Proceeding Paper

Reflections on Economics: From the Perspective of Philosophy of Information †

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† Presented at Forum on Information Philosophy—The 6th International Conference of Philosophy of Information, IS4SI Summit 2023, Beijing, China, 14 August 2023.

Abstract: The term “information” exhibits notable differences in its usage in different genres. In the field of Philosophy of Information, information serves as a primary object of study, while in Economics, information is considered as a research tool. In the process of resource allocation, information functions as an intermediary that connects different entities, and in the study of allocation, information serves as a medium to understand the objective world. In Economics, information is interpreted as “uncertainty eliminated”. The “uncertainty” in economic activities and economic relationships is explicated based on the determined information, and thus, the retrospection of economic information creates predictability. Conversely, from the perspective of the Philosophy of Information, information possesses both determinacy and indeterminacy, and its existence emerges from chaos. In comparison to the understanding of the essence of information in the Philosophy of Information, Economics has relative limitations in comprehending information. This article attempts to reflect on economics from the perspective of the Philosophy of Information to provide a contrast and connection between the two fields.

Keywords: philosophy of information; economics; information; uncertainty

1. Introduction

Philosophy of Information and Economics are two distinct disciplinary fields, in which the term “information” exists with differentiated semantics, respectively, in their unique backgrounds, but with overlap as well. In Philosophy of Information, information is the object of study, a fundamental form of existence that has three basic forms and one comprehensive form: information of nature (objective information), information of knowing (primary form of subjective information), information of reproducing (advanced form of subjective information), and information of society (organic integration of the first three basic forms of information) [1,2] (pp. 131–143). In the perspective of Economics, however, information is not a subject of study; rather, it is regarded as a medium for various resource allocation phenomena and economic behaviors. Economics does not focus on the specific form of information, but instead concerns itself more with the uncertainty of probability distribution of information under specific forms of deviation. This article will explore the relationship between Philosophy of Information and Economics through the lens of uncertainty and certainty.

2. Uncertainty in Philosophy of Information and Economics

Uncertainty and certainty are topics that are commonly faced by both Philosophy of Information and Economics. On the one hand, from the perspective of Information Philosophy, uncertainty and certainty are related with mutual dependence. In the ontology
of information, it is a basic form of existence and one of the fundamental elements that constitutes reality [3]. Information is objectively present, the interpretation of which is assigned by human beings as a subject. The two major morphologies of information, information of knowing and information of reproducing, coexist with the reception, understanding, and interpretation of information of nature from the subject. The uncertainty and certainty of information arise from the interaction between human beings as information processing agents, while information is the object being processed. At the same time, in Information Philosophy, the uncertainty of information is measured by information entropy [4]. It indicates the degree of randomness and disorderliness within information. The higher the information entropy, the greater the uncertainty and complexity of the information, requiring more processing and interpretation to achieve certainty. On the other hand, from the perspective of Economics, there are rather more contradictions between uncertainty and certainty. Economics treats uncertainty as “noise”, while economists aim to eliminate uncertainty in economic issues as much as possible, drawing graphs of functions with determined expectations and variances, where uncertainty is manifested as a random error term added in. In Economics, uncertainty and certainty are interpreted under the probability theory. Economists are adept at abstracting the complex and variable world into a “function”. When the objective function does not possess a determined value but features a probability distribution, it manifests uncertainty. For Economics, information contributes to uncertainty not by itself but rather by its absence, which is consistent with Shannon’s theory, claiming that information is only the uncertainty eliminated [1,5,6] (p. 121).

3. Limitations of Economics in Understanding Information

From the perspective of Economics, information is merely uncertainty eliminated, which is a very limited view. Rational risk-averse human beings, constrained by the utility function, always long for certainty. This longing molds information into a very valuable resource. With the accumulation of information and the development of digital technology, the information economy has emerged. Environed in the vastness of information, economists attempt to receive and analyze as much information as possible, eliminating as much uncertainty as possible. However, such attempts, especially in macroeconomics, are often not entirely satisfactory. Macroeconomists even go so far as to construct models consisting of hundreds of equations to make “predictions”. Regardless of how many objective tools economists use, such as mathematics, data, and computers to process mathematical formulas and vast amounts of data, there always seems to be deviations between the prediction results and the corresponding reality. In the estimated equation used to predict, there is always an unknown random error term. As the classic saying that economists can predict ten out of three financial crises illustrates, this is such a myth in Economics. The micro-behavioral rules are deterministic (given the properties of utility functions), but there is no globally deterministic algorithm that can predict the evolution from micro-individuals to macro-whole [7]. It seems that macroeconomists have not fully embraced the part of determinism that involves chaos, or they believe that this chaos is a part that can be somewhat disregarded.

In the field of micro, economists focus on decision-making behavior, which underlies causal inference. The uncertainty in decision-making behavior at the micro level arises from the probability distribution of information. In imperfect information games, the information set of the information-processing subject is materialized as a probability distribution of a series of actions, while the realization of the distribution actually relies on the decision-maker’s beliefs. In the inference at the micro level, causal relationships are non-mechanical relationships, and decision-makers are at the nodes of decision trees. When the tree is regarded as a complete system, its properties are determined regardless of whether the system is activated or not, and the finale can be deduced under the known probability distribution, constructing a space of possibilities [8]. For the first time when the system is activated, the results are revealed, then the information contained in the system is expanded, forming an updated environment. The decision-maker thus optimizes the
decision accordingly, changing her belief of the possibility space in the following deduction. The possibility space of this self-organizing system corresponds to the confidence interval when doing statistical inference in Economics.

In the above analysis, it can be seen that in current Economics, information is only a tool for explanation and prediction. There exist limitations in economists’ understanding of information. Economists recognize that there are laws in the objective world containing continuity, which is a form of information of society. Based on this continuity, economists can calculate models. However, there is always stochastic noise in the law of continuity. Humans cannot observe all phenomena at any one given time; thus, they can never abstract the regularities from each random, accidental change at every moment. There are deviations in the process of transferring information into different forms, as well as lags between the information generation and reception behavior. Economists often treat these deviations and lags as “uncertainty”, however, in fact, these deviations are a kind of certainty. They are also certain, in the form of information of nature. Its contribution to uncertainty is not caused by itself, but by its absence, which inevitably brings uncertainty in prediction.

4. Discussing the Significance of Economics from the Perspective of Information Philosophy

Nowadays, in the era of information, economics is an unavoidable topic of information. From a philosophical perspective, exploring the relationship between the Philosophy of Information and other disciplines is essential [9–11]. Economics is an example of a social science, and its understanding of information at the theoretical level is still limited. Information is objective and unreal. Economists treat objective existence as a tool while aiming to understand it. In other words, information is still in the position of tools in Economic theory. Even so, its nature should be properly understood. Modern Economics and Statistics rely heavily on information as a form of eliminated uncertainty. In the limitations of understanding information, Economics is still in its pursuit of “certainty”. Progress is reflected in the modification of the concept of “certainty”. The concept of “certainty” in modern Economics and Statistics has been expanded. Just as Heisenberg proposed the “the principle of uncertainty”, which drove the development of modern Physics, the development of the traditional probability theory and Bayesian statistical theory has made economists aware that the pursuit of “certainty” based on the concept of “total probability summing up to one” is unattainable. They have instead devoted themselves to understanding and continually improving concepts such as “confidence intervals” and “significance levels”.

At the theoretical level, uncertainty has become a principle of Physics. A confidence interval that fluctuates and encompasses an infinite number of possible points in Euclidean space has also become a new “principle” of Economics and Statistics. In order to break through limitations, economists need to realize that information is not just a kind of eliminated uncertainty, and it does not need to be defined by whether it is certain or not. Its existence does not depend on reception and processing by human subjects. At the same time, when making predictions and causal inferences, the uncertainty that has been eliminated is a form of information, as well as the uncertainty that remains as random error term, which is also manifestations of information. It is a medium, as well as starting point and endpoint; it is a neurogen, as well as a reactant and product; it is a tool to be used, as well as a value to be gained; it is creating things, as well as being created. Perhaps this is the breakthrough in the academic field underlying the breakthrough understanding of the most fundamental academic tools.

Author Contributions: Conceptualization, H.L. and T.W.; methodology, H.L. and T.W.; formal analysis, H.L. and T.W.; investigation, H.L. and T.W.; resources, H.L. and T.W.; writing—original draft preparation, H.L.; writing—review and editing, T.W.; supervision, T.W.; project administration, T.W.; funding acquisition, T.W. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.
Institutional Review Board Statement: Not applicable.
Informed Consent Statement: Not applicable.
Data Availability Statement: No datasets are used in the article.
Conflicts of Interest: The authors declare no conflict of interest.

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