Mechanisms that Make Economic Inequality Increase in Democratic Countries

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Abstract

Many empirical studies show that the level of economic inequality has worsened recently in democratic countries, which means that the majority of the electorates in these countries have agreed with, or at least not opposed, increases in economic inequality. In this paper, I show that the level of economic inequality can unintentionally and markedly increase in democratic countries because (1) households are often unable to perceive their true surrounding economic situation, (2) the primary political issue for the individual is not always to address increases in economic inequality, and (3) the government may favor a particular part of the electorate and discriminate against others. The examinations in this paper strongly suggest that democracy does not necessarily guarantee that the level of economic inequality will not significantly increase.

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Keywords: Democracy; Inequality; Misunderstanding; Redistribution; Uncertainty

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1 INTRODUCTION

Many empirical studies have shown that since the 1980s economic inequality has increased in industrialized and democratic countries (Piketty, 2003, 2013; Piketty and Saez, 2003; Atkinson et al., 2011; Parker, 2014). In the same period, wealth inequality has also increased in those countries (Piketty, 2013; Saez and Zucman, 2016). Several explanations for the increase in economic inequality have been proposed. Until the early 2000s, skill-biased technological change, the change in technology that favors skilled over unskilled labor, was the most favored explanation (Katz and Murphy, 1992; Autor et al., 1998, 2003); however, this has not been supported empirically (Card and DiNardo, 2002). Other explanations based on globalization have also been proposed, in particular, those based on the Stolper–Samuelson theorem (Stolper and Samuelson, 1941); however, these explanations are also not supported empirically (Leamer, 1998; Goldberg and Pavcnik, 2007). Subsequent discussions of the mechanisms underlying the increase in inequality have considered the heterogeneity of firms, labor market frictions, and offshoring of tasks (Helpman, 2016). In addition, Piketty (2013) has argued that the recent increases in income and wealth inequalities can be attributed to uneven capital accumulation across households.

One puzzling aspect of this increase in economic inequality is that it has occurred under democratic political systems, that is, political systems based on majority rule, the principle of one-person one-vote, and regular elections, which suggests that the majority of the electorate in these countries supports, or at least does not oppose, these increases in economic inequality. Various mechanisms for the origin of economic inequality have been proposed (e.g., Kuznets, 1955; Boix, 2010; Picketty, 2013; Milanovic, 2016). A mechanism through which extreme economic inequality can naturally develop due to heterogeneities among people has also been proposed. Becker (1980) and Harashima (2010[1], 2012[2], 2014) have shown that if the rate of time preference (RTP) among households is heterogeneous, an extreme economic inequality will eventually be generated, even if the differences in RTP are very small. This indicates that very small differences in the natures of people can lead to huge differences in incomes and wealth among households.

Harashima (2020b) has shown that a similar amplification mechanism exists for heterogeneity in persistent economic rents among households, which provides an explanation for the deep-rooted view that wealthy persons have sources of wealth (i.e., economic rents), and that this wealth is a major origin of high levels of economic inequality (Stiglitz, 2015a, 2015b, 2015c, 2015d). Stiglitz (2015d) also argues that

[1] Harashima (2010) is also available in Japanese as Harashima (2017a).
[2] Harashima (2012) is also available in Japanese as Harashima (2020a).

"exploitation rents" are another type of economic rent that contribute to inequality, although his arguments are narrative and remain suggestive. Harashima (2016[3], 2018b[4]) has shown that the economic rents that are generated through people's ranking preferences and mistakes in business dealings particularly play an important role in economic inequality because they are ubiquitous, they are generally not regulated directly by governments, and they are persistent.

At the same time, Harashima (2010, 2012, 2014) has shown that a state can exist in which all of the optimality conditions of all households are satisfied, even if the abovementioned heterogeneities exist, and called this "sustainable heterogeneity" (SH). Although SH is unlikely to arise naturally, it can be achieved with appropriate government intervention. However, Harashima (2018c)[5] has shown that the "true" or "correct" SH may not be achieved even if a government intervenes as much as it can. Instead, an approximate SH can be achieved in which the numbers of voters who support and do not support an increase in economic inequality are balanced in elections. This would suggest that it is highly likely that the conditions for achieving approximate SH are satisfied in democratic countries, which prevents significant increases in economic inequality from being generated. However, this assumption is at odds with the actual observed large increases in economic inequality in these countries.

In this paper, I examine several possible causes of the recent large increases in inequality in democratic countries. An important point to note is that an approximate SH is by definition an approximation. That is, there is no guarantee that an approximate SH is close to the true SH because votes cast by households are a result of their subjective and likely biased considerations about a range of political and economic issues. Particularly, it is likely that households systematically misunderstand their surrounding economic situation because of their inability to perceive the true values with regard to SH, possibly because of cognitive biases (e.g., Kahneman et al., 1982). If households regularly and systematically misunderstand their surrounding economic situation, the approximate SH can become skewed, resulting in substantial increases in economic inequality. I also examine the possibility that even if households do not misunderstand their surrounding economic situation, economic inequality can still increase because addressing economic inequality will not always be the most important political issue for the whole electorate and because the government may discriminate against certain parts of the electorate.

2 ECONOMIC INEQUALITY AND SUSTAINABLE

[3] Harashima (2016) is also available in Japanese as Harashima (2018a).
[4] Harashima (2018b) is also available in Japanese as Harashima (2021).
[5] Harashima (2018c) is also available in Japanese as Harashima (2019).

HETEROGENEITY

2.1 Causes of significant economic inequality

2.1.1 Heterogeneity among households

It seems highly unlikely that huge income gaps among households can be explained by arguing that they are simply reflecting proportional differences in people's absolute abilities. Therefore, there must be a mechanism that amplifies the differences among the intrinsic characteristics of people and results in large differences in incomes and wealth. Becker (1980) and Harashima (2010, 2012, 2014) have shown that if the RTP is heterogeneous among households, even slightly, an extreme economic inequality will eventually be generated. That is, very small differences among people can lead to extreme economic inequality.

In addition, Harashima (2020b) has shown that a similar amplification mechanism also exists for persistent economic rents, and Harashima (2016, 2018b) has shown the existence of a different type of economic rent that had not been discussed previously: monopoly profits (rents) derived from people's ranking preference. These rents enable some individuals to be superstars in the worlds of sport, art, or music (Harashima, 2016, 2018b) and enable some corporate executives to earn extremely high compensations (Harashima, 2018d). Because ranking preference is an important element in product differentiation that allows companies to accrue large amounts of monopoly rent (Harashima, 2017b) and product differentiation is one of the most important strategies a company uses to prosper (Porter, 1980, 1985) and as such has been intensely pursued by many companies, monopoly rents derived from product differentiation owing to ranking preference are highly likely to be found in economies.

Furthermore, Harashima (2020c) has discussed the importance of another kind of economic rent, that which arises from heterogeneity in mistakes made in business. Here, a "mistake" means, for example, that a household purchases a product at a price that is higher than the cost to produce it plus a normal margin, or that a worker accepts a wage that is lower than their marginal productivity would indicate is appropriate. Harashima (2020c) showed that because there is certainly heterogeneity in the ability to make fewer mistakes in business dealings among people, the economic rents from the mistakes probably exist ubiquitously and at a large scale across an economy.

2.1.2 Family lines

An important nature of these heterogeneities is that some households or family lines will persistently obtain these economic rents with a higher probability than others because the intrinsic abilities for obtaining these rents are probably exogenously given and unevenly

distributed. Family lines consist of households that are descended from common ancestors and therefore share similar traits. In addition, in accordance with local customs and various other reasons, many groups of people mostly marry within the same or similar groups. Therefore, it is highly likely that abilities (e.g., those related to obtaining economic rents) are exogenously and unevenly given (Harashima, 2020d, 2020e). Therefore, the average abilities of people in a given group (or family line) will remain different from those in other groups (Harashima, 2020d, 2020e). This means that there are groups (or family lines) that indefinitely obtain persistent economic rents. At the same time, there are groups (or family lines) that are indefinitely exploited because of these persistent economic rents. As a result, many economic rents will be enjoyed persistently by only a small number of households and family lines; that is, the persistent economic rents will be distributed very unevenly.

2.2 Sustainable heterogeneity

Heterogeneities in RTP and persistent economic rents do not always result in extreme economic inequality. Indeed, Harashima (2010, 2012, 2014) has shown that even if SH does not arise naturally, it can be achieved via government intervention. In this section, I briefly explain the mechanism through which appropriate government intervention enables SH to be achieved in an economy with heterogeneous households; this discussion is based on Harashima (2010, 2012, 2014).

2.2.1 SH

Here, three heterogeneities—RTP, degree of risk aversion (DRA), and productivity—are considered. Suppose that there are two economies (Economy 1 and Economy 2) that are identical except for RTP, DRA, and productivity. Each economy is interpreted as representing a group of identical households, and the population in each economy is constant and sufficiently large. The economies are fully open to each other, and goods, services, and capital are freely transacted between them, but labor is immobilized in each economy. Households also provide laborers whose abilities are one of the factors that determine the productivity of each economy. Each economy can be interpreted as representing either a country or a group of identical households in a country. Usually, the concept of the balance of payments is used only for international transactions, but in this paper, this concept and the associated terminology are used even if each economy represents a group of identical households in a country.

The production function of Economy i (= 1, 2) is

$$y_{i,t} = A_t^{\alpha} k_{i,t}^{1-\alpha} \ ,$$

where $y_{i,t}$ and $k_{i,t}$ are the production and capital of Economy i in period t, respectively; A_t is technology in period t; and α ($0 < \alpha < 1$) is a constant and indicates the labor share. All variables are expressed in per capita terms. The current account balance in Economy 1 is τ_t and that in Economy 2 is $-\tau_t$. The accumulated current account balance

$$\int_0^t \tau_s ds$$

mirrors capital flows between the two economies. The economy with current account surpluses invests them in the other economy. Since $\frac{\partial y_{1,t}}{\partial k_{1,t}} \left(= \frac{\partial y_{2,t}}{\partial k_{2,t}}\right)$ is returns on investments,

$$\frac{\partial y_{1,t}}{\partial k_{1,t}} \int_0^t \tau_s ds \quad \text{and} \quad \frac{\partial y_{2,t}}{\partial k_{2,t}} \int_0^t \tau_s ds$$

represent income receipts or payments on the assets that an economy owns in the other economy. Hence,

$$\tau_t - \frac{\partial y_{2,t}}{\partial k_{2,t}} \int_0^t \tau_s ds$$

is the balance on goods and services of Economy 1, and

$$\frac{\partial y_{1,t}}{\partial k_{1,t}} \int_0^t \tau_s ds - \tau_t$$

is that of Economy 2. Because the current account balance mirrors capital flows between the economies, the balance is a function of capital in both economies such that

$$\tau_t = \kappa\left(k_{1,t}, k_{2,t}\right).$$

This two-economy model can be easily extended to a multi-economy model. Suppose that a country consists of H economies that are identical except for RTP, DRA, and productivity (Economy 1, Economy 2, … , Economy H). Households within each economy are identical. $c_{i,t}$, $k_{i,t}$, and $y_{i,t}$ are the per capita consumption, capital, and output of Economy i in period t, respectively; and θ_i, $\varepsilon_q = -\frac{c_{1,t}u_i''}{u_i'}$, ω_i, and u_i are the RTP,

DRA, productivity, and utility function of a household in Economy *i*, respectively (*i* = 1, 2, …, *H*). The production function of Economy *i* is

$$y_{i,t} = \omega_i A_t^{\alpha} k_{i,t}^{1-\alpha}.$$

In addition, $\tau_{i,j,t}$ is the current account balance of Economy *i* with Economy *j*, where *i*, *j* = 1, 2, … , *H* and $i \neq j$.

Harashima (2010) showed that if, and only if,

$$\lim_{t\to\infty} \frac{\dot{c}_{i,t}}{c_{i,t}} = \left(\frac{\sum_{q=1}^{H} \varepsilon_q \omega_q}{\sum_{q=1}^{H} \omega_q}\right)^{-1} \left\{\left[\frac{\varpi\alpha \sum_{q=1}^{H} \omega_q}{Hmv(1-\alpha)}\right]^{\alpha} - \frac{\sum_{q=1}^{H} \theta_q \omega_q}{\sum_{q=1}^{H} \omega_q}\right\} \quad (1)$$

for any *i* (= 1, 2, … , *H*), all the optimality conditions of all heterogeneous economies are satisfied, where *m*, *v*, and ϖ are positive constants. Furthermore, if, and only if, equation (1) holds,

$$\lim_{t\to\infty} \frac{\dot{c}_{i,t}}{c_{i,t}} = \lim_{t\to\infty} \frac{\dot{k}_{i,t}}{k_{i,t}} = \lim_{t\to\infty} \frac{\dot{y}_{i,t}}{y_{i,t}} = \lim_{t\to\infty} \frac{\dot{A}_t}{A_t} = \lim_{t\to\infty} \frac{\dot{\tau}_{i,j,t}}{\tau_{i,j,t}} = \lim_{t\to\infty} \frac{\frac{d\int_0^t \tau_{i,j,s} ds}{dt}}{\int_0^t \tau_{i,j,s} ds}$$

is satisfied for any *i* and *j* ($i \neq j$). Because all the optimality conditions of all heterogeneous economies are satisfied, the state at which equation (1) holds is SH by definition.

2.2.2 SH with government intervention

As shown above, SH is not necessarily naturally achieved, but if the government properly transfers money or other types of economic resources from some economies to other economies, SH is achieved.

Let Economy 1+2+…+ (*H* – 1) be the combined economy consisting of Economies 1, 2, …, and (*H* – 1). The population of Economy 1+2+… + (*H* – 1) is therefore (*H* – 1) times that of Economy *i* (= 1, 2, 3, …, *H*). $k_{1+2+\cdots+(H-1),t}$ indicates the capital of a household in Economy 1+2+…+ (*H* – 1) in period *t*. Let g_t be the amount of government transfers from a household in Economy 1+2+…+ (*H* – 1) to households in Economy *H*, and $\bar{g}_t$ be the ratio of g_t to $k_{1+2+\cdots+(H-1),t}$ in period *t* to achieve SH. That is,

$$g_t = \bar{g}_t k_{1+2+\cdots,+(H-1),t} \ .$$

$\bar{g}_t$ is solely determined by the government and therefore is an exogenous variable for households.

Harashima (2010) showed that if

$$\lim_{t\to\infty}\bar{g}_t = \left(\frac{\sum_{q=1}^{H}\varepsilon_q\omega_q}{\omega_H}\right)^{-1}\left\{\frac{\varepsilon_H\sum_{q=1}^{H}\omega_q - \sum_{q=1}^{H}\varepsilon_q\omega_q}{\sum_{q=1}^{H-1}\omega_q}\left[\frac{\varpi\alpha\sum_{q=1}^{H}\omega_q}{Hmv(1-\alpha)}\right]^{\alpha} - \frac{\varepsilon_H\sum_{q=1}^{H}\theta_q\omega_q - \theta_H\sum_{q=1}^{H}\varepsilon_q\omega_q}{\sum_{q=1}^{H-1}\omega_q}\right\}$$

is satisfied for any i (= 1, 2, …, H) in the case that Economy H is replaced with Economy i, then equation (1) is satisfied (i.e., SH is achieved by government interventions even if households behave unilaterally). Because SH indicates a steady state, $\lim_{t\to\infty}\bar{g}_t$= constant.

Note that the amount of government transfers from households in Economy 1+2+ … + (H – 1) to a household in Economy H at SH is

$$(H-1)g_t = (H-1)\,k_{1+2+\cdots+(H-1),t}\lim_{t\to\infty}\bar{g}_t \ .$$

Note also that a negative value of g_t indicates that a positive amount of money or other type of economic resource is transferred from Economy H to Economy 1+2+ · · · + (H – 1) and vice versa.

2.2.3 SH for heterogeneous RTP with government intervention

Suppose that RTP is heterogeneous among households. If the government's transfers from a household in economy 1+2+ · · · + (H – 1) to households in economy H are such that

$$\lim_{t\to\infty}\bar{g}_t = \frac{\theta_H - \frac{\sum_{q=1}^{H-1}\theta_q}{H-1}}{H}\ , \tag{2}$$

then

$$\lim_{t\to\infty}\frac{\dot{c}_{i,t}}{c_{i,t}} = \varepsilon^{-1}\left[\left(\frac{\varpi\alpha}{mv}\right)^{\alpha}(1-\alpha)^{-\alpha} - \frac{\sum_{q=1}^{H}\theta_q}{H}\right] \tag{3}$$

for any i (= 1, 2, · · ·, H). If equation (2) is satisfied for any i (= 1, 2, · · ·, H) in the case that Economy H is replaced with Economy i, then equation (3) is satisfied (i.e., SH is achieved by government intervention). Because SH indicates a steady state, $\lim_{t\to\infty}\bar{g}_t$=

constant.

2.2.4 SH for heterogeneous RTP and economic rents with government intervention

Next, suppose that not only RTP but also persistent economic rents are heterogeneous among households, as shown in Harashima (2020b). First, I examine this case using the two-economy model. A household in Economy 1 obtains rent income z_t in period t, and conversely, the income of a household in Economy 2 is reduced by z_t in period t. Suppose, for simplicity, that a household in Economy 1 does not consume z_t in period t but lends the money equivalent to z_t to a household in Economy 2 in period t. It is assumed that z_t is proportional to $k_{i,t}$ such that

$$z_t = \bar{z} k_{1,t} \ ,$$

where $\bar{z}$ (> 0) is a constant. A positive value of $\bar{z}$ means that the mean of rents that households (family lines) in Economy 1 obtain over generations is positive.

In the case of multiple economies such that there are H economies (Economy 1, Economy 2, …, Economy H) that are identical except for RTP and rent income and that only Economy H obtains rent income (z_t), as Harashima (2012) showed for an analogous case, SH requires government (positive or negative) transfers from a household in Economy 1+2+ · · · + (H – 1) to households in Economy H by

$$\lim_{t\to\infty} \bar{g}_t = \frac{\theta_H - \frac{\sum_{q=1}^{H-1} \theta_q}{H}}{H-1} - \frac{\bar{z}}{H-1} \ , \tag{4}$$

where Economy 1+2+ · · · + (H – 1) is the combined economy of Economy 1, Economy 2, …, and Economy (H − 1), and SH is satisfied among these economies; that is, equation (3) is satisfied.

2.3 Approximate SH

SH can be achieved by appropriate government intervention, but as Harashima (2018c) showed, households cannot know the true SH; therefore, a government will adjust the amounts of transfers among households to achieve an approximate SH as a substitute for the true SH. That is, a situation in which the number of votes cast in response to increases in economic inequality is equivalent to that in response to decreases in economic inequality will be pursued.

The reason why households cannot know the true SH can be easily understood

from the maximum degree of comfortability (MDC)–based procedure presented by Harashima (2018c). There are two possible procedures through which a household can reach steady state: (1) the conventional RTP-based procedure in which households reach steady state by generating rational expectations using RTP and (2) an alternative MDC-based procedure in which households self-assess their value from the combination of earned (labor) income and wealth (capital) (the capital–wage ratio; CWR) and then adjust its consumption to the point at which it feels most comfortable. Harashima (2018c) proved that both procedures are equivalent and thereby a household can reach the same steady state whichever procedure is used. Nevertheless, under the MDC-based procedure, a household is not required to do anything equivalent to computing a complex, large-scale, macro-econometric model to generate rational expectations; in fact, it is not even required to be aware of any sort of economic model. Thus, the MDC-based procedure is extremely easy for a household to use.

An important result of using the MDC-based procedure is that even though households cannot know the true SH, an approximate SH can still be achieved. This approximate SH will be not necessarily be equal to the true SH, but it can result in a steady state forming in a heterogeneous population because the votes relating to economic inequality are balanced. However, the uncertainty of whether the approximate SH is equal to the true SH is an important origin of households' misunderstandings, which are examined in the following sections.

Because both procedures are equivalent, for simplicity, in this paper I generally use the model based on the RTP-based procedure to examine households' misunderstandings; however, where necessary, explanations using the MDC-based procedure have been added.

3 INCREASES IN ECONOMIC INEQUALITY IN DEMOCRATIC COUNTRIES

3.1 Misunderstandings

If households misunderstand the current situation regarding economic inequality when they cast votes in elections, the level of economic inequality is not guaranteed to remain constant because achieving an approximate SH depends on the votes of households as described previously (i.e., a government adjusts the amounts of transfers among households so as to keep a situation in which the number of votes cast in response to increases in economic inequality is equivalent to that in response to decreases in economic inequality), and even if economic inequality does increase, households may not change

their voting behaviors due to their misunderstanding. As a result, the level of economic inequality can increase further.

Here, I examine three types of misunderstanding that appear to occur as a result of households not being able to know the true value of CWR at MDC (or equivalently RTP) or that of persistent economic rents. In addition, it seems highly likely that households cannot accurately estimate the current level of economic inequality within the economy. With these misunderstandings, households can cast "wrong" votes with regard to economic inequality.

Nevertheless, if the misunderstandings of households have a normal distribution with a mean that reflects the true values (i.e., if the distribution is not skewed), the misunderstandings may not negatively affect the approximate SH. However, it is highly likely that the distributions are skewed because the distributions of households' preferences and persistent economic rents are also highly likely skewed. For example, the distribution of households that receive persistent economic rents is surely markedly skewed because only a few households and family lines in an economy will be able to obtain persistent economic rents, and many ordinary households will be exploited (see Section 2.1.2).

3.1.1 Misunderstanding Type-1: Finite time horizon

Ordinary households will be very anxious about their lives if their incomes continue to decline. However, as long as their incomes continue to increase even a little, they may not mind the current economic situation, even if the rate of increase of the incomes of rich households are much higher than those of ordinary households. That is, households may misunderstand the economic situation because they evaluate it based only on the current situation and that in the near-future and do not fully consider the eventual consequences. I call this Misunderstanding Type-1, and it is caused by only having a finite time horizon in the sense that ordinary households do not sufficiently consider consequences in the indefinite future.

Of course, because of Misunderstanding Type-1, the optimality conditions of ordinary households cannot be satisfied and economic inequality will eventually increase to the limit, but ordinary households may not complain about the situation, at least at the present, because their incomes are currently increasing (i.e., they feel that they are continuously better off than before). As a result, ordinary households will not change their voting behavior and increases in economic inequality will continue until the households eventually begin to feel that they have accumulated too little capital.

3.1.1.1 Insufficient government intervention

If Misunderstanding Type-1 exists, a government does not necessarily change its current

method of income redistribution, even though it is insufficient to keep the level of inequality unchanged, because ordinary households (i.e., the majority of the electorate) do not complain about economic inequality or change their voting behavior.

Suppose that there are H households (Household 1, 2, …, H). Only Household H obtains persistent economic rents $\bar{z}k_{H,t}$ in every period, and the other $H-1$ households are equally exploited for the sake of $\bar{z}k_{H,t}$. $k_{i,t}$ is identical for any i = 1, 2, …, H because the households are identical except for RTP and persistent economic rents. Household H therefore represents a rich household and Households 1, 2, …, $H-1$ represent ordinary households. Suppose also that $\theta_H < \theta_i$ for i = 1, 2, …, $H-1$. In addition, it is assumed for simplicity that SH among Households 1, 2, …, $H-1$ is kept with sufficient government intervention (i.e., Household 1+2+…+$H-1$ is assumed to be formed and kept).

The government transfers money or other types of economic resources from a household in Economy 1+2+ · · · + (H – 1) to households in Economy H in each period according to

$$\lim_{t\to\infty}\bar{g}_t = \frac{\theta_H - \frac{\sum_{q=1}^{H-1}\theta_q}{H-1}}{H} - \frac{\bar{z}}{H-1} + \frac{\chi}{H-1}\ , \tag{5}$$

where χ > 0. Equivalently, the amount of government transfers from a household in Economy H to households in Economy 1+2+ · · · + (H – 1) is

$$\frac{\frac{\sum_{q=1}^{H-1}\theta_q}{H-1} - \theta_H}{H} + \frac{\bar{z}}{H-1} - \frac{\chi}{H-1}\ .$$

That is, the amount of government intervention is insufficient by $\frac{\chi}{H-1}$ to achieve the true SH where equation (4), instead of equation (5), must be satisfied to achieve true SH. Nevertheless, households and the government perceive that an approximate SH is currently being kept because of Misunderstanding Type-1. Therefore, even if the amount of government intervention is insufficient, it is left as is.

In this case,

$$\begin{aligned}\lim_{t\to\infty}\frac{\dot{c}_{H,t}}{c_{H,t}} &= \varepsilon^{-1}\left[\left(\frac{\varpi\alpha}{mv}\right)^{\alpha}(1-\alpha)^{-\alpha} - \theta_H + \bar{z} + \bar{g}_t\right] \\ &= \varepsilon^{-1}\left[\left(\frac{\varpi\alpha}{mv}\right)^{\alpha}(1-\alpha)^{-\alpha} - \frac{\sum_{q=1}^{H}\theta_q}{H} + \chi\right]\ ,\end{aligned} \tag{6}$$

and

$$\lim_{t\to\infty}\frac{\dot{c}_{1+2+\cdots+H-1,t}}{c_{1+2+\cdots+H-1,t}}$$
$$=\varepsilon^{-1}\left[\left(\frac{\varpi\alpha}{mv}\right)^{\alpha}(1-\alpha)^{-\alpha}-\theta_{1+2+\cdots+H-1}-\bar{z}-\frac{\theta_H-\frac{\sum_{q=1}^{H-1}\theta_q}{H-1}}{H}+\frac{\bar{z}}{H-1}-\frac{\chi}{H-1}\right]$$
$$=\varepsilon^{-1}\left[\left(\frac{\varpi\alpha}{mv}\right)^{\alpha}(1-\alpha)^{-\alpha}-\frac{\sum_{q=1}^{H}\theta_q}{H}-\chi\right]. \tag{7}$$

Hence, by equation (7),

$$\lim_{t\to\infty}\frac{\dot{c}_{1+2+\cdots+H-1,t}}{c_{1+2+\cdots+H-1,t}}\bigg|_{\chi=0}-\lim_{t\to\infty}\frac{\dot{c}_{1+2+\cdots+H-1,t}}{c_{1+2+\cdots+H-1,t}}\bigg|_{\chi>0}=\frac{\chi}{\varepsilon}>0\ , \tag{8}$$

and by equations (6) and (7),

$$\lim_{t\to\infty}\frac{\dot{c}_{H,t}}{c_{H,t}}\bigg|_{\chi>0}-\frac{\dot{c}_{1+2+\cdots+H-1,t}}{c_{1+2+\cdots+H-1,t}}\bigg|_{\chi>0}=\frac{2\chi}{\varepsilon}>0\ ,$$

where $\lim_{t\to\infty}\frac{\dot{c}_{j,t}}{c_{j,t}}\Big|_{\chi=0}$ and $\lim_{t\to\infty}\frac{\dot{c}_{j,t}}{c_{j,t}}\Big|_{\chi>0}$ indicate $\lim_{t\to\infty}\frac{\dot{c}_{j,t}}{c_{j,t}}$ when $\chi=0$ and $\chi>0$, respectively.

That is, because of insufficient government intervention, the growth rate of Household $1+2+\ldots+H-1$ (i.e., ordinary households) is lowered to be less than that of Household H (i.e., the rich household). If this situation is left as is, the SH between the rich household and the ordinary households will not be achieved and eventually all capital will be owned by Household H.

Nevertheless, because of Misunderstanding Type-1, ordinary households will not complain about, or will even be satisfied, by this situation, at least in the short-term, as long as

$$\lim_{t\to\infty}\frac{\dot{c}_{i,t}}{c_{i,t}}\bigg|_{\chi>0}>0$$

is kept. If the value of χ is small, they will not lose much capital for a long while and therefore will not soon realize that they are in a non-optimal state. They will not change their voting behavior until they eventually begin to feel that they have too little capital.

Misunderstanding Type-1, therefore, enables economic inequality to significantly increase, even in democratic countries.

3.1.1.2 An extreme case

Consider an extreme case that a government intervenes to a minimum, that is, only to the extent that the consumption growth rate of Household 1+2+…+$H-1$ is not negative. If a government intervenes such that

$$\chi = \left(\frac{\varpi\alpha}{mv}\right)^{\alpha}(1-\alpha)^{-\alpha} - \frac{\sum_{q=1}^{H}\theta_q}{H},$$

then

$$\lim_{t\to\infty}\frac{\dot{c}_{i,t}}{c_{i,t}}\bigg|_{\chi>0} = 0$$

continues. Although the growth rate of consumption of ordinary households is zero, they may not complain about the increase in economic inequality between rich households and themselves due to Misunderstanding Type-1 because their growth rate is still not negative. Without opposition, the government will continue to intervene in that way.

3.1.1.3 Misunderstanding Type-1 under the MDC-based procedure

Misunderstanding Type-1 is examined as a consequence of the finite time horizon underlying the RTP-based procedure, but how does Misunderstanding Type-1 work under the MDC-based procedure? Misunderstanding Type-1 is made during a household's evaluation of their income growth, and income growth is basically generated by technological progress. Hence, the question is how do ordinary households misunderstand in their response to technological progress under the MDC-based procedure?

Under the MDC-based procedure, households behave such that their CWR at MDC is satisfied and their economic (income) growth is driven by technological progress. Harashima (2018c, 2020f) summarized how a household responds to technological progress under the MDC-based procedure as follows:

(a) If a new version of a product with higher performance at almost the same price as the old version is introduced, a household will buy the new version instead of the old version as long as the households' MDC remains unchanged.

(b) If a household's income unexpectedly and permanently increases, the household begins to feel that its current CWR is unexpectedly higher than its CWR at MDC.

However, because of the increase in income, its capital unexpectedly gradually increases, and the household will continue to accumulate capital until its CWR is returned to that at MDC.

In scenarios (a) and (b), ordinary households' incomes plus government transfers can persistently increase thanks to steady technological progress. Ordinary households adjust their CWR in response to technological progress even if the amount of government transfers are insufficient for SH. In addition, with Misunderstanding Type-1, under both scenarios the households are satisfied with the current situation and do not feel uncomfortable as long as their incomes and government transfers increase and CWR at MDC is satisfied, even if economic inequality is significantly increasing. They will continue to feel that way until they begin to feel that they have too little capital.

Thus, the MDC- and RTP-based procedures are similar in that, because of Misunderstanding Type-1, ordinary households do not feel uncomfortable and do not complain about their economic situation until they eventually begin to feel that they have too little capital and thereby they cannot satisfy the optimality conditions or CWR at MDC. Hence, the eventual result is the same whichever procedure is used.

3.1.2 Misunderstanding Type-2: Limited spatial horizon

3.1.2.1 Skewed distribution

The distributions of preferences and persistent economic rents among households will not be normal but skewed, probably largely skewed (Figures 1 and 2). Although the distribution of CWR at MDC (or RTP) may be approximately close to a normal distribution, that of persistent economic rents seems highly likely to be markedly skewed (i.e., only a few households or family lines can obtain persistent economic rents and the remaining ordinary households are exploited because of the persistent economic rents). The largely skewed distribution indicates that the observed economic inequality can be interpreted simply as disparity between a few rich people and the vast majority of people (i.e., ordinary people).

Here, suppose that a government intervenes, but it does so such that it does not collect sufficient taxes from the few rich people and does not transfer sufficient amounts of money or equivalent economic resources to ordinary people. Because of insufficient government intervention, the level of inequality steadily increases. Although the shortage of transfers to each ordinary household may be small, the shortage of taxes from the rich households will be very large because the number of rich households is far smaller than that of ordinary households and the total sum of the taxes should be equal to that of the transfers (Figure 3). If ordinary households understand this situation, they will change their voting behavior to strengthen the redistribution policy.

Figure 1: **Example of a skewed distribution for the capital–wage ratio (CWR) at the maximum degree of comfortability (MDC)**

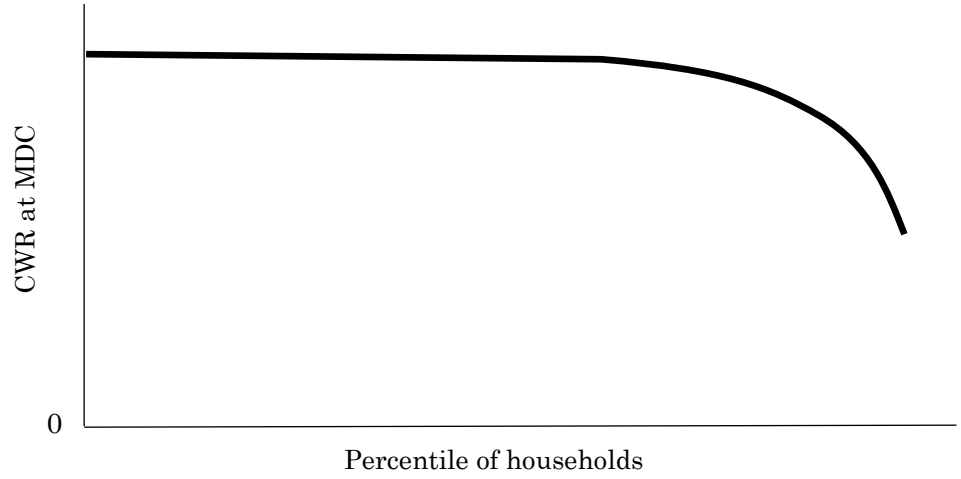


Figure 2: **Example of a skewed distribution of persistent rent incomes**

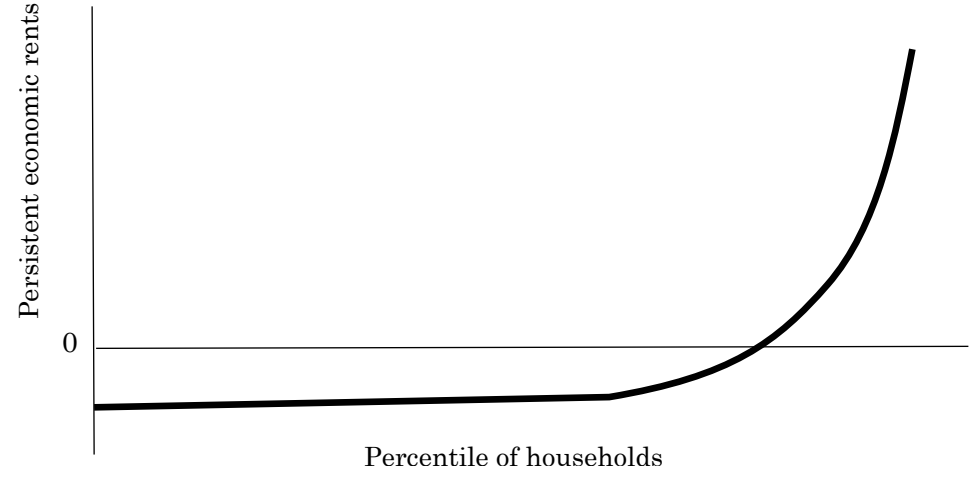
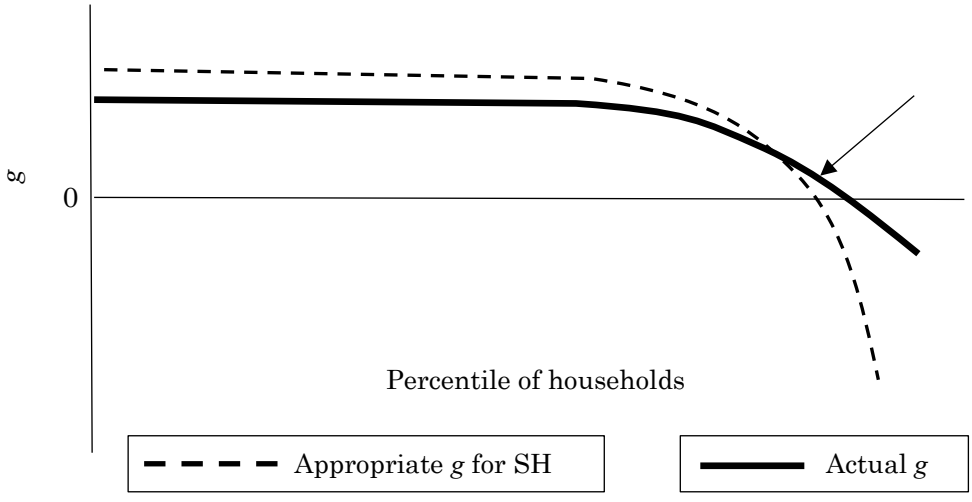


Figure 3: **Example of insufficient government transfers (*g*) for sustainable heterogeneity (SH)**



However, ordinary households may not perceive this situation correctly because they cannot know exactly how much taxes the rich households pay. Furthermore, many of the ordinary households are probably not interested in the lives of the rich households other than superficially because they cannot directly see and know the true lives of the rich households. On the other hand, they will be very concerned about the economic states of neighboring households who have standards of living similar to their own. Ordinary people will react vehemently if their standard of living seems to be lower than those of people in a similar financial situation, but they may show little reaction even if the wealth of a rich household substantially increases. I call this Misunderstanding Type-2.

Although the focal point of economic inequality is disparity between a few rich households and the remaining ordinary households, ordinary households may judge the degree of economic inequality in society based mostly on comparisons among neighboring ordinary households because of Misunderstanding Type-2. That is, there is a spatial limit to the available information, so ordinary households will judge the degree of economic inequality based on a limited spatial horizon.

As a result, votes for and against strengthening measures to decrease inequality may not change even if the level of inequality is in reality increasing. It may not be until the level of economic inequality between rich households and ordinary households becomes very high that the votes for strengthening measures to decrease inequality exceed the votes against it.

3.1.2.2 The model

Suppose that there is a continuum of households $i \in [0, 1]$, and that all households are identical except for persistent economic rents that are obtained or exploited. Households in interval [0, β] obtain no persistent economic rents but are exploited, whereas households in interval (β, 1] obtain persistent economic rents; the amounts of economic rents in both directions are equal. It is assumed for simplicity that there is no economic growth. Until the level of economic inequality a household perceives exceeds a certain critical point, the household does not take the problem of economic inequality seriously or change its voting behavior.

Each household perceives the level of economic inequality differently, and the perceived level of economic inequality (IEQ_i) of household i ($0 \leq i \leq 1$) is

$$IEQ_i = \int_{j=0}^{i} \left| g_j - \tilde{g}_j \right| \exp[-\lambda(i-j)]dj + \int_{j=i}^{1} \left| g_j - \tilde{g}_j \right| \exp[\lambda(i-j)]dj \ , \quad (9)$$

where λ is a positive constant and $\tilde{g}_j$ is g_j for household j when SH is achieved. $\left| g_j - \tilde{g}_j \right|$ indicates the excess or shortage of government transfers or taxes from their level at the

true SH and means the degree of deviation of household j from the state at SH. Hence, equation (9) means that a household perceives the level of economic inequality by the weighted sum of the deviations of households from SH. Nevertheless, the weights are different across households because of Misunderstanding Type-2. The weights change according to the distance between households i and j, and they become smaller as household i is more distant from household j.

It is assumed that for household j in interval $(0, \beta]$ that

$$\left|g_j - \tilde{g}_j\right| = q \ , \tag{10}$$

and for household j in interval $[\beta, 1]$ that

$$\left|g_j - \tilde{g}_j\right| = \frac{q\beta}{1-\beta} \ . \tag{11}$$

The total shortage of taxes on households in interval $(\beta, 1]$ for SH to be achieved is equal to the total shortage of transfers for households in interval $[0, \beta]$ for SH to be achieved because, by equations (10) and (11),

$$q\beta - \frac{q\beta}{1-\beta}(1-\beta) = 0 \ .$$

By equations (9), (10), and (11), if $i \leq \beta$

$$IEQ_i = \int_{j=0}^{i} q\exp[-\lambda(i-j)]dj + \int_{j=i}^{\beta} q\exp[\lambda(i-j)]dj + \int_{j=\beta}^{1} \left(\frac{q\beta}{1-\beta}\right)\exp[\lambda(i-j)]dj \ ,$$

and if $\beta < i$

$$IEQ_i = \int_{j=0}^{\beta} q\exp[-\lambda(i-j)]dj + \int_{j=\beta}^{i} \left(\frac{q\beta}{1-\beta}\right)\exp[-\lambda(i-j)]dj + \int_{j=i}^{1} \left(\frac{q\beta}{1-\beta}\right)\exp[\lambda(i-j)]dj \ .$$

Therefore, if $i \leq \beta$,

$$IEQ_i = \frac{q}{\lambda}\left\{2\exp(0) - \exp(-\lambda i) + \left(\frac{2\beta - 1}{1-\beta}\right)\exp[\lambda(i-\beta)] - \left(\frac{\beta}{1-\beta}\right)\exp[\lambda(i-1)]\right\}, \quad (12)$$

and if $\beta < i$,

$$IEQ_i = \frac{q}{\lambda}\left\{\left(\frac{2\beta}{1-\beta}\right)\exp(0) + \exp[\lambda(i-\beta)] - \exp(-\lambda i) - \left(\frac{\beta}{1-\beta}\right)\exp[-\lambda(i-\beta)] - \left(\frac{\beta}{1-\beta}\right)\exp[\lambda(i-1)]\right\}. \quad (13)$$

Here, for household 0 (i.e., $i = 0$), by equation (12),

$$IEQ_0 = \frac{q}{\lambda}\left\{\exp(0) + \left(\frac{2\beta - 1}{1-\beta}\right)\exp[\lambda(-\beta)] - \left(\frac{\beta}{1-\beta}\right)\exp[\lambda(-1)]\right\}. \quad (14)$$

Suppose that $\beta = 0.95$ (i.e., 5% of the households are rich households and 95% are ordinary households). Hence, by equation (14), if $\lambda = 1$, $IEQ_0 = 0.971629q$; if $\lambda = 2$, $IEQ_0 = 0.560432q$; and if $\lambda = 3$, $IEQ_0 = 0.365081q$. On the other hand, for household 1 (i.e., $i = 1$), by equation (13),

$$IEQ_1 = \frac{q}{\lambda}\left\{\left(\frac{\beta}{1-\beta}\right)\exp(0) + \exp[\lambda(1-\beta)] - \exp(-\lambda) - \left(\frac{\beta}{1-\beta}\right)\exp[-\lambda(1-\beta)]\right\}. \quad (15)$$

If $\beta = 0.95$, by equation (15), if $\lambda = 1$, $IEQ_1 = 1.610033q$; if $\lambda = 2$, $IEQ_1 = 1.388962q$; and if $\lambda = 3$, $IEQ_1 = 1.252865q$. Therefore, when $\beta = 0.95$, if $\lambda = 1$, $\frac{IEQ_1}{IEQ_0} = 1.65$; if $\lambda = 2$, $\frac{IEQ_1}{IEQ_0} = 2.74$; and if $\lambda = 3$, $\frac{IEQ_1}{IEQ_0} = 3.43$.

That is, the economic inequality perceived by Household 0 is 2–3 times lower than that perceived by Household 1. This means that it is not necessarily easy for ordinary households to perceive changes in inequality between the few rich households and themselves because of Misunderstanding Type-2, even though Household 1 finds it relatively easy to perceive the increase in inequality.

The assumption of $\beta = 0.95$ seems reasonable considering the current level of economic inequality. The above example means that it is likely that even if the level of inequality significantly increases, many ordinary households may not take the problem of inequality seriously because of Misunderstanding Type-2; therefore, they may not change their voting behavior until they clearly perceive a marked increase in economic inequality.

3.1.3 Misunderstanding Type-3: Uncertainty

Various kinds of uncertainty will also make households misunderstand the economic situation. At SH, households need to estimate the values of CWR at MDC (or RTP) as well as the persistent rent incomes of other households and the amounts of government transfers, but they can only estimate these values and amounts and do not know their true values, including their true means and variances. Therefore, they inevitably face a situation characterized by uncertainty. Under such a situation, ordinary households may behave by simply believing that the current situation must be the "normal" situation even if in reality it is significantly deviated. Normalcy bias is a type of cognitive bias that has been studied in psychology and economics (Kahneman et al., 1982). It describes the tendency of people to disbelieve warnings and thereby underestimate the probability of an impending disaster. Normalcy bias likely plays an important role in Misunderstanding Type-3.

Uncertainties exist intrinsically in many economic activities (e.g., in predicting future economic growth). Combined with these intrinsic uncertainties, the uncertainty caused by an inability to perceive the surrounding economic situation, as discussed earlier in the text, can lead to misunderstandings by households. I call this Misunderstanding Type-3. In this section, I examine Misunderstanding Type-3 using the model constructed in Section 3.1.1 for Misunderstanding Type-1.

3.1.3.1 Uncertainty about future economic growth

Future economic growth is uncertain, even for experts. Let ϵ_1 be the expected variance of disturbances in future economic growth rates. Suppose that government intervention is insufficient and therefore transfers to Household $1+2+\ldots+H-1$ are short by $\chi k_{H,t}\left(=\chi k_{1+2+\cdots+H-1,t}\right)$ as equation (5) indicates. Hence, the growth rate of consumption (income) of ordinary households is reduced by

$$\lim_{t\to\infty}\frac{\dot{c}_{1+2+\cdots+H-1,t}}{c_{1+2+\cdots+H-1,t}}\bigg|_{\chi=0} - \lim_{t\to\infty}\frac{\dot{c}_{1+2+\cdots+H-1,t}}{c_{1+2+\cdots+H-1,t}}\bigg|_{\chi>0} = \frac{\chi}{\varepsilon}$$

as indicated by equation (8).

In this case, if

$$\frac{\chi}{\varepsilon} < \sqrt{\epsilon_1} \quad ,$$

many ordinary households will not be able to easily recognize that the current state is not at SH, probably for a long period of time, because they cannot easily discern $\frac{\chi}{\varepsilon}$ from the disturbances. It is possible that they will not well perceive the increase in economic inequality due to $\frac{\chi}{\varepsilon}$ until the increase in economic inequality exceeds a certain limit and is clearly recognized. Hence, they will not change their voting behavior until that limit is exceeded.

3.1.3.2 Uncertainty about idiosyncratic disturbances in income

Suppose again that transfers to Household $1+2+\ldots+H-1$ are short by $\chi k_{H,t}\left(=\chi k_{1+2+\cdots+H-1,t}\right)$. Households are heterogeneous in receiving idiosyncratic disturbances in their incomes. Let ϵ_2 be the average variance of the changes in the rate of increase of ordinary households' incomes due to idiosyncratic disturbances. If

$$\frac{\chi}{\varepsilon} < \sqrt{\epsilon_2} \quad ,$$

many ordinary households cannot easily recognize that the current state is not at SH, possibly for a long period, because they cannot easily discern $\frac{\chi}{\varepsilon}$ from the disturbances. Hence, they also will not change their voting behaviors or well perceive the increase in economic inequality until the increase exceeds a certain level.

3.1.3.3 Uncertainty in distinguishing temporary and persistent rents

Uncertainty exists also in distinguishing between temporary and persistent economic rents. Indeed, it is very difficult to distinguish these two kinds of rents in real time even for experts and governments. Rents are obtained not only because of luck but because of structural factors (e.g., heterogeneity in abilities that are distributed unevenly among family lines). Generally, the former corresponds to temporary rents and the latter to persistent economic rents.

Under this kind of uncertainty, it is likely that ordinary households view economic rents only as temporary because the structural factors cannot be easily perceived and recognized by many people. For example, many people may think that rich people are rich only because they are lucky, and luck is an element to any endeavor that

makes a person rich.

Of course, persistent economic rents themselves may be interpreted as the consequence of luck in the sense that a person is lucky to be born into a gifted family line. Nevertheless, many people may misunderstand the concept that luck only provides temporary economic rents, and they may not well understand and recognize the influence of structural factors on persistent economic rents. This kind of misunderstanding can also be considered Misunderstanding Type-3. With this kind of misunderstanding, ordinary households may believe that most economic rents are temporary rents. People may therefore choose to bear significant increases in economic inequality, rationalizing it as somehow being a result of fate, until the level of economic inequality increases past a certain level and becomes unbearable.

3.2 Multiple political issues

Even without the three misunderstandings discussed above, significant economic inequality can be generated in democratic countries because households cast their votes in elections based on politicians' stances on a wide range of political, economic, cultural, social, medical, environmental, and international issues. Therefore, it is unlikely that the primary issue for the electorate as a whole will be to address increases in economic inequality.

Suppose for simplicity that there are two political stances: A and B, and there are only two political parties that each represents one of the two stances. The number of voters who support stance A competes with those who support stance B. Suppose also that the political issue with regard to stances A and B is far more important for all voters than the issue of economic inequality, and that the results of votes for electing the government from between the two parties are always mainly determined by this political issue. In this case, even if the level of economic inequality significantly changes, households will not change their voting behavior, so the increase in economic inequality will remain unchanged.

3.3 Discriminatory government

3.3.1 Discriminatory government under democracy

There is one other way that marked economic inequality can arise in democratic countries. A government may predominantly favor a particular part of the electorate and discriminate against the rest. Even under a democratically elected government (i.e., majority vote under the principle of one-person one-vote), part of the electorate may be favored for a long period of time. An example of where such a situation may occur is in countries severely divided by factors such as culture, language, religion, and race.

A discriminatory government works to achieve SH only for the favored

electorate at the exclusion of the remaining electorate. In this case, the optimality conditions of the favored electorate are satisfied whereas those of the rest of the electorate are not; therefore, eventually the favored electorate prospers while the rest fall into extreme poverty. Thus, a serious economic inequality can surface even in a democratic country.

Here, I examine a simple case in which households are identical except for their RTP, and the government is always in favor of the lower RTP households (majority) and discriminates the higher RTP households (minority). There are M households, where M is an even number. The RTP of household i is θ_i, and the value of θ_i is lower than that of θ_j if $i < j$. Suppose that household 1, 2, …, $(\frac{M}{2} + 1)$ achieves SH with the help of the government, but the remaining higher RTP households cannot without help from the government. Because of SH, household 1, 2, …, $(\frac{M}{2} + 1)$ can be seen as a combined household 1+2+…+ $(\frac{M}{2} + 1)$ with RTP

$$\frac{\sum_{i=1}^{\frac{M}{2}+1} \theta_i}{\frac{M}{2}+1}.$$

Because $\theta_i < \theta_j$ for any $i \leq \frac{M}{2} + 1$ and $j > \frac{M}{2} + 2$,

$$\frac{\sum_{i=1}^{\frac{M}{2}+1} \theta_i}{\frac{M}{2}+1} < \theta_j$$

for any $j > \frac{M}{2} + 2$. That is, the RTP of household 1+2+…+ $(\frac{M}{2} + 1)$ is lower than those of the other higher RTP households (i.e., it is the lowest). Because there is no SH between household 1+2+…+ $(\frac{M}{2} + 1)$ and the other higher RTP households with lack of government intervention, household 1+2+…+ $(\frac{M}{2} + 1)$ will eventually hold all of the capital in the economy and the other higher RTP households will eventually become significantly poor, as described by Becker (1980) and Harashima (2010, 2012, 2014). That is, a significant economic inequality is generated by a discriminatory government even under a democracy.

An important point is that even if the higher RTP households become poor, the government can continue to hold power. The government therefore will not change its

method of intervention because they always receive a majority of votes.

This example shows that the one-person one-vote principle cannot always ensure a state that is socially favorable. That is, the majority can persistently and significantly oppress the minority under this system.

3.3.2 Reality

In reality, however, can such a discriminatory government exist? Such a government can certainly exist in a country where the electorate is clearly and deeply divided; however, because there are many different political issues involved (see Section 3.2), it seems unlikely that the majority will always be united for every issue. It is more likely that the electorate will be divided differently issue by issue, and that the most important political issue for an individual will change year by year, possibly day by day. Therefore, it seems unlikely that the union of the majority like the one discussed in Section 3.3.1 will remain for a long period of time. If the solidarity within the majority is weak, the partial SH shown above will become unstable. Therefore, it seems that it would be difficult for a discriminatory government to exist in reality in democratic countries.

Another reason why a discriminatory government such as that described in section 3.3.1 probably does not exist or at least does not persist is that the income and wealth distributions in a country are usually significantly skewed because of a few super-rich households. If SH within the majority exists, a few super-rich households would not be able to exist because most of their income and wealth would be taxed to maintain SH within that group. Hence, the distribution of incomes and wealth among the majority after redistribution would be much less skewed, which is contrary to reality.

3.4 Oppositely skewed distribution

In the previous sections, the focus has been on the disparity between a few rich households and the remaining ordinary households. However, there will also be an opposite inequality that forms between a few very poor households and the remaining ordinary households. It is highly likely that these very poor households cannot obtain persistent economic rents (i.e., they are basically exploited).

In theory, a SH that only excludes a few very poor people can exist, which may be interpreted as an extreme example of a discriminatory government. In such a case, the very poor people become even poorer without government intervention. However, because the people at SH (i.e., households other than the very poor) always hold the majority, they may not ask the government to change the income and wealth redistribution, and because they always win elections, the means of redistribution will never change.

Nevertheless, recent increases in inequality seems to have moved toward higher disparities between a few rich households and the remaining ordinary households, not

that between a few very poor households and the remaining ordinary households. Hence, the problem of this oppositely skewed distribution may be less important for most of the electorate than the problem of a significant increase in economic inequality. However, the possibility that a small number of very disadvantaged people are severely neglected by the vast majority of people will remain. If this situation exists in reality, it is a very important humanitarian and ethical issue.

4 CONCLUDING REMARKS

Many empirical studies have shown that economic inequality has increased recently in industrialized and democratic countries. However, these increases are puzzling because the governments of these countries have been elected by majority decision under the principle of one-person one-vote.

Heterogeneities among households (i.e., preferences or persistent economic rents) amplify disparities in incomes and wealth among households. However, an approximate (or true) SH in a heterogeneous population can be achieved if the government intervenes appropriately, which means that in democratic countries, a significant increase in economic inequality should not be generated. However, in this paper, I have shown three types of misunderstandings by households that can lead to significant increases in economic inequality even in democratic countries. A common origin of these misunderstandings is that an approximate SH is just that, an approximation. That is, households cast votes based on their subjective and probably biased understanding about their surrounding economic situation.

Misunderstanding Type-1 is caused by households' finite time horizons and suggests the tendency of households not to complain about economic inequality as long as their incomes are increasing, even slightly, because they feel that they are continuously better off than before. Hence, they do not change their voting behavior. Misunderstanding Type-1 means that households evaluate the future economic state only by considering the current and near-future states and do not consider consequences in the far future.

Misunderstanding Type-2 is caused by households' limited spatial horizons and indicates the tendency of households to judge the level of economic inequality mostly by relying on comparisons among neighboring households. As a result, votes for and against strengthening measures for diminishing inequality will not change even if the level of inequality is in reality widening. Misunderstanding Type-2 is important because distributions of preferences and persistent economic rents among households are likely largely skewed. A skewed distribution means that the economy consists of a few rich households and many ordinary households. However, the many ordinary households are probably not interested in the true lives of the rich households beyond the topic of gossip

but are very concerned about the economic situations of neighboring households whose standards of living are similar to their own.

Misunderstanding Type-3 is caused by various kinds of uncertainties surrounding households. These uncertainties also make households inaccurately perceive inequality. Because they cannot know the true values of CWR (or RTP) and persistent rent incomes, uncertainties are inevitably generated. As a result, ordinary households may continue to believe that the current situation is normal, or at least that it has not deviated too far from normal, even if it has significantly deviated.

In addition, I have shown other possible underlying reasons why, even if households do not misunderstand their surrounding economic situation, economic inequality can still increase in democratic countries. First, the primary issue for people when they cast votes will not always be the issue of addressing increasing economic inequality because there are many other important political, economic, cultural, social, medical, environmental, and international issues that need to be addressed. People cast votes considering which of these issues is a priority for themselves. Second, there is the possibility that the government is always in favor of only a select part of the electorate and discriminates against the rest. Third, oppositely skewed distributions in incomes and wealth may exist and result in an SH that only excludes a few very poor people.

The examinations in this paper strongly suggest that democracy does not necessarily guarantee that the level of economic inequality will not significantly increase. This may mean that we should consider the indefinite future (not behave based on a finite time horizon, and furthermore limited spatial horizon) and be concerned about minorities if democracies are to function well.

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