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**Abstract:** Having described the way markets allocate scarce resources we now need to address the question of whether these market allocations are desirable. In other words, our analysis has been positive (what is) rather than normative (what should be). We know that the price of a good adjusts to ensure that the quantity of a good supplied equals the quantity demanded. But, at this equilibrium, is the quantity of the good produced and consumed too small, too large or just right? In this article we take up the topic of welfare economics, the study of how the allocation of resources affects economic well-being.

**Introduction.** Economists use the term well-being a good deal and have taken steps to define the term. A UK Treasury Economic Working Paper published in 2008 (Lepper, L. and McAndrew, S. (2008) Developments in the Economics of Well-being. Treasury Working Paper number 4) highlighted two main definitions of economic well-being – subjective and objective well-being. Subjective well-being refers to the way in which people evaluate their own happiness. This includes how they feel about work, leisure and their response to the events which occur in their lives. Objective well-being refers to measures of the quality of life and uses indicators developed by researchers such as educational attainment, measures of the standard of living, life expectancy and so on. Welfare economics uses some of the microeconomic techniques we have already looked at to estimate allocative efficiency – a measure of the utility (satisfaction) derived from the allocation of resources. We have seen how buyers place a value on consumption in Chapter 5. Allocative efficiency occurs when the value of the output that firms produce (the benefits to sellers) matches the value placed on that output by consumers (the benefit) to buyers. We begin by examining the benefits that buyers and sellers receive from taking part in a market. We then examine how society can make these benefits as large as possible. This analysis leads to a profound conclusion: the equilibrium of supply and demand in a market maximizes the total benefits received by buyers and sellers. One of the Ten Principles of Economics is that markets are usually a good way to organize economic activity. The study of welfare economics explains this principle more fully. It also answers our question about the right price of a good: the price that balances the supply and demand for any good is, in a particular sense, the best one because it maximizes the total welfare of consumers and producers.

**Results and discussion.** Imagine that you own an extremely rare signed vintage electric guitar which you decide to sell. One way to do so is to hold an auction. Four guitar collectors show up for your auction: Liam, Paul, Noel and Tony. Each of them would like to own the guitar, but there is a limit to the amount that each is willing to pay for it. Each buyer's maximum is called his willingness to pay, and it measures how much that buyer values the good. Each buyer has his own value assigned to the guitar, which is expressed as the price he is willing to pay to own it. Each will have some upper limit above which they will not be prepared to pay (possibly because they don't feel the guitar is worth it above that upper limit or because they know they cannot afford to pay any more). If the price were below this upper limit then each would be eager to buy the guitar. To sell your guitar, you begin the bidding at a low price, say €100. Because all four buyers are willing to pay much more, the price rises quickly. The bidding stops when Liam bids €801. At this point, Paul, Noel and Tony have dropped out of the bidding because they are unwilling to bid any more than €800. Liam pays you €801 and gets the guitar. Note that the guitar has gone to the buyer who values it most highly. What benefit does Liam receive from buying the guitar? In a sense, Liam says he has 'found a real bargain': he is willing to pay €1,000 for the guitar but pays only €801 for it. Liam valued the benefits from

owning the guitar more highly than the money he has had to give up to own it. One way to express the value of these benefits is in monetary terms. We say that Liam receives consumer surplus of €199. Consumer surplus is the amount a buyer is willing to pay for a good minus the amount the buyer actually pays for it. We refer to ‘getting a bargain’ regularly in everyday language. In economics, a bargain means paying much less for something than we expected or anticipated and as a result we get a greater degree of consumer surplus than we expected. Consumer surplus measures the benefit to buyers of participating in a market. In this example, Liam receives a €199 benefit from participating in the auction because he pays only €801 for a good he values at €1,000. Paul, Noel and Tony get no consumer surplus from participating in the auction because they left without the guitar and without paying anything. Now consider a somewhat different example. Suppose that you had two identical guitars to sell. Again, you auction them off to the four possible buyers. To keep things simple, we assume that both guitars are to be sold for the same price and that no buyer is interested in buying more than one guitar. Therefore, the price rises until two buyers are left. In this case, the bidding stops when Liam and Paul bid €701. At this price, Liam and Paul are each happy to buy a guitar and Noel and Tony are not willing to bid any higher. Liam and Paul each receive consumer surplus equal to his willingness to pay minus the price. Liam’s consumer surplus is €299 and Paul’s is €99. Liam’s consumer surplus is higher now than it was previously, because he gets the same guitar but pays less for it. The total consumer surplus in the market is €398.

Consumer surplus is closely related to the demand curve for a product. To see how they are related, let’s continue our example and consider the demand curve for guitars. We begin by using the willingness to pay of the four possible buyers to find the demand schedule for the album. The table in Figure 7.1 shows the demand schedule that corresponds to Table 7.1. If the price is above €1,000, the quantity demanded in the market is 0, because no buyer is willing to pay that much. If the price is between €801 and €1,000, the quantity demanded is 1, because only Liam is willing to pay such a high price. If the price is between €701 and €801, the quantity demanded is 2, because both Liam and Paul are willing to pay the price. We can continue this analysis for other prices as well. In this way, the demand schedule is derived from the willingness to pay of the four possible buyers. The graph in Figure 7.1 shows the demand curve that corresponds to this demand schedule. Note the relationship between the height of the demand curve and the buyers’ willingness to pay. At any quantity, the price given by the demand curve shows the willingness to pay of the marginal buyer, the buyer who would leave the market first if the price were any higher. At a quantity of 4 guitars, for instance, the demand curve has a height of €500, the price that Tony (the marginal buyer) is willing to pay for a guitar. At a quantity of 3 guitars, the demand curve has a height of €700, the price that Noel (who is now the marginal buyer) is willing to pay. Because the demand curve reflects buyers’ willingness to pay, we can also use it to measure consumer surplus. Figure 7.2 uses the demand curve to compute consumer surplus in our example. In panel (a), the price is €801 and the quantity demanded is 1. Note that the area above the price and below the demand curve equals €199 ( $€1,000 - €801 \times 1$ ). This amount is exactly the consumer surplus we computed earlier when only 1 guitar is sold. Panel (b) of Figure 7.2 shows consumer surplus when the price is €701. In this case, the area above the price and below the demand curve equals the total area of the two rectangles: Liam’s consumer surplus at this price is €299 and Paul’s is €99. This area equals a total of €398. Once again, this amount is the consumer surplus we computed earlier.

The lesson from this example holds for all demand curves: the area below the demand curve and above the price measures the consumer surplus in a market. The reason is that the height of the demand curve multiplied by the quantity measures the value buyers place on the good, as represented by their willingness to pay for it. The difference between this willingness to pay and the market price is each buyer’s consumer surplus. Thus, the total area below the demand curve and above the price is the sum of the consumer surplus of all buyers in the market for a good or service.

Our goal in developing the concept of consumer surplus is to make normative judgements about the desirability of market outcomes. Imagine that you are a policymaker trying to design a good economic system. Consumer surplus would be important to consider as it measures the net economic benefit in terms of surplus value that buyers receive from a good as the buyers themselves perceive it. The demand curve is a representation of the value of the economic benefit consumers get from consumption. This value is related to the amount of the consumer's scarce income they are willing to give up to purchase the good represented by the price they have to pay to acquire the good. Every consumer (mostly unconsciously) weighs up the value to them of buying a good. Psychologists have shown that there are lots of different things going on when we make such choices apart from simply a rational weighing up of the costs and benefits. As a consumer yourself, you will almost certainly be able to bring to mind instances where you have agonized over whether to buy something and if you were asked at that moment to describe your thinking you would no doubt be weighing up a variety of factors. If you are agonizing then you are operating right at this marginal value – the maximum amount you are prepared to pay. For some reason, if the price you are being asked to pay is slightly higher you decide not to buy – what you are being asked to give up is not offset by the value of the benefit you perceive you will get from purchasing the good. You might also recall times when you have seen a good and snapped it up – you think to yourself you have a bargain. You now have the tools to understand why you experience that feeling of getting a bargain – it is because of the amount of consumer surplus you have gained from the purchase. Thus, consumer surplus is a good measure of economic well-being if policymakers want to respect the preferences of buyers. Conceiving of Price as a Bargaining Model Our discussion of markets so far has noted that price acts as a signal to buyers and sellers. The actual purchasing decision by a consumer can be seen from the perspective of a bargaining model. Suppliers are offering goods to consumers at different prices and consumers have to make decisions about whether the prices they are offered represent a net economic benefit to them. There is an interaction between suppliers and consumers, therefore, which can be seen as a bargaining process – an agreed outcome between two interested and competing economic agents. Think of the times when you have trawled through a price comparison website or been around almost every shop in a mall only to return to the first item you saw in the first shop you went into and bought that item. In these cases consumers are responding to the prices being offered by suppliers and making decisions based on the competing prices available. Suppliers respond to the decisions made by consumers – if too few people buy their product then they will be forced to take action to improve the product offering. If consumers buy the product in sufficient numbers to make it worthwhile for producers, then this implies that the supplier has some understanding of the net benefit to consumers and can continue to work on finding ways to maximize this benefit at prices consumers are willing to pay.

**Conclusion.** Consumer surplus equals buyers' willingness to pay for a good minus the amount they actually pay for it, and it measures the benefit buyers get from participating in a market. Consumer surplus can be computed by finding the area below the demand curve and above the price. Producer surplus equals the amount sellers receive for their goods minus their costs of production, and it measures the benefit sellers get from participating in a market. Producer surplus can be computed by finding the area below the price and above the supply curve. An allocation of resources that maximizes the sum of consumer and producer surplus is said to be efficient. Policymakers are often concerned with the efficiency, as well as the equity, of economic outcomes. The equilibrium of supply and demand maximizes the sum of consumer and producer surplus. That is, the invisible hand of the marketplace leads buyers and sellers to allocate resources efficiently.

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<b>119</b>	ISSN 2277-3630 (online), Published by International journal of Social Sciences & Interdisciplinary Research., under Volume: 12 Issue: 06 in June-2023 <a href="https://www.gejournal.net/index.php/IJSSIR">https://www.gejournal.net/index.php/IJSSIR</a>
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