

Lecture 2: Trade, Prices and Efficiency

1. Efficiency
 - a. A *Pareto improvement* (hereafter just *improvement*) is a change that makes somebody better off without making somebody else worse off.
 - i. A *strict improvement* makes everyone better off
 - ii. An *improvement* makes somebody better off without making somebody else worse off.
 - iii. All strict improvements are improvements
 - iv. Improvements are good—why throw away the possibility of making somebody happier?
 - (1) what if it causes envy?
 - (2) well, when you take the envy into account, then perhaps it isn't an improvement.
 - b. A situation is *efficient* if there are no improvements available, that is, there is no way to make somebody better off without making somebody else worse off.
 - i. This is the standard economists' definition of efficiency. It is very weak.
 - (1) Consider a world with a very rich king and a bunch of very poor serfs.
 - (2) Even if we could make *everyone* except the king better off at the expense of the king, we would still call the status quo efficient
 - ii. It is a minimal definition of goodness. If your situation is not efficient, then it is pretty bad—it is like you are throwing an opportunity away.
 - iii. I think of efficiency as equivalent to *not badness*. It would be bad if you could make everybody better off and didn't do it.
 - c. We can also think of efficiency in terms of the set of things that are possible.
 - i. Draw picture of you and me and our happiness, and draw a line to define the most happiness we can each get, given how happy the other is.
 - ii. There is a trade-off, perhaps because we are sharing some stuff, or doing stuff together or what-have-you.
 - iii. The edge is called the *frontier*.
 - iv. Efficiency requires that we be on the frontier. Efficient situations are not unique: there are typically many efficient situations to choose from.
 - v. It does not require that we are both very happy, just that given how happy each is, we cannot make the other more happy.
2. Trade
 - a. *Trade* between people may be defined as individuals buying and selling goods and services with each other.
 - i. Usually, we use money, and the stuff we trade has a *price* measured in money. For example, a shirt might cost \$40 and a meal might cost \$20: their prices are \$40 and \$20.
 - ii. *Barter* is where we trade without using money---just stuff for stuff. There's still a price here, it is just measured in stuff. If we were just bartering shirts for meals, the prices would be 2 meals for a shirt, or half a shirt for a meal.
 - b. A *Market* is an economic environment in which people can trade.
 - i. It could be a physical environment, like a farmers' market, where people physically trade goods and services with each other.
 - ii. It could be a stock market, where people can phone in or use the internet to purchase or sell stocks and bonds.
 - iii. It could be a regulatory environment in which it is legal to trade stuff.
 - iv. It is easy to think of commodities for which there is no market, that is goods or

services that you cannot buy or sell:

- (1) you can't (legally) buy a kidney or a slave.
- (2) residents of the east Fraser Valley can't (easily) pay residents of Vancouver to pollute less so the air is better out east.
- (3) you can't buy insurance against failing this course.

c. **Trade enables people to get together and make each other better off.**

- i. If I am good at baking but not sewing, and you are good at sewing but not baking, then individually, we would be deprived of either good food or good clothing. However, if we trade with each other, then we could each produce twice as much of the thing we are good at, and none of the thing we are bad at, and trade with each other so that each of us has both good food and good clothing.
 - ii. This is the miracle of the market: markets allow traders to get better off, and in principle, all traders can win.
- d. *Voluntary* interactions occur only with the consent of all parties. If trade is voluntary, then it cannot make a trader worse off---s/he just wouldn't trade. So, voluntary trade can only make traders better off.
- e. Thus, voluntary trade results in (Pareto) improvements. If we can engage in voluntary trade, we will do if there is an improvement to be had. Thus, trade may allow us to exhaust all potential improvements
- i. **voluntary trade may yield efficiency**
- f. If the market is *simple* (in a specific way, defined below), then if there is a way for traders to be better off, then allowing them to trade will take advantage of it.
- g. **The miracle of trade: repeated trade in a simple market yields efficiency.**
- i. That is, traders left alone in a market can get an efficient outcome. Nobody would wonder why a possibility to make everyone better off goes unexploited---trade always exploits such possibilities.
- h. Another miracle is that under very general conditions, there is a set of prices (in this example a price for food and a price for clothing) such that if we trade at these prices, we will end up with an efficient situation. That is, there is a set of prices that, if we all faced them, would yield an efficient outcome.
- i. Yet another miracle, is that in *simple markets* (described below), private markets with no government intervention and free trade between people results in exactly this set of prices (the efficient set of prices).
- i. This is the classic story for why government intervention in private markets might be bad: if governments just leave people alone to trade in simple markets, then people will trade to reach an efficient situation. However, if governments intervene to change the price for any good, then the market will NOT deliver efficiency.

3. Prices, Market Clearing and Efficiency

- a. The *price* of a good is the rate at which it can be traded for other goods.
- b. When we trade, there is a price underneath the trade, even if there is no money and the trade was just barter.
- c. The *market-clearing price* is the price that would 'clear the market' in the sense that:
 - i. everybody who wants to buy at that price has bought exactly how much they want; and
 - ii. everyone who wants to sell at that price has sold exactly how much they want.
- d. If prices do not clear the market, then there may be pressure on the price, upwards or downwards, until prices do clear the market.
- e. The *First Fundamental Theorem of Welfare Economics* (described below) states that if

- markets are simple (described below), then the market clearing price yields efficiency.
- f. prices reveal information about how much goods are valued by the seller and the buyer.
 - i. the seller values the good no more than the price (otherwise, s/he wouldn't sell it)
 - ii. they buyer values the good at least as much as the price (otherwise, s/he wouldn't buy it)
 - g. in simple markets, both buyers and sellers agree on the value of the last unit of the good traded: they both value it at the price.
 - i. what if the seller valued that last unit way less than the price? well, s/he'd want to sell more of it, so as to extract more value from the trading. this would push the price down.
 - ii. what if the buyer valued that last unit way more than the price? well, s/he'd want to buy more of it, so as to extract more value from the trading. This would push the price up.
 - iii. the price only 'stabilizes' when the buyer and seller agree that the last unit traded was worth exactly the price paid for it.
4. Taxes and inefficiency
- a. Taxes do two things: they raise money for government to do stuff; and they change the prices of things.
 - i. Raising money is obvious: government gets the revenue from the tax;
 - ii. Changing prices is subtler: the GST raises the price of goods and services; income taxes raise the price of labour for firms (because workers get less than the advertised rate); excise taxes change the price of alcohol and tobacco.
 - b. If taxes change prices, then people may change their behaviour. Here, we say that the tax may *distort* my actions. If the tax reduces the amount of money I get from working, I may work less. Maybe I would stop working entirely.
 - i. Imagine that I stop working entirely. If I had a job, it was revealed that my services were worth at least my wage to my employer, and my time was worth my wage to me. The arrangement is 'worth it'.
 - ii. But, if the government taxes my income, it puts a wedge between what my employer must sacrifice to get me and what I get out of my employer. An activity that is 'worth it' to undertake does not get undertaken.
 - iii. The inefficiency here is that everyone could be better off if the government just told me 'you have to pay x\$ in taxes whether you work or not'.
 - c. in simple markets, the market price is the 'right' price: it is the price that achieves efficiency.
 - i. thus, taxation (or any other policy which changes the price) kills the efficiency of the simple market.
5. If you want to prove that a situation is **inefficient**, all you have to do is show that a (Pareto) improvement exists.
- a. So, the inefficiency of taxation is demonstrated by spelling out the Pareto improvement. An improvement of the "taxes with price change" option would be a "taxes with no price change" option. For example, we could figure out how much money each person *would* pay in tax through, e.g., income taxes, and then charge them this amount *no matter what income level they have*. This kind of tax does not change the price of working (that is, your income).
 - i. But, typically, this option is not available to the government.
 - b. Demonstration of efficiency by example, as above, can fall into two types, depending on whether the alternatives considered are restricted to those that are *feasible* or not restricted at all:

- i. one could consider any example, feasible or not. We call this efficiency or inefficiency relative to a *first-best* situation.
 - ii. one could restrict attention to examples that are *feasible* (or, equivalently, possible). We call this efficiency or inefficiency relative to a *second-best* situation.
 - iii. With the taxation example above, income taxation might be inefficient in a first-best sense, because we have an alternative in mind where everyone is better off (charge a tax that doesn't depend on work hours to everyone---this option is conceivable, but infeasible). But, income taxation might be efficient in a second-best sense (because we cannot think of a **feasible** alternative that makes everyone better off).
- c. Try another example of demonstrating inefficiency. Eg, a monopolist charges a lot to produce a little.
- d. If they would just sell more stuff 'at-cost' to purchasers committed to their initial monopoly-price purchase, then all the purchasers are better off, and the monopolist is no worse off. So, monopolies are inefficient.
 - i. Monopolists cannot typically do this, because they cannot precommit their consumers.
 - ii. However, the state could do it, if it were the monopolist, because it can command consumers to do stuff.
 - iii. The state could take over the monopoly, and sell people a fixed quantity at cost, and not allow people to buy more. This could be a (Pareto) improvement over a private monopolist that charged a lot and produced little.
- 6. *First Fundamental Theorem of Welfare Economics*. Markets deliver efficiency at the market-clearing (competitive) price if the market is *simple*. A simple market satisfies:
 - a. Perfect Competition
 - i. price-taking; large number of individuals and firms; equal power (of zero) for all individuals and firms. Individuals and firms take the prices of things as beyond their control, and just make decisions as if those prices fell out of the sky.
 - (1) monopolists are not price takers; they are in some sense 'price-setters'.
 - b. Complete Markets
 - i. you can buy and sell anything, eg, all types of futures and insurance contracts.
 - (1) nobody will see me insurance for journals rejecting my papers.
 - c. No Externalities
 - i. action taken by an agent cannot affect other agents, except through prices
 - (1) I drive to work without taking into account the crap coming from my tailpipe that is then breathed by Fraser Valley residents.
 - d. No Public Goods
 - i. *public goods* are can be shared without cost, and cannot be consumed exclusively, and no agents can choose not to consume.
 - (1) clean air can be shared nearly freely, cannot be made exclusive and cannot be denied (except in Total Recall).
 - e. No Increasing Returns to scale.
 - i. If returns to scale are increasing for a firm, competitive firms don't know how much to produce; the industry will be monopolised by the biggest producer (see Perfect Competition).
 - f. Perfect Information
 - i. everybody knows everything about commodities and prices:
 - (1) perfect knowledge of quality (health, education?)

- (2) perfect knowledge of prices (all of them, for all qualities)
 - (3) perfect knowledge of qualities and prices in the future. (savings).
 - ii. eg, firms don't know who is sickly and who's healthy, so they don't know what price to charge for insurance policies to people. They charge a fixed price independent of your health (which they can't observe), so healthy people don't buy any because it seems too expensive. used cars.
- 7. The miracle of efficiency:
 - a. Market-clearing prices deliver efficiency.
 - b. This means that even if you start very far from an efficient allocation, markets (repeated voluntary trade) get you to an efficient allocation.
 - c. For example: SITUATION A: I have beer, you have stinky cheese. I like stinky cheese, you like beer. Clearly, this is not a very good allocation of goods. Propose an alternative SITUATION B: wherein I have all the cheese and you have all the beer. A is inefficient if B is feasible.
 - d. Imagine now that SITUATION A holds, and that there is a price, eg, 1 pound of cheese per pint of beer, that we can trade at.
 - i. I may want to sell 2 beer to you at this price; you may want to sell 10 pounds of cheese to me at this price.
 - ii. Since trade is voluntary, only 2 beer and 2 pounds will transact.
 - iii. You will feel that you didn't sell 'enough' cheese.
 - iv. This trade is an improvement—after all it was voluntary and we did it.
 - v. But is it efficient?
 - vi. The price didn't 'clear the market'
 - (1) the market *clears* when everyone who wants to buy and sell stuff buys and sells exactly as much as they want to at the going price.
 - (2) the *market-clearing price* is the price at which the market clears.
 - e. The Theorem above states that if we trade at the market clearing price, then we will get an efficient allocation
 - i. It will not be possible to arrange any switches of stuff that makes everyone better off.
 - f. It sounds like that Theorem is just about trading goods, but it covers the case where agents both produce and trade goods.
- 8. One can think of the "if conditions" in the Theorem as relating to the nature of prices.
 - a. Perfect competition implies that nobody—neither buyer nor seller—can influence the price.
 - b. Complete markets implies that there is a price for everything. (Lives, slums, futures contracts on shrimp dumplings, everything.)
 - c. No externalities implies that all the agents affected by a goods consumption either pay or collect the price. I buy gas from a gas station. But folks who breathe in the carbon monoxide neither pay nor collect any part of the price.
 - i. Alternatively, we may say that the price covers the full social cost or value of the good. If the good has no consequences beyond me, then my value is sufficient.
 - d. No Public Goods implies that if I consume a good, then someone else cannot. If they could, then they would consume it without paying any price.
 - e. No increasing returns implies that there are no natural monopolies that exert power on the price.
 - i. If there were increasing returns, it means that the big producer can produce cheaper than the small producer. In this case, the big producer wins. But a big producer is, by definition, big, and can influence the price.

- f. Perfect information implies that everyone knows how the price connects with quality, and that everyone knows every price for every good.

9. Market Failure

- a. We cannot count on markets to deliver efficiency if any of the conditions above does not hold. For example, if there is a public good, then markets may not deliver efficiency.
- b. We often think of these failures market-by-market (even though the theorem does not). So, we think about a market failure for pollution (because there is an externality on other people), and we think about an inefficient quantity of pollution in the economy. However, one cannot really isolate a market like that---the inefficiency in that market may cause inefficiency in all the others.
- c. But, market-by-market thinking will dominate how we try to correct market failures.