

Economic theory studies the laws of economic development. The term "economy" and its derivative "economy" come from the fusion of the Greek words "oikos" - house, household and "nomos" - rule, law. So, the economy is the management of the economy, the rules of farming.

In the field of economic science, there are problems that concern everyone without exception: when and what types of work should be performed, how to pay for them, how many goods can be bought with a certain monetary unit, etc.

In economic theory, life problems are studied not from an individual, but from a social point of view.

Any society is faced with three main and interrelated problems of the economy: what should be produced? How are these products produced? and who is the product made for?

Economic resources are natural, human and productive resources that are used to produce goods and services. These include: factory and agricultural enterprises. buildings, equipment, tools, machines, various types of labor, land and all kinds of minerals. All economic resources consist of material and human resources. In addition, there are factors of production: land, capital, labor, entrepreneurial ability. A property of all economies. resources are limited.

Economic theory is the science of relations between people regarding the production, exchange, distribution and consumption of material goods and services, and ways to effectively use limited production resources.

Economic theory has two main functions - practical and cognitive.

The cognitive function is the establishment of relationships between facts, their generalization and the conclusion of certain patterns. There is a mathematical apparatus for studying economic phenomena and a mechanism for building economic models. Economic theory is divided into two main areas - macro and microeconomics. Macroeconomic analysis examines the economy as a whole or its main major components. It operates with such quantities as gross output, gross income, total price level, etc.

Microeconomic analysis examines specific economic units: an industry, a company, or individual indicators of these units. He operates with such concepts as demand, supply, and production costs.

Economics, like any other science, must systematize, interpret and summarize the facts. The final result of the economist's work is principles and theories. There are two main methods of deducing such principles and patterns - inductive and deductive. When an economist acts by induction, he begins by accumulating and systematizing facts, which are then analyzed in such a way that a generalization or principle can be deduced. That is, to go from facts to theory.

The action of deduction begins with the fact that a theory is put forward, which is then verified by a large number of facts. A theory can be confirmed or refuted by facts. Thus, the economist goes from theory to facts.

It should be noted that the concepts of "principle", "theory", "law" are very conditional in economic theory, they act as synonyms. Their meaning is a simplified model of reality, a generalization of the behavior of statistical data. These generalizations contain some inaccurate quantitative definitions. Some individuals act this way, others act differently, so very often in economics such a concept as an average value is used. For example, the average per capita income is \$ 1,000, this does not mean that every person receives this thousand, some receive significantly more, some (usually the majority) significantly less.

In economic theory, the ceteris paribus principle is used in the construction of principles and models, as in other sciences (all other things being equal). That is, it is assumed that all other variables except those considered remain unchanged. In the natural sciences, it is possible to conduct an experiment when all other conditions really remain unchanged. Then you can test the theory with great accuracy. But economics is not a laboratory science, it is impossible to conduct a "pure" experiment here. Therefore, despite the development of complex statistical methods of analysis aimed at maintaining other equal conditions, the economic principles applied in practice are less strict than the principles of natural sciences.

Of course, economic principles are abstractions that do not reflect all the colors of reality. However, the equation of acceleration of free fall also does not accurately reflect the condition of a parachutist thrown out of an airplane at an altitude of two kilometers. Despite this, this equation is very useful when studying its motion. Similarly, the principles of economic theory, although they do not accurately reflect real processes, they are very useful in studying the economic situation and predicting its development.

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Dolphins and other toothed whales—or Odontocetes—use their heads to create sounds that help them communicate, navigate, and hunt in their murky marine world. These sometimes vocal-fry-like sounds reveal information about their murky marine world that is critical for survival. Some new genetic analysis suggests that the collections of fatty tissues that enable echolocation in toothed whales may have evolved from their skull muscles and bone marrow, changing how these animals

eat and sense the world around them. The findings are described in a study published in the April 2024 issue of the journal *Gene*.

Toothed whales include numerous dolphin species as well as orcas, sperm whales, belugas, and narwhals. Echolocation produced by a bulbous mass of fat tissue inside of their heads called the melon.

Alongside of the jawbone of dolphins and toothed whales is a group of sound producing extramandibular fat bodies (EMFB). Another set of acoustic fat deposits called the intramandibular fat bodies (IMFB) are located inside the jawbone. The evolution of the melon, the extramandibular, and intramandibular fat bodies was critical for echolocation to develop in these marine mammals. However, little is known about how these fatty tissues themselves originated genetically.

Illustration of the body plan of a toothed whale, with a cross section of the head showing the melon (dark yellow) and the extramandibular fat bodies (light yellow) which are key organs for using sound such as echolocation.

Illustration of the body plan of a toothed whale, with a cross section of the head showing the melon (dark yellow) and the extramandibular fat bodies (light yellow) which are key organs for using sound such as echolocation. CREDIT Hayate Takeuchi et. al. 2024

“Toothed whales have undergone significant degenerations and adaptations to their aquatic lifestyle,” Hayate Takeuchi, a study co-author and PhD student at Hokkaido University in Japan, said in a statement.

One of these adaptations was the partial loss of their sense of smell and taste, alongside the gain of echolocation. To look closer at this and other adaptations at a genetic level, the team from Hokkaido University studied DNA sequences of genes that are expressed in these acoustic fat bodies. They measured the gene expressions in harbor porpoises (*Phocoena phocoena*) and Pacific white-sided dolphins (*Lagenorhynchus obliquidens*).