

Chapter 5

The Analysis of Taxes and Demand

It is often said that "Nothing is certain in Life except Death and (the Paying of) Taxes". But, while the effects of taxes on economic activity may not be certain, there are general principles that we can use to understand these effects. The model we use is supply and demand. There are, of course, many taxes being used by government to raise revenue for its expenditure. In this chapter, we will consider only two types of taxes – income taxes and sales taxes.

In some sense, income taxes are more complicated than sales taxes, so we can begin with income taxes first.

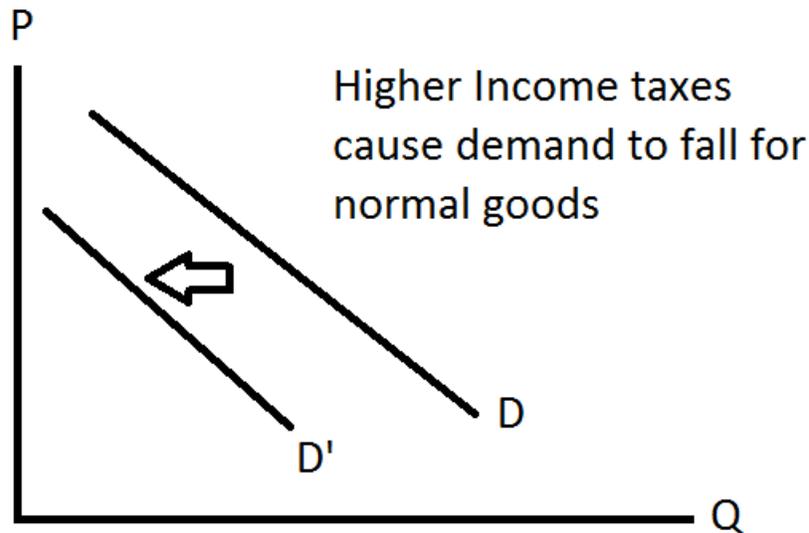
Income taxes are taxes on factor income (wages and salaries, interest, rent, and profits). It is true that most income goes to work effort (labor) and therefore taxes on income are really taxes on work effort. Thus, logically speaking income taxes must have some supply effect. Higher taxes on income will cause some people decide to work less. However, there is not a lot of evidence that this effect is strong. The largest effect should be on professionals, who decide their work schedules on a continuing basis¹. Most people are not professionals and therefore take what work is available. It is also true that if income taxes are assessed on everyone and are extremely heavy and onerous, some people will not choose to work two jobs. Households may decide to stay at home and engage in household production. They will leave the labor force. Some people may seek to work in the underground economy for cash payments each day. Income taxes affect supply, but not as much as one would expect as rates remain moderate.

Most economists think of taxes affecting demand directly. Higher taxes reduce disposable income for consumers and this means consumers have less resources to spend. Of course, income taxes affect different products differently. Products with a large income elasticity – like high definition TVs – would be greatly affected by a rise in taxes, whereas the demand for cigarettes – with a low income elasticity – would be affected much less. The point is that the demand for each product in the market depends not on gross income but on net income (net of taxes) and this net income is referred to as disposable income.

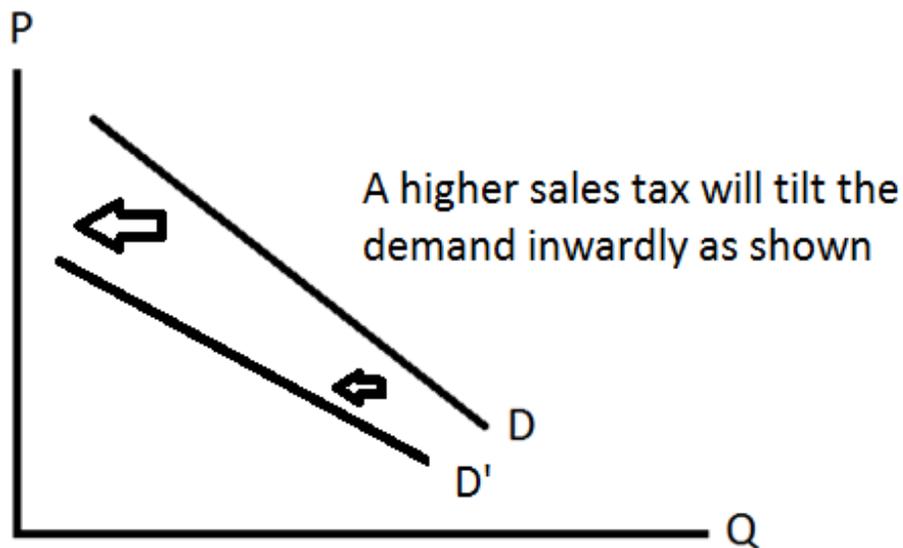
How can we explain the impact of income taxes on a single representative market? Raising income taxes means that consumers in any market will have less disposable income. This will reduce their demand. The degree to which demand falls depends on the income elasticity of demand. A high income elasticity will result in the large fall in demand when income drops. The opposite is also true. This means that low elasticity goods, which are generally thought to be small budget necessities, will not be altered much by a fall in disposable income due to a rise in income taxes. Luxury goods, which are thought to have a high income elasticity of demand, will experience a

¹ President Ronald Reagan felt that taxes had a strong effect on work effort. He justified this by saying that when he worked in Hollywood in the 1950s people would only make 4 movies each year. The reason was that the government took so much from the income of the fifth movie that it was not worthwhile to make it. Few people get to enjoy the flexibility that Reagan did, though.

large drop in demand whenever disposable income falls due to high income taxes. This can be seen in the diagram below.

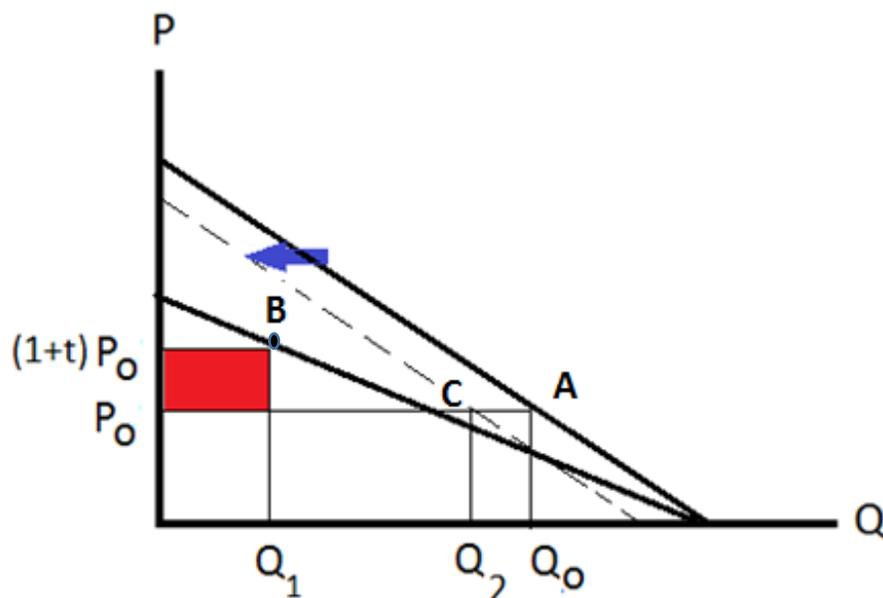


Sales taxes are assessed on the sales value of a transaction. Thus, one can think of a sales tax as $(1 + \tau)P$ where $P =$ price of the good. The total sales tax paid would be equal to $T = \tau PQ$. Imposing a sales tax (only on the good in the graph below) tilts the demand curve.



In general, economists prefer direct taxes like income taxes to indirect taxes like a sales tax. For one thing, direct taxes cannot be easily shifted to other people (a direct tax taxes people and things) whereas an indirect tax, such as a sales tax, can be shifted to other people. Also, sales taxes generally affect relative prices (if the tax is not a general tax) while income taxes do not. Thus, indirect taxes tend to upset market allocations much more than direct taxes.

Let's use the demand curve to show the superiority of an income tax over a limited sales tax.² In the graph below we see that before the sales tax is assessed the market is at point A with Q_0 being demanded at price P_0 . After the sales tax of t is imposed, the consumer moves to point B with Q_1 being demanded at price $P_0(1+t)$. Note that we hold the price constant at P_0 to compare positions. Much less is demanded at a higher full price (including the tax). The total tax collected would be tP_0Q_0 and is shown in red. Now, suppose that this tax is instead taken away as a lump sum amount from consumers. The demand shifts inward and the consumer moves from point A to point C. It is clear that although we have assumed equal taxes are collected, consumers would prefer point C to point B since it provides more quantity at a lower price. The reason it is preferred is because the move from A to C is an income effect only, whereas the move from A to B is both an income effect and a substitution effect.



This analysis shows that a lump sum income tax (direct tax) is preferable to a limited sales tax (indirect tax). Economists believe that lump sum taxes are preferred to taxes that distort relative prices. The tilting of the curve in the figure above occurs because one good is assessed a sales tax while another good is not taxed. The tax is limited to one good only. This makes the taxed good more expensive to consumers than the good that is not taxed. It is the government discriminating against one good in favor of another. The lump sum tax does not create this discrimination since it taxes the total income (regardless of the size of the income and regardless of the work effort). Of course, consumers will not like paying their income tax or sales tax. But, given equal tax

² We assume here that some goods are not assessed a sales tax. If all goods are assessed a proportional sales tax, the effect is no different than a general reduction in income.

revenue must be raised, a lump sum income tax will be preferred by the market to a discriminatory sales tax.

Problems:

(P1) What is the difference between a direct tax and an indirect tax?

(P2) Suppose the demand for X is

$$Q_x = \alpha - \beta P$$

Now draw this demand in (Q, P) space. Next, suppose that there is a sales tax rate τ . Now draw this demand in (Q, P) space. Is there a shift or a tilt in the demand because of the tax?

(P3) Suppose the government wants to control pollution that is caused by the production, sale, and use of good X. How can a sales tax on this good X alone help reduce pollution? How big should such a tax be?

(P4) The most important tax for any modern government is the income tax. Since most income assessed on wages and salaries earned from work, a tax on this income is really a tax on work. Why should we tax income and therefore discourage work effort?

(P5) What is the difference between wealth and income? Which one affects demand, or do both affect demand?

(P6) What is the price elasticity of demand in (P2) above?

(P7) When a sales tax is placed on a good, who bears the burden of the tax? (hard: I will answer this one in class)