

Consumer Surplus / Producer Surplus / Efficiency

Consider walking into the grocery store and buying 5 boxes of your favorite breakfast cereal. We know that total value of consuming 5 boxes, say \$17, tells us that the consumer is indifferent between having 5 units and \$17. The most they would be willing to pay for the cereal would be \$17.

However, you walk into the store and the price of a box of Grape Nuts is only \$3. You must only pay \$15 for the 5 boxes. You look around to make sure no one notices (it must be a sting, Peter Warrick must be involved). Don't make eye contact. You secretly make fun of the store manager. You would have paid \$17, but only have to pay \$15. The moron store manager must have taken Econ 211 at USC or from some less qualified drone graduate student at CU. This \$2 you didn't have to pay makes you happy.

On the flip side, the TC of producing (selling) the 5 boxes of Grape Nuts was only \$13 for the store. They would have been willing to sell them for only \$13, but received \$15. The store manager is laughing at you as you go up to the checkout aisle. Stupid Clemson grad, she says.

Who's right? They both are. Thankfully, the higher educational system in South Carolina is of the highest quality. The fact that demanders compete amongst demanders and that suppliers compete amongst suppliers has resulted in an equilibrium price where both suppliers and demanders benefit from being involved in this market. (As an aside, we will consider the case where suppliers know exactly how much demanders are willing to pay later in the semester. It's tough to make consumers pay their whole total value. It's called price discrimination...more later...)

When we talked about RC and Friday and trading, we talked about the gains from trade, how each party was made better off from mutually beneficial exchange. What is a market? It's a bunch of people getting together to make trades. It's a virtual onslaught of mutually beneficial exchange. We have drawn all of these markets (Supply and Demand curves), where there are gains from trade. Can we quantify these gains from trade? Can we measure how big the gains from trade are, and too whom they accrue? The answer is yes, and what follows below is just that.

Consumer Surplus (CS) = what consumers were willing to pay – what they had to pay
= total value – total expenditures
= $TV - P * Q$

The idea is that consumers were willing to pay much more than they had to pay (in the market equilibrium) and thus they are happy. CS is a measure of their welfare of participating in the market.

Producer Surplus (PS) = what suppliers were paid – what they had to be paid to supply the goods
= total revenue – total costs (=profit)
= $P * Q - TC$

Again, producers would have been willing to supply the goods for less money than they actually received, and thus they are giddy. PS is a measure of the welfare of participating in the market.

Gains from Trade (GFT) = $PS + CS$

Finally, we look at the gains from trade to society as a whole. Add up the welfare that consumers enjoy and the welfare that producers enjoy, and we have the societal welfare.

Aside: Hey, why are you calling $P * Q$ two different things?

When we talk about suppliers, we usually think of $P * Q$ as total revenue. It is the amount of money suppliers take in from selling their goods.

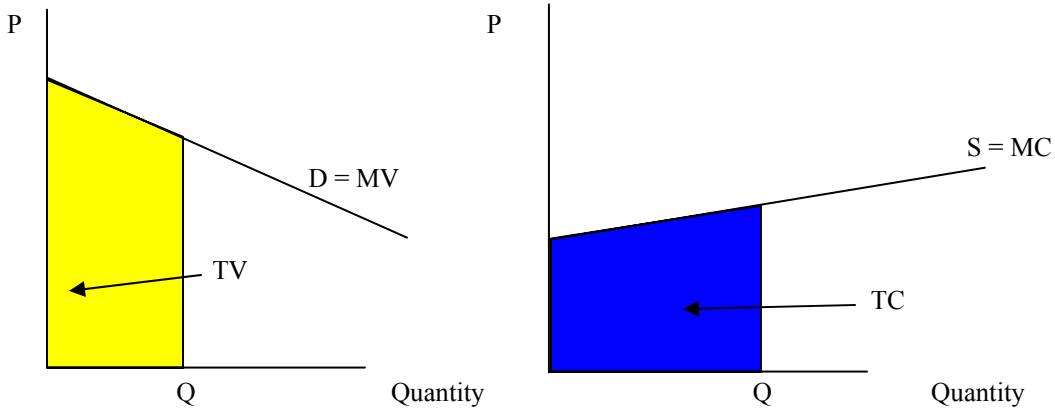
When we talk about consumers, we usually think of $P * Q$ as total expenditures. It is the amount of money consumer spending on the goods.

Really, they are the same thing, as unless money evaporates in the transaction, they will be equal. However, we'll keep this distinction, and it will help us out a bit when it comes to elasticities.

Oh goodness, Supply and Demand curves tell us MV and MC. Can we find out TV and TC graphically somehow, or are we doomed?

There are three ways to see it. You can take it on faith, and that's fine. For the skeptics, I will show you two different ways I can show you how we can add up marginal values to get total values.

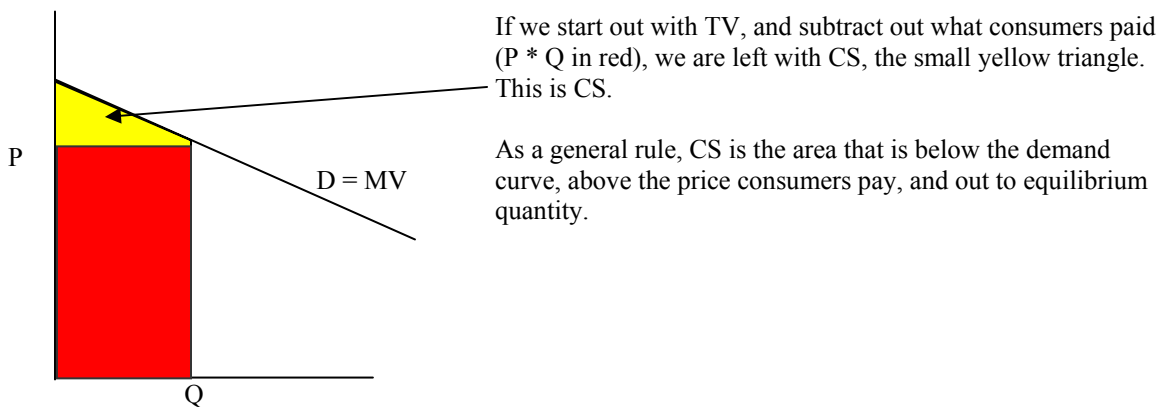
Take it on faith: It is true mathematically the area under a marginal curve will add up to the total. That is, if we add up all the area under a MV curve out to quantity Q, it will add up to the total value of consuming Q units. If we add up all the area under a marginal cost curve out to quantity Q, it will add up to the total cost of producing Q units.



The total value of Q units is shaded above. The total cost of producing Q units is shaded above.

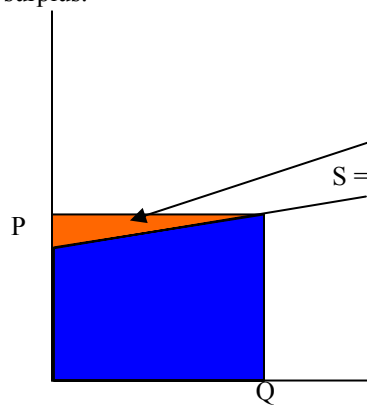
Consumer Surplus (graphically)

We are looking for some area that is the TV less total expenditures. We just figured out how to show total value, and expenditures is just the rectangle formed by $P * Q$.



Producer Surplus (graphically)

Here we want to start out with total revenue, $P * Q$, and subtract out TC. The difference will be producer surplus.

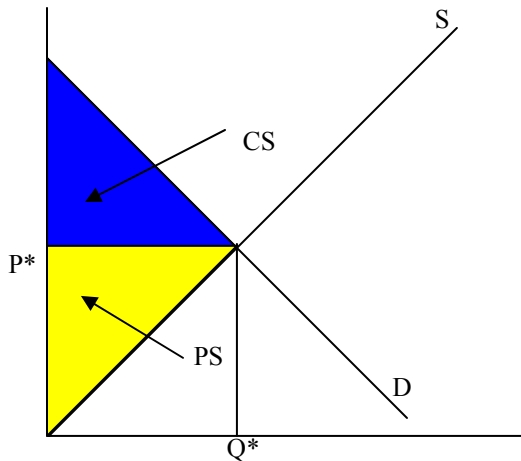


For PS, if we start out with TR (a orange box that is obscured by the blue trapezoid) and subtract out TC (blue), we are left with the small orange triangle.

This is producer surplus.

As a general rule, PS is the area that is above the supply curve, below the price suppliers receive, and out to the equilibrium quantity.

Finally, this is much easier to see if you put Supply and Demand together.



Consumer surplus is a measure of the welfare of consumers. The higher the consumer surplus, the better off consumers are.

Producer surplus is a measure of the welfare of producers. The higher the producer surplus (profits), the better off producers are. Again, remember that $PS = \text{profits}$. Higher profits mean happier producers.

The total gains from trade is the sum of $PS + CS$. It is a measure of welfare to society. It would be the sum of the blue triangle and the yellow triangle.

Don't forget what the "gains from trade" are. Consumers and producers are making mutually beneficial exchanges. CS and PS the graphical representation of the amount of "gains from trade" that occur in this market, and who gets them.

Economic Efficiency

As economists, we like it when the "gains from trade" are maximized. In fact, we will consider the situation where "gains from trade" are maximized as the **economically efficient** level of production.

When the gains from trade are not maximized, we have unexploited gains from trade. There are mutually beneficial transactions that could occur, but are not occurring. That is, society as a whole could be made

better off by allowing these transactions to occur. (At the economically efficient level, all mutually beneficial transactions have occurred).

It turns out, that whenever $MV > MC$ there are potential (unexploited) gains from trade. Consumers are willing to pay more than suppliers require to produce the good. There is some price where both will benefit from exchange. This will continue until $MV = MC$, where all gains from trade are exhausted. If we choose a quantity where $MV < MC$, we have gone too far. This strange case is a silly place to be. Here it is costing producers more to produce than consumers are willing to pay. We need to cut back.

As it turns out, the simple Supply and Demand model we have been considering, without any distortions, P^* and Q^* are the economically efficient outcome. There is no other P, Q combination that will result in higher gains from trade. Also, remember at equilibrium, $MV = MC$. This is no coincidence.

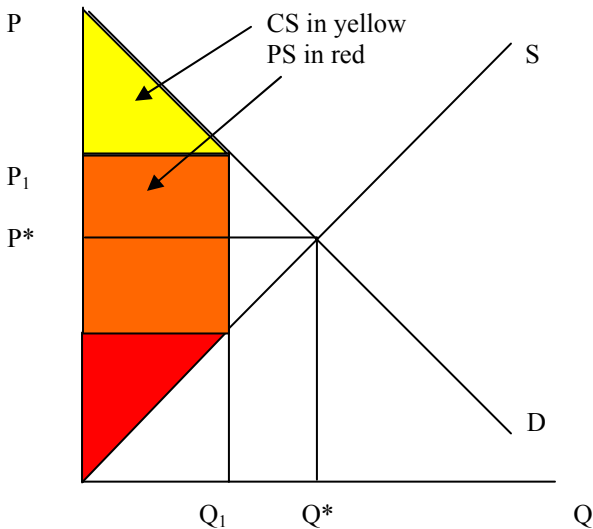
Later in class we will talk about a number of items, such as price ceilings (rent controls), price floors (minimum wages), price searchers (monopolists), externalities (pollution) that will end up reducing the gains from trade. CS and PS will be used as tools to see if society as a whole is better off, if producers are better off, and if consumers are better off.

(Not that) Fun activities?

See the picture below. Here, we start out with simple S and D and equilibrium P^* and Q^* . Now, we pick any Q that is less than Q^* and pick any old price you care to. Shade in CS and PS. Are GFT lower (than it would be if we had P^*, Q^*)? Since GFT in this case are less than maximum possible, P_1 and Q_1 is inefficient. We call the lost gains from trade an **efficiency loss**, or a **dead weight loss (DWL)**. Can you shade in the triangle of DWL?

Inside this triangle (from Q to Q^*) are unexploited gains from trade. Why? Compare MV to MC . Recollect that MV measures how much consumers are willing to pay for that individual unit, and MC measures how much it costs producers to produce it. In the triangle, $MV > MC$. Can you come up with a price whereby each party would gain from exchanging? The answer is yes. This continues until you get to Q^* .

If you're really adventurous, pick a Q greater than Q^* . This is tough, because you actually have negative producer surplus ($TC > P * Q$), so it's pretty hard to shade in the gains from trade. If you do it correctly, you find gains from trade smaller than the equilibrium P^* and Q^* .



In short, you can't do better than P^* and Q^* .

lecture7-gvl

What should I be reading?

Chapter 4