First Generation Marginalists

- We will look at the three individuals regarded as the co-founders of marginalist economics in the 1870s
- Carl Menger, W. S. Jevons, Leon Walras
- Significant differences in method and approach, particularly in terms of the use of mathematics and concepts of science
- Neither Menger nor Jevons dealt adequately with production

Carl Menger
1840-1921

Carl Menger
1840-1921

- Became a professor of economics at the University of Vienna and was the founder of what became the Austrian school of economics
- Individualistic and subjectivist approach
- Non-mathematical
- Involved in methodological debate with the historical school
- Menger believed in the importance of general economic principles and wanted to sharply distinguish between historical and statistical studies and exact laws of theoretical economics

Valuation of Consumption Goods

- For something to be an economic good
  - There must be a want
  - The object must have want satisfying power
  - Consumers have to be aware of its want satisfying power
  - Must be available
  - Must be scarce relative to wants
- Goods that are not scarce may be very useful but are not economic goods

Valuation of Consumption Goods

- Economic goods have to be economized
- Allocate goods to the most important want first
- But will begin to satisfy wants of lesser importance before fully satisfying the most important want
- Concept of diminishing marginal utility but not stated in these terms
- Did see this as a solution to the Classical water/diamond paradox

Valuation of Consumption Goods

WANTS

I	II	III	IV	V	VI
10	9	8	7	6	5
9	8	7	6	5	4
8	7	6	5	4	3
7	6	5	4	3	2
6	5	4	3	2	1

The numbers in the cells are an indication of the want satisfying power of a unit of a good with that want satisfying power. Possibly an ordinal ranking.

Valuation of Consumption Goods

- The value of a good is defined in terms of the want satisfaction that would be lost if the last unit of the good was not available
- Menger did not formally derive the condition for a consumer maximum but seems to be what he had in mind
- People are constantly weighing up and choosing which needs shall be met and which not

Menger's Theory of Factor Valuation

- Menger produces no analysis of the cost side but does discuss the valuation of higher order goods (production goods or factors of production)
- Emphasis on complementarity of production goods
- Production goods derive their value from the value of final consumption goods
- Theory of "imputation"
- Value of a factor is the value of the production that would be lost if the last unit was withdrawn from production

William Stanley Jevons
1835-1882

W. S. Jevons
1835-1882

- Biographical Details
  - Born and raised in England
  - Scientific training--Chemistry
  - Lived in Australia (1854-59) working as Assistant Assayer to the Royal Mint in Sydney
  - Studied meteorology, but became interested in social science
  - Returned to University of London
  - Professor of Economics at Manchester and then London

W. S. Jevons
1835-1882

- Major Writings
  - 1863 Pure Logic
  - 1865 The Coal Question
  - 1862 Investigations in Currency and Finance
  - 1871 Theory of Political Economy
  - 1874 Principles of Science: A Treatise on Logic and the Scientific Method
  - 1875 The Solar Period and the Price of Corn

W. S. Jevons
1835-1882

- Scientific background
- Interest in logic and “laws of the mind”
- Did experimental work
- Index numbers and time series observations
- Notion of equilibrium as a mechanical balance

Theory of Political Economy

- Opens with an attack on the Classical economics of Ricardo and Mill
- Critical of labour theory of value and wage fund doctrine
- Argues for use of mathematical methods—calculus
- The theory is arrived at deductively—role of intuition in providing basic premises—but Jevons also interested in measurement and empirical work
- Wants to demonstrate that “value depends entirely upon utility”

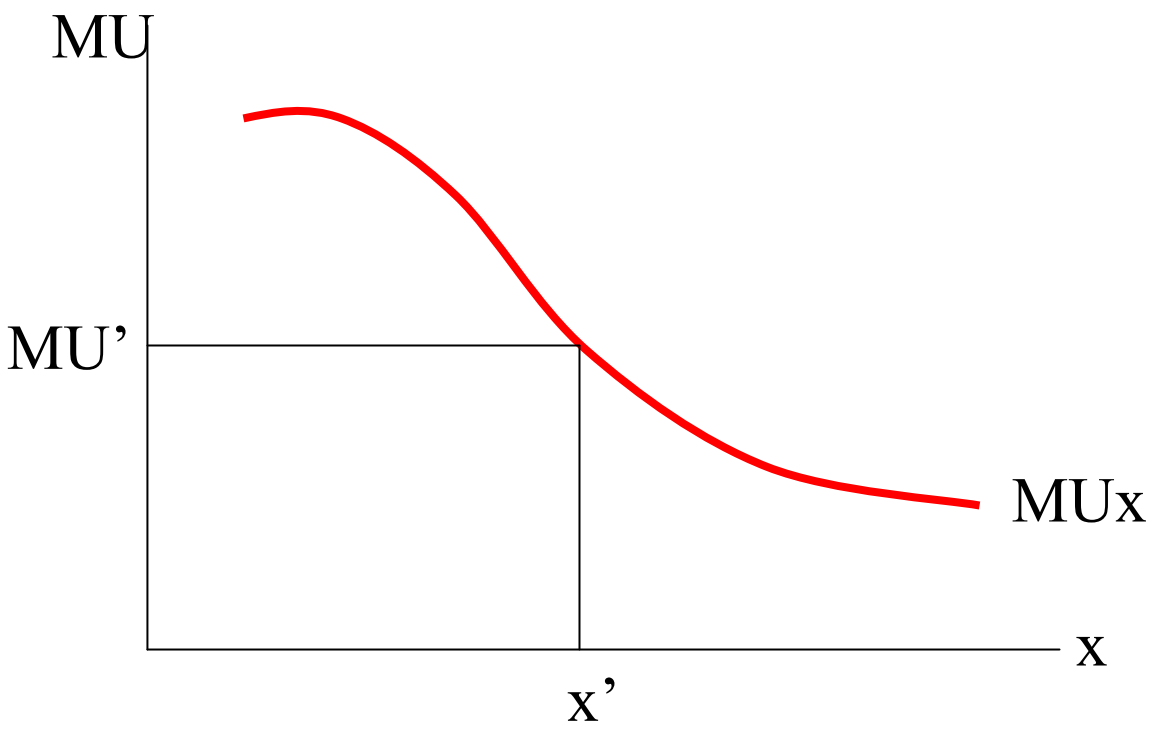
Utility Theory

- Individuals seek to maximize pleasure/minimize pain (hedonism, based on Bentham)
- The purpose of production is consumption
- Consumption choices based on utility
- Utility is not intrinsic to a good, but a matter of individual valuation
- How does utility vary with quantity?

Law of Variation of Utility

- Law of Variation of utility
  - Assumes continuous utility functions
  - Total utility (u)
  - Degree of utility ($\Delta u/\Delta x$)
- "The degree of utility varies with the quantity of the commodity, and ultimately decreases as quantity increases"
- Clear distinction between total and marginal utility
- Solution of the water/diamond paradox

Law of Variation of Utility



As quantity of x increases, the degree of utility (MU) must eventually fall. If the individual has x' of x the "final degree of utility" is MU'

Exchange Theory

- Jevons does not go on from his theory of utility to derive demand curves, but considers the problem of exchange
- Individuals start with given endowments of goods, but depending on the final degrees of utility they may wish to exchange some of their goods for other goods in order to maximize utility
- Initially, Jevons interested in the "limits of exchange" or how much would be traded between individuals at given prices

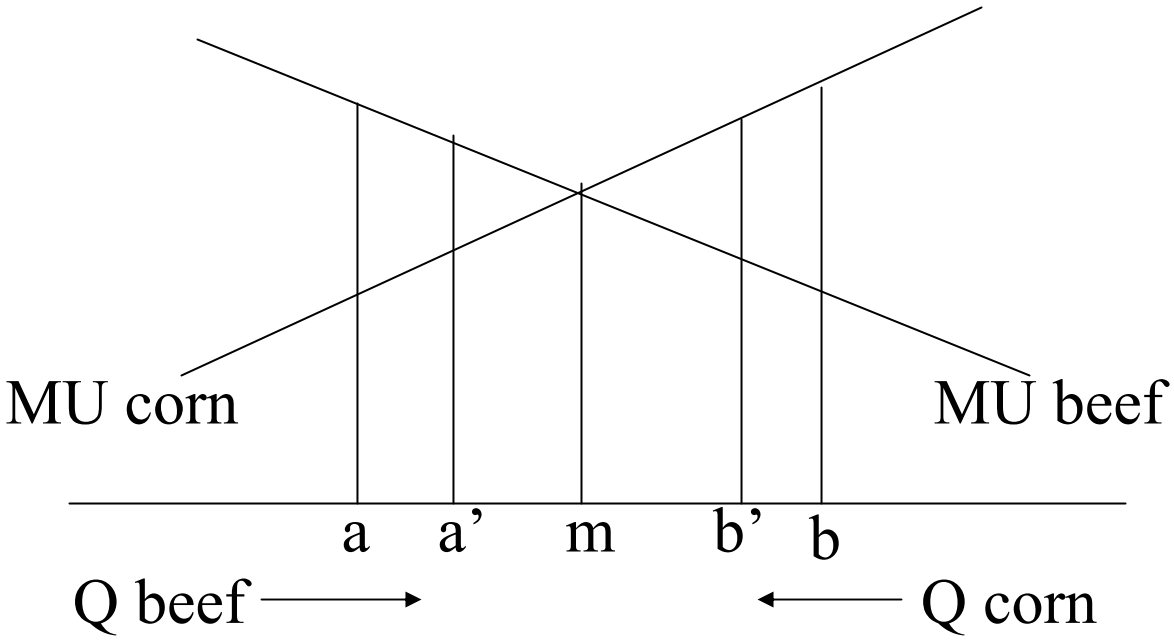
Exchange Theory

- Jevons takes the case of given supplies of two goods distributed to two individuals (one holds all the beef the other all the corn)
- He assumes competition and perfect information and an established ratio of exchange
- Each individual will exchange up to the point where the ratio of the marginal utilities is equal to the ratio of exchange
- This is equivalent to the utility maximizing condition of each person trading until MUc/MUb = Pc/Pb

Exchange Theory

- Jevons tried to extend this analysis to the case of many traders and to the formation of market prices
- Concept of a "trading body" as the aggregate of the buyers or sellers in a market
- Law of indifference or law of one price
- Example of two trading bodies each with a given supply of two goods. To begin with one has all the beef and the other all the wheat
- Assumes that utility functions can be aggregated

Exchange theory



Trading body 1 starts at point a which represents a given endowment of corn and with MU functions as shown. Trading body 2 starts from b which represents a given endowment of beef (with the same MU functions). If 1 exchanges corn for beef and moves to a' there is a utility gain. Similarly for 2 with the exchange of beef for corn And the movement from b to b'

Equation of Exchange

- If, ultimately y of beef is exchanged for x of corn the ratio of exchange can be expressed as y/x (which is equivalent to Px/Py)
- Trading body 1 will be left with (a-x) corn and y of beef and trading body 2 will have (b-y) of beef and x of corn
- For this to be an equilibrium the equation of exchange must hold:

$\Phi_1(a-x)/\psi_1(y) = y/x = \Phi_2(x)/\psi_2(b-y)$

Where $\Phi_1(a-x)$ is the final degree of utility of corn for trading body 1, etc.

- However, Jevons does not show how the ratio of exchange is determined but implicitly assumes it.

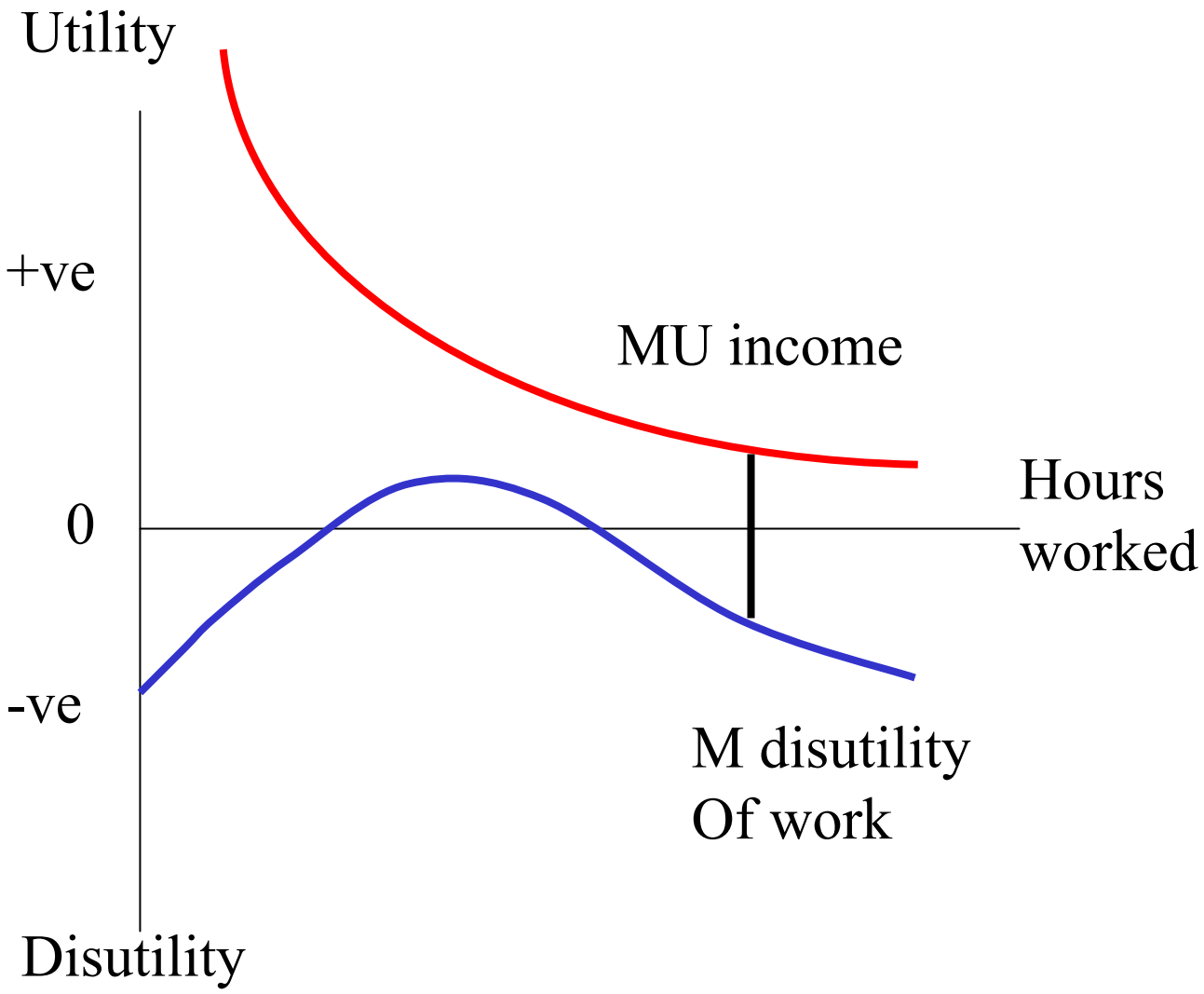
Production

- As noted above Jevons wanted to show that value depends entirely on utility
- Treatment of exchange assumed given supplies
- What determines supply?
  - Cost of production determines supply
  - Supply determines final degree of utility
  - Final degree of utility determines value
- This is not satisfactory as it suggests supply is determined first and before price
- Demand and supply jointly determine price (Walras, Marshall)

Factor Supply

- Supply of effort a matter of the utility derived from income as against the disutility of work
- Diminishing MU of income and eventually increasing marginal disutility of work
- Labour becomes more tiring the more hours worked
- Supply effort to the point that the marginal utility of income is just equal to the marginal disutility of work
- Wage increases and the supply of effort?

Supply of Effort



Applied Economics: Resources

- Although Jevons' theory was deductive he was also interested in empirical work and in a number of applied areas
- Exhaustible resources and British coal supply—application of Malthusian theory to the issue of limited supply of coal
- Jevons did not forsee the development of substitutes for coal

Applied Economics Cycles

- Jevons conducted a great deal of empirical work on cyclical fluctuations—he was one of the pioneers of trade cycle research
- Pioneered use of semi-log graphs, index numbers, geometric means, moving averages in time series analysis
- Developed a theory based on changes in weather produced by the solar period (sunspot cycle)

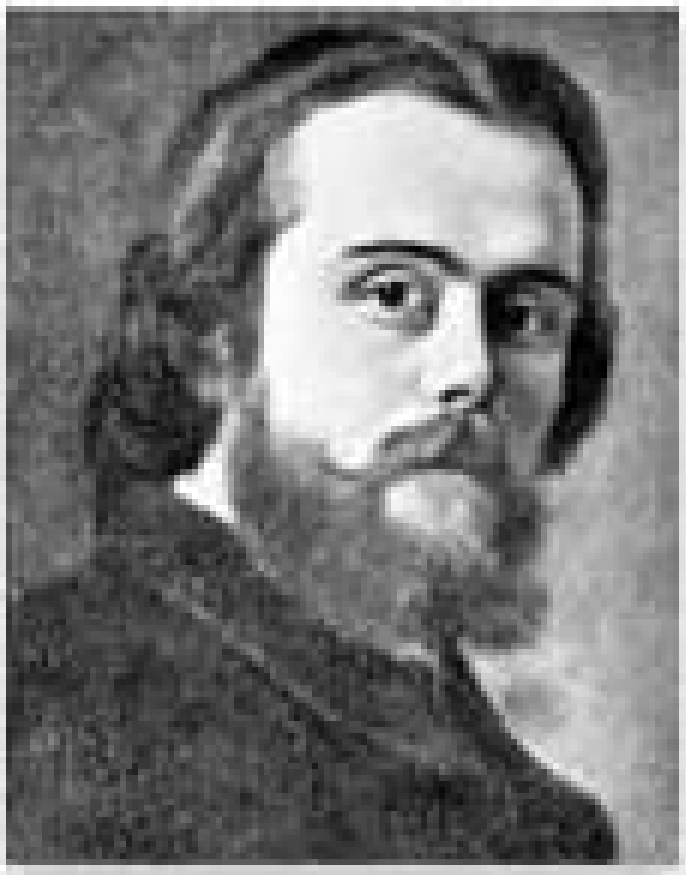
Sunspot theory

- Good weather produces good harvests in India, China and other countries, after a time this increases demand for manufactured goods from Europe, so spreading prosperity
- At that point the decline in solar radiation produces poor harvests in India and China reducing incomes and reducing demand
- Time series graphs
- Difficulties with the empirical evidence and the implied leads and lags in the theory

Government Policy

- Jevons a utilitarian and followed Bentham
- The greatest good for the greatest number
- Case by case judgment
- State enterprise in cases such as the post office
- Generally anti-trade union but certainly not an apologist for private business—pragmatic reform position

Leon Walras
1834-1910



Leon Walras
1834-1910

- Biographical details
  - His father, Augustin Walras a professor of philosophy and economics
  - Leon Walras trained in engineering
  - Turned to economics in 1858
  - *Elements of Pure Economics* 1874 and 1877
  - Professor of Economics at University of Lausanne
- Method was mathematical and concerned with *general equilibrium*

Utility and Demand

- Like Jevons, Walras developed the idea of diminishing marginal utility
- Assumes a cardinally measurable utility: “a standard measure of intensity of wants”
- Walras develops the condition for a utility maximum: that the ratio of marginal utilities must equal the ratio of prices
- Walras then derives demand curves from this consumer utility maximizing condition—this is what Jevons failed to do

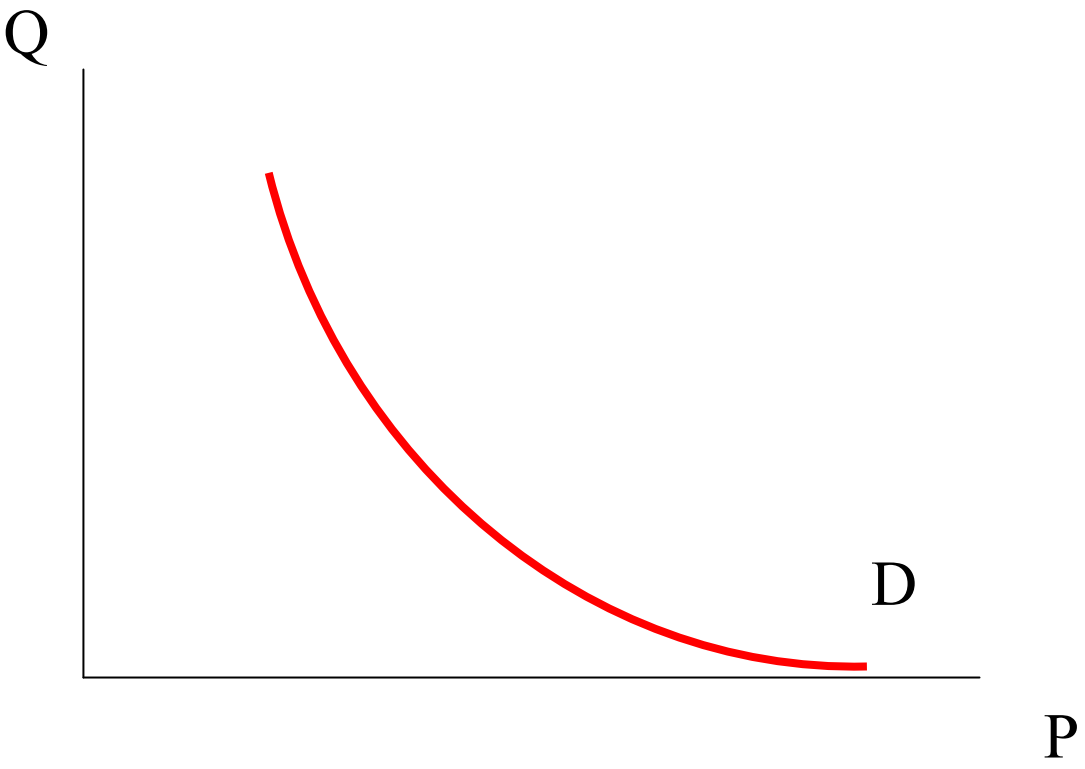
Derivation of Demand Curves

- Deals first with simple two commodity case but then moves on to assume many (m) commodities
- Select one as the numeraire
- The numeraire is the good in terms of which the prices of all other goods are expressed ($P_1=1$)
- Consumer maximum

$MU_1=MU_2/P_2=MU_3/P_3=MU_m/P_m$

- Walras argues that it follows from this that a decrease in price of a good will lead to an increase in the quantity demanded
- This ignores possibly perverse income effects

Walrasian Demand Curves



Walras sees Q as the dependent variable and places it on the vertical axis

General Equilibrium

- What most concerned Walras was the problem of general equilibrium
- Is it possible to have an equilibrium in all markets at the same time?
- Walras approached this first by assuming given quantities of goods and looking only at a pure exchange economy but then goes on to include production and factor markets
- Assumes as given:
  - initial factor endowments that individuals may use themselves or exchange for income
  - Marginal utility functions for individuals for goods and self employed factor services
  - Technical coefficients of production
  - Competitive conditions

General Equilibrium

- Need to determine four sets of unknowns: the equilibrium prices of n productive services, the equilibrium quantities of n productive services, the equilibrium prices of m finished goods, and the equilibrium quantities of m finished goods
- That is 2m+2n unknowns
- One price is a numeraire so we have (2m + 2n – 1) unknowns
- To solve this need a set of (2m +2n – 1) simultaneous equations

General Equilibrium

- Individuals supply factor services to factor markets and demand goods from goods markets
- Firms demand factors from factor markets and supply goods to goods markets
- Individual demand functions for m goods will be of the form

  $d_a = f_a(p_a, p_b \ldots p_m, p_{f1}, p_{f2} \ldots p_{fn})$
- Individual factor supply functions for n factors will be of the form

  $s_{f1} = f_1(p_{f1}, p_{f2} \ldots p_{fn}, p_a, p_b \ldots p_m)$

General Equilibrium

- These goods demand functions and factor supply functions can be aggregated over individuals giving m + n equations
- Then need a set of n equations giving equilibrium in factor markets
- If coefficient a_{f1} tells us how much of factor 1 is required to produce a unit of good a, then for factor market 1 to be in equilibrium

  $a_{f1}d_a + b_{f1}d_b + \ldots m_{f1}d_m = s_{f1}$
- Have n such equations for each factor market

General Equilibrium

- Lastly, need a set of m equations giving equilibrium in m goods markets
- Condition for a long run equilibrium is zero economic profit

  $a_{f1}p_{f1} + a_{f2}p_{f2} + \ldots a_{fn}p_{fn} = p_a$
- Now have (2m + 2n) equations
- Can eliminate one equation by Walras' law and are left with (2m+2n-1) equations and the same number of unknowns

General Equilibrium

- Counting of equations and unknowns only shows that there is a solution—a solution exists
- However, the solution may not be unique
- Solution may not be economically feasible (involve negative prices or quantities)
- Solution may not be stable
- Despite this Walras thought he had provided a rigorous demonstration of Smith's invisible hand

Adjustment to a General Equilibrium

- Walras provides a description of adjustment to a general equilibrium through a process of “tatonnement” until no excess demand or supply exisits
- Idea of the auctioneer who calls out prices
- Price adjustment leading to quantity adjustments (Q is the dependant variable)
- But the system will fail if there is any trading at non-equilibrium prices
- Analysis of an equilibrium system only

Walras and Applied Economics

- The pure theory of a competitive general equilibrium is “the guiding light for applied theory”
- Generally competitive conditions provide a maximum of utility for society
- Policy to remove obstacles and hindrances
- Social policy may involve state regulation or provision
- Social economics to examine principles of distribution and the framework of property rights
- Envisaged a “liberal-socialist” system