University of Zurich[UZH]

Leseaufträge «Mikroökonomik I»

Modul 2: Konsument und Nachfrage

Unit 6:

– Ausgabenminimierung

Quellen:

– **Chapter 6 – Applications of Rational Choice and Demand Theories**
Frank, Robert H, & Cartwright, Edward. (2016). *Microeconomics and Behaviour (2nd European ed.)*. London: McGraw-Hill Education.

A brief look at the car industry illustrates the difficulty. In 1988 the average price of a new car in the UK was £12,207. In 2013 the number was £27,742.[5] This is an increase of 127 per cent over 25 years. It turns out, however, that this increase is almost exactly the same as the overall rate of inflation over this period. So, a new car costs roughly the same now as it did back in 1988.

Note, though, that a modern car is very, very different to a 1988 model. Air bags, power steering, air-conditioning, satellite navigation, digital radio, parking sensors, cruise control, ABS breaks and enhanced fuel efficiency are just some of the things we expect of a new car that simply did not exist in a standard 1988 model. Thus, the quality of car a buyer gets for her money has dramatically increased since 1988.

A failure to account for this change in quality induces a bias in the CPI. In particular, customers in 1988 would have been willing to pay a lot more, on average, than £12,207 if the cars they were buying had the features we see in a modern car. Similarly, modern customers would want to pay a lot less than £27,742 if modern cars only had the features available on 1988 models. Either way, we see that the CPI will tend to overstate price increases if it neglects changes in quality. And quality has been improving rapidly not just in cars but in other goods and services as well. Modern computing, for instance, has come a long way from the ZX Spectrum and Commodore 64!

Measures of CPI do try to account for changes in quality. This, however, is tricky to do. We simply do not know, for instance, how much consumers would have paid in 1988 for a modern-looking car. We should also be mindful that CPI is a measure of 'cost of living'. Cars built in 1988 would not have passed modern emissions tests and so current car users *have to buy* a better quality car than was common in 1988. Similarly, the computers of 1988 did not have wireless internet access but many today would find life intolerable without wireless internet. The quality of goods and services that are necessary in order to obtain a particular standard of living also, therefore, changes over time. ■

THE INCOME-COMPENSATED DEMAND CURVE

The individual demand curves we saw in the previous chapter take into account both the substitution and income effects of price changes. For many applications, such demand curves will be the relevant tool for predicting people's response to a change in price. Suppose, for example, that petrol prices rise because of conflict in the Middle East. Such a price increase will have both income and substitution effects, and the individual demand curve described earlier will be the appropriate device for predicting a person's response.

In other situations, however, this demand curve will not be the right tool. Evaluating the impact of a tax change is one important example. Put simply, governments take money through taxes and give it back through state benefits or publicly-funded services. So, when a government increases the tax on a good the revenue from that tax should trickle back to consumers one way or another. Because of redistribution from, say, the rich to the poor, the revenue from a tax rise does not necessarily go back directly to those who paid the taxes. But often it does. Finance ministers typically play on this fact, softening the news of a tax rise with promises of all the things the revenue will be spent on.

Sometimes governments go further by explicitly saying that money raised from a tax will be given back in benefits. As an interesting historical case in point, consider a proposal in the US in the late 1970s to tax petrol. The aim was to make the US less dependent on foreign oil. A modern view would also look at the resulting reduction in carbon emissions. One immediate objection to the proposal was that the resulting rise in petrol prices would impose economic hardship on the poor. Anticipating this objection, the government proposed to ease the burden on the poor by using the proceeds of the petrol tax to reduce the tax on wage earnings. Critics immediately responded that to return the proceeds of the tax in this fashion would defeat its purpose. These critics believed that if consumers got the petrol tax back in the form of higher pay cheques, they

[5]Figures from the Office for National Statistics.

© Digital Vision Ltd./SuperStock

In 1979, critics used economically flawed arguments to defeat US President Carter's proposed tax on petrol.

would go on buying just as much petrol as before. The critics 'won' the argument and the plans were dropped. But as we will see, these critics were woefully in need of instruction in the basic principles of rational choice.

A tax on petrol, taken by itself, would increase the price of petrol and produce the corresponding income and substitution effects. The effect of the simultaneous earnings tax reduction, roughly speaking, would have been to eliminate the income effect of the price increase. The substitution effect, however, still remains. This is what the critics overlooked. A higher price for petrol would have resulted in consumers substituting away from cars by using alternative forms of transport, joining car-sharing pools, making fewer trips, or similar. It is no accident that vehicles produce the equivalent of around 6 tonnes of CO_2 per capita per year in the US compared to only 2 tonnes in the EU.

income-compensated demand curve demand curve that tells how much consumers would buy at each price if they were fully compensated for the income effects of price changes.

To analyse the effect of such a policy in more detail, we can use the **income-compensated demand curve**. This tells the amounts consumers would buy if they were fully compensated for the income effects of changes in price. To generate this curve for an individual, we simply eliminate the income effect from the total effect of price changes.

The top panel of Figure 6.12 shows the income and substitution effects of an increase in the price of petrol from €0.75/litre to €1.50/litre for a consumer whose weekly income is €120. The ordinary demand curve for petrol for the individual pictured here would associate €0.75 with 70 litre/wk and €1.50 with 45 litre/wk.

The income-compensated demand curve is always constructed relative to a fixed reference point, the current price. Thus, like the ordinary demand curve, it too associates 70 litre/wk with the price €0.75. But with the price €1.50 it associates not 45 litre/wk but 55 litre/wk, which is the amount of petrol the consumer would have bought at €1.50/litre if he had been given enough income to remain on the original indifference curve, I_0.

The critical point is that C lies well to the left of the original bundle, A, which means that, despite his income being compensated, the consumer substantially curtails his petrol consumption. If petrol is a normal good, the effect of the rebate is to offset partially the income effect of the price increase. It does nothing to alter the substitution effect.

The individual whose responses are described in Figure 6.12 happens to regard petrol as a normal good, one for which the quantity demanded increases as income rises. For normal goods, the income-compensated demand curve will necessarily be steeper than the ordinary demand curve. In the case of an inferior good, however, the ordinary demand curve will always be the steeper of the two. The relationship between the two demand curves for an inferior good is as pictured in Figure 6.13.

In applications, the distinction between ordinary and income-compensated demand curves turns out to be particularly important for questions of tax policy. In the case of Jimmy Carter's petrol tax proposal, there was an explicit provision for the proceeds of the tax to be returned to the people who paid it. But, as discussed earlier, even without such a provision, the practical impact of a new tax would be roughly the same. When the government raises more revenue from one source it can raise less from others or spend more. The end result is that the relevant demand curve for studying the effects of a tax on a good is the income-compensated demand curve.

As a practical matter, the distinction between the two types of demand curve is relevant only for goods for which income effects are large in relation to the corresponding substitution effects. In order for the income effect of a price change for a particular good to be large, it is necessary (but not sufficient) that the good account for a significant share of total expenditures.

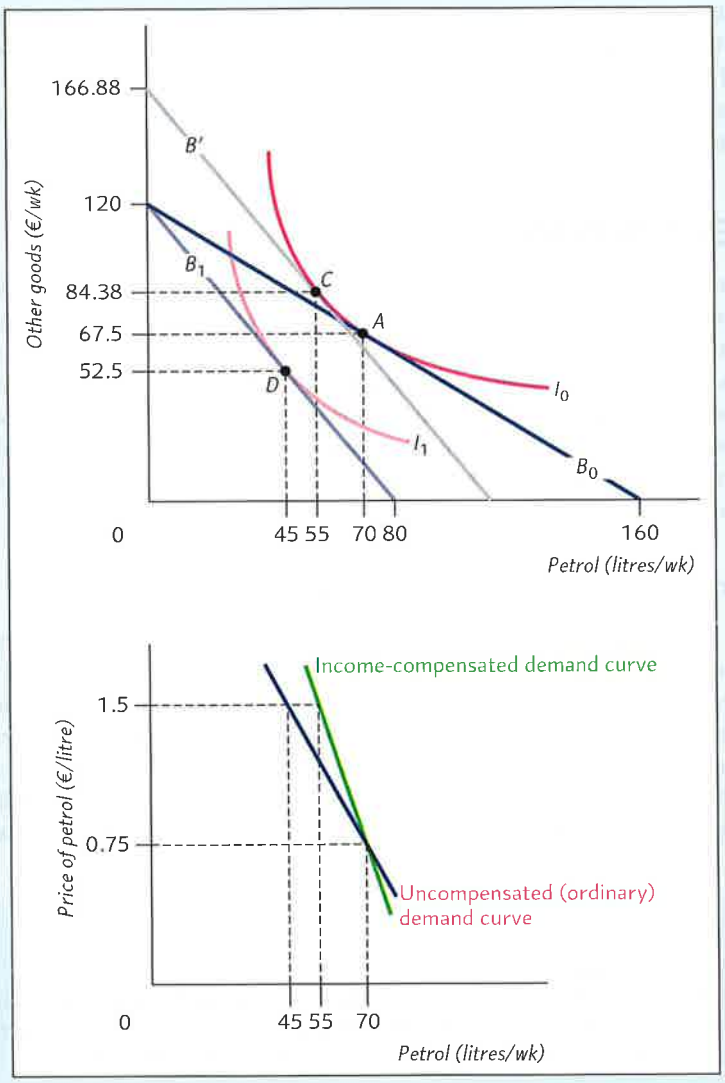

FIGURE 6.12
Income-Compensated Demand Curve for a Normal Good
The ordinary demand curve plots the substitution and income effects of a price change. The income-compensated demand curve plots only the substitution effect. For a normal good, the income-compensated demand curve will always be steeper than the ordinary demand curve.

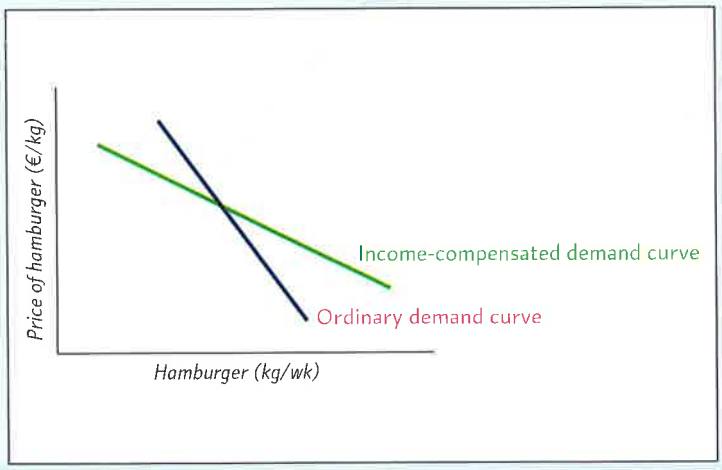

FIGURE 6.13
Income-Compensated Demand Curves for an Inferior Good
The income effect offsets the substitution effect for an inferior good. The income-compensated demand curve, which omits the income effect, is therefore less steep than the ordinary demand curve in the case of an inferior good.

Many of the individual goods and services we buy, however, account for only a tiny fraction of our total expenditures. Accordingly, for such goods the distinction between the two types of demand curve will be unimportant. Even for a good that accounts for a large budget share, the income effect of a price change will sometimes be small. (The good might lie on the border between a normal and an inferior good.) For such goods, too, the distinction between ordinary and income-compensated demand curves will be of little practical significance.

CONSUMER SURPLUS

When exchange takes places voluntarily, economists generally assume it makes all participants better off. Otherwise they would not have engaged in the exchange. It is often useful to have a monetary measure of the extent to which people benefit from a transaction. Such a measure, called **consumer surplus**, is useful for evaluating potential government programmes. It is relatively straightforward to measure the costs of, say, building a new road. But an intelligent decision about whether to build the road cannot be made without a reliable estimate of the extent to which consumers will benefit from it.

consumer surplus a monetary measure of the extent to which a consumer benefits from participating in a transaction.

Using Demand Curves to Measure Consumer Surplus

The easiest way to measure consumer surplus involves the consumer's ordinary (uncompensated) demand curve for the product. In both panels in Figure 6.14, the line labelled *D* represents an individual's demand curve for shelter, which sells for a market price of €3/sq. m. In panel (*a*), note that the most the consumer would have been willing to pay for the first square metre of shelter is €14. Since shelter costs only €3/sq. m, this means that he obtains a surplus of €11 from his purchase of the first square metre of shelter each week. The most he would be willing to pay for the second square metre of shelter is €13, so his surplus from the purchase of that unit will be
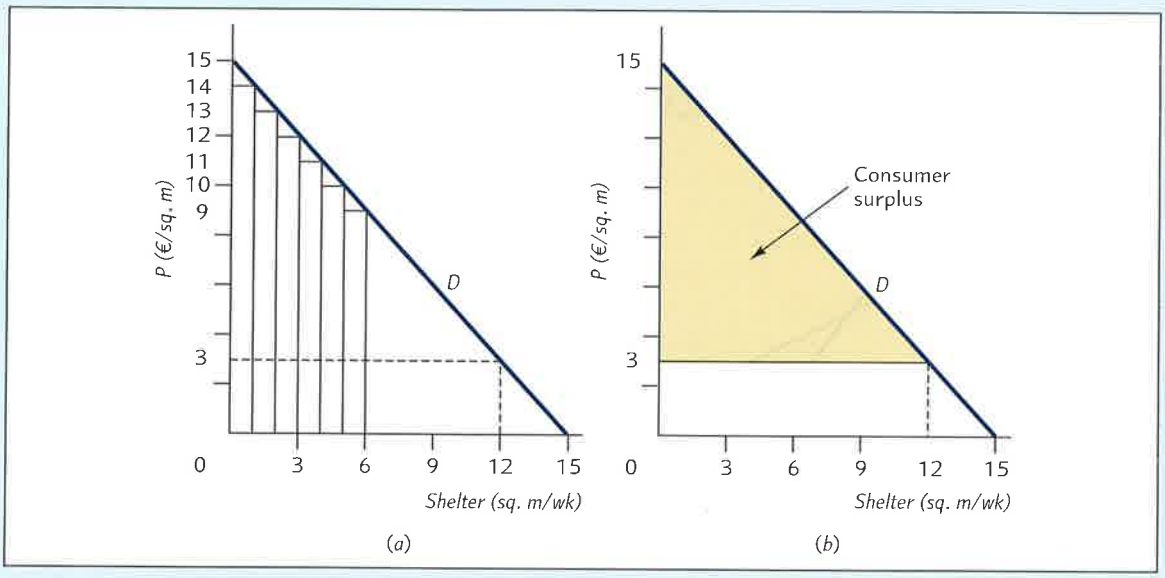
FIGURE 6.14
The Demand Curve Measure of Consumer Surplus
(*a*) The height of the demand curve at any quantity measures the most the consumer would be willing to pay for an extra unit of shelter. That amount minus the market price is the surplus he gets from consuming the last unit.
(*b*) The total consumer surplus is the shaded area between the demand curve and the market price.