

Taxes

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Governments are an unavoidable feature of modern life: they are the central player in building and enforcing the institutional arrangements that make economic and business life as we know it possible. They're also, in some cases, an obstacle to performance. The difference between good and bad economic performance is often the difference between good and bad government.

Our focus will be on the narrower issue of government revenues and expenses. Governments differ around the world in how much they spend (generally measured as ratio to GDP), what they spend it on, and how they finance their spending (taxes and borrowing).

This class is devoted to taxes. Taxes are mind-numbingly complicated, but these two principles describe good tax systems:

- Administratively simple and transparent. The tax systems in some countries are so complex that people spend days or weeks of their time, or even hire professionals, to figure out what they owe. Worse, some countries assess taxes in ways that seem arbitrary, leading to unpredictable tax expenses and endless disputes. The best systems are simple (it's not hard to figure out what you owe) and transparent (you know ahead of time the tax consequences of your actions).
- Broad tax base. Most tax systems are riddled with exemptions. The problem with exemptions is that they leave non-exempt activities to finance government spending. With a narrower tax base, the rate must be higher, which generally creates worse incentives.

We'll focus on the second principle, leaving the first to speak for itself.

Social cost of taxes

Taxes are a necessary evil: governments, like people and businesses, must finance their spending one way or another. Governments generally do it with taxes. However, the way in which governments collect tax revenue can affect economic performance and welfare. The issue is not that taxes take purchasing power away from individuals.

They do, but if government spending must be financed, that's really a question of whether the spending is socially useful. We'll leave you to decide that for yourself. Our issue is that taxes inevitably discourage some activities relative to others. Taxes on labor income may discourage work, taxes on capital (or investment) income may discourage saving and investment, and taxes on cigarettes may discourage smoking. We'll leave cigarettes for another time, but the general incentive effects of taxes are worth a closer look.

More formally, taxes affect ("distort") economic decisions. They insert a "wedge" (a difference or discrepancy) between private and social costs of various activities. As a result, they generally lead to decisions that are socially inefficient: we could reallocate the same resources and raise everyone's welfare. The conditions for this "invisible hand" result should be familiar from your Firms & Markets class: clear property rights, competitive buyers and sellers (no monopolies), complete information, and absence of externalities (no direct impact of one person's actions on another's income or welfare). Under these conditions, we might want to set tax rates to generate the least disruption to resource allocation: to minimize the adverse incentives built into taxes.

We can get a sense for how taxes affect decisions in a traditional supply and demand setting like that illustrated in Figure 1. The demand curve (labelled D) represents purchasers of the product; for any given quantity Q it tells us how much buyers are willing to pay, hence the value to them (at the margin) of that number of units. The supply curve (labelled S) represents sellers. With competitive sellers, it tells us how much it costs to produce a given quantity (at the margin). The market clears at point A, where supply and demand are equal.

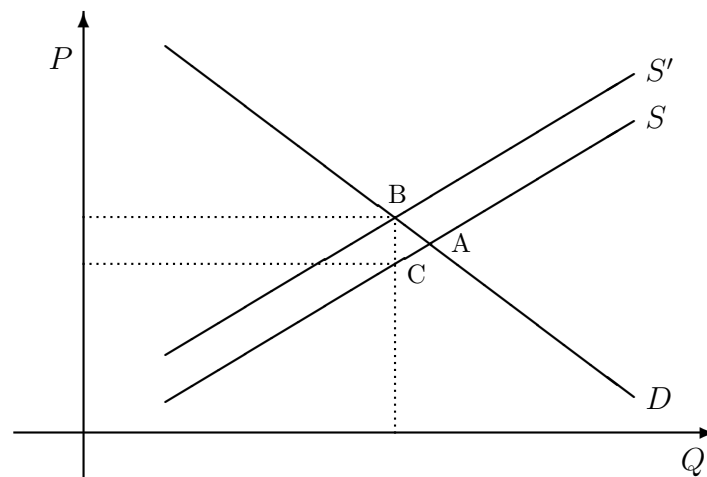


Figure 1: Social cost of a tax. The social cost of imposing a tax that shifts the supply curve from S to S' is the triangle ABC.

Now suppose we charge a tax of a fixed amount per unit. From the perspective of

buyers, the supply curve has shifted up by the amount of the tax to S' . Note that there is now a difference between the social cost (the marginal cost of production in terms of resources used) and the private cost (the price paid by buyers). The market now clears at B for buyers and C for sellers. This difference leads buyers and sellers to reduce the quantity of resources allocated to this product, leaving them to be used elsewhere in the economy. Buyers, of course, buy fewer units, because the price has gone up. Sellers offer fewer units for sale, because the price to them has fallen. The magnitude of the change in quantity depends on the slopes of the supply and demand curves.

The social cost of the tax (the reduction in welfare it causes) is the area inside the triangle ABC. The upper part of the triangle is the loss of consumer surplus (the difference between what buyers pay and what the product is worth to them). The lower part of the triangle is the loss of producer surplus (the difference between what sellers receive and the cost of production). The sum is the social cost of the tax, which economists refer to as the “deadweight loss” or “excess burden.” You may recall a similar argument against monopolies. Both result in fewer resources devoted to the product than we would like.

There’s a fine point here about who pays the tax. We could charge sellers or buyers with the same result. Governments sometimes prefer taxes on firms to taxes on people, in part because it makes the tax less visible to voters, but the impact on resource allocation should be the same.

The benefits of a broad tax base

One objective of a good tax system is to minimize the social cost of taxes: to raise tax revenue with as little impact as possible on resource allocation. We sometimes say we’re looking for a resource-neutral tax system. This is an incredibly complicated issue, both in theory and in practice, but one principle is that we want a broad tax base.

The argument for a broad tax base goes like this. Think about two ways of raising the same tax revenue: a low tax rate on a broad base and a higher rate on a narrower base. Which is better? We’ll give an answer using our supply and demand analysis. Suppose we have two similar markets, each like the one we described in Figure 1. In the broad-base system, we tax the products in both markets at the same rate. The social cost is therefore double what we saw earlier: the triangle ABC for each market.

Now consider a narrow base system: tax one market at twice the rate. We’ll use Figure 2 to see how this works. There we have drawn three supply curves: S refers to supply without the tax, S' refers to supply with a small tax (the broad base system), and S'' refers to supply with a tax rate double that in S' (the narrow base system).

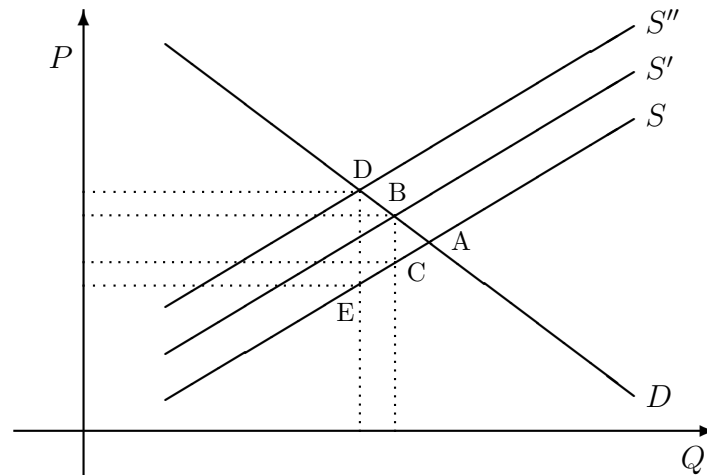


Figure 2: Social cost of doubling a tax. We double the tax rate by shifting the supply curve from S to S'' . Note the social cost: the triangle ADE is four times as big as ABC .

What is the social cost of the narrow base? Since the rate is higher, the welfare triangle is larger; it consists of the area ADE . If you look at this long enough, you'll realize that the area of ADE is four times that of ABC , which makes the social cost twice as large as the broad base system. The point in general is that broad-based tax systems are better, because they allow you to raise a given amount of revenue with a lower rate and smaller welfare cost. You'll hear lots of arguments for tax exemptions, but you rarely hear that they result in higher taxes on other things, which is the primary argument against them.

A corollary of this principle is that with similar goods — by which we mean goods with similar supply and demand curves — we should aim for similar tax rates. The reasoning is the same, although it's harder to show in a diagram (high and low being less obvious than double and zero). If we have goods whose demand curves have different slopes, similar logic would lead us to tax them differently, but that's a subtle point we'd prefer to leave for another time. (How's "never" for you?)

Applications

Here are some practical applications of the broad-tax-base/tax-similar-goods-the-same principle.

The underground economy. One of the difficulties of an underground economy is that unofficial businesses typically do not pay taxes, thereby forcing all of the tax burden on the rest of the economy. That violates our principle (low rate on broad base) and

also the corollary (tax similar goods at the same rate). We've shown that this leads to an inefficient allocation of resources.

William Lewis (*The Power of Productivity*) argues that in Brazil, it may also lower productivity. His argument: Brazil has a relatively large government for a country at its stage of development (40% of GDP, which is above the US and significantly above what we see in most developing countries). Financing government spending requires, therefore, relatively high tax rates, which creates a substantial incentive for tax avoidance. Small firms are generally less productive than large firms (economies of scale), but they survive because they are able to avoid taxes. The system thus acts to encourage inefficient small firms, thereby lowering overall productivity. In Lewis's story, this is a direct impact of large government.

Value-added taxes. Before the VAT became popular, countries often had piecemeal tax systems in which goods were taxed at every stage of production. This led, in some cases, to very high taxes on intermediate and final products simply because the taxes at each stage added up. This violates our principle, specifically the corollary, because a product made by one firm is taxed at a lower rate than the same product made by several firms, one at each stage.

Consider a product that has five stages of production, each performed by a different firm. If each stage is charged a moderate tax of 10%, what is the total tax paid in the production of the product? Let's say total value added is five, with one unit of value added at each stage. The first-stage firm produces one unit of value. This costs the second-stage firm 1.10, since it must pay a 10% tax. This firm also adds one unit of value, and sells its output for a price (including taxes) of

$$(1.10 + 1) \times 1.10 = 2.31,$$

so the implicit tax rate over the two stages is $0.31/2 = 15.5\%$. If you work through all five stages, you'll find that the price of the final product, including all the taxes paid, is 6.71 after the last stage, so the effective tax rate is 34.2% $[(6.71 - 5.00)/5.00]$. Note the large difference in tax rates across the five stages of production. The final stage only gets taxed once, so it pays a tax rate of 10%, but the first stage gets taxed five times, so it's taxed at a rate of 61% $[1.10^5 = 1.61]$! In contrast, a vertically-integrated firm pays only 10% — at each stage and overall.

These differences in tax rates potentially lead to inefficient production, as firms look for substitutes for highly-taxed inputs, or integrate vertically. This is one of the arguments for a value-added tax system. With a value-added tax, firms pay tax on only the value-added of their stage of production, which eliminates differences in tax rates paid by the different stages. A value-added tax system is equivalent to one in which we tax only the final good, we just arrange to collect the tax in pieces.

Taxes on capital income. A high tax rate on capital income might be expected to discourage saving and investment, leading the economy to have less capital than

otherwise. This in turn would reduce wages, since the marginal product of labor is lower if we have less capital. So what is an appropriate tax rate on capital income? Some economists argue that taxes on capital income should be zero. People would eventually pay tax on capital income indirectly when they consume the proceeds, but they should not be taxed before then. The logic is similar to the argument for a value-added tax, since taxes on capital income are effectively taxes on future consumption and accumulate in a similar way.

Let's think about how households allocate their income over time. Suppose we have two dates (labelled "0" and "1"). If a household earns labor income (Y_0, Y_1) at the two dates and receives a (real) interest rate r on saving, then saving is $S = Y_0 - C_0$ and consumption at date 1 must be $C_1 = (1 + r)S + Y_1$. We can put the two together in the present value relation,

$$C_0 + C_1/(1 + r) = Y_0 + Y_1/(1 + r).$$

This tells us, in essence, that the price of date-1 consumption is $1/(1 + r)$. If we had more periods, we'd have a similar relation, with prices of $1/(1 + r)$, $1/(1 + r)^2$, $1/(1 + r)^3$, etc., for consumption at dates 1, 2, 3, etc.

Now think about taxes. If we tax interest income, this changes the price of future consumption. For a given real interest rate r , a higher tax rate increases the price of future consumption, which you might expect to encourage current consumption. If the tax rate on capital income is τ , then the after-tax interest rate is $(1 - \tau)r$ and the price of consumption n periods in the future is $1/[1 + (1 - \tau)r]^n$. This may not seem like a big deal, but with the mythical power of compound interest, it can increase the price of future consumption substantially. Consider a numerical example with $r = 0.04$ (4% a year) and a tax rate of $\tau = 0.25$ (25%). With no tax, the price of consumption one period in the future is 0.9615 [= $1/(1 + r)$]. With the tax, this increases to 0.9709 [= $1/[1 + (1 - \tau)r]$], a modest difference. But if the number of periods is large, the difference can also be large. Suppose $n = 25$; think of a 30-year-old consultant saving for retirement. Then the tax raises the price of future consumption by 27%, from 0.3751 to and 0.4776. You can imagine that this could lead people to consume more now and less later, since future consumption has become relatively more expensive. It might also lead them to work less, if working now is designed to finance future consumption.

If people consume more now and less later, then they are saving less. And if they are saving less, the economy will have less capital. The cost has the same source as our earlier analysis: the private benefits of saving are less than the social benefits, so we do too little of it. That's why some economists favor a consumption tax: a tax on only that part of income that is consumed. In practice, many countries offer something of this sort through tax-sheltered retirement and saving programs, which avoid the period-by-period tax on investment income of our example.

Changing tax rates. Economist Edward Prescott writes (*Wall Street Journal*, December 20, 2005):

Let's drop the word "cuts" [when we talk about taxes]. The problem with advocating a cut in something is that you are necessarily going to stir up political trouble from someone who will want to increase it again. So, even if you are fortunate enough to get your cut enacted, it is likely a matter of time before the political pendulum swings back and someone else gets their increase.

The argument against large changes in tax rates over time follows from the corollary: tax two similar markets at the same rate. In this case, the two markets are "today" and "tomorrow." We could add the cost of the uncertainty created by the process of changing tax rates.

Deficits. The same argument gives us some insight into deficits: we should finance whatever the government spends with relatively stable tax rates. Why? Because low taxes now and high taxes later, or the reverse, violates our principle. Suppose, then, the government is running a deficit. Should it raise taxes? It should aim at a stable level of tax rates that finances government spending. Typically you would expect this to lead to deficits in recessions, when the tax base is small, and surpluses in booms. In practice, this is more complicated, because we don't know either the level of spending (what's the present value of future commitments to social security and medicare?) or the base on which tax rates will be applied (will the economy grow 3% a year over the next decade or 4%). The principle remains: finance government spending with stable tax rates.

Executive summary

1. All taxes have incentive effects. In the absence of externalities and monopolies, the tax systems that lead to the most efficient allocations of resources (a) apply low tax rates to a broad base and (b) tax similar products at similar rates.
2. The cost of exemptions is that non-exempt products must pay higher rates.

Review questions

1. Suppose a hypothetical government has no expenditures to finance. What tax rates should it set?

Answer. Zero! Why? Nonzero taxes (even negative taxes or subsidies) generate adverse incentives: the prices people pay for products do not reflect their social cost of production. Possible exception: externalities, although even here there may be better choices than taxes.

2. Is small government best?

Answer. This is a complex issue, but here's one take on it. First, you need a government. There are clearly important and necessary roles for government: providing national and personal security, defining and enforcing property rights, supporting competitive markets, and so on. Without an effective government, you simply can't have a productive economic system. Second, there's tremendous variety across countries in the kinds of services provided by government. In many countries, governments supply educational services, social insurance, and pensions, although the degree of government involvement varies. The evidence is mixed. Among countries with high GDP per person, those with large governments are not noticeably less productive than those with small governments. Sweden, for example, is a prosperous country despite very high government spending. Among developing countries, the evidence is stronger: those with smaller ratios of spending to GDP have grown faster, on average, over the last forty years. This may reflect the direct effects of government or other factors, it's hard to say.

3. Comment on these aspects of the US tax system:

- (a) Sales tax exemption for food and clothing.
- (b) Sales tax exemption for goods purchased over the internet.
- (c) Sales tax exemption for medical care.
- (d) Income tax exemption for health insurance.
- (e) Sales tax exemption for education supplied by nonprofit institutions.
- (f) Elimination of the capital gains tax.

Answers.

- (a) Probably bad: it means tax rates on other things must be higher. One common justification is that favors poor people, since food and clothing are necessities, but it's probably not a very good way to do this.
- (b) Also bad, and for the same reason. It leads to such things as sales tax on internet purchases from Barnes & Noble (since they have local outlets) but not Amazon (since they do not).
- (c) Ditto.
- (d) Ditto.
- (e) It's hard to argue you would tax a product differently just because its producer has different legal structure. Remember: the NYSE was a nonprofit until recently.
- (f) To the extent that it's a tax on capital or investment income, this could be a good thing. Further, capital gains reflect inflation as well as investment

income, which can result in potentially very high tax rates on real returns. The solution here, though, is to index the tax system (or keep inflation low enough that it doesn't have much effect). An important caveat is that there are no adverse incentive effects involved in taxing capital gains that have already occurred; the incentive argument only works going forward.

If you're looking for more

For more information on tax systems and tax rates, see:

- The [OECD](#) has a program on taxes in (mostly) developed countries.
- The World Bank's Doing Business website has a [project](#) on the amount and difficulty of paying taxes for mid-sized firms in most countries around the world. Be careful, however, of the definitions. Total tax, for example, is reported as a percentage of profit, even though some of the taxes apply to labor. It's a tax, but we find this way of reporting it misleading.
- The Economist Intelligence Unit's Country Commerce and Country Finance reports contain information about both business and individual taxes. Here's what they say about corporate taxes in the US: "Tax jurisdiction in the United States is divided among the federal government, the 50 states plus the District of Columbia, and local counties and municipalities. ... There are no uniform rules on the definition of taxable income or on the apportionment of income among the various tax jurisdictions. Hence, the advice of a tax lawyer is practically indispensable to any newcomer to multistate business."
- Myron Scholes, Mark A. Wolfson, Merle Erickson, Edward Maydew, and Terrence Shevlin's *Taxes and Business Strategy (4e)* is a wonderful practical book on tax issues. (Earlier editions are cheaper, authors vary.)
- [Greg Mankiw](#) and [David Altig](#) have nice discussions in their blogs of a practical example: if Mankiw were to make an extra dollar, invest it, and give it to his kids in 35 years, what would they get? The answer highlights tax rates on labor income, interest income, and bequests. My take: they add up.