Consequence of Heterogeneous Economic Rents under the MDC-based Procedure

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Abstract

If preferences of households are heterogeneous, there is no guarantee that a steady state exists other than corner solutions, and only the most advantaged household will eventually possess all the capital in the economy. This is also true if economic rents are obtained persistently and unevenly among households. I examine whether this is true even if households behave not on the basis of rational expectations but on the basis of keeping the most comfortable capital-wage ratio and show that there is no guarantee in this case as well.

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1 INTRODUCTION

If preferences of households, particularly their rates of time preference (RTP), are heterogeneous, there is no guarantee that a steady state exists other than corner solutions, and furthermore only the most advantaged household will eventually possess all the capital in the economy (Becker 1980). Also, if economic rents are obtained persistently and unevenly among households, there is also no guarantee of such a steady state (Harashima 2020a). Nevertheless, a sustainable heterogeneity (SH) can exist in which all optimality conditions of all heterogeneous households are simultaneously satisfied (Harashima 2010[1], 2012[2]).

Furthermore, Harashima posited the MDC-based procedure under which households keep their capital-wage ratio (CWR) at the maximum degree of comfortability (MDC) and showed that the behavior of households based on rational expectations (the behavior under the RTP-based procedure) is equivalent to that under the MDC-based procedure (Harashima 2018a[3]). Harashima also showed that if preferences of households are heterogeneous under the MDC-based procedure, there is no guarantee of a steady state (Harashima 2018a). Because behavior under the MDC- and RTP-based procedures is equivalent, it can be predicted that if households obtain economic rents persistently and unevenly, there is also no guarantee of a steady state, even under the MDC-based procedure. The purpose of this paper is to examine whether this prediction is correct, and I show that it is indeed correct.

2 MDC-BASED PROCEDURE

In this section, the MDC-based procedure is explained briefly following Harashima (2018a).

2.1 "Comfortability" of CWR

Let k_t and w_t be per capita capital and wage (labor income), respectively, in period t. Under the MDC-based procedure, a household should first subjectively evaluate the value of $\frac{\breve{w}_t}{\breve{k}_t}$ where $\breve{k}_t$ and $\breve{w}_t$ are household k_t and w_t, respectively. Let Γ be the subjective valuation of $\frac{\breve{w}_t}{\breve{k}_t}$ by a household and Γ_i be the value of $\frac{\breve{w}_t}{\breve{k}_t}$ of household i ($i = 1, 2, 3, \dots$,

[1] (Harashima 2010) is also available in Japanese as (Harashima 2017a).
[2] (Harashima 2012) is also available in Japanese as (Harashima 2020b).
[3] (Harashima 2018a) is also available in Japanese as Harashima (2019).

M). Each household assesses whether it feels comfortable with its current Γ (i.e., its combination of income and capital expressed by CWR). "Comfortable" in this context means "at ease," "not anxious," and other similar feelings.

Let the "degree of comfortability" (DOC) represent how comfortable a household feels with its Γ. The higher the value of DOC, the more a household feels comfortable with its Γ. For each household, there will be a most comfortable CWR value because the household will feel less comfortable if CWR is either too high or too low. That is, for each household, a maximum DOC exists. Let $\tilde{s}$ be a household's state at which its DOC is the maximum (MDC). MDC therefore indicates the state at which the combination of revenues and assets is felt most comfortable. Let $\Gamma(\tilde{s})$ be a household's Γ when it is at $\tilde{s}$. $\Gamma(\tilde{s})$ indicates the Γ that gives a household its MDC, and $\Gamma(\tilde{s}_i)$ is household i's Γ_i when it is at $\tilde{s}_i$.

2.2 Homogeneous population

I first examine the behavior of households in a homogeneous population (i.e., all households are assumed to be identical).

2.2.1 Rules

Household i should act according to the following rules:

Rule 1-1: If household i feels that the current Γ_i is equal to $\Gamma(\tilde{s}_i)$, it maintains the same level of consumption for any i.
Rule 1-2: If household i feels that the current Γ_i is not equal to $\Gamma(\tilde{s}_i)$, it adjusts its level of consumption until it feels that Γ_i is equal to $\Gamma(\tilde{s}_i)$ for any i.

2.2.2 Steady state

Households can reach a steady state even if they behave only according to Rules 1-1 and 1-2. Let S_t be the state of the entire economy in period t and $\Gamma(S_t)$ be the value of $\frac{w_t}{k_t}$ of the entire economy at S_t (i.e., the economy's average CWR). In addition, let $\tilde{S}_{MDC}$ be the steady state at which MDC is achieved and kept constant by all households, and $\Gamma(\tilde{S}_{MDC})$ be $\Gamma(S_t)$ for $S_t = \tilde{S}_{MDC}$. Let also $\tilde{S}_{RTP}$ be the steady state under the RTP-based procedure; that is, it is the steady state in a Ramsey-type growth model in which households behave based on rational expectations generated by discounting utilities by θ, where θ (> 0) is the RTP of a household. In addition, let $\Gamma(\tilde{S}_{RTP})$ be $\Gamma(S_t)$ for $S_t = \tilde{S}_{RTP}$.

Proposition 1: If households behave according to Rules 1-1 and 1-2, and if the value of θ that is calculated from the values of variables at $\tilde{S}_{MDC}$ is used as the value of θ under the RTP-based procedure in an economy where θ is identical for all households, then $\Gamma(\tilde{S}_{MDC}) = \Gamma(\tilde{S}_{RTP})$.
Proof: See Harashima (2018a).

Proposition 1 indicates that we can interpret $\tilde{S}_{MDC}$ to be equivalent to $\tilde{S}_{RTP}$. This means that both the MDC-based and RTP-based procedures can function equivalently and that CWR at MDC can be substituted for RTP as a guide for household behavior.

2.3 Heterogeneous population

In actuality, however, households are not identical—they are heterogeneous—and if heterogeneous households behave unilaterally, there is no guarantee that a steady state other than corner solutions exists (Becker 1980; Harashima 2010, 2012). However, Harashima (2010, 2012) has shown that a sustainable heterogeneity (SH) at which all optimality conditions of all heterogeneous households are simultaneously satisfied exists under the RTP-based procedure. In addition, Harashima (2018a) has shown that SH also exists under the MDC-based procedure, although Rules 1-1 and 1-2 have to be revised, and a rule for the government should be added in a heterogeneous population.

Suppose that households are identical except for their MDCs (i.e., their values of $\Gamma(\tilde{s})$). Let $\tilde{S}_{MDC,SH}$ be the steady state at which MDC is achieved and kept constant by any household (i.e., SH in a heterogeneous population under the MDC-based procedure), and let $\Gamma(\tilde{S}_{MDC,SH})$ be $\Gamma(S_t)$ for $S_t = \tilde{S}_{MDC,SH}$. In addition, let Γ_R be a household's numerically adjusted value of Γ for SH based on its estimated value of $\Gamma(\tilde{S}_{MDC,SH})$ and several other related values. Specifically, let $\Gamma_{R,i}$ be Γ_R of household i, T be the net transfer that a household receives from the government with regard to SH, and T_i be the net transfer that household i receives (i = 1,2,3, … , M).

2.3.1 Revised and additional rules

Household i should act according to the following rules in a heterogeneous population:

Rule 2-1: If household i feels that the current $\Gamma_{R,i}$ is equal to $\Gamma(\tilde{s}_i)$, it maintains the same level of consumption as before for any i.
Rule 2-2: If household i feels that the current $\Gamma_{R,i}$ is not equal to $\Gamma(\tilde{s}_i)$, it adjusts its level of consumption or revises its estimated value of $\Gamma(\tilde{S}_{MDC,SH})$ so that it perceives that $\Gamma_{R,i}$ is equal to $\Gamma(\tilde{s}_i)$ for any i.

At the same time, the government should act according to the following rule:

Rule 3: The government adjusts T_i for some i if necessary so as to make the number of votes cast in elections in response to increases in the level of economic inequality equivalent to the number cast in response to decreases.

2.3.2 Steady state

Even if households and the government behave according to Rules 2-1, 2-2, and 3, there is no guarantee that the economy can reach $\tilde{S}_{MDC,SH}$. However, thanks to the government's intervention, SH can be approximately achieved. Let $\tilde{S}_{MDC,SH,ap}$ be the state at which $\tilde{S}_{MDC,SH}$ is approximately achieved, and $\Gamma(\tilde{S}_{MDC,SH,ap})$ be $\Gamma(S_t)$ at $\tilde{S}_{MDC,SH,ap}$ on average. Here, let $\tilde{S}_{RTP,SH}$ be the steady state that satisfies SH under the RTP-based procedure, that is, in a Ramsey-type growth model in which households that are identical except for their θs behave generating rational expectations by discounting utilities by their θs. Furthermore, let $\Gamma(\tilde{S}_{RTP,SH})$ be $\Gamma(S_t)$ for $S_t = \tilde{S}_{RTP,SH}$.

Proposition 2: If households are identical except for their values of $\Gamma(\tilde{s})$ and behave unilaterally according to Rules 2-1 and 2-2, if the government behaves according to Rule 3, and if the value of θ_i that is calculated back from the values of variables at $\tilde{S}_{MDC,SH,ap}$ is used as the value of θ_i for any i under the RTP-based procedure in an economy where households are identical except for their θs, then $\Gamma(\tilde{S}_{MDC,SH,ap}) = \Gamma(\tilde{S}_{RTP,SH})$.
Proof: See Harashima (2018a).

Proposition 2 indicates that we can interpret $\tilde{S}_{MDC,SH,ap}$ as being equivalent to $\tilde{S}_{RTP,SH}$. No matter what values of T, Γ_R, and $\Gamma(\tilde{S}_{MDC,SH})$ are estimated by households, any $\tilde{S}_{MDC,SH,ap}$ can be interpreted as the objectively correct and true steady state. In addition, a government need not necessarily provide the objectively correct T_i for $\tilde{S}_{MDC,SH,ap}$ even though the $\tilde{S}_{MDC,SH,ap}$ is interpreted as objectively correct and true.

3 HETEROGENEOUS ECONOMIC RENTS UNDER THE MDC-BASED PROCEDURE

3.1 Economic rents from ranking value and preference

Harashima (2016)[4] introduced the concept of ranking value and preference and showed that some people can obtain much higher incomes than ordinary people because ranking value and preference generate monopoly powers. Thanks to these monopoly powers, producers can obtain economic rents (profits). Because the concept of the ranking value of preference is new, this type of economic rent has not previously been studied or considered as a contributor to economic inequality.

Harashima (2017b) showed that ranking preference plays an important role in product differentiation, and the monopoly rents obtained from product differentiation resulting from ranking preference are essential for a firm's prosperity. Because the strategy of product differentiation is one of the most important for companies (Porter 1980, 1985) and is actually pursed by many companies, the monopoly rents generated from differentiation will be large and widespread across the economy today and in the future. Furthermore, Harashima (2016, 2018c, 2018d) showed that these monopoly rents will be distributed very unevenly within a firm, team, or organization. In particular, they will be distributed largely to a few relatively more talented persons.

Individuals who do not obtain "ranking monopoly rents" (monopoly rents derived from ranking, see Harashima 2020a) suffer decreases in their labor and capital incomes because the total production (total income) in an economy does not increase as a result of the generation of ranking monopoly rents (i.e., people are in a situation that can be represented as a zero-sum game). In other words, to compensate for the ranking monopoly rents distributed to some people, the incomes of other persons must be reduced by the same amount directly or indirectly through lower wages or higher prices. Therefore, some amount of income from one group of households is transferred to, or exploited by, people in the other group (i.e., those who receive the ranking monopoly rents).

An important nature of ranking monopoly rents is that it is likely that some particular family lines will obtain them and, conversely, the incomes of some other family lines will consistently be reduced. To be in the position to obtain ranking monopoly rents, some types of special abilities—particularly higher abilities than those of ordinary people—will be necessary. Because of the nature of heredity, some family lines may have higher probabilities of having such abilities and thereby obtaining the rents. These family lines may obtain monopoly rents "persistently" in the sense that the mean of monopoly rents they obtain over generations is positive. Hence, there will not only be "temporary" ranking monopoly rents for some individuals, but also "persistent" ranking monopoly rents for some family lines.

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[4] Harashima (2016) is also available in Japanese as Harashima (2018b).

3.2 No guarantee for a steady state other than corner solutions

Suppose that there are persistent economic rents that are distributed unevenly among households and that households behave unilaterally, i.e., that a household behaves without considering the optimality conditions of other households. Furthermore, such a household behaving unilaterally generally supposes that other households behave in the same manner as it does (i.e., that households, including itself, are identical) because a household that behaves unilaterally is basically indifferent to the fates of other households and does not care about differences among households (Harashima 2019). For simplicity, it is assumed that the only heterogeneous factor is the amount of persistent economic rents that a household obtains, or which are exploited by other households. In other words, households are identical except for the amounts of persistent economic rents.

In theory, the real interest rate in the market in period t (r_t) is uniquely determined to be equal to the value of $\frac{\partial y_t}{\partial k_t}$ of the entire economy where y_t and k_t are per capita production and capital of the economy in period t, respectively, and the value of r_t is common knowledge for all households. If all households are identical, the value of $\frac{\partial y_t}{\partial k_t}$ that is perceived by them will be identical, but if they are heterogeneous, a household does not necessarily use the value of r_t as its perceived (or guessed) value of $\frac{\partial y_t}{\partial k_t}$ because the value of r_t is not necessarily the value of r_t at steady state and the stream of r_t starting from the present is guessed differently by different households under the heterogeneous scenario. That is, if households are heterogeneous, the values of $\frac{\partial y_t}{\partial k_t}$ that are perceived (or guessed) by the households will also be heterogeneous.

In addition, a household does not necessarily know the correct amount of persistent economic rents that it obtains, or which are exploited by other households, because rent incomes often have large fluctuations and because it is difficult to distinguish between rent incomes and non-rent incomes and between temporal and persistent rent incomes. Hence, a household guesses the amount of its persistent economic rents but does so incorrectly. When it guesses the amount, therefore, it will tend to be bounded or largely influenced by the information it obtained through its personal experiences.

Under an environment in which the guessed streams of r_t and the guessed amounts of persistent economic rents are heterogeneous among households, how does a household perceive (or guess) the value of $\frac{\partial y_t}{\partial k_t}$? If a household obtains persistent economic rents but cannot correctly know their amount, its income will tend to be unexpectedly larger than the amount implied by the market value of r_t. This means that

the household will tend to increase its capital to maintain its CWR at MDC in accordance with Rule 1-2. At the same time, if the household behaves unilaterally, i.e., it generally supposes that the other households behave in the same manner as it behaves, it estimates that the capital accumulated in the economy will increase to a greater amount in the future than the amount that is implied by the market value of r_t. As a result, the household will tend to perceive (guess) a lower value of $\frac{\partial y_t}{\partial k_t}$ than the market value of r_t.

On the other hand, if a household does not obtain persistent economic rents but instead is exploited by other households that obtain persistent economic rents, and if that household cannot correctly know the amount of persistent economic rents that has been exploited by other households, its income will tend to be unexpectedly smaller than the amount implied by the market value of r_t. The result is that the household will decrease its capital in order to maintain its CWR at the MDC. If the household behaves unilaterally and generally supposes that the other households behave in the same manner as it behaves, it will estimate that the capital in the economy will also decrease to a lower amount in the future than the amount that is implied by the market value of r_t. As a result, the household will tend to perceive (guess) a higher value of $\frac{\partial y_t}{\partial k_t}$ than the market value of r_t.

Because the values of $\frac{\partial y_t}{\partial k_t}$ perceived (guessed) by households are heterogeneous, household capital is accumulated differently among different households. Because households will often make incorrect guesses of the amount of persistent economic rents and are influenced by their personal experiences, when the amount of persistent economic rents of a household becomes larger, the household will tend to perceive (guess) a lower value of $\frac{\partial y_t}{\partial k_t}$, by the same reasoning as shown above, and will accumulate more capital as a result. Similarly, when a household is exploited more by other households, the household will tend to perceive (guess) a higher value of $\frac{\partial y_t}{\partial k_t}$, and therefore it will accumulate less capital.

Proposition 3: If households are identical except for the amounts of persistent economic rents that they obtain, or which are exploited by other households, and if they behave unilaterally according to Rules 1-1 and 1-2, all capital is eventually owned by the household with the largest persistent economic rents.

Proof: The value of r_t is determined to be equal to the value of $\frac{\partial y_t}{\partial k_t}$ of the entire economy,

and the capital of the entire economy accumulates according to the value of r_t. However, because households are heterogeneous and behave unilaterally, they accumulate their capital differently on the basis of the values of $\frac{\partial y_t}{\partial k_t}$ that they separately perceive (guess).

As shown above, the value of $\frac{\partial y_t}{\partial k_t}$ perceived (guessed) by a household that is exploited more tends to be higher than the market value of r_t, and a household whose personal valuation of $\frac{\partial y_t}{\partial k_t}$ is higher than the value of r_t accumulates less capital than it estimated because the value of r_t is lower than its perceived (guessed) value of $\frac{\partial y_t}{\partial k_t}$. Therefore, by Rule 1-2, the household decreases its consumption in order to increase its capital so that its CWR will approach its value at the MDC. However, in accordance with the same reasoning of accumulating less capital when personal valuation of $\frac{\partial y_t}{\partial k_t}$ is higher, even after it makes this adjustment, the household will still tend to accumulate less capital than it had estimated. Hence, by Rule 1-2, it tends to decrease its consumption further, and this process continues until it can no longer decrease its consumption. Once the household reaches this point, it has to decrease its capital to sustain its minimum level of consumption and eventually loses all its capital.

The valuation of $\frac{\partial y_t}{\partial k_t}$ by a household with smaller persistent economic rents tends to be higher than the valuation by a household with larger persistent economic rents by the same reasoning described above. As a result, the amount of capital of a household with larger persistent economic rents increases more than the amount of a household with smaller persistent economic rents. Therefore, the ratio of capital owned by households with relatively larger persistent economic rents to all capital in the economy increases, and thereby $\Gamma(S_t)$ and r_t decrease for the reason that households with larger persistent economic rents tends to perceive (guess) lower values of $\frac{\partial y_t}{\partial k_t}$ and behave on the basis of these values. These decreases in $\Gamma(S_t)$ and r_t, will cause the perceived (guessed) values of $\frac{\partial y_t}{\partial k_t}$ of some households with comparatively smaller persistent economic rents to become higher than the value of r_t, and therefore these households also eventually lose all capital according to the same reasoning as for households without persistent economic rents. This process continues until all capital is owned by the household with the largest persistent economic rents. Hence, the steady state is a corner solution. ■

If households are heterogeneous except for the amount of persistent rent incomes and they

behave unilaterally, therefore, there is no steady state other than corner solutions. That is, the outcome of the problem arising from heterogeneity in persistent rent incomes under the MDC-based procedure is equivalent to that under the RTP-based procedure.

3.3 Sustainable heterogeneity under the MDC-based procedure

Harashima (2012, 2017a) showed that sustainable heterogeneity (SH) exists under the RTP-based procedure, and Harashima (2019) showed that if households behave according to Rule 2-1 and 2-2 and the government behaves according to Rule 3, an approximate SH exists under the MDC-based procedure.

In addition, Harashima (2020a) showed that even in the case that persistent economic rents are distributed heterogeneously among households, an SH is also achieved under the RTP-based procedure. By the same logic as shown in Harashima (2019), it can be easily shown that an approximate SH also exists for the case in which persistent economic rents are distributed heterogeneously under the MDC-based procedure, if households behave according to Rules 2-1 and 2-2, and the government behaves according to Rule 3. Furthermore, even if households behave completely unilaterally, i.e., they still behave according to Rules 1-1 and 1-2 in a population of heterogeneous households, an approximate SH can be still achieved if the government resolutely determines to achieve an approximate SH and strictly behaves according to Rule 3.

4 CONCLUDING REMARKS

If preferences of households are heterogeneous, there is no guarantee that a steady state exists other than corner solutions, and therefore, only the most advantaged household will eventually possess all the capital in the economy (Becker 1980). In addition, if households obtain economic rents persistently and unevenly, there is also no guarantee under the RTP-based procedure that a steady state exists other than corner solutions (Harashima 2020a).

Harashima (2019) showed that the MDC- and RTP-based procedures are equivalent, and therefore, it is predicted that even under the MDC-based procedure, if households obtain economic rents persistently and unevenly, there is also no guarantee that a steady state exists other than corner solutions. In this paper, I have shown that there is really no guarantee also in this case.

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