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**PROFESSOR:** All right, so today we are going to finish up our discussion of consumer theory and then move on to producer theory. That is, we're finishing up what's behind the demand curve and moving on to what's behind the supply curve. But before we do that, I want to talk about an application of why income and substitution effects are important. Income and substitution effects, we talked about this imaginary budget constraint. It seems like sort of a vague concept. We talked last time about labor supply and how you can get some interestingly different answers. But I want to talk about an application now, of why understanding income and substitution effects can really help you understand the world a bit better.

And the application I want to talk about today is the case of child labor in developing countries. Now this is a terrible problem worldwide. In developing countries in particular, children are pulled out of school to work. They then don't develop the skills that can allow them to earn high wages later in life and as a result, the cycle of impoverishment continues in these nations, where these children in turn have low wage jobs and make their kids go to work. And it's a major problem in the developing world. And we all know that one way to help countries out of poverty is to help them get their kids to get education. Education is the key to getting out of poverty. And you can't get education if you're working.

I think that's a generally recognized fact. A more interesting, controversial fact is well, what does this imply for the benefits or cost of free trade? We'll talk about free trade later in the semester and we'll come back to this, but basically the idea is look, if you have free trade, then poor countries can sell more goods to rich countries and that will allow them to raise their standard of living. But many of you will point out that that's contradictory with our concern over child labor. Which is if a poor country is going to sell more goods to a rich country, then maybe kids in that country are going to have to work harder to make those goods. And one concern people have when they talk about free trade agreements is essentially we're dooming the children of these impoverished countries to work harder to make the goods that rich countries want. And that if these impoverished countries weren't engaging in making all these textiles and all the things these rich countries want, maybe their kids would be getting an education

instead.

So that's a concern that's been raised about free trade, but in fact, what we can understand from understanding income and substitution effects is that, in fact, that claim may not be true. In fact, the effect of free trade on child labor is ambiguous. And that's what I want to talk through now, an application of why understanding income and substitution effects matter. And there's a very interesting study by two professors at Dartmouth who studied the impact of trade liberalization in Vietnam. Vietnam used to have a system where they would not allow domestic producers to sell rice abroad. Domestic rice producers had to sell that rice only in Vietnam and then they introduced free trade provisions in Vietnam which allowed them to sell that rice abroad as well. And one concern that was raised is that would mean kids in Vietnam would have to work harder producing rice so it could be sold around the world.

Let's see whether that was true. Well, to think about that, let's first think about it theoretically. So let's go to figure 8-1. Figure 8-1 shows the demand for rice,  $D_V$  the demand for rice in Vietnam,  $D_W$  is the demand for Vietnamese rice worldwide.  $D_V$  is the Vietnamese demand for Vietnamese rice,  $D_W$  is the world demand for Vietnamese rice, and  $S_V$  is the supply of Vietnamese rice. And we assume demand curves are downward sloping, supply curves are upward sloping, as usual. So if there was a worldwide market where Vietnamese rice farmers could sell their rice to the entire world, then you'd have an equilibrium price  $P_W$  and an equilibrium quantity of  $Q_W$ .

What happened was until 1989, that was not the case. Before 1989, the government imposed a quota which said that rice producers in Vietnam could not sell effectively, could not sell outside Vietnam. It wasn't quite that easy, but you could think of it this way, they could not sell outside Vietnam. Instead, they could only sell the amount that Vietnamese citizens demanded of rice, which meant that they sold  $Q_V$  units of rice at a price,  $P_V$ . So there was a government imposition which said effectively-- not quite, but effectively-- you can only sell rice in Vietnam, so we're going to sell  $Q_V$  at a price,  $P_V$ .

So then what happened was in the early 1990s, the government weakened this quota so that by 1997, there was no longer a quota. Rice farmers were allowed to sell wherever they want. So effectively, the country moved from  $Q_V$ ,  $P_V$  to  $Q_W$ ,  $P_W$ . Essentially, it expanded the market for Vietnamese rice so that they were able to sell a larger quantity at a higher price on the worldwide market. And the difference between  $Q_V$  and  $Q_W$  were exports. So basically, the government allowed them to export an extra amount of rice,  $Q_W$  minus  $Q_V$ , and allowed them

to obtain a higher price for their rice.

So we'll talk later about whether this is a good idea or a bad idea in general. We'll talk about free trade and get on to free trade later in the semester. Hint, we like free trade as economists. I think most of you probably knew that, and we'll talk about that later in the semester. But now I want to focus specifically on one question, which is what did this do to child labor?

Well, if we go the next figure, if you look for a second-- forget the shifting supply curves. The market for child labor is initially at equilibrium at a supply of child labor of  $S_1$ -- that is, the higher the wage, the more the kids will work-- and demand for child labor of  $D_1$ -- that is, the higher the wage, the less the demand there is for child labor. And we're in some initial equilibrium where  $L_1$  kids work at a wage,  $W_1$ .

And let me highlight an important thing about the supply of labor of kids. If the kids aren't working, they're in school. The notion is not if the kids aren't working, they're sitting at home. If the kids aren't working, they're in school. So basically, the more kids are working, the fewer kids are in school. So you have this supply,  $S_1$ , and this demand,  $D_1$ . So what free trade does is it shifts out the demand for child labor. Because now you need to produce more rice, you need kids to produce it, so it shifts out to  $D_2$ . It's not marked in this diagram, but you would end up, if you could see where  $D_2$  intersects with  $S_1$ , you'd end up with a lot more child labor at a higher wage.

And that's the argument for why free trade is bad for child labor. Because it increases demand for child labor and therefore increases the amount of child labor that's used. But what that argument misses is the income effect, which is that the rice farmers in Vietnam are now richer. And one thing they'll do with their wealth is buy their kids more education. That is, think about the utility function of these rice farmers. They don't want their kids to work. They understand that their kids are better off with education. So what would happen if they won the lottery? What would happen if they won the lottery is they'd use some of that money to say hey kids, you don't have to work anymore. You get to now go to school instead and build yourselves a brighter future. Well, the higher price for rice that exists through world trade is like them winning the lottery. Suddenly, rice farmers are richer because each unit they produce is sold at a higher price.

What are they going to do with that higher wealth? They're going to allow their kids to work

less. They're going to say, we're effectively richer because we're now selling our rice at a higher price. As a caring parent who's richer, I'm going to send my kids to school instead of having them work. How do we manifest that in this diagram? As an inward shift in the supply of child labor. That is, children get pulled off the market because their parents now say, I'm going to send them to school instead. So the supply curve for child labor shifts inwards.

Now, how much it shifts inwards determines what ultimately happens to child labor. If it shifts inwards a little bit from  $S_1$  to  $S_2$ , then child labor on net still increases from  $L_1$  to  $L_2$ . That is, the demand shift exceeds the supply shift and on net child labor increases. That is, on net, free trade does increase child labor. But if supply shifts in a lot, if parents are a lot richer and send their kids to school a lot, then actually the supply of child labor could fall from  $L_1$  to  $L_3$ . You could have less child labor, even though the demand for it's gone up. And that's because of income effects. The importance of income effects is that the families are now richer, so they're pulling their kids out of the market. And they're pulling their kids out of the market in such numbers that it exceeds the excess demand for child labor.

So once again, we see the power of income and substitution effects. We have the standard market operation, which is  $g$ . We want more rice, we need to hire more kids to produce it. But we're forgetting the income effect, which is the price of rice has gone up. Farmers are now richer, they're now going to send their kids to school instead of making them work in the rice paddies. OK? So that is the importance of understanding the subtle argument that comes forth when you think more completely about income and substitution effects and when you don't stop and just say, gee, more rice exported means more child labor.

So the question is, which of these is right? OK? Which of these is right? How do we know whether free trade increases or decreases the demand for child labor? Let me first stop and ask a question about the theory. People understand why an increase in free trade can either lead to more kids working or less kids working. Yeah?

**AUDIENCE:**

I'm not sure how you would sustain that increase in demand for rice. Because if their kids won't work anymore, how will they keep up that increase in demand of rice, keep them wealthy?

Well, see, here's the key point, which is that the price has gone up. So the price has gone up, so they don't have to increase the supply that much. So the kids could work less, they could work more, or they could just not supply that much more rice. But the fact that they sell it in a

worldwide market increases the demand so that they're getting a higher price and that makes them wealthier.

So now we have to ask, what's the truth? What happened? Well, the answer is that how do we tell this? Well, the way we tell this is we can look, we can use the fact that the increase in the price of rice varied across the country. In some parts of Vietnam, those that were very close to the border and it was easy to export, there was a big increase in the demand for rice, a big price increase. In other parts of Vietnam, those more internal where it's a huge transportation cost to get to the coast and therefore export it, it's like nothing happened.

So you can actually ask, what happened to child labor in the areas close to the border where the price of rice went up a lot and therefore there's a big effect of this free trade, versus the areas more internal to the country where price of rice didn't change much? And by comparing those two, you can ask, what happened to child labor in those two areas? What you find is that child labor went down in the areas near the coast. They got so much richer from these higher prices that on net, they used fewer kids to work. That is, the supply shift was larger than the demand shift. So actually, free trade lowered overall use of child labor. Free trade lowered the overall use of child labor so that freeing up trade was good for kids, not bad for kids.

We'll talk later about other arguments about why free trade is good or not, but this is an important point where you can get beyond a simple intuition of, gee, more kids are going to work, to say wait a second. That's offset by the fact that the higher worldwide prices led parents to allow their kids to go to school rather than go to work. And that's an example of the power of income and substitution effects. And the power of this theory for understanding how you might not get what seems, initially, an intuitive answer. OK, questions about that example, how it relates to consumer theory, income or substitution effects, any of that? OK. So that's where we are going to stop on consumer theory, and that's where the material for the exam will stop. You can't leave, but that's where the material for the exam stops, OK? So the exam will cover everything up to through this point. The exam will be on consumer theory.