Chapter 1
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Exploring New Socioeconomic Thoughts for a Small and Narrow World: Unity and Decentralization

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ABSTRACT

The world has been getting smaller and narrower with the expansion of human activities. Now, exploring and studying new socioeconomic thoughts for this small and narrow world is an urgent task for social scientists. This article provides a normative theory and a descriptive theory for the present and future of the world. The normative theory helps us think about where we should direct the world: it provides evaluations of possible events and designs of social institutions, viewing the world and human community as a unit. The latter is to discuss practical management of the world: considering great diversity of cultures, unified management is practically impossible. Thus, a decentralization of the entire world is required. We consider a decentralized way of management of the world in terms of the constitution of the World Federal Government (WFG).

Keywords: Free-market libertarianism; large-environment; small world; normative theory; Hobbes-Einstein-Nash social contract theory; descriptive theory; cognizance assumption; inductive game theory; bounded rationality and intelligence.

1. INTRODUCTION

In the twenty-first century, we continue to witness poverty, famines, hungers, deadly diseases, conflicts, wars, genocides, and other serious problems in the world. Though these events have been problems throughout our history, they are now more stark universally, as human economic activities with technological progress are becoming larger and non-negligible relative to the size of the world. These sizable impacts require us to explore new socioeconomic thoughts including the management of the entire world, by taking into account the influences of human economic activities seriously. In this article, we explore what we, as social scientists, can and should do for the future world.

This article consists of two almost contradictory parts: A normative theory and a descriptive theory. The former is to provide, considering the world and human community as a unit, evaluations of possible events and of design of social institutions. The latter discusses social sciences for practical management of the world, but at the same time, it shows that because of great diversity of cultures, a unified management of the world is practically impossible. Social problems as well as theoretical/ methodological thoughts to be discussed also vary widely. It would be helpful to summarize the main themes of this article and to give a map of the subjects to be discussed.

The main themes are:

- Small and narrow world: unity of the world vs. diversity in cultures;
- Dominant socioeconomic thoughts;
- Normative theory for the world;
- Human nature: bounded rationality, intelligence, and conservativeness;
- Social scientific research on these problems;
- Practical decentralized management of the world.

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Fig. 1 depicts the logical relationships between these themes. The top box states the conflicting features of the present world, which are discussed in Section 2. Then, we go to the normative theory, which is in the left box and is discussed in Section 3. The right box consists of thoughts on the present state of economics and game theory, which are discussed in Section 4. Sections 5 and 6 address the necessities of descriptive/empirical studies and practical management of the future world.

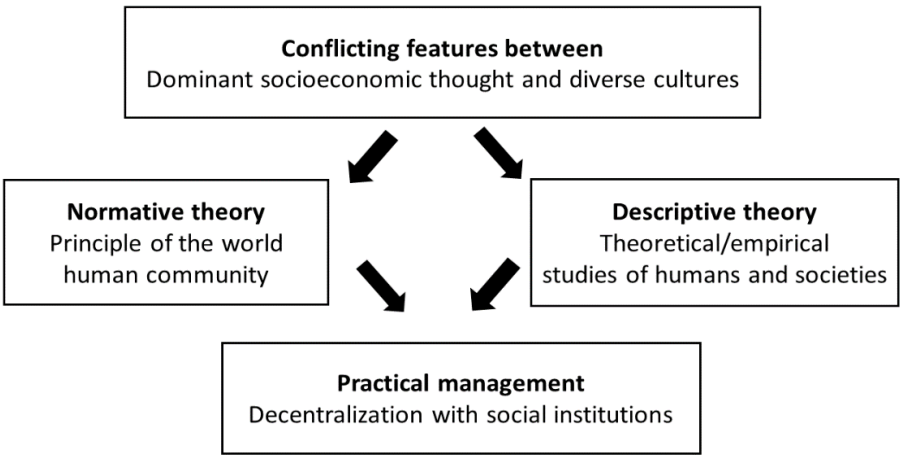

Fig. 1. Logical structure of the themes

Let us look at each section in brief. In Section 2, we discuss the conflicting features of dominant socioeconomic thoughts and the present world. Free-market libertarianism remains strong with individualism in developed countries but is no longer compatible with the small world. It has tremendous influence also on underdeveloped countries, whereas diverse cultures contradict free-market libertarianism. We discuss these features from the viewpoint of economics.

In Section 3, we consider the normative theory for the world as a unit. The Hobbesian social contract theory is applied to the entire world, where his “state of nature” is replaced by the total destruction of the world. This change leads to a different conclusion that all people should be treated equally and freed from vested rights. We argue that this extreme view is possible for the small world but at the same time, it has great difficulties in its applications.

In addition to the normative theory, we consider the foundations and developments of human/social sciences in order to understand the current problems worldwide. In Section 4, we reconsider the standard economics and game theory from a methodological point of view. These fields are well developed but lack the reflective thoughts on their boundaries from the outside. We consider these features and give a brief description of a new theory called *inductive game theory* [1,2], which is motivated by reflective thoughts on cognitive assumptions in the standard theories, that is, bounded rationality, bounded intelligence, and conservativeness.

To think about the problems of the entire world, we look at the historical changes/ developments of societies and social institutions. At the end of the 19th century, which was only 120 years ago, the world and its institutions differed tremendously from the present world. Vast changes have been occurring with social structures, but people with their bounded logical and perceptional abilities were not able to follow such changes. In Section 5, we discuss the needs of positive/empirical studies of societies and social institutions.

From the normative viewpoint, we consider the entire world in a unified way, but from the practical point of view, the world needs to be decentralized into many or various states. In Section 6, we discuss the idea of the *World Federal Government* (WFG) to reconcile decentralized states. Each state has some independence from the other states yet under the constraints given by the constitution of the WFG. We will discuss how the states are constrained while how much freedom should remain

for each state and each individual person. These are considered from the economic and political viewpoints. Also, the roles of social sciences for the governance by the WFG are considered.

In Section 7, we conclude our explorations into new socioeconomic thoughts on a small and narrow world. As a whole, the article describes where the world should go and what we, as social scientists, can and/or should, though these appear very difficult.

2. CONFLICTING FEATURES IN A SMALL AND NARROW WORLD

2.1 Economics as a Science and a Thought

Although economic activities are among the many social aspects of human worlds, they become more important as people pursue materially richer lives. This tendency is becoming stronger as technology progresses, with which the world is becoming smaller and narrower. In this section, first, we look at how the field of economics presently thinks, and also consider, from the viewpoint of the entire world, what the important issues are.

Economics has two sides: social science and social thought. The former is to study objectively the economic structures and behavior of economic agents. The latter includes some normative judgments, based on the former, about how society should be. The economics of the first half of 20th century emphasized the former so that economics be a value-free science; it should be void of normative judgments. However, because it takes people and societies as the subject matter, we cannot avoid the question of how human economic lives and societies should be. The field of economics still maintains a tradition of value-freeness; however, it has slightly retreated. Instead of avoiding such normative questions, it now looks for an economic science with minimum normative judgments.

Additionally, economics has a strong tendency to focus only on economic aspects, as if all social aspects could be treated in the same manner. In this article, we take the position that economic aspects are only part of the entire human world. From this perspective, we should critically investigate the foundations of economics as it stands currently. We will now discuss with the benchmark theories in economics.

2.2 Theory of Perfect Competition

The theory of perfect competition in the tradition from Adam Smith's "the Wealth of Nations" (1776) is suitable for minimizing normative judgments as a research position. The salient characteristic of this theory is to start with a very individualistic description of an economic agent (a consumer and/or a producer), restricting its scope only to economic aspects of human beings and societies. The theory, as described in general equilibrium theory, succeeds in explaining the behavior of the market economy as a harmonization of the activities of many economic agents; see Hicks [3], Debreu [4] and Arrow and Hahn [5]. This success, however, has made many economists ignore aspects other than the economic ones.

Game theory has been regarded as a supplement for the theory of perfect competition to allow for more micro-level behavioral analysis of people and societies. John von Neumann, the founder of game theory, intended to surpass the idea of perfect competition, while including descriptions of other aspects of human beings and societies (cf. von Neumann [6] and von Neumann and Morgenstern [7]). However, his followers have not taken his radical attitude toward the development of the new basic idea for the understanding of humans and society: At present, game theory is effectively included in economics and its teaching is not very different from the theory of perfect competition. In Section 4, we discuss the necessity of development in the direction von Neumann addressed.

It will be soon argued that the theory of perfect competition is, in fact, used to support some social thought, but its basic structure leads people to unconsciousness of the social thought.

In the theory of perfect competition, given fixed prices, each consumer maximizes his or her utility and each firm maximizes its profits. The theory purports that a well-organized market institution

guarantees commodities and services to be suitably produced and circulated. One main result, called the (first) *fundamental theorem of welfare economics*, (cf., Arrow and Hahn [5]), states that the resulting outcome of the market is Pareto optimal.[1] This means that the market functions with no waste in production processes as well as in distributions (exchanges) of commodities and services.

The above fundamental theorem is typically summarized as "optimization of economic efficiency by decentralization." It may be easier to divide this statement into three levels: The individual, the organization, and the entire economy. The first is the motivation for an individual agent (laborer, employer, or entrepreneur). The work environment for each agent should be designed to promote one's work motivation. The second requires an economic organization (a private firm or a public sector) to be created to guarantee that each individual agent as well as the organization itself can freely pursue their profits/utilities and that efficiency is achieved for the organization as a result of their free pursuit. The last level is that the total profits/utilities of the entire economy are maximized as a result.

For example, the privatization of the Japanese railway company divided it into several independent companies; this took place in 1987, and is based on the first two levels of the above idea to eliminate legal constraints on decision making by workers and organizations. The transition of former Eastern-European communist countries into market economies, which started around 1990, is based more clearly on all the three levels of decentralization.

A basis for the idea of perfect competition is the large-number assumption, that is, each economic agent at the individual or organizational level has many (or at least several) similar competitors. Under this assumption, each individual or organizational economic agent cannot control market prices, that is, each is a price-taker (or environment-taker) and their pursuit of profits/utilities contributes to social benefits and welfare. This is behind the theory of perfect competition, specifically, the fundamental theorem of welfare economics.

2.3 Free-Market Libertarianism (Individualism) as a Social Thought

The theory of perfect competition supports what we call free-market libertarianism. This school of thought takes individual economic freedom as the supreme principle, guaranteeing every agent to freely pursue his economic profit/utility. However, this already includes a normative judgment in that the society should allow such freedom for each economic agent as much as possible and political/legal systems should be arranged to support this idea. Although it asserts to maximize individual freedom, some political and institutional arrangements of society, such as basic property rights, are inevitably needed.

We should also mention the political counterpart of free-market libertarianism. Political libertarianism asserts that the political system should be minimized but to support individual freedom. These two thoughts appear to include no normative judgments; however, the normative judgment that such individualistic freedom has the supreme value has been made. These typically include the presumption that each person's ownership, including property rights, is taken for granted. This is seriously problematic in the present small and narrow world.

2.4 Expansion of Human Activities in a Shrinking World

Many problems in the present world suggest the rethinking of free-market libertarianism (and individualism). In the world, there are many societies with different cultural traits incompatible with free-market libertarianism; for example, family ties are still very important in many Asian countries. Religions are a substantial part of society and human lives in the world, including in Europe and North America. These societal aspects constitute the substructures for economic lives and activities. Here, we postpone our discussions on societal and cultural aspects in Sections 4 and 5; instead, we look at free-market libertarianism from the viewpoint of economics, taking the smallness and narrowness of the world into account.

[1] *Pareto optimality allows many "optimal" states, and the theory of perfect competition chooses one or a few states among others.*

As mentioned above, free-market libertarianism relies upon the fundamental theorem of welfare economics. Besides the large-number assumption, in fact, this theorem assumes, what we call the *large-environment assumption*, that is, the natural environment behind the economy is large enough for economic activities to have only negligible influence on the environment. This assumption may already be inconsistent with the large-number assumption; that is, economic activities of a large number of economic agents almost necessarily change the environment. Thus, the fundamental theorem is a mathematical theorem under the large-number assumption and large-environment assumptions. It is misleading to call it the fundamental theorem.

What we pointed out above is often called a *market failure* in the economics literature. However, the function of the market as production and exchange is quite another problem. Consider an economy with air pollution by automobiles; for example, it is convenient for each economic agent to use a car, and even though a single person stops using a car, his contribution to the improvement of air is negligible in the city. Thus, each agent continues to use a car and pollution continues and may become serious. Unless the pollution escalates to the level of incurring serious damage to inhabitants, the market could still function to promote individual economic activities. The market itself generates and often magnifies environmental problems. This structure exists commonly behind environmental problems such as global warming in the present earth.

Theoretical discussions and some examples of the above phenomena, widespread externalities, are given in Hammond, et al. [8] and Kaneko and Wooders [9]. Implications are extensively discussed in the 3rd Chapter of Kaneko [10].

A brief look at the history of economics may facilitate our understanding. Economics has a history of about 250 years from Adam Smith; full-blown research in economics started, slightly more than 100 years ago, from the beginning of the 20th century. In the 21st century, the influence of human activities is entirely different at the material and cognitive levels from 250 years, 100 years, and even 50 years ago. The large-environment assumption might not be a problem during Smith's time. However, if we carefully look at local events in the past, we find that the large-environment assumption was already inappropriate in many places. Various ancient civilizations collapsed by destroying their natural environments. In the 18th and 19th centuries, the American West was still a frontier; the natural environment there was almost unbounded relative to human activities. However, in the old continents, many famines happened constantly and victimized many people.

The above point is confirmed by looking at the world populations of the past and future. The world population exceeded 1 billion in the beginning of the 19th century; it reached 3.0 billion in 1930 and 4.0 billion in 1965. The present total human population on the earth is 7.2 billion in 2013, and according to the United Nation's prediction, the total human population of the world will reach 9.6 billion in the year 2050.[2] It would be adequate to assume that the population in 2100 would be beyond 10 billion. Taking these figures into account, the large-environment assumption is no longer valid; we cannot keep free-market libertarianism (and the fundamental theorem of welfare economics) as a sound basis for the socio-economic thought of the present and future world.

2.5 Globalization: Explosive Progress of Information and Transportation Technology

Another important fact we should explore is the rapid progress in information and transportation technology. Scientific knowledge and technological progress are explosive as a whole, which may support the globalization of economic and industrial activities. This makes worldwide trade possible, but at the same time, it generates many social problems; an obvious example, other than global warming, is the instability of the worldwide market, as evidenced by the 2008/2009 financial crisis. Some local events may influence the global market rapidly through information channels; this differs entirely from the world of 30 years ago. In fact, the concept of perfect competition requires informational decentralization, and is not compatible with rapid spreads of information (cf., Kaneko, [10], p.106). This requires us to rethink the present state of economics and game theory.

[2] *"World Population Prospects-Population Division-United Nations". esa.un.org. Retrieved 2016-09-15.*

2.6 Steady Slowness: Diversified Cultures and Values in the World

It is conceivable to assume that the entire world can and/or does move in the same direction by globalization, and people will have the same and uniform values in the near future. This inclination is caused by neglecting local social backgrounds surrounding each person: Though accumulated knowledge and technology in the human world are getting larger, the ability of an individual remains, more or less, unchanged. At the superficial level, technological progress will give more global information, but at a slightly deeper level, each person is created by one's family and community in that he follows the patterns of behavior and thinking developed in his community and its local history. This leads to a great social diversity of cultures, languages, religions, values, etc., in the world, which together with globalization causes inevitable conflicts between groups of different cultures. This will be discussed in Section 4 from the viewpoint of inductive game theory and bounded rationality and intelligence.

The above fact is confirmed by looking at the evidence that the worldwide illiteracy rate in 2015 was still more than 20% and that many developing nations have even higher illiteracy rates. This implies the existence of a large barrier to exclude illiterates from economic activities; no illiteracy is presumed in economics and game theory.

Thus, the present world shows the explosive progress of informational technology and some people in some nations are enjoying prosperity brought about by such technological progress, sacrificing many other people and denying their cultures.

2.7 Unity of the World

We are facing various contradictory problems occurring in the world. One is that the world becomes smaller and narrower with the growth of the human population and explosive technological progress. This implies that individualism such as free-market libertarianism can no longer be a suitable social thought. In Section 3, we discuss a normative theory for the future world as unity, though we admit difficulties in practical applications of the normative theory. The contradictory features may have no direct reconciliation, but at least we should look at them seriously.

3. NORMATIVE THEORY FOR THE WORLD AS UNITY

3.1 The Entire World as a Unit

There are about 200 sovereign nations in the world presently. Here, sovereignty means the full right and power of a governing body over a nation, without any interference from other nations. Because of the smallness and narrowness of the world, those nations will no longer be able to retain their sovereignty. When present nations face severe conflicts, or when a problem at the level of the entire world happens such as global warming, we need to consider the integrated unity of the nations and people in the world. In this case, sovereignty cannot keep its literal meaning.

We need a normative theory to think, from the viewpoint of the integrated unity, about how severe conflicts between nations are resolved.[3] The normative theory has a scope large enough to discuss local as well as global events conceivable to occur in the present and future world. For example, genocides such as those occurring in Cambodia in the 1970's and the Congo area in the 1990's, and famines and hungers in the present sub-Saharan Africa. The normative theory is required to be able to evaluate such events and to discuss what should be done from the worldwide viewpoint.

We separate the normative theory from practical management of the world: After this section, we consider the problem of practical management.

[3] This argument sounds related to "global justice," discussed in the field of philosophy of law. It has been discussed that developed countries are responsible for poverty in underdeveloped countries such as Africa. The main issue in this field is to look for the moral responsibilities of advanced nations and their people. Many viewpoints have been discussed, but Rawls' [11] distributive justice relative to "global justice" is the central term (see Pogge, [12]). We will discuss only briefly the relation of Rawls to the normative theory to be given in this paper.

For our normative theory, we choose the ultimate worst possibility for the entire world and discuss other events from it. In fact, the problem of the ultimate worst possibility was already discussed by two great thinkers: The 17th century philosopher, Thomas Hobbes, and the 20th century physicist, Albert Einstein. Hobbes proposed the social-contract theory, and put the worst scenario as the basis for his social-contract theory of a nation. Einstein considered the total destruction of the earth by nuclear bombs as the worst possibility for the earth.

3.2 Hobbes's Social-Contract Theory of a Nation

The seventeenth century philosopher Thomas Hobbes mentioned nothing about the small and narrow world. Nevertheless, the logic of his social-contract theory of a nation described in his "Leviathan" (1651) can almost directly be extended into the social-contract theory of the *world nation*. In order to study the logical origin of a nation, he considered the hypothetical state of the society, called the "state of nature" by eliminating all social institutions and governmental authorities for protection of the individual rights from the present society. We emphasize that this is the logical origin of a nation, but not a historical origin/emergence of a nation.

In the state of nature, because no authorities protect and control people's rights and duties, everybody owns the unbounded rights for everything. These rights contradict each other, and lead the state of nature to "a war of all against all", where everybody robs everybody else: Hobbes described the state of nature as "In such condition, there is no place for industry; … no culture of the earth; … no arts; no letters; … and the life of man, solitary, poor, nasty, brutish, and short". To avoid this cruel state, everybody gives up and provides almost all rights to the nation, and agrees on a social contract to have the central authority to govern the nation.[4]

3.3 Einstein's Principle for World Peace

In a paper on the special relativity theory published in 1907, Albert Einstein derived the conclusion that mass might be transformed into energy; if mass m is converted into energy E, it obeys the formula $E = mc^2$, where c is the speed of light and is gigantic (about $300{,}000\ km/s$). Thus, even if a small amount of mass is converted into energy, a tremendous amount of energy would be released. In the 1940's, atomic bombs became technically possible and in 1945, atomic bombs were released on Hiroshima and Nagasaki, victimizing three to four hundred thousand people. In the 1950's, the USA and USSR (the present Russia) had kept enough atomic (hydrogen) bombs to destroy the entire earth.

In the 1940's, Einstein recognized the crisis of the earth and faced the fact that the earth was no longer unbounded for human beings. Being apprehensive of the human race on earth, Einstein wrote in a letter to a Russian scientist in 1949:

(*): The objective of avoiding total destruction (of the Earth) must have priority over any other objective.[5]

This has been called the *principle for world peace*.

It is to avoid the worst possibility for the earth and human race. The worst possibility differs from Hobbes's time in that human beings can now destroy the entire earth. In our normative theory, we consider problems and events in the present/future earth from this point of view. It is time for us to think about the very existence of the entire earth and human race in order to look at worldwide events. Taking this extreme reference point, we can consider any events that may occur in the present/future earth in a relativistic manner.

[4] Hobbes [13] himself went to the conclusion of the "political absolutism" to centralize all the rights to the nation except for a small number of "natural rights" for individual members. The present author does not think that his conclusion is inevitable from his state of nature.
[5] Einstein ([14], p.146)

3.4 The Hobbes-Einstein Social Contract Theory of the World Nation

After finding the possible release of atomic energy, the implication of Hobbes's question of what would happen if no social institutions guaranteeing individual rights were highlighted. In Hobbes's time, its logical/physical implication is "a war of all against all." However, now, the pure logical answer to his question is the total destruction of the earth and the annihilation of the human race.

Our normative theory for the entire world is obtained from Hobbes's social-contract theory by substituting the destruction/annihilation of the earth and human race for Hobbes's state of nature. Substitution of the total destruction for the Hobbesian state of nature has an implication very different from its original conceptualization by Hobbes, as well as from currently prevailing thoughts about rights and duties for an individual being. To understand this implication, we look at the nature of vested rights in the context of free-market libertarianism.

3.5 Abrogation of Vested Rights and Interests

Property rights are very basic for libertarianism; ownerships for properties (and, more basically, individual lives) are protected by law and the police from stealing, robbing, and killing. This legal and police power needs to be financed by a tax system, which is a partial denial of property rights; however, this tax system is necessary for free-market libertarianism to work.

We, living in "modern" developed societies, tend to think that ownership of some property should belong to its owner, and that each individual should have integrity, meaning that one's identity belongs to oneself. Some social systems are needed to protect ownership and individual integrity. Many of us living in developed societies have not experienced states with no protecting social systems. Similar beliefs are held on "sovereignty" of a nation meaning that it should retain its own rights and interests. However, once a nation is under attack by another nation, individual integrity and the nation's sovereignty are meaningless.

If we take individual integrity and a nation's sovereignty literally, people in developed nations could ignore droughts, famines, wars, and genocides in Africa. A cause for droughts and famines may be economic activities in developed nations. People in developed nations think, based on their moral feeling, that they should give some aid to people suffering from droughts and famines.[6] Because this has no theories, it gives only a local and temporal resolution. The principle (*) is applied to those events, because these are comparable with the total destruction of the worlds, at least for people suffering from the events.

3.6 The Principle of the World Human Community

The principle (*) is more extreme than Hobbes's state of nature; it is applied to the very existence of each individual being. From the viewpoint of (*), each human being and their rights exist simultaneously with the entire earth. This is formulated as follows:

(**WHC): The body and talent of each human being belong to the world human community, which owns all rights for them. The world human community consists of all human beings on the earth.

All rights including those to one's body and talent are taken away from each person, but are gathered as a collective to the world human community. The world human community is a hypothetical entity, and may be regarded as already presumed for the principle (*). The principle (**WHC) itself, however, induces no conclusive decisions. We assume another principle for the world human community to make decisions:

(**IRW) Every individual in the community has the right to the world human community.

We denote these two, (**WHC) and (**IRW), simply by (**). We call this (**) the *principle of the world human community*.

[6] *Arguments of this type have been found in the field of global justice (see Pogge, [12]).*

The principle (**) has a similar status to Hobbes's state of nature. In either (**) or Hobbes's principle, each being has the entire gamut of rights. However, in Hobbes's case, physical/technological constraints lead to "a war of all against all." In our case, the development of atomic bombs leads to the total destruction of the earth, and the property rights of each are entirely denied, including the body and talent. Hobbes's argument is still logically consistent; "a war of all against all" shows it, the avoidance of which leads to a social contract for the nation. On the other hand, in (**), each person retains all rights even to the entire world. When at least one person disagrees, the earth can be destroyed, which means that each person keeps the switch of the huge atomic bomb.

The principle (**) denies and abrogates the vested interests and rights of all people and nations. This is the supreme normative principle for individual rights. Practically, we cannot directly follow (**); when we need the very basis of our normative principle, we should recall this principle.

We can apply (**) to the examples of the people waiting for death by famines, hungers, or genocides in Africa. It is legitimate for these people to demand developed nations to save them. People in developed nations cannot ignore the demands but save the suffering people by sacrificing (some part of) their rich lives, because not only the economic capital of developed nations but also the bodies and talents of people there belong to the world human community. It is a more apparent duty for all people in the world to immediately stop genocides. Either sovereignty or the "nonintervention of the affairs of other nations" is now an invalid concept.

3.8 The Nash Social Welfare Function

A mathematical formulation of the Hobbes-Einstein social contract theory is given as the theory of the Nash social welfare function proposed in Kaneko and Nakamura (1979). The Nash social welfare function is given as

$$W(x) = \sum_{i=1}^{n} \log(u_i(x) - u_i(x_0)). \tag{1}$$

Here, $i = 1, \dots, n$ are the members of the world nation, $u_i(\cdot)$ is the utility function of member i in the sense of expected utility theory, x is a world state to be evaluated, and x_0 is the total destruction/annihilation of the earth/human race.

Mathematically, the Nash social welfare function (1) is a different representation of an n-person version of the Nash bargaining solution given by Nash [15]. The main difference is that in the former, the disagreement point x_0 is the total destruction of the world, whereas in the latter, the disagreement point is given or determined in each situation.

By associating the Nash bargaining theory with the Nash social welfare function, the social contract aspect of our normative theory becomes more explicit; everybody has a button to destroy the earth, and a social decision to employ an alternative state different from the destruction of the earth is made only when people reach a unanimous agreement. Thus, everybody makes a decision on whether to agree or not, taking into account the possibility that one's disagreement could lead to the total destruction. Here, nobody can guarantee vested rights and interests.[7,8]

Let us apply the Nash social welfare function to the problems of famines/ hungers/genocides, as mentioned above. The world state x includes the deaths of suffering people in the near future. For any person i of these people, this state x is close to the total destruction x_0. The utility $u_i(x)$ is still higher than $u_i(x_0)$, implying that $u_i(x) - u_i(x_0)$ is positive, but it is close to 0; equivalently, $\log(u_i(x) - u_i(x_0))$ is almost -∞. Thus, the total social welfare $\sum_{i=1}^{n} \log(u_i(x) - u_i(x_0))$ is also almost -∞. Hence, the Nash social welfare function suggests avoiding the world state x and choosing any world state y in order to

[7] This argument may look similar to some studies of contractarian-morality such as in Binmore [16] and Gauthier [17], in which agreement is the fundamental component for morality. However, our normative theory is not to explore people's (natural) morality, which belongs to the subjects in Section 4, but we take a different view for morality.
[8] The above argument requires stringent mathematical foundations and indeed, such mathematical foundations must be revealed to see the scope and limitations of this theory. These mathematical discussions should be given in a separate paper.

stop deaths from famines/hungers/ genocides; for example, by sacrificing the wealth of rich people in developed nations.

3.9 Difficulties in Applications of the Principle of World Human Community

There are many difficulties in practical applications of the principle of the world human community (**) or the Nash social welfare function to less extreme social problems. In the above example, the lives/deaths of some people are compared with the total destruction/annihilation of the earth. In this case, the physiological part of "utility" dominates the social/cultural part. In less extreme problems, however, "utility" is closely related to society and culture; in many cases, "utility" is formed by interactions with other people in society. Red sweaters may give higher utilities to some people than blue ones, for example, because red is the symbol color of their community. Here, the social-psychological part becomes dominant, compared to the physiological part. The loss of utility by blue sweaters is negligible relative to that of genocide or starvation. Psychological "utility" is not as important as death or life. We, as social scientists, should study the problems of what "utility" is and when it should be taken into account seriously.

Immediate direct actions are required in the example of famines/hungers/ genocides. These involve no time structures; however, in many other social problems, we cannot directly choose resulting states. Instead, we should use some social institutions to facilitate behavior of people. Thus, social institutions and their management become the targets of our study, which will be discussed in Sections 4 - 6. Together with such studies, we may apply our normative theory to the choice of social institutions.

3.10 Rights-Based Normative Theory

The reader might wonder why we do not adopt Rawls' [11] theory of distributive justice. This theory starts with the social choice behind the veil of ignorance and measuring in the worst position in society. This is interpreted as expressing a unanimous decision of the members of the community in question; in this sense, it is claimed that the theory is contractarian. The veil of ignorance argument is more coherent to Harsanyi's [18] utilitarianism than Rawls [11], as far as we look at them from the viewpoint of the present utility theory. Nevertheless, these theories have no scope to include the entire earth, and no further consideration of individual rights is given. On the other hand, our normative theory, as in the Hobbesian theory, is based on the hypothetical setting to eliminate the institutions protecting individual rights from every member of the world; this enables us to discuss and evaluate social institutions in a relativistic way.

As mentioned above, the use of social institutions will be inevitable for the practical management of the entire world. The central target of the design of a social institution is to control individual rights, within which each individual is admitted to have the freedom of behavior and thinking. Our theory evaluates the design of distributions of individual rights from the viewpoint of the principle of the world human community (**).

4. THEORETICAL STUDIES OF HUMANS AND SOCIETIES

Here, we claim that a majority of individual beings are effectively living in their local communities and are unchanged or changing slowly, even though they are surrounded by globalized economic activities. This claim implies a great difficulty in practical management of the entire earth. The claim itself is not new, and is found in some social sciences such as sociology and cultural anthropology. However, we need a theoretical investigation of it in order to gain a better understanding of the human world. The key theory here is *inductive game theory* recently developed by the present author and his collaborators (e.g., Kaneko and Matsui [1], Kaneko and Kline [2]).[9] In this section, we explore the claim and its implications for the small and narrow world.

[9] *The basic research program is described in Kaneko [10].*

4.1 Diversity of Customs, Behaviors and Ways of Thinking

Some readers may doubt the above claim, considering that convenient and rapid informational technology will be available to people, which they may use to communicate to more people locally and globally. We argue below that the social context surrounding them exceeds their cognitive abilities. A change in informational technology is limited to the superficial level; communication devices rely upon a language, and language is too coarse to convey their deeper and detailed cultural backgrounds.

Let us give a rough sketch of the idea of inductive game theory. It has been observed that people cannot instantaneously adapt to new situations. Little prior knowledge of the situation is available to a newcomer. Situational knowledge is obtained only by putting themselves into a new situation and having experiences there. Learning from experiences requires many trials and errors; each time, a person may learn only a small part of the social custom and structure. To understand the structure better, one needs to put oneself deeply into the situation and experience the same situation many times. However, experiences are scattered over time, and forgetfulness may prevent one from recalling them.

These activities are time consuming and constrained to local social environments because of individuals' cognitive and perceptual abilities. These constraints lead to inevitable slowness of individual changes. The readers could understand these by reflecting on their social network and how many people can communicate with in their community. This observation, together with a large society, implies that cultures, behaviors, and ways of thinking are diversified even with rapid information technology. Such diversity was emphasized by Benedict [19], a cultural anthropologist, by observing many advanced and primitive societies. She was strongly against the biological-environmental determinism of human cultures, i.e., the argument that natural, biological, and environmental components solely determine people's behavior and thinking.

4.2 The Cognizance Assumption in the Standard Theories

The above view is very different from standard economics and game theory. It is typically and implicitly assumed in these fields that an individual agent has well-formed beliefs over the structure of the model; "a belief" is expressed as subjective probability along the lines of Savage [20]. This requires the cognizance assumption that the structure of the target situation is known to each agent *a priori*. The term "uncertain," which is often used synonymously with "unknown", means that the estimated probability is less than 1, or more generally, there are multiple possibilities for given information. This makes sense only under the cognizance assumption that the set of possibilities is known to an agent *a priori*.

A related difficulty is the blinded use of set-theoretical apparatus; it is based on that all structures have well-defined substances. The cognizance assumption is based on this presumption. However, these substances are not observable but are hiding below observables. From the viewpoint of human cognition, it would be natural to reverse the direction from the substances to observables, to that from observables to substructural elements. Inductive game theory adopts this reversed direction; by this change, we meet a lot of phenomena that are simply excluded by the cognizance assumption.

4.3 Inductive Game Theory: Exploring Experiential Sources of Beliefs/Knowledge

Instead of starting with the above cognizance assumption, inductive game theory explores the origin and emergence of beliefs/knowledge of the basic structure in individual experiences.[10] This changes our understanding of the social world by almost a 180°. First, let us examine how inductive game theory thinks about society.

[10] Here, the concepts of "belief" and/or "knowledge" are entirely different from those in the sense of subjective probability. It is about a symbolic sentence or symbolic structure. "Knowledge" is a true "belief," where truth is defined outside. See Kaneko ([21], Section 6).

Each person is involved in various social situations in the social web, including families, friends, schools, offices, companies, etc. In Fig. 2, Γ^0, Γ^1, ⋯ are those social situations constituting the social web, which may or may not involve a person, say PL1. The social-web is already very complex for PL1, and only some part is directly related to him; the other parts are typically invisible to him. He follows some behavioral patterns in these situations. He has no prior knowledge of the structure of each situation. Only after experiencing a situation several times, he may have constructed a view about it. Then, based on this, he may choose a better alternative action. If he has encountered a situation for the first time, he can choose only a predetermined default action.

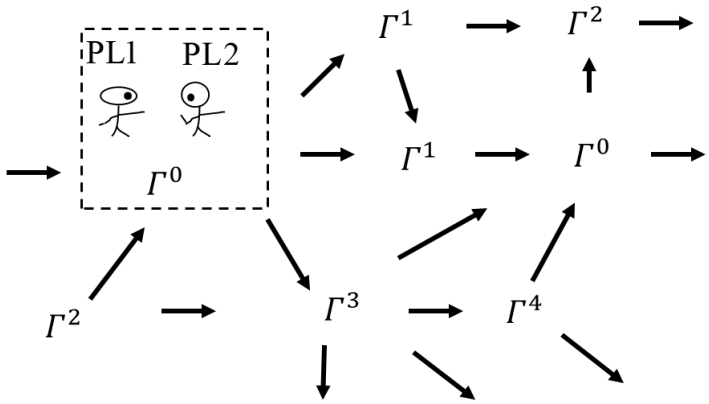

Fig. 2. Social-Web

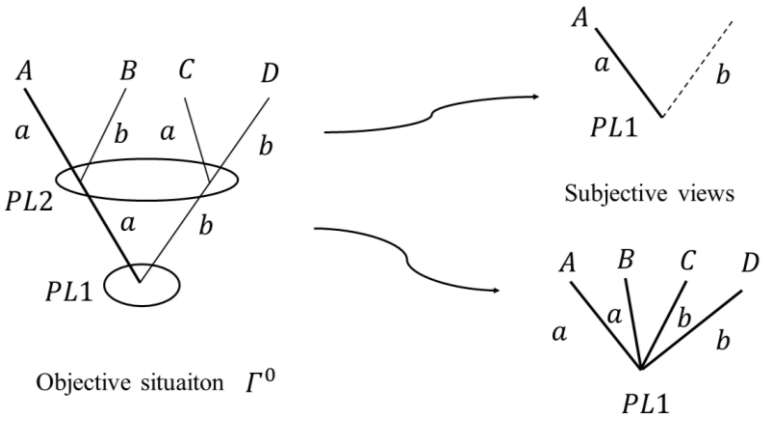

Fig. 3. Objective situation and subjective understanding

Once the above idea is taken, we would notice that the cognizance assumption is highly problematic. For example, let Γ^0 be the 2-person extensive game described in the left of Fig. 3, which is described from the objective point of view. On the other hand, we make the basic assumption that PL1 does not know the structure of the game. We can assume that PL1 does not know even the existence of PL2 moving after PL1. When both PL1 and PL2 have always been playing act a, PL1's experiences give a view like the upper right tree, having outcome A resulting from act a, while he recognizes another available act b without knowing the resulting outcome from it.

When PL1 and PL2 have tried both actions, PL1 has experienced the four outcomes A, B, C, D that have been led by his two actions and PL2's two actions. If PL1 does not know the existence of PL2, PL1 thinks that both A and B are caused by his choice a, and similarly, C and D are by b. His view becomes like the bottom right tree; here, causality is not unique. If PL1 knows that PL2 is playing in Γ^0, the view constructed by PL1 may be the same as the objective game; yet, he needs to know more than the existence of PL2.

The above game is extremely simple; however, with different basic assumptions on prior knowledge and on trials/errors and accumulated experiences, we have different possible individual views. For a game with more people and more available actions, the number of possibilities becomes astronomical. One society consists of a huge and complex social web, and people belonging to different parts of the social web have developed almost necessarily different views.

Computerized technology does not help each person learn the details of the social web, because the complexity involved is astronomical and people have bounded cognitive and perceptional abilities.[11] This constraint will not be eliminated by progress in technology.

This view is consistent with Benedict [19], in that it is against the biological-environmental determinism of human cultures. Theoretically, we can study how such diversity has originated and emerged. Within the theory, however, it would be difficult to find which forms of cultures occur more likely; the theory can talk about the structure but may not find detailed patterns in diversity. To see detailed patterns, we need to look at the real world, and empirical research is required. Such studies should compensate for the theory, as will be discussed in Section 5.

4.4 Underlying Model of a Human Being: Conservative Nature

An individual person typically follows one's behavior pattern and a patterned way of thinking. He or she may have learned the patterned behavior and thinking from other people from their childhood. The underlying model of a human being in inductive game theory is such a pattern-governed person, who only occasionally thinks about new possibilities. However, new trials are scarce for each person, because making trials/errors is behaviorally and mentally costly. Thus, a human is necessarily conservative for his present situation and thought. This gives a clear distinction from the standard economics and game theory.

4.5 Methodological and Philosophical Studies

Here, we mention the necessity of methodological and philosophical considerations of our research. As we need a normative theory to discuss objectives and evaluations, methodological and philosophical considerations may lead theoretical and empirical research in a right direction; without them, theoretical research could become mere mathematical exercises and empirical research might be simple pursuits of social events.

In his novel "Nineteen Eighty-Four," Orwell [22] wrote about a new system of language called the "new speak" forced upon people. Behind the new speak is the philosophical idea that if some words were removed from the dictionary, the concepts described by them would be eliminated. For example, if the word "revolution" were removed from the dictionary, then people might no longer be able to conceive of a revolution. This metaphor is effectively observable in our profession. We give two examples among others: Arrow's [23] *impossibility theorem* and the free use of the concept of subjective probability.

Arrow's theorem is regarded as important in welfare economics, claiming that it is impossible to find a social welfare function satisfying certain "plausible" conditions. One interpretation of a social welfare function is the mechanism of aggregating the preference relations reported by members of society. We find a difficulty in this interpretation in that "having a preference relation" should be distinguished from "knowing his own preference relation." The former is already problematic but not very serious. The latter is serious; how does one know his own preference relation? If the number of alternative choices is two or three, it would not be a problem, but in the case with more alternatives, it is difficult to think about own's preference relation. This is compared with a statement about one's brain; it is unavoidable to assume that a person has a brain but cannot know its inner functioning.

[11] *Recently, there have been certain relevant developments. Kline, Lavendohmme and Waltener [23] describe the constructive process of a derived view from experiences. Kaneko [24] provides a constructive expected utility theory by restricting the permissible probabilities to finite (decimal) fractions. These findings suggest a systematic study of the concepts of induction, deduction, and bounded rationality.*

Another example is the free use of the concepts of subjective probability.[12] People's beliefs are expressed by subjective probability, according to Savage [20]. In the theory of games with incomplete information, due to Harsanyi [26], subjective probability is extensively used to express beliefs about nature as well as other's beliefs including logical inferences. Savage [20] gave an axiomatization of subjective probability, but, mathematically, any axiomatization is not beyond necessary and sufficient conditions; some pre-mathematical argument and evaluation about the suitability of those conditions should be given. In the case of subjective probability, the real problem is the lack of evaluations of what the concept represents. The use of such beliefs expressing logical inferences comes from the ignoring the field of mathematical logic; it has a long history from ancient Greece as a scientific study of human logical inferences.[12]

The above examples of existing theories are regarded as dominant and important in economics and game theory. Although the initiators of those theories dug new problems in their times, they are mediocre theories now. According to Thomas Kuhn [27], history of science has a long steady period of progress-generating variants within a paradigm and has a possible scientific revolution only when serious anomalies appear.

Now, the world and human race are in an urgent situation; we cannot wait for a long period before a revolution in our sciences. Instead, we should be conscious about what an important problem is and what a mediocre one is. We should attack the heart of each problem.

5. DESCRIPTIVE/EMPIRICAL STUDIES OF SOCIETIES AND INSTITUTIONS

People from different communities meet each other more in the future earth; their meetings cause frictions and conflicts between them. As a different background is deeply impregnated in each community, diversity cannot be easily erased by teaching a common language such as English and/or computer technology. In this section, we will discuss what kind of research is required to understand such diversified cultures.

5.1 Geological and Historical Understanding of the Human World

First, we need to investigate what events have occurred, and will possibly occur in the human world. There are two kinds of empirical research for these questions: the horizontal and the vertical. The horizontal research studies what is occurring over the present world, and the vertical one assesses what has occurred in the past of each region. To consider the future world, we need these different methods.

From the horizontal point of view, we see a great variety of human cultures and events occurring in the world. Studying people and their behaviors in different situations helps our understanding of human beings and societies. On the other hand, from the vertical point of view, we trace events in the past of a region and understand what social structures and social institutions lead to them. Through these studies, we may foresee possible events to happen in the future world and find ways to prevent them.

5.2 Historical Investigations of Japanese Societies

Kaneko [29] adopted the vertical methodology to examine Japanese histories over 400 years. Even though Japan is geologically small from the present standard, its histories are rich and give hints to consider the future world and possibility of the world nation. Modern Japan began in 1868, and before it, Japan was governed by the Tokugawa family, a feudal clan, from 1603 to 1867. During this period, Japan had a policy of national isolation from 1633 until 1858, except for one channel (a small island in Kyushu) to the Netherlands. After 1868, Japan was quickly industrialized, and took militarism until the end of World War II. It has since grown and become one of the richest nations in the world.

[12] In the first half of the 20th century, the question of what "probability" is has been extensively discussed. Among various interpretations, the frequentist interpretation is only an attempt to view "probability" from the material world. See Weatherford [28]. For the expected utility theory, von Neumann and Morgenstern [7] explicitly stated that they adopt the frequentist interpretation. See Hu [29] for a treatment of expected utility theory from the frequentist perspective.

Looking into Japanese societies in the past, we find some social situations hardly perceivable in the present Japan. For example, extreme poverty prevailed in the rural areas in the Tohoku[13] region of Japan from the Tokugawa period until some years after the end of World War II. This is just one history relevant to our considerations. In the following section, we discuss some other observations about Japanese histories, which provide a hint for understanding market economies.

5.3 Concentration of Land Ownerships and Its Implications

In Japanese history, we find that private ownership, which is one of our crucial issues as already discussed, created a small number of huge landlords and a large number of peasants. Some peasants were observed in the Tokugawa era, but after the reform of the tax system on farmland in 1873 (6 years after the Meiji restoration), the percentage of peasants in the Tohoku region increased from 15% - 20% to 45% - 50% in 40 years. Suffering cold weather for several years, many peasants, who were in despair, sold their daughters for prostitution in Tokyo. After World War II, the concentration of land ownership was fully dissolved by the allied forces.

The market system with a specific legal structure led to the concentration of land ownership. As discussed in Section 2, the central assumption for the market system is property rights (private ownership), which requires legal protection. For the practical management of the future earth, it could be inevitable to use a market system in a certain manner, which requires us to admit property rights. However, we should always be careful in controlling the system of property rights.

5.4 Conservativeness and Its Implications

The concentrations of land ownership are social phenomena. Scrutinizing landlords' behavior and speaking, we find that their mentality is very conservative in nature; they were prone to think that their ownership would be eternal. Their justification often takes the following form: their furthest ancestors reclaimed wastelands by hard work and all their successors had kept their lands from generations to generations. Some bought lands from other farmers, but they were all legally legitimate.

Their attitudes may be called *rationalization*. This is consistent with what we discussed in Section 4; we have a tendency to find a convenient explanation (cf., Kaneko and Matsui, [1]). This is the conservative nature of a human being. Our normative theory states that we should abrogate vested rights and interests; however, people naturally want to keep them; they are conservative, regardless of their conservatism being conscious or unconscious.

Incidentally, the principle of the world human community (**) provides a way to eliminate such conservatism.

5.5 Administrative Units in the Past

Before 1868, Japan was divided into about 270 feudal states and people were not able to freely cross the borders between those states. Poor people, such as farmer, were strictly restricted to their local places, and their views were limited to these places. Therefore, each state developed its own dialect and culture. After the Meiji restoration, Japan became one nation without legal boundaries, but people from different states had difficulties in communicating. This was observed until recently between people even from geographically neighboring states; however, now young people, due to the TV, speak the standard Tokyo dialect. This fact indicates that diversity is decreasing in Japan, at least at the surface.

6. THE WORLD FEDERAL GOVERNMENT

In Section 3, we discussed the principle of the world human community (**) emphasizing the unity of the entire world and the whole human family. This principle has apparent suggestions, as discussed, only about extreme problems such as avoidance of genocides, famines and even capital punishments. Practical management of the world is a different matter. Each individual being has a

small social world, while being connected to larger societies in various hierarchical ways such as families, schools, companies, towns, prefectures, and nations. Without such institutions, we are not able to run our societies and economies; we need to reconcile the relationships between individuals, institutions, and the entire world. Here, we propose the notion of the *World Federal Government (WFG)*. In the following discussions, we consider the time span of 100-200 years of the future world.

As stated in Section 5, until 1867, Japan was divided into about 270 feudal states as administrative units and the Tokugawa family acted as the central government. Now, Japan is one nation and has no boundary between the former feudal states. In the present European Union, the borders are practically removed, and people move in search of a job from one nation to any other within the Union. In the year 2100, the concept of "nation" in the European Union will be less clear.

This historical direction may be interpreted as meaning that unification of present nations in the world would be a natural conclusion in the future. Some centralized governance is needed for this unification; however, as discussed in the previous sections, due to geological distances and diversified cultures, decentralized governance is inevitable, unlike in the cases of Japan and the EU. In addition, easy centralization may magnify an external shock and lead to a worldwide disaster. We would meet many contradictory features for practical management of the entire world. Here, we discuss how to reconcile the centralized idea of the entire world and its practical decentralized management. The argument to be given may be applied to the decentralized management of each state into substates, though we do touch upon this issue.

6.1 CONSTITUTION OF THE WORLD FEDERAL GOVERNMENT

To decentralize the management of the entire world, the world is divided into *states*; the WFG consists of states. This sounds similar to the present relationship between the United Nations (UN) and each nation; here, each of these nations keeps sovereign power, that is, each keeps an almost categorical right of disagreement for international affairs with other nations. Each state constituting the WFG, instead, is a management unit. A salient difference from the present nations is that each state has only limited sovereignty, which is determined by the *constitution* of the WFG. The constitution is designed based on the principle of the world human community (**) given in Section 3.

We coordinate the two almost contradictory elements: the normative principle (**) for the unity of the world and the practical decentralized management of the world. Avoidance of extreme bad events such as genocides, famines, epidemics, etc., need centralized and direct controls of the WFG. For less extreme and long-run problems, each state is given some power to decide to choose plans for the state, up to the scope allowed by the constitution. We consider decentralization from the two viewpoints of people's economic activities and political choices of management systems. A market economic system is for the former and a democratic political system is for the latter.

Within a state, decentralization is also required; possible institutional arrangements of society consist of a market economy with private ownership and democracy with minority protections. As individual rights are the bases for both systems, these should take the principle (**) into account. Both systems are related to the entirety of each state; the market economy requires some authority such as the police power to protect private ownership for each individual person, and political democracy directly chooses policies at the entire level including a policy to finance the police power.

The constitution of the WFG imposes constraints on the market system and democratic system of each state. Constraints are made uniformly for all states of the world, rather than for a specific state. In the following section, we discuss only problems in the cases of market economy and democracy.

6.2 A Spectrum of Decentralized to Centralized Systems of Economy and Politics

Two salient facets of the society, among others, are politics and economy; the former is to treat the behavior/policy of the entire state and the latter is to treat people's everyday lives. There is a great spectrum within the pairs of political and economic systems; it differs along the dimension of how much freedom is given to an individual person for his own behavior and how much the central

authority controls each individual's behavior. One case is that the central authority has a strong centralized power to control society including people's behavior; the communism system of the former Soviet Union was an example. Another extreme is a combination of democracy and market economy, where the power system is politically and economically decentralized.

Combination of democracy and market economy are entangled with each other and are inseparable; for example, the market economy is based on public infrastructure, and is financed by a taxation system. The choice of infrastructure is made by politics but should also be feasible by a tax system and the economy. Both market economy and democracy include their own drawbacks, as will be discussed below. The constitution of the WFG imposes constraints on possible systems of the market economy and democracy.

6.3 Market Economy with Constraints

The aim of the WFG and each state is to give safe and good lives to people. A market economic system is regarded as a tool to achieve the economic part of this aim. Its functioning relies upon an institution (legal system) of private ownership to guarantee individual freedom of pursuing monetary profits, social successes, and psychological satisfaction. Private ownership has two different dimensions: one is to promote a labor incentive for each individual to achieve more socioeconomic success, and the other is to create prosperity for one's family and descendants. Unless private ownership is properly controlled, the market economy would not function with respect to these dimensions. For example, a small portion of people monopolize social prosperity and the remaining majority stay poor; this is a potential drawback of the market economy. The control of private ownership is by a tax system. A proper design of a tax system should avoid such a concentration of prosperity. The constitution of the WFG suggests constraints on the tax system of each state.

In the present nations, many complicated tax systems are observed. Tax systems should be clear and well-comprehensible to ordinary people. Here, we look at

(1) income tax system;
(2) inheritance tax system.

The progressivity of a tax system is possible in (1) and (2) in the market economy as long as the anonymity of individual economic behavior is preserved, except for the total income and stored property. The constitution of the WFG should give constraints on tax rates.

In (1), let us see the progressivity of a tax system. For example, suppose that the marginal tax rate on the annual income is 10% up to 20,000$, 20% up to 50,000$, and 30% for more than that. The marginal tax rate means that a person with an income 20,000$ should pay tax 20,000$×0.1 = 2,000$. When he gains an additional income of 100$, his total tax becomes 20,000$×0.1 + 100$×0.2 = 2,020$. Progressivity means that the marginal tax rate increases with income. This example is progressive.

Nevertheless, there is a wide range of degrees of progressivity. One extreme is a proportional tax system, that is, the marginal tax rate is constant over possible incomes. Another extreme is to give a high marginal tax rate to high incomes. Piketty [30] claims, based on data of incomes in many nations and concentrations of wealth through market economies, that the highest marginal tax rate should be designed to be 80%. We argue that the constitution of the WFG suggests imposing a relatively high constraint on the highest marginal tax rates, at least, say, 80%.

There is some widespread tendency to think:

(#): High progressivity prevents labor incentives for highly talented people, which would be a loss to the entire society including other people.

This view is neither proven nor discussed. It may be worth looking at a framework used in the literature of "optimal taxation" initiated by Mirrlees [32]. It is based on the following assumptions:

(i) A utility function of each person in an economy is monotonically increasing with a leisure time = 24 hours – working time and with his income (consumption);
(ii) His income is the multiplication of his talent and working time;
(iii) The tax revenue to the government is used for social infrastructure;
(iv) Social welfare is defined as the sum of utilities derived by (i), (ii), and (iii), and is maximized over possible tax schemes.

The above view (#) is rephrased in terms of these assumptions: when the tax system is highly progressive, the after-tax income is only slowly increasing with one's income, and this would kill labor incentives to people, because disutility generated by working is not compensated by an increase in income. Although this argument appears to support (#), it is not more than the verbal argument of (#); it does not see the problem in a qualitative manner.

A few remarks should be noted here. (i) ignores a positive utility from working and working constitutes an important part of our lives - - highly talented people are more likely to have this tendency. The argument for (#) does not take (iii) into account, and more productive people rely upon social infrastructure more, because being more productive requires not only a high personal productivity but also more economic opportunities, which is guaranteed by social infrastructure. Finally, in a progressive tax system even with a high marginal tax rate (80%), one's after-tax income increases at the rate of at least 20%. Highly talented people receiving satisfaction from large incomes would not lose their labor motivation. Kaneko [33] showed, under mathematically specified assumptions, that the optimal marginal income tax rate increases to 100% as the incomes become arbitrarily large. Because the number of people is finite in reality, here we choose 80% for the lower bound of the maximal marginal rate.

The inheritance tax system (2) is applied to succession from one generation to the next. Here, the argument (*) is less relevant because the inheritance tax is indirect to the labor incentive. In Sections 5.3 and 5.4, the inclination of thinking one's property is eternal, but this is denied by the principle of the world human community (**WHC), as the next generation should be treated equally to other people. Hence, the inheritance tax system should be more progressive than the income tax system.

6.4 Democracy with Constraints

We have considered the market economy and democracy, as an economic institution and a political institution for the sake of decentralization, respectively. However, the natures of these institutions have large differences in their targets in addition to functions. The institution of In the market economy works in a decentralized manner under the basic infrastructures mentioned in Section 6.3. On the other hand, democracy targets collective plans for society, community, and a nation, though democracy presumes equal individual rights and the majority decision rule coordinates different opinions and desires of people. Individual rights and freedom of desires are regarded as the counterpart of decentralization in the market economy.

As discussed in Sections 5.2 and 5.3, the market economy may generate a severe concentration of prosperity and destroy the functioning of the market economy. Similarly, democracy, together with a majority decision rule without constraints, would suffer from the destruction of society. The majority rule is literally interpreted as meaning that a group having a majority can decide any plan. In this case, a plan to genocide against some minorities can be chosen. There were quite a few examples in our world history such as the Nazi assumption of power in 1934.
Thus, democracy with a majority decision rule needs some constraints and protection of minority groups. Such constraints and protection are imposed on each state by the constitution of the WFG. In the present world, there are many instances where nations officially employing democratic systems, yet, do not protect some minorities. The constitution of the WFG should give a constraint on the democratic systems of these nations.

Here, we give two instances of implications from the principle of the world human community (**), which is officially imposed the WFG. One is the instance of the UK leaving the EU; the independence asserted by (**) implies that the constitution of the WFG should allow this leaving of the UK from the

EU. In a sense, this is a good example of applying our theory of democracy with constraints to each nation of the world. Another application is the independence of Taiwan from mainland China. China itself does not have a democratic system, which is already a violation of our theory. On the other hand, Taiwan has a democratic system. If it is regarded as a state of the WFG, the theory would support its independence from China. This reasoning is applied to Hong Kong, too.

These examples indicate that we would face tremendous difficulties in a practical management of the world. After all, we should consider such subtle difficulties, while deciding the distances between each problem to the principle of the world human community (**).

7. CONCLUSION

In this article, we considered the expected problems that we would encounter in a small and narrow world of the near future. Our theory consisted of two almost contradictory parts: A normative theory and a descriptive theory. The former provides evaluations of possible events and of designs of social institutions from the viewpoint of the unified world. The latter discussed that because a great diversity of cultures would remain, a unified management of the world is practically impossible. Instead, the idea of the world federal government is suggested as a way of decentralized management of the world.

We looked at Japanese societies over the past 400 years. A dynamic change in the social structure of Japan was noted, and a similar change could be observed in the histories of other countries. This may provide a lot of hints for further considerations of the future world. In this article, we have not touched upon the geological differences in the world, which should also be studied seriously.

We, scientists, especially, social scientists, should now seriously investigate the problems of the future earth. To make meaningful recommendations for policies for the management of the entire earth, we need to understand the world better, which requires philosophical (methodological), theoretical, and empirical studies. These should include technical studies of the external worlds, people's internal mental worlds, normative studies, and philosophical studies of researchers' methods and their attitudes. We are also required to synthesize studies of different fields; in the present academia, various fields on close subjects exist almost separately. Scientists should cooperate to save the world and human beings. As our task is urgent, we should take a truly radical attitude for every step.

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Author has declared that no competing interests exist.

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Biography of author(s)

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He completed his PhD at Tokyo Institute of technology, and has taught at University of Tsukuba, Hitotsubashi University, Virginia Polytechnic Institute, and Waseda University. In 1970's, he started working on game theory and economics, and then he was motivated by "Leviathan" by T. Hobbes for all later works. After 1985, he started working on mathematical logic and conceptual foundations for game theory and economics; he initiated a new theory called inductive game theory. A list of his representative academic contributions is given below. A central part of his chapter of the present book is based on the paper [1], the book [2] discusses philosophical foundations of game theory and economics, and the paper [4] is a recent contribution to logic. The paper [4] studies the foundation of expected utility theory. These are all related to his chapter: normative theory, philosophical evaluations, and practical management of the world.

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