

Economics

Economics is the social science that studies the production, distribution, and consumption of goods and services. The term *economics* comes from the Ancient Greek *οικονομία* (*oikonomia*, "management of a household, administration") from *οἶκος* (*oikos*, "house") + *νόμος* (*nomos*, "custom" or "law"), hence "rules of the house(hold)".^[1] Current economic models developed out of the broader field of political economy in the late 19th century, owing to a desire to use an empirical approach more akin to the physical sciences.^[2] A definition that captures much of



A traditional marketplace is a physical arena where buyers and sellers meet, and the traded items are present, ready to change hands.

modern economics is that of Lionel Robbins in a 1932 essay: "the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses."^[3] Scarcity means that available resources are insufficient to satisfy all wants and needs. Absent scarcity and alternative uses of available resources, there is no economic problem. The subject thus defined involves the study of choices as they are affected by incentives and resources.

Economics aims to explain how economies work and how economic agents interact. Economic analysis is applied throughout society, in business, finance and government, but also in crime,^[4] education,^[5] the family, health, law, politics, religion,^[6] social institutions, war,^[7] and science.^[8] The expanding domain of economics in the social sciences has been described as economic imperialism.^[9] ^[10] Common distinctions are drawn between various dimensions of economics: between positive economics (describing "what is") and normative economics (advocating "what ought to be") or between economic theory and applied economics or between mainstream economics (more "orthodox" dealing with the "rationality-individualism-equilibrium nexus") and heterodox economics (more "radical" dealing with the "institutions-history-social structure nexus"^[11]). However the primary textbook distinction is between microeconomics ("small" economics), which examines the economic behavior of agents (including individuals and firms) and macroeconomics ("big" economics), addressing issues of unemployment, inflation, monetary and fiscal policy for an entire economy.

→ Economics



General categories

Microeconomics · Macroeconomics
History of economic thought
Methodology · Heterodox approaches

Fields and subfields

Behavioral · Cultural · Evolutionary
Growth · Development · History
International · Economic systems
Monetary and Financial economics
Public and Welfare economics
Health · Labour · Managerial
Business · Information · Game theory
Industrial organization · Law
Agricultural · Natural resource
Environmental · Ecological
Urban · Rural · Regional
Economic geography

Techniques

Mathematical · Econometrics
Experimental · National accounting

Lists

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The economy: concept and history

 Business and Economics Portal

History of economic thought

The city states of Sumer developed a trade and market economy based originally on the commodity money of the Shekel which was a certain weight measure of barley, while the Babylonians and their city state neighbors later developed the earliest system of economics using a metric of various commodities, that was fixed in a legal code.^[12] The early law codes from Sumer could be considered the first (written) economic formula, and had many attributes still in use in the current price system today... such as codified amounts of money for business deals (interest rates), fines in money for 'wrong doing', inheritance rules, laws concerning how private property is to be taxed or divided, etc.^[13] ^[14] For a summary of the laws, see Babylonian law and Ancient economic thought.

Economic thought dates from earlier Mesopotamian, Greek, Roman, Indian, Chinese, Persian and Arab civilizations. Notable writers include Aristotle, Chanakya (also known as Kautilya), Qin Shi Huang, Thomas Aquinas and Ibn Khaldun through to the 14th century. Joseph Schumpeter initially considered the late scholastics of the 14th to 17th centuries as "coming nearer than any other group to being the 'founders' of scientific economics" as to monetary, interest, and value theory within a natural-law perspective.^[15] After discovering Ibn Khaldun's *Muqaddimah*, however, Schumpeter later viewed Ibn Khaldun as being the closest forerunner of modern economics,^[16] as many of his economic theories were not known in Europe until relatively modern times.^[17] Nonetheless, recent research indicates that the Indian scholar-philosopher Chanakya (c. 340-293 BCE) predates Ibn Khaldun by a millennium and a half as the forerunner of modern economics,^[18] ^[19] ^[20] ^[21] and has written more expansively on this subject, particularly on political economy. His magnum opus, the *Arthashastra* (*The Science of Wealth and Welfare*),^[22] is the genesis of economic concepts that include the opportunity cost, the demand-supply framework, diminishing returns, marginal analysis, public goods, the distinction between the short run and the long run, asymmetric information and the producer surplus.^[23] In his capacity as an advisor to the throne of the Maurya Empire of ancient India, he has also advised on the sources and prerequisites of economic growth, obstacles to it and on tax incentives to encourage economic growth.^[24]



The upper part of the stele of Hammurabi's code of laws



1638 painting of a French seaport during the heyday of mercantilism

Two other groups, later called 'mercantilists' and 'physiocrats', more directly influenced the subsequent development of the subject. Both groups were associated with the rise of economic nationalism and modern capitalism in Europe. Mercantilism was an economic doctrine that flourished from the 16th to 18th century in a prolific pamphlet literature, whether of merchants or statesmen. It held that a nation's wealth depended on its accumulation of gold and silver. Nations without access to mines could obtain gold and silver from trade only by selling goods abroad and

restricting imports other than of gold and silver. The doctrine called for importing cheap raw materials to be used in manufacturing goods, which could be exported, and for state regulation to impose protective tariffs on foreign manufactured goods and prohibit manufacturing in the colonies.^{[25] [26]}

Physiocrats, a group of 18th century French thinkers and writers, developed the idea of the economy as a circular flow of income and output. Adam Smith described their system "with all its imperfections" as "perhaps the purest approximation to the truth that has yet been published" on the subject. Physiocrats believed that only agricultural production generated a clear surplus over cost, so that agriculture was the basis of all wealth. Thus, they opposed the mercantilist policy of promoting manufacturing and trade at the expense of agriculture, including import tariffs. Physiocrats advocated replacing administratively costly tax collections with a single tax on income of land owners. Variations on such a land tax were taken up by subsequent economists (including Henry George a century later) as a relatively non-distortionary source of tax revenue. In reaction against copious mercantilist trade regulations, the physiocrats advocated a policy of *laissez-faire*, which called for minimal government intervention in the economy.^{[27] [28]}

Classical political economy

Publication of Adam Smith's *The Wealth of Nations* in 1776, has been described as "the effective birth of economics as a separate discipline."^[29] The book identified land, labor, and capital as the three factors of production and the major contributors to a nation's wealth.



Adam Smith wrote *The Wealth of Nations*

In Smith's view, the ideal economy is a self-regulating market system that automatically satisfies the economic needs of the populace. He described the market mechanism as an "invisible hand" that leads all individuals, in pursuit of their own self-interests, to produce the greatest benefit for society as a whole. Smith incorporated some of the Physiocrats' ideas, including *laissez-faire*, into his own economic theories, but rejected the idea that only agriculture was productive.

In his famous invisible-hand analogy, Smith argued for the seemingly paradoxical notion that competitive markets tended to advance broader *social* interests, although driven by narrower *self-interest*. The general approach that Smith helped initiate was called political economy and later classical economics. It included such notables as Thomas Malthus, David Ricardo, and John Stuart Mill writing from about 1770 to 1870.^[30]

While Adam Smith emphasized the production of income, David Ricardo focused on the distribution of income among landowners, workers, and capitalists. Ricardo saw an inherent conflict between landowners on the one hand and labor and capital on the other. He posited that the growth of population and capital, pressing against a fixed supply of land, pushes up rents and holds down wages and profits.



Malthus cautioned law makers on the effects of poverty reduction policies

Thomas Robert Malthus used the idea of diminishing returns to explain low living standards. Population, he argued, tended to increase geometrically, outstripping the production of food, which increased arithmetically. The force of a rapidly growing population against a limited amount of land meant diminishing returns to labor. The result, he claimed, was chronically low wages, which prevented the standard of living for most of the population from rising above the subsistence level.

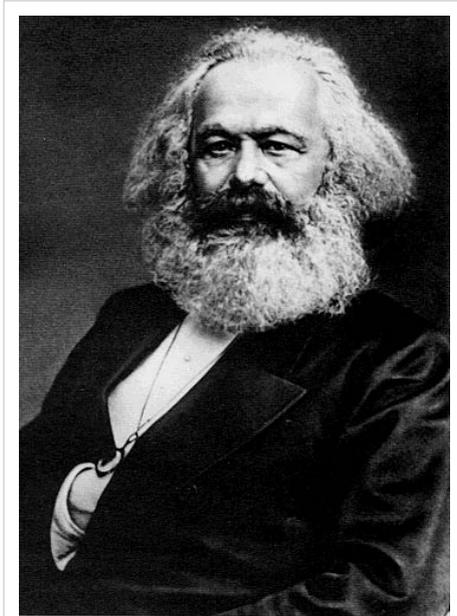
Malthus also questioned the automatic tendency of a market economy to produce full employment. He blamed unemployment upon the economy's tendency to limit its spending by saving too much, a theme that lay forgotten until John Maynard Keynes revived it in the 1930s.

Coming at the end of the Classical tradition, John Stuart Mill parted company with the earlier classical economists on the inevitability of the distribution of income produced by the market system. Mill pointed to a distinct difference between the market's two roles: allocation of resources and distribution of income. The market might be efficient in allocating resources but not in distributing income, he wrote, making it necessary for society to intervene.

Value theory was important in classical theory. Smith wrote that the "real price of every thing ... is the toil and trouble of acquiring it" as influenced by its scarcity. Smith maintained that, with rent and profit, other costs besides wages also enter the price of a commodity.^[31] Other classical economists presented variations on Smith, termed the 'labour theory of value'. Classical economics focused on the tendency of markets to move to long-run equilibrium.

Marxism

Marxist (later, Marxian) economics descends from classical economics. It derives from the work of Karl Marx. The first volume of Marx's major work, *Das Kapital*, was published in German in 1867. In it, Marx focused on the labour theory of value and what he considered to be the exploitation of labour by capital.^[32] ^[33] The labour theory of value held that the value of a thing was determined by the labor that went into its production. This contrasts with the modern understanding that the value of a thing is determined by what one is willing to give up to obtain the thing.



The Marxist school of economic thought comes from the work of German economist Karl Marx.

Neoclassical economics

A body of theory later termed 'neoclassical economics' or 'marginalism' formed from about 1870 to 1910. The term 'economics' was popularized by such neoclassical economists as Alfred Marshall as a concise synonym for 'economic science' and a substitute for the earlier, broader term 'political economy'.^[34] ^[35] This corresponded to the influence on the subject of mathematical methods used in the natural sciences.^[2] Neoclassical economics systematized supply and demand as joint determinants of price and quantity in market equilibrium, affecting both the allocation of output and the distribution of income. It dispensed with the labour theory of value inherited from classical economics in favor of a marginal utility theory of value on the demand side and a more general theory of costs on the supply side.^[36]

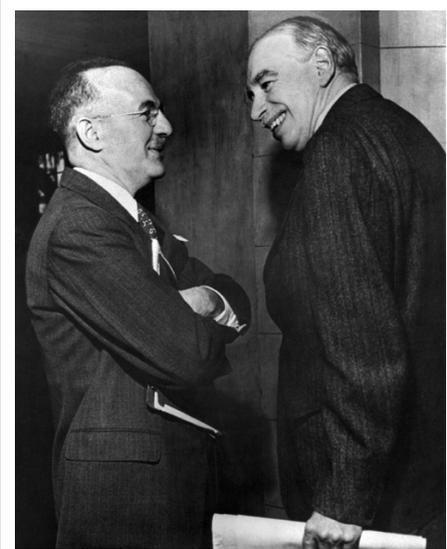
In microeconomics, neoclassical economics represents incentives and costs as playing a pervasive role in shaping decision making. An immediate example of this is the consumer theory of individual demand, which isolates how prices (as costs) and income affect quantity demanded. In macroeconomics it is reflected in an early and lasting neoclassical synthesis with Keynesian macroeconomics.^[37] ^[38]

Neoclassical economics is occasionally referred as *orthodox economics* whether by its critics or sympathizers. Modern mainstream economics builds on neoclassical economics but with many refinements that either supplement or generalize earlier analysis, such as econometrics, game theory, analysis of market failure and imperfect competition, and the neoclassical model of economic growth for analyzing long-run variables affecting national income.

Keynesian economics

Keynesian economics derives from John Maynard Keynes, in particular his book *The General Theory of Employment, Interest and Money* (1936), which ushered in contemporary macroeconomics as a distinct field.^[39] ^[40] The book focused on determinants of national income in the short run when prices are relatively inflexible. Keynes attempted to explain in broad theoretical detail why high labour-market unemployment might not be self-correcting due to low "effective demand" and why even price flexibility and monetary policy might be unavailing. Such terms as "revolutionary" have been applied to the book in its impact on economic analysis.^[41] ^[42] ^[43]

Keynesian economics has two successors. Post-Keynesian economics also concentrates on macroeconomic rigidities and adjustment processes. Research on micro foundations for their models is represented as based on real-life practices rather than simple optimizing models. It is generally associated with the University of Cambridge and the work of Joan Robinson.^[44] New-Keynesian economics is also associated with developments in the Keynesian fashion. Within this group researchers tend to share with other economists the emphasis on models employing micro foundations and optimizing behavior but with a narrower focus on standard Keynesian themes such as price and wage rigidity. These are usually made to be endogenous features of the models, rather than simply assumed as in older Keynesian-style ones.



John Maynard Keynes (above, right), widely considered a towering figure in economics.

Chicago School of economics

The Chicago School of economics is best known for its free market advocacy and monetarist ideas. According to Milton Friedman and monetarists, market economies are inherently stable if left to themselves and depressions result only from government intervention.^[45] Friedman, for example, argued that the Great Depression was result of a contraction of the money supply, controlled by the Federal Reserve, and not by the lack of investment as Keynes had argued. Ben Bernanke, current Chairman of the Federal Reserve, is among the economists today generally accepting Friedman's analysis of the causes of the Great Depression.^[46] Milton Friedman effectively took many of the basic principles set forth by Adam Smith and the classical economists and modernized them. One example of this is his article in the September 1970 issue of *The New York Times Magazine*, where he claims that the social responsibility of business should be "to use its resources and engage in activities designed to increase its profits...(through) open and free competition without deception or fraud."^[47]

Other schools and approaches

Other well-known schools or trends of thought referring to a particular style of economics practiced at and disseminated from well-defined groups of academicians that have become known worldwide, include the Austrian School, the Freiburg School, the School of Lausanne and the Stockholm school. Contemporary mainstream economics is sometimes separated into the MIT, or Saltwater, approach, and the Chicago, or Freshwater, approach.

Within macroeconomics there is, in general order of their appearance in the literature; classical economics, Keynesian economics, the neoclassical synthesis, post-Keynesian economics, monetarism, new classical economics, and supply-side economics. Alternative developments include ecological economics, institutional economics, evolutionary economics, dependency theory, structuralist economics, world systems theory, thermoeconomics, econophysics and technocracy.

Microeconomics

Microeconomics looks at interactions through individual markets, given scarcity and government regulation. A given market might be for a *product*, say fresh corn, or the *services of a factor of production*, say bricklaying. The theory considers aggregates of *quantity demanded* by buyers and *quantity supplied* by sellers at each possible price per unit. It weaves these together to describe how the market may reach equilibrium as to price and quantity or respond to market changes over time. This is broadly termed supply and demand analysis. Market structures, such as perfect competition and monopoly, are examined as to implications for behavior and economic efficiency. Analysis of change in a single market often proceeds from the simplifying assumption that behavioral relations in other markets remain unchanged, that is, partial-equilibrium analysis. General-equilibrium theory allows for changes in different markets and aggregates across *all* markets, including their movements and interactions toward equilibrium.^{[48] [49]}

Markets

In microeconomics, production is the conversion of inputs into outputs. It is an economic process that uses resources to create a commodity that is suitable for exchange. This can include manufacturing, warehousing, shipping, and packaging. Some economists define production broadly as all economic activity other than consumption. They see every commercial activity other than the final purchase as some form of production. Production is a process, and as such it occurs through time and space. Because it is a flow concept, production is measured as a "rate of output per period of time". There are three aspects to production processes, including the quantity of the commodity produced, the form of the good created and the temporal and spatial distribution of the commodity produced. Opportunity cost expresses the idea that for every choice, the true economic cost is the next best opportunity. Choices must be made between desirable yet mutually exclusive actions. It has been described as expressing "the basic relationship between scarcity and choice."^[50] The notion of opportunity cost plays a crucial part in ensuring that scarce resources are used efficiently.^[51] Thus, opportunity costs are not restricted to monetary or financial costs: the real cost of output forgone, lost time, pleasure or any other benefit that provides utility should also be considered.

The inputs or resources used in the production process are called factors of production. Possible inputs are typically grouped into six categories. These factors are raw materials,

machinery, labour services, capital goods, land, and enterprise. In the short-run, as opposed to the long-run, at least one of these factors of production is fixed. Examples include major pieces of equipment, suitable factory space, and key personnel. A variable factor of production is one whose usage rate can be changed easily. Examples include electrical power consumption, transportation services, and most raw material inputs. In the "long-run", all of these factors of production can be adjusted by management. In the short run, a firm's "scale of operations" determines the maximum number of outputs that can be produced, but in the long run, there are no scale limitations. Long-run and short-run changes play an important part in economic models.

Economic efficiency describes how well a system generates the maximum desired output with a given set of inputs and available technology. Efficiency is improved if more output is generated without changing inputs, or in other words, the amount of "friction" or "waste" is reduced. Economists look for Pareto efficiency, which is reached when a change cannot make someone better off without making someone else worse off. Economic efficiency is used to refer to a number of related concepts. A system can be called economically efficient if: No one can be made better off without making someone else worse off, more output cannot be obtained without increasing the amount of inputs, and production ensures the lowest possible per unit cost. These definitions of efficiency are not exactly equivalent. However, they are all encompassed by the idea that nothing more can be achieved given the resources available.

Specialization

Specialization is considered key to economic efficiency because different individuals or countries have different comparative advantages. While one country may have an absolute advantage in every area over other countries, it could nonetheless specialize in the area which it has a relative comparative advantage, and thereby gain from trading with countries which have no absolute advantages. For example, a country may specialize in the production of high-tech knowledge products, as developed countries do, and trade with developing nations for goods produced in factories, where labor is cheap and plentiful. According to theory, in this way more total products and utility can be achieved than if countries produced their own high-tech and low-tech products. The theory of comparative advantage is largely the basis for the typical economist's belief in the benefits of free trade. This concept applies to individuals, farms, manufacturers, service providers, and economies. Among each of these production systems, there may be a corresponding *division of labour* with each worker having a distinct occupation or doing a specialized task as part of the production effort, or correspondingly different types of capital equipment and differentiated land uses.^{[52] [53] [54]}

Adam Smith's *Wealth of Nations* (1776) discusses the benefits of the division of labour. Smith noted that an individual should invest a resource, for example, land or labour, so as to earn the highest possible return on it. Consequently, all uses of the resource should yield an equal rate of return (adjusted for the relative riskiness of each enterprise). Otherwise reallocation would result. This idea, wrote George Stigler, is the central proposition of economic theory, and is today called the marginal productivity theory of income distribution. French economist Turgot had made the same point in 1766.^[55]

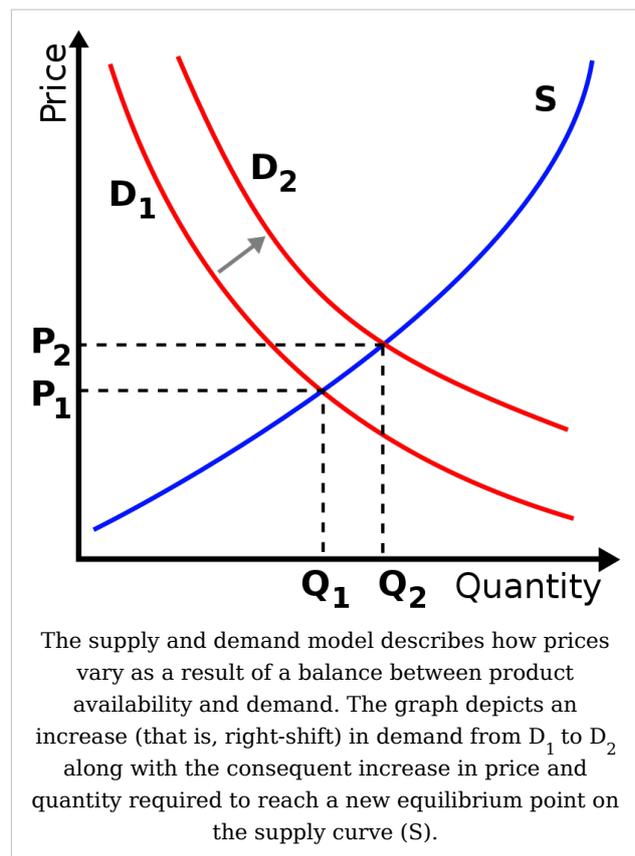
In more general terms, it is theorized that market incentives, including prices of outputs and productive inputs, select the allocation of factors of production by *comparative*

advantage, that is, so that (relatively) low-cost inputs are employed to keep down the *opportunity cost* of a given type of output. In the process, aggregate output increases as a by product or by design.^[56] Such specialization of production creates opportunities for *gains from trade* whereby resource owners benefit from trade in the sale of one type of output for other, more highly-valued goods. A measure of gains from trade is the *increased output* (formally, the sum of increased consumer surplus and producer profits) from specialization in production and resulting trade.^{[57] [58] [59]}

Supply and demand

The theory of demand and supply is an organizing principle to explain prices and quantities of goods sold and changes thereof in a market economy. In microeconomic theory, it refers to price and output determination in a perfectly competitive market. This has served as a building block for modeling other market structures and for other theoretical approaches.

For a given market of a commodity, demand shows the quantity that all prospective buyers would be prepared to purchase at each unit price of the good. Demand is often represented using a table or a graph relating price and quantity demanded (see boxed figure). Demand theory describes individual consumers as rationally choosing the most preferred quantity of each good, given income, prices, tastes, etc. A term for this is 'constrained utility maximization' (with income as the constraint on demand). Here, utility refers to the (hypothesized) preference relation for individual consumers. Utility and income are then used to model hypothesized properties about the effect of a price change on the quantity demanded. The law of demand states that, in general, price and quantity demanded in a given market are inversely related. In other words, the higher the price of a product, the less of it people would be able and willing to buy of it (other things unchanged). As the price of a commodity rises, overall purchasing power decreases (the income effect) and consumers move toward relatively less expensive goods (the substitution effect). Other factors can also affect demand; for example an increase in income will shift the demand curve outward relative to the origin, as in the figure.



Supply is the relation between the price of a good and the quantity available for sale from suppliers (such as producers) at that price. Supply is often represented using a table or graph relating price and quantity supplied. Producers are hypothesized to be profit-maximizers, meaning that they attempt to produce the amount of goods that will bring them the highest profit. Supply is typically represented as a directly proportional

relation between price and quantity supplied (other things unchanged). In other words, the higher the price at which the good can be sold, the more of it producers will supply. The higher price makes it profitable to increase production. At a price below equilibrium, there is a shortage of quantity supplied compared to quantity demanded. This pulls the price up. At a price above equilibrium, there is a surplus of quantity supplied compared to quantity demanded. This pushes the price down. The model of supply and demand predicts that for given supply and demand curves, price and quantity will stabilize at the price that makes quantity supplied equal to quantity demanded. This is at the intersection of the two curves in the graph above, market equilibrium.

For a given quantity of a good, the price point on the demand curve indicates the value, or marginal utility^[60] to consumers for that unit of output. It measures what the consumer would be prepared to pay for the corresponding unit of the good. The price point on the supply curve measures marginal cost, the increase in total cost to the supplier for the corresponding unit of the good. The price in equilibrium is determined by supply and demand. In a perfectly competitive market, supply and demand equate cost and value at equilibrium.^[61]

Demand and supply can also be used to model the distribution of income to the factors of production, including labour and capital, through factor markets. In a labour market for example, the quantity of labour employed and the price of labour (the wage rate) are modeled as set by the demand for labour (from business firms etc. for production) and supply of labour (from workers).

Demand and supply are used to explain the behavior of perfectly competitive markets, but their usefulness as a standard of performance extends to any type of market. Demand and supply can also be generalized to explain variables applying to the whole economy, for example, quantity of total output and the general price level, studied in macroeconomics.

In supply-and-demand analysis, the price of a good coordinates production and consumption quantities. Price and quantity have been described as the most directly observable characteristics of a good produced for the market.^[62] Supply, demand, and market equilibrium are theoretical constructs linking price and quantity. But tracing the effects of factors predicted to change supply and demand—and through them, price and quantity—is a standard exercise in applied microeconomics and macroeconomics. Economic theory can specify under what circumstances price serves as an efficient communication device to regulate quantity.^[63] A real-world application might attempt to measure how much variables that increase supply or demand change price and quantity.

Marginalism is the use of marginal concepts within economics. Marginal concepts are associated with a specific change in the quantity used of a good or of a service, as opposed to some notion of the over-all significance of that class of good or service, or of some total quantity thereof. The central concept of marginalism proper is that of marginal utility, but marginalists following the lead of Alfred Marshall were further heavily dependent upon the concept of marginal physical productivity in their explanation of cost; and the neoclassical tradition that emerged from British marginalism generally abandoned the concept of utility and gave marginal rates of substitution a more fundamental rôle in analysis.

Market failure

The term "market failure" encompasses several problems which may undermine standard economic assumptions. Although economists categorise market failures differently,^[64] the following categories emerge in the main texts.^[65]

Natural monopoly, or the overlapping concepts of "practical" and "technical" monopoly, involves a failure of competition as a restraint on producers. The problem is described as one where the more of a product is made, the greater the returns are. This means it only makes economic sense to have one producer.

Information asymmetries arise where one party has more or better information than the other. The existence of information asymmetry gives rise to problems such as moral hazard, and adverse selection, studied in contract theory. The economics of information has relevance in many fields, including finance, insurance, contract law, and decision-making under risk and uncertainty.^[66]

Incomplete markets is a term used for a situation where buyers and sellers do not know enough about each other's positions to price goods and services properly. Based on George Akerlof's Market for Lemons article, the paradigm example is of a dodgy second hand car market. Customers without the possibility to know for certain whether they are buying a "lemon" will push the average price down below what a good quality second hand car would be. In this way, prices may not reflect true values.

Public goods are goods which are undersupplied in a typical market. The defining features are that people can consume public goods without having to pay for them and that more than one person can consume the good at the same time.

Externalities occur where there are significant social costs or benefits from production or consumption that are not reflected in market prices. For example, air pollution may generate a negative externality, and education may generate a positive externality (less crime, etc.). Governments often tax and otherwise restrict the sale of goods that have negative externalities and subsidize or otherwise promote the purchase of goods that have positive externalities.^[67] Elementary demand-and-supply theory predicts equilibrium but not the speed of adjustment for changes of equilibrium due to a shift in demand or supply.^[68] In many areas, some form of price stickiness is postulated to account for quantities, rather than prices, adjusting in the short run to changes on the demand side or the supply side. This includes standard analysis of the business cycle in macroeconomics. Analysis often revolves around causes of such price stickiness and their implications for reaching a hypothesized long-run equilibrium. Examples of such price stickiness in particular markets include wage rates in labour markets and posted prices in markets deviating from perfect competition.

Macroeconomic instability, addressed below, is a prime source of market failure, whereby a general loss of business confidence or external shock can grind production and distribution to a halt, undermining ordinary markets that are otherwise sound.



Pollution can be a simple example of market failure. If costs of production are not borne by producers but are by the environment, accident victims or others, then prices are distorted.

Some specialised fields of economics deal in market failure more than others. The economics of the public sector is one example, since where markets fail, some kind of regulatory or government programme is the remedy. Much environmental economics concerns externalities or "public bads". Policy options include regulations that reflect cost-benefit analysis or market solutions that change incentives, such as emission fees or redefinition of property rights.^{[69] [70]} Environmental economics is related to ecological economics but there are differences.^[71]



Environmental scientist sampling water

Firms

One of the assumptions of perfectly competitive markets is that there are many producers, none of whom can influence prices or act independently of market forces. In reality, however, people do not simply trade on markets, they work and produce through firms. The most obvious kinds of firms are corporations, partnerships and trusts. According to Ronald Coase people begin to organise their production in firms when the costs of doing business becomes lower than doing it on the market.^[72] Firms combine labour and capital, and can achieve far greater economies of scale (when producing two or more things is cheaper than one thing) than individual market trading.



In Virtual Markets, buyer and seller are not present and trade via intermediates and electronic information. Pictured: São Paulo Stock Exchange.

Labour economics seeks to understand the functioning of the market and dynamics for labour. Labour markets function through the interaction of workers and employers. Labour economics looks at the suppliers of labour services (workers), the demanders of labour services (employers), and attempts to understand the resulting patterns of wages and other labour income and of employment and unemployment, Practical uses include assisting the formulation of full employment of policies.^[73]

Industrial organization studies the strategic behavior of firms, the structure of markets and their interactions. The common market structures studied include perfect competition, monopolistic competition, various forms of oligopoly, and monopoly.^[74]

Financial economics, often simply referred to as finance, is concerned with the allocation of financial resources in an uncertain (or risky) environment. Thus, its focus is on the operation of financial markets, the pricing of financial instruments, and the financial structure of companies.^[75]

Managerial economics applies microeconomic analysis to specific decisions in business firms or other management units. It draws heavily from quantitative methods such as operations research and programming and from statistical methods such as regression analysis in the absence of certainty and perfect knowledge. A unifying theme is the attempt to optimize business decisions, including unit-cost minimization and profit maximization, given the firm's objectives and constraints imposed by technology and market

conditions.^{[76] [77]}

Public sector

Public finance is the field of economics that deals with budgeting the revenues and expenditures of a public sector entity, usually government. The subject addresses such matters as tax incidence (who really pays a particular tax), cost-benefit analysis of government programs, effects on economic efficiency and income distribution of different kinds of spending and taxes, and fiscal politics. The latter, an aspect of public choice theory, models public-sector behavior analogously to microeconomics, involving interactions of self-interested voters, politicians, and bureaucrats.^[78]

Much of economics is positive, seeking to describe and predict economic phenomena. Normative economics seeks to identify what is economically good and bad.

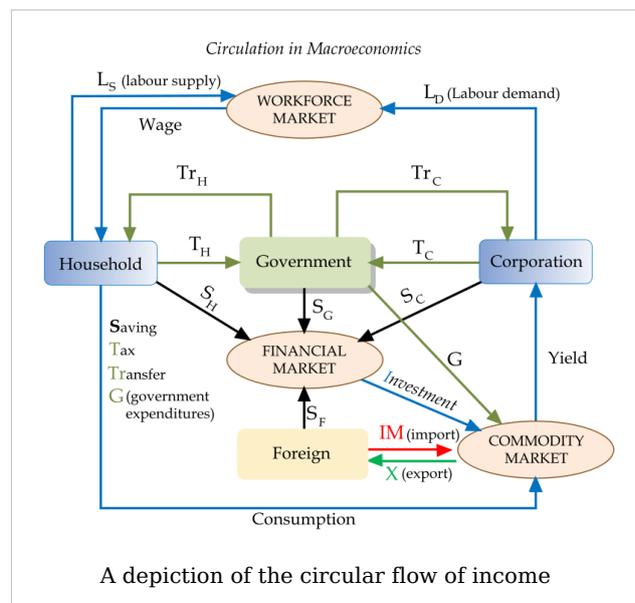
Welfare economics is a normative branch of economics that uses microeconomic techniques to simultaneously determine the allocative efficiency within an economy and the income distribution associated with it. It attempts to measure social welfare by examining the economic activities of the individuals that comprise society.^[79]

Macroeconomics

Macroeconomics examines the economy as a whole to explain broad aggregates and their interactions "top down," that is, using a simplified form of general-equilibrium theory.^[80] Such aggregates include national income and output, the unemployment rate, and price inflation and subaggregates like total consumption and investment spending and their components. It also studies effects of monetary policy and fiscal policy. Since at least the 1960s, macroeconomics has been characterized by further integration as to micro-based modeling of sectors, including rationality of players, efficient use of market information, and imperfect competition.^[81] This has

addressed a long-standing concern about inconsistent developments of the same subject.^[82]

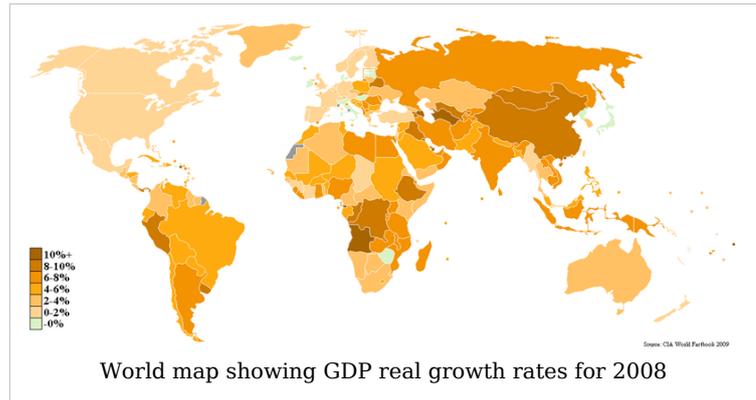
Macroeconomic analysis also considers factors affecting the long-term level and growth of national income. Such factors include capital accumulation, technological change and labor force growth.^{[83] [84]}



Growth

Growth economics studies factors that explain economic growth - the increase in output per capita of a country over a long period of time. The same factors are used to explain differences in the *level* of output per capita *between* countries, in particular why some countries grow faster than others, and whether countries converge at the same rates of growth.

Much-studied factors include the rate of investment, population growth, and technological change. These are represented in theoretical and empirical forms (as in the neoclassical and endogenous growth models) and in growth accounting.^{[85] [86]}



The Business Cycle

The economics of a depression were the spur for the creation of "macroeconomics" as a separate discipline field of study. During the Great Depression of the 1930s, John Maynard Keynes authored a book entitled *The General Theory of Employment, Interest and Money* outlining the key theories of Keynesian economics. Keynes contended that aggregate demand for goods might be insufficient during economic downturns, leading to unnecessarily high unemployment and losses of potential output. He therefore advocated active policy responses by the public sector, including monetary policy actions by the central bank and fiscal policy actions by the government to stabilize output over the business cycle^[87] Thus, a central conclusion of Keynesian economics is that, in some situations, no strong automatic mechanism moves output and employment towards full employment levels. John Hicks' IS/LM model has been the most influential interpretation of *The General Theory*.

Over the years, the understanding of the business cycle has branched into various schools, related to or opposed to Keynesianism. The neoclassical synthesis refers to the reconciliation of Keynesian economics with neoclassical economics, stating that Keynesianism is correct in the short run, with the economy following neoclassical theory in the long run.

The New classical school critiques the Keynesian view of the business cycle. It includes Friedman's permanent income hypothesis view on consumption, the "rational expectations revolution"^[88] spearheaded by Robert Lucas, and real business cycle theory.

In contrast, the New Keynesian school retains the rational expectations assumption, however it assumes a variety of market failures. In particular, New Keynesians assume prices and wages are "sticky", which means they do not adjust instantaneously to changes in economic conditions.

Thus, the new classicals assume that prices and wages adjust automatically to attain full employment, whereas the new Keynesians see full employment as being automatically achieved only in the long run, and hence government and central-bank policies are needed because the "long run" may be very long.

Inflation and monetary policy

Money is a *means of final payment* for goods in most price system economies and the unit of account in which prices are typically stated. It includes currency held by the nonbank public and checkable deposits. It has been described as a social convention, like language, useful to one largely because it is useful to others. As a medium of exchange, money facilitates trade. Its economic function can be contrasted with barter (non-monetary exchange). Given a diverse array of produced goods and specialized producers, barter may entail a hard-to-locate double coincidence of wants as to what is exchanged, say apples and a book. Money can reduce the transaction cost of exchange because of its ready acceptability. Then it is less costly for the seller to accept money in exchange, rather than what the buyer produces.^[89]



A 640 BCE one-third stater electrum coin from Lydia, shown larger. One of the first standardized coins.

At the level of an economy, theory and evidence are consistent with a positive relationship running from the total money supply to the nominal value of total output and to the general price level. For this reason, management of the money supply is a key aspect of monetary policy.^{[90] [91]}

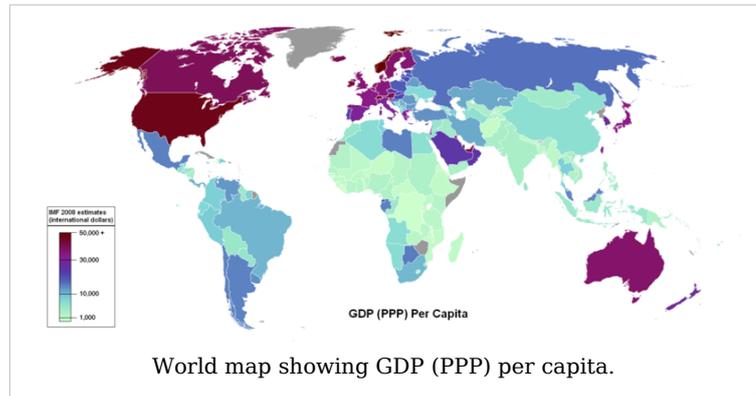
Fiscal policy and regulation

National accounting is a method for summarizing aggregate economic activity of a nation. The national accounts are double-entry accounting systems that provide detailed underlying measures of such information. These include the national income and product accounts (NIPA), which provide estimates for the money value of output and income per year or quarter. NIPA allows for tracking the performance of an economy and its components through business cycles or over longer periods. Price data may permit distinguishing nominal from real amounts, that is, correcting money totals for price changes over time.^[92] ^[93] The national accounts also include measurement of the capital stock, wealth of a nation, and international capital flows.^[94]

International economics

International trade studies determinants of goods-and-services flows across international boundaries. It also concerns the size and distribution of gains from trade. Policy applications include estimating the effects of changing tariff rates and trade quotas. International finance is a macroeconomic field which examines the flow of capital across international borders, and the effects of these movements on exchange rates. Increased trade in goods, services and capital between countries is a major effect of contemporary globalization.^{[95] [96] [97]}

The distinct field of *development economics* examines economic aspects of the development process in relatively low-income countries focussing on structural change, poverty, and economic growth. Approaches in development economics frequently incorporate social and political factors.^{[98] [99]}



Economic systems is the branch of economics that studies the methods and institutions by which societies determine the ownership, direction, and allocation of economic resources. An *economic system* of a society is the unit of analysis. Among contemporary systems at different ends of the organizational spectrum are socialist systems and capitalist systems, in which most production occurs in respectively state-run and private enterprises. In between are mixed economies. A common element is the interaction of economic and political influences, broadly described as political economy. *Comparative economic systems* studies the relative performance and behavior of different economies or systems.^{[100] [101]}

Economics in practice

Contemporary mainstream economics, as a formal mathematical modeling field, could also be called mathematical economics.^[102] It draws on the tools of calculus, linear algebra, statistics, game theory, and computer science.^[103] Professional economists are expected to be familiar with these tools, although all economists specialize, and some specialize in econometrics and mathematical methods while others specialize in less quantitative areas. Heterodox economists place less emphasis upon mathematics, and several important historical economists, including Adam Smith and Joseph Schumpeter, have not been mathematicians. Economic reasoning involves intuition regarding economic concepts, and economists attempt to analyze to the point of discovering unintended consequences.

Theory

Mainstream economic theory relies upon a priori quantitative economic models, which employ a variety of concepts. Theory typically proceeds with an assumption of *ceteris paribus*, which means holding constant explanatory variables other than the one under consideration. When creating theories, the objective is to find ones which are at least as simple in information requirements, more precise in predictions, and more fruitful in generating additional research than prior theories.^[104]

In microeconomics, principal concepts include supply and demand, marginalism, rational choice theory, opportunity cost, budget constraints, utility, and the theory of the firm.^[105] ^[106] Early macroeconomic models focused on modeling the relationships between aggregate variables, but as the relationships appeared to change over time macroeconomists were pressured to base their models in microfoundations. The aforementioned microeconomic concepts play a major part in macroeconomic models - for instance, in monetary theory, the quantity theory of money predicts that increases in the money supply increase inflation, and inflation is assumed to be influenced by rational

expectations. In development economics, slower growth in developed nations has been sometimes predicted because of the declining marginal returns of investment and capital, and this has been observed in the Four Asian Tigers. Sometimes an economic hypothesis is only *qualitative*, not *quantitative*.^[107]

Expositions of economic reasoning often use two-dimensional graphs to illustrate theoretical relationships. At a higher level of generality, Paul Samuelson's treatise *Foundations of Economic Analysis* (1947) used mathematical methods to represent the theory, particularly as to maximizing behavioral relations of agents reaching equilibrium. The book focused on examining the class of statements called *operationally meaningful theorems* in economics, which are theorems that can conceivably be refuted by empirical data.^[108]

Empirical investigation

Economic theories are frequently tested empirically, largely through the use of econometrics using economic data.^[109] The controlled experiments common to the physical sciences are difficult and uncommon in economics^[110], and instead broad data is observationally studied; this type of testing is typically regarded as less rigorous than controlled experimentation, and the conclusions typically more tentative. The number of laws discovered by the discipline of economics is relatively very low compared to the physical sciences. Statistical methods such as regression analysis are common. Practitioners use such methods to estimate the size, economic significance, and statistical significance ("signal strength") of the hypothesized relation(s) and to adjust for noise from other variables. By such means, a hypothesis may gain acceptance, although in a probabilistic, rather than certain, sense. Acceptance is dependent upon the falsifiable hypothesis surviving tests. Use of commonly accepted methods need not produce a final conclusion or even a consensus on a particular question, given different tests, data sets, and prior beliefs.

Criticism based on professional standards and non-replicability of results serve as further checks against bias, errors, and over-generalization,^{[106] [111]} although much economic research has been accused of being non-replicable, and prestigious journals have been accused of not facilitating replication through the provision of the code and data.^[112] Like theories, uses of test statistics are themselves open to critical analysis,^{[113] [114] [115]} although critical commentary on papers in economics in prestigious journals such as the *American Economic Review* has declined precipitously in the past 40 years.^[116] This has been attributed to journals' incentives to maximize citations in order to rank higher on the Social Science Citation Index (SSCI).^[117]

In applied economics, input-output models employing linear programming methods are quite common. Large amounts of data are run through computer programs to analyze the impact of certain policies; IMPLAN is one well-known example.

Experimental economics has promoted the use of scientifically controlled experiments. This has reduced long-noted distinction of economics from natural sciences allowed direct tests of what were previously taken as axioms.^{[118] [119]} In some cases these have found that the axioms are not entirely correct; for example, the ultimatum game has revealed that people reject unequal offers. In behavioral economics, psychologists Daniel Kahneman and Amos Tversky have won Nobel Prizes in economics for their empirical discovery of several cognitive biases and heuristics. Similar empirical testing occurs in neuroeconomics.

Another example is the assumption of narrowly selfish preferences versus a model that tests for selfish, altruistic, and cooperative preferences.^{[120] [121]} These techniques have led some to argue that economics is a "genuine science."^[9]

Game theory

Game theory is a branch of applied mathematics that studies strategic interactions between agents. In strategic games, agents choose strategies that will maximize their payoff, given the strategies the other agents choose. It provides a formal modeling approach to social situations in which decision makers interact with other agents. Game theory generalizes maximization approaches developed to analyze markets such as the supply and demand model. The field dates from the 1944 classic *Theory of Games and Economic Behavior* by John von Neumann and Oskar Morgenstern. It has found significant applications in many areas outside economics as usually construed, including formulation of nuclear strategies, ethics, political science, and evolutionary theory.^[122]

Profession

The professionalization of economics, reflected in the growth of graduate programs on the subject, has been described as "the main change in economics since around 1900".^[123] Most major universities and many colleges have a major, school, or department in which academic degrees are awarded in the subject, whether in the liberal arts, business, or for professional study. The Bank of Sweden Prize in Economic Sciences in Memory of Alfred Nobel (colloquially, the Nobel Prize in Economics) is a prize awarded to economists each year for outstanding intellectual contributions in the field. In the private sector, professional economists are employed as consultants and in industry, including banking and finance. Economists also work for various government departments and agencies, for example, the national Treasury, Central Bank or Bureau of Statistics.

Economics and other subjects

Economics is one social science among several and has fields bordering on other areas, including economic geography, economic history, public choice, energy economics, cultural economics, and institutional economics.

Law and economics, or economic analysis of law, is an approach to legal theory that applies methods of economics to law. It includes the use of economic concepts to explain the effects of legal rules, to assess which legal rules are economically efficient, and to predict what the legal rules will be.^{[124] [125]} A seminal article by Ronald Coase published in 1961 suggested that well-defined property rights could overcome the problems of externalities.^[126]

The relationship between economics and ethics is complex. Many economists consider normative choices and value judgments, like what needs or wants, or what is good for society, to be political or personal questions outside the scope of economics. Once a person or government has established a set of goals, however, economics can provide insight as to how they might best be achieved.

Others see the influence of economic ideas, such as those underlying modern capitalism, to promote a certain system of values with which they may or may not agree. (See, for example, consumerism and Buy Nothing Day.) According to some thinkers, a theory of economics is also, or implies also, a theory of moral reasoning.^[127]

The premise of ethical consumerism is that one should take into account ethical and environmental concerns, in addition to financial and traditional economic considerations, when making buying decisions.

On the other hand, the rational allocation of limited resources toward public welfare and safety is also an area of economics. Some have pointed out that not studying the best ways to allocate resources toward goals like health and safety, the environment, justice, or disaster assistance is a sort of willful ignorance that results in less public welfare or even increased suffering.^[128] In this sense, it would be unethical not to assess the economics of such issues. In fact, state agencies all over the world, including the federal agencies in the United States, routinely conduct economic analysis studies toward that end.

Energy economics relating to thermoeconomics, is a broad scientific subject area which includes topics related to supply and use of energy in societies. Thermoeconomists argue that economic systems always involve matter, energy, entropy, and information.^[129] Thermoeconomics is based on the proposition that the role of energy in biological evolution should be defined and understood through the second law of thermodynamics but in terms of such economic criteria as productivity, efficiency, and especially the costs and benefits of the various mechanisms for capturing and utilizing available energy to build biomass and do work.^{[130] [131]} As a result, thermoeconomics are often discussed in the field of ecological economics, which itself is related to the fields of sustainability and sustainable development.

Georgescu-Roegen reintroduced into economics, the concept of entropy from thermodynamics (as distinguished from the mechanistic foundation of neoclassical economics drawn from Newtonian physics) and did foundational work which later developed into evolutionary economics. His work contributed significantly to bioeconomics and to ecological economics.^{[132] [133] [134] [135] [136]}

Exergy analysis is performed in the field of industrial ecology to use energy more efficiently.^[137] The term *exergy*, was coined by Zoran Rant in 1956, but the concept was developed by J. Willard Gibbs. In recent decades, utilization of exergy has spread outside of physics and engineering to the fields of industrial ecology, ecological economics, systems ecology, and energetics.

Criticisms of economics

"The dismal science" is a derogatory alternative name for economics devised by the Victorian historian Thomas Carlyle in the 19th century. It is often stated that Carlyle gave economics the nickname "the dismal science" as a response to the late 18th century writings of The Reverend Thomas Robert Malthus, who grimly predicted that starvation would result, as projected population growth exceeded the rate of increase in the food supply. The teachings of Malthus eventually became known under the umbrella phrase "Malthus' Dismal Theorem". His predictions were forestalled by unanticipated dramatic improvements in the efficiency of food production in the 20th century; yet the bleak end he proposed remains as a disputed future possibility, assuming human innovation fails to keep up with population growth.^[138]

Some economists, like John Stuart Mill or Leon Walras, have maintained that the production of wealth should not be tied to its distribution. The former is in the field of "applied economics" while the latter belongs to "social economics" and is largely a matter of power and politics.^[139]

In *The Wealth of Nations*, Adam Smith addressed many issues that are currently also the subject of debate and dispute. Smith repeatedly attacks groups of politically aligned individuals who attempt to use their collective influence to manipulate a government into doing their bidding. In Smith's day, these were referred to as factions, but are now more commonly called special interests, a term which can comprise international bankers, corporate conglomerations, outright oligopolies, monopolies, trade unions and other groups.^[140]

Economics per se, as a social science, is independent of the political acts of any government or other decision-making organization, however, many policymakers or individuals holding highly ranked positions that can influence other people's lives are known for arbitrarily using a plethora of economic concepts and rhetoric as vehicles to legitimize agendas and value systems, and do not limit their remarks to matters relevant to their responsibilities. The close relation of economic theory and practice with politics^[141] is a focus of contention that may shade or distort the most unpretentious original tenets of economics, and is often confused with specific social agendas and value systems.^[142]

In *Steady State Economics* 1977, Herman Daly points out the logical inconsistencies between the emphasis placed on economic growth and the energy and environmental realities confronting us.^[143] Like Frederick Soddy, Daly argued that our preoccupation with monetary flows at the expense of thermodynamics principles misleads us into believing that technological advance is limitless, and that perpetual economic growth is not only physically possible, but morally and ethically desirable as well. In *Wealth, Virtual Wealth and Debt*, (George Allen & Unwin 1926), Frederick Soddy turned his attention to the role of energy in economic systems. He criticized the focus on monetary flows in economics, arguing that "real" wealth was derived from the use of energy to transform materials into physical goods and services. Soddy's economic writings were largely ignored in his time, but would later be applied to the development of biophysical economics and ecological economics and also bioeconomics in the late 20th century.^[144]

Issues like central bank independence, central bank policies and rhetoric in central bank governors discourse or the premises of macroeconomic policies^[145] (monetary and fiscal policy) of the States, are focus of contention and criticism.^{[146] [147] [148] [149]}

Deirdre McCloskey has argued that many empirical economic studies are poorly reported, and while her critique has been well-received, she and Stephen Ziliak argue that practice has not improved.^[150] This latter contention is controversial.^[151]

A 2002 International Monetary Fund study looked at "consensus forecasts" (the forecasts of large groups of economists) that were made in advance of 60 different national recessions in the '90s: in 97% of the cases the economists did not predict the contraction a year in advance. On those rare occasions when economists did successfully predict recessions, they significantly underestimated their severity.^[152]

Criticism of assumptions

Economics has been subject to criticism that it relies on unrealistic, unverifiable, or highly simplified assumptions, in some cases because these assumptions lend themselves to elegant mathematics. Examples include perfect information, profit maximization and rational choices.^{[153] [154] [155]} Some contemporary economic theory has focused on addressing these problems through the emerging subdisciplines of information economics, behavioral economics, and complexity economics, with Geoffrey Hodgson forecasting a

major shift in the mainstream approach to economics.^[156] Nevertheless, prominent mainstream economists such as Keynes^[157] and Joskow, along with heterodox economists, have observed that much of economics is conceptual rather than quantitative, and difficult to model and formalize quantitatively. In a discussion on oligopoly research, Paul Joskow pointed out in 1975 that in practice, serious students of actual economies tended to use "informal models" based upon qualitative factors specific to particular industries. Joskow had a strong feeling that the important work in oligopoly was done through informal observations while formal models were "trotted out *ex post*". He argued that formal models were largely not important in the empirical work, either, and that the fundamental factor behind the theory of the firm, behavior, was neglected.^[158]

Despite these concerns, mainstream graduate programs have become increasingly technical and mathematical.^[159] Although much of the most groundbreaking economic research in history involved concepts rather than math, today it is nearly impossible to publish a non-mathematical paper in top economic journals.^[160] Disillusionment on the part of some students with the abstract and technical focus of economics led to the post-autistic economics movement, which began in France in 2000.

David Colander, an advocate of complexity economics, has also commented critically on the mathematical methods of economics, which he associates with the MIT approach to economics, as opposed to the Chicago approach (although he also states that the Chicago school can no longer be called intuitive). He believes that the policy recommendations following from Chicago's intuitive approach had something to do with the decline of intuitive economics. He notes that he has encountered colleagues who have outright refused to discuss interesting economics without a formal model, and he believes that the models can sometimes restrict intuition.^[161] More recently, however, he has written that heterodox economics, which generally takes a more intuitive approach, needs to ally with mathematicians and become more mathematical.^[162] "Mainstream economics is a formal modeling field", he writes, and what is needed is not less math but higher levels of math. He notes that some of the topics highlighted by heterodox economists, such as the importance of institutions or uncertainty, are now being studied in the mainstream through mathematical models without mention of the work done by the heterodox economists. New institutional economics, for example, examines institutions mathematically without much relation to the largely heterodox field of institutional economics.

In his 1974 Nobel Prize lecture, Friedrich Hayek, known for his close association to the heterodox school of Austrian economics, attributed policy failures in economic advising to an uncritical and unscientific propensity to imitate mathematical procedures used in the physical sciences. He argued that even much-studied economic phenomena, such as labor-market unemployment, are inherently more complex than their counterparts in the physical sciences where such methods were earlier formed. Similarly, theory and data are often very imprecise and lend themselves only to the *direction* of a change needed, not its *size*.^[162] In part because of criticism, economics has undergone a thorough cumulative formalization and elaboration of concepts and methods since the 1940s, some of which have been toward application of the hypothetico-deductive method to explain real-world phenomena.^[163]

See also

- Wikipedia Books: Economics

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External links

General information

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- Economic journals on the web ^[165]
- Economics ^[166] at Encyclopædia Britannica.
- Intute: Economics ^[167]: Internet directory of UK universities.
- Research Papers in Economics (RePEc) ^[168]
- Resources For Economists ^[169]: American Economic Association-sponsored guide to 2,000+ Internet resources from "Data" to "Neat Stuff," updated quarterly.

Institutions and organizations

- Center for Economic and Policy Research (USA) ^[170]
- Economics Departments, Institutes and Research Centers in the World ^[171]
- Organization For Co-operation and Economic Development (OECD) Statistics ^[172]
- United Nations Statistics Division ^[173]
- World Bank Data ^[174]
- World Trade Organization ^[175]

Study resources

- A guide to several online economics textbooks ^[176]
 - Ask The Professor ^[177] section of EH.Net Economic History Services
 - Economics at About.com ^[178]
 - Economics textbooks on Wikibooks
 - Introduction to Economics ^[179]: Short Creative commons-licensed introduction to basic economics
 - MERLOT Learning Materials: Economics ^[180]: US-based database of learning materials
 - MIT OpenCourseWare: Economics ^[181]: Archive of study materials from MIT courses
 - Online Learning and Teaching Materials ^[182] UK Economics Network's database of text, slides, glossaries and other resources
 - Schools of Thought ^[183]: Compare various economic schools of thought on particular issues
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