



A Thought of Witt's Continuity Hypothesis

—Consider the Grafted Tree of Evolutionary Tree—

Kazuhisa Taniguchi

Abstract This paper considers Prof. Witt's continuity hypothesis, which is a theory that views both evolution of life and society are continuing. Prof. Witt has claimed that the theory gives the ontological basis of evolutionary economics. The rhetoric in Witt's continuity hypothesis is artful and it attracts readers, however, some parts of the rhetoric seem odd. This paper aims to give a specific description of the continuity hypothesis referring to "Universal Darwinism" and "The Extended Phenotype" written by Prof. Dawkins.

Key words Continuity hypothesis, Societal Evolution, Biotic Evolution, Grafted Tree of Evolution

January 15, 2007 accepted

1. Introduction

In evolutionary economics, it is recognized that economic phenomena have been evolving. However, there are differing views on the economic phenomena of the evolution. Yagi [12] has given a comprehensive overview of present day evolutionary economics and has introduced the idea that there have always been diverse streams in the field. In addition, Nishibe [8] has classified present evolutionary economics into seven different categories.⁽¹⁾ Nishibe [8] states that a variety of streams in evolutionary economics and diversity in the concept of economic evolution are natural consequences as evolutionary economics evolves.⁽²⁾ Around the field of evolutionary economics, however, there exists a field of economics, which considers social and economic phenomena to be independent of evolution. In the field of biology, there has already been an effort firstly to view evolution not as a concept or idea but as a hard fact, and secondly to clarify the factors and paths of evolution.⁽³⁾ The concept that economies and societies are unrelated to evolution might point to the diversity in economics. However, at the same time, it might indicate that economics themselves might be at a low evolutionary level as a discipline.

The existence of various concepts in economic evolution might show the possibility for evolutionary economics, though a weakness may exist in the theory if such concepts generate vagueness and amorphism. Hodgson [6] has given a strong warning regarding on this.⁽⁴⁾ Consequently, in what sense evolution is being discussed should be clearly specified.

With such viewpoints, this paper considers Prof. Witt's continuity hypothesis.

(1) Nishibe [8], p. 73.

(2) Nishibe [8], p. 46.

(3) The statement of editors in the series "Evolutionary Studies." For example, a basic commonality has been found in the group of gene, which is related to the genesis of anterior-posterior axis, dorsal-ventral axis and eyes recognized as fundamental to a system of animal. This proves that animals on the earth have a common ancestor. Sato, Noji, Kuraya, Hasebe [9]

(4) Hodgson, G.M. [6], translated under the supervision of Nishibe, the foreword for Japanese edition.

The continuity hypothesis is a theory that views both evolution of life and society are continuing, and Witt [11] has claimed that the theory gives the ontological basis of evolutionary economics. The author holds that the rhetoric in Witt's continuity hypothesis is artful and it attracts readers, though some parts of the rhetoric seem odd. This paper aims to give a specific description of the continuity hypothesis referring to "Universal Darwinism" and "The Extended Phenotype" written by Dawkins [2] [3].

2. Witt's Continuity Hypothesis

"*The Evolving Economy*" by Prof. Witt consists of a long introductory chapter and 19 published papers. The continuity hypothesis is described in the introductory chapter and four papers published earlier. In describing the continuity hypothesis, Prof. Witt first discusses Darwin's theory of evolution; he indicates that the main concept of economic evolution was obtained from the theory of Darwinism independently. Then, a definition of evolution independent of the evolutionary domain and specific examples are introduced. The effect is as follows.⁽⁵⁾

Darwin's theory of evolution by genetic mutation and natural selection have been regarded as the original model of evolutionary theory. However, to what extent is considered in applying Darwin's thought in the field of economics? In an economic sense, there are three ways to utilize Darwin's concept. The first is the biological reduction method. This method attempts to describe observed economic behavior directly from the strategy of organisms to adapt genetically to the environment. The second method is to find similarities between principles of evolutionary biology and principles of evolutionary economics and to make an analogy. The third method is the metaphorical

(5) In Witt [11], the hypothesis is referred to as the assumption of an "ontological continuity of evolution" (p. 3), an ontological basis of evolutionary economics, and the hypothesis of a basic continuity of evolution (p. 15); this paper simply uses the term of "the continuity hypothesis" (p. 15.).

method ; however, reducing observed economic behavior to a field of biology is inappropriate. In addition, with obvious differences in the two domains to make an analogy, it is impossible to arrive at accurate analogical reasoning even with an extremely high level of abstraction. In the domain of economics, the metaphorical method has been utilized ; however, there has been doubt in the way to use Darwin's thought in this method.⁽⁶⁾

When making an analogy with the biotic gene in economies, an analogy should elucidate what the gene and the species in economies are, but no convincing answers have been given here. For instance, with regard to the analogy that markets are a piece of external selection devices because the business company may remove a threat to drive it out of the market before external selection takes place, it is difficult to make such an analogy. Furthermore, regarding a systematic procedure routine as a genetic analogy also seems to be difficult because a company itself might identify an insufficient routine in order to replace it with another type of routine. This differs from the genetic functioning observed in organisms.⁽⁷⁾

Darwin's theory of evolution was a challenge to Newton's worlds-view. Natural evolution is a process, which can lead to the birth of new, previously non-existent, species. The main concern became how was it possible for the theory of natural evolution to challenge the Newtonian world-view, which was accepted as the dominant concept at that time and in which the belief was that no new things exist under the sun, and the cosmic concept of the gravity was an externally existing system. Darwin's view on this had been affected by a laissez-faire social philosophy, and he brought the understanding of social philosophy to the natural world. Darwin knew Adam Smith and Malthus, and the individualism introduced by Adam Smith which had brought the individualistic interpretation as a unit of selection.⁽⁸⁾

(6) Witt [11] p. 9-11. (Summary)

(7) Witt [10] p. 23-4. (Summary)

(8) Witt [10] p. 21. (Summary)

Magnetism and gravity had long been known in Europe ; a fact Prof. Witt used to show that Darwin's theory of evolution had not merely come up from the voyage of the Beagle ; but that there had been a long history of human recognition behind it. Additionally, he claimed that human ideas and imagination are subjective, not only that, they should follow to their own regularities. Based on this, he states as following, emphasizing that the economic evolution is recognized independently of biotic evolution :

At this point it is worth noting that important ideas about how economic phenomena evolve have indeed been derived independently of any inspiration from Darwinism and refer to regularities in the domain of human cognition instead.⁽⁹⁾

Thus, seeing that evolution is independent from the domain of evolution, he has defined evolution as follows.

Evolution is the self-transformation over time of a system under consideration. In this definition, the term 'transformation' means a process of change governed by regularities. The prefix '*self*-transformation' points to the endogenous sources and causes of novelty. Self-transformation can be split into two logically (and usually also ontologically) distinct processes : the *emergency* and the *dissemination* of novelty. It is in these two processes, I think, that we are faced with two characteristic, domain-unspecific features of evolution.⁽¹⁰⁾

In the different disciplines the two features appear in quite different forms. In biology, we have random mutation and genetic recombination on the one hand and selective replication in the gene pool of a population on the other.

(9) Witt [10] p. 24.

(10) Witt [11] p. 13.

In linguistics, the invention of new idioms marks the emergence part and their popularization the dissemination part. In the economic domain, given the discipline's focus on human action, novelty is usually seen as emerging from a newly discovered possibility for action which, once taken, is called an innovation. However any attempt to innovate is likely to trigger, and be accompanied by, learning.⁽¹⁾

Following this introduction, he talks about the continuity hypothesis as the ontological basis of economic evolution. He begins his theory with the following typical example.

Darwin sailed around the world with the Beagle and recorded many undiscovered species. Particularly, he observed the avian species in the Galapagos Islands in the Pacific Ocean almost unspoiled by humans. This had a strong impact on him and on his identification of species. However, what can we discover on the Galapagos Islands in these modern days less than 200 years after Darwin's visit? We discover not new biotic species but artificial materials such as cottages, roads and landing fields. No signs of any genetic program, which indicate the appearance of those artificial materials, can be discovered. How can such human artefacts be explained, if no signs are observed? What kind of evolution has been occurred there? Darwin's theory of evolution can never answer this question. Because evolution of human economic activities had been shaped by natural selection at the early stage of human history, but another form of evolution has become dominant as evolutionary process. Evolution occurs continuously beyond the scope of what Darwin's theory of evolution can explain.⁽²⁾

Prof. Witt described the continuity clearly as follows.

(1) Witt [11] p. 13.

(2) Witt [11] p. 3. and p. 15-18. (Summary)

It Natural evolution has therefore shaped the ground and still defines the constraints for man-made, or cultural, evolution. In this sense, there is, thus, also an ontological continuity despite the fact that the mechanisms and regularities of cultural evolution differ from those of natural selection.⁽¹³⁾

Darwin described the evolutionary process by natural selection as a tree of life.⁽¹⁴⁾ Does Witt's continuity hypothesis assume that it is possible to attach the tree of societal evolution to the tree of biological evolution as if it were a graft? Assume that the z-axis is a time axis, the x-axis is the diversity of biological species, and its phylogenic tree is drawn on the x-z-plane. Then, setting the diversity of economies on the y-axis, can a stereoscopic phylogenic tree be drawn, which connects the base of the human economic evolutionary tree continuously to the biologic evolutionary tree? Does Prof. Witt describe continuity in such sense?

The example of the Galapagos Islands used by Witt [11] to explain the continuity hypothesis is very interesting and effective; however, it also seems to be just odd. The number of endemic species discovered in the Galapagos Islands is so great because they have evolved uniquely in geographical isolation. Obviously, cottage and roads in the Galapagos Islands example did not evolve by themselves on the islands. This example might be fitting to explain the continuity hypothesis, if aliens who cannot distinguish the difference between animate and inanimate beings came down to earth, then the aliens might a bird evolved into an air plain and a fish evolved into a submarine. However, this is the odd case clearly. By citing the example of cultural evolution in an uncivilized society without any contact with the outside world, the example of continuity hypothesis is given and the different sign of evolution such as diversity in languages should be discussed.⁽¹⁵⁾

(13) Witt [11] p. 15. The sentence in parentheses was written by the author.

(14) Darwin [1] p. 98-99.

(15) Darwin tells that the family tree of ethnic groups can be classification of languages. Using the example of language to show this viewpoint regarding classification might be effective. If a perfect family tree of humans is made, the systematic arrangement of ethnic groups gives the best classification to various languages currently spoken in the world. (Darwin, C [1] p. 345.)

3. “Universal Darwinism” and “The Extended Phenotype” of Dawkins

Prof. Witt discusses only what is associated with human economic society. If evolution is independent on a domain, however, the continuity hypothesis can be also applied to societal evolution in organisms other than humans. Consequently, Prof. Dawkins' Universal Darwinism and The Extended Phenotype will be discussed here. Dawkins [3] stated as follows, indicating extra-terrestrial life has arisen many times the statistical sense.

However varied in detail alien forms of life may be, everywhere, there will probably be certain principles that are fundamental to all life. I suggest that prominent among these will be the principles of Darwinism. Darwin's theory of evolution by natural selection is more than a local theory to account for the existence and form of life on Earth. It is probably the only theory that can adequately account for the phenomena that we associate with life.⁽⁶⁾

Then Dawkins [3] discusses six kinds of evolutionary theories appeared in the history of biology, introduced by Mayr, in order. These six kinds of evolutionary theories are : (1) Built-in capacity for, or drive toward, increasing perfection, (2) Use and disuse plus inheritance of acquired characters, (3) Direct induction by the environment, (4) Saltationism, (5) Random evolution, (6) Direction (order) imposed on random variation by natural selection. Recognizing the only sixth theory corresponds to the theory of Darwin, Dawkins states ;

Darwinism, as nonrandom selection of an entity that makes a copy mutating randomly, is the only force to guide evolution towards complex adaptation. The ingredients of Darwin's evolutionary theory are found in copying of a certain entity, and in showing a kind of phenotype power in the process of

(6) Dawkins, R. [3] p. 403.

replication. The recipe is not a passive account book for recording the phenotype variation in gene frequency, but a positive cause of the phenotype variation that might accurately promote phenotype evolution. This universal perspective emphasizes a distinction between one-time selection and cumulative selection. An order in the inanimate world might arise from the process that can be observed in a fundamental quality of selection, that is, one-time selection. However, complicated adaptation requires numerous generations of the cumulative selection. Variation in each generation overlaps with a previous generation. The particular characteristic of organisms is to build up a framework, which is sufficient for organisms to cultivate their strong notions that they were designed, by accumulating of the continuity of generations of selection. One-time selection is a common ground for physics, but make construction of adaptive complexity impossible. The cumulative selection, however, is an outstanding characteristic of organisms, and underlies all adaptive complexities.

Generally, a kind of limitation is imposed on a quest for life in the universe. The limitation indicates that if the form of life shows adaptive complexity, it must have an evolutionary mechanism to generate adaptive complexity. If no other generalization is made about life throughout the universe, no matter how diverse the evolutionary mechanism is, conviction is that life in the universe can always be recognized as Darwinian life. The Darwinian law may be as universal as great laws of physics.⁽¹⁷⁾

Although Dawkins [3] talks about the universality of Darwinism, the universality is related to organic evolution throughout the universe and no direct reference is made to economic phenomena. In this regard, however, Hodgson [7] mentions about the universal Darwinism in the economic field as follows.

The nature of Darwinian evolution is not the one connected to DNA or gene, it

(17) Dawkins, R. [3] p. 421-3. (Summary)

requires an entity to be replicated. DNA has the capacity to replicate, though another replication factor may exist both inside the earth and out. A related example is that people have the capacity to replicate, adapt and imitate an idea or custom ; this can be recognized as an important characteristic of human societal system. Hence, Universal Darwinism is not “biological imperialism” that tries to explain everything in terms of biology ; it supports the universal Darwinian principle that is applicable to a broad range of phenomena. For instance, a language or idea can copy itself and causes variation. Therefore, the universality of Darwinian evolution does not try to explain all things with biologic terms. Rather, where genetic evolution exists, it admits of additional evolutionary process on different logical levels, developed on different entities. A century-ago philosopher, Pierce, claimed that the rules of nature themselves also evolve. The idea of Darwin’s universality have developed further ; among modern physicists there is discussion about important physical constants are set in their own values because an alternative universe with different physical constant values could not survive.

Darwinism is the extremely powerful theory because it is the only one gives an explanation of cause and effect of evolution in a complicated system including life. What is very important for social scientists is that the concept of universal Darwinism itself never brings alternatives, when explaining a particular emergent property at a certain social level and its detailed process.⁽¹⁸⁾

What relation can be found between the universal Darwinism and the continuity hypothesis? Witt [11] mentions about the continuity hypothesis as follows.

Somewhere in the history of humankind there is, thus, a point where the power of Darwinian evolutionary theory for explaining economic behavior ends. But evolutionary change continues beyond that point—only with differ-

(18) Hodgson [7] p. 103-5. (Summary)

ent means and in other forms. I call this assumption of an 'ontological continuity of evolution' which set the frame for the approaches to evolutionary economics in this book, Why and how evolution continues can only be assessed, I claim, on the basis of a general, domain-unspecific conception of evolution.⁽⁹⁾

Prof. Witt did not clarify the meaning of "the power of Darwinian evolutionary theory for explaining economic behavior". Suppose, if there is an interpretation that the power of Darwinian evolutionary theory exists in the core of Darwin's thought, which believes that the process of evolution is brought about by mutation and natural selection, the interpretation, that the time when the power of Darwinian evolutionary theory comes to its end is equal to the time when another type of evolution begins without mutation and natural selection, must be made. This interpretation, however, is difficult to make because it should be assumed that mutation and natural selection are not conducted according to evolution defined by Prof. Witt, namely, self-transformation through time. Furthermore, even if interpreting the end of Darwin's theory as the time when evolution itself stops, this idea conflicts with the definition of evolution because evolution does not have a goal. Hence, "the power of Darwinian evolutionary theory" aims only organic evolution, and does not include economical evolution. Therefore, after evolution occurs consecutively from organic evolution to economical evolution, an interpretation will be brought out that an entity is changed with evolution and Darwin's theory loses its power of explanation. This interpretation can be appropriate judging from Prof. Witt's claim that not only Darwin has introduced the concept of evolution. However, regarding the end of the power of Darwinian evolutionary theory as a premise for establishing the continuity hypothesis, it conflicts with universal Darwinism. As stated by Hodgson [7] above, this is because the theory of Darwin has extremely powerful logic since only Darwin's theory gives an explanation of cause and effect of evolution in a compli-

(9) Witt [11] p. 3.

cated system including life. However, is that really what Prof. Witt intended to say?

Now, the extended phenotype is considered. "The Extended Phenotype"⁽²⁰⁾ devoted more than two third of its pages to contradicting criticism of his previous work "The Selfish Gene."⁽²¹⁾ The actual extended phenotype is briefly described three chapters into the book. According to the description, since a gene not only controls ontogenesis but also manipulates the periphery outside an individual organism, what is made by an individual organism becomes the extended phenotype for the usual phenotype. A specific example can be observed in a spider web, a termite mound, and a beaver dam, but what is contained is shocking.

An animal artefact, like any other phenotypic product whose variation is influenced by a gene, can be regarded as a phenotypic tool by which that gene could potentially lever itself into the next generation.⁽²²⁾

The pressure of natural selection is applied on the extended phenotype, so that evolution also occurs in the extended phenotype. Dawkins [2] said that if the fossil of termite mound is discovered, the evolutionary sequence exists within it.⁽²³⁾ On the fossil of beaver dam Dawkins [2] said :

If beaver lakes could fossilize, we would presumably see a trend towards increased lake size if we arranged the fossils in chronological order. The increase in size was doubtless an adaptation produced by natural selection, in which case we have to infer that the evolutionary trend came about by allele replacement.⁽²⁴⁾

Prof. Dawkins did not, however, make any direct mention of human societies

(20) Dawkins [2] The subtitle of first printing "The Gene as the Unit of Selection" changed into "The Long Reach of the Gene" in Oxford Paperback Edition published in 1989.

(21) Dawkins [4] Originally printed in 1976.

(22) Dawkins [2] p. 199.

(23) Dawkins [2] p. 207.

(24) Dawkins [2] p. 233.

in his book "The Extended Phenotype" or his paper of Universal Darwinism.²⁵ As Dawkins [2] stated, if the extended phenotype evolves, then a certain point of time when phenotype has been extended can be discovered by tracing the path of evolution backward. Viewing the extended phenotype as a juncture from the process of organic evolution to societal evolution, then at this point, the continuity hypothesis is examined. In other words, the point of time when a spider began to make a net, termites began to form a mound, and a beaver began to build a dam, could be discovered by tracing the path of evolution, and the continuity is shown. Although a spider web or a beaver dam might not be recognized as a society of each species, a termites mound can be recognized as a symbol of termite society. Hence, Witt's continuity hypothesis is established at the time when termites began to form the society that requires a mound. The continuity hypothesis means the continuity of the time regarding the phenotype and the extended phenotype. The continuity hypothesis is not unique to human societies, but if a certain species construct a society, the phenotype and the extended phenotype must be able to be connected as a grafted evolutionary tree. Dawkins [2] regards a phenotype as the nodal point of replicator.

The phenotypic power by which they (=replicator) ensure their survival is in principle extended and unbounded. In practice the organism has arisen as a partially bounded local concentration, a sharked knot of replicator power.²⁶

Amplifying this concept, a multiple cellular organ and the extended phenotype can also be one of a number of nodal points. Witt's continuity hypothesis, therefore, can be recognized as the temporal continuity hypothesis of a nodal point in more general sense. Human society was formed at a certain time point

²⁵ Dennett [5] wrote as follows regarding this matter as an effect of cultural gene-meme: "A vast protecting net of meme we have made is essential for our phenotype, as well as more narrowly defined biological gift. There is no basic discontinuity, and one human can even become a mammal, father, citizen, scholar, Democrat, and full-time associate professor. Just as a man-made barn plays an essential part in the ecology of barn swallows, a chapel, university, and even factory or prison plays an essential part in our ecology."

²⁶ Dawkins, R. [2] p. 264.

in the prehistoric age. This is the primitive extended phenotype. Evolution has occurred consecutively, so that human gene has long arms that can reach the moon and to the edge of the solar system.

4. Conclusion

In human societal evolution, replications are made frequently in the level of imagination or learning, therefore the extended phenotype is outstandingly huge compared to other species. However, the course of organic evolution is slow and humans as a creature have remained almost unchanged since the dawn of time. What the continuity hypothesis explicitly indicates is that the existence of serious problems caused by the pressure newly added to humans who evolved with natural selection, because of rapid development of economic evolution. Diabetes comes to mind as one example. Human history is a history of the battle with starvation. Sugar taken into a body is very hard to broken down. Insulin is the only hormone that promotes the absorption of sugar. Living organisms with many hormones to break down sugar, might have existed ; however, they could have been devastated under the pressure of natural selection. Although humans no longer starve thanks to improvement in food production, a large amount of energy has been unnecessarily consumed in some countries, which has caused an outbreak of diabetes. This shows that economic evolution conflicts with the consequence of organic evolution. At the same time, the continuity hypothesis indicates another possibility, which is that humans produce new evolution in the sense that the entity of evolution also evolves. There is a possibility that economic evolution brings diversity to humans as species, which was impossible with organic evolution. A new variety of human being, which can bear the future unknown pressure of natural selection, could possibly exist already.

Whatever the case may be, the value judgment of society is the basic solution for the problems caused by natural evolution and societal evolution. Exactly, it is precisely judgment of society that has led to the development of the leisured class. This paper does not refer to this matter, though it is closely related to the

evidence that the continuity hypothesis provides ontological foundation of evolutionary economics. However, a discussion of this matter is beyond the purpose of this paper ; it will form the subject of future work.

References

- [1] Charles Darwin. *On the Origin of Species —By Means of Natural Selection or the Preservation of Favoured Races in the Struggle for Life—*. Watts & Co., 1859.
- [2] Richard Dawkins. *The Extended Phenotype —The Gene as the Unit of Selection—*. 1982.
- [3] Richard Dawkins. “Universal Darwinism”. In D. S Bendall, editor, *Evolution from Molecules to Man*, pp. 403–25. Cambridge University Press, 1983.
- [4] Richard Dawkins. *The Selfish Gene —New Edition—*. Oxford University Press, 1989.
- [5] Daniel C. Dennett. *Darwin's Dangerous Idea —Evolution and the Meanings of Life*. Touchstone, 1996.
- [6] Geoffrey M. Hodgson. *Economics and Evolution*. Polity Press, 1993.
- [7] Geoffrey M. Hodgson. “Is Social Evolution Lamarckian or Darwinian?”. In John Laurent and John Nightingale, editors, *Darwinism and Evolutionary Economics*. Edward Elgar, 2001.
- [8] Tadashi Nishibe. “Sinkakeizaigaku no Genzai” in Masaaki Yoshida editor, *Keizaigaku no Genzai 2*, Nihon Hyoronsha, 2005. (in Japanese).
- [9] Noriyuki Sato, Sumihare Noji, Shigeru Kuratani, Mituyasu Hasebe. *Hassei to Shinka*, IwanamiShyoten, 2004. (in Japanese).
- [10] Ulrich Witt. “Bioeconomics as Economics from a Darwinian Perspective”. *Journal of Bioeconomics*, Vol. 1, pp. 19–34, 1999. Reprinted in Ulrich Witt editor., *The Evolving Economy*, Edward Elgar, 2003, pp. 139–154.
- [11] Ulrich Witt. *The Evolving Economy*. Edward Elgar, 2003.
- [12] Kiichiro Yagi. “Shinkakeizaigaku no Genzai” in Takashi Sakagami editor, *Hennisuru Dauinizumu —Shinkaron to Syakai—*, Kyotodaigaku gakujutu syuppankai, 2003. (In Japanese).