Intermediate Microeconomics: Preferences

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Chapter 3: Preferences

You will need to read all of Chapter 3. Read Sections 3.0 to 3.3 carefully. You must understand the examples given in Section 3.4, but do not focus on memorizing them. Make sure you understand what Section 3.5 is saying, and what makes a well-behaved set of preferences. You will constantly encounter the Marginal Rate of Substitution in economics in various forms, so read Sections 3.6 to 3.8 very carefully as well.

In the previous chapter we discussed what choices are available to people. In order to keep building our model of the consumer, we now need to know what they like. To figure out what they like, we need to talk about their **preferences**.

We need a way to describe people's preferences. The easiest way to do so is to say "I like cheese more than I like jam". We are simply comparing two items. We can write that more formally: cheese $\succ$ jam. Or maybe you're indifferent between cheese and jam—you like them exactly equally and can't make a choice between them. We write that as cheese $\sim$ jam. Or how about if you're basically indifferent between the two but if push comes to shove, you'll take cheese over jam. Then we write this cheese $\succeq$ jam. These three symbols give us a way to talk about people's preferences.

They are more formally described as:

- strict preference ($\succ$),
- weakly preference ($\succeq$),
- and indifference ($\sim$).

We call these 'preference relations' since they *relate* one good to another. They tell us how one thing stands in relation to another in the consumer's eyes. Remember this is all about what the consumer likes—there are therefore no right or wrong answers.

An Example Now, suppose we have three types of shoes: Nike, Adidas, and Puma. In order for a person's preferences to be **consistent**, economists have to make some assumptions about their preferences. Basically, we need to assume that people aren't complete idiots; our models break down otherwise!

The first assumption is that a person's preferences are **complete**. That is, we must be able to compare all the goods! This is absolutely necessary, or else we're just shooting in the dark.

The second assumption is that people's preferences are **reflexive**. You must not *strictly* prefer any good to itself. Or else you'd just be crazy. This is pretty obvious.

The third assumption is that your preferences must be **transitive**. This is where it gets good. You can't tell me that you

1. prefer Nike to Adidas, and
2. prefer Adidas to Puma,
3. but you prefer Puma to Nike.

You might not be crazy, but you'd definitely be illogical. Here is where we need to assume that people are (to some extent) rational. And here is where a bit of psychology comes in. We're making some statement about how we believe people behave. This isn't a deep underlying truth of human nature.

Can you think of any cases where it's reasonable to think that transitivity of preferences doesn't hold?

If I ever ask you to explain transitivity and you give me back this example, you will get zero.

The Usefulness of Consistency These three assumptions that make up consistency help us to make some extrapolations. For example, given the first two statements about a person's preference over shoes, I can figure out what the third *should be*. If person who is transitive prefers Nike to Adidas and Adidas to Puma, they will also prefer Nike to Puma. Consistency allows us to make logical statements over a person's preferences.

Indifference Curves Indifference curves are a method of graphically representing people's preferences. Specifically it focuses on all the consumption bundles that a consumer is *indifferent* between. Take two bundles (x_1, x_2) and (y_1, y_2). If a consumer is indifferent between these two, then we say they are on the same *level of preference*. We can then turn this into an indifference curve by drawing a line through all the bundles that a consumer is perfectly indifferent $(\sim)$ between. The choice of any of these bundles do not make the consumer any more or less happy. Remember this! A consumer must be **indifferent** between all bundles on an **indifference** curve. It isn't rocket science.

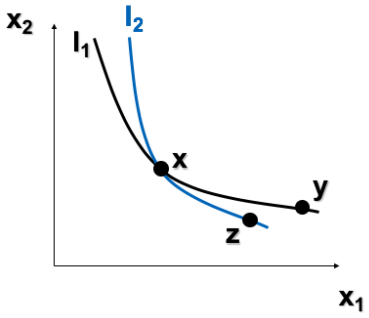
Some Indifference Curves are Better Than Others Since an indifference curve represents a specific level of preference, then indifference

curves to the right represent a higher level of preference while indifference curves to the left represent lower levels of preference. This is easy to see since a bundle can give you 1 chocolate and 1 biscuit. An indifference curve directly to the right of that might give you 1 chocolate and 2 biscuits. So the second bundle will be preferred to the first. What is it that we're assuming here? *We're assuming that a person prefers more biscuits to less biscuits.* Is this a good assumption?[1]

[1] See section on satiation below.

No Touching! Why can't indifference curves intersect? Let's take the most extreme example. If we have rum on the y-axis and corn curls on the x-axis, we can draw two indifference curves that clearly intersect, and cross. At the upper part we can say $I_1 \succ I_2$. But where they intersect, we say that $I_1 \sim I_2$. And at the lower part of the chart, we see $I_2 \succ I_1$. All of these things cannot be simultaneously true! We would be violating the logical rules we've set out. Can you show that this isn't transitive?

Figure 1: There's a Contradiction



Bad Hombres We can distinguish between two types of commodity: a good and a bad. A good is one where more of the commodity is always preferred. What type (slope) of indifference curve does this give us? A bad, on the other hand, is one where less of the commodity is always preferred. What does this imply for the slope of the indifference curve?

Perfect Substitutes What if I said that the consumer thinks that one unit of Good 1 is exactly equivalent to one unit of Good 2? What would the indifference curve look like? If the consumer believes that both goods are exactly equivalent, then only the *total amount* of these two commodities matters for the way in which the consumer behaves. Red pencils versus blue pencils is the easiest example. In this case, the slope is exactly equal to -1. In what case could we get perfect substitutes in which the slope is different to -1? Well, what if the consumer regards two bags of six saltbreads as exactly equivalent to one bag of 12 saltbreads. Technically, they're different commodities, but the consumer only cares how many total saltbreads he gets. In this case, the slope of the indifference curve could be -0.5. The key is that with perfect substitutes, the curve is *constant*.

Perfect Complements What if the consumer always consumes two goods in exactly the same quantity? That is, you buy one saltbread and a red frutee together—you cannot have them separately. In this case, all that matters for the consumer's preferences is the number of *pairs* that they consume. What would this indifference curve look like? The basic idea is that consuming one more of Good 1 while

holding constant the amount you consume of Good 2 does not make you better off. The best example is shoes: getting an extra left shoe without getting another right shoe doesn't benefit you because you simply can't wear one shoe.

Satiation Remember the rum example? Well, if you drink *too much* rum, you get drunk, you puke, you have a terrible hangover, you smell of alcohol the next day, you do silly stuff. Well means that there's a point where alcohol becomes a bad. But you wanted the first rum punch. And the second. Maybe three is the perfect amount. We call this the bliss point—or better, the point of satiation. The point where the last increase made you better off, but the next one will make you worse off. Basically, you get tired of it.[2]

[2] There's a life lesson in here somewhere.

Getting Rid of Satiation Sometimes we need to think about special cases *so that we can assume them away*. Slightly crazy? Satiation is one. Satiation makes our whole story a bit exposed to 'what-ifs'. It makes it hard to concretely say that more is always better. And we want to move to a more general setting of well-behaved preferences where our arguments are less open to poking and prodding.

Well-Behaved Preferences Where we really want to get to is a more general idea of **well-behaved preferences**. Why do we want well-behaved preferences? Well, as much as these special cases are cute, they don't allow us to move much further in creating a simple and general theory (model) of the consumer. We rarely deal with non-linear functions that are crazy. Instead, we focus on simple linear that are smooth, continuous, and just go up or down. This makes our lives a billion times easier.

Definition 1. Well behaved. A preference relation is well-behaved if it is monotonic and convex.

Monotonicity says that more of a commodity is always preferred. That is, we haven't reached the point of satiation. It also means that all commodities are 'goods'.

Convexity intuitively implies that we prefer averages to extremes. It says that we are moderate people. The definition says that a mixture of bundles are at least weakly preferred to those bundles themselves. Convexity is a graphical term, so it's best explained graphically as in the textbook. Note that this assumption of 'moderation' is useful when we think of a single 'representative agent'.[3] Why? There *are* people in Barbados who will eat ice cream each and every single day and never have cookies. However, if we were to combine all of Barbados' preferences into one *average* person, then Barbados-person

[3] A representative agent is one whose choices or preferences mirror those aggregated across society.

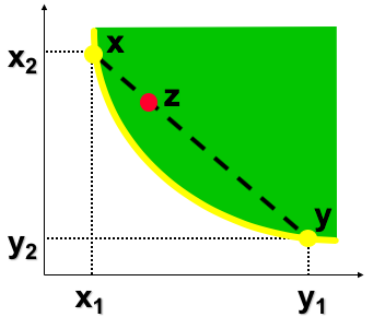
would like some ice cream and some cookies, and never want to have only ice cream or only cookies. So convexity, as an assumption that says averages are preferred to extremes, holds especially when we are considering a 'representative agent'. This also holds when we talk about you as an individual over a longer period of time. Maybe you bought cookies today, but you'll buy ice cream tomorrow. In a single day, you prefer to have *only* cookies, but over the period of a month, you prefer to have some cookies and some ice cream.

Can we draw some convex and non-convex preferences? How do we 'combine' bundles? Graphically, you simply draw a line from one to the other. Mathematically, you take a weighted average of the two bundles, with the weights adding up to 1. So for two bundles (x_1, x_2) and (y_1, y_2), we can combine them as

$$(z_1, z_2) = 0.3(x_1, x_2) + 0.7(y_1, y_2). \tag{1}$$

For this line to be convex, then (z_1, z_2) has to be better than either (x_1, x_2) or (y_1, y_2).

Figure 2: Strictly Convex Preferences



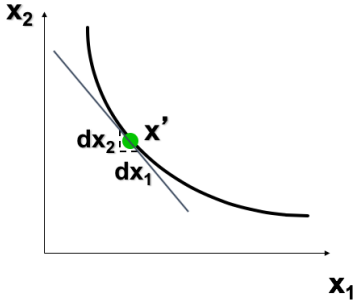
Marginal Rate of Substitution We're interested in what the slope of the indifference curve tells us. Remember the budget line told us the rate at which the *market* is willing to substitute one good for another. In this case, it is the rate *the consumer* is willing to substitute one good for another. We call the slope at a specific point on the indifference curve the **marginal rate of substitution** (MRS).

The MRS is a vital concept that is used in all of economic theory. The MRS asks: given that we start from a specific bundle, how much of a good are you willing to give up in order to get just one more unit of another good? Here are the trade-offs again, this time in your preferences.

Think about it in the context of your life. How much reading time would you give up to get another hour in the gym? How many M&Ms would you give up today for a single M&M tomorrow? Can you write out what the MRS means in your own simple words? Can you explain it to your parents?

The idea of the marginal rate of substitution is simple. If I took one cookie from you, how much ice cream would I have to give you in order for you *not* to fight me? That is, when I take away Δx_1 from you, how big does Δx_2 need to be in order to leave you on the same indifference curve?

Figure 3: $MRS = dx_2/dx_1$

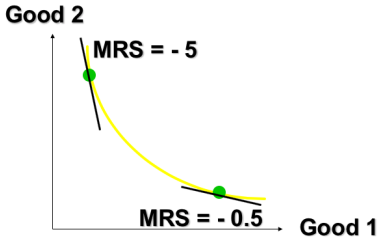


We can also interpret the marginal rate of substitution as a **marginal willingness to pay**. How much are you willing to give up of Good 1 in order to get another unit of Good 2? Note that this has nothing to do with prices; how much you *actually* have to pay has nothing to do with how much you're *willing* to pay. Remember from the first week

that your reservation price is not always equal to the market price of a commodity.

What can we say about the Marginal Rate of Substitution at different points along the line? Let's consider the case of well-behaved preferences. If we have a strictly convex set of preferences, then the MRS becomes less negative as you go down the indifference curve—it gets flatter. What does this imply about the way we choose bundles when our preferences are well-behaved? Well it says that as we get more of Good 1 you get, the more of it you're willing to give up in order to get an extra unit of Good 2. If you have lots of money and no happiness, you're likely willing to give up a lot of money to get a bit of happiness. If you're poor with lots of happiness, well, you'd probably not be willing to give up much of your already-limited funds for a little bit more happiness.

Figure 4: MRS gets less negative



Notes

Transitivity is Fundamental The axiom[4] of transitivity is a fundamental idea in economics. It introduces the kind of logical thought we want to use in economics. Many ideas in economics are posed in much the same way as we talk about transitive preferences: *if monsters are cute, and cute is good, then does it mean that monsters are good?* The approach is to use the information you have available (statements 1 and 2) to make some inference about a problem at hand (the final question).

[4] An axiom is simply a statement that everyone believes to be true. Always challenge axioms.

Graphical Methods It's really useful to be able to describe important economic concepts on a simple two-dimensional chart. It makes it easy to understand, and drawing charts are fun (makes you feel like you're in an art class, right?). However, I need you to not get carried away with charts and graphs. They are very useful for *introducing* an idea, but do not think that the graph is the *entire* idea. Instead, think about what deeper concept the graph is trying to represent. Can you generalise the concept in your mind? When you see a graph in the textbook or in the lecture slides, try to write down the more **general or abstract idea** that it is trying to convey.

Mathematical Methods This leads us to the importance of mathematical methods. The next chapter shows us how to generalise the idea of indifference curves using mathematical methods. It's not hard, but it's important you understand how preferences work first.

Special Cases While we always search for really broad and widely applicable answers to our questions, sometimes special or extreme

cases are really interesting. Perfect substitutes and perfect complements are extreme cases. Extreme cases help you to think about what mechanism is driving your general ideas. Using extreme cases is a logical trick economists use to think about whether their arguments are solid. Take the statement "cats are evil"[5] as an example. This might imply the cat will pee on your carpet. But lets take it to the extreme: an evil cat would kill you in your sleep and try to take over the world. Do we observe cats doing that? Is it correct to say that cats are "evil" then?

[5] This is an axiom.