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Search on Self Organization Knowledge Distribution System and Its Operation Mechanism

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Abstract: The mechanism of promoting economic growth by the system is still a black box. Through analysis of the system operation mechanism, reasons for the formation of the system are clarified, through analysis of the causes of the introduction of self-organized knowledge to the system, the mechanism of the system to promote economic growth through the advancement of technology is clarified.

Keywords: Institution, Economic Growth, Operation Mechanism, Self-Organizing, Knowledge Distribution

1. The Essence of the Economic System

In essence, the system should be a kind of knowledge, for the establishment of a system is fundamentally about how people know how to establish a system, what kind of system it wants to establish, and the effect that the system may achieve. In this regard, the issue of system is essentially the collection of knowledge and the application of knowledge. Douglas C North, the representative of the new institutional economics, made it clear that "the knowledge stock of the individual is a potential factor in economic and social performance, and the change of knowledge is the key to the evolution of the economy". "The success or failure of knowledge integration is the core issue of economic development [2]". In an article on a theory on property rights, Harold Demsetz also believes that "changes in knowledge lead to changes in production functions, market values and market expectations [3]." From the view of the new institutional economics, although the system and knowledge are not connected directly, the emphasis on the system in the new institutional economic theory is the most fundamental factor in economic growth. In fact, knowledge is the key to economic growth, the system of economic growth is attributed to knowledge. Therefore, the study of the nature of the economic system and the role of its operating mechanism in promoting economic growth can be demonstrated from the knowledge point of view, and then the mechanism of the operation of the economic system and the path of the evolution of the economic system.

2. The Evolution of Knowledge

Harold Demsetz and Zhang Wuchang believe that the system is for the crowd, individuals do nont care about the system [4-5]. The knowledge of all individuals in an economy, only through the self-organization and continuous optimization of the population, can eventually form a system that has a final impact on economic growth, and this system has become a more fundamental reason for economic growth. The level of institutional structure optimization in an economy should be the expected value of the per capita level of self-organizing knowledge in the economy, which is the basis for the formation of the institutional structure. Based on this understanding, we can analyze the pattern of the formation of the economic system by the constitution of human self-organizing knowledge, and gradually uncover the black box of the system on this basis, and then realize the essence of the system.

In general, the knowledge of the individual can be divided into two categories in general, one is about the knowledge of self organization, and this kind of knowledge will eventually become institutional knowledge; the other is knowledge about nature, and this kind of knowledge will eventually become [6] of technical knowledge. When the economic system is returned to knowledge, it is necessary to answer such a

question -- what way does the institutional structure promote economic growth? This paper holds that the evolution of the economic system only provides the conditions for technological progress, and the progress of technology is only the possible case of the evolution of the economic system, that is, the emergence of technological progress is a conditional probability event.

It is made up of two parts of self - organized knowledge and natural knowledge, that I s $z_i = x_i + y_i$, the stock of self-organizing knowledge x_i , which represents the stock of individual natural knowledge. If the weight of self - organized knowledge is a_i , then $x_i = a_i z_i, y_i = (1-a_i)z_i$. Without losing generality, suppose $x_i \sim N(\mu_1, \sigma_1^2)$, $y_i \sim (\mu_2, \sigma_2^2)$, set $x = \frac{1}{n}\sum_{i=1}^{n} x_i, y = \frac{1}{n}\sum_{i=1}^{n} y_i$, the distribution function $F(x)$ is the probability that the corresponding level of system may appear in the case of human level of x per capita of self-organizing knowledge. The distribution function $F(y)$ indicates that the probability of the corresponding level of technological evolution that may occur in the case of y of natural knowledge per capita level.

On the one hand, from the situation of countries and regions in the world, places with higher level of knowledge often have a relatively favorable system for economic growth, that is, the possibility of a better system in those areas is great. It is assumed that the emergence of any economic system is determined by the level of human knowledge related to self-organization, that is, the degree of human awareness of self-organization, and determines the optimization of the economic system. For any group, when the population size n is large enough, there is per capita institutional level of self-organization knowledge x at the probability level $F(x)$. Set up the system ξ for, so $\xi = xF(x)$, and because $x = \frac{1}{n}\sum_{i=1}^{n} x_i$, then, there is $\xi = \frac{1}{n}\sum_{1}^{n} x_i F(x)$. It can be seen from this equation that ξ it is inversely proportional to n the ratio $\sum_{1}^{n} x_i$. The economic significance of this is that the optimization level of an economic system is directly proportional to the level of the total knowledge of the population, and is inversely proportional to the number of people. It shows that the more economic body with the higher total human organization knowledge is more likely to lead to the evolution of the economic system, and the larger the population is, the more it is not easy to develop the system evolution, which is also from the history of economic development. It can be observed. It can be seen through this equation that the optimization level of the economic system can be obtained if the number of people in an economy and the level of self-organizing knowledge can be examined in more detail.

On the other hand, if an economy has a better system, it will ensure the rapid development of local technology. If the technical knowledge used in the economic growth of natural knowledge is mapped and set $\hbar$, it can be obtained $\hbar = yF(y)$, which is because when the mean of the technical knowledge of the population y is represented, the long-term average level of support for economic development may be obtained at this mean and the probability level. Because of that $y = \frac{1}{n}\sum_{1}^{n} y_i$, $\hbar = \frac{1}{n}\sum_{1}^{n} y_i F(y)$. When the vector meaning of self-organizing knowledge is not considered, for every individual, all knowledge is composed of self-organizing knowledge and natural knowledge. Using the amount of knowledge set before, then there is $y_i = z_i - x_i$. In this case, it is possible to consider the knowledge of self organizing and the knowledge about nature as an overall existence in the individual, and the two have different weights, and the definition of the weight is (0,1). This can continue to follow the previous setting and make the weight of self-organizing knowledge a_i in the whole knowledge. Then, for any individual i as the total amount of knowledge z_i , there is $x_i = a_i z_i$, $y_i = (1-a_i)z_i$, then, the per capita distribution of knowledge can be expressed in a new way, and the economic system mapped to the self-organizing knowledge $\xi = \frac{1}{n}\sum_{1}^{n} x_i F(x)$ and the technology $\hbar = \frac{1}{n}\sum_{1}^{n} y_i F(y)$ supported by the corresponding economic growth. The two equations show that both the evolution of the economic system and the progress of the technology applied to economic growth are all counter to the scale of the population n , which is in line with the theory of substitution of labor and technology. As we can see from the equation $\hbar = \frac{1}{n}\sum_{1}^{n} (1-a_i) z_i F(y)$, the larger a_i , the smaller $(1-a_i)$ the corresponding, which should indicate that the greater the knowledge weight of the self-organization in the population, the relatively small knowledge about nature, and the relatively low technical level that the corresponding economic growth can depend on, which may also explain Joseph Needham's question. China has gradually lagged behind the development of science and technology after the Song Dynasty. The reason should be that after the Song Dynasty, the knowledge of natural knowledge, including the knowledge of technology, including the knowledge of nature, including the natural knowledge, including the technical knowledge, was not required at the national level. Learning, therefore, after the Song Dynasty, Chinese knowledge of nature gradually lagged behind the western world.

The question that must be answered here is how human self-organizing knowledge promotes the growth of natural knowledge, which should be analyzed from the perspective of dynamics. That is, how to organize knowledge to promote the growth of natural knowledge when the situation a_i, z_i and n is changing. Se t $\xi = \frac{1}{n}\sum_{1}^{n} a_i z_i F(x)$, $\hbar = \frac{1}{n}\sum_{1}^{n} (1-a_i) z_i F(y)$,

$\sum_{1}^{n} a_i z_i = \frac{n\xi}{F(x)}$ can be obtained, and $\sum_{1}^{n} a_i z_i = \sum_{1}^{n} z_i - \frac{n\hbar}{F(y)}$ can be obtained. according to these two equations, $\hbar = \frac{1}{n}[\sum_{1}^{n} z_i - \frac{n-\xi}{F(y)}]F(x)$ can be obtained, thus forming the relationship between the technical level $\hbar$ related to economic growth and the system level ξ corresponding to self-organizing knowledge. Since $\sum_{1}^{n} z_i$ it contains both the self-organizing knowledge and the natural knowledge, we can draw a definite relationship $\hbar = \frac{1}{n}[\sum_{1}^{n} z_i - \frac{n-\xi}{F(y)}]F(x)$ between the economic and technological level $\hbar$ and the economic system level ξ. However, in the static state of the evolution of the economic system ξ, the economic and technical level of $\hbar$ is negatively correlated with the total knowledge level of the population when it remains the same. On the premise that the number of people is large enough, the level of economic and technological progress is only related to the economic system level, but has no direct relationship with the number of people, and economic technology plays a very big role in economic growth, especially in the modern sense of economic growth [7], then, the economic growth can be seen from this equation. It is directly related to the level of economic system evolution and shows a positive growth.

3. Economic Growth Under Self-Organizing Knowledge

The system plays an important role in economic growth, and a large amount of discussion on the new system economic theory, such as the American scholar Douglas C North, thinks that "when the economy provides institutional incentives for activities that can improve productivity, it will produce economic growth." [1] 120, to return to self-organizing knowledge, is actually to regard economic growth as self-organization knowledge growth. In this regard, Hayek believes that "the so-called social order, in essence, means that individual action is guided by the foresight of success, that is to say that people can not only use their knowledge effectively, but also be able to anticipate the cooperative [8] they can obtain from others with great confidence." It can be known that order is system. Hayek actually attributed the system to knowledge. Here, the existing relatively mature economic growth mode that can be used to deduce the relationship between economic growth and self-organization knowledge. What has been obtained $\hbar = \frac{1}{n}[\sum_{1}^{n} z_i - \frac{n-\xi}{F(y)}]F(x)$ before and given the possibility of technological level for economic growth, then what is the relationship between technology and economic growth? This can be analyzed by the solo-Mead model, that is $G = a\Delta K / K + (1-a)\Delta L / L + \Delta T / T$, G it represents economic growth, K represents the level of capital, L represents the level of labor, and T represents the technical level. Since we have given the equation of technical level and institutional optimization, that is $T = \hbar$, $\Delta T = \Delta\hbar$, because $\hbar = \frac{(1-a_i)\xi}{2}$, then $\Delta\hbar = \frac{(1-a_i)\Delta\xi}{2}$, we can deduce that $\Delta\hbar = \frac{(1-a_i)\Delta\xi}{2}$, therefore $\Delta T / T$, it can be expressed $\Delta\hbar / \hbar$ as a constant, that is a_i, when human beings maintain a definite weight on self-organizing knowledge and natural knowledge, there are $\Delta\hbar / \hbar = \Delta\xi / \xi$, that is, technological progress. Elasticity is the same as the elasticity of the evolution of the system. However, it is not difficult to know that as long as human knowledge is acquired, it is unlikely that these two types of knowledge will be given a definite weight, a_i which will change with the evolution of knowledge, that is, a_i is a dependent variable. In the case of a variable a_i, the elasticity of the progress of technology will not be exactly the same as the elasticity of institutional progress, and the relationship between the two exists $\Delta T = \Delta\hbar = \frac{(1-a_i)}{2}\Delta\xi - \frac{\xi}{2}\Delta a_i$. By replacing this equation with the solo-Mead growth model, economic growth $G = a\Delta K / K + (1-a)\Delta L / L + [\frac{(1-a_i)}{2}\Delta\xi - \frac{\xi}{2}\Delta a_i] / T$ can be obtained. It can be seen from this equation that economic growth is not only related to current capital, labor and possible variables, but also with the current technical level and institutional level, while taking into account the two types of knowledge of the total amount of adult knowledge. Weight is a variable, so economic growth is related to the weight of current human self-organizing knowledge, and it is related to the variable of weight.

As the focus of this paper is to study the operating mechanism of the economic system and how to advance the economic growth through technological progress, it can be set $\Omega = a\Delta K / K + (1-a)\Delta L / L$, this is $G = \Omega + \frac{(1-a_i)}{2T}\Delta\xi - \frac{\xi}{2T}\Delta a_i$ for simple consideration. In this equation, it can be seen from this equation that, in the absence of consideration, economic growth is positively related to the evolution of the system, that is, the system, and the current system. The situation has a negative correlation. This shows that in a established economic and social region, the greater the weight of institutional knowledge is not conducive to economic growth, the weight growth will also play a negative role in economic growth. At the same time, we can also see $\Delta\xi$ that in the whole equation, in addition to Ω, play the positive effect on economic growth, this further illustrates the optimization of the economic system caused by the evolution of organizational knowledge, which plays an important role in economic growth. When $\Delta\xi = 0$, the economic system does not evolve at the time of the order, $G = \Omega - \frac{\xi}{2T}\Delta a_i$, the economic growth will be limited to the economic system in the case of Δa_i no change in the case

that ξ it must be a constant at this time. And $T=\frac{(1-a_i)\xi}{2}$ replaces $G=\Omega+\frac{(1-a_i)}{2T}\Delta\xi-\frac{\xi}{2T}\Delta a_i$, the substitution will bring a closer relationship between economic growth and economic system, this is $G=\Omega+\frac{\Delta\xi}{\xi}-\frac{\Delta a_i}{(1-a_i)}$. The analysis of this equation can also draw a similar conclusion to the front face, and it is more intuitive than the front, and the economic growth and economic system evolves in the same way, and presents a counter proportional relationship with the existing system. This situation shows that once an economic system is formed, economic growth will be limited by institutional locking effect.

If there is no change in the weight of self-organization knowledge and natural knowledge, then $\frac{\Delta a_i}{(1-a_i)}=0$, we can get a simplified equation $G=\Omega+\frac{\Delta\xi}{\xi}$. This equation is a model of short-term economic growth and institutional relations. This is because in the short term, the evolution of knowledge is not likely to increase the proportion of the two types of knowledge of self-organized knowledge and natural knowledge. Change. But in the long run, because a_i it is a variable, it can not be maintained $\frac{\Delta a_i}{(1-a_i)}=0$. In this case, economic growth depends not only on the heavy weight to $\frac{\Delta\xi}{\xi}$, but also on the impact from $\frac{\Delta a_i}{(1-a_i)}$, which can be verified from the real economic macroeconomic regulation and institutional economic reform in the long term failure. Through the analysis, the reason is that the institutional economic change is often implemented in the case of the failure of the technological supply to achieve economic growth. Therefore, it will undoubtedly increase the proportion of self-organized knowledge and make Δa_i it a positive added value, at the same time $(1-a_i)$ to reduce the value. The result of the joint action will inevitably accelerate the growth to $\frac{\Delta a_i}{(1-a_i)}$, thus limiting the long-term economic growth.

Therefore, by analyzing this equation $G=\Omega+\frac{\Delta\xi}{\xi}-\frac{\Delta a_i}{(1-a_i)}$, we can find that in a given economy, to achieve economic growth, the weight of self-organized knowledge in the total amount of knowledge should be reduced correspondingly, which is highly consistent with the technical role of the economic growth emphasized by the modern government. However, since the evolution of self-organized knowledge plays a positive role in economic growth, it is necessary to continuously promote the evolution of self-organized knowledge. In this way, the evolution of self-organized knowledge should be constantly promoted. At the same time, because the existing technology plays a locking role in economic growth, it is necessary to advance the progress of technology, especially the introduction of new technology to economic growth through the evolution of the system. It can be found from that $\Delta T=\frac{(1-a_i)}{2}\Delta\xi-\frac{\xi}{2}\Delta a_i$ in a given economy, to advance technological progress should reduce a_i that the weight of self-organized knowledge to the total knowledge and reduce the total level of institutional knowledge ξ, but it should also increase its incremental level $\Delta\xi$. The latter conclusion seems to contradict the policy opinion on self-organization knowledge, that is, to reduce the existing stock and increase its increment, which can be understood that reducing the existing stock itself is in fact reducing its weight in the current total amount of knowledge, and increasing its increase to promote the evolution of self-organized knowledge. This can actually be seen as promoting the evolution of the economic system.

4. Conclusion

In this paper, the system variables and economic growth are linked, and the problem of "which path through the system to promote economic growth" proposed by Douglas C North and others has been preliminarily solved, and the black box of the system has been cleared up to a certain extent. Through the integration of self-organized knowledge into the model of economic growth, the fact is clarified that the economic growth that human can achieve depends largely on the role of the system, and the evolution of the economic system is related to the level of human cognition. Cognition on the basis of human biological characteristics depends on the level of knowledge acquired, especially the level of self-organizing knowledge, that is, human knowledge about self organization plays a more fundamental role in economic growth.

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