

# Thinking on the Application of Mathematics to Economics

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**ABSTRACT:** With the development of modern mathematics and various branches of mathematics, the role of mathematics in economics has become more and more prominent and the application of mathematics to economics can promote more scientific development of economics. Starting from the influence of mathematics applied to economics, thinking about its main manifestations and putting forward the considerations for applying mathematics in economics, hoping to contribute to the long-term development of economics.

**KEYWORDS:** Economics; Mathematics; Application Embodiment.

## I. INTRODUCTION

From the perspective of the development of mathematics and economics, the two are inseparable. Some rigorous and unique analysis methods in mathematics can be effectively used in economics. With the help of these analysis methods, the essence of economics can be discovered through phenomena. Moreover, the application of mathematics has enriched and deepened economic theories and improved the effectiveness of economic policies, which has an important impact on the development of modern economics. It is very important to strengthen the exploration of the application of mathematics in economics.

## II. THE IMPACT OF THE APPLICATION OF MATHEMATICS TO ECONOMICS

### 1. Positive impact

Economic phenomena show complex relationships among various economic variables and applied mathematics can help clarify these relationships. On the one hand, the application of mathematical language in the economy can make abstract concepts concrete and describe economic relations more concisely and accurately. In this way, the abstract concept preferences in economics

can be expressed through mathematical language, while using mathematical methods to analyze consumer behavior. On the other hand, the application of mathematical models and geometric figures helps to make economic theories simple and clear, which is helpful for understanding. There are many abstract theories in economics and economic relations are intricate and sometimes difficult to describe in words. For example, when analyzing the optimal production decision of a manufacturer in an oligopolistic market, economists use mathematical functions to express a series of production behaviors of the manufacturers and use mathematical models to more concisely present the decision-making behaviors of the manufacturers and at the same time, they can compare different results play an active role in mathematics.

### 2. Negative effects

Everything has two sides. The application of mathematics to economics has a positive impact, but there is also a negative impact, which is mainly reflected in the abuse of mathematics in economics, that is, when studying economics and analyzing economics, it ignores the essence of economics and is keen on playing with mathematical models. Such as blindly applying cutting-edge mathematical models without considering the assumptions of the model. Many economists, especially macroeconomists, use mathematical models to explain economic theories, but the establishment of these theories must be based on certain assumptions, which are not unconditionally applicable in all situations. If the application of mathematical models in economics only changes a set of data, blindly applies the existing mathematical models mechanically, purely implements mathematical derivation and does not consider the specific existence environment of economic phenomena, then the economic theory will lose its meaning and be of practical significance. The guidance will inevitably fail.

Another example is fabricating data or modifying results in order to obtain a satisfactory conclusion. When writing economics articles, it is generally necessary to conduct empirical analysis through data. However, it is more difficult to obtain data and the research results are likely to be unsatisfactory. At this time, some authors will fabricate experimental data or even modify the results of the analysis. Moving a decimal point can make the result satisfactory, but it prevents people from discovering new problems and is not conducive to the development of economics.

### III. THE MAIN EMBODIMENT OF THE APPLICATION OF MATHEMATICS TO ECONOMICS

#### 1. Applied to learning economics

As a high school student, our research on economics-related content is still relatively shallow and with the help of mathematics, we can have a better understanding of the basic theories of economics. But many people have questions about this, because we usually think that the subject of mathematics is very complex, logical and difficult to understand. Mathematics is a subject we have learned since childhood. Even if we do not master mathematics knowledge well, we still have a certain mathematical thinking. Relatively speaking, we are relatively new to economics. Using mathematical thinking to understand the principles of economics is helpful. Reduce the difficulty of learning and deepen the understanding of economics. For example, for the concept of "equilibrium" in economics, in the learning process, mathematical equations can be constructed for the relationship between supply and demand and the solution can be obtained. If the economic operation can meet the solution standard, it means that the economic operation has achieved equilibrium. In this way, with the help of mathematics, we can have a deep understanding of equilibrium problems in economics.

#### 2. Applied to economic research

Every major breakthrough in economics research is closely related to mathematics. Whether it is the transition from classical economics to neoclassical economics, or the Keynesian revolution and marginal revolution, these all benefit from applied mathematics. For example, the continuous development of mathematics in economics promotes the strengthening of the relationship between economics and mathematics and at the same time changes our thinking habits and ways of thinking in economics, so that our

thinking and behavior have quantitative characteristics. The reason is that mathematics has the most rigorous logical form. In particular, many of us may have lack of rigorous logic in language applications. Therefore, with the help of accurate and concise mathematical language, economics-related content can be better explained. In addition, because of the strong logic of mathematical language, there will be no logical confusion or divergence of meaning in expression, which can greatly improve the efficiency of academic exchanges in economics, thereby enhancing the scientific nature of economic research.

#### 3. Scientific application of mathematical methods

For economics, mathematical methods are one of the effective research methods. Many people think that mathematics cannot be used in economics. The key lies in whether it is measurable in the study of economics research objects. Some economists are influenced by Marx's ideas. In the process of studying the production relations of economic objects, from an abstract perspective, production relations seem to be immeasurable, but economic interests are the core of production relations and value is the core of economic interests. Either the entity of value (human abstract labor) or the expression of price form (price) can objectively measure things. Fundamentally speaking, mathematical methods can be used when economic research objects can conduct quantitative analysis. Regarding the question of whether the application of mathematics in economics research is feasible, it can be found that there is a certain degree of extremeness in the analysis of the development history of economics. This is mainly due to the fact that most scholars who support this view use qualitative analysis to analyze economic theories. To conduct research, the basis and premise of quantitative analysis is qualitative analysis and qualitative analysis needs to be deepened and continued through quantitative analysis.

People have long emphasized qualitative analysis and regard the method used in the study of Marx's economics as qualitative analysis. However, this is actually a misunderstanding. Marx has paid more attention to the use of mathematics to study theoretical issues in economics. For example, in the process of studying crisis theory, Marx used the rising and falling curve of mathematics to analyze and Marx believed that when the material is sufficient, the calculation process can be used to analyze the laws that exist in the process of crisis. In the analysis of the equilibrium product market and currency market-related issues, qualitative analysis is used to show that the product market

and the currency market are both balanced and balanced at the same time. It is difficult to clearly express the interrelationship of various influencing factors. With the help of the LS-LM mathematical model, the relationship between different economic variables can be better presented, making the relationship between variables more indirect and clear, so that the accuracy and effectiveness of economic policy evaluation and forecasting can be ensured.

#### IV. NOTES ON THE APPLICATION OF MATHEMATICS TO ECONOMICS

Although mathematics is widely used in economics, we must pay attention to the scale in its actual process. First, in the solution of economic problems, not all conditions can be transformed into digital problems. For example, when we study economics, we must pay attention to the influence of external factors such as politics, culture, policy, system and market conditions on the study of economics. The second is that although mathematics is an indispensable tool for studying economics, it also has limitations and cannot rely solely on mathematics. For example, when studying economics, we must not only apply mathematical tools, but also scientifically apply knowledge of physics and chemistry to gain more inspiration, avoid entering a dead end in research and promote economics to a scientific development path. The third is that economics and mathematics are two different disciplines. The study of economics must be based on the theory of economics itself and cannot turn the cart before the horse. For example, when we are studying economics, we can appropriately use mathematical methods to analyze and better solve some common economic problems.

#### V. CONCLUSION

The rapid development of market economy has enabled mathematics to be widely used in various fields of economics. There is no doubt that mathematics is indispensable in the follow-up research and development of economics, but its influence has both positive and negative aspects. To learn economics knowledge, one must be good at applied mathematics, pay attention to the scientificity and rationality of application, highlight positive influences, avoid negative influences and use mathematical methods to study economics knowledge to promote the continuous and in-depth development of economics and promote better mathematics and economics Serve the society.

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