

Dictatorship, the Luxury Goods Sector, and a Balanced Growth Path

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Abstract

The purpose of this paper is to examine the sustainability of dictatorship by analyzing the existence of a balanced growth path in an economy with luxury goods sector. The dictator and the privileged class consume luxury goods in order to satisfy their vanity and show their superiority. Loyalty of the privileged class to the dictator is based on the belief that they can consume luxury goods. Consequently, the dictatorship cannot be sustained without consumption these goods. The results show that the balanced growth path in an economy with luxury goods sector exists if and only if the stability condition of the system is satisfied and the equilibrium real wage rate is in the positive sphere of both the rate of profit and the exploitation rate.

Key words

Dictatorship, luxury goods, balanced growth path, North Korea, royal court economy

1. Introduction

The purpose of this paper is to examine the sustainability of dictatorship by analyzing the existence of a balanced growth path in an economy with luxury goods sector. First, we explain the relation between dictatorship and the luxury goods sector.

The dictatorship is the regime where the dictator wields absolute authority. In order to subordinate the people, an administrative mechanism is needed and many types of security organ oppress anti-government fractions. Since bureaucrats in the administrative mechanism and security organs have to work incessantly, they need to be rewarded and consume more than ordinary citizens, forming a privileged class. In general, the dictator and the privileged class consume luxury goods in order to satisfy their vanity. Loyalty of the privileged class to the dictator is thought to be based on the belief that they can consume luxury goods. Since the dictatorship is based on this loyalty, the dictatorship cannot be sustained without luxury goods. In order to analyze the sustainability of dictatorship, we create economic model with luxury goods sector.

Regarding dictatorship, Kurosaka (2014a) considered an economy composed of a

dictator and people. The people allocate their labor between production and adoration of the dictator (termed, adoration labor). The dictator permits the people to obtain a certain amount of goods in the economy. The dictator pays the real wage for each unit of adoration labor. The people maximize their income by allocating their labor. Since the dictator knows their maximizing behavior, he can govern them. The dictator derives utility from consumption and adoration labor. In this model, the dictator is leader of the game, shows the people both the rate of allocation in production and the real wage rate of adoration labor. Consequently, the people, as the followers of the game, decide their labor allocation so as to maximize their income. The people also confront the income constraint, that is, they cannot receive more income than the one they can obtain outside. The model derives sub-game perfect equilibrium of the dictator and the people, but is insufficient to analyze the sustainability of dictatorship since it neglects the production and consumption of luxury goods.¹

In analyzing the regime in regard to sustainability from the economic viewpoints, the equilibrium condition of demand and supply of goods and equalization of the rate of profit in each sector needs to be considered. If there is a difference in the rate of profit between sectors, the capitalist or the bureaucrat ceases his production in the sector in which the rate of profit is low. Therefore, the profit rate of luxury goods sector and that of other sectors need to be equalized in order to sustain the dictatorship in the long run.

Considering the dictatorship in regard to production and consumption of luxury goods, it is akin to the capitalist society where there is inequality between the rich and the poor. The rich can consume luxury goods, while the poor cannot. The dictator and the privileged class can be interpreted as the rich, whereas the people can be interpreted as the poor. Consequently, analyzing the sustainability of capitalism with the rich and the poor is akin to analyzing the sustainability of a dictatorship.

Our result shows that the balanced growth path in an economy with luxury goods sector exists if and only if the stability condition of the system is satisfied and the equilibrium real wage rate is in the positive sphere of both the rate of profit and the exploitation rate.

This paper is structured as follows: Section 2 explains the theory of balanced growth path and recent situations of the North Korean luxury goods sector, that is, the Royal Court Economy, where North Korea is used as the typical example of dictatorship. Section 3 presents a model of balanced growth path in an economy with luxury goods sector and, section 4 provides the concluding remarks.

¹ Kurosaka (2015b) considered an economy composed of a dictator, the cadre, and the people.

2. Balanced growth path, dictatorship, and luxury goods sector in North Korea

According to Okishio (1975, 1988), balanced growth path can be defined as the growth path that satisfies the following conditions.

- (1) Production in both sectors is equal to demands for each every period ;
- (2) In both sectors the means of production and labor procured are fully utilized for production ;
- (3) The rate of profit in both sectors is equalized and the rate of profit is equal to capitalists' required rate of profit ;
- (4) Rate of unemployment is constant.

Okishio (1975) defined the growth path that satisfies conditions of (1) (2) (3) as “Jyunchyou na Kakudai Saiseisan Keiro” (smoothly extended reproduction path). This concept is akin to Harrod's (1973, p.19) warranted rate of growth. Okishio (1975) showed that there could be a smoothly extended reproduction path in the model of two sectors, one of productive goods and the other of consumption goods, given the technological condition, real wage rate, and rate of saving by capitalist. Okishio (1975, 1988, 1991) showed that the ratio of the amount of production in two sectors needs to be constant in order for this path to be sustainable. Moreover, Nakatani (1978) looked into the balanced growth path with fixed capital. Both Kawaguchi and Matsuo (1990), and Okishio (1991) analyzed the sustainability of the balanced growth path with choice of technology by capitalists. Matsuo (1996) examined the existence of balanced growth path in many cases.

These authors have considered the balanced growth path as the condition of sustainability of a capitalist regime. In a capitalist regime, those with high incomes can consume luxury goods that people with low incomes cannot buy. Therefore, consumption of luxury goods is a sign of social status and vanity satisfaction, which would be hard to achieve without luxury goods consumption. Thus, in order to analyze the sustainability of dictatorship or capitalism with inequality, both the production and consumption of luxury goods needs to be considered. Kurosaka (2014c) analyzed smoothly extended reproduction and balanced growth path with both production and consumption of luxury goods. This paper brings improvements to the cited study.

North Korea is a typical example of dictatorship. ²For both production and

² For a modelling of North Korean regime, see Kurosaka (2014a, 2015b). For the real

consumption of luxury goods in North Korea, the statement by Kim Kwang-Jin is needed to be noticed.³ According to him, the North Korean economy is divided into two sectors; the first one is the people's economy run by the Cabinet, which is under the control of the national planning; the other one is Kim Jong-Il's Royal Court economy, which is independent from the central planning and, the government control. Kim Kwang Jin noted that all the hard currency is earned through this Royal Court sector and this is controlled by Kim Jong-Il through the party departments such as Office Number 39, 38, and the Organization and Guidance Department of the Korean Worker's Party. We can interpret this Royal Court economy as the sector of luxury goods. Kim (2007) estimated that people's economy accounted for 40~60 percent of North Korean economy, while the rest pertains to the Royal Court economy. Kim Kwang-Jin also insisted that dollarization was happening in North Korea, where dollars or hard currency were used in many types of market and in bribing. It means that central planning is gradually demised in North Korea and marketization is taking place since the dictator himself ignores orders of central planning by making Royal Court economy grow. This behavior of the dictator is rational, since marketization in many areas activates the economy and leads to economic growth. Consequently, Kim Jong-Il's ignorance of central planning was useful to sustain his dictatorship.

3. The model

Consider an economy composed of two sectors and assume that workers in the first sector produce goods for regular production and consumption and workers in the second sector produce luxury goods. Capitalists (bureaucrats) in both sectors consume a part of his profit. Within consumption of capitalists (bureaucrats), c_1 goes to goods for production and for consumption, while the rest, $1 - c_1$ goes to luxury goods. Workers do not consume luxury goods and they consume all the wage income. The rate of profit, r is equalized between the two sectors. $p_i (i = 1, 2)$ is the nominal price of goods i . The nominal wage is denoted as w . The other notations are given as follows:

a_i : the amount of the first goods necessary to produce a unit of i th good.

τ_i : the amount of labor directly needed to produce a unit of i th good.

t_i : the total amount of labor necessary to produce a unit of the goods with standard methods in a society.

situations of North Korean society, see Kurosaka (2014b, 2015a).

³ See Kim (2007) (2009). Before defecting to South Korea, Kim Kwang-Jin worked in the insurance division of North Korea's Overseas Bureau.

The value of goods is measured by the total amount of labor necessary to produce a unit of the goods with standard methods in a society.⁴

$$t_1 = \frac{\tau_1}{1 - a_1} \quad (1)$$

$$t_2 = \frac{a_2\tau_1 - a_1\tau_2 + \tau_2}{1 - a_1} \quad (2)$$

Assuming the equalization of the profit rate in both sectors,

$$p_1 = (1 + r)(a_1p_1 + \tau_1w) \quad (3)$$

$$p_2 = (1 + r)(a_2p_1 + \tau_2w) \quad (4)$$

The real wage, R , and the relative price, q are defined as follows:

$$R = \frac{w}{p_1} \quad (5)$$

$$q = \frac{p_2}{p_1} \quad (6)$$

The surplus condition is obtained as follows. If this condition is not satisfied, the rate of profit cannot take positive value.

$$R < \frac{1 - a_1}{\tau_1} \quad (7)$$

Substituting equations (5) and (6) into (3) and (4),

$$1 = (1 + r)(a_1 + \tau_1R) \quad (8)$$

$$q = (1 + r)(a_2 + \tau_2R) \quad (9)$$

The rate of profit is determined by equation (8). From equation (8) and (9):

⁴ As for theory of value and surplus condition, see Okishio (1963) (1988).

$$q = \frac{a_2 + \tau_2 R}{a_1 + \tau_1 R} \quad (10)$$

Suppose that wages are paid after production and denote the amount of production in i sector as x_i . Nominal profit, π_i , can be shown as follows:

$$\pi_1^t = p_1 x_1^t - a_1 p_1 x_1^t - w \tau_1 x_1^t \quad (11)$$

$$\pi_2^t = p_2 x_2^t - a_2 p_1 x_2^t - w \tau_2 x_2^t \quad (12)$$

Equilibrium of the goods market of the first sector in period t is:

$$p_1 x_1^t = a_1 p_1 x_1^t + a_2 p_1 x_2^t + w(\tau_1 x_1^{t+1} + \tau_2 x_2^{t+1}) + c_1 c(\pi_1^t + \pi_2^t) \quad (13)$$

Equilibrium of the goods market of the second sector (luxury goods sector) in period t is:

$$p_2 x_2^t = (1 - c_1) c(\pi_1^t + \pi_2^t) \quad (14)$$

The following can be obtained by simple calculations:

$$\pi_1^t + \pi_2^t = \frac{r}{1 + r} (p_1 x_1^t + p_2 x_2^t) \quad (15)$$

To simplify the expression, denote b as follows:

$$b = \frac{r}{1 + r} = 1 - a_1 - \tau_1 R \quad (16)$$

Equation (13) and (14) can be transformed:

$$x_1^t = a_1 x_1^t + a_2 x_2^t + R(\tau_1 x_1^{t+1} + \tau_2 x_2^{t+1}) + c_1 c b(x_1^t + q x_2^t) \quad (17)$$

$$q x_2^t = (1 - c_1) c b(x_1^t + q x_2^t) \quad (18)$$

Denote the rate of labor increase as n . In order for the rate of unemployment to be constant, the amount of employment needs to increase as the same rate of the rate of labor increase:

$$\tau_1 x_1^{t+1} + \tau_2 x_2^{t+1} = (1+n)(\tau_1 x_1^t + \tau_2 x_2^t) \quad (19)$$

The model of balanced growth path in an economy with luxury goods sector is shown by equations (17), (18), and (19). From equation (10) and (16), q and b are a function of real wage, R . In the model of balanced growth path, the real wage is treated as an endogenous variable. Here, it is assumed that the real wage is determined as the ratio between the two sectors is fixed, which is shown in equation (18). Denote the ratio of the amount of production between the two sectors as μ_t and from equation (18) :

$$\begin{aligned} \mu_t &= \frac{x_2^t}{x_1^t} \\ &= \frac{(1-c_1)c\{-\tau_1^2 R_t^2 + \tau_1(1-2a_1)R_t + (1-a_1)a_1\}}{(1-c_1)c\tau_1\tau_2 R_t^2 + \{\tau_2 - (1-c_1)c(1-a_1)\tau_2 + (1-c_1)c\tau_1 a_2\}R_t + a_2 - (1-c_1)c(1-a_1)a_2} \end{aligned} \quad (20)$$

From equation (20), real wage R_t can be solved as the function of μ_t and other parameters.

$$\begin{aligned} (1-c_1)c\tau_1(\tau_2\mu_t + \tau_1)R_t^2 &+ [\{\tau_2 - (1-c_1)c(1-a_1)\tau_2 + (1-c_1)c\tau_1 a_2\}\mu_t \\ &- (1-c_1)c\tau_1(1-2a_1)]R_t + \{1 - (1-c_1)c(1-a_1)\}\mu_t a_2 \\ &- (1-c_1)c(1-a_1)a_1 = 0 \end{aligned} \quad (21)$$

Equation (21) can be interpreted as the quadratic equation of R_t . For simplification:

$$(1-c_1)c\tau_1(\tau_2\mu_t + \tau_1)R_t^2 + (M\mu_t - N)R_t + Q\mu_t - S = 0 \quad (22)$$

$$M = \tau_2\{1 - (1-c_1)c(1-a_1)\} + (1-c_1)c\tau_1 a_2 > 0 \quad (23)$$

$$N = (1-c_1)c\tau_1(1-2a_1) \quad (24)$$

$$Q = \{1 - (1-c_1)c(1-a_1)\}a_2 > 0$$

(25)

$$S = (1 - c_1)c(1 - a_1)a_1 > 0$$

(26)

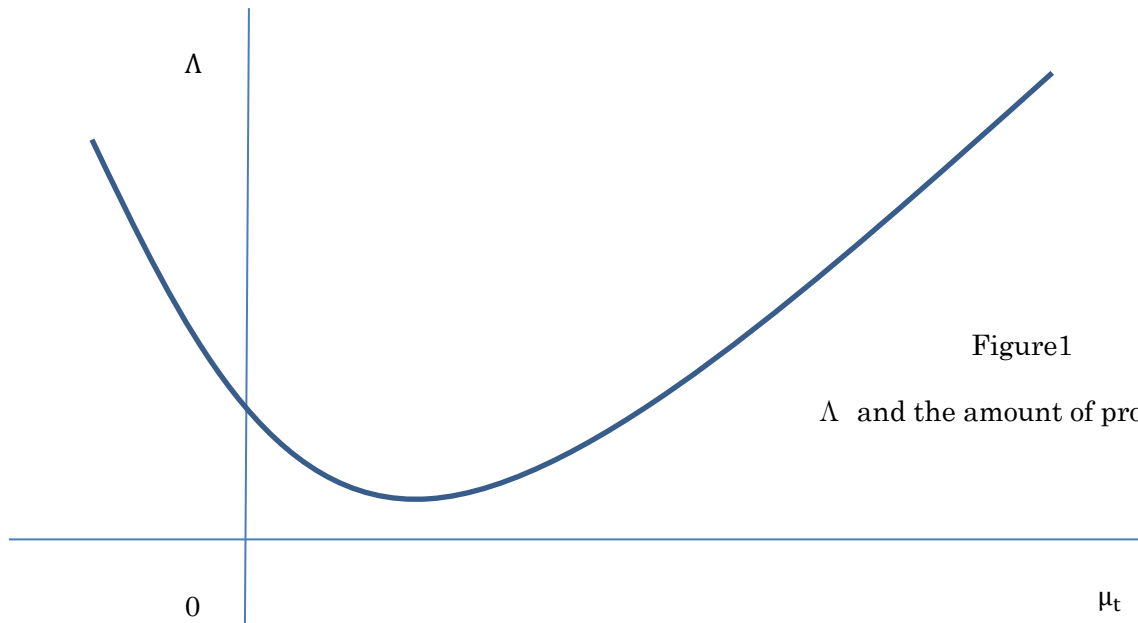
There can be two values of R_t that satisfy equation (21).

$$R_t = \frac{-(M\mu_t - N) \pm \sqrt{\Lambda}}{2(1 - c_1)c\tau_1(\tau_2\mu_t + \tau_1)} \quad (27)$$

$$\begin{aligned} \Lambda = & [\tau_2\{1 - (1 - c_1)c(1 - a_1)\} - (1 - c_1)c\tau_1a_2]^2\mu_t^2 - 2(1 - c_1)c\tau_1[(1 - 2a_1)\tau_2\{1 \\ & - (1 - c_1)c(1 - a_1)\} - 2\tau_2(1 - c_1)c(1 - a_1)a_1 + 2\tau_1a_2 \\ & - (1 - c_1)c\tau_1a_2]\mu_t + (1 - c_1)^2c^2\tau_1^2 \end{aligned} \quad (28)$$

Substituting equilibrium level of the ratio of the amount of production between the two sectors into equation (27), the one that is positive is the equilibrium level of real wage, R_t^* .

If equation (28) takes non-negative values for all ratios of the amount of production between the two sectors, there is no complex number of solution for equation (27) as shown in the Figure 1.



Equation (28) can be interpreted as a quadratic equation of the amount of production ratio between the two sectors, μ_t . The vertical intercept of the Figure of equation (28) takes positive value. The coefficient of μ_t^2 is positive. Consequently, if the coordinate of the climax takes negative values, equation (28) becomes positive for the positive amount of production ratio between the two sectors, μ_t . In this case, there is no complex number of solution in equation (27)(Figure 2).

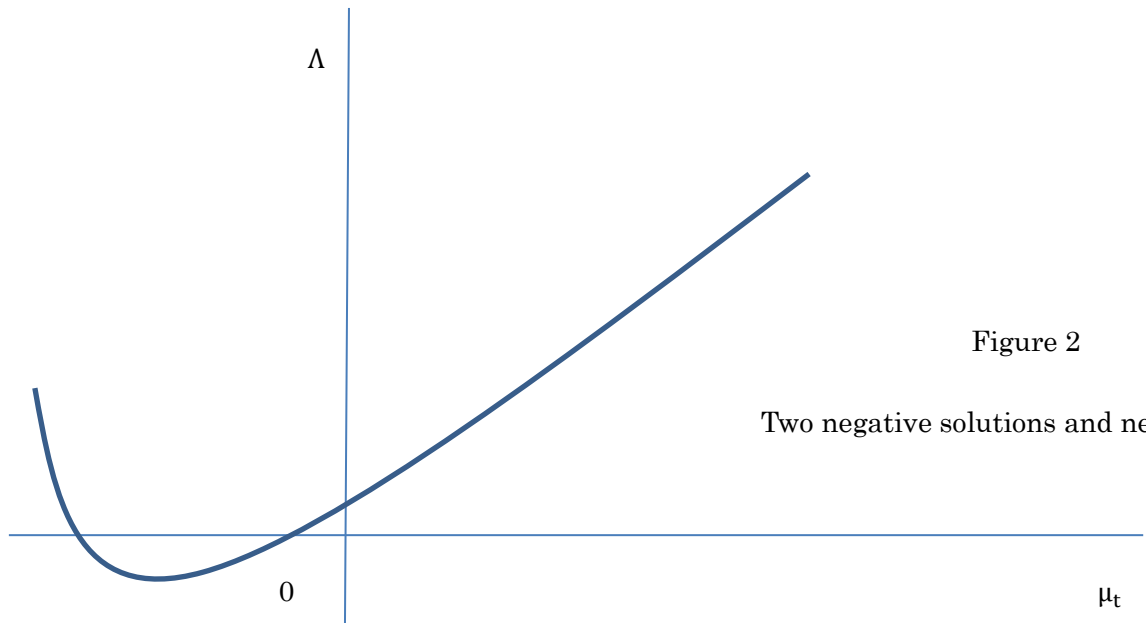


Figure 2

Two negative solutions and negative climax

The discriminant of equation (28) is obtained:

$$\begin{aligned}
 D = & 4(1 - c_1)c[\tau_2(1 - 2a_1)\{1 - (1 - c_1)c(1 - a_1)\} - 2\tau_2(1 - c_1)c(1 - a_1)a_1 \\
 & + \tau_1a_2\{2 - (1 - c_1)c\}] - 4[\tau_2\{1 - (1 - c_1)c(1 - a_1)\} \\
 & - (1 - c_1)c\tau_1a_2]^2(1 - c_1)^2c^2\tau_1^2
 \end{aligned}
 \tag{29}$$

In case equation (29) takes negative values, the figure of equation (28) can be depicted as in Figure 1. This is the case in which the coordinate of the climax takes positive value. It is possible that the coordinate of the climax takes negative value.

Inequality (30) is the situation when the Figure of equation (28) is depicted

like shown in Figure 2, where it is assumed that there are two negative solutions for equation (28).

$$(1 - 2a_1)\tau_2\{1 - (1 - c_1)c(1 - a_1)\} - 2\tau_2(1 - c_1)c(1 - a_1)a_1 + 2\tau_1a_2 - (1 - c_1)c\tau_1a_2 < 0 \quad (30)$$

Subsequently, real wage R_t can be interpreted as a function of the amount of production ratio between the two sectors, μ_t , using equation (27):

$$R_t = R_t(\mu_t) \quad (31)$$

Substituting equation (31) into equations (17) and using (19), the following is obtained:

$$\begin{aligned} & \frac{[1 - c_1c\{1 - a_1 - \tau_1R_t(\mu_t)\}][1 + \mu_t \frac{a_2 + \tau_2R_t(\mu_t)}{a_1 + \tau_1R_t(\mu_t)}]}{\tau_1 + \tau_2\mu_t} \\ &= \frac{[a_1 + a_2\mu_{t+1} + R_t(\mu_t)(\tau_1 + \tau_2\mu_{t+1})](1 + n)}{\tau_1 + \tau_2\mu_{t+1}} \end{aligned} \quad (32)$$

Equation (32) is a one-order difference equation of μ_t . In the steady state, the amount of production ratio between the two sectors, μ_t , takes a fixed value. Denoting this value as μ^* results in:

$$\begin{aligned} & [1 - c_1c\{1 - a_1 - \tau_1R_t^*(\mu^*)\}]\{1 + \mu^* \frac{a_2 + \tau_2R_t^*(\mu^*)}{a_1 + \tau_1R_t^*(\mu^*)}\} \\ &= \{a_1 + a_2\mu^* + R_t^*(\mu^*)(\tau_1 + \tau_2\mu^*)\}(1 + n) \end{aligned} \quad (33)$$

Linearizing equation (32) in the neighborhood of the steady state, denoting $R_{t\mu}$ as the partial differentiation of R_t by μ_t ,

$$\mu_{t+1} - \mu^* = \frac{G(\mu^*)}{F(\mu^*)}(\mu_t - \mu^*) \quad (34)$$

$$\begin{aligned}
G(\mu^*) = & (\tau_1 + \tau_2 \mu^*) \left(c_1 c \tau_1 + \frac{\{a_2 + \tau_2 R_t^*(\mu^*)\} c_1 c \tau_1}{a_1 + \tau_1 R_t^*(\mu^*)} \right. \\
& + \frac{\{\{a_1 + \tau_1 R_t^*(\mu^*)\} \tau_2 - \tau_1 \{a_2 + \tau_2 R_t^*(\mu^*)\}\}}{\{a_1 + \tau_1 R_t^*(\mu^*)\}^2} \mu^* \{1 - c_1 c + a_1 c_1 c \\
& + c_1 c \tau_1 R_t^*(\mu^*)\} \left. \right) R_{t\mu} \\
& + \frac{a_2 + \tau_2 R_t^*(\mu^*)}{a_1 + \tau_1 R_t^*(\mu^*)} \{1 - c_1 c + a_1 c_1 c + c_1 c \tau_1 R_t^*(\mu^*)\} (\tau_1 + \tau_2 \mu^*) - \tau_2 [1 \\
& - c_1 c (1 - a_1) + c_1 c \tau_1 R_t^*(\mu^*) \\
& + \mu_t \frac{a_2 + \tau_2 R_t^*(\mu^*)}{a_1 + \tau_1 R_t^*(\mu^*)} \{1 - c_1 c + a_1 c_1 c + c_1 c \tau_1 R_t^*(\mu^*)\} - (1 + n) (\tau_1 \\
& + \tau_2 \mu^*) (\tau_1 + \tau_2 \mu^*) R_\mu
\end{aligned} \tag{35}$$

$$F(\mu^*) = [(a_2 + R_t^*(\mu^*) \tau_2) (\tau_1 + \tau_2 \mu^*) - \{a_1 + a_2 \mu^* + R_t^*(\mu^*) (\tau_1 + \tau_2 \mu^*)\} \tau_2] (1 + n) \tag{36}$$

Linearized difference equation (34) converges to the steady state equilibrium if the following inequality is satisfied:

$$-1 < \frac{G(\mu^*)}{F(\mu^*)} < 1 \tag{37}$$

If inequality (37) is satisfied, the amount of production ratio between the two sectors, μ_t , converges to the steady state in the long run. This is the stability condition of the system. In the steady state, the amount of production in each sector grows by the rate of labor increase and the rate of unemployment is constant. Since the real wage rate becomes constant, the profit rate also becomes constant. Thus, the existence of the balanced growth path in an economy with luxury goods sector has been proved.

As previously noted, one of the characteristics of dictatorship is production and consumption of luxury goods. It is a fact that goods for production and consumption for the people needs to be produced in dictatorship. In this model, the real wage rate is a function of the ratio of the amount of production between the two sectors. The equilibrium real wage rate needs to take the value shown in inequality (7). If not, the rate of profit takes negative values, exploitation is impossible and dictatorship is not sustained. The mechanism of how the real wage rate takes the value needs to be considered in another model. We obtain the following proposition.

Proposition

In an economy with luxury goods sector, the balanced growth path exists if and only if inequality (37) is satisfied and the equilibrium real wage rate takes the value shown in inequality (7).

4. Concluding Remarks

It has been shown that the balanced growth path in an economy with luxury goods sector exists if and only if the stability condition of the system is satisfied and the equilibrium real wage rate takes the value which is in the positive sphere of both the rate of profit and the exploitation rate. The results show that dictatorship is sustainable if and only if these conditions are satisfied. This means that the dictator can allow the privileged class to consume luxury goods, having the power to constrain the real wage rate within positive sphere of both the rate of profit and the exploitation rate.

In this model, the mechanism of how the real wage rate can take positive value of the rate of profit and the exploitation rate is not considered. Additionally, the bureaucrat maximizes the profit rate by choosing the amount of labor under the technological constraint.⁵ These problems are should be considered in future research.

Appendix -Technological Choice-

Based on the work of Okishio (1991), it is assumed that $a_i (i = 1, 2)$ goods for production are needed to produce one unit of goods in each sector. Similarly, $\tau_i (i = 1, 2)$ unit of labor is needed to produce one unit of goods in each sector. We assume the following technological condition.

$$0 < \alpha < 1 \quad 0 < \beta < 1 \quad A_i > 0 \quad i = 1, 2$$

$$A_1 a_1^\alpha \tau_1^{1-\alpha} = 1$$

$$A_2 a_2^\beta \tau_2^{1-\beta} = 1$$

The profit rate in the sector of productive and consumption goods can be obtained as the follows:

⁵ See Appendix.

$$r_1 = \frac{1 - a_1 - \tau_1 R}{a_1 + \tau_1 R}$$

Furthermore, the profit rate of luxury goods sector can be obtained:

$$r_2 = \frac{q - a_2 - \tau_2 R}{a_2 + \tau_2 R}$$

Using the above equation:

$$a_1 = A_1^{\frac{-1}{\alpha}} \tau_1^{\frac{\alpha-1}{\alpha}}$$

$$a_2 = A_2^{\frac{-1}{\beta}} \tau_2^{\frac{\beta-1}{\beta}}$$

The bureaucrat (capitalist) decides the amount of employment per each good in order to maximize the rate of profit;

$$\frac{1 - \alpha}{\alpha} \left(\frac{a_1}{\tau_1} \right) = R$$

$$\frac{1 - \beta}{\beta} \left(\frac{a_2}{\tau_2} \right) = R$$

Thus, the amount of both goods for production and labor for unit production is decided, given the level of the real wage rate.

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