**Model of consumer behavior**

Scarcity forces consumers to live under budget constraint

Consumers choose basket of goods/services the maximizes well-being subject to constraint

**Budget Constraint**

In real life consumer chooses among many goods

Model will show choices open to consumer choosing between two homogeneous goods

 1. Food (in pounds)

2. Shelter (in square yards)

Consumption is a flow for both goods

Consumer must choose basket that satisfy:

Expenditures ≤ income

Budget constraint reveals all baskets of food and shelter satisfying condition

On the constraint:

Income = expenditure

M = Pf·F + Ps·S

Rearrange terms:

F = $\frac{M}{P\_{f}}- \frac{P\_{s}}{P\_{f}} S$

F (lbs/week)

S (square yards/week)

Budget line

1. For each basket on line, income equals expenditures

2. Downward slope of line indicates consumer must forego one good if she wants to increase consumption of the other

3. Consumer may choose any basket along line; final choice depends on preference

What is held constant along a budget line?

What attribute does every basket along a budget line share?

Suppose M = $100/week

 Ps = $5/sq yd

 Pf = $10/pound

Budget line:

F = $\frac{M}{P\_{f}}- \frac{P\_{s}}{P\_{f}} S$

F = 10 – ½ S

F (lbs/week)

S (square yards/week)

a

b

3

5

(Shelter, Food)

c

Baskets a? b?

What is total expenditure on basket c?

Is there any tradeoff in moving from basket a to c? basket b to c?

**Slope of budget line**

 Represents rate consumer can substitute one good for another holding total expenditure constant

$\frac{∆F}{∆S}=\frac{-P\_{S}}{P\_{F}}=-^{1}/\_{2}$

For each additional square yard of shelter consumer rents per week, must give up ½ pound of food

The consumer acquires two square yards of shelter in moving from basket a to c. How much does she forgo in pounds of food?

How does the tradeoff relate to the slope of the budget line?

Budget line slope illustrates marginal tradeoffs consumer can make in market

Determined by relative prices

Relevance…

∆ Price

Shelter price rises from $5 to $10 per square yard

1. Rate at which consumer can substitute between goods has changed: $-\frac{P\_{S}}{P\_{F}}= -1$

Opportunity cost of acquiring additional unit of shelter has increased

2. All baskets (except one) are now smaller on new budget line

 Consumer real income has changed, though nominal unchanged

∆ Price

1. PS decreases from $5 to $1

2. PS increases from $5 to $20

3. PF increases from $10 to $40

∆ Income

**Composite Good**

Budget line can illustrate choices open to consumer for one good relative to remaining budget

Y

X

M

M/Px

Y – composite good

 A collection of all goods except one (good X)

Price of Y normally set to $1/unit

Generate the function of the above budget line for the composite good.

Explain the intuition behind the slope of the budget line being -Px.

**Kinked Budget Line**

Think of a good whose price changes for different units purchased

Suppose price of good X decreases after first unit purchased

Marginal tradeoff changes after initial unit purchased

Y

X

M

M/Px

1

What happened to price of X after first unit acquired?

How is this example different from the previously discussed price change in a good?

Show budget constraint if price went in other direction after first unit.

Examples

**Consumer Preference**

Assuming consumer exhausts income, he will choose basket on budget constraint the maximizes well-being

Consumer ability to choose such basket based on three assumptions regarding decision-making

**1. Completeness**

Consumer is able to rank all possible combinations of goods and services

The consumer comparing baskets I and J; three possible scenarios

Y

X

I

J

1. Consumer prefers I to J or

2. Consumer prefers J to I or

3. Consumer indifferent between baskets

**2. Transitivity**

Suppose consumer ranks baskets as:

**most preferred → least preferred**

 **I J K**

Y

X

I

J

K

If consumer prefers I to J

And prefers J to K

Must prefer I to K

Consumer preference does not reverse

**3. More is Better**

Consumer will always prefer basket L to basket I

Y

X

I

L

[Experiment suggesting violation of assumptions](https://www.dropbox.com/s/6sggi12j4sv2275/contingent_value.xlsx?dl=0)

Explain why we can never assume the consumer in the transitivity diagram would prefer any one basket (I, J, K) over another?

What allows us to assume the consumer in the “more is better” diagram prefers L to I?

Utility – well-being that in economics arises from consumption of goods and services

People normally consume many goods/services x1……..xn

Mathematical representation

U = U(X1, X2,……Xn)

An explicit function may be used to represent relationship between consumption and well-being

Consumer can be modeled as if she is maximizing a mathematical function

Suppose:

Consumer derives utility from food and shelter consumption

U = U(food, shelter) food - F shelter - S

Assume the explicit function

U = U(F,S) = F·S

Characteristics of individual consumer’s behavior

1. Consumer well-being increases with consumption of either good

 $\frac{∂U(F,S)}{∂F}>0 \frac{∂U(F,S)}{∂S}>0$

Marginal utility - change in utility resulting from a incremental change in consumption of a good

Marginal utility of food - MUF = $\frac{∂U(F,S)}{∂F}$ Marginal utility of shelter - MUS = $\frac{∂U(F,S)}{∂S}$

2. Consumer must consume some of each good in order to derive any utility

U = U(F,S) = F·S

if F=0 then U(F,S)=0

if S=0 then U(F,S)=0

Compare to utility function U(F,S)=S+$\sqrt{F}$

If the marginal utility of a component of a utility function turns out to be an negative, explain why we should not consider the component a “good”.

**Indifference Curve**

A collection of market baskets in which consumer is indifferent

Each basket on curve generates same utility for consumer

F

S

I

J

L(20,20)

$$\overbar{U}$$

Suppose $\overbar{U}(F,S)=100$

100 index of consumer well-being

Utility measure is only in terms of order

U=100 represents greater well-being than U=99

or U=50 etc.

(S,F)

Will the indifference curve ever touch either axis?

What is utility level of point L?

Why would it be impossible for L to be on the same indifference curve as J or I?

Any basket on indifference curve L is on would be preferred by consumer to any basket along $\overbar{U}=100$ (transitivity)

There are many combinations of F,S that can generate $\overbar{U}=100$

|  |  |  |
| --- | --- | --- |
| **Basket** | **F** | **S** |
|  | 1 | 100 |
| **J** | 5 | 20 |
|  | $$\vdots $$ | $$\vdots $$ |
| **I** | 20 | 5 |
|  | 25 | 4 |

As move down curve consumer substituting food for shelter

Marginal Rate of Substitution (MRS)

 Represents rate at which consumer willing to substitute one good for another holding utility constant

MRS is the slope of the indifference curve

MRSS,F =$ \frac{-∆F}{∆S}$ marginal relationship changes as move down curve

Calculation of MRS from utility function:

 As move down indifference curve, F and S are changing while utility is unchanged

Total differentiation of the utility function U(F,S) (showing effect of F and S changing)

$\frac{∂U}{∂F} ∙∆F+\frac{∂U}{∂S} ∙∆S$ = $∆\overbar{U}$

Along indifference curve $∆\overbar{U}=0$, therefore

$\frac{∂U}{∂F} ∙∆F+\frac{∂U}{∂S} ∙∆S=0$ or denote partial derivatives as marginal utilities

$$MU\_{F} ∙∆F+MU\_{S} ∙∆S=0$$

Rearranging terms

$$MU\_{F}∙∆F=-MU\_{S} ∙∆S$$

$\frac{-∆F}{∆S} $ = $\frac{MU\_{S}}{MU\_{F}}$

Calculate MRS for our utility function U(F,S) = F·S

F

S

I

J

$$\overbar{U}$$

MRS of $U(F,S)=F∙S$

MRSS,F = $\frac{MU\_{S}}{MU\_{F}}$ = $\frac{F}{S}$

|  |  |
| --- | --- |
| Basket (S,F) | MRSS,F |
| I(5,20) | 4 |
| J(20,5) | ¼ |

Interpretation of MRSS,F at points I, J.

At point I, if the consumer acquires an increment of shelter, ΔS, how much food (ΔF) is she will to forgo to just be indifferent?

At point J, if the consumer acquires an increment of shelter, ΔS, how much food (ΔF) is she will to forgo to just be indifferent?

MRS diminishes as we move down indifference curve

Marginal willingness of consumer to substitute food for shelter falls as consumer obtains more shelter and consumes less food

Examples: next course taken in quarter, next vacation in given time period