

Chapter 1. Microeconomics used in Macro

UMSL

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Micro Principles Used in Macro: 1 Facts

1 Facts, 2 Theory, 3 Application, 4 Summary, Appendices & Glossary

- *Industry* defined by private companies producing a *product*.
- Any organizational structures: corporations, limited liability, private.
- Products are firms' **output**, which we call goods and services.
- Households buy products: become *consumers* of products.
- Price determined freely in *market*.
- Firms supply at certain price & consumers purchase at certain price.
- A *market* for good defined as selling and buying by firms and consumers.
- Price determined by interaction of supply and purchasing demand.
- Market: specific or broadly defined in terms of good being traded.

Supply and Demand

- Selling by firms is *supply* of firms of product for a particular price.
- Buying by consumers is demand of products for a particular price.
- Each supply and demand by firms and consumers
- determined across an array of different prices.
- Can use *econometrics* to estimate.
- Result: firms supply more quantity when price is higher;
- consumers buy more when price is lower.
- Market price depends of market's industrial organization.

Charles Darwin solves puzzle of Malthus

- Malthus's seemingly impossible ever-increasing rate of population growth.
- Darwin suggested that population would mutate
- so as to preserve properties advantageous for surviving and discard properties disadvantageous for surviving.
- This gave rise to the theory of natural selection in the evolution of species.

Darwin's 1876 Autobiography

"In October 1838, that is, fifteen months after I had begun my systematic inquiry, I happened to read for amusement Malthus on Population, and being well prepared to appreciate the struggle for existence which everywhere goes on from long- continued observation of the habits of animals and plants, it at once struck me that under these circumstances favorable variations would tend to be preserved, and unfavorable ones to be destroyed. The results of this would be the formation of a new species. Here, then I had at last got a theory by which to work". Charles Darwin (1876),

Population and Production

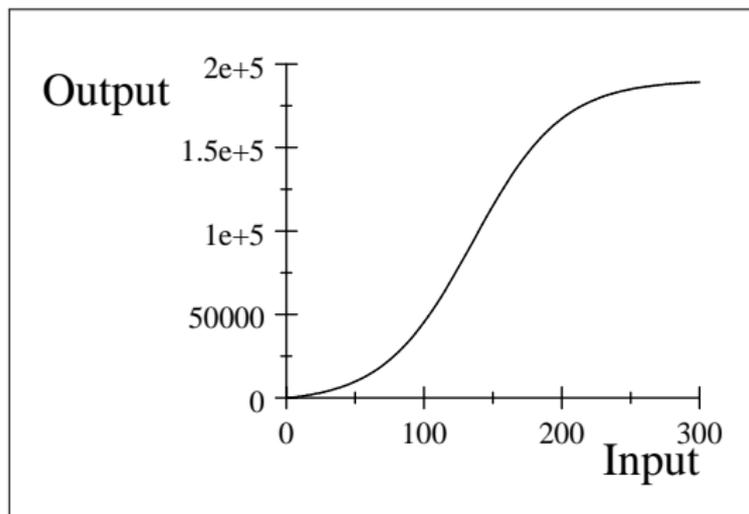


Figure: Population Growth Curve.

Centered Population Graph

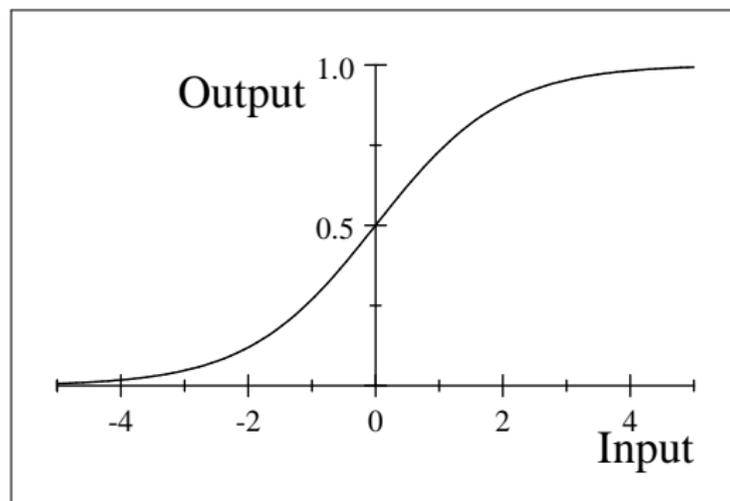


Figure: Population Growth Curve Centered at 0.

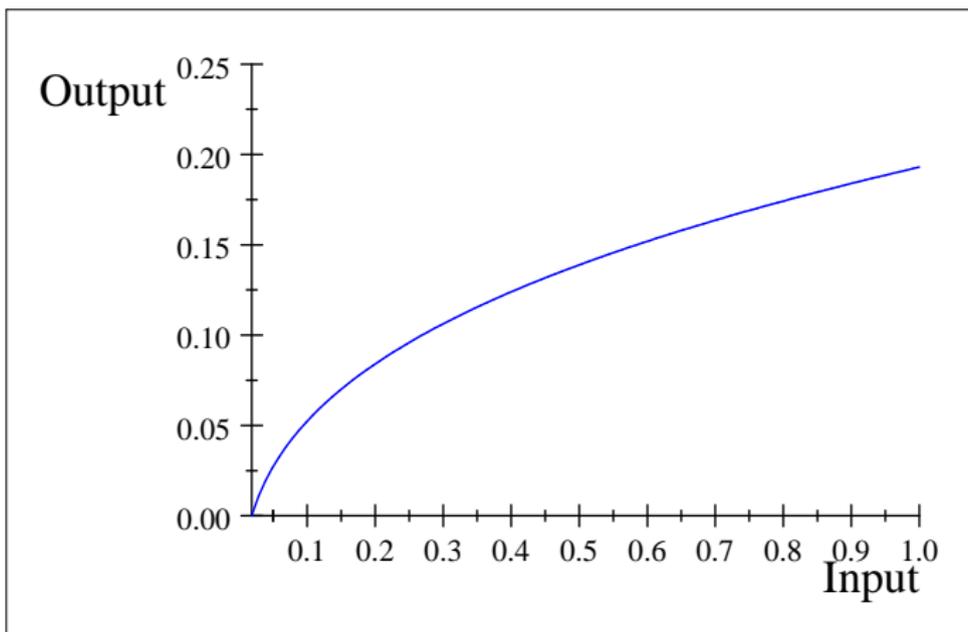


Figure: Production Function that transforms Inputs into Output.

Production of Output Y from Input L

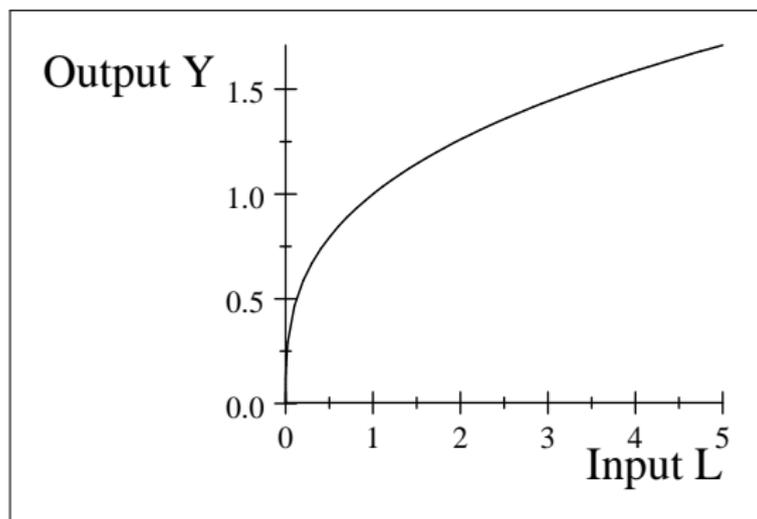


Figure: 2-Dimensional Production Function of Output Y & Input L.

Isoquant: Constant Level of Output

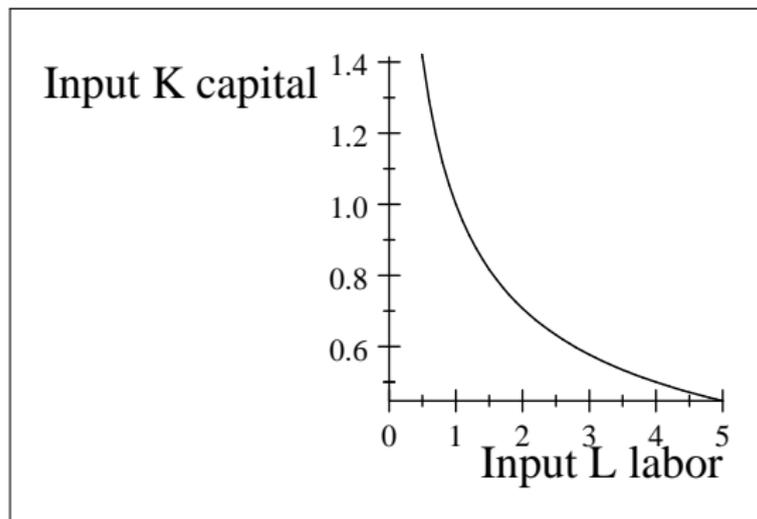


Figure: Two-Dimensional Isoquant with Constant Output and Two Variable Inputs L and K.

Industrial Organization

- Markets can be dominated by a small number of firms, or consumers.
- Market domination correlated with ability to influence price; but not causative.
- Large numbers of firms & consumers: sellers nor buyers affect price.
- Inability to influence price is how define *competitive markets*.
- *Monopoly power*: seller can influence price.
- *Monopsony power*: buyer can influence price.
- Market power eliminated by new entrants to market.
- Also use governments *anti-trust laws* to regulate.
- Markets overall tend towards competition.
- Caveat: some argue markets always have significant monopolistic elements.

Profit, Equity, Insolvency & Growth

- If firm makes profit, the market price is above its average cost.
- So revenue exceeds cost.
- Firms selling at price equal to average cost: zero profit.
- Firms have *equity capital* if assets exceed liabilities.
- Continual losses cause lower equity capital until it is negative;
- Firm *insolvent* if liabilities exceed assets.
- Insolvent firms have to start making profit or close down.
- When total industry output increases, industry is expanding.
- Any industry can go through expansion and contraction over time.
- Growth occurs in economy when industries of economy grow:
- With value of output growing over time (not just quantity).

2 Theory Part: Market Equilibrium

- Microeconomic theory is *equilibrium* price and quantity in a market.
- Determined by supply and demand.
- Equilibrium: quantity supplied equals quantity demanded at a price.
- Price then called equilibrium price; quantity the equilibrium quantity.
- Markets clear: since quantity sold equals quantity bought.
- Market clearing: zero excess supply or demand of goods at equilibrium price.

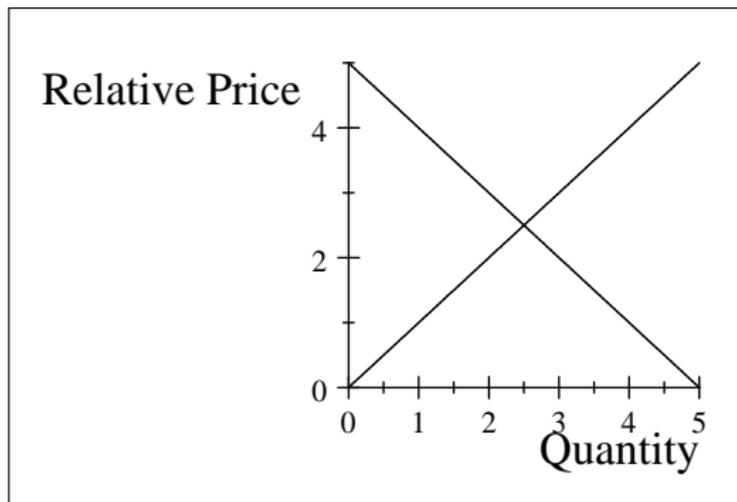
Theory of Supply

- *Supply schedule* by industry producing a good is upward sloping
- with respect to price per unit of good when represented on a graph.
- At higher price, quantity supplied of goods is higher.
- At lower price, quantity supplied of goods is lower.
- Graph typically has relative price on vertical axis,
- & quantity of good being supplied and demanded on horizontal axis.

Theory of Demand

- *Demand schedule* by consumers buying good is *downward sloping*
- with respect to price per unit of good when on a graph.
- At higher price, quantity of goods demanded is lower.
- At lower price, quantity of goods demanded is higher.
- Downward sloping demand and Upward sloping Supply
- Gives unique equilibrium price at intersection of curves.

Supply and Demand Graphs



Utility Theory of Consumer

- Purchase quantity at which price per unit equals marginal benefit.
- Marginal benefit of consumer is the *value of marginal utility* from good.
- Consumer has a *utility function* by which to value goods internally.
- Marg. Utility is increase in utility from consuming one more good.
- On *margin*, purchases quantity at which value of Marg Util = Price.
- Price is *marginal cost* of additional unit.
- So Consumer sets Marg Cost = Marg Benefit of good.
- Gives downward sloping Demand curve,
- because marg. util is lower as more is consumed.
- Called *diminishing marginal utility*.
- Why Demand (D) slopes down.

Utility of Good x

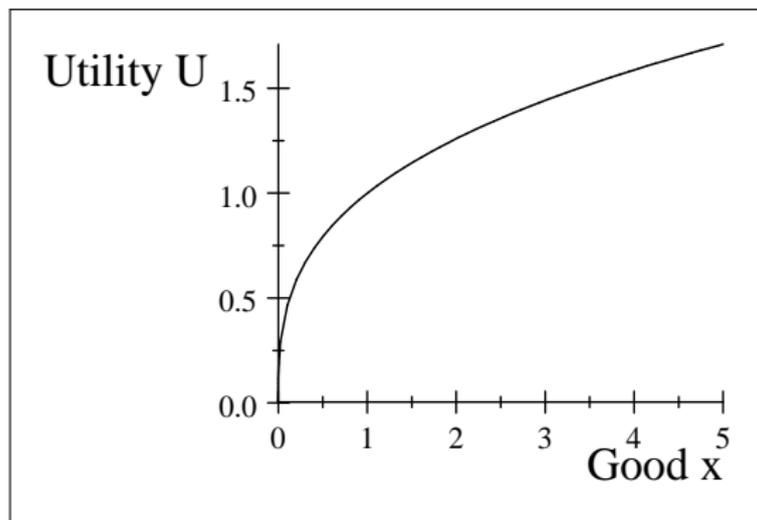


Figure: Two-Dimensional Utility Function of Consumed Item x .

Indifference Curve: Same Utility Level

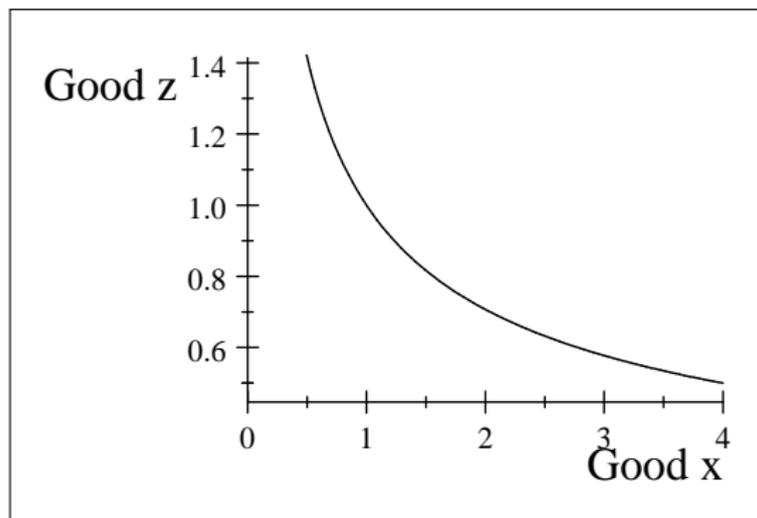


Figure: Utility Indifference Curve with Constant Utility

Supply and a Rising Marginal Cost of Firm

- Firm sets Marginal Cost (MC) of production = price,
- and supplies that amount where $MC = P$.
- Gives upward sloping supply schedule.
- Since increase in cost is higher as firm output grows.
- Rising Marg Cost with Output quantity gives upward sloping S.
- Why Supply (S) slopes up.

Aggregation in Microeconomics

- All firm's marginal cost supply curves summed up
- (horizontally when graphing)
- to yield industry supply curve.
- Sums up firms' supply schedules into industry supply schedule.
- Consumers' demand schedules also summed up
- (horizontally when graphing)
- to give total demand schedule for a good.
- Aggregate industry supply is upward sloping;
- aggregate industry demand is downward sloping.
- Equilibrium market price: each individual firm &
- individual consumer take as given in competition setting.
- Price then determined where industry supply *intersects* demand.
- A market clearing equilibrium: *no excess demand or supply*.

Theory of Competition and Firm Profit

- Individual seller of goods or buyer of goods
- in competitive economy has no influence over price.
- Take price as given.
- Zero profit for marginal firm in market at given equilibrium price.
- Other firms earn some profit if lower average costs than the Price.
- Marginal firm: marginal cost equals price, &
- average cost (AC) per unit of output equals Price.
- Implies Total Cost equals Total Revenue, No profit.

Perfect Competition

- Abstraction made of *representative firm*;
- for eg., A. Marshall, *Principles of Economics*, 1920.
- Single firm's marginal & average cost used to represent entire industry.
- Zero profit in industry results when $AC = MC = P$.
- No profit called *perfect competition* model.

Monopoly

- With monopoly power, representative firm
- sets marginal cost = *marginal revenue*.
- Marginal revenue (MR) in competitive market is just the price.
- In Monopoly, $MR < P_{competition}$, since as output goes up, MR down.
- Monop sets $MR = MC$, and Produces Less Output,
- than competitive firm.

Firm Production Functions and Production Possibility Curves

- 1: Firm produces output using *production function*.
- Function shows how *inputs* of labor and capital
- turned into *output* of goods.
- By adding more input, additional output results.
- 2: With Given Amount of inputs, Tradeoff exists
- in producing one of the two goods;
- since give up some of other good.
- trade-off between guns and butter, or any two outputs,
- called *production possibility curve (PPC)*.
- PPC Concave to Origin in Graph.
- Macro can use both Prod Funct. & PPC

Production Possibility Curve Flips Prod. Function

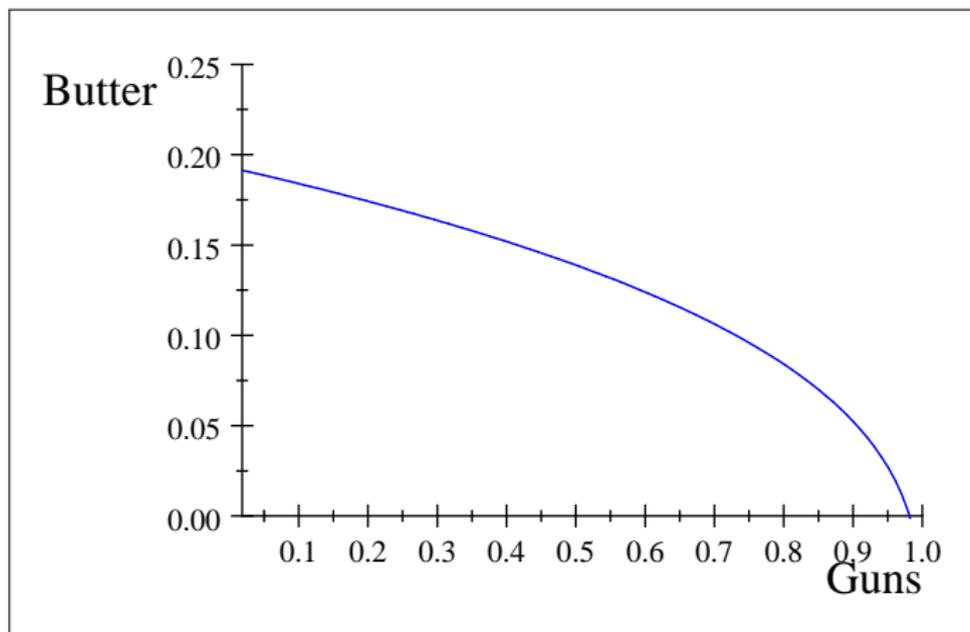


Figure: Production Possibility Curve.

PPC with Budget Line: Slope is Relative Price

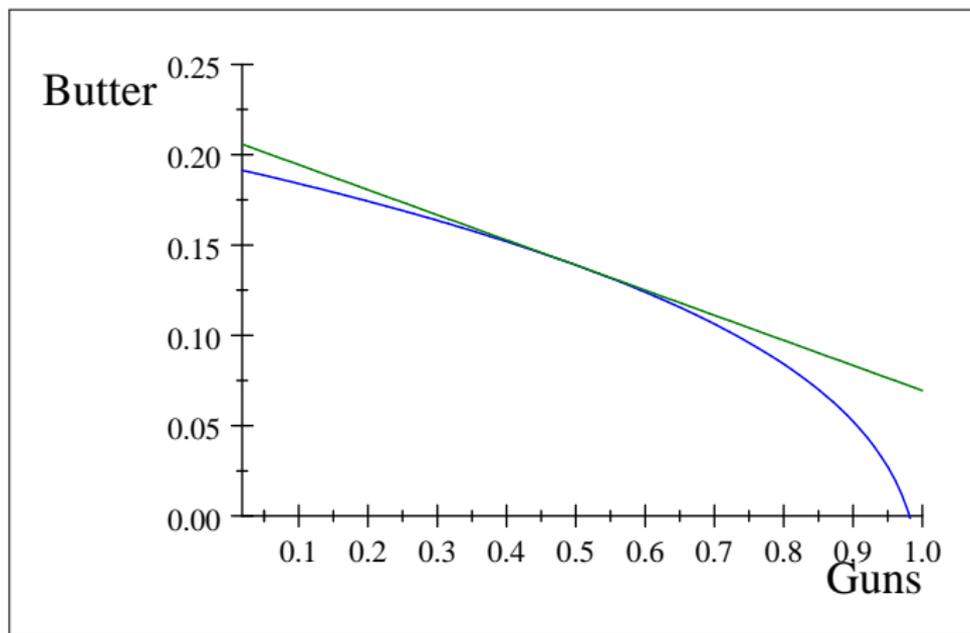


Figure: Production Possibility Curve and Budget Constraint

Cons. Indifference Curves & Production Possibility Curves

- Given same Utility level, different combination of 2 goods
- is Definition of Consumer Indifference Curve.
- Can Find Equilibrium Relative Price and Quantity,
- where PPC *tangent* to Indifference Curve,
- at equilibrium Utility Level.
- Shows rate consumer willing to tradeoff guns & butter
- & PPC shows rate firm willing to tradeoff guns & butter.
- Find where are same: get equilibrium.
- As same quantity and relative price for each Guns
- & Butter, in their respective Supply, Demand Markets.

Production, Utility, & Equilibrium at Tangency

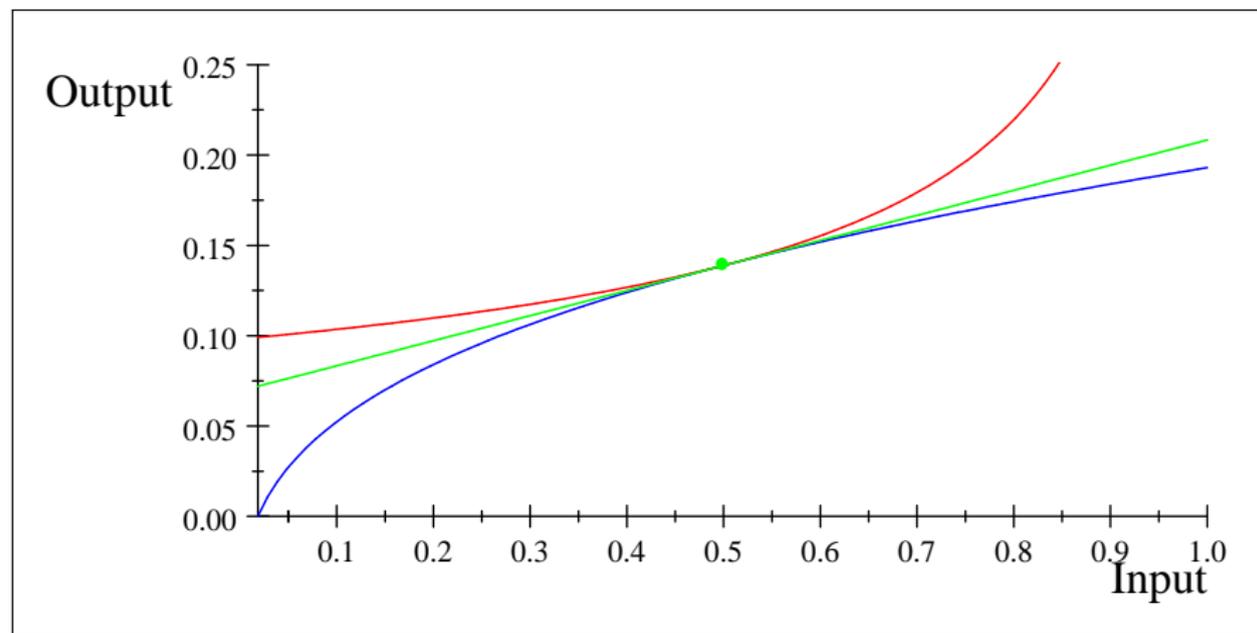


Figure: General Equilibrium Production Function (Blue) and Utility Level Expressed as Indifference Curve (Red).

Relative Prices

- Microeconomics always poses price of good
- in terms of it being a price relative to price of another good.
- All prices in Microeconomics are *relative prices*.
- Often relative price nature of price in supply and demand schedules
- is ignored in practice.
- Just say price in terms of dollars, usual eg.
- But no money in pure microeconomic economy.
- Only trading one good for another good.
- Bringing money in is not common until Macroeconomics.
- Can make second good a basket of goods,
- but still a relative price of one good,
- in exchange for an average basket.

Fixed Prices and Excess Supply or Demand

- Assume Price fixed by some outside force to markets,
- call it an *exogenous factor*: outside of model.
- Price can coincide with natural market equilibrium price by chance.
- Generally, fixed price above or below normal equilibrium price.
- Above: "*minimum price*", or "*price floor*".
- eg. minimum wage rate in US if above normal market equilibrium wage.
- Then *excess supply* at fixed price. Markets do not clear.
- Fixed price below, called *price ceilings*;
- eg. Rent control NYC: excess demanded apartments
- allocated by *rationing* device.
- Markets are *distorted* if fixed prices do not clear markets.

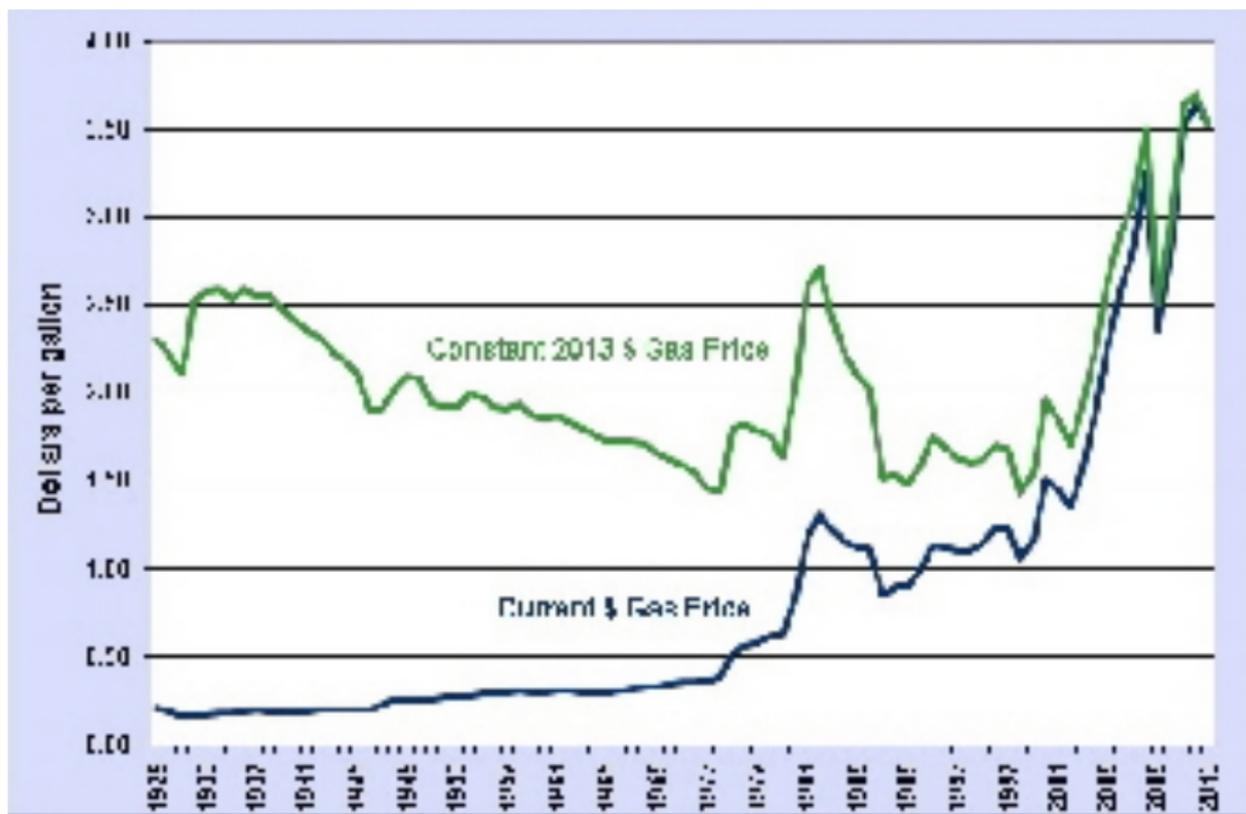
Comparative Statics

- Change from one equilibrium to another,
- as caused by change in any one exogenous factor.
- Eg. Income increases, and demand for good shifts out,
- at all prices, more is demanded.
- Supply can shift out if Technological Innovation, for eg;
- all costs, marginal and average, are lower:
- eg. Intel's Moore's Law of increasing computer processor speed.
- Compare equilibrium after change; Comparative Statics.
- Both Supply and Demand may shift after one exog. factor change.
- Comparative statics also done with PPC & Utility Indifference curves.

Application: US Automobile Long-term Industrial Decline

- US inefficient relative to Germany and Japan
- because US long has built upon lower price of gasoline.
- Policy: allow US oil exports of crude.

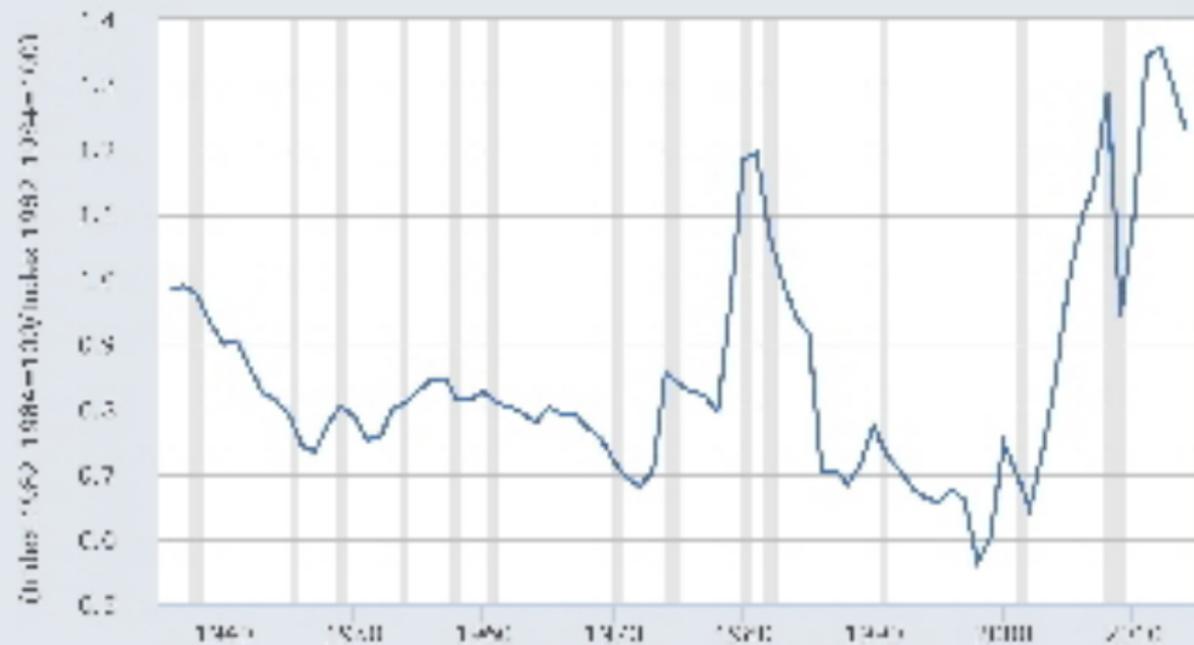
US Gas Prices, \$ per Gallon, 1929-2014.



US Gas Prices, Using CPI Indices, 1936-2014.

FRED

— Consumer Price Index for All Urban Consumers: Gasoline (all types)/Consumer Price Index for All Urban Consumers: All Items

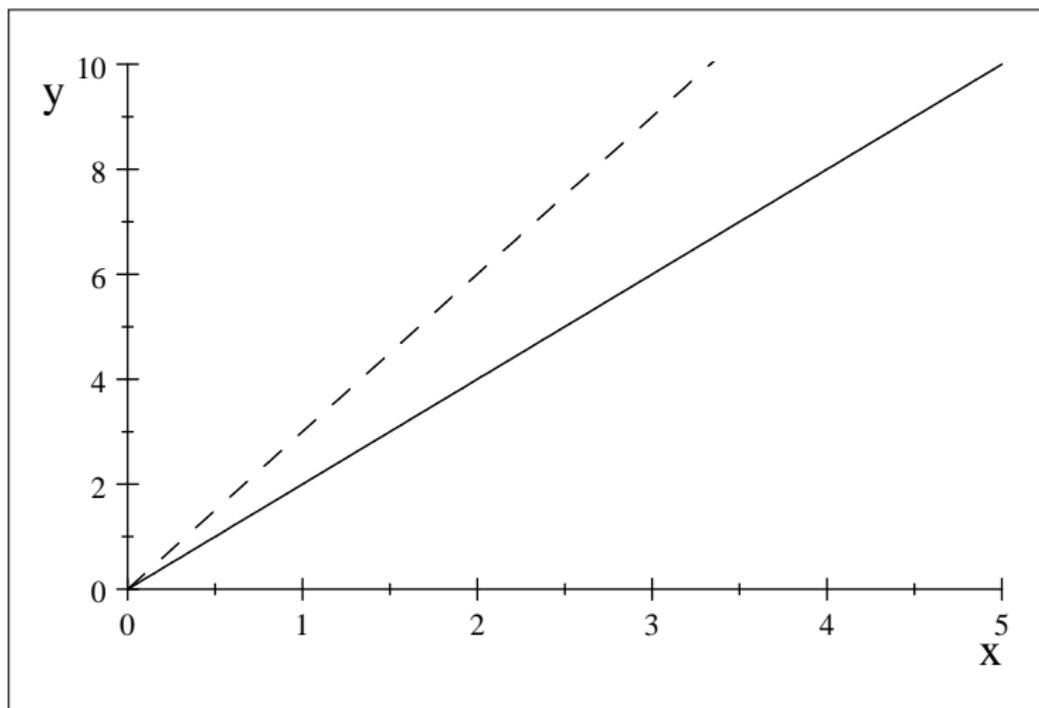


Source: Bureau of Economic Analysis - 2015 Research Foundation

Summary

- Sets out facts, theory and application on use of microeconomics in macroeconomics.
- Includes consumers, firms, industries and markets.
- Industrial organization is discussed.
- Competition and profits, & monopoly pricing and profits.
- Supply, demand, market prices.
- Concept of equilibrium in markets.
- Marginal cost equals marginal benefit in equil for cons & firm.
- Methods include PPC, production functions, indifference curves.
- Prices in markets are relative prices of one good for another.
- Excess supply or demand possible with fixed prices.
- Comparative Statics and US Auto Application.

Appendix: Understanding Graph Slopes



Understanding Graph Slopes

Glossary of Italic Words

aggregation: adding together a group using some means of making each member of the group likewise so that they can be added.

anti-trust laws: government laws that prohibit monopoly or monopsony.

average cost per unit of product: the total cost of output divided by the quantity of output.

budget constraint: the amount of real income that can be used for purchasing goods in a given period.

clears: characteristic of a market when the quantity demanded equals the quantity supplied at a particular equilibrium price.

comparative statics: comparing one equilibrium to another equilibrium, usually where one exogenous factor to the economy has changed.

competitive market: where each consumer and firm has no influence individually over the market price by means of their demand of and supply for the good respectively; some firms may have lower costs than others and thereby earn profit.

concave to the origin: a curve drawn from the origin in the graph has a slope that gets flatter, the further out the curve goes along the horizontal

constant dollar, or real: in dollars that take out the inflationary effect on prices; real dollars is another term for constant dollars.

constant dollar valuation: determining the value of a good in terms of prices that hold in one given year, as a way to take out inflation from the valuation of the good.

consumers: households who optimize their choice of which goods and how many to consume based on their budget constraints.

demand schedule: A schedule of prices and quantities which shows how many goods the aggregate number of consumers in a particular market will buy at each given price, when that price was the equilibrium price; can be graphed.

diminishing marginal utility: the marginal utility of a particular good becomes less as the quantity of goods consumed increases.

distorted: a feature of markets when they are taxed, subsidized or regulated such that the normal equilibrium price does not hold.

econometrics: the economic statistical methodology for estimating how economic variables relate to each other.

economy-wide: all of the industries of the microeconomy that make up a particular aggregate economy.

endogenous: an event that occurs which is explained as an outcome of the actions taking place within a model economy.

endowment: a quantity of any factor of production with which typically the consumer is given exogenously.

equilibrium: when the forces of supply and demand are at rest in that there is no incentive for the price to be raised or lowered.

equity capital: the net worth or residual value of a firm found by subtracting liabilities from assets.

estimated: a relation that results from econometric analysis of data in which variables are related to each other in a certain fashion.

excess supply: the quantity of goods that are supplied in excess of what is demand at a particular market price.

exogenous: an event that occurs by assumption rather than being explained within the model economy.

firms: companies of any particular legal organization that produce and supply goods to the market-place.

goods: a product of firms that consumers want to purchase.

government regulation: Restrictions to free trade that any branch of government is able to impose upon the market economy.

indifference curve: a schedule that can be graphed which shows the combination of any two goods for which the consumer has the same level of utility.

industry: a grouping of firms producing a similar product, or output.

inputs: the factors of production such as labor and capital that enter a firm's production function for output.

insolvent: a firm with liabilities greater than assets is characterized in this way.

intersects: where two lines or curves cross.

loss: occurs when current period revenues are less than current period costs, and profit is negative.

marginal benefit: the increase in benefits resulting from a one unit increase in a good.

marginal cost: the change in total cost in producing a good due the

marginal revenue: the increase in revenue from a one unit increase in the quantity of goods sold.

marginal utility: the change in the consumer utility of consuming goods when one additional good is consumer.

market: a grouping in which goods are supplied and demanded.

market clearing: a part of an equilibrium in which the equilibrium price makes the quantity demanded exactly equal to the quantity supplied.

market economy: an economy in which resources are largely allocated according to buying and selling freely in all of its markets.

market entry and exit: firms begin producing a good in a market when they enter the market, and stop producing a good in a market when they exit.

market supply and demand: the supply and demand for goods within a particular market.

minimum price, or price floor

model economy: a simplistic representation of an economy that abstract from certain details.

monopoly power: the ability of a firm to influence the price of a good in a market in which the firm is supplying goods.

movement upwards, movement downwards: along a given graphed line, a movement upwards along the line means that the point of interest goes from a lower position on the line to a higher position along the same line; conversely for a movement downwards.

nominal: any valuation that is given in monetary terms rather than in terms of goods.

perfect competition: firms and consumers sell and buy goods in a market in which firms and consumers cannot individually affect the market price and in which all firms have the same cost structure so that there is zero profit earned in the market.

price ceilings: a minimum price imposed upon a market usually by the government that is below the natural equilibrium price in the case that it is an effective ceiling that changes the equilibrium.

price floors: a maximum price imposed upon a market usually by the government that is above the natural equilibrium price in the case that it is an effective floor that changes the equilibrium.

product: a good that is produced as output of a firm.

production function: a means by which a firm turns inputs of factors such as labor and capital into output of a good.

production possibility curve (PPC): a schedule that can be graphed that shows the combinations of two goods that can possibly be produced given a certain endowment of the factors of production such as labor and capital.

profit: total revenue minus total cost.

rationing: the allocation of goods that takes place outside of market allocation through pricing; this typically involves non-economic behavior such as political favor or influence.

real quantities

real terms: any valuation that is given in terms of goods, rather than in terms of money.

relative prices: the statement of how many units of one good must be given up in order to purchase one unit of another good.

representative firm: a producer that is thought of as the average within a group of firms

representative consumer: a household that is thought of as the average utility within a group of households.

slopes: the change in the vertical axis quantity as a result of a unit change in the horizontal quantity, along a particular line or curve; rise over run is one definition that means the vertical axis amount divided by the horizontal axis amount at the given point; a line with a slope of one that starts at the origin is a line that makes a 45 degree angle.

supply schedule : a schedule of prices and quantities which shows how many goods the aggregate number of firms in a particular market will sell at each given price, when that price was the equilibrium price; can be graphed.

tangent to: when two curves, of which one may be a line but not both just "touch" and share a single point without having an intersection at this point of tangency.

utility function: a representation of how different goods give benefits to the consumer.

wage rates: the rental rate of labor supplied for working at a firm.

Questions

- 1 What is a market and how does it function?
- 2 What slopes do the supply and demand functions have when graphed against the relative price (vertical axis) and the quantity of output (horizontal axis)?
- 3 How are supply and demand related to the firm's production function and the consumer's utility function?
- 4 How does an increasing marginal cost and diminishing marginal utility relate to supply and demand for a good?
- 5 Use supply and demand to explain the problem of the US automobile industrial decline.
- 6 How are comparative static exercises shown using supply and demand?
- 7 How is the equilibrium determined and defined in any given market?
- 8 What is the difference between a competitive and a monopolistic market?
- 9 Provide an explanation for the relative shrinkage worldwide of the US automobile industry.

Rest of Chapter Questions

- 1 Graph two lines in the same graph: $y=4+3x$ and $y=4+x$.
- 2 Graph a production function, a utility function, an isoquant and an indifference curve.
- 3 How might the theory of population growth relate to the theory of diminishing marginal utility or diminishing marginal product?
- 4 Complete the Federal Reserve Bank of St. Louis EconLowdown Course Module "Supply and Demand".