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History of Economic Thought

VIII. The Marginal Revolution

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VIII. The Marginal Revolution

1. Introduction
2. William Stanley Jevons
3. Léon Walras
4. Carl Menger

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Introduction

- Problems
- Differences
- Sociology
- Precursors

Introduction

The Situation Before the "Revolution"

- Problems in explaining actual prices in classical terms
  - Labour theory of value
- Problems in exactly showing the interrelations of social and economic phenomena
  - Class conflict or social harmony
- The British and German subjective utility theorists had made important advances
- Classical economics reigned supreme (JS Mill)

Differences among the Revolutionaries

Walras and Jevons

- The quest for mathematical economics
  - Walras with his equations describing general equilibrium
  - Jevons by making utility tractable through differential calculus
- Jevons and Walras closer to the British utilitarian tradition
- Positivist attitude to science

Menger and the Austrians

- Economics can only establish qualitative laws
- Closer to the German and general continental tradition
- Classic / Aristotelian understanding of science

The Sociology of Economics

Economics as Profession

- In general, the period saw the "professionalisation" of economics – everyone treated here university professors (eventually)
- Economics becomes an academic discipline – the gifted amateur and the man of affairs no longer make theoretical contributions

A few Precursors Passed Over in Silence

- Mathematical economists Daniel Bernoulli, Auguste Cournot, Jules Dupuit
- German economists Hermann Heinrich Gossen and Johann Heinrich von Thünen
- Of varying importance – will be passed over in silence

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2. William Stanley Jevons (1835-82)

The Man

- From Unitarian background, went to University College, London 1850, studied chemistry, math
- Assayer at the Australian mint in Sydney 1854-59, began studying social questions while there. Decided to make the "study of man" his vocation
- Returned to University College, London 1860, graduated 1862

His Works

- Published work on value of gold 1863, became famous with his *Coal Question* 1865
- Professor of logic, moral and mental philosophy at Owens College, Manchester 1866, professor of political economy at University College, London, 1876, resigned 1880 to devote all his time to research
- Key writings: *Theory of Political Economy* 1871, *Principles of Science* 1874, *Money and the Mechanism of Exchange* 1875

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The Jevonian Revolution

Subjectivism

- Value is subjective
- Methodological individualism
- Benthamite utilitarianism re-interpreted and applied

Search for Scientific Rigour

- Application of mathematics to economics
- Economics is like natural science: there are necessary quantitative laws
- Numbers can express everything

Method/Procedure

- Invent hypotheses, compare deductions from these to experience
- Jevons did not aim at an "axiomatic" economics – what mattered was the realism of a theory, not its logical construction

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Jevons and Utilitarianism

Building on Bentham

- Jevons founded his theory on utilitarian ideas
- Use value or utility one-dimensional and quantitative
- Felicific calculus reduced to two factors: intensity and duration
- The quantity of pleasure determined by their product
- Time and intensity continuous variables, hence so is utility

Application

- Utility is always a relationship between a person and an object
- An object can have different utility to different persons
- What matters is the *increment in utility* when the quantity of the object increases – the *final degree of utility*
- Each individual signals this magnitude to him by his readiness to pay for a given commodity
- We can compare different persons' evaluation of the same object
- But we cannot construct a social felicific calculus (or social utility function), since people may attribute different degrees of utility to the same amount of money

Rational Choice

Opposition to Classical Economics (and Benthamism)

- Jevons wanted to reduce economics to the theory of rational choice
- Economics only concerned with "needs of the lowest order"
- Each person assumed perfectly rational when calculating his utility function
- But it is impossible to make interpersonal comparisons of utility, so there is no consequentialist ethics

Utility and Prices

- The exchange value of a good is equal to its marginal utility
- And to the marginal disutility of labour necessary to obtain it
- The quantity of a good produced and consumed is determined simultaneously with its exchange value
  - Notion of indifference a necessary implication

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Capital and Rent

Capital

- Is "the aggregate of those commodities which are required for sustaining labourers of any kind or class engaged in work" and "simply allows us to expend labour in advance"
- Distinction between amount of capital invested, and the amount of investment of capital
  - Former simply quantity of capital
  - Latter has two dimensions, quantity of capital and duration
  - "Average time of investment of the whole amount" the ratio between first and second
  - Foreshadows Böhm-Bawerk's average period of production, lot of ink spilled here
  - Jevons is the first to give graphical presentation of capital structure in the form of a triangle – foreshadows Hayek

Rent

- Jevons follows Ricardo on rent, natural resources – nothing new here
- Jevons soon overshadowed by Alfred Marshall – "all the good in Jevons is incorporated in Marshall" so there's no need to read him (allegedly)

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Philip H. Wicksteed (1844-1927)

"Jevons's Only Disciple"

- Unitarian minister, classical scholar
- Wicksteed was initially a Georgist before encountering Jevons

Subjective Value Theory

- Wicksteed took the theory to its natural conclusion, applied it to all fields of human activity
- Subjective value connected to opportunity cost
  - The cost of production is simply "the marginal significance of something else"
  - The supply curve for any commodity is simply the reverse demand curve for the set of all other commodities (shades of Say's Law)

***An Essay on the Co-Ordination of the Laws of Distribution* (1894)**

- One of the first works illustrating marginalist theory of wages, profits and rents
- Income distribution is not arbitrary or simply down to class conflict
- Income is based on the marginal productivity of the factors of production

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3. Marie Esprit Léon Walras (1834-1910)

The Man

- Trained at the *Ecole des mines*, failed entrance exam at the *Ecole polytechnique*
- Gave up engineering for journalism, worked at the *Journal des économistes*, as clerk at the railways, as bank director
- Gained teaching position at the Academy (later university) of Lausanne 1870, nominated to chair of political economy next year, retired 1892

His Works

- *Elements d'économie pure* 1874, fourth edition 1900, "definitive" French edition 1926. First of three planned volumes

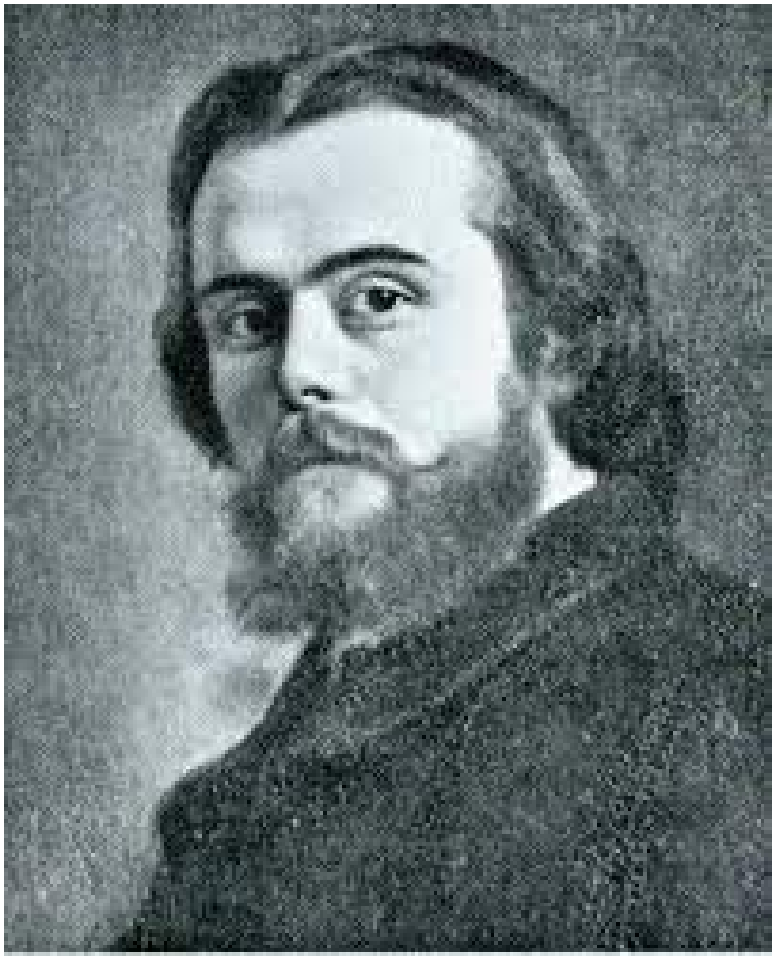
Walras's Inspirations

Key Inspirations

- French mathematical economics
- Developments in mechanics, physics

Walras the Elder

- Walras's father Antoine (1801-66) an important economist
- Concept of *numéraire*
- Distinction between capital goods and their services
- Capitalists and entrepreneurs



Walras's Vision

The Plan of Work

- Three volumes dealing with A) pure economics; B) applied economics; C) social economics
  - A) Deals with the laws of exchange, similar to the natural laws of physics, but dealing with facts of humanity, not natural facts
  - B) The subject here is the production of wealth, the division of labour, industrial organisation
  - C) Social economics deal with problems of distribution, including ethical issues

The Vision Behind

- (A) closely connected to natural sciences and their method, (B) to social sciences, and (C) to philosophy
- The core of economics thus deal with exact, quantitative laws
  - Applied and social issues are less certain
  - The method of (A) applied to (B) and (C)

General Equilibrium

The Freely Competitive Market

- An analytical assumption and an ethical ideal
- Paris Bourse of his day the archetype: the auctioneer calls out a price, adjust the call as demand is higher or lower than supply
  - Exchanges only take place once equilibrium reached
- Basis for Walras's *tâtonnement* process: initial price set at random (*crié au hasard*), then adjusted in process of trial and error

Pure Exchange Economy

- The data of the problem consist of
  - The number of commodities and economic agents
  - Their preferences and the endowments of each commodity for each agent
- Preferences are expressed by individual demand function for different goods
  - Derived from utility functions
  - Utility is a measurable quantity

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Pure General Equilibrium

Equilibrium Definition

- The solution to a system of equations, illustrated by the *tâtonnement* process
- In pure exchange, there are for each individual as many demand functions as there are commodities
  - Each function express demand as a function of the price of the commodity (expressed in the *numéraire* commodity), all other prices, and the initial endowments
- Demand functions for each commodity added up to give aggregate demand functions
- Individual budget constraints are reflected in a system of equations expressing aggregate equilibrium conditions (supply = demand)

Resulting Equations

- Two groups of equations: demand functions and conditions of equilibrium
- The number of equations in each group equal to number of commodities
  - If n commodities, then $2n$-1 equations
- Number of equations equal to number of unknowns: n-1 relative prices in terms of numeraire commodity, n number of commodities
- Once prices are determined, the quantities bought and sold follow from demand functions
- Result: the prices of the various commodities proportional to their *raretés*, their marginal utility

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Equilibrium – Production and Exchange

Further Assumptions

- To examine production, we now assume that each individual has an endowment of capital goods
  - Land, capital goods in the real sense (machines etc.) and personal capital goods (skills)
- Production functions are known
- Constant returns to scale
- Capital goods owners hire out services to entrepreneurs, latter organise production and sell products
  - Profits limited by competition to wages of direction

New Sets of Equations

- Production functions ensure equality between costs of production and value of each consumption good
- New group of demand functions: for services of capital goods, equal to their number
- New group of equations expressing equilibrium conditions for capital goods markets
- The new equations correspond to number of additional unknowns
  - Prices of capital goods service in terms of numeraire
  - Quantities demanded of each service
  - Quantities produced of different consumption goods
- *Tâtonnement* process much more complex in capital markets

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Equilibrium – Accumulation and Credit

Credit

- Treated of in "real terms", i.e., in terms of the commodity chosen as numeraire
- New commodity introduced to model accumulation: *E* (for *épargne*), yields one unit of numeraire commodity per year in perpetuity
  - Price of E thus equal to inverse of interest rate
  - Demand for E: from entrepreneurs wanting to invest in new capital goods
  - Supply of E: from savers (capitalists)

Accumulation and Capital Markets

- Demand and supply of E therefore depends on preference for present consumption over future and on the return on investment of new capital goods
- One new equation, since one new unknown in form of price of E
- It is possible to define, for each capital good, a rate of return given by its net income divided by its price
  - Investment in different capital goods must yield rates of return equal to the interest rate equating demand and supply of E
  - In equilibrium, demand=supply for each capital good
  - If some good yields a higher rate of return, expansion of its production results, and conversely for a good with a lower rate of return

Equilibrium – Money

- In the final stage of analysis, Walras introduces money
- Money is a bridge by which economic agents can cross time intervals between outlays and takings
- Strict contradiction emerges:
  - Walras's insistence on static nature of equilibrium and full certainty
  - Notion of money as something more than the *numéraire*
  - Not clear what role of money is in Walras's theory
- Net demand for money depends on the rate of interest, this is the opportunity cost of money
- Overall problem for Walras and his followers: demonstrating the existence, uniqueness and stability of an overall equilibrium

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4. Carl Menger (1840-1921)

The Man

- Born in Neu-Sandec, Galicia to family of prosperous craftsmen, officials, army officers
- Studied in Vienna (1859-60) and Prague (1860-63), took doctor's degree in Krakow
- Worked as journalist in Lemberg and Vienna
- Reporting on the state of the markets for the *Wiener Zeitung* made Menger aware of the glaring contrast between traditional theories of value and what businessmen thought and did

His Works

- Wrote the *Principles of Economics* (1871) in "state of morbid excitement"
- Professor at Vienna – Privatdozent 1872, extraordinary professor 1873
- Tutor to Crown Prince Rudolph 1876-78, called to new chair of political economy by the emperor 1879, retired 1903

Menger's Works

- *Principles of Economics* 1871
- *Investigations into the Method of the Social Sciences* 1883
- Other smaller works criticizing the historical school
- An important essay on capital theory
- Smaller works on money: e.g., the 1892 article on the origins of money

Menger's Goal

Price Theory

- A uniform theory of price built from first principles
- Everything deduced from first principles
- Uniform causal explanation: individual human wants

Influence

- The German historical school
  - Roscher: Economics studies laws of development
- The German subjective utility theorists
  - Theory of goods, connection to individual human wants
  - Focus on human action, activity of want-satisfaction

The Nature of Economic Science

The Nature of Economics

- Clear, qualitative laws – not quantitative
  - Menger: "All things are subject to the law of cause and effect"
- Mathematics not applicable as a method
- Letter to Walras 1883: the Austrian school fundamentally different, mathematics is *in principle* not a method for advancing economics

Economic Method

- Research into economic phenomena has to proceed deductively from first causes
- The "analytic-compositive method"
- Methodological individualism
- Thoroughgoing subjectivism

The Theory of Value and Exchange

Explaining Exchanges

- The inequality of subjective valuations the foundation for exchange
- A person always prefers what he gets to what he gives up
- Reverse valuations lead to exchange

Nature of Value and Goods

- Value cannot be measured: a thing has value if a person thinks it helps him achieve an end
- Valuable things are goods
- An object is only an *economic* good if its supply is limited, i.e., if there is not enough of it to fulfil all human wants
- Goods are valued according to the end the last unit serves

Marginal Utility

Example of Water

- First litre used for drinking, second for cleaning, third for plants, then animals, then fountain
- Since units are interchangeable, its only the last satisfied want, lowest on the value scale that determines the value to the person

Marginal Utility and Exchange

- A person will only acquire one more unit of any good, if the end he can then fulfil is ranked above what he gives up
- Similarly, the value of the unit he gives up in exchange determined by the lowest-ranked end
- There is always inequality, always preferring and setting aside
- Opportunity costs are baked in from the beginning

Price Formation

Consumer Goods

- Consumer goods are valued for their immediate contribution to wants satisfaction
- They are immediate means to the ends humans pursue
- They are what Menger terms first-order goods
- The value of consumer goods are determined directly by subjective utility

Producer Goods

- Producer goods are goods used to produce consumer goods
- Their value derive from the value of the consumer goods they ultimately contribute to producing
  - Second-order goods are valued for their ability to produce first-order goods
  - Third-order goods are valued for their ability to produce second-order goods
- Producer goods are ordered in a structure or hierarchy

Price Formation

Marginal Valuations

- The price of a thing is set between the valuations of the seller and the buyer
- Menger's example
  - Person A values 40 units of wine up to 100 units of grain
  - Person B values 40 units of wine up to 80 units of grain
- The exchange will take place at a price between 81 and 99 units of grain
  - Indeterminate beyond that, set by bargaining

Marginal Pairs Analysis

- Extending the market narrows the zone of indeterminacy, but it does not eliminate it
- The full analysis worked out by Böhm-Bawerk 1889
- Note: the paradox of value is a non-issue to Menger and the marginalists

The Development of Money

Organic Institutions

- In his polemics against the historicists, Menger worked out a theory of organic institutions
- Institutions developed over time as the "by-product" of purposeful human action
- Money the prime example of such an institution

The Development of Money

- Money emerged to overcome the problems of direct exchange
  - Coincidence of wants
  - Divisibility of goods
- Under these conditions, exchanges very costly
- Individual self-interest lead people to seek indirect ways to achieve their ends
- They exchange what they have for goods they think can more easily be sold
- As indirect exchange develop, the precious metals were selected as most suitable
  - Due to their qualities: divisible, durable, valuable, etc.

The Nature of Money

Marketability

- How easily a good can be sold for other goods
- Differences in marketability the precondition for indirect exchange to emerge

Functions of Money

- Money is simply and only the general medium of exchange
- Other functions are derivative
  - Unit of account
  - Store of value
  - Standard of deferred payments

Menger on the development of money

As *each* economizing individual becomes increasingly more aware of his economic interest, he is led by this *interest*, *without any agreement*, *without legislative compulsion*, *and even without regard to the public interest*, to give his commodities in exchange for other, more saleable, commodities, even if he does not need them for any immediate consumption purpose.

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Capital Theory

Menger's Capital Concept

- Critical of "real" capital concepts, as used in German and classical economics
- Capital means simply what merchants mean by it
  - The money equivalent of the goods devoted to production
- For this reason very critical of Böhm-Bawerk's later theory

Entrepreneurs and Capital

- Entrepreneurs employ capital to produce goods
- They buy/hire services of higher-order goods
- Combine them to produce lower-order goods
- Then sell product to new set of entrepreneurs/to the consumers
- Capital goods do not earn interest, they are paid prices for their services
- But interest theory not really developed – the one lacuna in Menger's theory

Friedrich von Wieser and Marginal Utility

- Wieser (1851-1926) with Eugen von Böhm-Bawerk (1851-1914) central to developing Menger's Austrian school

Marginal Utility and Imputation

- First use of the term marginal utility (*Grenznutz*) in Wieser's 1884 *Origin and Fundamental Laws of Economic Value*
- The value of the means of production determined through imputation

Opportunity Costs

- The costs of production interpreted as the sacrifice of utility which could have been realised through a different use of the means
- One key difference from Wicksteed
  - Wieser emphasises the subjective character of opportunity costs
  - Derived from entrepreneurs' evaluations, not technological data

Marginal Revolution in Distribution Theory

Distribution Theory Turned Around

- Distribution now clearly and closely tied to production
- Marginal productivity, contribution to the product, determines the prices of all factors of production
- In principle, all factors earn same kind of income – no essential differences between e.g., land and labour income

Unsettled Questions

- What about interest, return on capital?
- What about the production and reproduction of capital goods, and the difference between gross and net profits?
- The principles of distribution still took some working out – there are *some* differences between land and labour we need to take into account, after all

Different revolutions, but some common ground

- A great deal of debate within and between the different schools down to the mid-twentieth century

Common Ground

- Economic theory is real, applicable to reality
- Free markets still the basic conclusion of all

Austrian Distinctiveness

- Caught up in debate with the theory-denying historicists until 1920s
- Distinction to mathematical economics clear beginning with Mises
- Continued liberal, free market leaning

Alfred Marshall and the Marshallians

- Moderate in their theoretical positions (stick the maths in the appendix)
- Moderate in their policy conclusions (progressively more interventionist)