제도와 경제
제15권 제1호, 2021년 2월, 65-81
한국제도·경제학회

Review of Institution and Economics
Volume 15, No. 1, February 2021, 65-81
Korea Institution and Economics Association
https://doi.org/10.30885/RIE.2021.15.1.065

The Value-Cost Rationality Mapping Impertinent to the Bounded Rationality Space*

Sung Sup Rhee rheess@ssu.ac.kr

Emeritus professor of Soongsil University, Korea.
https://nyxabartar.wixsite.com/sungsuprhee

<Contents>

Abstract

The decision of human cognition always accompanies by wavering behavior. It is why a decision bears the ICP (indeterminate, coincidental, path-dependent) property. If the suspicion of mechanical problem holds Akerlof's used car in check, there is wavering in a purchase decision. The premise CMVCI (consistent measuring of the value-cost indices) severs the behavioral approach from the rationality approach. It is nothing but Hume's PUN (the principle of the uniformity of nature). The VCR (value-cost rationality) mapping is unfit for modeling the ICP phenomena.

Key words: Sympathy-consent process, Pricing scheme, Wavering, Coincidental, Indeterminate.

* This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF- 2018S1A5A2A01029958).

I. Human Cognitive System and Epistemic Taxonomy

The *sympathy-consent* dimension is an analytical dimension built on the human cognitive system (Kahneman, 2003; Rhee, 2017, 2018c). The interpersonal interactions require the sympathy-consent process between interacting individuals (Hume, 1739; Smith, 1759; Buchanan and Tullock, 1962; Rhee, 2012b). Behavioral experiments unfolded that the human cognitive system begins with perception. At a perception, two types of cognitive processes are *intuition and reasoning* (Chaiken and Trope, 1999; Gilbert, 2002; Sloman, 2002; Stanovich and West, 2002).

The cognitive process of *intuition* prompts fast, in parallel, automatically, effortlessly, associatively at the moment of perception (Kahneman, 2003), which fulfills primal as 'System 1' (Stanovich and West, 2000). On the other hand, the cognitive process of *reasoning* carries out slowly, serially, in a controlled way, effortfully, and as rule-governed fashion. It is secondary as 'System 2'.

The cognitive system process is affected by the mental contents set by percepts and stimulation arousal on the one hand and by conceptual representation on the other hand. The technical term for the ease with which mental contents come to mind is accessibility (Higgins, 1996; Kahneman, 2003). With mental contents being differentiated by *accessibility*, the process of human decision becomes *reference-dependent* (Kahneman and Tversky, 1979), influenced by framing effects (Tversky and Kahneman, 1981, 1986), and guided by judgment heuristics (Kahneman and Frederick, 2002).

Sympathy-consent Dimension

The cognitive process of behavioral studies precisely parallels with Hume's taxonomy of *perceptions* (Johansson, 2012). Human cognition begins with perceptions, which make impressions. Ideas are the copy of impressions. Principles of Association work to create the sensation and reflection from impressions and ideas (Hume, 1739, 1748). While running the causal inference from one idea to another, Hume relied on the imagination and memory (missing shade of blue: Hume, 1739), which leads to the territory of inductive reasoning (Johansson, 2012). 뱟David Hume deserve(s) the honorary title: the first cognitive scientist. (Johansson, 2012; also John Biro, 1993: 33; Craig, 2000)

In the rational agent model (RAM, in short), value-cost measures navigate the interpersonal interface. The price mechanism attains the trading. The optimization-equilibrium algorithm supports the price mechanism. The exchange takes place from the market-clearing system $D(p) = S(p)$.

In the human cognitive system, such RAM model does not hold efficacy. The consistent measuring of the value-cost indices (CMVCI in short)[1] is not supported by the human cognitive system (scope neglect: Kahneman et al., 1999, Frederick and Fischhoff, 1998; violation of monotonicity: List, 2002, Hsee, 1998, Alevy et al., 2003). The human cognitive system even does not support basic probability principles (Tversky and Kahneman, 1983).

How to achieve the 'interpersonal interface' when the cognitive systems of individuals differ from each other? The sympathy is the only conduit available to the empiricists (Hume, 1739; Smith, 1759). Consent is the connotation presented in the public-choice studies, which indicates the process of interpersonal interaction (Buchanan and Tullock, 1962).[2] The sympathy-consent process denotes the process of interpersonal interaction when individuals' cognitive systems differ from each other (Rhee, 2012b). The significance of the sympathy-consent process consists of its role as the vehicle to attain the exchange (Rhee, 2012b).

Although this denotation of the *sympathy-consent process* is new in the literature, the phenomena are familiar. Entrepreneurship is a well-known idea in economics. However, there is no room in the RAM where to locate the idea. Entrepreneurship is a phenomenon of the sympathy-consent process (Rhee, 2018d, 2018e). The sympathy-consent process's typical real features are the actions like trust, friendship, affection, colleagueship, and so on. Now and then, we encounter the occasion of exchange through such activities (Goldberg, 1980; Macneil, 1978; Dore, 1983). Such an exchange but through the sympathy-consent process is denoted as relation exchange (Rhee, 2012b). A real example of relation exchange may be household life. Human life is full of relation exchanges.

It offers a new analytical dimension to the study of economics (Rhee,

1) I will elaborate on CMVCI in the next subsection.

2) Buchanan and Tullock (1962) didn't consider the human cognitive system and relied on the RAM for the analyses. In this paper, their concept of consent is extended to the human cognitive system.

2012b, 2013b, 2018c). I consider all the trading or exchange as relation exchange. It is the dimension of bounded rationality (Simon, 1955; Rhee, 2012b, 2018c). Natural questions are: what is the role of price in the sympathy-consent process? Can we use a RAM modeling to represent human actions dictated according to the sympathy-consent process? This paper aims to answer the questions.

Ⅱ. Price Mechanism versus Sympathy-consent Process

We discussed two different mechanisms of *exchange*: price mechanism and sympathy-consent process. The former is the exchange mechanism of the RAM. The latter is the mechanism that works with the human cognitive system. How are they related? To answer the question, we must understand the *epistemic* taxonomy of human understanding (Hume, 1739).

The RAM's price mechanism is the method to present modeling, which will explain an indisputable phenomenon, *e.g.*, the exchange. The market-clearing system D(p) = S(p) accounts for the phenomena of exchange. We may adopt a statistical testing method to verify the efficacy of the modeling. However, this modeling approach works on one big premise. The phenomena that the modeling stands for continue to recover uniformly.[3] It is called the Principle of the Uniformity of Nature (PUN in short).

Once the statistical testing accepts a model, it indicates its acceptance as the PUN outcome in an epistemic sense. When we use a model of the market-clearing system D(p) = S(p) to explain an exchange, it indicates the CMVCI, on which the model works, continues to sustain uniformly. In the RAM modeling, the CMVCI is equivalent to Hume's PUN.

Definition 1: CMVCI (consistent measuring of the value-cost indices): We can measure the value-cost indices consistently across different applying individuals and different possible conditions throughout the modeling operation.

---

3) "..that instances, of which we have had no experience, must resemble those of which we have had experience, and that the course of nature continues always uniformly the same". (T: 1, 3, 6, 5). As for the parenthesis, T denotes *Treatise of Human Nature* (Hume, 1739) and numbers indicate Book, Part, Section, paragraph each in serial order.

This modeling approach began with the premise CMVCI, on which we extend the rational reasoning to elicit epistemic understandings. To reject a (statistically accepted) model of D(p) = S(p) is the same as to deny the CMVCI. This approach is called the *value-cost rationalism* (Rhee, 2018a, 2018b). In an epistemic sense, such an approach is incorrect because understanding the matters of fact does not come from the reason (Hume, 1739). The insights of the modeling come eventually from the assumption. Any refusal to accept the insights of the model is the same as the refusal of the assumption.[4)]

In rational reasoning, as RAM modeling, any process to gain knowledge from experiences is completely blocked. However, every human understanding has to come from the experiences of perception. In other words, we are not allowed to rely on the price mechanism only to explain the trading or exchange. The reliance on the sympathy-consent process to understand the exchange is an unavoidable imperative.[5)]

Human Cognitive System and Price Determination

Once we accept the human cognitive system, we cannot rely on the price mechanism D(p)=S(p) to determine the exchange because the latter approach needs the CMVCI as the PUN. The experiments of behavioral studies do not support the premise CMVCI. We have to rely on the sympathy-consent process. The exchange becomes a *relation exchange*. Then, what is the role of the price? The price becomes a part of the sympathy-consent process. It is an essential catalytic factor of the exchange.

If the market clearing system D(p) = S(p) does not work, how is the price determined? Haggling, auction, ask-bid, markup, administered pricing or any combination of them are the way to determine the price (Rhee, 2018a). No price is determined by the market-clearing system D(p) = S(p) in the market. Market clearing system is entirely theoretical modeling. Markup is the way to determine the price for most of the commodities in the market. Auction fixes the price of fresh fishes or

---

4) You accept the assumption at first. Hence, your rejection of the modeling's insights is the same as the rejection of the assumption because the modeling is nothing but rational reasoning. In the PUN approach, the denial of modeling is the same as the rejection of the PUN (C. M. Lorkowski 2018: Internet Encyclopedia of Philosophy)

5) The lack of epistemic process in economics seems to account for why there is not much literature addressing the definition of the market.

famous artworks. Most interest rates are the administered pricing. Stock, bond, futures prices, and foreign exchange rates are determined in the stock exchange or foreign exchange market's ask-bid scheme.

A distinctive feature of the price in the sympathy-consent process is *path dependence*. Markup and administered pricing reveal path dependence. The beginning price in most of the markets consults reference prices like closing prices of the day before. The price determination pertains to the indeterminate system. The coincidence is an essential factor to determine the price path (Rhee, 2012b, 2013b, 2018c). The haggling and ask-bid scheme reveal indeterminateness and coincidence. In contrast, the price determination in the market clearing system D(p) = S(p) is neither path-dependent nor coincidental. It pertains to the determinate system.

Ⅲ. Bounded Rationality and the Empiricism

Any logical reasoning has to begin with the PUN. The PUN is the CMVCI in the case of the RAM modeling. We may define a topological 'Space R' that may occur according to the dictation of RAM model operation when the premise CMVCI is in place.[6)]

$$\text{Space R} = \{r_{ij}: \text{the economic states of the RAM model operation for i-th person and j-th instance at the premise CMVCI}\} \quad (1)$$

Space R is a closed and determinate system because every economical state which belongs to Space R is closed and determined by the adopted RAM model. We will denote it as the closed-determinate system (Rhee, 2013b, 2018c).

Once we accept the human cognitive system, the premise CMVCI becomes untenable.

Definition 2: Untenable CMVCI: Untenable CMVCI defines the condition that the CMVCI is not sustainable.

---

6) Space R is a topological space. We can define Ø, R, where R is a set and Space R is a topological space defined on Set R. Every union of subsets of R belongs to Space R because they meet the PUN or CMVCI. Every finite intersection of subsets of R belongs to Space R for the same reason.

We may define another topological 'Space M' that may occur when the premise Untenable CMVCI is put in place.[7)]

Space M = {m_{ij}: the economic states that may take place for i-th person and j-th instance at the premise Untenable CMVCI} (2)

Space M is an open and indeterminate system because the Untenable CMVCI defines the economic states which belong to Space M. The Space M expressed on Untenable CMVCI indicates the domain of Hume's empiricism. Determinate conditions are unreal. We cannot seek a determinate solution in the world of human cognition. For instance, the trust in Akerlof's lemon market is not a determinate state. We will denote it as the open-indeterminate system (Rhee, 2013b, 2018c).

Indeterminateness, *Coincidence*, *and Path Dependence*

The human cognitive system's economic states are a subset of Space M because the premise CMVCI becomes untenable as we assume the human cognitive system. How do we get at the knowledge with the human cognitive system? It is what David Hume coped with. His answer was the experience. He presented his cognitive ontology (Johansson, 2012). Human understanding begins with perceptions, which give rise to impressions. Every human idea is the copy of impressions (Copy Principle). Ideas and impressions combined with the human intellectual faculty of imagination build the epistemic taxonomy of empiricism. One essential pillar of Hume's epistemic inquiry is the reasoning of relations, which is built, after all, on the relations of causality (Associative Principle).

How can we interpret the essential properties of Hume's epistemic taxonomy into the language of modern economics? They are the indeterminateness, coincidence, and path dependence (Rhee, 2013b; Owens, 2007). They describe three different features of the same property of empiricism: the Copy Principle and Associative Principle. They are useful because they become the criteria to determine the pertinence of

7) Space M is a topological space. We can define Ø, M, where M is a set and Space M is a topological space defined on Set M. Every union of subsets of M belongs to Space M because they meet the Untenable CMVCI. Every finite intersection of subsets of M belongs to Space M for the same reason.

the phenomena to the territories between the value-cost rationalism and empiricism. If a phenomenon is either of indeterminate, coincidental, and path-dependent (ICP in short), it belongs to the empiricism Space M. If the phenomenon is determinate and neither coincidental nor path-dependent, it belongs to the rationalism Space R.

Remark 1: the ICP as Essential Property of Space M: If any of the features of I (indeterminateness), C (coincidence), and P (path dependence) occurs, it denotes the pertinence to Space M.

Proof:

Any phenomenon of Space R works on the PUN, i.e., CMVCI in the RAM. If any of the property ICP occurs, it denotes the PUN violation, i.e., the breach of the CMVCI. Hence, it means the pertinence of the phenomena to Space M.□

From 'Remark 1', if the PUN or CMVCI is not complied with, the phenomena belong to Space M. Any modeling of the RAM is validated only upon the premise CMVCI. If any of the properties ICP occurs, the phenomena belong to Space M. For instance, trust is a phenomenon of the ICP. Hence, the purchase of Akerlof's used car is a phenomenon of Space M. Trust problem exists in the transaction in a used car market.

Ⅳ. SCP Mapping versus VCR Mapping

How about the sympathy-consent process? The sympathy-consent process is the mapping g from individuals' perception to their action. Individuals' perception X is a subspace in Space M. Their decision Y is also a subspace in Space M.

$$\text{Subspace } X \subset \text{Space } M \tag{3}$$
$$\text{Subspace } Y \subset \text{Space } M \tag{4}$$

Subspaces X and Y are relative topologies of M. X is a relative topology of perception in set M. Y is a relative topology of purchase decision

in set M. By assuming Untenable CMVCI, we know the perception set X pertains to the property ICP. Hence, it belongs to Space M. For instance, the trust problem of Akerlof's used car bears the property ICP, thus belongs to Space M.

Decision Wavering and SCP Mapping

However, to understand why a decision set Y bears the property ICP, we have to introduce an idiosyncratic feature of buyer's behavior, *i.e.*, decision wavering. When we go to the market, our decision is not that of purchase. It never fails to accompany a wavering action. Wavering is different from nil. Not buying may be recorded as purchasing nil. In the market-clearing system, the purchasing will be zero if the price is too high. However, purchase nil if the price is reasonable, it is wavering. Such wavering behavior bears the property ICP. It is the outcome of the human cognitive system.

Definition 3: Wavering: Wavering means the decision wavering that bears the property ICP.

Human cognition renders decisions to encompass wavering behavior. In Space M, a buyer's purchase decision always accompanies wavering action. Hence, Subspace Y becomes a subset of Space M. A buyer of Akerlof's used car never avoids decision wavering because the dealer's used car's trust remains susceptible to suspicion.

The purchasing decision becomes SCP mapping from perception Subspace X to decision Subspace Y.

$$\text{SCP mapping } g\text{: } x_{ij} \in \text{Subspace X} \rightarrow y_{ij} \in \text{Subspace Y} \qquad (5)$$

They belong to the empiricism Space M because individuals' perceptions and actions (purchasing decisions) occur under the premise of Untenable CMVCI (Rhee, 2018c).

Proposition 1: SCP Mapping (sympathy-consent process mapping): The mapping sympathy-consent process belongs to Space M.

Proof:

The equations (3), (4), (5) proves the proposition.□

The SCP mapping bears the ICP attributes. Human beings mobilize their cognitive system and interact with each other. The purchase of Akerlof's used car is a case of the SCP mapping. It is the exchange of trust between car dealers and buyers. The buyer uses his/her cognitive system to detect the credibility of the dealer. A dealer uses media for advertising his/her shops. It is the business model of the dealer. A buyer uses internet platforms to detect the information on the credibility of the dealer. It is the business model of the buyer. The interface of business models of both is the sympathy-consent process. Price is a part of SCP mapping. Markup pricing or some combination of markup pricing with haggling will be the used car transaction's pricing scheme. It is different from the market-clearing system D(p) = S(p). It is an SCP mapping process.

With every effort to strike a better deal, the SCP process remains short of complacency due to the limit of human cognition. A wavering behavior always accompanies the buying decision. Buyers know how to act when their cognition is incomplete.

VCR Mapping

In contrast with the SCP mapping, the VCR (value-cost rationality) mapping belongs to the rationality Space R because an individual's action takes place under the premise CMVCI (Rhee, 2018c). Since we assumed the CMVCI, the neoclassical school rolled out the preference ordering as an orthodox tenet. The utility schedule represents an individual's perception. If we denote Subspace W for an individual's preference space, it becomes a subspace of Space R.[8] Subspace Z denotes a decision set and is a subset of Space R.[9]

$$\text{Subspace } W \subset \text{Space } R \tag{6}$$
$$\text{Subspace } Z \subset \text{Space } R \tag{7}$$

8) Space R was a topological space that is set in place by the premise CMVCI. Subspace W is a relative topology of Set R, hence a subset of Space R.

9) Subspace Z is a relative topology of Space R.

The VCR mapping h maps preference space W to decision space Z.

$$\text{VCR mapping h: } w_{ij} \in \text{Subspace W} \rightarrow Z_{ij} \in \text{Subspace Z} \qquad (8)$$

Proposition 2: VCR Mapping (the value-cost rationality mapping): The value-cost rationality mapping belongs to Space R.

Proof:

Equations (6), (7), (8) prove the proposition.□

VCR mapping carries on to the efficacy due to the premise CMVCI. The optimization-equilibrium algorithm determines the decision behavior based on the preference set Subspace W. It is nothing but VCR mapping. There is no wavering behavior in this determinate process. If we paraphrase the analysis into Akerlof's used car's story, the VCR mapping is like assuming CMVCI. In other words, we pretend that there is no mechanical trust problem in used car markets.

Since there is no hindrance of trust problem, the price will determine the transaction of used cars. The market-clearing condition D(p) = S(p) will determine the price. Buyers of a used car come to the market and purchase a used car with a reference only to the tag price without lodging any suspicion on possible hidden mechanical problems. The VCR mapping unfolds the story likewise, although it may sound unreal.

The Impertinence of VCR Mapping

Can we use the VCR mapping to identify an exchange activity in Space M? In other words, can we use the optimization-equilibrium algorithm to represent the exchange activity in Akerlof's used car market? The following proposition states the impertinence of the VCR mapping.

Proposition 3: The Impertinence of VCR Mapping in Space M: The VCR mapping cannot identify the exchange transaction in Space M.

Proof:

The VCR mapping h maps the Subspace W in Subspace Z; h: $w_{ij} \in$ Subspace W $\rightarrow Z_{ij} \in$ Subspace Z. However, the exchange transaction in

Space M is the mapping from Subspace X to Subspace Y. The premise CMVCI block the use of the VCR mapping to represent the exchange transaction between Subspaces X and Y. The VCR mapping cannot identify the exchange transaction in Space M.□

'Proposition 3: The Impertinence of VCR Mapping to Space M' bears an immense significance in economics. We cannot use the market-clearing system D(p) = S(p) as modeling to represent Akerlof's used car transaction. Due to the trust problem, which is unavoidable in human cognition, the SCP mapping determines the exchange transaction of Akerlof's used car. The price is a part of the sympathy-consent process. Markup pricing mixed with haggling determines the exchange price. The SCP mapping, not VCR mapping, determines the exchange transaction (Rhee, 2021a).

Ⅴ. Concluding Remarks

The dual cognitive system, *perception-intuition* and *reasoning*, separates the behavioral approach from the value-cost rationality approach. The value-cost rationality approach begins with the premise CMVCI (consistently measuring of the value-cost indices). The CMVCI may be considered as the economic interpretation of Hume's PUN (the principle of the uniformity of nature). In other words, the behavioral approach opens the gateway to Hume's empiricism approach in economics.

Since each individual has a respective cognitive system, the SCP (sympathy-consent process) is the sole conduit between individuals. It implicates the separation of the SCP approach from the VCR (value-cost rationality) approach. The exchange transaction no longer relies on the price determined by the market-clearing system D(p) = S(p). The price becomes a part of the SCP. The SCP set the pricing scheme such as haggling, auction, markup, ask-bid, and administered pricing.

A distinctive attribute of the cognitive system is the ICP (indeterminate, coincidental, path-dependent). The SCP mapping maps a perception to a decision. A perception belongs to the subspace of the ICP property. Likewise, a decision also belongs to the subspace of ICP property. The decision of human cognition always accompanies by wavering behavior. It is why a decision bears the ICP property. If the

suspicion of a mechanical problem holds Akerlof's used car in check, there is wavering in a purchase decision.

On the other hand, the VCR mapping maps a *perception utility* to a decision. The perception is nothing but utility under the premise of CMVCI. The decision no longer bears the ICP property. It belongs to a determinate space. The optimization-equilibrium algorithm always makes a determinate solution of a purchase decision. Without a trust problem, the purchase decision of a used car leads to a determinate answer.

The premise CMVCI severs the behavioral approach from the rationality approach. It is nothing but Hume's PUN (the principle of the uniformity of nature). The VCR mapping is unfit for modeling the ICP phenomena.

References

Akerlof, G. A. (1970), The market for 'lemons': quality uncertainty and the market mechanism, *Quarterly Journal of Economics*, 84(3): 488-500.

Biro, J. (1993), Hume's new science of the mind, in D.F. Norton (ed.), *The Cambridge Companion to Hume*, Cambridge: Cambridge University Press, 33-63.

Buchanan, James M. and Gordon Tullock (1962), *The Calculus of Consent*, Ann Arbor: University of Michigan Press.

Craig, E. (2007), Hume on causality: projective and realist?, in R. Read and K. A. Richman (eds.), *The new Hume debate*, revised edition, London: Routledge, 113-21.

Dore, Ronald (1983), Goodwill and the spirit of market capitalism, *The British Journal of Sociology*, 34(4): 459-482.

Gilbert, Daniel T. (1989), Thinking lightly about others: Automatic components of the social inference process, in James S. Uleman and John A. Bargh, eds., *Unintended thought*. Englewood Cliffs, NJ: Prentice-Hall, 189-211.

_____ (2002), Inferential correction, in Thomas Gilovich, Dale Griffin, and Daniel Kahneman, eds., *Heuristics and biases: the psychology of intuitive thought*, New York: Cambridge University Press, 167-84.

Goldberg, Victor P. (1980), Relational exchange; economics and complex contracts, *American Behavioral Scientist*, 23(3): 337-352.

Hart, Oliver (1995), *Firms*, *contracts*, *and financial structure*, Clarendon Press: Oxford

Grossman, Sanford J. and Oliver D. Hart (1986), The costs and benefits of ownership: a theory of vertical and lateral integration, *Journal of Political Economy*, 94(4), 691-719.

Hart, Oliver and Holmstrom, Bengt (1987), The theory of contracts, in Bewley, T. *Advances in economics and econometrics*, Cambridge University Press, 71-155.

Hart, O. and J. Moore (1988), Incomplete contracts and renegotiation, *Econometrica*, 56, 755-786.

_____ (1990), Property rights and the nature of firm, *Journal of Political Economy*, 98(6), 1119-1158.

_____ (1999), Foundations of incomplete contracts, *Review of Economic Studies*, 66, 115-138.

Higgins, Tory E. (1996), Knowledge activation: Accessibility, applicability, and salience, in E. Tory Higgins and Arie W. Kruglanski, eds., *Social psychology: handbook of basic principles*, New York: Gilford Press, 133-68.

Hodgson, G. M. (2004), Opportunism is not the only reason why firms exist: why an explanatory emphasis on opportunism may mislead management strategy, *Industrial and Corporate Change*, 13(2), 401-418.

_____ (2015), *Conceptualizing capitalism: institutions*, *evolution*, *future*, The University of Chicago Press.

Hsee, Christopher K. (1998), "Less is better: when low-value options are valued more highly than high-valued options," *Journal of Behavioral Decision Making*, 11(2), 107-21.

Hume, David (1739), *A Treatise of Human Nature*, produced 1992 by Prometheus Books.

_____ (1748), *The Enquiries concerning Human Understanding*, printed 2015 by Amazon.

Johansson, Ingvar (2012), Hume's ontology, *Metaphysica*, 13(1), 87-105.

Kahneman, Daniel and Amos Tversky (1979), Prospect theory: an analysis of decisions under risk, *Econometrica*, 47(2), 263-91.

Kahneman, Daniel and Shane Frederick (2002), Representativeness revisited: attribute substitution in intuitive judgment, in Thomas Gilovich, Dale Griffin, and Daniel Kahneman, eds., *Heuristics and biases: the psychology of intuitive thought*, New York: Cambridge University Press, 49-81.

Lorkowski, C. M. (2018), David Hume: Causation, Internet Encyclopedia of Philosophy: (https://www.iep.utm.edu/hume-cau/)

Macneil, Ian R. (1978), Contracts: adjustment of long-term economic relations under classical, neoclassical, and relational contract law, *Northwestern University Law Review*, 72, 854-905.

Owens, David (2007), *Causes and Coincidences*, Cambridge Studies in Philosophy, Cambridge University Press.

Rhee, Sung Sup (2012b), KwankaeKyohwanKyongjaehak (Relation Exchange Economics), *Jaedo wa Kyongjae (Review of Institution and Economics)*, 6(2), 123-151.

_____ (2013b), YulrinKyongjaehak qua DatchinKyongjaehak (Open system of economics vs. closed system of economics), *Jaedo wa Kyongjae (Review of Institution and Economics)*, 7(2), 13-43.

_____ (2014), Coasean closed system versus open system with institution, *Jaedo wa Kyongjae (Review of Institution and Economics)*, 8(1), 183-198.

_____ (2016), Reinterpretation of finance as relation exchange in the sympathy-consent dimension: market modalities and inductive price, presented at 2016 KEA-KAEA Conference in Seoul, Korea, August 8-9, 2016.

_____ (2017), Relation exchange as the model of bounded rationality, presented at 2017 KEA-APEA conference, July 7-8, 2017, Seoul, Korea.

_____ (2018a), The economics of empiricism and relation exchange, *Review of Institution and Economics*, 12(1), 51-90.

_____ (2018b), Empiricist approach to incomplete contract theory, J*aedo wa Kyongjae (Review of Institution and Economics)*, 12(2), 15-39.

_____ (2018c), Sympathy-consent process mapping as the model of bounded rationality, presented at 2017 WINIR Conference at Utrecht, Netherland; revised at 2018 Korea Econometrics Society Conference at Choonchun, Korea.

_____ (2018d), Institutional modality of the market with the application to financial assets, presented at 2018 Annual Conference of the Korea Law and Economics Association, Choonchun, February 1, 2018.

_____ (2018e), The indeterminateness of the sympathy-consent dimension and the entrepreneurship (in Korean), *Jaedo wa Kyongjae (Review of Institution and Economics)*, 12(3), 1-18.

_____ (2021a), The metrizability of human behavior as the fundamental problem of bounded rationality, presented by Zoom Link at the KASIO session of 2021 KEA Allied Conference, February 4, 2021.

Simon, Herbert (1955), A behavioral model of rational choice, *Quarterly Journal of Economics*, 69(1), 99-118.

Smith, Adam (1759), *The Theory of Moral Sentiments*, reprinted edition by D. D. Raphael and A. L. Macfie Classics (1976), Oxford: Oxford University Press.

Shelly, Chaiken and Yaacov Trope (1999), eds. *Dual-process theories in social psychology*, New York: Guilford Press.

Sloman, Steven A. (2002), Two systems of reasoning, in Thomas Gilovich, Dale Griffin, and Daniel Kahneman, eds., *Heuristics and biases: the psychology of intuitive thought*, New York: Cambridge University Press, 379-96.

Spence, Michael (1973), Job market signaling, *Quarterly Journal of Economics*, 87(3), 355-374.

Stanovich, Kith E. and Richard F. West (2000), Individual differences in reasoning: implications for the rationality debate?, *Behavioral and Brain Sciences*, 23(5), 645-65.

_____ (2002), Individual differences in reasoning: implications for the rationality debate?, in Thomas Gilovich, Dale Griffin, and Daniel Kahneman, eds., *Heuristics and biases: the psychology of intuitive thought*, Hew York: Cambridge University Press, 421-40.

Tversky, Amos and Daniel Kahneman (1981), The framing of decisions and the psychology of choice, *Science*, 211(4481), 453-58.

_____ (1983), Extensional versus intuitive reasoning: the conjunction fallacy in probability judgment, *Psychological Review*, 90(4), 293-315.

_____ (1986), Rational choice and the framing of decisions, *Journal of Business*, 59(4), S251-78.

〈한글초록〉

제한적 합리성 위상공간에서 가치-비용 합리성 매핑의 비적용성

이성섭
(숭실대 글로벌통상학과 명예교수)

지각-직관인지와 추론인지를 구분하는 2원적(dual) 인지시스템은 행동경제학의 접근과 가치-비용 합리성의 접근을 분리한다. 후자(가치-비용 합리성 접근)는 '가치-비용 척도의 일관성 있는 계측성'(CMVCI)을 전제로 한다. CMVCI는 흄(David Hume)의 '자연현상의 동일반복성'(PUN)과 일치한다. 가치-비용 합리성의 세계는 CMVCI를 가정하는 모델링, 예컨대 시장청산시스템 D(p) = S(p)의 세계이다. 반면에 CMVCI가 성립되지 않는(untenable CMVCI) 세계는 경험론의 세계이다. 각각의 세계는 각각의 서로 분리가 되는 위상공간(topological space)이다. '가치-비용 합리성 매핑'(VCR mapping)은 합리성 공간 안에서 지각인지의 상대위상공간으로부터 의사결정의 상대위상공간으로 연결되는 매핑이다. 반면에 '공감-동의 매핑'(SCP mapping)은 경험론의 공간에 속하는 지각인지 상대위상 공간으로부터 의사결정 상대위상 공간으로 연결되는 매핑이다. 두 매핑 공간은 CMVCI로 분리되어 있다. 따라서 경험론 현상을 가치-비용 합리성(VCR) 매핑으로 표현할 수 있는 방법은 존재하지 않는다. 예컨대, 수요함수-공급함수로 표현되는 D(p) = S(p) 모델을 가지고 신뢰(trust)를 의심받는 애컬로프(Akerlof) 중고차 시장의 매매 현상을 표현하는 것은 가능하지 않다. 오직 공감-동의 과정(SCP)을 가지고 표현하는 것이 가능할 뿐이다.

주제어(key words): 공감-동의 과정, 가격결정 기제, 망설임, 우연성, 비결정성.

【2021. 1. 27. 접수】【2021. 2. 22. 수정】【2021. 2. 24. 게재확정】