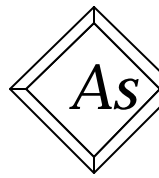


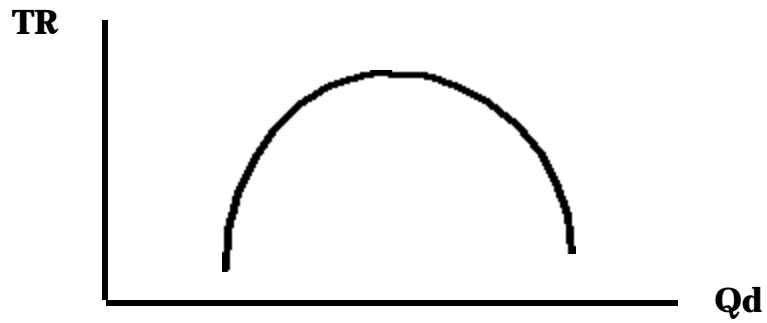
Price Elasticity of Demand

Lecture #2



As We Move Down the Demand

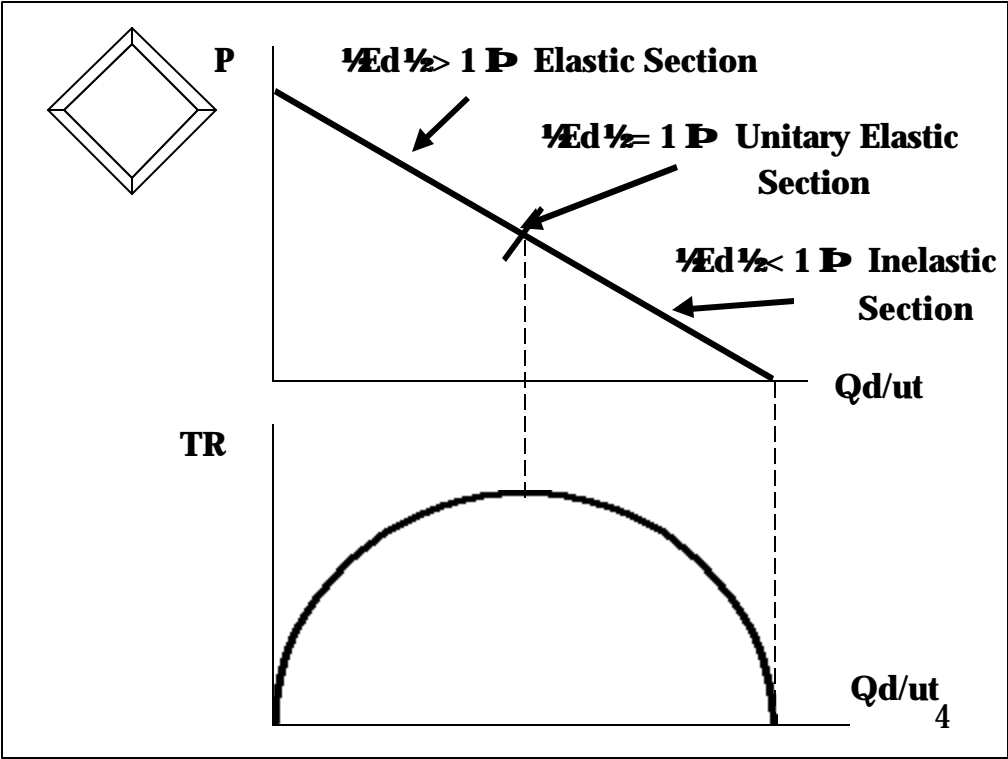
curve, TOTAL REVENUE first increases, reaches a maximum (or peak), and then decreases.





Another Curve Ball Folks!

**All downward sloping
linear demand curves
can be divided into 3
distinct sections that
differ in elasticity.**





Price Changes:

If a price change causes TR to move in the opposite direction from the price change, we are in the elastic portion of the demand curve.

Price Changes:

Therefore,

$$\text{if } - P \uparrow \rightarrow \text{TR}$$

or

$$\text{if } - P \downarrow \rightarrow \text{TR}$$

Elastic Section of Demand Curve



Price Changes:

If a price change causes TR to move in the same direction as the price change, we are in the inelastic portion of the demand curve.

Price Changes:

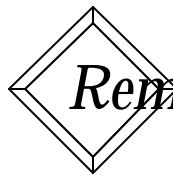
Therefore,

$$\text{if } - P \uparrow - TR$$

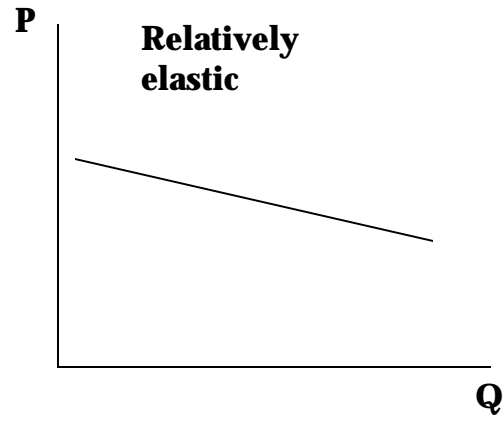
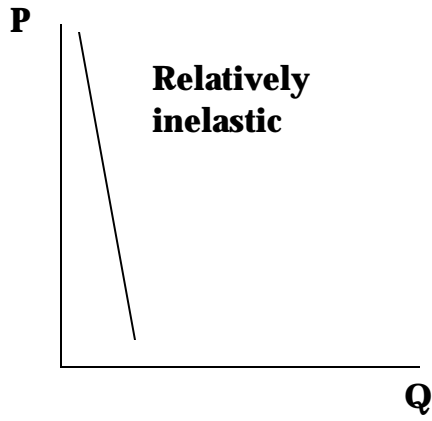
or

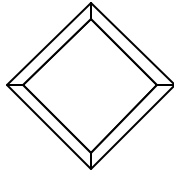
$$\text{if } - P \downarrow - TR$$

Inelastic Section of Demand Curve



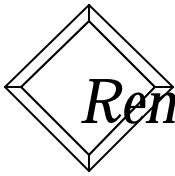
Remember:



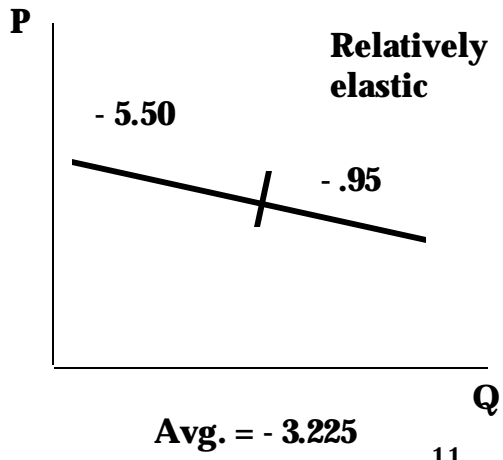
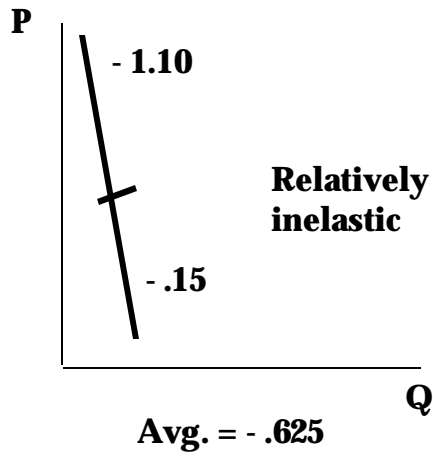


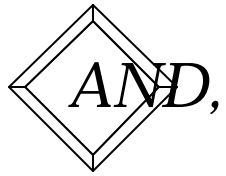
The two demand curves have the 3 sections of elasticity

We use the terms relatively inelastic or elastic here as a means of saying that over the whole range (3 sections) the average elasticity of demand is either inelastic or elastic.



Remember:






When:

$|E_d| > 1$ → elastic demand → TR - with a P -

$|E_d| = 1$ → unitary demand → TR is maximized.

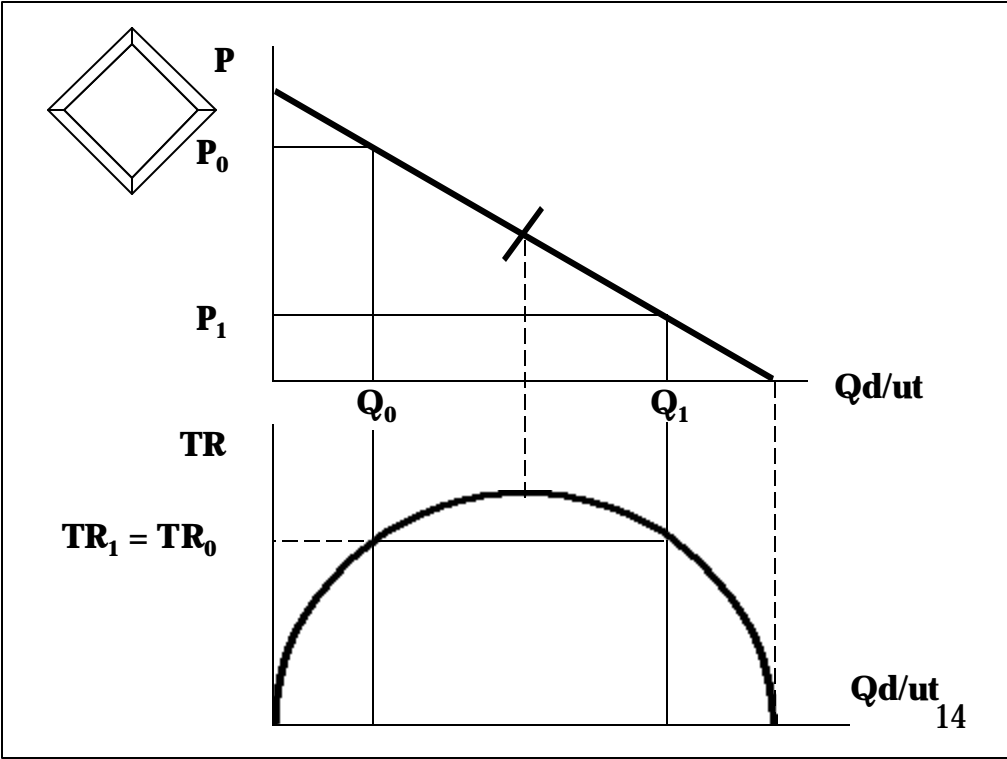
$|E_d| < 1$ → inelastic demand → TR - with P -

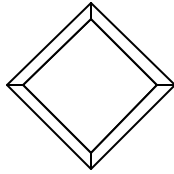


Practical Use:

Would a producer facing a negatively sloped demand curve for the commodity he/she sells ever want to operate in the inelastic range of the demand curve ?

Generally, NO!!

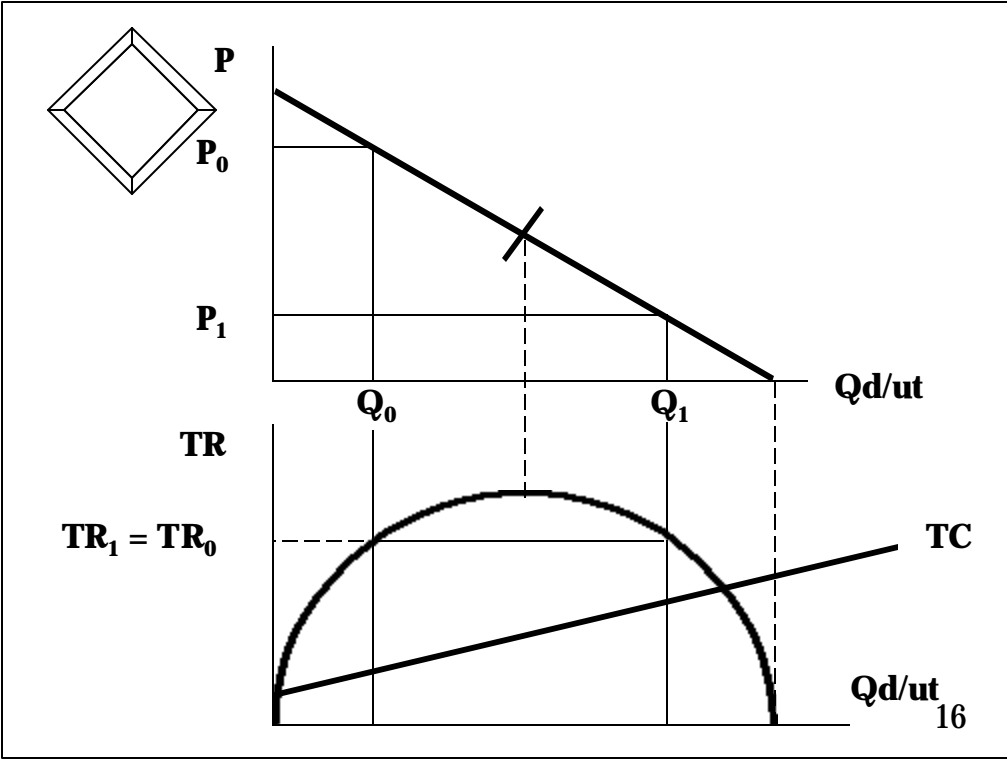




Q_0 and Q_1 yield the same total revenue.

Now Some Common Sense:

**Don't you think the total cost (TC) of
producing Q_0 is $<$ the TC of producing
 Q_1 ?**





Want to Maximize Profits

$$\mathbf{p} = \mathbf{TR} - \mathbf{TC}$$

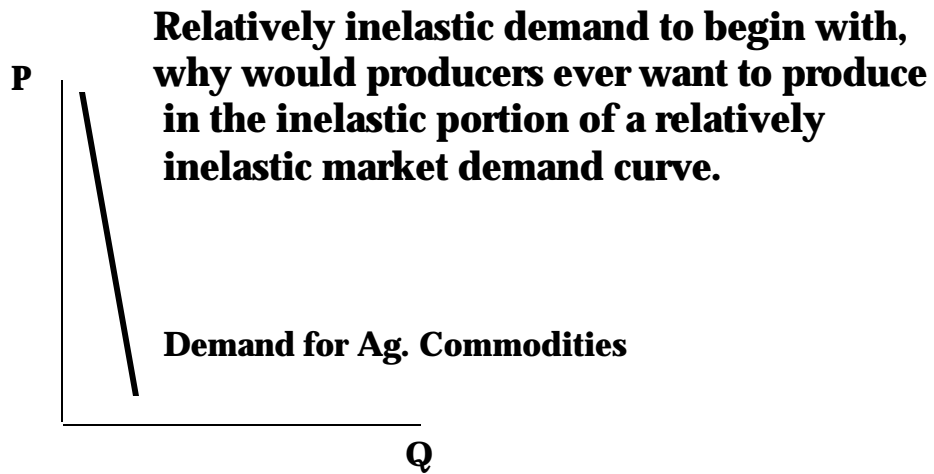
$$\mathbf{p}_0 = \mathbf{TR}_0 - \mathbf{TC}_0$$

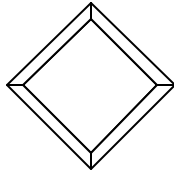
$$\mathbf{p}_1 = \mathbf{TR}_1 - \mathbf{TC}_1$$

$$\mathbf{p}_0 > \mathbf{p}_1$$

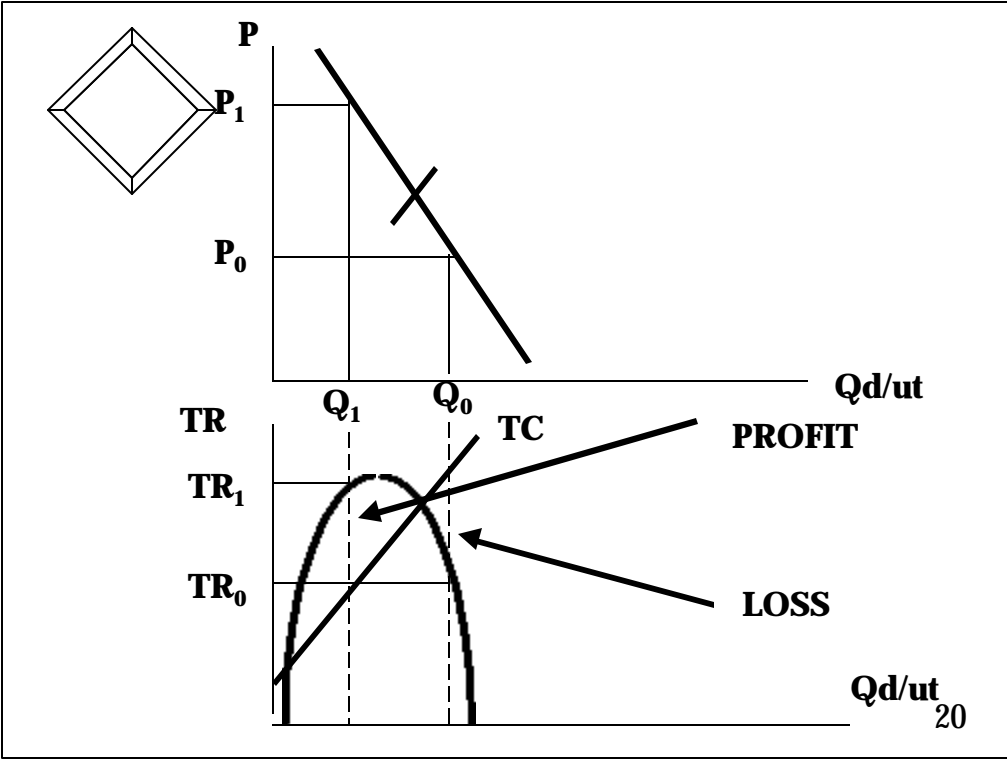


Practical Use: Ag. Production



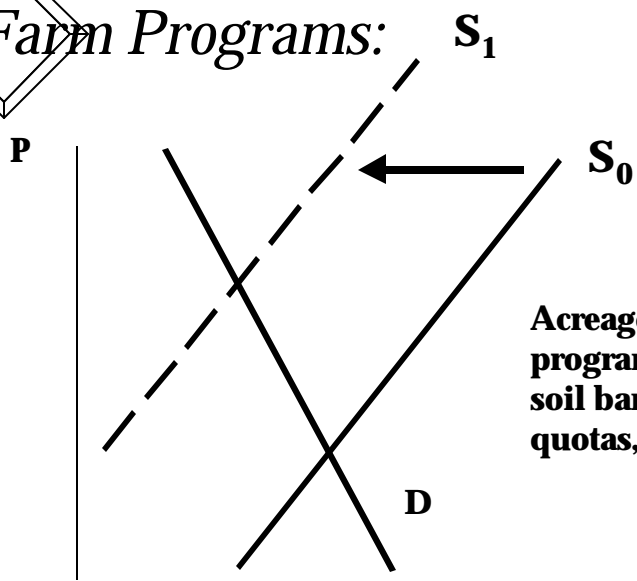


But many agricultural commodities are produced in the inelastic section of an inelastic market demand curve





Farm Programs:



Acreage reduction programs, set aside, soil bank, CRP, WRP, quotas, allotments.



Farm Programs

One of the main reasons we have had acreage control programs and price supports in the past was to encourage producers to collectively reduce production.



Farm Programs

Based on a Supreme Court ruling in 1943, our Constitution does allow direct government control of agriculture. However, recognizing that direct government control may not be politically palatable to the citizenry, agricultural producers are essentially “bribed” by government to cut production. Government offers producers guaranteed prices for their commodities and direct treasury subsidies in return for “cooperation.”

23

In *Wickard v. Filburn* decided upon by the Supreme Court November 9, 1942 with one justice dissenting, ruled that the government did have a Constitutional right to control agricultural production by virtue of the Commerce Clause of the Constitution.

"The general scheme of the Agricultural Adjustment Act of 1938 as related to wheat is to control the volume moving in interstate and foreign commerce in order to avoid surpluses and shortages and the consequent abnormally low or high wheat prices and obstructions to commerce."

The present Chief Justice has said in summary of the present state of the law: "The commerce power is not confined in its exercise to the regulation of commerce among the states. It extends to those activities intrastate which so affect interstate commerce, or the exertion of the power of Congress over it, as to make regulation of them appropriate means to the attainment of a legitimate end, the effective execution of



Farm Programs

Based on a Supreme Court ruling in 1943, our Constitution does allow direct government control of agriculture. However, recognizing that direct government control may not be politically palatable to the citizenry, agricultural producers are essentially “bribed” by government to cut production. Government offers producers guaranteed prices for their commodities and direct treasury subsidies in return for “cooperation.”

24

the granted power to regulate interstate commerce. ... The power of Congress over interstate commerce is plenary and complete in itself, may be exercised to its utmost extent, and acknowledges no limitations other than are prescribed in the Constitution It follows that no form of state activity can constitutionally thwart the regulatory power granted by the commerce clause to Congress. Hence the reach of that power extends to those intrastate activities which in a substantial way interfere with or obstruct the exercise of the granted power.'

It is well established by decisions of this Court that the power to regulate commerce includes the power to regulate the prices at which commodities in that commerce are dealt in and practices affecting such prices. 28 One of the primary purposes of the Act in question was to increase the market price of wheat and to that end to limit the volume thereof that could affect the market. It can hardly be denied that a factor of such volume and variability as home- consumed wheat would have a substantial influence on price and market conditions. This may arise

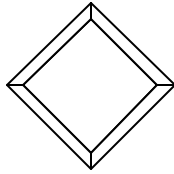


Farm Programs

Based on a Supreme Court ruling in 1943, our Constitution does allow direct government control of agriculture. However, recognizing that direct government control may not be politically palatable to the citizenry, agricultural producers are essentially “bribed” by government to cut production. Government offers producers guaranteed prices for their commodities and direct treasury subsidies in return for “cooperation.”

25

because being in marketable condition such wheat overhangs the market and if induced by rising prices tends to flow into the market and check price increases. But if we assume that it is never marketed, it supplies a need of the man who grew it which would otherwise be reflected by purchases in the open market. Home-grown wheat in this sense competes with wheat in commerce. The stimulation of commerce is a use of the regulatory function quite as definitely as prohibitions or restrictions thereon. This record leaves us in no doubt that Congress [317 U.S. 111, 129] may properly have considered that wheat consumed on the farm where grown if wholly outside the scheme of regulation would have a substantial effect in defeating and obstructing its purpose to stimulate trade therein at increased prices.

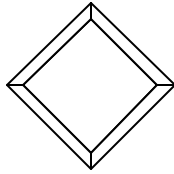


The government said, “ OK farmers, if you want these guaranteed government prices and deficiency payments, you have to sign a contract agreeing to cut your production by how much the govt. says to cut production.

26

“It is important to recognize that this level of economic regulation comes from the people, and particularly farmers, and is not something that some one in government thought would be simply a good thing to do. Farmers have demanded price support and have lobbied for it through their farm organizations. Farmers have over the years consistently punished politicians who sought free markets by voting them out of office. Farmers of course would be happy to receive price support without any restrictions on production; however, this would push government costs beyond a level the the rest of the taxpaying public would be willing to support. Even with production controls direct Federal payments in FY 1999 to farmers amounted to \$28 billion or half of all net farm income.

The Roosevelt administration represented a major increase in Federal economic regulation of agricultural, but it is best seen in the light of history. The Federal government has been involved in agriculture from its very beginning. It distributed land, without charge, to settlers willing to till it; it created a massive military establishment to protect that land from hostile native nations that claimed it as their own; it funded research on how to better produce crops and livestock; it chartered and subsidized canal companies, and later railroads, to provide means for transporting the commodities produced by farmers to foreign markets; it limited the tariffs



The government said, “ OK farmers, if you want these guaranteed government prices and deficiency payments, you have to sign a contract agreeing to cut your production by how much the govt. says to cut production.

27

that railroads could charge for the transportation of commodities; through antitrust it limited the market power of those who did business with farmers; and it provided Federal officers for the tracking, capture and repatriation of escaped slaves most of whom were employed in producing agricultural commodities. Thus has the Federal government and the farmer been entwined since the beginning of our nation. If Federal involvement in agriculture is tyranny then it is, to use the words of Jefferson, a "tyranny of the majority" or at least a majority of farmers."

Ted Feitshans, Lecturer, Department of Agricultural and Resource Economics, North Carolina State University, March 3, 2001.



*Determinants of Demand
Elasticity*

Relatively inelastic demand:

- a. Very few acceptable substitutes.**
- b. Shorter adjustment period.**
- c. Good is a small proportion of budget.**



*Determinants of Demand
Elasticity*

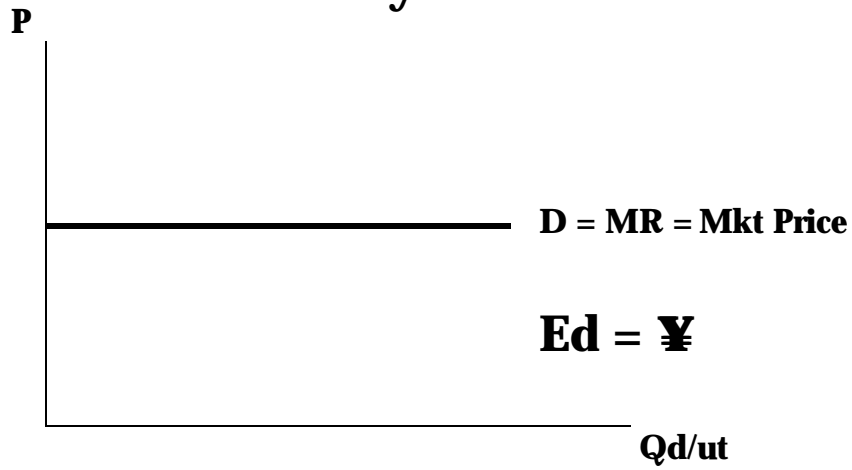
Relatively elastic demand:

- a. Many close substitutes.**
- b. Longer adjustment period.**
- c. Good is a large proportion of budget.**



Extreme Cases:

Perfectly Elastic Demand





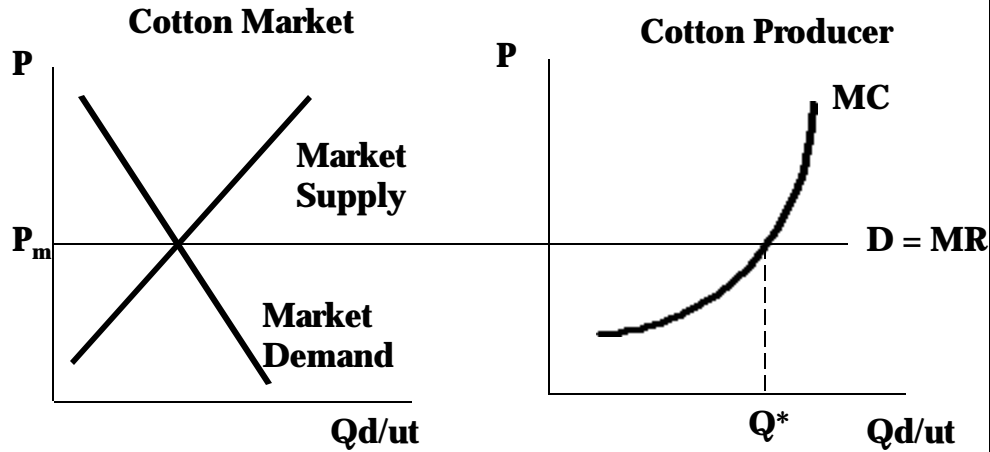
Perfectly Elastic Demand

**This is the demand curve that a
“Price-taker” confronts.**

**A “Price-taker” is a producer that has no
pricing power. They receive the price
that is determined by market demand
and market supply.**



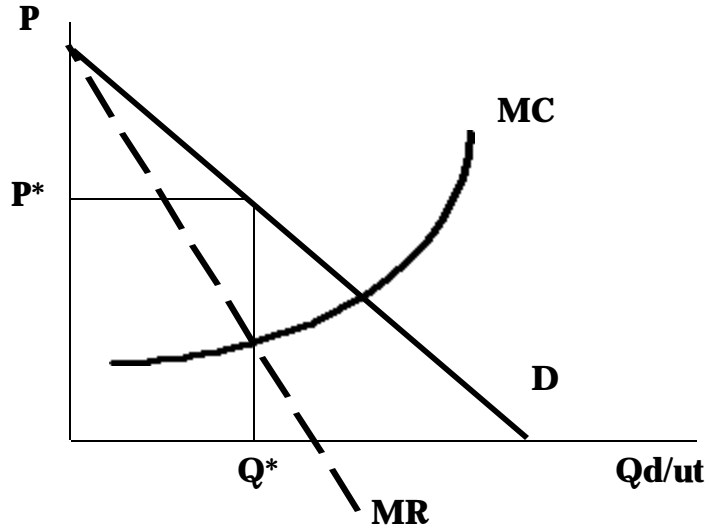
Maximizing Profits: Price Takers



Q^* = profit maximizing output level for producer 32

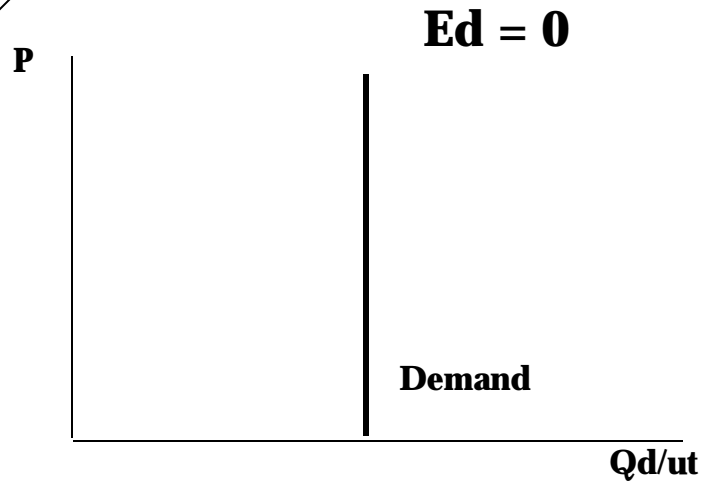


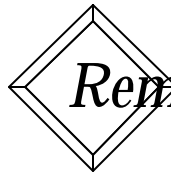
Maximizing Profits: Price Searchers





Perfectly Inelastic Demand

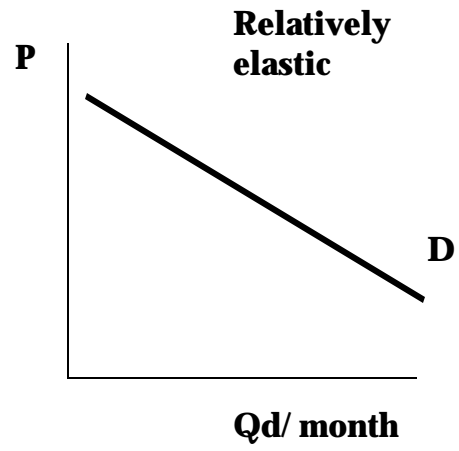
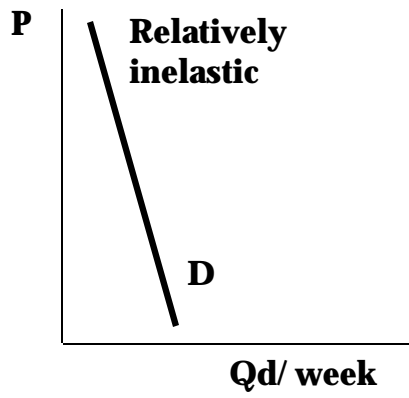




Remember

- 1. If a price change causes TR to move in the same direction as the price change, demand is inelastic.**
- 2. Demand is more elastic in the long run than in the short run.**

For Example:





Income Elasticity of Demand

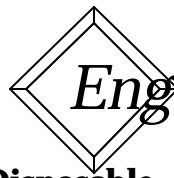
$$\mathbf{E_I = \% \mathbf{D}Q_d / \% \mathbf{D}I_d}$$

Measures the sensitivity of DEMAND to changes in disposable income.



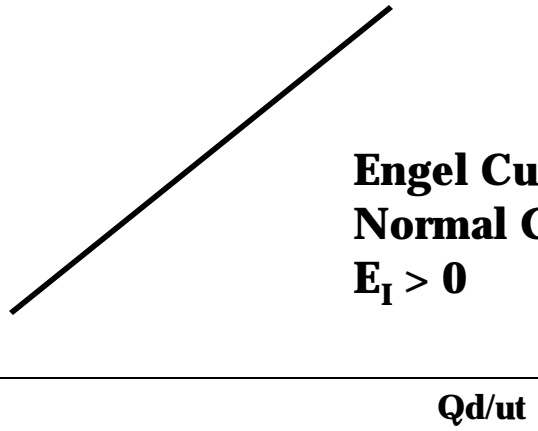
Engel Curve:

Shows the relationship between quantity demanded and disposable income given a constant price.



Engel Curve: Normal Good

**Disposable
Income**





Luxury Goods

**Luxury Goods are Normal Goods but
they have an**

$$\mathbf{E_I \geq 1}$$

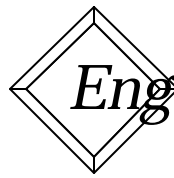
**Quantity demanded is very sensitive to
changes in disposable income**

 *“Necessities”*

“Necessities” are Normal Goods but

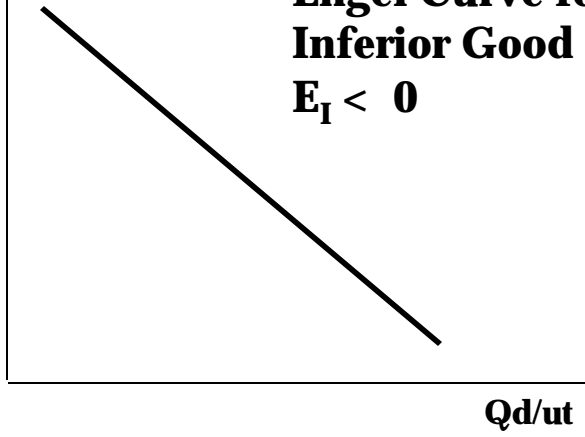
$$\mathbf{0 < E_I < 1}$$

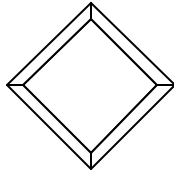
**Quantity demand is not very sensitive to
changes in disposable income**



Engel Curve: Inferior Good

**Disposable
Income**





- ❖ **Normal Goods ($E_I > 0$)**
 - **Luxury Goods ($E_I \geq 1$)**
 - **Necessities ($0 < E_I < 1$)**

- ❖ **Inferior Goods ($E_I < 0$)**



Some Income Elasticities

Beef	+.29
Pork	+.13
Chicken	+.18
Milk	+.20
All foods	+.18
Non foods	+1.25



Cross-Price Elasticity

Measures how sensitive DEMAND for a commodity is to changes in the price of a substitute or compliment commodity

Cross-Price Elasticity

$$\mathbf{E}_{\text{cp of } x,y} =$$

$$\% \mathbf{DQ}_x / \% \mathbf{DP}_y$$



Cross-Price Elasticity

$E_{cp} > 0$ \Rightarrow Substitute

$E_{cp} < 0$ \Rightarrow Compliment

$E_{cp} = 0$ \Rightarrow Independent

Example:

**The Cross-Price Elasticity of Beef and
Pork would be calculated as:**

$E_{cp, \text{Beef, Pork}} =$

$\% \mathbf{DQ}_{\text{Beef}} / \% \mathbf{DP}_{\text{Pork}}$

Example

The Cross-Price Elasticity of Pork and Beef would be calculated as:

$$E_{cp, \text{Pork, Beef}} =$$

$$\% \mathbf{DQ}_{\text{Pork}} / \% \mathbf{DP}_{\text{Beef}}$$

Interpretation?

If the

$$E_{cp, \text{Pork, Beef}} = + .65$$

Then for every 1% increase in the price of beef, the Qd of pork would increase .65%. We also would know that pork and beef are substitutes