

Market Failures

Uncertainty

Understanding Asymmetric Information as an Economic Problem

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Why is it so difficult to buy a good used car? Have you wondered about that? This is a great example of a problem economists call asymmetric information. Asymmetric information means that one party in a transaction has more information or knowledge about the quality of the good being traded than the other party does. And asymmetric information can really mess up a market.

In a previous lecture, we talked about risk. Risk is when an agent looks at the odds and takes a gamble. You decide whether to buy insurance on your house or not. You decide whether to play roulette or not. You decide whether to buy a lottery ticket or not. You decide ahead of time whether you want to subject yourself to the odds, whether you think your chance of winning is enough to warrant the cost that you are incurring to take the gamble.

Asymmetric information is a different kind of problem. This is a problem that stems from the distribution of information. What different people know. The fact that one person knows more about a trade than the other. And one of the things that we learn, when we study information, is that sometimes a little bit of information can make the situation much worse than no one having information at all.

Let's look at this example, as we consider what economists call the problem of lemons. The market for lemons. Now, a little bit of vocabulary here. For any of you who are non-native speakers of English, a lemon refers to a car that is so much trouble that it isn't worth it. You have to spend so much time and money repairing it that you don't get enough value to warrant the expense. We will contrast a lemon with a gem. A gem is a good car that you buy that gives you a lot of satisfaction and very small repair bills.

Now, let's suppose that we have a situation where there is complete knowledge about the quality of cars. This would be a market, in which there is perfect information. We'll consider the first the case of perfect information. And let's suppose that in this market the price that a buyer is willing to pay for a gem is equal to \$10,000. So, the price a buyer is willing to pay for a gem is \$10,000. And let's suppose also that the price that a seller will accept for a gem, the reservation price of sellers, is equal to \$8,000. Now, in this case, you can see very clearly that it's great for buyers and sellers to get together; that is, buyers are willing to pay a price that's higher than the price seller's are willing to accept; that there is \$2,000 worth of economic value created by getting the buyer and the seller together. So, if there's a gem, the trade should certainly take place.

On the other hand, let's suppose that with lemons - there is no value for a lemon to anybody. Buyers wouldn't pay any money to get one and sellers would be willing to give the lemon away for free. So, we've got gems and lemons, and we've got the reservation price that buyers have and sellers have for each of these two kinds of cars.

Now, if we had perfect information, our first case, what's going to happen? If buyers and sellers all know whether any given car is a gem or a lemon, what is going to happen in that case? The answer is the sellers will sell the car to the buyer at a price somewhere between \$8,000 and \$10,000. What do economists think about this outcome? They think it's great, right? Because the car goes from the hand of the seller, who values it less, to the hands of the buyer, who values it more. Great. With perfect information, no problem. Trades take place and economic value is created.

What about the lemons? Well, if you're sure that a car is a lemon, then you're not going to pay anything for it. But the seller would just as soon give it to you for free, and the economist doesn't care anyway, because lemons aren't creating any economic value for anybody. So, no matter who gets the lemon, it's just a wash.

Let's consider now a second case. In the second case, let's suppose we have uncertainty on both sides, that any given car could be a gem or a lemon, but the buyer doesn't know which is which and the seller doesn't know which is which. You could think of this as the market for new cars that roll off the factory line and the seller doesn't know if it's a gem or a lemon and neither does the buyer. There is the same uncertainty on both sides of the story.

Let's suppose, however, that there is one other piece of information that both the buyers and sellers have; and that is that 50% of the cars that roll off the factory line are gems and 50% are lemons. Now, given that you're buying a car and you don't know whether it's a gem or a lemon, but you do know the odds, the market for cars becomes a kind of lottery. When you buy a car, you're buying lottery ticket. You're buying something that half the time is going to be

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worth \$10,000 to you, if you're a buyer, and half the time it's going to be worth nothing to you, because it's a lemon. On the other hand, if you're selling these, you're also selling lottery tickets. Fifty percent of the time you're selling something that's worth \$8,000 to a seller and 50% of the time you're selling something that's worthless.

So, let's suppose, for the sake of this story, that all of our agents are risk neutral; that is, they are equally excited about gains as they are concerned about losses; that is, the value of any gamble to a risk neutral person is the expected payoff from the gamble, the expected value. Well, in that case, for the buyers, the expected value of a car is 50%, or one-half, times 10,000, that's the chance of getting a good car, plus 50% times zero, the chance of getting a lemon, multiplied by the value of a lemon. And that equals \$5,000. Five thousand dollars is the expected value when you buy this new car. And that's what a buyer would pay, if the buyer is risk neutral.

Now, how much would a seller want to sell the car for? Remember, 50% of the time it will be a gem, 50% of the time it will be a lemon. You calculate. What's the value of which a seller would sell a car under this situation of uncertainty? The answer is the seller would sell for one-half times \$8,000 plus one-half times zero, for an expected value of \$4,000.

Now look, the buyer's expected value is 5,000, the seller's value is 4,000. All the trades are going to take place. The sellers will be willing to part with this car for anything, any amount that's greater than \$4,000. The buyers will be willing to pay any amount that's less than \$5,000. So, there's room here for agreement and, once again, all the cars move from the hands of the seller to the hands of the buyer. A good outcome, as far as the economist is concerned, because, once again, the buyers get all the gems. And since the gems are worth more to the buyers than to the sellers, the economist says value is created by moving them from the seller's hands to the buyer's hands.

Well, what about the lemons? All the lemons move, too, don't they, because they buyers buy cars and half the time they're getting lemons. But, once again, the economist doesn't care whether a buyer gets a lemon or whether the seller keeps the lemon. Since lemons aren't creating any value, there's no concern about who gets the lemons. Some of the buyers will wake up the next morning, turn the key in their new car and be unpleasantly surprised, but that's just a redistribution. That's just like losing some money. It's not like value hasn't been created. Value would be lost if some of the good cars stayed in the hands of people who valued them less.

Now, let's consider the final case. The final case is the case of asymmetric information and this is what describes the market for used cars. The seller knows whether the car is a gem or a lemon and the buyer doesn't. The buyer knows that 50% of the cars that come off the factory line are lemons, but the buyer doesn't know whether the particular car he's looking at from this particular salesman is a lemon or a gem. But the salesman knows. The salesman knows. The salesman has private information about the quality of the car. What happens in this case?

Suppose you're a buyer and you go into a used car lot, and a salesman offers to sell you a car for \$5,000. What do you know? You know for sure that that car is not a gem. Why? Because if it were a gem, the salesman wouldn't part with it for less than \$8,000. That's what a good car is worth to the seller in our story. So, if the seller is willing to sell you a car for under \$8,000, you know it's a lemon. To have any chance at all of getting a gem, you've got to pay a price in excess of \$8,000. However, if you pay \$8,000 or more, what are you going to get? Well, you're going to get a 50/50 gamble, because all the cars will be on the market at \$8,000 and some of them will be gems and some of them will be lemons. In our case, 50% will be each. So, what's it worth to you to get that 50/50 gamble? Well, we already calculated it. The 50/50 gamble is only worth \$5,000. It's expected value to the buyer. So, why pay \$8,000 for a lottery ticket that's only worth \$5,000? You wouldn't do it. The problem is when you lower your price below \$8,000, then you know for sure you're going to get a lemon. And that's why this market falls apart. The market falls apart because buyers are not willing to pay a price that's high enough to draw the gems into the market. They're not willing to pay that high price because of the risk of getting a lemon. This is what we call, in economics, adverse selection.

Adverse selection exists from the presence of low quality. Leads buyers to behave in such a way that it drives the high quality out of the market. The presence of these lemons causes buyers to try to protect themselves by paying a lower price, which leads the owners of the good cars to take them off the market. No one will sell a good car at a price that buyers are willing to pay, and the price buyers are willing to pay is low because of the risk of getting a lemon. This is the problem of adverse selection. Adverse selection is also why there's no market for scratched-off

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lottery tickets. If someone wants to sell you one, you can be sure it's not a winner. It's also the reason why the market for health insurance sometimes has problems. The people who are inclined to buy health insurance are people who have higher risks, and this raises the price of insurance for everyone, which means people with low risks decide not to buy, and the market then has problems. Only the high risks are in the market. The price keeps going higher, pushing out the low risks, cooling the dynamic of adverse selection.

So, asymmetric information then is a problem that can really mess up a market. The solution would be to pay extra money to try to eliminate the asymmetric information. There's a service called Lemon Busters that will come and examine your car before you buy it. You have to pay them a fee, but the fee then helps you sort out gems from lemons. So, there can be some kind of certification process, or maybe fellows will be willing to offer you a 90-day guarantee. You can bring the car back, if it happens to be a lemon. There are ways of dealing with adverse selection, but if it's left untreated, it can cause a market to vanish.