

# 1 Consumer Theory in a Nutshell

We are starting a series of lectures on consume theory. The intent is to build a theory/model to explain the predict the behavior of an individual (how she will live her life: what she will consume, where she will live (and work), what she will consume, where she will go, how she will get there, and who will she spend her life with.)

In economics there are many different theories of the consumer. We will present a simple form of the standard neoclassical theory.

ct-nutshell.pdf January 21, 2011

Read up on consumer theory in KW, chapters 10 and 11.

The intent is build a model/theory to explain what an individual will purchase in the market place.

Remember and review our earlier notes on what's a model/theory

Start by defining some terms:

$x_n$  = amount of good  $n$  consumed by the individual  
 $p_n$  = price of good  $n$   
 $y$  = individual's income

Assume  $n$  goods in the world,  $[x_1, x_2, \dots, x_N] \equiv \mathbf{x}$ . Let  $\mathbf{p} \equiv [p_1, p_2, \dots, p_N]$  denote the vector of prices.

Do you know what a "vector" is?

$\mathbf{x}$  represents a bundle of goods

and  $\mathbf{x}^s$  represents a specific bundle of goods, bundle  $s$ .  $s$  the name given to a particular bundle.

$\mathbf{p}$  and  $y$  are exogenous variables in this theory.  $\mathbf{x}$  is endogenous—what the theory is trying to explain

Denote the bundle the individual chooses to consume  $\mathbf{x}^* \equiv [x_1^*, x_2^*, \dots, x_N^*]$ .

Many of the  $x_n^*$  are likely zero: there are many goods you do not consume.

Further assume that the individual can rank bundles of goods and that the individual chooses the highest ranked bundle from among those she can afford.

The above is consumer theory in a nutshell.

## 2 Elaborating:

The individual has a ranking over **bundles** of goods such that  $\forall$  bundle  $j$  and  $k$  either

- $\mathbf{x}^j \succ \mathbf{x}^k$  read this, bundle  $j$  is ranked higher than bundle  $k$
- $\mathbf{x}^j \prec \mathbf{x}^k$

or

- $\mathbf{x}^j \sim \mathbf{x}^k$

where  $\succ$  denotes preferred (ranked higher), and  $\succeq$  denotes weakly preferred (ranked at least as high).

Note that

$$(\mathbf{x}^j \succeq \mathbf{x}^k \text{ and } \mathbf{x}^j \preceq \mathbf{x}^k) \Leftrightarrow \mathbf{x}^j \sim \mathbf{x}^k$$

which is indifference (ranked at the same level)

Assume this ranking has the following properties:

- $\mathbf{x}^m \succeq \mathbf{x}^m \forall m$
- $\mathbf{x}^k \succeq \mathbf{x}^h \succeq \mathbf{x}^t \Rightarrow \mathbf{x}^k \succeq \mathbf{x}^t$

These two properties are a definition of rationality. They are assumed, so assumptions.

That is, a rational individual ranks each bundle at least as high as itself, and her preferences are transitive.

The individual's ranking of bundles is her preferences.

When an economist says "Jane has preferences" all he means is that she has a ranking over all possible bundles of goods.

The following inequality identifies the bundles that the individual can afford (in terms of money)

$$y \geq p_1x_1 + p_2x_2 + \dots + p_Nx_N$$

Recollect that  $y$  and  $\mathbf{p}$  are exogenous—they constrain the individual

If the modeler assumes more is always preferred to less, which is often assumed, the chosen bundle,  $\mathbf{x}^* \equiv [x_1^*, x_2^*, \dots, x_N^*]$ , will have the following properties:

- $y = p_1x_1^* + p_2x_2^* + \dots + p_Nx_N^*$
- $\mathbf{x}^* \succeq \mathbf{x}^j \forall j : y = p_1x_1^j + p_2x_2^j + \dots + p_Nx_N^j$

Can you explain why?

If  $\mathbf{x}^*$  is unique (it does not have to be), each  $x_n^*$  is a function, a different function, of  $y$  and  $\mathbf{p}$ . Their particular functional form depends only on the individual's preferences.

These functions are called demand functions. That is

$$x_1^* = x_1(y, \mathbf{p}) = x_1(y, p_1, p_2, \dots, p_N)$$

$$x_2^* = x_2(y, \mathbf{p}) = x_2(y, p_1, p_2, \dots, p_N)$$

That is  $x_k^*$  is the individual's demand for good  $k$ , and how much she will demand is a function of her income and the prices she faces. Her demand function for commodity  $k$  identifies how much she will buy and consume for every possible  $y$  and  $\mathbf{p}$ .

In review, to solve this consumer's problem we need only her budget set and her ranking over bundles.

Note that we completely specified consumer theory without ever mentioning the terms "utility" or "utility function."

### 3 Generalizing a bit (beyond the scope of chapter 10): economists assume that individuals can rank *states-of-the-world*, and consumption goods are only part of that what you experience in a state

At the moment you are living in a state of the world; simply put, what you are experiencing is a SOW.

The bundle of goods you consume,  $\mathbf{x}$ , is only one of the many determinants of your quality of life.

Let  $i$  refer to individual  $i$

What are some **other** things that affect your quality of life?

$s_i = 1$  if you have a significant other, and zero otherwise

$k_i$  = number of kids you have

$p$  = pollution level

$c$  = crime rate

$f_i$  = number of good friends,

$w$  = number of wars going on

$h_i = 1$  if going to heaven, and zero otherwise.

$sick_i$  = how sick you are.

etc., etc.,

Note that the above things are not market goods: you don't buy them with money. Some you get to choose, others you have no control over.

Denote state of the world  $j$  for individual  $i$  as  $SOW_i^j$  where it depends on  $\mathbf{x}_i^j, s_i^j, k_i^j, p^j, c^j, f_i^j, w^j, h_i^j$  and  $sick_i^j$ .

Note that some of these state attributes vary across individuals and some do not (e.g. everyone in Boulder pretty much experiences the same pollution levels, but we don't all have the same significant other.

The T.A.s are busily working making up multiple-choice questions on preferences and states of the world.

One can imagine an individual having a ranking over states of the world, "I would rather live in world  $h$  than in world  $d$ ."

To have preferences in this more general sense simply means you can rank states of the world.

Some individuals, most, would be willing to give up some consumption goods in exchange for more friends, or to get to heaven. Others would not.

Or you might be willing to give up some of the market goods you consume for a world with less pollution. This is a research area for me: your WTP (willingness-to-pay) in terms of market goods (money) for an improved environments.

Would you give up your HDTV for a 12" analog TV if the switch eliminated global warming?

Or give up some market goods to get over your pesky case of brain cancer?

At this point, you should be getting the idea that economic choice is not simply about how big of a TV screen you will buy.

Note that many of the things that affect your quality of life, you can do little about, many of them cannot be bought and sold in the market place—their levels are exogenous from your perspective. That said, you can vote for the other guy, gain or lose 20 pounds, shoot the wife, and start meditation, or kick-boxing classes. These are all choices. People born in very poor countries often have very limited choices.

An interesting question is whether you are happier when you live in a higher ranked state of the world - this is a topic I research. Economists typically says that higher ranked states are "preferred" to lower ranked states, the question is what do we mean by "preferred?" If you are interested, I can recommend a paper or two.

Another interesting, and important question, is whether having more market goods (having more money) makes you happier. The evidence suggests that making the very poor less poor (giving the starving and homeless, food, shelter and safety) makes them happier. That said, it is not clear that increasing your parents income from \$100K to \$120k would make them happier.

Don't make the mistake of thinking that the policy goal of economics is to always get everyone more shit.