Chapter 4 Consumer Choice

Introduction

We have learned supply-demand model, which is used to analyze the behavior of market. Market consists of a lot of consumers and firms. The market demand curve is the sum of all individual demand curves. Similarly, the market supply is the sum of all supply curves. So, how is the individual demand curve decided? How does each individual decide the amount of goods he is going to buy? To analyze this kind of question, supply-demand model is not useful here. We have to learn how consumers' choices are made.

All consumers must choose which goods to buy, how much to buy because limits on wealth prevent them from buying everything that catches their attention. Therefore, consumers buy the goods that give them the most pleasure, subject to the constraint that they cannot spend more money than they have.

When economists describe consumers' behavior, they always use positive statement rather than normative statements. Economists want to predict behavior instead of judging it. They want to know, for example, whether Jack will smoke more next year if the price of cigarettes decreases.

In this chapter, we examine four topics:

1. Preference: We use three properties of preferences to predict which combination, or bundle, of goods an individual prefers to other combinations.

2. Utility: Economists summarize a consumer's preference using a utility function, which assigns a numerical value to each possible bundle of goods, reflecting the consumer's relative ranking of these bundles.

3. Budget constraint: Prices, income, and government restrictions limit a consumer's ability to make purchases.

4. Constrained consumer choice: Consumer maximize their pleasure from consuming

various possible bundles of goods given their income, which limits the amount of goods they can purchase.

Preference

Consumers always choose goods which give the most pleasure. So how do we measure about the pleasure? And how do we rank the goods? Economists assume that consumers have a set of tastes or preferences that they use to guide them in choosing between goods.

These preferences have to satisfy three properties:

1. Completeness: When consumers face a choice between any two bundles of goods, a consumer can always rank them by the following relationships: For choice between A and B, either $A > B$, or $B > A$, or $A = B$. Here, ">" means "prefer to", while "=" means "indifferent". This property rules out the possibility that consumers cannot decide which bundle is preferable.

2. Transitivity: the ranking must be consistent in the sense that, if consumer weakly prefer Bundle z to Bundle y, and weakly prefer Bundle y to Bundle x, then it must be true that consumers prefer z to x. ("weakly prefer" means that z is at least as good as y)

3. More is better: If all else the same, more of a good is always preferred to less of that good. "Good" here is defined by economist as a commodity for which more is better than less. "Bad" is defined as a commodity for which less is preferred, for example, "pollution". Since consumers can always throw away the extra goods that they don't want, so more goods at least don't make consumer worse off. That is why this property is here.

Now, with these three properties, we can tell a lot about a consumer's preference.

Example:

Lisa loves fast food. She has to decide how many pizzas and burritos to eat. Here, she faces several bundles:

a:(32,12); b:(30,10); c(15,25); d(15,10); e(25,15); f(30,20).

Now let's decide about lisa's preference:

By property 3, $e > d$, $c > d$, $a > b$, $f > e$, $b > d$. Then by transitivity, we know that $f > e > d$, and $a > b > d$. But we still don't know the relationship between e, c, and a. We cannot use any property to justify them.

Indifference Curve

Suppose we ask Lisa to identify all the bundles that gave her the same amount of pleasure as consuming bundle e. Using her answers, we draw curve I. Curve I is an **indifference curve**: the set of all bundles of goods that a consumer views as being equally desirable. So, consumers are indifferent among bundles along the same indifference curve because they give consumers same pleasure.

Indifference curve I includes bundle c, e, and a. Then from this indifference curve, we know that Lisa prefer e to b. How do we know that? Lisa prefers a to b, while e and a give the same pleasure, so Lisa will prefer e to b. Similarly, we can decide the relationships among all bundels.

If we asked Lisa many, many questions, in principle, we could draw an entire set of indifference curves through every possible bundle. This set is called indifference map, or perference map, which is a complete set of indifference curves that summarize a consumer's tastes.

We assume that indifference curve is continuous, and no gaps. Indifference curve maps have the following four important properties:

1. Bundles on indifference curves farther from the origin are preferred to those on indifference curves closer to the origin.

2. There is an indifference curve through every possible bundle.

3. Indifference curves cannot cross.

4. Indifference curves slope downward.

To prove the first one, we can always draw a line from the origin and cross that with two indifference curves. By "more is better", the one on the indifference curve farther from origin is prefered to the one close to the origin, but any bundles on the farther IC are indifferent, so by transitivity, those bundles will be preferred to all the bundels on closer IC. By completeness, given any bundles, consumers can rank them. For proporty 3, if IC crosses, then there is one bundle which is on two different IVs. And this will cause all bundles on these two ICs be indifferent. But this is wrong. By more is better, some bundles must be better than others. To prove the last proporty, just use "more is better". Bundles on this IC are indifferent, but by "more is better", they are not. So IC must be downward slope.

Marginal Rate of Substitution

We can notice that if we move along the IC, consumers are getting more of one good, while less of the other good. This means that consumers are willing to make trades between goods. How do we measure this willingness to trade? We use marginal rate of substitution. MRS is the maximum amount of one good a consumer will sacrifice to obtain one more unit of another good.

$$MRS = \frac{dB}{dZ}$$

where dZ is the number of pizzas that Lisa will give up to get dB.

MRS is the slope of indifference curve.

For example, suppose point a is (3,8), point b is (4,5), then move from a to b causes burritoes to drop 3, while pizzas have been increased from 3 to 4. So

$$MRS = \frac{-3}{1} = -3$$

Curvature of Indifference Curve

First, let's talk about convex and concave curve. Convex means that the line connecting any two points on an IC is above this IC, while Concave means the opposite.

In the reality, we notice that when people have a large amount of one good, they tend to value that good less, which implies they are willing to give up a larger amount of that good to trade for other goods. When they have relatively less amount of one good, then they tend to value more of that good, which implies that they are willing to give up a small amount of that good to trade for other goods. This is the situation when IC is convex. For concave case, people are willing to give up more of a good that is scarce for them. This is hard to imagine though sometimes it does happen. But in this course, we will only talk about convex case.

Convex IV reflects a *diminishing marginal rate of return.*

Two extreme cases

1. Straight line: perfect substitutes.

The slope of IC is always constant. Consumers view two goods as perfect substitutes. He doesn't care which one he is consuming. They all give the same pleasure. Therefore, no matter which bundle he is consuming, his willingness to trade is the same along the IC.

For example: seven-up and sprite if you cannot tell the difference.

2. Right angle: perfect complements.

Consumers is interested in consuming only in fixed portions. Give more of one good is useless to him and it is on the same IC as that fixed portion bundle.

For example: left and right shoes. Giving more of left shoes doesn't do people any good.

Any convex IC is in between this right angle and straight line, and it implies these two goods are imprefect substitutes.