**Representative Consumer**

Utility Function: U(F,S)=F·S

Budget Constraint: M = PFF+PSS

Demand Functions: F = $\frac{M}{2P\_{F}}$ S = $\frac{M}{2P\_{S}}$

**Notes on demand function:**

1. Illustrates how consumer behaves in market given preferences and budget constraint.

2. Generates quantities demanded given prices and income in which two conditions are satisfied:

$MRS\_{S,F}=\frac{P\_{s}}{P\_{f}}$ and Income=Expenditures

Use demand functions to confirm both conditions

3. Demand curves slope downward

Confirm: $\frac{∂F}{∂P\_{F}}<0$ and $\frac{∂S}{∂P\_{S}}<0$

Both demand curves are non-linear

4. There are no cross price effects coming out of specific utility function:

Confirm: $\frac{∂F}{∂P\_{S}}= 0$ $\frac{∂S}{∂P\_{F}}= 0$

5. Both food and shelter and normal goods:

Confirm: $\frac{∂F}{∂M}>0$ $\frac{∂S}{∂M}>0$

**Price Elasticity of Demand**

Measures the responsiveness of quantity demanded to price

Unitless measure that calculates percentage change in quantity demanded given percent change in price

Price elasticity:

η = $\frac{\%∆Q}{\%∆P}$

= ${\frac{∆Q}{Q}}/{\frac{∆P}{P}}$

= $\frac{∆Q}{∆P}∙\frac{P}{Q}$

$\frac{∆Q}{∆P}$ at a specific point on demand curve is calculated by$\frac{∂Q}{∂P}$

Calculate own price elasticity for food from demand function: F = $\frac{M}{2P\_{F}}$

η = $\frac{∂F}{∂P}∙\frac{P}{F}$

= $\frac{-M}{2P\_{F}^{2}}∙\frac{P\_{F}}{F}$

substitute for F using thedemand function

= $\frac{-M}{2P\_{F}^{2}}∙\frac{P\_{F}}{^{M}/\_{2P\_{F}}}$

= -1

Interpretation:

At every point along demand curve a given percentage change in price will cause quantity demanded to change by an equal percentage (in opposite direction)

Calculate price elasticity for shelter

[Example of price elasticities](http://milesfinney.net/410/handout/elast.htm)

Elasticity is function of:

1. substitution possibilities

2. budget share

3. time

**Income Elasticity**

Measures responsiveness of demand to income changes:

$ε= {\frac{∆Q}{Q}}/{\frac{∆M}{M}}$

 = $\frac{∆Q}{∆M}∙\frac{M}{Q}$

Calculate income elasticity for food from demand function: F = $\frac{M}{2P\_{F}}$

 $ε= \frac{∂F}{∂M}∙\frac{M}{F}$

 = $\frac{1}{2P\_{F}}∙\frac{M}{^{M}/\_{2P\_{F}}}$

 = 1

Interpretation:

An increase in income by a given percentage causes a change in consumption of food by an equal percentage

Calculate price elasticity for shelter

[Estimated income elasticities](http://milesfinney.net/410/handout/elast.htm)

**Budget share:** proportion of total budget taken up by specific good

Calculation of budget share for shelter: $\frac{P\_{S}∙S}{M}$ substitute demand function for shelter (S)

As income increases, what happens to the consumer’s budget share for a good with an income elasticity greater than one?

As income increases, what happens to the consumer’s budget share for a good with an income elasticity between zero and one?

If a good has an income elasticity less than zero, what happens to absolute expenditure as income increases?

Explain why we should never find a positive own-price elasticity for a good.

If a good has a price elasticity more negative than -1, what happens to the good’s budget share as price increases?

If a good has a price elasticity between 0 and -1, what happens to the good’s budget share as price increases?

Explain why an inferior good for a consumer must have been a normal good over some initial income range.