

Mr. Consumer has a total budget of \$10 a day to spend for bread and beer. Without any tax, a loaf of bread sells for \$1, and a can of beer also costs \$1. Mr. Consumer must decide on the right combination of bread and beer. His menu of choices is: 10 bread, 0 beer; 9 bread, 1 beer; 8 bread, 2 beer; . . . ; 5 bread, 5 beer; . . . ; 0 bread, 10 beer. We do not know what his preferences are, but Mr. Consumer is very cooperative with respect to our inquiries. Suppose he feels that the combination 5 bread, 5 beer gives him the highest degree of satisfaction. Then, among the above combinations that he is able to buy, he is willing to buy 5 loaves of bread and 5 cans of beer. He also thinks to himself that had his budget shrunk to \$8, he would have chosen the combination 4 bread, 4 beer in order to maximize his satisfaction, and not, say, the 6 bread, 2 beer combination. Once again, based solely on his private preferences, he assures us that he would much rather consume four of each than, say, six loaves of bread and two cans of beer.

Consumer's thought continues to a hypothetical budget of \$12 a day; he would choose the 6 bread, 6 beer combination in order to increase his satisfaction. In other words, if he is poorer, he will reduce his purchase of both bread and beer, and thus his total satisfaction; if he is richer, he will increase his purchase of both bread and beer. In this example, it should be obvious that Mr. Consumer derives exactly the same pleasure from an additional can of beer as he does from a loaf of bread.

If a selective excise tax of one dollar per unit is slapped on beer but not on bread, the relative price of bread and beer changes from 1 to 1 to 1 to 2. Mr. Consumer, with the same \$10, faces the following new combinations: 10 bread, 0 beer; 8 bread, 1 beer; 6 bread, 2 beer; 4 bread, 3 beer; 2 bread, 4 beer; 0 bread, 5 beer. Notice that the old selection of 5 beer and 5 bread is no longer available, nor is the 4 beer and 4 bread combination. In this new set of feasible alternatives, Consumer picks the 6 bread, 2 beer combination on the grounds that it brings him the highest degree of satisfaction.

With Mr. Consumer buying 2 cans of beer, the excise tax revenue is \$2. The pre-tax price of beer at \$1 per can still lingers in his mind. Mr. Consumer realizes ruefully that, had this \$2 tax been taken directly out of his \$10 budget, as with an income tax, leaving relative prices between beer and bread intact, he would have bought 4 bread and 4 beer and enjoyed a higher level of satisfaction than with the 6 bread, 2 beer combination. Mr. Consumer's loss of satisfaction is due to the tax-induced distortion in the relative prices of beer and bread.

As the price of beer increases relative to that of bread, Consumer substitutes bread in place of beer to the point where the marginal benefit from each product (the satisfaction from additional consumption) just equals the price of the product.

In sum, a selective excise tax distorts consumers' decisions by changing the price of the taxed product in relation to the prices of the untaxed goods and services. As

consumers are induced to consume more of the untaxed goods and less of the taxed product than before the change in relative prices, the selective excise tax reduces the consumers' satisfaction; thus it is less efficient than a general tax that yields the same amount of revenue. In our example, the general tax may take the form of equal taxation of both products such that the prices of bread and of beer rise to \$1.25.

### Loss of "Consumer Surplus"

We can get a feel for the loss of overall economic welfare in another way, by referring to a fundamental law of economics. As the price of a good increases, an individual will demand less of it. Further, the more of a good that one consumes, the less valuable that good is. To a starving man, a steak may be extremely valuable; if he had the money, the man might pay a very high price for one. If offered a second steak, our subject would probably not be willing to pay quite as much for it. Having eaten two or three steaks, the individual would probably not offer very much money for additional pieces of meat. In the market place, steaks all have the same cost per unit. There could very well be a sizable difference between the amount an individual is willing to pay for a certain number of units of a commodity, and the amount he actually has to pay. This difference benefits the consumer. If he has to pay much less than he would be willing to pay, he is very well off indeed!

A numerical example will show the effects of excise taxes on this measure of well being.

Consider the case of a product, such as wine, for which a consumer, Mr. John Doe, is willing to pay \$10 for the first bottle. Mr. Doe feels that the first bottle of wine will bring him \$10 worth of happiness. By the same line of reasoning, Doe is willing, and can afford to pay \$9 for the second bottle, and \$8 for the third. Note that Doe is willing to purchase more wine only at a decreasing price; this is because of the well-known economic phenomenon mentioned above: The more of a good one consumes, the less satisfaction one derives for that last unit consumed.

Now suppose that the market price is \$8 a bottle of wine. John Doe buys 3 bottles, and pays \$24 for them. But his total satisfaction is valued at \$27 (\$10 + \$9 + \$8). Hence, his "consumer surplus," the extra value above his total expenditure, is equal to \$3. When a unit tax of \$2 is imposed, raising the market price to, say, \$9 (this implies the tax is only partially shifted), he buys two bottles, pays \$18, and derives a total satisfaction valued at \$19. The reason he buys only two bottles is that he only values the third bottle at \$8, and because the price is now \$9, he chooses not to buy it. His "consumer surplus" is \$1, which is \$2 less than in the pre-tax net gain of \$3.

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