

Lecture 4

Supply and Demand I



15.011/0111 Economic Analysis for Business Decisions
Oz Shy

Increased Dairy Supply, Steady Demand Lead to Drop in Prices

JANUARY 23, 2015 05:32 AM

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Milk prices at the farm level are expected to be about \$6 a hundredweight lower than the record prices in 2014.

“That is not going to be fun for producers,” says Joe Horner, University of Missouri Extension agricultural economist. “But it is not as bad as it has been some years in the past.”

Commodities

Another Year of the Chicken: U.S. Beef Supply Will Fall Again in 2015

By Venessa Wong November 18, 2014



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Bloomberg
Business



Photograph by Luke Sharett/Bloomberg

Chickens raised by organic farmer Will Meurer of Wholesome Living Farm in Winchester, Ky.

It's been an **expensive year to eat beef**, and 2015 doesn't look any cheaper.

The U.S. Department of Agriculture expects ([PDF](#)) the **beef supply to decline** 3.6 percent, or 1 billion pounds, **next year** as domestic production decreases and

The World Is Running Out of Chocolate

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TWO CHOCOLATE MAKERS WARN OF HUGE ANNUAL DEFICIT



By [Neal Colgrass](#), Newser Staff

Posted Nov 16, 2014 4:00 PM CST

STORY



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Cadbury's chocolate bars, at right, and Kraft's Toblerone chocolate, lower left, are seen at a store in central London, Tuesday, Jan. 19, 2010. (AP Photo/Sang Tan)

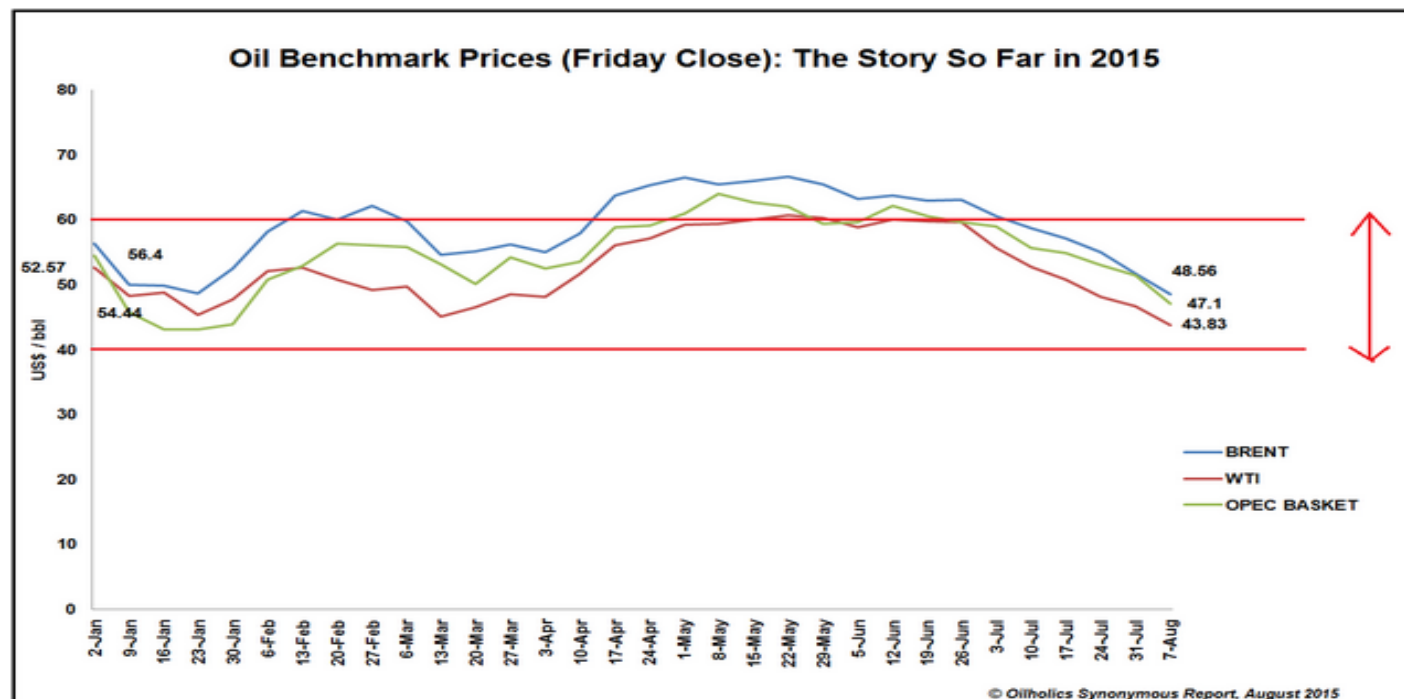
(NEWSER) – Like grabbing a Snickers on the run or savoring a little dark chocolate in the evening? Then brace yourself, because chocolate production is failing to keep up with worldwide consumption and could fall behind by 2 million metric tons annually by 2030, two big chocolate makers tell the *Washington Post*. Dry weather and fungal disease are partly to blame, but there's another cause: "Demand for chocolate is great," an expert told Bloomberg last year. "A lot of the world population is moving to the middle class and will have more money to spend, in particular in emerging markets and Asia." Yes, the Chinese are eating twice as much chocolate as 10 years ago, and dark chocolate, which uses much more cocoa than regular chocolate bars, is growing more popular.

Oil Supply-Demand Imbalance Will Dissipate Painfully Slowly

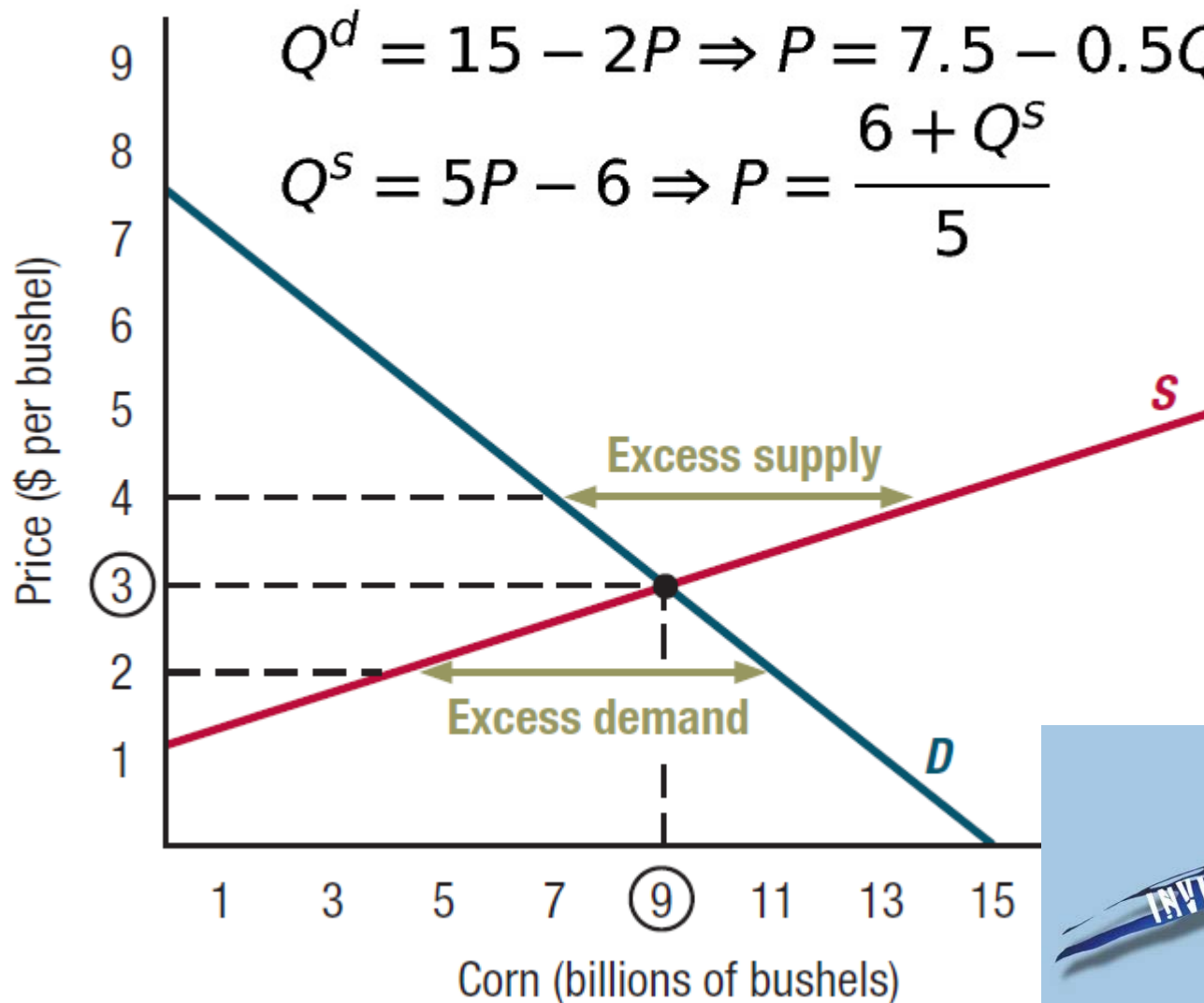
Oil prices slipping to their lowest in six months has not gone unnoticed even if wider turmoil in the commodities sphere, especially the industrial metals market, ensured the drop is not the dominant discussion these days.

Forbes

Afterall, theme in the oil markets is a familiar one – of there being **too much of the crude stuff** around **exceeding** actual **demand** for it. There are worries over [Iran adding to the glut](#),



Supply & demand equilibrium and disequilibrium



The market “searches” for the market clearing price (P=3). How does it find it?

Adam Smith's Invisible hand?
Or an auctioneer that calls prices?



The effects of a supply increase Gov't subsidizes corn production

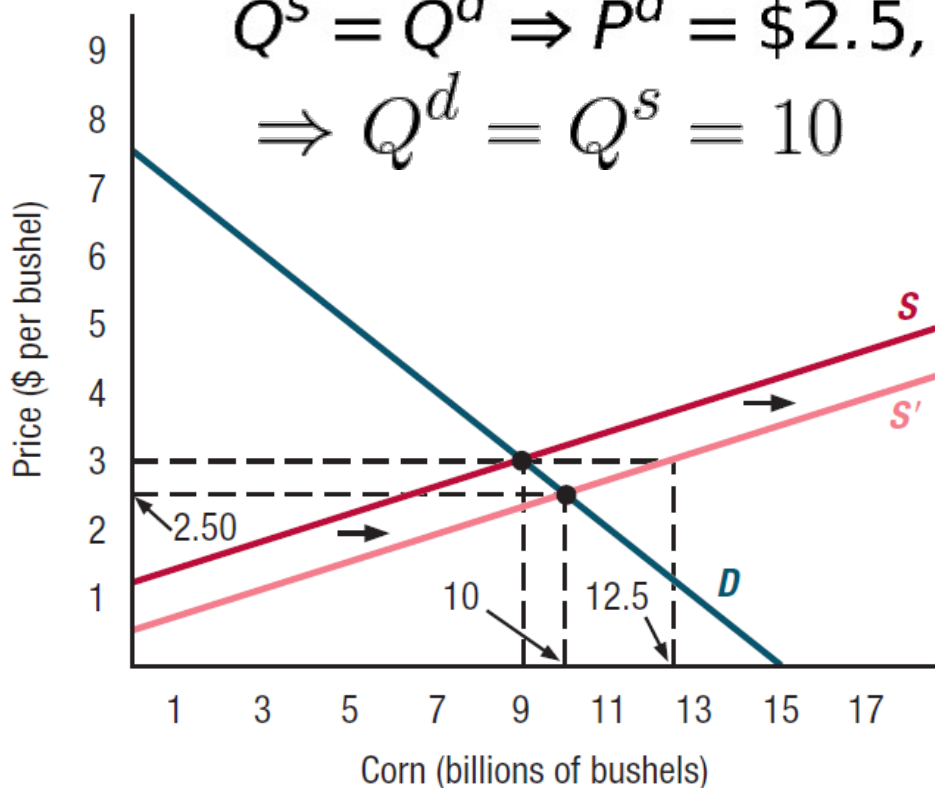
$$Q^d = 15 - 2P \Rightarrow P = 7.5 - 0.5Q^d$$

$$P^s = P^d + 0.70 = \frac{6 + Q^s}{5}$$

The gov't pays farmers (sellers) \$0.70 per bushel grown

$$Q^s = Q^d \Rightarrow P^d = \$2.5, P^s = \$3.2$$

$$\Rightarrow Q^d = Q^s = 10$$



Supply shifts downwards (equivalently, to the right), Surplus is created, prices fall until a new equilibrium is established

Note: P^s rises by \$0.20 (not \$0.70)

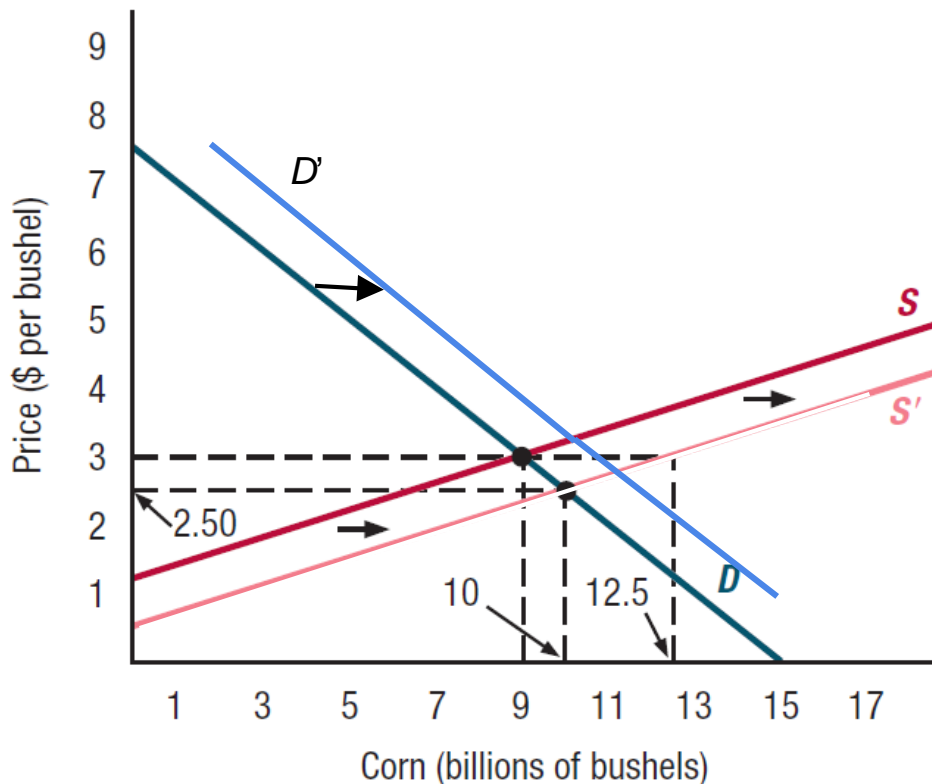
P^d decreases by \$0.50

What happens if the subsidy is given to buyers (instead of sellers)?

Answer: Same effect! Why?

Subsidy to sellers yields: $P^s = P^d + 0.7$

Subsidy to buyers yields: $P^d = P^s - 0.7$

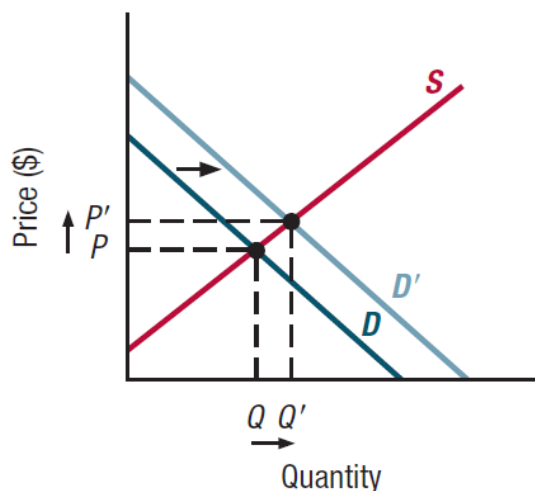


Instead of supply shift we have demand shift

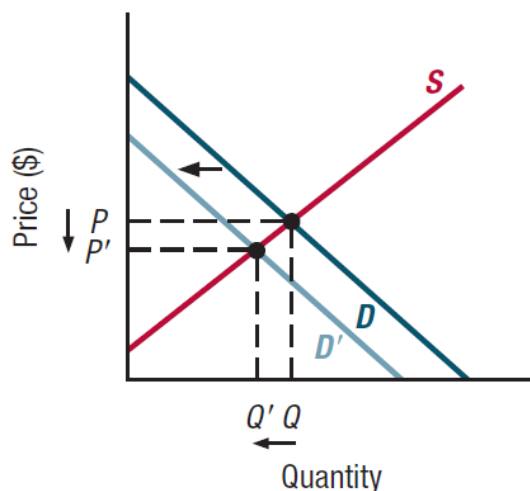
Note: The subsidy effect on P^d and P^s would depend only on elasticities and *not* on who initially collects the subsidy
In either case $P^s =$

Four different possible shifts in demand or supply

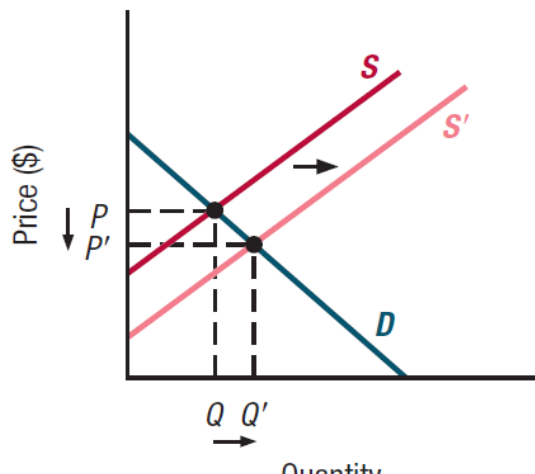
(a) Increase in demand



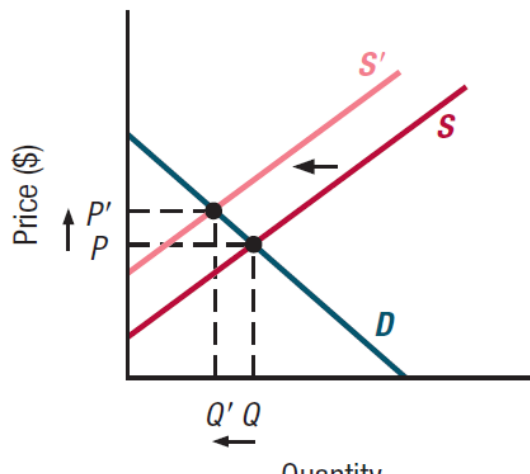
(b) Decrease in demand



(c) Increase in supply



(d) Decrease in supply



Case a: Successful advertising campaign, increase in income (“normal good”)

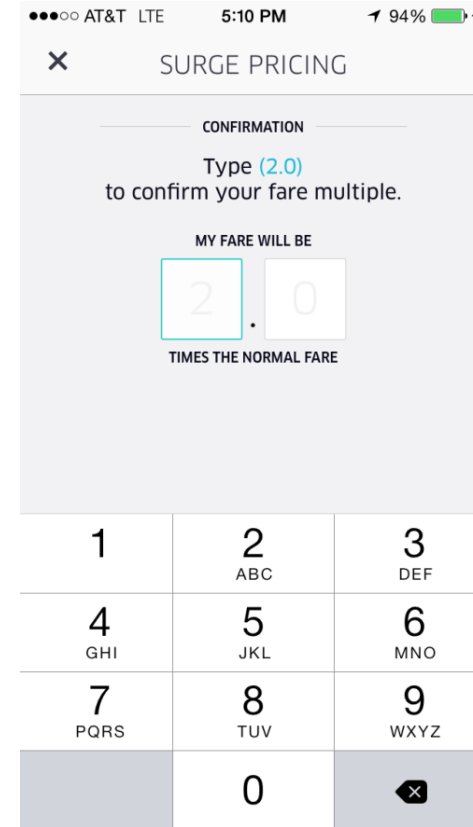
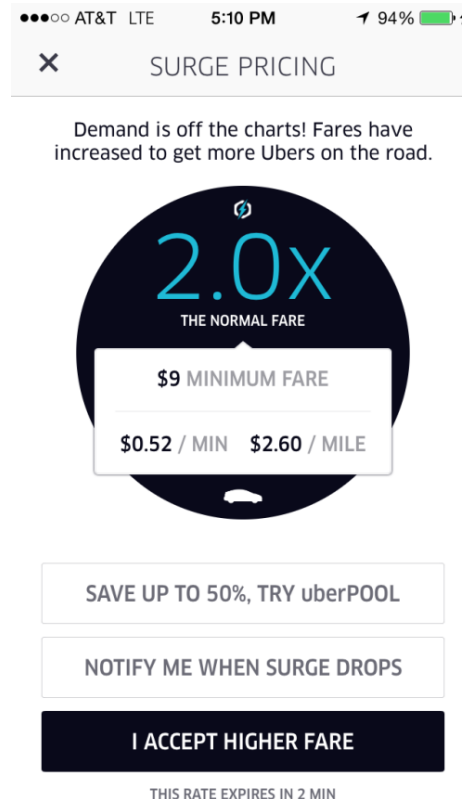
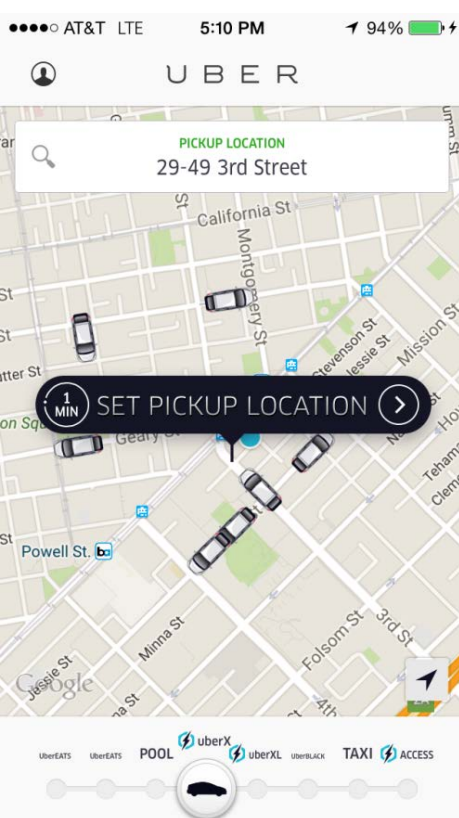
Case b: Introduction of a substitute, increase in income (“inferior good”)

Case c: Production subsidy, tech innovation

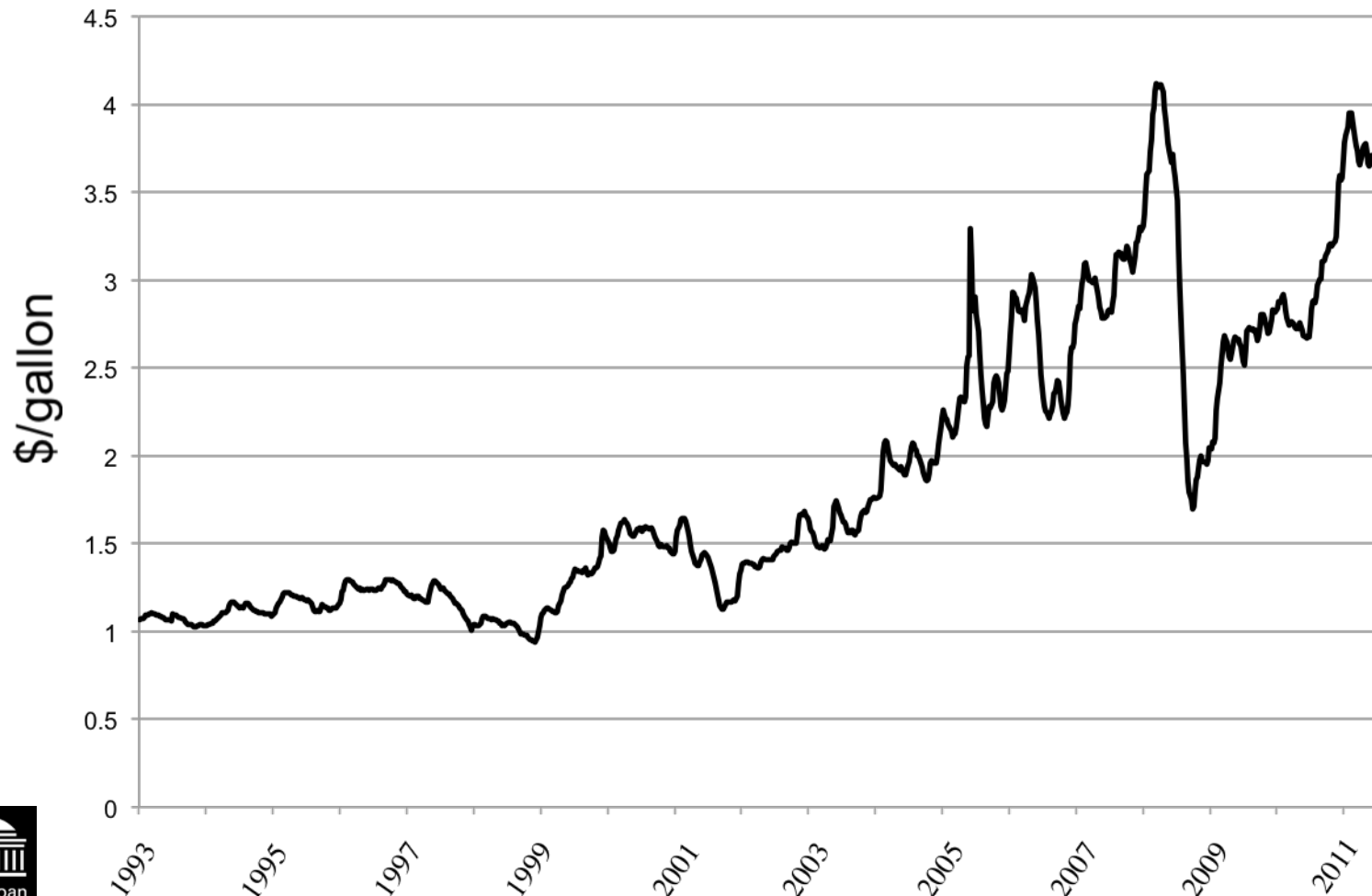
Case d: Bad weather

Excess demand: Example of price adjustment

Rainy rush hour: Shortage of taxis lead some people to raise their bid to get priority. Note: The market is segmented between those who can wait and those who don't want to wait

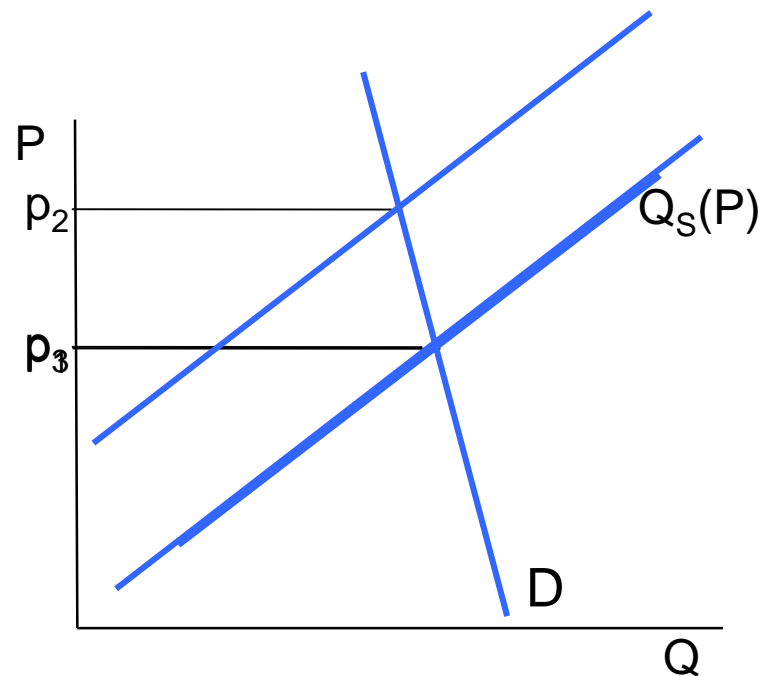


We now have the tools to explain the weekly U.S. retail gas prices



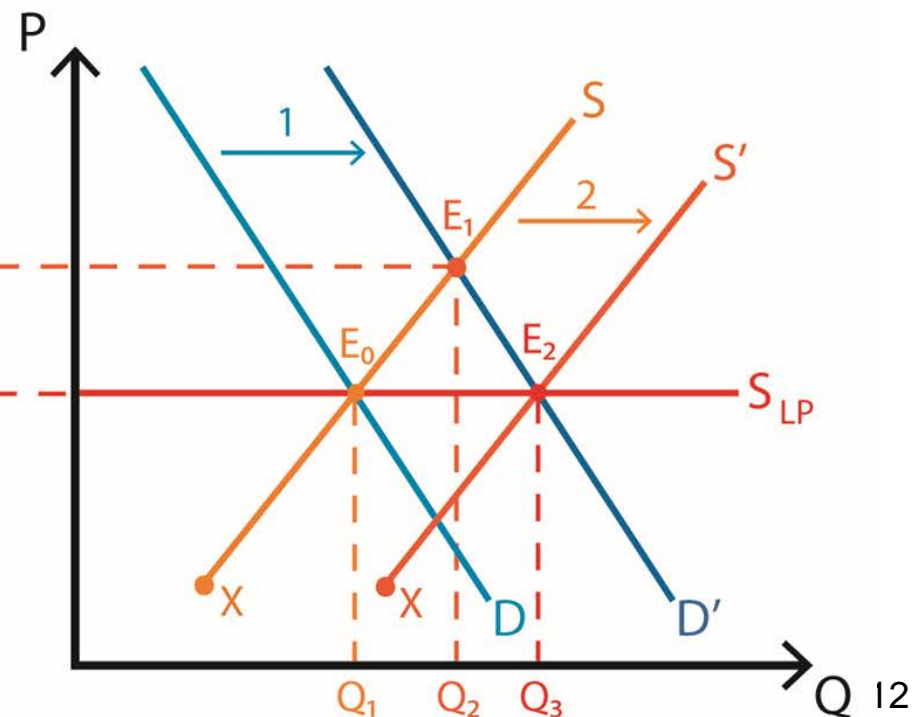
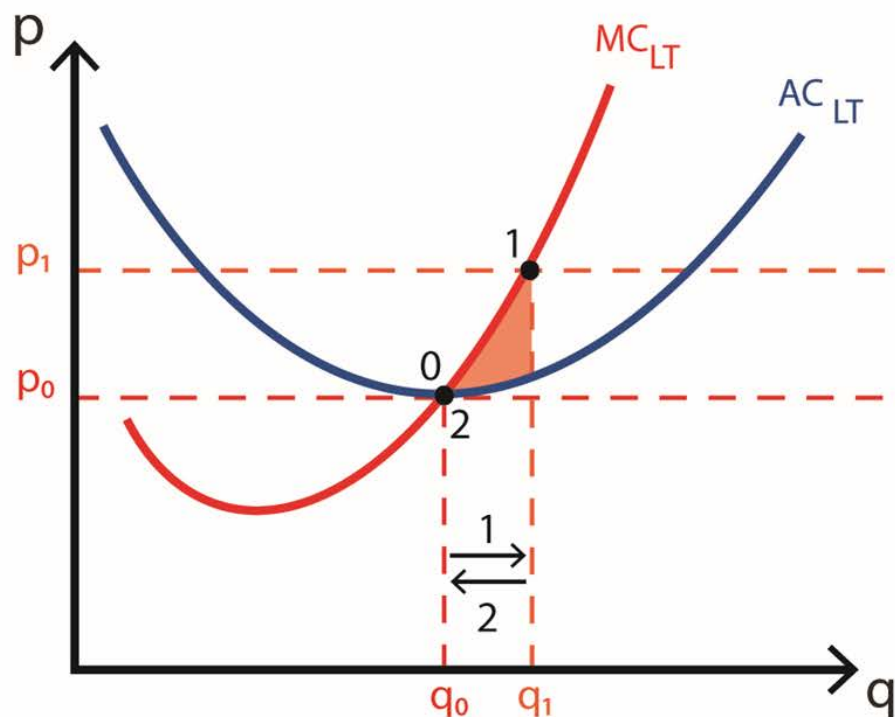
Volatility in gasoline prices

Steep (inelastic) demand for gasoline means large swings in prices



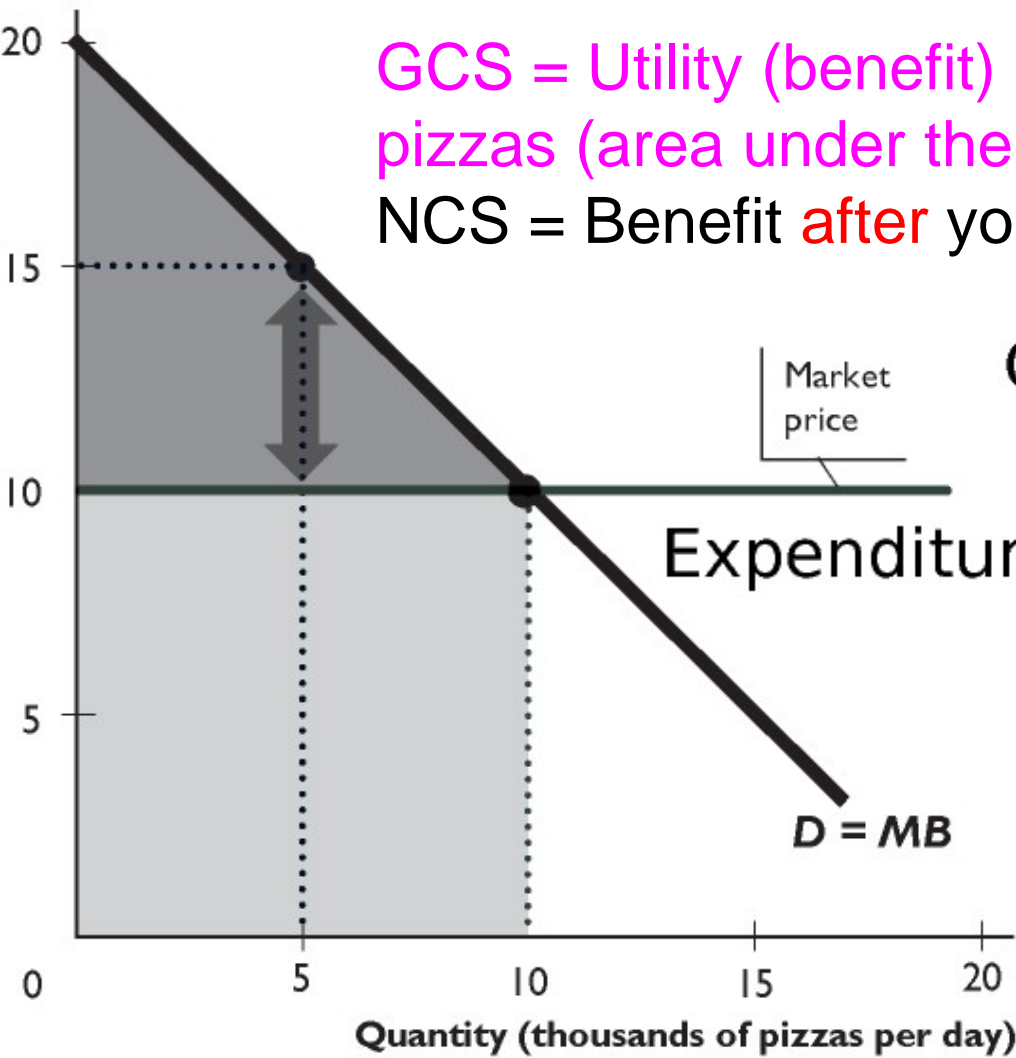
Long-run supply curve in a competitive industry with free entry

Suppose $p_0 \nearrow p_1$. Then, existing firm(s) raise output $q_0 \nearrow q_1$.
Then, new firms enter, Q increases, price falls, in a LT equilibrium
 $Q = n q$ ($n = \#$ firms). The, LT supply is horizontal (infinite elas)
Note: Some textbooks refer to q_0 as the “optimal plant size”



Gross and net consumer surplus

Price (dollars per pizza)



GCS = Utility (benefit) derived from consuming 10 pizzas (area under the demand curve)

NCS = Benefit **after** you paid \$100 for 10 units

$$GCS = \frac{20 + 10}{2} \cdot 10 = 150$$

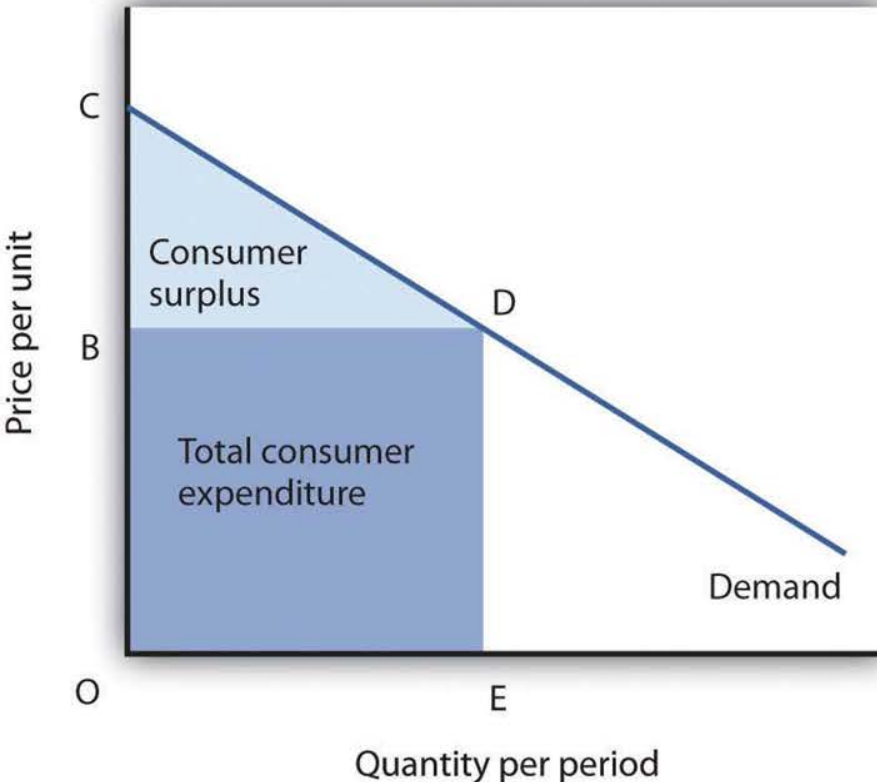
$$\text{Expenditure} = P \cdot Q = \$10 \cdot 10 = \$100$$

$$NCS = 150 - 100 = 50$$

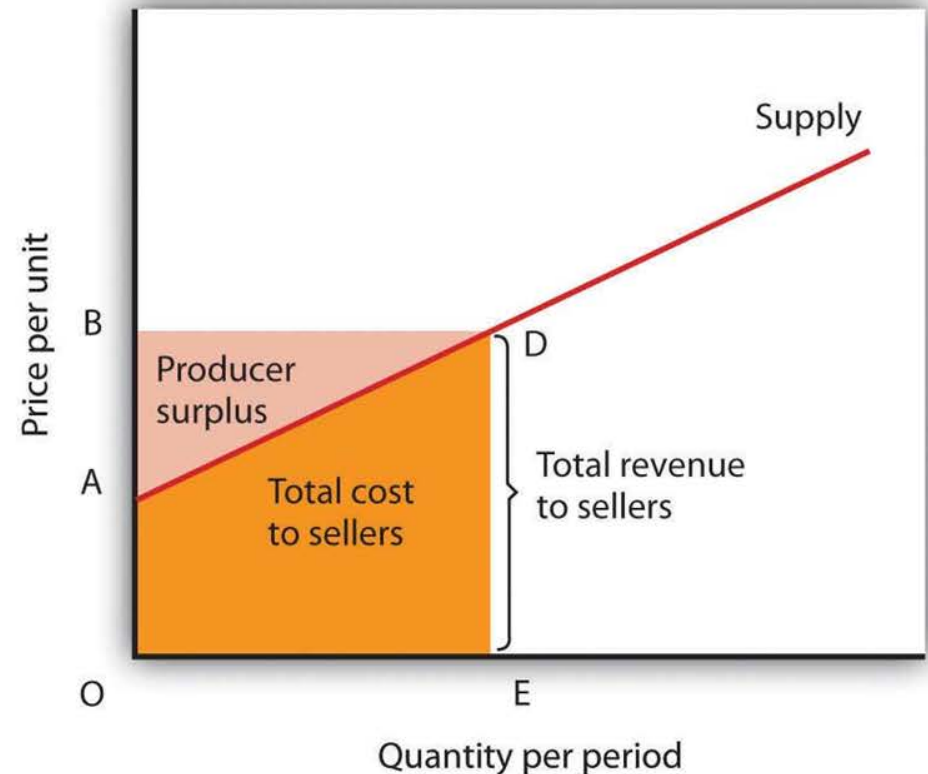
NCS is also the area of the upper triangle (often referred to as “consumer surplus” (w/o the “net”))

Producer surplus

Panel (a)



Panel (b)

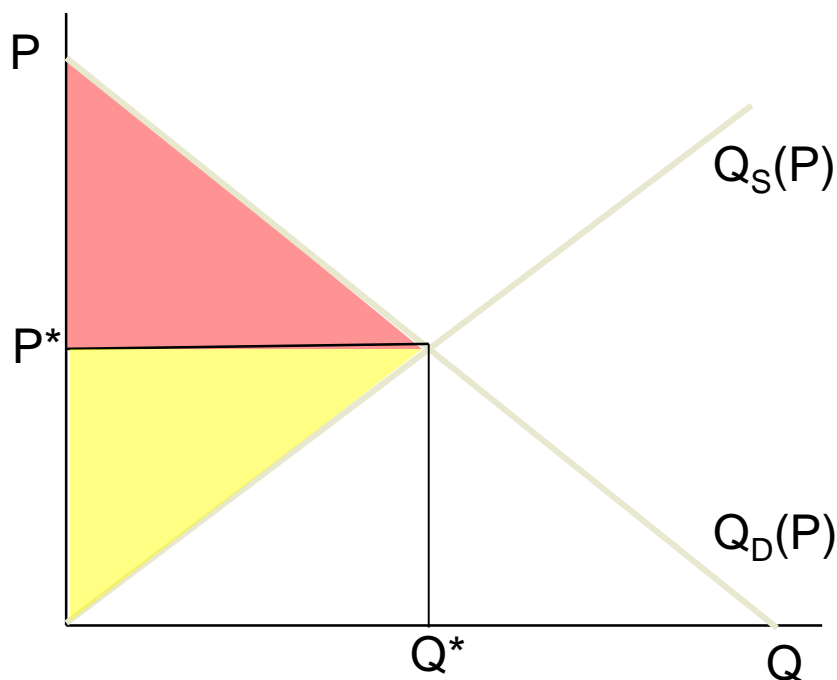


Producer surplus (right panel): Area beneath the price less than the area beneath the supply (marginal cost) curve

Measuring gains from trade

Consumer Surplus: Difference between willingness to pay and expenditure

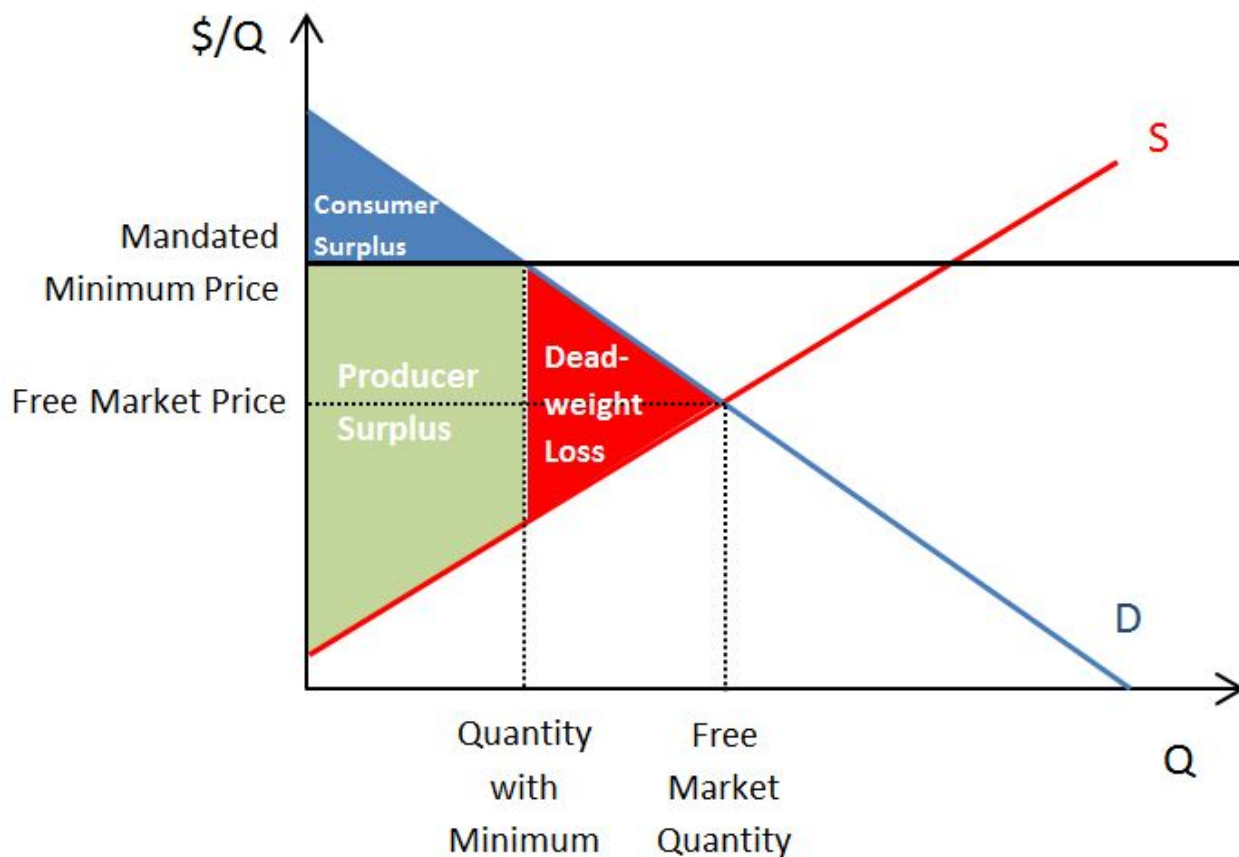
Producer Surplus: Difference between revenue received and cost



$CS + PS =$
“gains from
trade”

Trade restrictions: Deadweight loss

3 possible government policies may reduce trade: (a) “High” minimum price (plotted), (b) “Low” maximum price (rent control)



c) Quota (import quota)

Note: Total surplus (economy wide) decreases. However, the distribution of surplus between consumers and producers may vary depending on the policy

Trade restrictions: Import quota

Autarky (boycott): Q^* units consumed, all locally produced

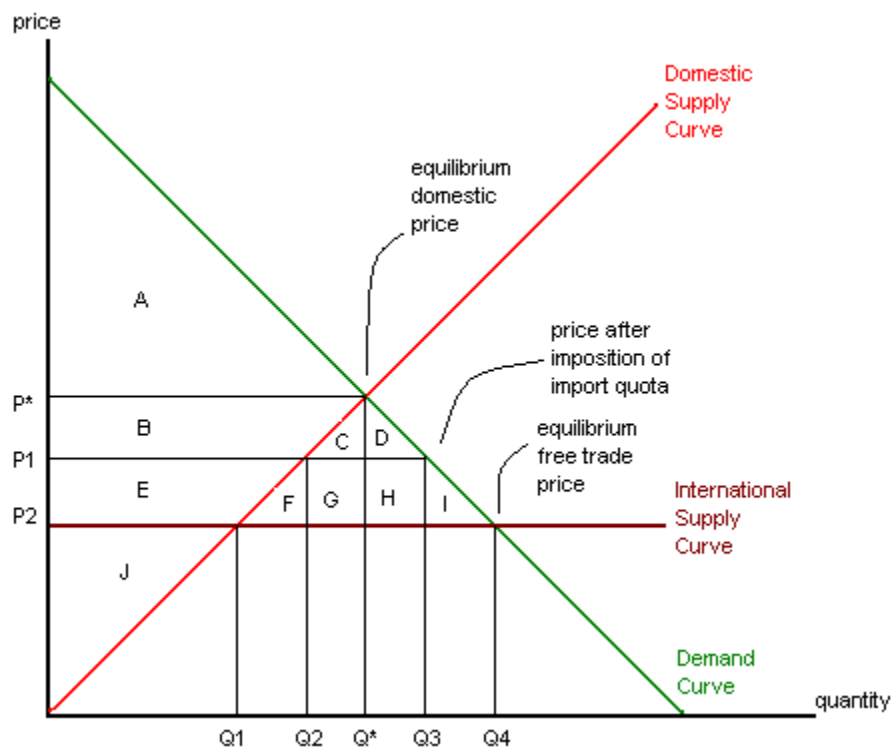
Free trade: Q_4 consumed, Q_1 locally produced,

$Q_4 - Q_1 = \text{units imported}$

Import quota: Gov't limits imports to $Q_3 - Q_2$ units

Scarcity raises the price to P_1

Note: Importers earn $P_1 - P_2$ profit per unit imported (difference between domestic price and the intn'l price)



Marginal land and shifts in bargaining power



So far, we analyzed “exchanges” with many buyers and many sellers. Value (surplus) is determined in an equilibrium. Now, let’s examine extreme cases of how value is determined

Many sellers, one buyer: Buyer captures most of the surplus



One seller, many buyers: Seller captures most of the surplus



Scarcity, marginal operator, and the average of price an international phone call (prices are rough estimates!)



Year	Operators	Price/min	Remarks
Before 1982	AT&T (Bell)	\$3.00/min	Regulated public utility Marginal op = AT&T
1982	AT&T, MCI, Sprint	\$1.00/m	AT&T breakup Marginal op = MCI
2003	VoIP (Skype, Vonage etc.)	\$0.20/m	Price varies by plan Marginal op = Skype
2009	Skype, Vonage, Google Voice	\$0.02/m	Landline and mobile may vary Mar.op.= G.V.

Scarcity, marginal land, and bargaining power: From: “Who pays for your coffee?”

Time	Farmer(s)	Landlord(s)	Bargaining power
1	Axel	Many (fixed meadowland)	Axel
2	New immigrants	Many (fixed meadowland)	Landlords
3	More immigrants	New scrubland (Free) = new marginal land	rent on meadowland = revenue from 5 bushels/year (difference in land productiveness)
4.	Same	Zoning restrictions on scrubland	Rent goes back up
5.	Even more	Grassland available (lowest productiveness)	rent on meadowland > revenue from 5 bushels/year (difference in grassland productiveness)

Vanishing scarcity: Additional examples

1. In 2004, people auctioned rights to open a Gmail account (used to be “by invitation” only)
In 2015, How much will you pay for it now?
2. An apartment overlooking Central Park in 1980
In 2015, a new high rise blocks the view
3. A new release of Call of Duty 4 (computer game)
Price of COD 4 a year later
4. Shutting down a train service to town X. What will happen to the level of rent in this town?
5. Introduction of alternative services: Online legal services reduce the cost of making a will