hours of leisure available because leisure is not taxed, so the intersection point remains unchanged on the leisure axis. But the slope of the budget constraint becomes less steep, reflecting the less desirable trade-off between income and leisure, and B is below A because even if the person takes no leisure time, total income declines as a result of the tax. The person's utility-maximizing point is now Y, income has fallen to I_2 , and leisure activities have risen to L_2 . In this example, the income tax causes a substitution from income-earning activities into leisure.

Substitution effects
due to income taxes
might cause people to
substitute out of
income-earning
activities

The substitution effect, in which a person substitutes out of the good experiencing a price increase and into a good experiencing a price decrease, will always occur. But recall that when income is significantly affected, the income effect can work against the substitution effect. For example, the tax takes away so much of the person's income that the person's standard of living declines, causing the person to work more to make up for some of the income that has been taxed away. In this case, the effect of the income tax is actually to increase the number of hours worked.

This case is illustrated in figure 13.2, which is drawn the same as figure 13.1 except for the indifference curves. In figure 13.2, the individual's preferences are such that the amount of leisure falls from L_1 to L_2 as a result of the income tax. Likewise, after-tax income falls from I_1 to I_2 . But what is most interesting about this case is that the person could actually work more as a result of an income tax. Another possibility, not depicted here, is that the person's work hours could be the same amount with or without an income tax.

This figure shows that a person can work more as a result of an income tax if the income effect works in the opposite direction and is larger than the substitution effect.



■ **FIGURE 13.2**
AN INCREASE IN
WORK IN RESPONSE
TO AN INCOME TAX

The excess burden of any tax arises because the tax alters the choices that people make. The excess burden comes from the substitution effect. In the case in which income and substitution effects cancel each other out, the excess burden remains because of the substitution effect. In the aggregate, the person may work the same amount with or without an income tax, but, if the same amount of income were taken away as a lump sum tax, leaving only the substitution effect, the person would work more with the lump sum tax than with the income tax, and this is the appropriate comparison when considering the excess burden. The tax still alters people's behavior. For example, the person might still paint her own house rather than hire a painter (the substitution effect) even if the amount of income the mechanic earns does not change. The excess burden of a tax results solely from the substitution effect and remains the same regardless of the nature of the income effect.

Income effects due to income taxes might cause people to work more or less

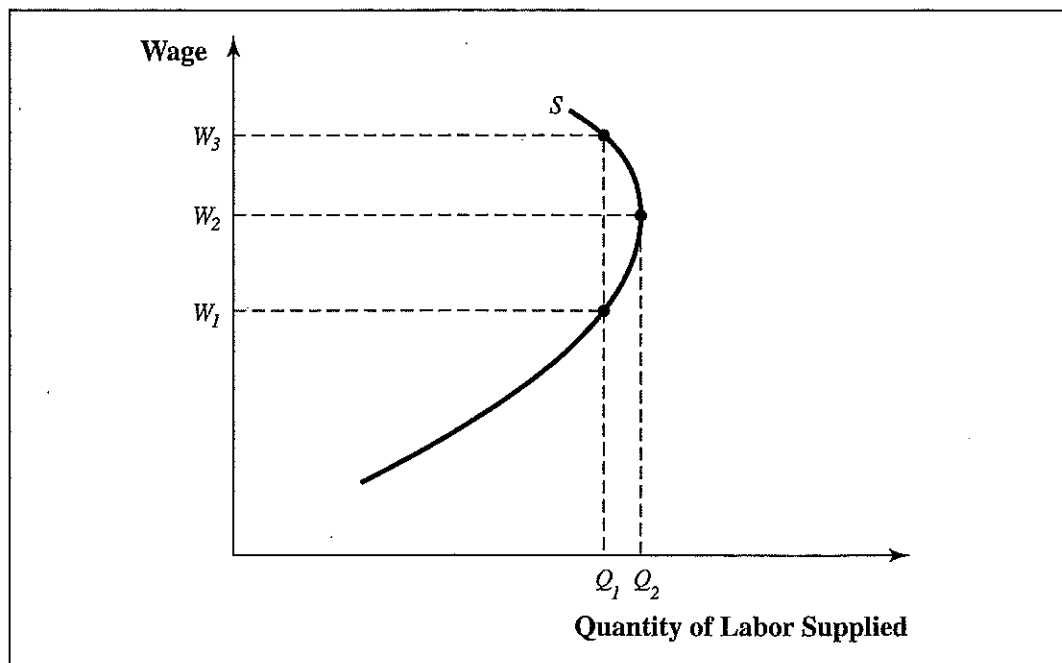
THE BACKWARD-BENDING SUPPLY CURVE OF LABOR

Because workers work for after-tax rather than before-tax wages, an income tax represents a reduction in the effective wage rate paid to workers. If workers work more to offset an income tax, this implies that workers are willing to work more hours when the wage rate is lower. This suggests that there is a backward-bending supply curve of labor.

A backward-bending supply curve is depicted in figure 13.3. At low wage rate W_1 , workers supply quantity of labor Q_1 , but when they are offered higher wages, such as

■ **FIGURE 13.3**
THE BACKWARD-
BENDING SUPPLY
CURVE FOR LABOR

A backward-bending supply curve of labor can exist because at high wage rates, workers want to work less as wages increase. In effect, they are buying more leisure time with their higher wages.



An increase in income
taxes may cause
people to work more
or less

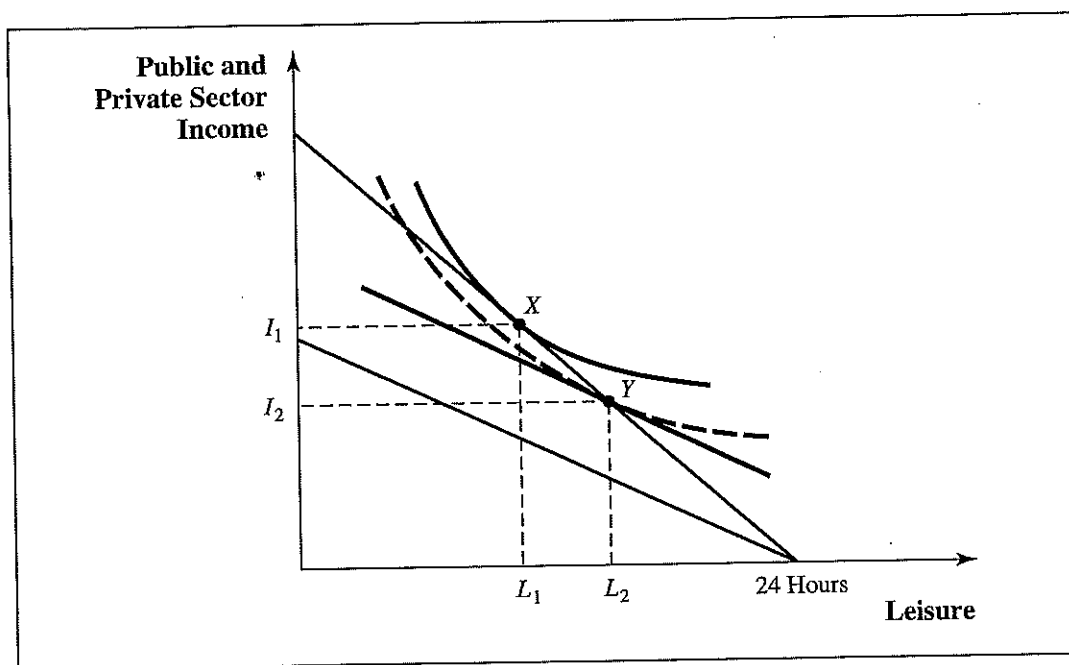
W_2 , they work more, so the quantity of labor supplied increases to Q_2 . Eventually, however, when wages increase to W_3 , the quantity of labor supplied declines. This happens because at wage W_2 , workers have many of the material things in life that give them satisfaction, so they use an increase in income, in effect, to buy more leisure time. The indifference curve diagram in figure 13.2 illustrates this type of case in which workers who are initially making a wage equal to W_3 in figure 13.3 react to an increase in the tax rate that lowers their effective wage by working more.

Note that the backward-bending supply curve of labor applies to the economy as a whole and not to an individual employer. An individual employer will always have to pay a higher wage to hire additional workers (unless the labor market is very competitive, in which case additional workers can be hired at the same wage). The individual employer must compete with other employers to hire more labor, so the employer must make that employment possibility more attractive than its alternatives.

This does not answer the question if whether the backward-bending supply curve of labor actually exists, though. In theory, it could exist, but perhaps only for some workers and not economywide, especially since the economywide supply curve for labor includes not only workers at high wages who might work less if wages got higher but also many potential workers who are not in the labor force. New entrants into the labor force at higher wages may offset any reduction in work effort from those already in the labor force. From a positive standpoint, this is an interesting question, but, from a normative standpoint, the issue is of limited relevance to public finance. The reason is that the model depicting the relationship between income taxation and labor, as shown in figures 13.2 and 13.3, is built on the assumption that the income tax lowers a person's income. Although the income tax does indeed lower a person's disposable

Examining an income tax in isolation for its effect on labor supply tells only half the story. The income tax rotates the budget constraint inward, but the public sector output bought with the tax revenues has an income effect that shifts the budget constraint out, leaving only the substitution effect. The substitution effect unambiguously reduces the amount of labor supplied because leisure increases from L_1 to L_2 .

■ **FIGURE 13.4**
THE INCOME-LEISURE
TRADE-OFF WITH
TAXES AND
GOVERNMENT
SPENDING



income (the income that can be spent in the private sector), it also provides revenues for government expenditures that provide utility to the taxpayer. Thus, the income effect of the income tax, which reduces the taxpayer's income, should be offset at least partially, and maybe by more than 100 percent, if government-provided goods yield more utility than if the income were spent in the private sector. For goods such as roads, parks, and national defense that are difficult to buy individually in the private sector, this may be the case.

In this light, figures 13.1 and 13.2 tell only part of the story because they depict the income reduction from the income tax but not the positive income effect that results from the public goods the income tax revenues buy. Figure 13.4 fills in the missing details. First, the budget constraint rotates inward, as in the earlier figures, but then the budget constraint shifts outward, parallel to the rotated budget constraint, reflecting the income in kind from the public sector output paid for by the tax revenues and placing the individual at point Y. If the resulting output were equal in value to the taxes paid, this would place the individual on the original budget constraint, but the new relative price line reflects the relatively higher price of income in terms of leisure forgone. In this case there is no net income effect. All that remains is the substitution effect, which unambiguously causes the individual to substitute away from the more costly activity (income) and toward the less costly activity (leisure).⁶

Government expenditures paid for by income taxes may offset the income effect of the taxes

⁶ See James Gwartney and Richard Stroup, "Labor Supply and Tax Rates: A Correction of the Record," *American Economic Review* 73, no. 3 (June 1983): 446-51, for a discussion of this idea.

Government provision
of goods they would
purchase for
themselves encourages
people to work less

This idea has significant implications for the provision of government goods and services, especially the substitution of government financing in place of personal purchases. Assume that we are considering a good such as health insurance, which most people have paid for themselves in the past. If instead the government decides to provide the good by taxing individuals and then returning the good to them, the private sector provision would be represented by point X in figure 13.4 while the government provision would be represented by point Y. People have more of an incentive to earn income to purchase the good themselves (point X) than they have to earn income to pay taxes to have the government purchase the good (point Y).

There may be a backward-bending supply curve for labor, but, if it has any relevance to public finance, it is because taxpayers are not receiving as much utility from public sector output as they are losing through the income effect in their payment of taxes. If the income in kind from public sector output compensates taxpayers for their taxes, then the backward-bending supply curve of labor will have no influence on the effects of income taxation.

TAX RATES AND TAX REVENUES

The trade-off between tax rates and tax revenues is sometimes called the Laffer curve, named after economist Arthur Laffer, who popularized the concept in the late 1970s. The basic idea behind the concept is that as income tax rates rise, there is more and more of a disincentive to earn taxable income, so at higher rates the tax base is smaller. Eventually the increase in revenues caused by higher rates is more than offset by the decrease in revenues caused by a lower tax base, so an increase in rates will cause a decrease in revenues. The concept is graphed in figure 13.5. At the origin in the diagram, tax rates are zero, so tax revenues also will be zero because no taxes will be collected on any income. As tax rates rise, revenues will go up because now some taxes are being collected. Beyond some point, however, income will fall in response to the higher tax rates and when the percentage decline in taxable income is greater than the percentage increase in tax rates, tax revenues will fall with higher rates.

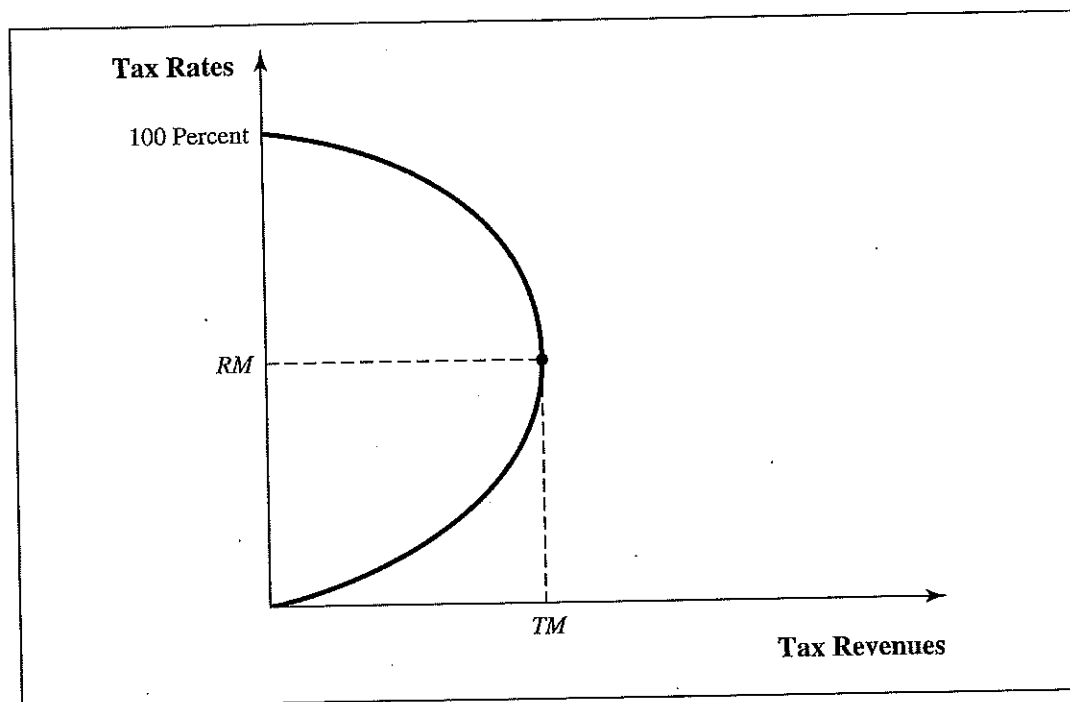
In the extreme, tax rates could be as high as 100 percent, but if 100 percent of income were taxed away, this would remove all incentives to earn taxable income, so with tax rates at 100 percent, no revenue would be collected because no income would be earned. Thus, in figure 13.5, when tax rates are either zero or 100 percent, tax revenues will be zero. Because low tax rates will collect some revenues, the curve must slope upward below the revenue-maximizing tax rate, RM, and then slope back toward the Tax Rates axis, making TM the maximum amount of tax revenue that can be collected.

The Laffer curve concept applies to any tax, not just income taxes. Because taxation discourages the taxed activity, beyond some point an increase in the tax rate on any tax will lead to a decrease in revenue. Figure 13.6 illustrates this point with an excise tax in a market with a perfectly elastic supply curve. Without taxation, the market will produce Q^* at price P^* , but when a tax of T is placed on the good, the price rises to $P^* + T$ and the quantity falls to Q_1 . If the tax rate is doubled to $2T$, the quantity exchanged falls to Q_2 , which produces more revenue per unit on the units exchanged, but fewer units will be exchanged. The shaded area marked Revenue Gained in figure

At very high tax rates,
an increase in rates
will cause a decrease
in revenues

As tax rates rise, the amount of taxable income earned is reduced. Eventually the reduction in the tax base more than offsets the increase in tax rates, so above RM , tax revenues fall in response to an increase in tax rates.

■ **FIGURE 13.5**
THE LAFFER CURVE



13.6 is the amount of additional revenue that is produced by the higher tax rate, while the area marked Revenue Lost is the reduction in revenue because of the lower quantity. In figure 13.6, the revenue lost because of a reduction in the taxed activity exceeds the revenue gained by the higher tax rate on the remaining taxed activity, so an increase in the tax rate from T to $2T$ lowers the amount of revenue collected.

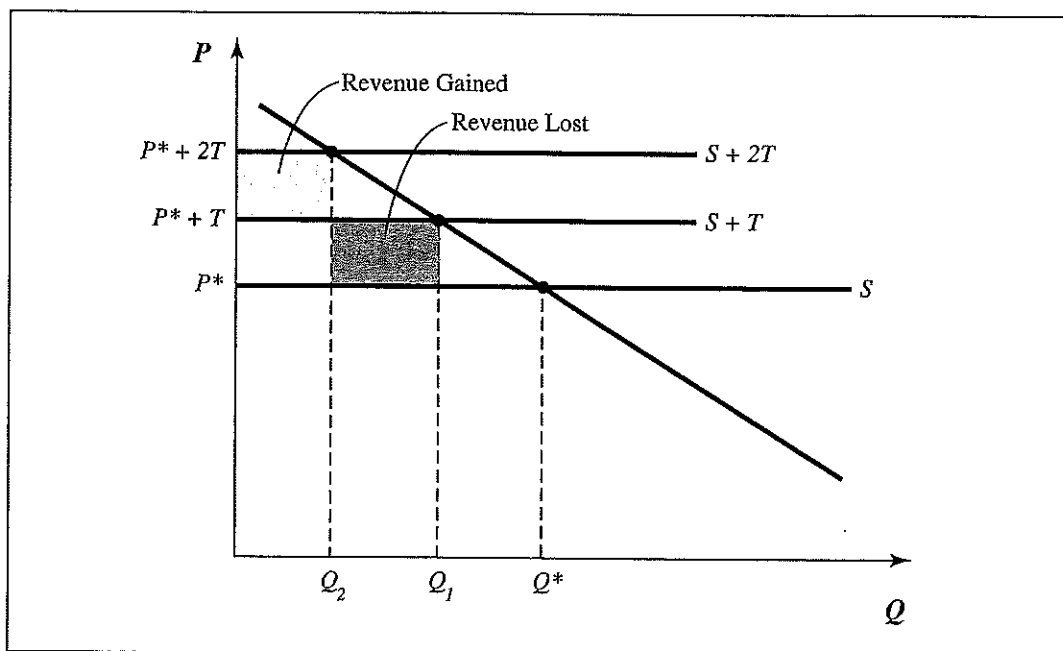
Any tax will have a revenue-maximizing tax rate, beyond which further increases in the rate will lower the revenue. Would tax rates above the revenue-maximizing tax rate be undesirable? A lowering of the rate would give the government more revenue and would give the taxpayers more income. The only justification for taxes above the revenue-maximizing rate would be that if those rates applied to the rich, they would create greater equality, but they would do so by lowering the well-being of the rich rather than by increasing the well-being of the poor.

Rates and Revenues in the 1980s

When Ronald Reagan campaigned for president in 1980, he claimed that high marginal income tax rates actually reduced the amount of revenues collected, so that by lowering rates, more revenues could be collected. Referring to figure 13.5, Reagan's claim was that for high-income taxpayers, income tax rates were above RM . Note that with many different tax brackets, the Laffer curve argument could be true for some taxpayers in high marginal tax rates without being true for all taxpayers. In 1980, the top marginal tax rate for the personal income tax was 70 percent, leaving the taxpayer in this bracket only 30 cents out of each additional dollar of income. In 1982, the top rate was dropped

■ **FIGURE 13.6**
AN INCREASE IN TAX
RATES THAT
PRODUCES A
DECREASE IN TAX
REVENUE

With tax rate T , total tax collections are T times Q_1 , represented by the area between P^* and $P^* + T$ out to quantity Q_1 . If the tax rate is doubled to $2T$, the revenue gained by the rate increase is less than the revenue lost due to the decline in taxed output, so, in this case, a higher tax rate generates less tax revenue.



In the 1980s, as tax rates for upper-income people fell, their share of total tax payments rose

to 50 percent and fell even further later in the decade to a low of 28 percent beginning in 1988. Thus, the taxpayer who could only keep 30 cents on the dollar after federal income taxes in 1980 could keep 72 cents on the dollar in 1988. The drop in the highest marginal tax rate was substantial during the 1980s.

Table 13.1 shows the effect of this decline in terms of the percentage of total income tax revenues collected in 1980 and 1988. When rates were high in 1980, the top 1 percent of income taxpayers paid 19.1 percent of total income taxes, but, after rates fell substantially by 1988, the top 1 percent paid 27.5 percent of all income taxes. As their rates fell, the percentage of total taxes paid by upper-income taxpayers rose considerably. The table shows that the same is true of the top 5 percent and the top 10 percent of taxpayers, who also paid a larger share of total income tax payments. As a percentage of the total, income tax payments by the bottom 90 percent of taxpayers fell. The bottom 50 percent of taxpayers, who paid 7 percent of all income tax payments in 1980, paid only 5.7 percent in 1988, which is a decline of about 19 percent in their share of tax payments.

Some of the increase in taxes by the highest income taxpayers in the late 1980s was because of the closing of loopholes, making more income subject to taxation, but this appears to have had a minor effect. In 1980, taxpayers earning between \$50,000 and \$99,999 paid an average of 29.9 percent of their taxable incomes in federal income taxes, and taxpayers with incomes above \$100,000 paid 46.6 percent of their incomes in federal income taxes. In 1988, taxpayers earning from \$75,000 to \$99,999 paid 16.7 percent of their incomes in income taxes, and taxpayers with incomes between \$100,000 and \$199,999 paid 20.4 percent. No income groups averaged as much as 29 percent

■ **TABLE 13.1**
SHARE OF INCOME
TAXES PAID BY
INCOME GROUPS

INCOME GROUP	PERCENTAGE OF TOTAL INCOME TAXES PAID	
	1980	1988
Top 1%	19.1	27.5
Top 5%	36.8	45.5
Top 10%	49.3	57.2
Next 40%	43.5	37.0
Bottom 50%	7.0	5.7

Source: Calculated from IRS personal income tax data.

of their incomes paid in federal taxes in 1988, so all groups paid, on average, less than the \$50,000–\$99,999 income group in 1980. Although average tax rates for high-income taxpayers fell substantially through the 1980s, their share of total income taxes paid rose, indicating that the closing of loopholes was not the main contributor to the rising tax shares paid by upper-income taxpayers.

The data in table 13.1 show that when the top marginal tax rates were cut significantly during the 1980s, the share of total income taxes paid by those in the top bracket increased substantially, and the share of those in the bottom half of the income distribution fell. This provides some evidence that, in 1980, marginal income tax rates for highest-income taxpayers were on the downward-sloping portion of the Laffer curve and that lowering tax rates on those taxpayers generated more tax revenue. There is some debate on how these numbers should be interpreted. The reason that high-income taxpayers paid a greater share of income tax revenues is that their incomes went up. Following the idea behind the Laffer curve, income would have risen because tax rates fell. Note that it is taxable income that would have had to have risen, so if high-income taxpayers take their money out of tax shelters, reported taxable income would rise without affecting the actual disposable incomes of those taxpayers.

There is no dispute that during the 1980s, the reported taxable incomes of the highest-income taxpayers rose more rapidly than for the population as a whole, and this is what led them to pay a greater share of total taxes. A big motivating factor surely was the decline in tax rates, but this may not have been the only factor. The relationship between tax rates and tax revenues is an important one from a policy perspective, and some economists suggested that President Clinton's tax increase in 1993, which increased the top marginal tax rate to 39.6 percent, would have the effect of reducing revenues. We know that beyond some point an increase in tax rates will reduce tax revenues, but what the revenue-maximizing rate is remains a matter of debate among economists.

AVERAGE AND MARGINAL TAX RATES

In considering the impact of income tax systems, it is important to understand the difference between average and marginal tax rates. A person's average tax rate is the

amount of tax paid divided by the person's income. A person's marginal tax rate is the percentage of any additional income that will have to be paid in tax. For example, assume that a tax schedule requires a taxpayer to pay 10 percent of the first \$10,000 and 20 percent of any additional income as tax. A person who has \$20,000 in income will pay 10 percent of the first \$10,000 in income, which is \$1,000, and 20 percent of the second \$10,000 in income, which is \$2,000, for a total tax bill of \$3,000. The person's average tax rate is the total tax of \$3,000 divided by the person's income of \$20,000, which is 15 percent. The person's marginal tax rate is the percentage of any additional income paid in tax, which is 20 percent.

This is an example of a progressive tax structure because the percentage of income paid in tax rises as income rises. Note that with progressive taxation, the marginal rate exceeds the average rate. The reason for using a progressive tax structure is its redistributive characteristics. A progressive tax structure applies the ability-to-pay principle by having people with larger incomes pay a higher percentage of their incomes in taxes. But it also has the effect of making marginal tax rates higher than average, which increases the excess burden of taxation when compared with a proportional (or regressive) tax structure that raises the same amount of revenue.

Marginal Tax Rates and Excess Burden

Recall that the excess burden of a tax is the result of the fact that the tax provides an incentive for taxpayers to change their behavior to try to avoid paying the tax. Thus, the greater the tax, the greater the incentive to change one's behavior and the greater the excess burden. In the previous example, the taxpayer was in the 20 percent marginal tax bracket, meaning that for each dollar earned, 20 cents had to be paid as income tax. The taxpayer's average tax rate was only 15 percent though, so, if instead of a progressive tax schedule a proportional tax were used, the taxpayer could be taxed at a 15 percent rate on all income and still be taxed the same \$3,000. In other words, with the progressive tax the taxpayer loses 20 cents of each additional dollar in taxes, whereas with the proportional tax that raises the same amount of revenue, the taxpayer loses only 15 cents of each additional dollar. Thus, there is less of an incentive to avoid earning income with the proportional tax than with the progressive tax.

This example is intended to illustrate a general point. The revenue collected by an income tax is a function of the average tax rate, but the excess burden of an income tax is a function of the marginal tax rate. Thus, to minimize the excess burden of a tax, the marginal tax rate should be kept as low as possible. Consider a lump sum tax in this context. The marginal rate of a lump sum tax is always zero, which is why there is no excess burden. Progressive taxes are used for redistributive purposes, but this equity justification for progressive rates has a cost in efficiency. The more progressive a tax system, the higher its marginal rates, and therefore the greater will be the excess burden of the tax system.

The Flat Tax

The idea of keeping marginal income tax rates low to minimize the inefficiency of the income tax has been the major motivating force behind proposals to adopt a flat tax. A flat tax is an income tax that offers a large personal exemption and after that taxes

The size of the excess burden of a tax is a function of the marginal tax rate

all income at one rate. A proposal put forward by Robert Hall and Al Rabushka in the 1980s suggested that if the tax base were broadened to remove all other exemptions, deductions, and credits, a flat tax with a personal exemption of about \$6,000 in 1993 prices for taxpayers and their spouses, and exemptions of \$2,700 for each child, could raise the same amount of revenue with a constant 19 percent tax rate as the current tax structure.⁷ Thus, a family of five, with two parents and three children, would have their first \$20,100 in income exempt from income taxation and would pay 19 percent on the rest.

A flat tax would tax all income at the same rate

The Hall and Rabushka proposal would also tax all corporate income at the 19 percent rate and eliminate the double tax on saving. Although this proposal was never adopted, it was an important element behind the 1986 tax reform that drastically lowered marginal tax rates and reduced the number of brackets. The idea of a flat tax continued to be a point of debate in tax policy through the early 1990s. Note that despite its only having one tax rate, the flat tax is a progressive tax because a significant amount of income is exempt from taxation altogether. Thus, average tax rates would be progressive. This flat tax proposal is interesting to consider as a point of departure in the trade-off between the equity goal of redistributing income through progressive taxation and the efficiency goal of minimizing the excess burden of taxation and may well turn out to be a major focal point in discussion of tax reform in the 1990s.

THE DOUBLE TAX ON SAVING

The income tax system in its current form places a double tax on saving. Income is taxed once when it is earned, and then, if it is saved, the proceeds from the saving are taxed again. To illustrate, consider a person planning to spend \$1,000 on a new stereo. Assume for the moment that there is no tax on income and also that the interest rate is 10 percent, which means that the person can save the \$1,000 and earn \$100 a year in interest. Thus, the cost of the stereo (\$1,000) is the same as the cost of buying an income stream of \$100 a year from now on. Without an income tax, the new stereo costs the same amount as \$100 a year in future income.

However, if there is a 50 percent income tax, the person must earn \$2,000 in income to buy the stereo because \$1,000 will be paid in taxes, leaving \$1,000 to pay for the stereo. How much income will have to be earned to buy the \$100 per year income stream? To receive the \$100 per year income stream, the interest earned must be \$200 because with a 50 percent tax rate, half the interest will be paid in taxes. Thus, to get \$100 after taxes, \$200 must be saved at a 10 percent interest rate, which yields \$200 in before-tax interest and \$100 in after-tax interest income. To put \$2,000 in the bank to earn the interest, \$4,000 in pretax income must be earned at a 50 percent tax rate, of which \$2,000 will be paid in taxes so that \$2,000 can be saved. Thus, it costs \$4,000 in pretax income to buy the \$100 income stream with a 50 percent tax rate, but it costs \$2,000 in pretax income to buy the \$1,000 stereo.

In this example, with no taxes the person must earn the same amount of income to buy the \$1,000 stereo as the \$100 permanent income stream. But with a 50 percent

⁷ Robert E. Hall and Alvin Rabushka, *The Flat Tax* (Stanford: Hoover Institution Press, 1985).

A double tax on saving arises because income is taxed before it is saved, and then interest earned on after-tax income is taxed again

tax rate, the \$100 income stream takes twice as much income to buy as the \$1,000 stereo. The reason is that with the income tax the future stream of income is taxed twice. Tax is paid on the income once when it is earned originally, and the money put into savings is after-tax income. The money is taxed again when the interest proceeds from the savings are taxed, so the relative price of saving rises with an income tax. This is why an income tax structure like the current U.S. income tax places a double tax on saving.

One problem with the double tax on saving is that it raises the cost of saving relative to consumption, so it reduces the amount of saving and the amount of income available for investment. Thus, the income tax system favors present consumption over investment. This is one reason why a consumption tax may be preferable to an income tax. When there is a double tax on saving, a part of the burden of the tax is shifted forward into the future. Lower investment today means lower future productivity. The double tax on saving reduces present capital formation and reduces future output in exchange for more consumption today. In this light, the advantages of a consumption tax over an income tax become evident. As long as income is saved, it is not taxed under a consumption tax, but when saving is withdrawn and consumed, then the tax is paid.

An argument can be made supporting this double tax based on equity grounds. Because people with higher incomes tend to save more, the double tax on saving falls more on those who can best afford it. Furthermore, some people have higher expenses than others, so the ability to save may indicate that the double tax is placed on income not needed for necessities. Indeed, the same arguments that favor progressive taxation can also be used to support a double tax on saving, but at least one should recognize that this double tax exists and that the burden of the tax is shifted into the future.

Although in general saving is taxed twice under the present income tax system, the tax system does provide ways to save so that the double tax is avoided. These methods, such as IRA and Keogh plans, are discussed in the next chapter, which examines the U.S. income tax system in detail.

CONCLUSION

Income taxation is the single most important source of tax revenue in the United States. For this reason, its effects are of more interest to the general public and to public finance economists than are the effects of other taxes. The income tax has the general effect of causing people to substitute into leisure and out of income-producing activities, although this substitution effect might be offset to a degree by the income effect. However, when the combined effects of taxation and government expenditures are considered, surely the substitution effect dominates and income taxation causes people to substitute out of income-producing activities. This is the excess burden of the income tax, and because it causes people to earn less income, it lowers the overall productivity of the economy.

The income tax places a double tax on saving because income is taxed once before it is saved and again as interest income from the saving. The result is that the income tax system provides an incentive to consume rather than save, which lowers investment in the economy. The resulting lower investment is yet another reason why the income tax lowers the productivity of the economy. Any tax has an excess burden, however,

and although it is desirable to minimize the excess burden of taxation, it is one of the costs of raising revenues to finance the government's expenditures.

This chapter has reviewed the theory of income taxation to help understand what income is and how income taxes affect the economy. We noted that there are many questions regarding the definition of income for tax purposes. How should in-kind income be treated? How should capital gains be treated? There were also issues regarding the trade-offs between equity and efficiency in income taxation. The next chapter builds on this foundation by examining the personal income tax in the United States to see how we actually have addressed these issues in the tax code.

QUESTIONS FOR REVIEW AND DISCUSSION

1. Why is there a problem in defining income for tax purposes? List some possible definitions of income for tax purposes, and outline the advantages and disadvantages of each.
2. Use a diagram to illustrate why the typical taxpayer is better off under a more broadly based tax rather than a more narrowly based tax when the two taxes collect the same amount of revenue.
3. Will people work more or less if income tax rates are increased? Fully explain the arguments on both sides of the issue. Which arguments do you think are correct, and why?
4. What is the Laffer curve? Explain why it is shaped the way it is. Why might a country choose a tax system that places it on the downward-sloping portion of the curve?
5. Explain the distinction between the average tax rate and the marginal tax rate. Why is this distinction important?
6. Explain the difference between a sales tax, a consumption tax, and an income tax. What are the advantages and disadvantages of each?
7. Explain how the current tax system places a double tax on saving. Can this policy be justified? What are the drawbacks of a double tax on saving?
8. What are the main differences between a flat tax and the current tax system? What are the advantages and disadvantages of a flat tax when compared with the current system?
9. What is imputed rental income? Should it be included as taxable income? Explain both sides of the argument, and then give your position.