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The Possibility of Behavioral New Institutional Economics

By

Kenshu Kikuzawa

Abstract

Behavioral economics has recently been the subject of considerable research with the consequence that theories in behavioral economics and finance have complementarily developed to comprise a research field known as 'behavioral finance'. Subsequent studies seeking to integrate game theory and behavioral economics come under the 'behavioral game theory' umbrella, while those wanting to integrate contract theory and behavioral economics fall under 'behavioral contract theory'. Given such circumstances, the remaining avenue to explore is the integration of behavioral economics and new institutional economics, the latter consisting of transaction cost economics, agency theory, and the theory of property rights. This paper pursues this remaining possibility and indeed proves that 'behavioral new institutional economics' can be developed and would be a fruitful new field of research.

Key Words

new institutional economics, behavioral economics, neoclassical economics, transaction cost economics, Popper, pluralistic world, value function

1. Introduction

One research field that has recently attracted considerable attention is behavioral economics which has been developed by Daniel Kahneman, who received the Nobel Prize in Economics in 2002, Amos Tversky (Kahneman and Tversky, 1979), and Richard H. Thaler. While much still has to be studied, what is clear at the moment is that this theory, integrated with others, complementarily makes possible a wider coverage, rather than having a distinct independent system as in neoclassical economics.

For example, theories in finance and behavioral economics have complementarily led to the establishment of a research field currently known as 'behavioral finance.' And, studies seeking to integrate game theory and behavioral economics are known as 'behavioral game theory,'¹ and those wanting to integrate contract theory and behavioral economics,

¹See Camerer (2003) for behavioral game theory.

‘behavioral contract theory.’² Furthermore, research focusing on integrating law and economics and behavioral economics is known as ‘behavioral law and economics.’³

Given such circumstances, the only remaining avenue to explore is the integration of behavioral economics and new institutional economics, the latter consisting of transaction cost economics, agency theory, and the theory of property rights. This paper pursues this remaining possibility and seeks to verify that ‘behavioral new institutional economics’ is a promising new field of research.

To accomplish this aim, I firstly explain that we live in three different worlds: the world of physical objects, the world of mental states, and the world of the objective content of knowledge or theories. Secondly, it is made clear that the theory based on the first world of physical objects corresponds to neoclassical economics, while that based on the second world of mental states is behavioral economics, and finally, the theory based on the third world of the objective content of theories falls under new institutional economics. Finally, I would like to introduce the model of cubic human nature behaving based on the total cost-benefit arising in the three worlds, and that, based on this model, prove that behavioral new institutional economics, composed of behavioral economics and new institutional economics, is a persuasive theory.

2. Pluralistic World

2.1 Changes in the View of the World in Business Administration Studies

Business administration is a relatively new field of study, which developed at the end of the nineteenth century and the beginning of the twentieth. Briefly looking back on the 100 years’ history of studies in business administration, we find that the world to be studied has changed.

In the early period of studies in business administration, unilateral management was the mainstream with the physical world a prerequisite. Classical scientific management, established by Frederick Winslow Taylor, known as the father of scientific management, regarded workers as physical objects (parts of the machines) and the main objective was to manage them to work systematically and efficiently just as machines in order to efficiently manufacture as many products as possible.

However, after a series of psychology experiments at the Hawthorne Western Electric Plant, at the request of General Electric, it became apparent that a different world from the physical world exists; that is to say, a world of mental states or states of consciousness.

At that time, General Electric was expecting to obtain experimental data showing that by changing the light in workshops from lamps to light bulbs, invented by its founder Thomas Edison, worker productivity would improve significantly. However, workers at the Hawthorne Plant worked harder not in response to the change in the lighting, but rather to the fact that they were being watched and that they had been especially chosen.

Thus, it was made apparent that we cannot separate our workplace from our homes, and that we act according to our emotions or sentiment at the workplace just as we do at home. Therefore, it became clear that unless mental states are managed, workers do not work efficiently at work, and products do not sell well unless they appeal to our state of

²See Hart and Moore (2008) for behavioral contract theory.

³See Sunstein (2000), for behavioral law and economics.

consciousness.

Moreover, it has become obvious that aside from the world of physical objects and the world of mental states, there is a world of intangible assets such as knowledge, theories, and rights. Further, the inmates of this world have even become extremely important business products. Nowadays, even carbon emissions are traded like products, and the rights to choose whether to buy or not, that is 'options,' are traded as products. The era of management based on a unilateral view of the world, where products will sell if only superior physical goods are manufactured, has come to an end.

2.2 Pluralistic World of Popper

The changes in the concept of the world in the background of the history of business administration studies can be more clarified by the view of the pluralistic world developed by philosopher Karl Raimund Popper (Popper, 1959, 1965).

While researching the logical process for discovering scientific knowledge, Popper found a new concept of the world. At the time, the two following ideas were attracting much attention in terms of the logical process for discovering scientific knowledge.

- (L1) In a world of physical states, there exists a process to inductively gain universal scientific knowledge by collecting as much sensory data (felt by the five human senses) as possible. For example, by observing many black crows, it is possible to inductively come to a universal statement that "All crows are black."
- (L2) In a world of mental states, there exists a mental process for discovering scientific knowledge. For example, by analyzing Albert Einstein's mental processes of scientific discovery it is possible to find one's way to the theory of relativity.

However, Popper argued that a true logic of discovery exists in neither of these theories. He even argued that a true logic of discovery of scientific knowledge itself does not exist at all.⁴ For example, it is not possible to logically derive a universal statement that "All crows are black" from just observing a limited number of crows. In order to derive from observation a universal statement that is not limited by time or place, it is necessary to observe all crows in all possible time and place. However, that is impossible in practice.

In addition, even if Einstein's thought processes were analyzed in detail, it is not possible to explain all content comprising the theory of relativity. Even Einstein himself did not have the least idea that his theory would lead to the production of the atomic bomb.

In the process of studying the logic of scientific discovery, Popper (1972, 1982) realized that the world of content of the theory itself, the world of physical objects, and the world of mental states were different worlds.

As a result, he called the world of physical objects or of physical states such as chairs, tables, and bodies "World One," the world of the subjective mind, or mental states, perceptions, and emotions "World Two," and the world which can be comprehended not by the five senses but by intellect such as knowledge, information, and rights "World Three." Thus, he began to argue pluralistic realism.⁵

⁴See Popper (1959) for this argument.

⁵See Popper (1972, 1982) for details of pluralistic realism. He is especially controversial on the difference between "World Two" and "World Three."

Table 1 Pluralistic World of Popper

	<i>World 1:</i> Physical world	<i>World 2:</i> Mental world	<i>World 3:</i> Intellectual world
<i>Examples</i>	Substances Objects Physical states Human bodies Books as paper Paintings as paint and canvass	States of the human mind Emotions Desires Mental processes Mental states in discovering theories States of mind while reading books Music composed by Beethoven and Wagner	General knowledge and scientific knowledge Content of theories Transaction costs Problem situations Values and artistic values Content of books and journals Ideas and concepts Music composed by Bach and Mozart

Physical World 1: World of physical objects such as chairs, tables, and bodies

Mental World 2: World of mental states, perceptions, and emotions

Intellectual World 3: World comprehended by intellect such as knowledge, content of theories, rights, and information

According to Popper, it is not possible to perfectly explain the mental world with the physical world, or the intellectual world with the mental world.

Popper argues that music composed by Beethoven and Wagner are works in the mental world—they depict the mental state and human emotion, and were not discovered but invented. Therefore, music composed by Wagner uplifts the human psyche and mental condition, and was indeed used by Hitler to instill an aggressive spirit of purpose among his troops during the Second World War.

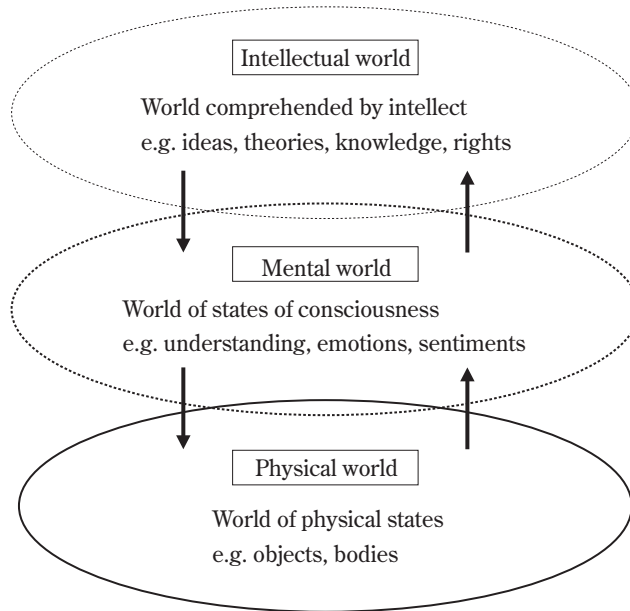
On the other hand, Popper argues that pieces of music composed by Bach and Mozart are works in the intellectual world—such pieces of work do not greatly change irrespective of the player and his/her mental condition. Such works of music were found to be beautiful melodies that had already existed rather than having been invented by humans.

It was Popper, one of the greatest philosophers of the twentieth century, who argued the realism of the intellectual world comprehended by intellect.

2.3 Objectivity of the Intellectual World Three and Interaction among the Three Worlds

Amid such pluralistic realism argued by Popper, what becomes especially important is the difference between the mental world and the intellectual world. It is true that a new theory, an inmate of the intellectual world, is developed through a mental process, an entity of the mental world. However, once a theory which is an inmate of the intellectual world is completed, disseminated, and made widely known to many, it becomes independent from the mental world of the person that created it and gains for itself an autonomous and objective existence.

The mental world and the intellectual world are totally different worlds, and Popper argues that although the mental world is a subjective world of each individual, the intellectual world understood by intellect is an objective existing world as it can be approached and accessed without restraint by anybody with intellect.

Figure 1 Image of the Worlds of Pluralistic Realism

Let us take Einstein's theory of relativity as an example. Even if it were possible to closely analyze and understand Einstein's mental processes (of the mental world) in discovering the theory of relativity, it is not possible to completely understand the actual content of the theory (of the intellectual world) through understanding the mental processes of discovery. This is because it is possible to derive innumerable prediction statements from the theory of relativity. The mental processes to discover a theory (an inmate of the mental world) and its content (an inmate of the intellectual world) are inmates of totally different worlds.

Einstein himself did not realize that the content of his theory of relativity included portions that would lead to the production of atomic bombs. It was discovered by another scientist later on.

The content of the theory of relativity, belonging to the intellectual world, is independent from the subjective mental world of Einstein, and exists in the objective world. Moreover, it exists even after his death. In other words, the intellectual world comprehended by intellect is not anybody's subjective possession but exists as an objective world which can be freely accessed by anyone and be approached by any intelligent person.

According to Popper, the physical world, the mental world, and the intellectual world interact with each other. The intellectual world can only affect the physical world through intervention of the mental world. In other words, the physical world and the intellectual world cannot interact directly. On the other hand, the physical world can affect the intellectual world with the mental world as a mediator.

For example, the know-how required to make a bomb, an inmate of the intellectual world, is understood through the mental world and then a bomb is produced as a physical object to destroy the real existence of the physical world.

Furthermore, books are inmates of the physical world as long as they are considered physical objects made of paper, while their content is an inmate of the intellectual world and understood through people's mental world.

Such pluralistic realism composed of the physical world (the world of physical states), the mental world (the world of mental states), and the intellectual world (the world of intellect) can be shown as an image as in Figure 1.

Besides, based on Popper's pluralistic realism, it is necessary to thoroughly understand that the physical world, our mental world, and the intellectual world comprehended through our intellect such as knowledge, coexist.

What is more, daringly suggested, while neoclassical economics developed based on the physical world, behavioral economics recently rapidly developed based on the mental world. In addition, new institutional economics is a theory developed on the basis of the intellectual world.

3. Three Worlds and Three Theories

3.1 Limits of Neoclassical Economics Based on the Physical World

a) Neoclassical Economics

In neoclassical economics, the behavior of consumers and firms is shown in the following functions, and it is assumed that we behave on the basis of the physical world. The utility of consumers is shown as U , and n kinds of products as x_i ($i=1, \dots, n$), while firms are assumed to produce n kinds of products using m kinds of factors of production y_j ($j=1, \dots, m$). The behavior of consumers and firms can be expressed as follows:

$$\begin{array}{ll} \text{Consumer} & U = U(x_1, \dots, x_i, \dots, x_n) \\ \text{Firm} & f(x_1, \dots, x_n, y_1, \dots, y_m) = 0 \end{array}$$

It is clearly shown that both are entities of the physical world.

In the theory of neoclassical economics, every individual is assumed to be completely rational. Especially in the product market, consumers demand products completely rationally to maximize utility. On the other hand, firms also act completely rationally to supply products according to the profit maximization motive. In such a situation, consumers are completely rational so that they are able to distinguish any small advantage or defect in the product supplied. Therefore, if new products which are superior to existing products are marketed, consumers will promptly shift to them.

If numerous consumers and firms existed in such situations, demand for the superior new products would increase and thus prices rise according to the market mechanism. As a result, firms with the ability to produce and sell superior products would gain more profits and therefore survive.

On the other hand, demand for existing products which are inferior to the new products would decrease and, as a result, their prices decline according to the market mechanism. In such situations, firms with the ability to only produce and sell existing products would not be able to gain enough profits to meet production costs and would therefore be weeded out.

As such, in a world of complete rationality, firms with the ability to survive are chosen and those which can only produce and sell inferior products fall by the wayside.

b) Anomalies

However, in the 1980s, Paul David (David, 1985), professor of economic history, discovered a case that showed neoclassical economics was falsifiable. The topmost row of letters on keyboards of the computers that we use everyday is laid out in the order of 'QWERTY.' David considered this strange sequencing of the letters.

This normative layout of the letters on the keyboard was completed in the nineteenth century. At that time, typewriter performance was still low so that there was a tendency for the type bars to clash and jam if struck in rapid succession. In order to solve this problem, the QWERTY layout was invented to make finger movements slower.⁶

However, even after the invention of electric typewriters and computers, and the more efficient layout of letters, the QWERTY layout is still presently used. Why? It is not because the QWERTY layout is efficient, but because it was adopted by mere chance and became the *de facto* standard.

c) Limits

There are similar cases. Why did Windows win and Macintosh lose in the computer operating system (OS) competition? Why did Sony's Betamax (β) lose to JVC's VHS in the home videocassette tape format competition? Was Windows more efficient? Was VHS more efficient?

These results show that markets do not necessarily choose the first best choice. It is not always the products with low manufacturing cost and technical superiority that dominate, which suggests there is a limit to neoclassical economics.

Why do these phenomena appear? They appear because we live not only in the physical world but also in the subjective mental world, and mental biases influence human behavior. In the following section, behavioral economics, which is based on such a concept, is explained.

3.2 Behavioral Economics Based on the Mental World

a) Reference Point

According to behavioral economics⁷ developed by Kahneman, Tversky, Thaler, *et al.*, there exists a "reference point" in one's mental state in the state of consciousness world. It is a criterion that we refer to when we recognize and evaluate things, and it differs from person to person.

For example, let us suppose that Mr. A is used to waiting five minutes at a bank. In such a case, Mr. A evaluates the length of time being made to wait at a bank based on these five minutes. If Mr. A's reference point is five minutes, Mr. A thinks either 'It took less time than I had expected, so I was lucky,' or 'It took more time than I had expected, so I was unlucky.'

It is not difficult to verify that such reference points exist. For example, let us suppose that two people were informed of changes in their assets as follows:

Mr. A: Assets decreased from 40 million yen to 30 million yen

Mr. B: Assets increased from 10 million yen to 11 million yen

⁶See David (1985) for details.

⁷See Thaler (1980, 1985) for more technical details of behavioral economics.

Which of them is happier?

According to traditional neoclassical economics, the utility here is defined by the absolute level of the final asset position. Therefore, Mr. A with the final asset position of 30 million yen would be happier than Mr. B with the final asset position of 11 million yen.

However, many respondents in an experiment said Mr. B was happier. Why was that? Obviously, many took the first state as the reference point, and therefore saw that Mr. A lost 10 million yen and Mr. B gained 1 million yen. Thus, it is confirmed from many experiments that we do have reference points.

b) Diminishing Sensitivity and Loss Aversion

With this reference point as a border, results higher than one's expectations are recognized as 'gains,' and the mental value increases if the gains increase. On the other hand, results lower than the reference points are recognized as 'losses,' and the mental value decreases if the losses increase, resulting in mounting dissatisfaction.

In spite of this, the increase in gains is not directly proportional to the mental value. In reality, the mental value (satisfaction) decreases as the gains increase, just as in a normative economic utility theory. In other words, mental satisfaction or pleasure diminishes gradually, which is termed "diminishing sensitivity."

Many experiments verify diminishing sensitivity. For example, more pleasure is found in an increase in wages from 100,000 yen to 130,000 yen than from 600,000 yen to 630,000 yen, although the actual amount of increase is 30,000 yen in both cases.

For a completely rational person, the increase in mental value caused by per unit increase in relative gains is symmetrical to the decrease in mental value caused by per unit relative loss. That is to say that the absolute value is exactly the same.

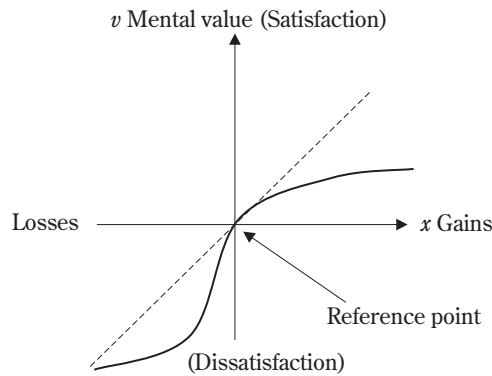
However, for a bounded rational person, the increase in mental value caused by per unit increase in gains is not as large as the mental value lost by per unit loss. In other words, the shock in losing something is much greater than the pleasure in gaining something.

For example, most would refuse to enter a draw in which the possibility of gaining 1,000 yen is 50% and the possibility of losing 1,000 yen is also 50%. Although the possibilities for gaining and losing 1,000 yen are exactly the same in theory, people would refuse to participate in such a draw. This shows that losses are evaluated more if the gains and losses are the same.

c) Value Function and Status Quo Bias

The properties of the mental world of such bounded rational individual can be shown as an S-shaped value function v as in Figure 2.

- (A1) The central point in Figure 2 shows the subjective reference point of a bounded rational person. If the results are above this point, they are regarded as gains, and the larger the gains are, the higher the mental value (satisfaction) will be. On the other hand, if the results are below this point, they are regarded as losses, and the larger the losses are, the lower the mental value will be.
- (A2) With the reference point of Figure 2 as the border, the more the relative gains increase, the more the mental value (satisfaction) decreases instead of increasing in proportion to the relative gains. This is the so-called 'diminishing sensitivity' characteristic of a bounded rational person.
- (A3) Figure 2 shows another characteristic of a bounded rational person, namely 'loss

Figure 2 Value Function

aversion' where the decrease in mental value (dissatisfaction) from the losses is larger than the increase in mental value (satisfaction) from the increase in gains.

Tversky and Kahneman (1992) formulated a value function with such characteristics as follows:

$$U(X) = \begin{cases} X^\alpha & (X \geq 0) \\ -\lambda (-X)^\beta & (X < 0) \end{cases}$$

(X: losses, U(X):utility)

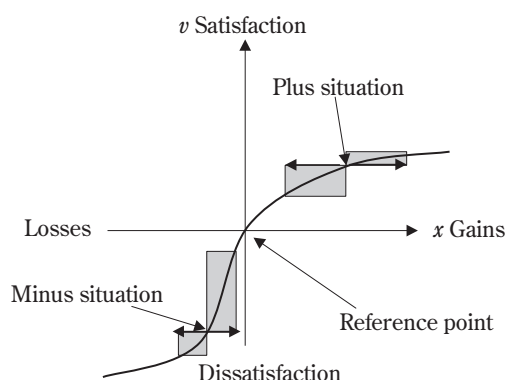
In this formula, λ is a loss averse coefficient. The authors conducted an experiment using 25 graduate students from the University of California and Stanford, and made an estimation that α and β were 0.88 and that λ was 2.25. A theory that is based on such bias of a mental state of a bounded rational person is called prospect theory, a theory in behavioral economics.

According to the value function of the prospect theory, if a consumer is already in the positive area as shown in Figure 3, mental value does not increase greatly even if one ventures to make changes to achieve some gains. On the other hand, even a slight decline caused by a change will result in looming pain or dissatisfaction for that consumer. This shows that we tend to be risk averse, thinking that maintenance of the status quo is by far more mentally rational.

In contrast, if a consumer is already in the negative area, even changes that result in a further decrease only lower mental value slightly. However, changes that result in even a slight increase in gains will greatly increase the satisfaction for that consumer. In such cases, it becomes more rational to change the status quo, even if the risk is high. In other words, consumers become more risk seeking.

As a result, if a consumer is satisfied to some extent with the current product, there is a possibility that he/she will not shift to a new product even if it is physically superior. This may appear irrational, but it is rational based on behavioral economics.

Consequently, under such circumstances, there is a high possibility that it would be difficult for consumers to change even if new products with higher performance came along. What would be necessary is an indirect approach strategy based on behavioral economics which leads consumers to realize that they are more in the negative area than they realize.

Figure 3 Value Function and Maintenance of Status Quo

3.3 New Institutional Economics Based on the Intellectual World

a) Existence of Transaction Costs

It is not only the mental bias of consumers that makes them continue to choose current inefficient products instead of shifting to superior new products.

Ronald Harry Coase (1937, 1988) and Oliver E. Williamson (1975, 1985, and 1996) identified costs separate from the physical and mental worlds, namely 'transaction cost,'⁸ which is difficult to measure but has a considerable influence on human behavior.

According to Williamson, we are moved by bounded rationality rather than complete rationality as assumed in neoclassical economics. As we are not able to perfectly collect, collate, and express information, we try to act rationally within a situation of limited information. Moreover, we are opportunistic and try to pursue self-interest, sometimes even by guile.

If every individual is governed by bounded rationality and is opportunistic, as assumed by Williamson, some may take advantage of the other and try opportunistically to bargain in order to pursue self-interest when conducting a market transaction. In such a case, it becomes necessary to appraise the other party, enter into a formal contract engaging a lawyer, and keep an eye on the other party during execution of the contract. A lot of bargaining would probably be seen in deals involving land and buildings, although not so much in transactions involving inexpensive products such as stationery.

Therefore, in negotiating transactions, considerable futility, in other words 'transaction costs,' become unavoidable. Every individual has the ability to grasp the importance of these costs. Transaction costs are not included in accounting cost. Although it is difficult to calculate the actual value of the cost and it is an indiscernible cost, it undoubtedly exists. It is comprehended by one's intellect and is an inmate of World Three, the intellectual world, in Popper's words.

b) Principle of Economizing Transaction Costs

Following is a simple example to explain how human behavior is influenced by the existence of transaction cost.

⁸Although new institutional economics consists of transaction cost theory, agency theory, and the theory of property rights, transaction cost theory developed by Coase and Williamson is explained here in more detail. See Eggertsson (1990) for the basics of new institutional economics.

Let us assume that Japanese manufacturer α does business with domestic parts manufacturer β at the cost of C_1 yen per part. Manufacturer β always observes the appointed delivery date and product quality is high. Thus, manufacturer α has full confidence in manufacturer β . However, one day an unacquainted parts manufacturer γ in Southeast Asia sounded out manufacturer α on the possibility of supplying the same parts at a lower price of $C_2 (< C_1)$ per part. Should manufacturer α continue business with manufacturer β or should it newly make a contract with manufacturer γ ?

From the point of view of the physical world, this situation can be expressed as the following inequality if manufacturer β supplies the parts at C_1 yen per part, and manufacturer γ at C_2 per part, and manufacturer α orders amount X . Therefore, a more rational choice for manufacturer α will be to do business with manufacturer γ .

$$C_1X > C_2X$$

However, manufacturer α will soon realize in this transaction the existence of transaction cost (TC) which is an inmate of the intellectual world. Manufacturer α realizes that there would not be much transaction cost TC_1 , because there is no uncertainty attaching to transactions with the Japanese manufacturer β , or any bargaining. On the other hand, in order to begin business with unacquainted manufacturer γ , it becomes necessary to appraise, in advance, its manufacturing ability, enter into a formal contract, and keep an eye on γ during execution of the contract. This would result in a considerable transaction cost, $TC_2 (> TC_1)$. Taking such cost into account, the following inequity will hold true for manufacturer α :

$$C_1X - C_2X < TC_2 - TC_1$$

Accordingly,

$$C_1X + TC_1 < C_2X + TC_2$$

Thus, even if the per unit price of manufacturer γ is lower than that of manufacturer β , manufacturer α will continue to choose to deal with manufacturer β due to the considerable transaction cost (TC_2) that would be incurred in doing business with manufacturer γ . Although it may seem to be an irrational choice, taking transaction cost into consideration it is an exceedingly rational choice of behavior. We tend to choose behavior with little transaction cost or behavior that decreases transaction cost. This is the principle of transaction cost economizing.

c) Absurd Phenomena

As explained so far, even if rival manufacturers produce superior and less expensive new products and thus offer more profit, according to neoclassical economics in a world where transaction cost exists there is no assurance that consumers will buy the products. And, based on behavioral economics, there is no assurance that consumers will shift from current products to the new products even if they are in the negative domain and seeking risk. This is because they realize the existence of invisible transaction costs in shifting from current products to the new superior and less expensive ones. As a result, we fall into absurdity (rational inefficiency)⁹ by continuing to choose inefficient situations if judging rationally.

⁹The absurd phenomenon is continuing to choose inefficient situations even if judging rationally.

For example, let us assume that a manager of a certain firm is considering importation of superior mechanical appliances to enhance productivity. The manager recognizes the current situation where business is slow and the firm is in a worse position than expected. In such a case, purchase of better mechanical appliances is seen as an efficient course of action according to neoclassical economics, and also rational behavior according to behavioral economics. However, it could be said that it is not rational according to transaction cost economics. This is because if production is made more efficient by importing new superior mechanical appliances, there is a possibility that some employees will be dismissed. If there is such a possibility, importation will be opposed by employees and thus considerable negotiation and transaction costs will likely be incurred. This is something which is more likely to happen at German firms where codetermination law, which makes labor-capital negotiation mandatory, is in place.

In transaction cost economics, choosing to remain in such an inefficient situation is not an irrational choice, rather, it is regarded as rational behavior. We cannot easily shift to the new situation simply because our intellect comprehends transaction costs. In other words, unless one shifts to the new situation, transaction costs will not emerge, and thus we tend to maintain the status quo. This is called 'absurdity (rational inefficiency).'

4. Possibilities of Behavioral New Institutional Economics

4.1 Behavioral New Institutional Economics Based on the model of Cubic Human Behavior

Based on the pluralistic world theory of Popper (1972) it is assumed that we live in three different worlds. This model of cubic (three-dimensional) human behavior, the basic assumptions behind behavioral new institutional economics, is taken to mean:

- (W1) Every individual lives in a physical world, a mental world, and an intellectual world.
- (W2) Every individual tries to act rationally based on limited information: bounded rationality.
- (W3) Every individual tries to self-centeredly maximize utility within limited bounds: bounded egoism.

To understand the individual characterized by bounded rationality and bounded egoism that lives in such pluralistic worlds, I present an example as follows. For a consumer purchasing a certain product the benefit arising in the physical world is assumed to be B_1 —his/her asset physically increases and thus the value of physical assets possessed accumulates. However, at the same time the consumer also has to bear the cost, an accounting cost which is the actual price of the product and is shown as C_1 .

Subsequently, the mental benefit to the consumer based on the reference point peculiar to that consumer is assumed to be B_2 and the mental cost felt as a burden in purchasing the product is shown as C_2 . This is the cost-benefit imposed on the consumer in the mental world. In this world, rigorous calculation may not be possible. Instead, cost-benefit is instantly calculated and expressed in words such as 'feel heavy-hearted,' 'feel depressed,' or 'be reluctant.'

Finally, the benefit arising from discussion with his /her family and friends and from

Table 2 Pluralistic Calculation of Profit and Losses

(-)	P/L	(+)
C_1 = cost in the physical world		B_1 = benefit in the physical world
C_2 = cost in the mental world		B_2 = benefit in the mental world
C_3 = cost in the intellectual world		B_3 = benefit in the intellectual world

negotiating with the store clerks is shown as B_3 . The cost, which is mostly transaction cost, is shown as C_3 . In this intellectual world, rigorous calculation also may not be possible. The cost-benefit is again calculated instantly, and, as a result, is voiced in words such as ‘seems costly,’ ‘is unlikely to cause any friction,’ or ‘may take time.’

Consequently, based on the limited ability as shown in Table 2, every individual living in the pluralistic world is assumed to add up the cost-benefit imposed on him in these three worlds and then to behave in such a way as to minimize total cost or to maximize total benefit. Such a model of human behavior characterized by bounded rationality and bounded egoism are called ‘the model of cubic human behavior.’

It is possible to develop the following theory if behavioral economics is associated with new institutional economics on the basis of the model of cubic human behavior.

Firstly, in deciding whether to purchase a particular product or not, it is assumed that a person decides to purchase it if the total benefit ($B_1 + B_2 + B_3$) is larger than the total cost ($C_1 + C_2 + C_3$).

$$C_1 + C_2 + C_3 < B_1 + B_2 + B_3 \rightarrow \text{purchase}$$

On the other hand, if the total benefit is less than the total cost, one would probably decide not to purchase it. However, if not purchasing the product is inefficient from a social viewpoint, people may try to employ an institution of governance (Williamson, 1996) that economizes total cost ($C_1 + C_2 + C_3$) ↓.

Then again, in order to employ such an institution of governance, physical cost, mental cost, and intellectual cost arise. If the cost to employ such an institution of governance is shown as c , and total cost including this cost c and economized total cost ($C_1 + C_2 + C_3$) ↓ is less than the total benefit, a new institution of governance will be employed resulting in purchase of the product.

$$(C_1 + C_2 + C_3) \downarrow + c < (B_1 + B_2 + B_3) \rightarrow \text{employment of the institution of governance purchase}$$

On the other hand, if the total benefit ($B_1 + B_2 + B_3$) is less than the total of institution employment cost c and economized total cost ($C_1 + C_2 + C_3$) ↓, the institution of governance will not be employed regardless of the social inefficiency. As a result, the status quo is maintained and the product will not be purchased. This would result in discord between individual efficiency and social efficiency. In other words, it would result in the ‘absurdity (rational inefficiency)’ abandoning social efficiency and pursuing individual efficiency.

$$(C_1 + C_2 + C_3) \downarrow + c > (B_1 + B_2 + B_3) \rightarrow \text{non purchase}$$

Furthermore, if the total benefit equals total cost or if the total of institution employment cost c and economized total cost equals the total benefit, the choice to purchase or not will be neutral.

$$C_1 + C_2 + C_3 = B_1 + B_2 + B_3 \rightarrow \text{neutral as whether to purchase or not}$$

$$(C_1 + C_2 + C_3) \downarrow + c = B_1 + B_2 + B_3 \rightarrow \text{neutral as whether to purchase or not}$$

In order to verify the theoretical effectiveness of such behavioral new institutional economics, the following section explains that neoclassical economics, behavioral economics, and new institutional economics can be deduced from behavioral new institutional economics. In other words, the following section explains that it is possible for the above economics to be subsumed in behavioral new institutional economics.

4.2 Deduction from Behavioral New Institutional Economics I: Type1 of Absurdity

From the viewpoint of the model of cubic human behavior in behavioral new institutional economics, human behavior which is at the basis of neoclassical economics, can be regarded as behavior where the total cost-benefit becomes zero in the mental and intellectual worlds and thus changes in these two worlds do not influence human behavior.

$$C_2 + B_2 = 0$$

$$C_3 + B_3 = 0$$

The cost-benefit of the physical world becomes the only determining factor of human behavior. If benefit B_1 is larger than cost C_1 in the physical world it is assumed everyone will choose to act, but if, on the other hand, it is smaller than C_1 , it is assumed we will try to maintain the status quo.

$$C_1 < B_1 \rightarrow \text{action}$$

$$C_1 > B_1 \rightarrow \text{maintenance of status quo}$$

In contrast, human behavior at the basis of behavioral economics can be regarded as behavior where the total cost-benefit of the physical and intellectual worlds becomes zero as shown in the following equation, and thus changes in these worlds do not influence human behavior.

$$C_1 + B_1 = 0$$

$$C_3 + B_3 = 0$$

Thus, cost-benefit of the mental world becomes the only determining factor of human behavior. If mental benefit B_2 is larger than mental cost C_2 , then everyone will choose to act.

$$C_2 < B_2 \rightarrow \text{action}$$

Conversely, if mental cost C_2 is larger than mental benefit B_2 , we will try to maintain the status quo. However, if such a situation is regarded as inefficient from a social point of view, everyone may try to employ an institution of governance which economizes mental cost C_2 , change the existing system, or try to relatively increase benefit B_2 .

However, in employing such an institution of governance that economizes mental cost, it is not possible to disregard the physical, mental, and intellectual costs. If the cost to employ such an institution of governance is shown as c , and the total cost including this cost c and economized cost $C_2 \downarrow$ is smaller than benefit B_2 , the institution of governance is likely to be employed. If the cost is larger than the benefit, it would mean that the cost is high and thus the status quo will be maintained even if the situation is inefficient from a social point of view. In other words, it will result in the 'absurdity (rational inefficiency).'

$$\begin{aligned}
C_2 > B_2, C_2 \downarrow + c < B_2 &\rightarrow \text{employment of or change in} \\
&\quad \text{the institution of governance} \\
C_2 > B_2, C_2 \downarrow + c > B_2 &\rightarrow \text{maintenance of status quo}
\end{aligned}$$

Finally, from the viewpoint of the model of cubic human behavior in behavioral new institutional economics, human behavior at the basis of new institutional economics may be regarded as behavior where the total cost-benefit becomes zero in the physical and mental worlds and thus changes in these two worlds do not influence human behavior in new institutional economics.

$$\begin{aligned}
C_1 + B_1 &= 0 \\
C_2 + B_2 &= 0
\end{aligned}$$

Thus, cost-benefit of the intellectual world becomes the only determining factor of human behavior. If intellectual benefit B_3 is larger than intellectual cost C_3 , then everyone will decide to act.

$$C_3 < B_3 \rightarrow \text{action}$$

To the contrary, if intellectual cost C_3 is larger than intellectual benefit B_3 , everyone may try to maintain the status quo. However, if such a situation is regarded as inefficient from a social point of view, everyone may try to employ an institution of governance which economizes intellectual cost C_3 and thus to increase benefit B_3 .

However, additional physical, mental, and intellectual costs will arise in employing such an institution of governance. If the cost to employ such an institution of governance is shown as c , and total cost including this cost c and economized intellectual cost $C_3 \downarrow$ is smaller than benefit B_3 , the system is likely to be employed. If the cost is larger than the benefit, the status quo will be maintained even if the situation is inefficient from a social point of view. In other words, it will result in discord between individual efficiency and social efficiency, and thus ‘absurdity (rational inefficiency)’ will arise.

$$\begin{aligned}
C_3 > B_3, C_3 \downarrow + c < B_3 &\rightarrow \text{employment of the institution of governance} \\
C_3 > B_3, C_3 \downarrow + c > B_3 &\rightarrow \text{maintenance of status quo}
\end{aligned}$$

Conclusively, human behavior as the basis of neoclassical economics, behavioral economics, and new institutional economics may be deductively derived from the model of cubic human behavior. Accordingly, it is possible to integrate behavioral economics and new institutional economics on the basis of the model of cubic human behavior, and thus behavioral new institutional economics,¹⁰ which subsumes the already existing theories, becomes possible.

4.3 Deduction from Behavioral New Institutional Economics II: Type2 of Absurdity

From the viewpoint of the model of cubic human behavior, it is not only possible to explain the phenomena already explained by the existing theories but also to explain and predict new phenomena thus indicating that behavioral new institutional economics is falsifiable. The other ‘absurdity (rational inefficiency)’ is explained in this section.

Concerning the purchase of a product, it is possible to think that a consumer may not necessarily decide to purchase even if benefit B_1 is larger than cost C_1 in the physical world.

¹⁰For a concrete case study on behavioral new institutional economics, see Kikuzawa (2006a, 2006b), a paper on behavioral transaction cost theory.

In other words, there is a possibility that he/she may not purchase the product even if everyone thought it was a good bargain.

$$\text{Physical world} \quad C_1 < B_1 \quad (1)$$

This is because mental cost C_2 felt in the mental world by the consumer in purchasing that product may be larger than mental benefit B_2 , and intellectual cost C_3 arising in the intellectual world may also be larger than benefit B_3 .

$$\text{Mental world} \quad C_2 > B_2 \quad (2)$$

$$\text{Intellectual world} \quad C_3 > B_3 \quad (3)$$

Accordingly, these inequalities(2)(3) are likely to hold true and total cost-benefit becomes minus for the consumer.

$$C_1 + C_2 + C_3 > B_1 + B_2 + B_3 \rightarrow \text{non purchase} \quad (4)$$

If this inequality is rephrased by a falsifiable proposition,¹¹ it would become: ‘concerning the purchase of a certain product, no one would purchase it if all inequalities (1) (2) (3) (4) hold true.’ In other words, if there is someone that actually purchases the product in such a situation, it will be falsified.

Adversely, from the viewpoint of the physical world, let us assume that in purchasing a certain product benefit B_1 achieved by the consumer is by far smaller than cost C_1 borne. Regardless of this fact, the consumer may continue to purchase the same product.

$$\text{Physical world} \quad C_1 > B_1 \quad (5)$$

If there is such a product market, firms may think that they will easily be able to control it if they develop a product whose benefit B_1 is larger than cost C_1 in the physical world.

However, this is not sufficient in reality, because, from the viewpoint of the mental and intellectual worlds, the benefit may be larger in maintaining the status quo and continuing to purchase the same product.

$$\text{Mental world} \quad C_2 < B_2 \quad (6)$$

$$\text{Intellectual world} \quad C_3 < B_3 \quad (7)$$

Consequently, if all cost-benefits are summed up, the total benefit will remain larger than the total cost. Thus, even if it looked like an inefficient act of purchase from the viewpoint of the physical world, continuing to purchase the same product will be rational for the consumer although it may apparently seem to be irrational.

$$C_1 + C_2 + C_3 < B_1 + B_2 + B_3 \rightarrow \text{maintenance of status quo} \quad (8)$$

If this inequality is rephrased by a falsifiable proposition, it would be: ‘Concerning the purchase of a certain product, no one would stop purchasing the product if all inequalities (5) (6) (7) (8) hold true’. In other words, if there is someone that actually does not purchase the product in such a situation, it will be falsified.

Business behavior disregarding consumer behavior and customers who live in three worlds and pursuing efficiency in only one world (W1), is rationally weeded out due to the other worlds(W2 or W3) changing. In other words, such one-dimensional business behavior

¹¹ According to Popper, the demarcation of empirical science and non-empirical science is at the falsifiability of the theory. More details are given in Popper (1959, 1965).

will fall in the realm of the ‘absurdity (rational inefficiency).’

Other phenomena may be explained and estimated, and thus a falsifiable proposition can be derived. In other words, behavioral new institutional economics retains the possibility of bringing about the development of knowledge.

5. Conclusion

In this paper, possibilities of integrating new institutional economics and behavioral economics, or in other words, the possibility of ‘behavioral new institutional economics,’ has been discussed.

To verify this possibility of integration, it has been clarified that, based on Popper’s pluralism, every individual lives in the three existing worlds of the physical, mental, and intellectual.

Secondly, it has been proved that among these three worlds, theory based on the physical world is neoclassical economics, theory based on the mental world is behavioral economics, and that based on the intellectual world is new institutional economics.

Finally, the model of cubic (three-dimensional) human behavior, in which every individual with bounded rationality and bounded egoism behaves based on the sum of total cost-benefit occasioned in these three worlds, has been presented. And then, evidence has been produced that it is possible to develop a theory of behavioral new institutional economics, composed of behavioral economics and new institutional economics, as a more persuasive theory.

In other words, it has been proved that not only the phenomenon already being explained, but also the phenomenon not being explained by traditional theories, can be explained by behavioral new institutional economics based on the model of cubic human behavior.

Consequently, it can be said that behavioral new institutional economics based on the model of cubic human behavior is promising as an empirically persuasive theory.

Reference

- Camerer, C.F. (2003). *Behavioral Game Theory*. Princeton: Princeton University Press.
- Coase, R.H. (1937). “The Nature of the Firm,” *Economica*, 4(3), 386–405.
- Coase, R.H. (1988). *The Firm, The Market, and The Law*. Chicago: The University of Chicago Press.
- David P. (1985). “Clio and the Economics of QWERTY,” *American Economic Review*, 75(2), 332–337.
- Eggertsson, T. (1990). *Economic Behavior and Institutions: Principles of Neoinstitutional Economics*. Cambridge, UK: Cambridge University Press.
- Hart, O. and J. Moore (2008). “Contracts as Reference Points,” *Quarterly Journal of Economics*, 123(1), 1–48.
- Kahneman, D. and A. Tversky (1979). “Prospect Theory: An Analysis of Decision under Risk,” *Econometrica*, 47, 263–291.
- Kikuzawa, K. (2006a). “Mental Accounting of Leader,” *Diamond Harvard Business Review*, February, 94–108.
- Kikuzawa, K. (2006b). “Mental Accounting Approach to Administrative Behavior: Toward Behavioral Transaction Cost Economics,” *Mita Business Review*, 49(4), 131–147.

- Popper, K.R. (1959). *The Logic of Scientific Discovery*. London: Hutchinson.
- Popper, K.R. (1965). *Conjecture and Refutations: The Growth of Scientific Knowledge*. London: Routledge and Kegan Paul.
- Popper, K.R. (1972). *Objective Knowledge: An Evolutionary Approach*. Oxford: Clarendon Press.
- Popper, K.R. (1982). *Unended Quest: An Intellectual Autobiography*. La Salle, Ill.: Open Court Publishing Company.
- Sunstein, C.R. (2000). *Behavioral Law and Economics*. Cambridge, UK; New York: Cambridge University Press.
- Thaler, R.H. (1980). "Toward a Positive Theory of Consumer Choice," *Journal of Economic Behavior Organization*, 1, 39-60.
- Thaler, R.H. (1985). "Mental Accounting and Consumer Choice," *Marketing Science*, 4, 199-214.
- Thaler, R.H. (1999). "Mental Accounting Matters," *Journal of Behavioral Decision Making*, 12, 183-206.
- Tversky, A. and D. Kahneman (1992). "Advances in the Prospect Theory: Cumulative Representation of Uncertainty," *Journal of Risk and Uncertainty*, 5, 297-323.
- Williamson, O. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: The Free Press.
- Williamson, O. (1985). *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*. New York: The Free Press.
- Williamson, O. (1996). *The Mechanisms of Governance*. New York: Oxford University Press.