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Abstract

This paper examines the short-run relationship between the income distribution- and finance-growth regimes using a simple post-Keynesian demand-driven model. While each mechanism of wage-led and profit-led growth has been revealed, its relationship with debt-led and debt-burdened growth, and vice versa, is yet to be clarified. This is because the argument on these growth regimes has been developed separately. By constructing a simple post-Keynesian model that generates these regimes, this paper examines their relationship. It is shown that the growth regimes transform as the regime switching parameters in the *IS* balance change. By way of theoretical analysis, this paper presents some important implications for the diversity of economic growth—including the complementarity of growth regimes to shocks—that are in contrast to the implications of the basic neo-classical model on income distribution and money. In addition, by doing so, this paper also validates recent empirical results.

1 Introduction

Post-Keynesians have emphasized the role of income distribution for the determination of demand-led growth. In the old models *à la* Kaldor and Robinson, the full utilization of capacities is assumed and an increase in profit rate stimulates economic growth, while the wage share is restrained (Marglin (1984)). In contrast, original Kaleckian models (or stagnationist models) stressed that an increase in wage share stimulates economic growth, which is in sharp contrast with classical-Marxian models. Subsequent models explain that changes in income distribution have ambiguous effects on economic growth (Bhaduri and Marglin (1990); Blecker (2002); Bhaduri (2007)). Depending on the relative size of the parameters in the *IS* balance, the growth rate of an economy can either increase or fall with income distribution. If profit share stimulates the economic growth rate, we refer to it as profit-led growth. In contrast, if wage share stimulates the economic growth rate, we refer to it as wage-led growth.

They also focus on the role of finance for economic growth and cycles. Along with the rapid development of the financial sector, the overall importance of debt, interest rate, and so on for income distribution, effective demand, and economic growth has risen considerably (Hein (2011)). One of the theoretical consequences is the examination of the growth mechanism of finance. The mechanism of debt-led growth (DLG) and debt-burdened growth (DBG) regimes has been revealed, by focusing on business borrowing under certain financial accounts (Lavoie and Godley (2001); Taylor (2004); Hein (2006); Hein (2007)). In the former, a bigger debt and a higher interest rate will increase the economic growth rate, and this case is also called the puzzling case. In the latter, a bigger debt and a higher interest rate will decrease the economic growth rate, and this case is also called the normal case. The formation of these growth regimes also depends on the values of the parameters in the *IS* balance.

Thus, the identification of the economic growth regime and its extension have been a focus of theoretical issues. However, while each mechanism of income distribution- and finance-growth regimes has been revealed, the relationship between the two regimes is yet to be conclusively proved.

This paper attempts to contribute to the short-run relationship between the income distribution- and finance-growth regimes for three reasons. First, I seek to present a structure of economic growth within a simple but general post-Keynesian model. Second, I wish to capture the mechanisms of economic growth in terms of both income distribution and finance. In particular, the mechanisms of wage-led growth (WLG) regime and profit-led growth (PLG) regime are explained as the income distribution-growth regime. In addition, the mechanism of DLG and DBG

regimes is explained as the finance-growth regime. Third, I want to present some implications for existing literature from theoretical and empirical viewpoints.

By doing so, I particularly emphasize the synthesis of the income distribution- and finance-growth regimes. While the mechanisms of economic growth have been examined in terms of income distribution and financial factors, these mechanisms are revealed separately. Basic Kaleckian models have focused principally on the growth and distribution. As such, it is not clear how WLG and PLG regimes are concerned with the finance-growth regimes. The argument in Kaleckian models with debt accumulation mainly concerns the mechanisms and stability of DLG and DBG regimes. Consequently, it is not fully revealed how these growth regimes are compatible with the income distribution-growth regimes. A growth regime should be examined from multiple perspectives, since economic growth is normally affected by not only the change in income distribution but also the accumulation of debt at the same time, which is confirmed by post-Keynesian empirical literature. Hein and Schoder (2011) confirm that the growth regimes of both the US and Germany have been debt-burdened in terms of finance, whereas Naastepad and Storm (2007) detect that the regime of Germany has been wage-led and that of the US has been profit-led. Nishi (2012) confirms by a time series analysis that the growth regime of the Japanese economy during the past 20 years has been profit-led and debt-burdened. Therefore, it is not desirable to identify the growth regime of an economy only from one side. Rather, in order to understand the macroeconomic performance of an economy in more detail, it is required to consider the growth regime from both sides. The results obtained in this paper will enable us to better understand how the income distribution- and finance-growth regimes are connected and ascertain the parameter by which the growth regime transforms from one factor to another.

The remainder of this paper is organized as follows. Section 2 briefly surveys the theoretical development of the income distribution- and finance-growth regimes. I then revisit the importance of formalizing growth regimes in a model in terms of both finance and distribution. Section 3 presents a simple growth model that explains the mechanism of growth regimes. Section 4 explains the formation and transformation of economic growth regime by focusing on the regime switch parameters. After deriving the properties of each growth regime, I show some implications of the current model for the existing literature. Section 5 concludes the paper.

2 Income Distribution, Finance and Growth: A Brief Survey of post-Keynesian Literature

One of the important issues in post-Keynesian economics is income distribution between wage and profit, and economic growth. Post-Keynesians have extended the theory of demand-led growth and distribution on the basis of Robinson, Kaldor, Pasinetti and Kalecki models. If an increase in wage (profit) share stimulates aggregate demand (in most cases, the capacity utilization rate), the demand formation pattern is called stagnationist (exhilarationist). Similarly, when an increase in wage share raises the growth rate of output, the growth regime is referred to as wage-led growth. In contrast, when an increase in profit share raises the growth rate of output, it is referred to as profit-led growth.

According to Lavoie (1992), these growth mechanisms have been initially examined by Del Monte (1975), then developed by Rowthorn (1981), Dutt (1984), and Taylor (1985). With the classical consumption function, they use an investment function that depends on profit rate and capacity utilization, and reveal that capacity utilization and economic growth rate are stimulated by wage variables. In contrast to such strong stagnationist results, Bhaduri and Marglin (1990) and Marglin and Bhaduri (1990) show that exhilarationist and PLG regimes are also possible in a Kaleckian model. They do so by introducing a strongly positive response of the investment function to an increase in profit share instead of profit rate. After these researches, the theory of income distribution and economic growth has been extended to the analysis of technological change (Dutt (2003)), structural change (You (1994)), open economic issues (Blecker (2011)), comparisons with alternative models such as neo-classical, neo-Keyneisan, and neo-Marxian (Dutt (2011)), and long-term issues (Lavoie (2010)). Useful surveys on growth and income distribution are provided by Setterfield (2002), Setterfield (2010), and Hein and Stockhammer (2011).

The seminal paper of Bhaduri and Marglin (1990) stimulates empirical analysis. Many use a general growth model that allows demand growth to be either wage-led or profit-led, and apply it to each economy. These include Bowles and Boyer (1995), Stockhammer and Onaran (2004), Barbosa-Filho and Taylor (2006), Naastepad and Storm (2007), and Hein and Vogel (2008). Although these studies confirm the existence of the WLG and PLG regimes in the economies considered, the results are not conclusive as they depend on the period and method employed.

In the context of the extension of the post-Keynesian model, Kaleckian economic growth models with debt accumulation have recently been presented that emphasize the financial side of an economy. An extension of the model to the financial side

is required because of both theoretical and empirical reasons. Empirically, it is because the overall importance of financial factors for income distribution, aggregate demand, and economic growth has risen considerably. That is, there has been an increase in the importance of financialization. Regarding consumption, financialization induces wealth-based and debt-financed consumption. Regarding income distribution, financialization has been viewed to be conductive to declining wage share and to increasing wage inequality (Hein (2011)). Concerning investment, increased investment in financial assets with financialization may have a crowding out effect on real investment. It also undermines the real investment because of increased payments to financial markets in the form of dividends and stock buybacks by the firm (Orhangazi (2008)). Theoretically, these extensions go with the development of a Minskian model as many studies introduce Minskian insights on finance and capital accumulation. Using a macroeconomic model that incorporates firms' finances, the mechanisms of DLG and DBG regimes have been revealed (Lavoie and Godley (2001); Taylor (2004); Hein (2006); Hein (2007)). Under the DLG regime, an increase in debt or a rise in interest rate stimulates economic growth. On the contrary, an increase in debt or a rise in interest rate restrains economic growth under debt-burdened growth regime.

The importance of growth, distribution, and finance lies in both theoretical and empirical aspects, which is in sharp contrast with basic neo-classical economics. The theoretical importance of the post-Keynesian model of income distribution is that it does not rely on the marginal productivity explanation of income distribution. Instead, it considers that income distribution is a result of class conflict among social classes. Although the share of income distribution share is considered to be an exogenous variable in the current model, post-Keynesians have endogenized it by employing the conflict-claiming model for the purpose (Cassetti (2003); Sasaki (2011)). The theoretical importance of finance for growth is that money and finance are not neutral for the real side of economy. The interest rate is not an adjustment variable for the IS balance. Moreover, debt finance will affect the growth and profit of firms, as a change in debt and in interest rate affects the income distribution and effective demand. Lastly, the empirical importance is that economic growth is not unique but exhibits diversity. According to the literature cited above, economies may be either wage-led or profit-led in terms of income distribution, and they may be either debt-led or debt-burdened in terms of finance, which may change depending on the period. The results of the empirical studies imply that some economies perform well under a certain economic growth regime, but others do not. In other words, it implies that the growth regime is neither unique nor optimum.

The current study focuses on the theoretical side of growth regimes. The next section constructs a simple post-Keynesian model that generates wage-led, profit-led, debt-led, and debt-burdened growth regimes. By doing so, it also presents a combination of these growth regimes that matters for economic performance.

3 Model

3.1 Setup

The following is a list of the main notations used in this paper. X: output (total income), X^*: potential output, K: capital stock, E: effective employment level, $1-\pi$: wage share, π: profit share, $X^*/K = \nu$: potential output-capital ratio (constant and set as unity for simplicity), $u = X/K$: output-capital ratio (effective demand), $r = \pi u$: profit rate, S: total savings, I: investment demand, g: actual rate of capital accumulation in the short-run, W: nominal wage, R: profit (net operating revenue), i: nominal interest rate, λ: debt-capital ratio.

I assume an economy that is closed and has no government fiscal expenditure. A single good that is used for both investment and consumption is produced using labour and capital by firms, which are combined through a fixed coefficient technology. For simplicity, I assume that there is no technological change in production.

Four classes—workers, firms, banks (including a central bank), and rentiers who own the firms and supply funds to firms via banks—are assumed to exist in the economy. The main difference between firms and rentiers is that while the former produces, the latter indulges in financial businesses via banks. The existence of banks is implicitly assumed because their activities are not explicitly formalized in the model. The worker households provide labour and receive wage income, with the wage bill being WE.

The firms receive net operating revenue R, which is the surplus over wages. Hence, the functional distribution of income is given by

$$PX = WE + R \tag{1}$$

where PX is the total income. It is assumed that income distribution remains constant under the oligopolistic pricing equation which is a feature in a standard Kaleckian model: $P = (1+z)WE/X$, where z is the constant markup ratio. As for price dynamics, I assume that there is no change in the price level. In this case, the wage share and profit share are obtained as constant ratios $1-\pi = 1/(1+z)$ and $\pi = z/(1+z)$, respectively.

I assume that the firms can make use of loans, which are financed by rentiers via banks. It is also assumed that firms do not issue new shares except for once when they start operating. These shares are owned by rentiers. With regard to the nominal interest rate i, it is assumed to be controlled via the base rate of interest by the monetary policy under the so-called horizontalist regime (Moore (2001); Rochon (2001)). In this regime, the interest rate is an exogenous variable for the accumulation process, whereas the quantities of credit and money are determined endogenously by economic activity.

The firms must therefore pay debt service iD on their debt stock, along with a dividend to the rentiers in each period. I assume the dividend rate to be $(1 - s_F)$, and the firms' retention rate to be $s_F \in [0, 1]$. Hence, the firms' net profit is $(R - iD)$, and the rentiers' total income is $(1 - s_F)(R - iD) + iD$. The three classes have different savings behaviours. The firms retain a constant fraction s_F of their net profits, rentiers save a constant fraction $s_C \in (0, 1)$ of their income, while workers spend all their wage income. At the macroeconomic level, the total savings S is composed of the profits retained by the firms and the savings from the rentiers' income. Therefore, the aggregate savings as a proposition of the capital stock is given by

$$\begin{aligned} S/K &= (S_C + S_F)/K \\ &= s_C[(1 - s_F)(\pi u - i\lambda) + i\lambda] + s_F(\pi u - i\lambda) = (\Delta + s_C)\pi u - \Delta i\lambda, \end{aligned} \tag{2}$$

where $\Delta = s_F(1 - s_C)$.

Post-Keynesians employ several types of investment functions. Charles (2008) assumes that capital accumulation positively depends on the firms' internal funds. Lima and Meirelles (2007) set up an investment function that depends on the profit rate and interest rate. Hein (2006) and Fujita and Sasaki (2011) use the Marglin and Bhaduri type investment function incorporating the negative effects of debt service. The current study follows Hein (2006) and Fujita and Sasaki (2011), in that the model can generate both the WLG and PLG growth regimes. Thus, the firms make an investment plan I, which is given by the following desired investment function:

$$g = I/K = \alpha + \beta\pi + \gamma u - \theta i\lambda, \tag{3}$$

where α, β, γ, and θ are positive parameters, and g denotes the short-run capital accumulation rate. α stands for the motivation to accumulate and might be affected by the firms' animal spirits. Both the profit share π and the capacity utilization rate u stimulate capital accumulation, but a rise in debt service negatively affects it. The type of investment function must be carefully chosen, as the arguments easily affect the possibility of growth regimes. In addition to the theoretical necessity, I select

the above investment function on the basis of empirical evidence. From empirical analysis, it is shown that the impacts of variables concerning the accelerator effect (by the growth rate of real net domestic income), and of the profit share on capital accumulation differ (Hein and Schoder (2011)). In addition, the interest payments also have a negative impact on capital accumulation (Ndikumana (1999)). Therefore, the interest payments are separately included in this function.

3.2 Equilibrium

This paper particularly considers the property of the short-run equilibrium state. In this period, disequilibrium in the goods market is adjusted by changes in the capacity utilization rate under given capital and debt stocks. From eqs. (2) and (3), the short-run equilibrium rate of capacity utilization is given by

$$u^* = \frac{\alpha + \beta\pi + (\Delta - \theta)i\lambda}{(\Delta + s_C)\pi - \gamma}. \tag{4}$$

For the stability of this equilibrium, I assume that $(\Delta + s_C)\pi - \gamma > 0$, which is known as the Keynesian stability condition. I also assume that the numerator of eq. (4) is positive, which will ensure a positive equilibrium value of capacity utilization.

By differentiating u^* with respect to the profit share π, I obtain the conditions for both the stagnationist and exhilarationist demand regimes. These conditions can be distinguished on the basis of the following equation:

$$\frac{\partial u^*}{\partial \pi} = -\frac{(\Delta + s_C)[\alpha + (\Delta - \theta)i\lambda] + \beta\gamma}{[(\Delta + s_C)\pi - \gamma]^2}. \tag{5}$$

This equation shows that if the α, β, and γ are large, the stagnationist demand regime will be established. On the contrary, when θ is large, the exhilarationist demand regime will be established.

Similarly, by differentiating u^* with respect to the debt ratio λ, I can obtain the conditions for both the debt-led and debt-burdened demand regimes. These conditions can be distinguished on the basis of the following equation:

$$\frac{\partial u^*}{\partial \lambda} = \frac{(\Delta - \theta)i}{(\Delta + s_C)\pi - \gamma}. \tag{6}$$

This calculation shows the importance of the difference between Δ and θ. If θ is larger than Δ, the debt-burdened demand regime will be established. Following Fujita and Sasaki (2011), I name this the debt-burdened capacity utilization (DBCU) regime. On the contrary, when Δ is larger than Δ, the debt-led demand regime will be established. I name this the debt-led capacity utilization (DLCU) regime. Finally,

the value of the interest rate reinforces these impacts. DBCU and DLCU play an important role for the existence of a combination of growth regimes; this is shown in the Appendix.

Below, I focus on the mechanism of economic growth in terms of income distribution and finance. By substituting eq. (4) in eq. (3), I obtain the short-run equilibrium rate of capital accumulation g^*:

$$g^* = \frac{(\alpha + \beta\pi)(\Delta + s_C)\pi + [\Delta\gamma - \theta\pi(\Delta + s_C)]i\lambda}{(\Delta + s_C)\pi - \gamma}. \tag{7}$$

In the short-run steady state, the capacity utilization rate $u^* = X/K$ remains constant. Therefore, the output growth rate is equal to the capital accumulation growth rate, g^*. On the basis of eq. (7), I will derive the income distribution- and finance-growth regimes.

First, I examine the impacts of a change in the income distribution share on the economic growth rate. Differentiating g^* with respect to π yields

$$\frac{\partial g^*}{\partial \pi} = \frac{(\Delta + s_C)}{[(\Delta + s_C)\pi - \gamma]^2}\Big\{\beta\pi^2(\Delta + s_C) - \gamma[\alpha + 2\beta\pi + (\Delta - \theta)i\lambda]\Big\}. \tag{8}$$

Since I assumed that the numerator of eq. (4) is positive, $[\alpha + 2\beta\pi + (\Delta - \theta)i\lambda]$ is also positive. In eq. (8), since $(\Delta + s_C)$ is positive, the income distribution-growth regimes can be distinguished on the basis of the sign of the terms in the brace.

Second, I investigate the effects of a change in the debt-capital ratio on the economic growth rate. Differentiating g^* with respect to λ gives

$$\frac{\partial g^*}{\partial \lambda} = \frac{i}{(\Delta + s_C)\pi - \gamma}[\gamma\Delta - \theta(\Delta + s_C)\pi]. \tag{9}$$

Since the denominator of eq. (9) is positive, the finance-growth regimes can be distinguished on the basis of the sign of the terms in the bracket.

Finally, let us focus on the relationship between debt/demand formation and growth. In this model, while DLCU leads to both DLG and DBG, DBCU leads only to DBG. By arranging eq. (9), we have

$$\begin{aligned}\gamma\Delta - \theta\pi(\Delta + s_C) =& \gamma\Delta - (\theta\gamma - \theta\gamma) - \theta\pi(\Delta + s_C)\\ =& \gamma(\Delta - \theta) + \theta[\gamma - \pi(\Delta + s_C)],\end{aligned}$$

where $\gamma - \pi(\Delta + s_C)$ is always negative, by the Keynesian stability condition. Therefore, if the economy is DBCU (i.e., $\Delta - \theta < 0$), the growth regime is necessarily debt-burdened. On the other hand, if the economy is DLCU (i.e., $\Delta - \theta > 0$), the growth regime may either debt-burdened or debt-led depending on the condition (eqs. (12) and (13) shown in the next section).

4 Parametrical Configuration for Economic Growth Regimes

4.1 On the Regime Switching Parameters

As shown in the previous section, whether the economic growth regime is wage-led or profit-led depends on the parameters in eq. (8). More precisely, the following inequalities determine the growth regime of income distribution.

- If the following inequality is satisfied

$$\gamma < \frac{\beta\pi^2(\Delta + s_C)}{\alpha + 2\beta\pi + (\Delta - \theta)i\lambda}, \tag{10}$$

  then the PLG regime will be established.

- On the contrary, if the following inequality is satisfied

$$\gamma > \frac{\beta\pi^2(\Delta + s_C)}{\alpha + 2\beta\pi + (\Delta - \theta)i\lambda}, \tag{11}$$

  then the WLG regime will be established.

As for the finance-growth regime, whether the economic growth regime is debt-led or debt-burdened depends on the parameters in eq. (9). More precisely, the following inequalities determine the finance-growth regime.

- If the following inequality is satisfied

$$\gamma < \frac{\theta\pi(\Delta + s_C)}{\Delta}, \tag{12}$$

  then the DBG regime will be established.

- On the contrary, if the following inequality is satisfied

$$\gamma > \frac{\theta\pi(\Delta + s_C)}{\Delta}, \tag{13}$$

  then the DLG regime will be established. The same conditions are true for the DLG and DBG regimes in terms of changes in the interest rate.

From eqs. (10)-(13), it is now clear that the values of parameters γ, Δ, θ, and π relate to the determination of the income distribution- and finance-growth regimes. γ represents the accelerator effect on investment, Δ is the product of the firms' retention rate and the rentiers' propensity to consumption. θ measures the depression effect of

the interest payments, and π is the initial value of the profit share. That is, changes in these parameters may result in the transformation from one economic growth regime to another. Therefore, I call these parameters the regime switching parameters.

I will illustrate the conditions for the economic growth regimes on the basis of γ and Δ, as these parameters show the formalization of the growth regimes in a clear manner. By taking Δ for the horizontal axis and γ for the vertical axis, I depict the relationship between the magnitudes of these parameters and the income distribution- and finance-growth regimes. I define the functions $F(\Delta)$ and $G(\Delta)$ on the basis of inequalities (10)-(13), in order to illustrate the regime formation conditions in the figure:

$$F(\Delta) = \frac{\beta\pi^2(\Delta + s_C)}{\alpha + 2\beta\pi + (\Delta - \theta)i\lambda}, \tag{14}$$

$$G(\Delta) = \frac{\theta\pi(\Delta + s_C)}{\Delta}. \tag{15}$$

It should be noted that Δ is composed of s_F and s_C. As s_C concerns other terms in equations (14) and (15), I consider the changes in Δ given a constant value of s_C. In this case, the maximum and minimum values of Δ are $1 - s_C$ and 0, respectively. The locus of $F(\Delta)$ is monotonically downward sloping in this domain, and the minimum and maximum values of $F(\Delta)$ are $\dfrac{\beta\pi^2}{\alpha + 2\beta\pi + (1 - s_C - \theta)i\lambda}$ and $\dfrac{s_C\beta\pi^2}{\alpha + 2\beta\pi - \theta i\lambda}$, respectively.[1]

Similarly, the locus of $G(\Delta)$ is also monotonically downward sloping in this domain. The limit and minimum value of $G(\Delta)$ are $\lim_{\Delta\to 0} G(\Delta) = \infty$ and $\dfrac{\theta\pi}{1 - s_C}$, respectively.

4.2 On the Properties of the Income Distribution-Growth Regimes

In this short-run model, the type of growth regime that will appear depends on chance as the regime switching parameters are all exogenous. If γ is relatively large and Δ

[1] By differentiating $F(\Delta)$ with respect to Δ, I get

$$\frac{dF(\Delta)}{d\Delta} = \frac{\beta\pi^2(\alpha + 2\beta\pi - (\theta + s_C)i\lambda)}{[\alpha + 2\beta\pi + (\Delta - \theta)i\lambda]^2}.$$

I assume that the numerator of this equation is negative, which is necessary to obtain an economically meaningful solution. For example, if the slope of $F(\Delta)$ is not negative, even when the firms' retention rate rises, it results in a profit-led economy although the aggregate consumption from profit decreases in this case. This contrasts with the intuitive economic explanation. I will examine this issue in more detail in the next section.

is sufficiently large, the WLG regime will be established. In contrast, when γ is relatively small and Δ is sufficiently small, the PLG regime will be generated.

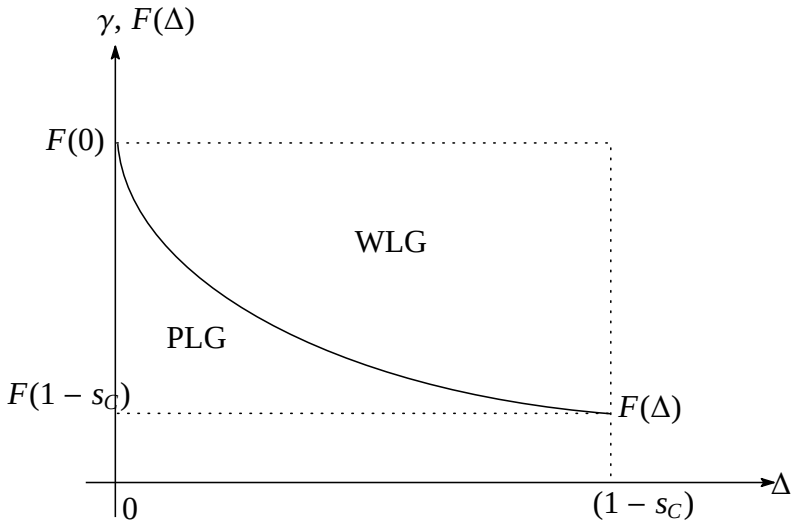

Figure 1: Conditions for the WLG and PLG regimes

Note: The locus is depicted by $F(\Delta) = \frac{\beta\pi^2(\Delta+s_C)}{\alpha+2\beta\pi+(\Delta-\theta)i\lambda}$. The value of $F(0)$ is $F(0) = \frac{s_C\beta\pi^2}{\alpha+2\beta\pi-\theta i\lambda}$, and that of $F(1-s_C)$ is $F(1-s_C) = \frac{\beta\pi^2}{\alpha+2\beta\pi+(1-s_C-\theta)i\lambda}$.

Figure 1 presents the income distribution-growth regimes. For $\gamma > F(\Delta)$, the economic growth is wage-led, while it is profit-led for $\gamma < F(\Delta)$. It is only when $\gamma = F(\Delta)$ that economic growth is independent of income distribution.

It is important to investigate why the income distribution-growth regime particularly depends on the values of γ and Δ. As is defined in eq. (3), γ represents the accelerator effect on investment. By this term, changes in consumption demand are led to aggregate demand. On the other hand, given the propensity to consumption of rentiers $1 - s_C$, Δ changes according to the firms' retention rate.

The parametrical configuration indicates that wage-led growth is more likely if firms retain more (i.e., when s_F is large). Why is this so? Remark that firms distribute a fraction $(1 - s_F)$ of their net profit income to rentiers, and retain the rest. Thus, they are not an actor of consumption. In contrast, the rentiers spend a fraction $(1 - s_C)$ of their financial income that is distributed from the net profit by $(1 - s_F)$. Therefore, the firms' propensity to consume is always zero, whereas an increase in the financial income distributed from the net profit income stimulates rentiers' consumption by $(1 - s_F)(1 - s_C)$. On the other hand, a unit decrease in the wage share (increase in the profit share) changes the workers' consumption by -1, as their propensity to consume is unity. Therefore, a unit increase in the profit share changes aggregate

consumption by $-1+(1-s_F)(1-s_C) = -s_F(1-s_C) - s_C < 0$. Therefore, an increase in profit share necessarily decreases aggregate consumption. Hence, as firms retain more (i.e., s_F increases), demand formation by way of an increase in profit becomes difficult. This is why increasing Δ through a change in s_F yields the WLG regime. Moreover, if the wage share rises when Δ is large, the workers' consumption demand rises as well. Then, the aggregate demand is stimulated by γ through the accelerator effect. Thus, wage-led growth is enhanced by a combination of large Δ and large γ.

4.3 On the Properties of the Finance-Growth Regimes

The model also generates finance-growth regimes, i.e., debt-led and debt-burdened growth. The growth regime that appears also depends on chance, as the regime switching parameters are all exogenous. Figure 2 presents these finance-growth regimes. Given a value of γ that is larger than $G(1-s_C)$, the DLG regime tends to be established, as the value of Δ increases. In contrast, given a value of γ, a smaller Δ is likely to generate debt-burdened growth. it is only when $\gamma = G(\Delta)$ is satisfied that the monetary and financial side of the economy may be neutral for the economic growth.

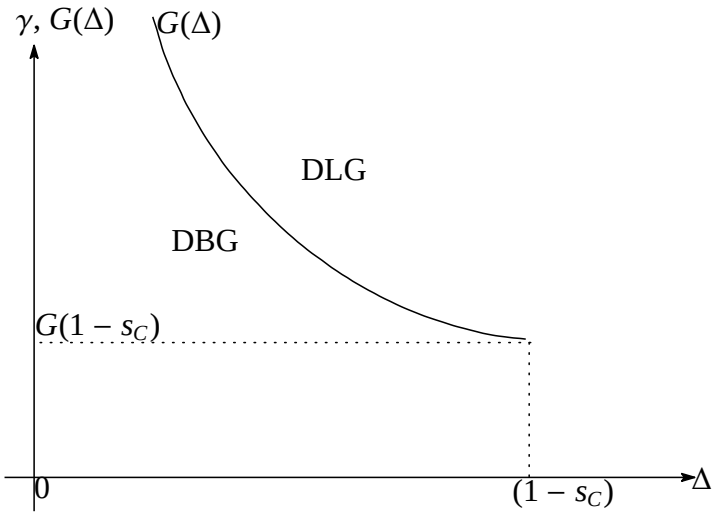

Figure 2: Conditions for the DLG and DBG regimes

Note: The locus is depicted by $G(\Delta) = \frac{\theta\pi(\Delta+s_C)}{\Delta}$. The limit of $G(\Delta)$ in case Δ is close to zero is $\lim_{\Delta\to 0} = \infty$, and the minimum value of $G(1-s_C)$ is $G(1-s_C) = \frac{\theta\pi}{1-s_C}$.

It is also important to investigate the principle of the finance-growth regimes on the basis of the changes in γ and Δ. Figure 2 shows that debt-led growth is more as the firms' retention increases. This mechanism can be explained in a similar manner

to demand formation in terms of income distribution. The consumption of workers is independent of the debt ratio. If the debt ratio rises by one unit, it decreases the distribution of dividends by the firms by $(1 - s_F)i$ and raises the rentiers' received interest income by i. Therefore, one unit of increase in the debt ratio changes the rentiers' financial incomes by $[-(1 - s_F) + 1]i$, which is the total of the changes in dividends and received interest. Because of this change in financial incomes, the rentiers' consumption increases by $(1-s_C)[-(1-s_F)+1]i = s_F(1-s_C)i$. The total change in consumption by a one-unit increase in the debt ratio is therefore positive. Given s_C, an increase in s_F reinforces the magnitude of consumption expansion in the case of a rise in debt, which stimulates economic growth. Therefore, when the retention rate is large, an increase in the debt ratio will raise aggregate demand through the rentiers' consumption. This is the mechanism wherein an increase in Δ through a change in s_F leads to the DLG regime.

Moreover, a large γ will support this demand formation pattern. An increase in consumption by rentiers stimulates investment demand, and thus, aggregate demand through the accelerator effect. Thus, debt-led growth is enhanced by a combination of large Δ and γ.

Other variables change the position of the locus. In particular, a rise in θ expands the debt-burdened areas given a value of Δ. It is easy to understand why such a change occurs. According to the investment function (3), θ represents the negative impact of increasing debt service. A rise in this value means that investment is restrained by an increase in interest payments. Even if the consumption accelerator effect through a rise in debt variables is effective, it may not be sufficient to offset the negative impact of interest payments on the investment demand. Therefore, a rise in θ tends to expand the debt-burdened area while reducing the debt-led area.

4.4 On the Possibility of a Combination of Economic Growth Regimes

If the focus of the study is on one side of the growth regime as is the case for most existing literature, it will be sufficient to study whether the Keynesian stability condition and the condition for the growth regime are compatible. However, as I investigate both types of growth regimes, I have to check if there exist parameters that satisfy the Keynesian stability condition, and discriminations for the income distribution- and finance-growth regimes. Such an examination concerns the possibility of a combination of growth regimes. I leave the proof concerning the existence of these regimes to the Appendix.

Using the results obtained by this exercise, I depict the possible areas for these

economic growth regimes in figures. Four types of combinations of growth regimes are theoretically possible. These are as follows: (1) WLG and DBG regimes, (2) WLG and DLG regimes, (3) PLG and DLG regimes, and (4) PLG and DBG regimes. However, there is another case in which three types of growth regimes exist. These are as follows: (1) WLG and DBG regimes, (2) WLG and DLG regimes, and (3) PLG and DBG regimes.

First, I consider the case where four types of growth regimes exist. In this case, the two loci may intersect once in the domain. This is depicted in Figure 3, and is mathematically formalized as follows. For $\Delta \in (0, 1 - s_C]$, the following function is set:

$$J(\Delta) = G(\Delta) - F(\Delta). \tag{16}$$

For this function, if the following assumption is satisfied, then the curves $G(\Delta)$ and $F(\Delta)$ intersect once: $\lim_{\Delta \to 0} J(0) > 0$ and $J(1 - s_C) < 0$. In this case, there exists $\Delta^* \in (0, 1 - s_C]$ such that $F(\Delta^*) = G(\Delta^*)$. Moreover, at $\Delta = \Delta^*$, economic growth is independent of both income distribution and debt accumulation.

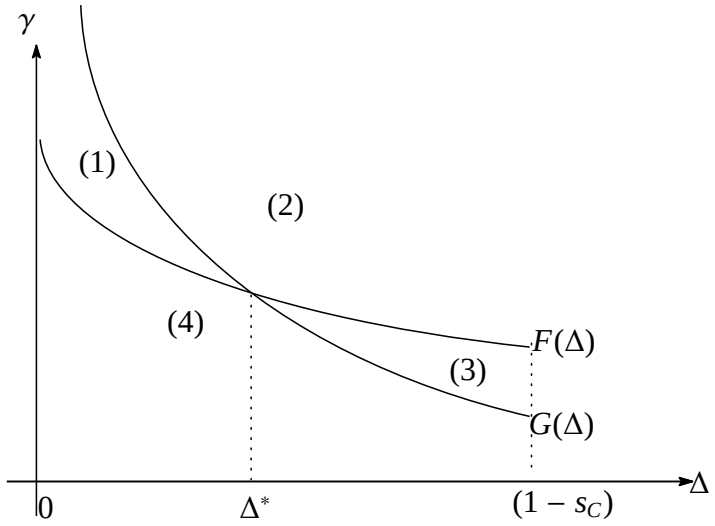

Figure 3: Four types of growth regimes (Case 1)

Note: (1) WLG and DBG regimes; (2) WLG and DLG regimes; (3) PLG and DLG regimes; and (4) PLG and DBG regimes. The frontiers are not included.

The other case is where the two loci never intersect in the domain. For function $J(\Delta)$, if the following assumption is satisfied, then the curves $G(\Delta)$ and $F(\Delta)$ never intersect in the domain: $\lim_{\Delta \to 0} J(0) > 0$ and $J(1 - s_C) > 0$. This condition is more likely to be satisfied when θ is large. This case is depicted in Figure 4 where the combination of the PLG and DLG regimes disappears. The underlying reasoning is simple.

As the investment function (3) implies, θ represents the negative impact of increasing debt service on investment demand. A rise in this value means that demand formation through a rise in interest payments becomes more difficult, given an accelerator effect. Therefore, for a large θ, the debt-led growth area is reduced.

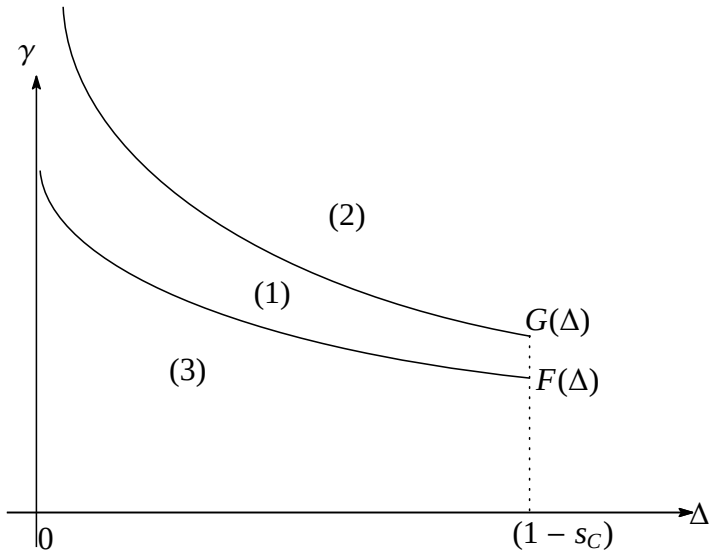

Figure 4: Three types of growth regimes (Case 2)

Note: (1) WLG and DBG regimes; (2) WLG and DLG regimes; and (3) PLG and DBG regimes. The frontiers are not included.

Let us consider the properties of each economic growth regime in detail. If γ and Δ remain in area (1) in Figure 3, the economy is wage-led and debt-burdened. This growth regime implies that an increase in income distribution favourable for workers stimulates their consumption, which has a larger effect for effective demand growth than a decrease in investment demand due to a decrease in profit share. As a result, the WLG regime is established. On the other hand, while a rise in debt negatively affects the firms' investment demand, it increases the rentiers' consumption through their financial income. As the effect of the former is larger than the latter, the DBG regime is obtained.

The opposite of area (1) is the economy that is profit-led and debt-led. This growth regime is established when γ and Δ remain in area (3) in Figure 3. This growth regime implies that an increase in income distribution favourable for workers stimulates their consumption, which has a smaller effect for effective demand growth than a decrease in investment demand due to a decrease in profit share. As a result, the PLG regime is established. On the other hand, while a rise in debt negatively affects the firms' investment demand, it considerably increases the rentiers'

consumption through their financial income. In this regime, as the effect of the latter is larger than the former, the DLG regime is obtained.

When γ and Δ remain in area (2), the economy is wage-led and debt-led. In this case, an increase in income distribution for workers (a large wage share) and rentiers (a large debt ratio) increases the economic growth rate. As a decrease in profit share and a rise in debt ratio principally restrain investment demand, these growth regimes are generated through the large increase in consumption, which is induced by the changes in real and financial income distribution.

The opposite of area (2) is the case in which γ and Δ remain in area (4). In this area, the economy is profit-led and debt-burdened. In this case, a change in income distribution favourable for the profit earners (a small wage share) will increase economic growth, whereas an income distribution favourable for the rentiers (a large debt ratio) will restrain economic growth. An increase in profit share stimulates the rentiers' consumption and the firms' investment, which expands aggregate demand. From the financial side, because a large debt ratio restrains investment demand, this growth regime is established. In other words, the rentiers' consumption through a rise in debt ratio is not enough to offset the decrease in investment demand.

4.5 Implications for Existing Literature

Thus far, I have derived the mechanisms for the growth regimes. These growth regimes are well-known in the existing literature. Therefore, this section presents the contributions of this paper in comparison to the existing literature from the theoretical and empirical viewpoints. Even though my modelling strategy is just one possible way of integrating these strands in a more complete manner (as there are other ways of doing so, especially depending on the form of the IS function), I believe that the results obtained in the current study have five implications. Although some of these have been indicated in the preceding literature, the current model can explain them in a more comprehensive manner.

First, as I referred to earlier, a comprehensive analysis of the income distribution- and finance-growth regimes has not been presented. Rather, these have been separately examined. Bhaduri and Marglin (1990), Blecker (2002), and Bhaduri (2007) give parametrical zones of cooperation and conflict regimes, but they do not consider the financial side of the economy. On the other hand, Taylor (2004), Hein (2006), and Hein (2007) present the conditions for the DLG and DBG regimes. However, it is not clear how these finance-growth regimes are related to the WLG and PLG regimes. In contrast to these analyses, this paper presents explicit models both economic regimes. By doing so, the current study reveals that four types of economic

growth regimes can coexist.

The second is that the economic growth path traces different trajectories. Given the locus of $G(\Delta)$ and $F(\Delta)$, the values of γ and Δ determine the types of economic growth regimes. However, as these variables are exogenous to the model, the type of economic growth regime that will appear is not deterministic. For instance, If the parametrical configuration of an economy results in the WLG and DBG regimes, an increase in the wage share and a reduction in the debt ratio will raise the economic growth rate. However, if an economy has the PLG and DLG regimes, such shocks will lead to economic stagnation. Thus, the economic growth path can show different trajectories to the same shocks. This is in sharp contrast to the standard Ramsey type neo-classical economic growth model in which the economic growth path always traces a unique saddle path to the steady state, regardless of the type of shock.

The third implication is derived from the second one. By way of theoretical examination, the current study insists on the condition for the complementarity of growth regimes. Let me illustrate the importance of the complementarity of economic growth regimes. If an economy is profit-led and experiences a profit squeeze, the economy will stagnate from the real side. Moreover, if the economy is debt-burdened, a rise in debt may restrain effective demand and the economy will shrink further. On the contrary, another possibility is that when an economy is wage-led and experiences an increase in wage share, the economy will expand because of the wage-led demand formation. In addition, if the economy is debt-led, a rise in debt will reinforce effective demand formation and the economy will expand further. In the first case, the two economic growth regimes do not have complementarity with regard to distributional and financial shocks, whereas in the latter case, the two economic growth regimes are complementary. In other words, the model suggests that economic performance is not a result of a unique shock, but of a hybrid shock. Needless to say, other combinations of economic growth regimes and shocks can also be explained.

Fourth, the Keynesian theory of effective demand is interpreted in terms of both income distribution and finance. That is, income distribution is not merely a kind of price that plays the role of resource allocation, but affects effective demand. As explained above, a change in income distribution will affect economic growth depending on the regime. When economic growth rises, employment will also expand in accordance with growth. This result is also in sharp contrast with that obtained in the standard neo-classical economics. The neo-classical economics claims that a high wage will be harmful for unemployment. However, in the current model, for example, under wage-led growth, wage restraining is not necessarily effective

for stimulating economic growth or decreasing the unemployment rate. In addition, money and financial factors are not neutral for the real side of the economy, but positively or negatively affect aggregate demand. As changes in debt or interest rate affect demand and growth, the real side of the economy is not independent of the financial factors. Such implications, too, are in sharp contrast with the standard neo-classical economics that involves the neutrality of money and loanable fund theory. As for the current model, the case—wherein money is neutral, and wage increases discourage employment—can be obtained only in a special locus in which $\mathcal{S} = \{(\gamma, \Delta) \in R^2_{++} | \gamma = G(\Delta), \Delta^* < \Delta \leq (1 - s_C)\}$.

Since Bhaduri and Marglin (1990), a number of empirical studies on growth and distribution have been presented. Recently, the reality of debt and growth has also been examined. The results obtained above enable us to understand the validity of the empirical facts on the basis of a theoretical foundation. For instance, Hein and Schoder (2011) show that the US and German economies have been in debt-burdened growth (normal regime), on the basis of an extended Marglin and Bhaduri type investment function. Nishi (2012) explains using structural VAR models that the Japanese economy has been profit-led and debt-burdened. As for income-distribution and economic growth, Naastepad and Storm (2007), Hein and Vogel (2008), and Stockhammer and Onaran (2004) show that some countries have traced wage-led growth paths and others have traced profit-led growth paths. The theoretical approach of the current study complements these empirical results by showing that such combinations of economic growth regimes are in fact plausible. In sum, the diversity of the economic growth regimes is theoretically and empirically possible.

These implications also give another perspective for the traditional post-Keynesian income distribution policy. In many cases, wage restraining does not impede economic growth under the WLG regime, while it may not be effective under the PLG regime. However, an investigation for both income distribution and finance yields another possibility. Even if the growth regime is profit-led, the depression effect of wage restraining for the economic growth may be partially offset by the financial side. If an economy is both debt-led and profit-led, stagnation due to an increase in wage can be avoided by stimulating debt accumulation. On the contrary, if an economy is debt-burdened and profit-led, the same stagnation can be avoided by reducing debt accumulation. Thus, there is still room for a wage increase, even if the economic growth is profit-led. Of course, it should be noted that if the type of financial shock is contrary to the finance-growth regime, the macroeconomic performance will deteriorate further. The current model incorporating both distribution and finance gives a wider perspective for the economic growth mechanism and income distribution

policy.

5 Conclusion

Post-Keynesians are interested in distributional issues not only for their own sake, but also for understanding the interaction between growth and income distribution. They have also emphasized the role of money and finance for economic growth, as these are not neutral for the real side of the economy. However, there is no study that investigates a general class of parameters that establish the coexistence of the income distribution- and finance-growth regimes. While many preceding studies have investigated which regime is obtained under what circumstances, a combination of both regimes has seldom been examined. Taking these facts into consideration, this paper attempts to provide such a comprehensive treatment of growth regimes within a simple post-Keynesian modelling framework.

The economic growth regime changes according to parameters γ (accelerator effect) and Δ (firms' retention ratio and rentiers' propensity to consume), which I referred to as the regime switching parameters. If these values change, an economic growth regime transforms into another. By identifying and synthesizing growth regimes, I presented five implications for the existing literature. (i) Economic growth can be explained in terms of both income distribution and finance. (ii) Economic growth shows diverse performance even to the same shocks. (iii) The macroeconomic performance should thus be explained by paying attention to the complementarity to the shocks. (iv) Unlike the basic neo-classical theory, income distribution and money and finance are not neutral for real economic growth. (v) Recent empirical results that show wage-led, profit-led, debt-led, and debt-burdened growth patterns are not obtained *ad hoc*, but these can be explained by a theoretically sounded foundation.

The attempt in the current study is also important for the argument on the effectiveness of economic policy. It suggests that even if an economy is profit-led, a policy aiming to increase wage will still be valid. When the economy is debt-burdened, the negative effect from a wage increase can be offset through an easy monetary policy, such as by reducing the interest rate. In such a combination of growth regimes, however, a tight monetary policy will further deteriorate economic performance. Therefore, a regime analysis that captures both income distribution and finance is important when considering economic policy choice.

Finally, the limitations of the model presented in this paper should be made clear. The time span of the model is restricted within the so-called short-run. The time

span is defined, depending on the adjustment of the variables. Although different authors have different modellings, among many post-Keynesian models, the short-run is considered to be the case where income distribution, debt, and capital stock are constant, and the GDP gap is adjusted by the capacity utilization rate (Rowthorn (1981); Dutt (1990)). The long-run period refers to a period when both debt and capital stock change in many cases. Recent models consider the long-run period, particularly, as a case in which the capacity utilization rate is adjusted to a desired or normal rate, and show that Kaleckian properties such as wage-led growth and paradox of thrift still hold (Lavoie (1995); Lavoie (2010)).[2] The model in the current study is short-run. In this sense, it is not a fully fledged model.

However, the current provides a prototype model of growth, distribution, and finance, on which many extensions can be established. For example, the model can be modified so as to endogenize the income distribution share (Cassetti (2003); Sasaki (2011)). In addition, it can be employed for the long-run analysis of debt accumulation and growth (Hein (2006); Hein (2007)). In this sense, the current model provides a foundation for the post-Keynesian analysis of both growth regimes, income distribution, and finance. Last but not the least, one of the important issues in doing so is the redefining of the concept of growth regimes. As Nikiforos and Foley (2012) indicate, the impact of a change in income distribution is not monotonic both theoretically and empirically for economic growth, which results in multiple equilibria. Moreover, the existence of multiple equilibria means that the same shock does not always lead to the expected result predicted by the demand regime. The same might be true for the finance-growth models. Now that we have almost entirely theoretically revealed the monotonic impact of income distribution and finance on economic growth, further investigation into more complex interactions among these variables is required. I hope that the current model will provide useful foundations for further research, as there exist few works on post-Keynesian economic growth, income distribution, and finance.

Appendix

Existence of Four Regimes I prove the coexistence of the finance- and income distribution-growth regimes. In order to do so, preliminary examinations for the relationships among $F(\Delta)$, $G(\Delta)$, and Keynesian stability condition are necessary. In

[2]This argument originates from the criticisms of the classical and Marxian models that consider the rate of capacity utilization to converge to an exogenously given rate of capacity utilization in the long-run.

the following examinations, the DLCU and DBCU regimes play an important role in the possibility of several regimes. Let us remark that the value of γ is independent of these functions. Therefore, γ can be chosen without affecting $F(\Delta)$, $G(\Delta)$, and $(\Delta + s_C)\pi$.

(A) Let us consider the following equation:

$$\begin{aligned} F(\Delta) - G(\Delta) &= \frac{\beta\pi^2(\Delta + s_C)}{\beta\pi + N_u} - \frac{\theta\pi(\Delta + s_C)}{\Delta} \\ &= \frac{\pi(\Delta + s_C)}{\Delta(\beta\pi + N_u)} \left[\beta\pi(\Delta - \theta) - N_u\theta\right], \end{aligned} \tag{17}$$

where $N_u = \alpha + \beta\pi + (\Delta - \theta)i\lambda > 0$ which is the numerator in eq. (4). Thus, taking the result in eq. (6) into consideration, the following results are obtained:

(A1) If an economy has the DLCU regime, then $\Delta - \theta > 0$. Therefore, both $F(\Delta) > G(\Delta)$ and $F(\Delta) < G(\Delta)$ are possible. The former is more likely to be established for a small θ. and the latter is more likely to be established by a large value of θ.

(A2) On the contrary, if an economy has the DBCU regime, then $\Delta - \theta < 0$. Therefore, only $F(\Delta) < G(\Delta)$ is possible.

(B) Let us now consider the following equation:

$$\begin{aligned} F(\Delta) - (\Delta + s_C)\pi &= \frac{\beta\pi^2(\Delta + s_C)}{\beta\pi + N_u} - (\Delta + s_C)\pi \\ &= -\frac{\pi(\Delta + s_C)}{(\beta\pi + N_u)} N_u. \end{aligned} \tag{18}$$

Given the above equation, we get that $F(\Delta) < (\Delta + s_C)\pi$ always holds.

(C) Finally, the relationship between $G(\Delta)$ and $(\Delta + s_C)\pi$ is examined:

$$\begin{aligned} G(\Delta) - (\Delta + s_C)\pi &= \frac{\theta\pi(\Delta + s_C)}{\Delta} - (\Delta + s_C)\pi \\ &= \frac{\theta(\Delta + s_C)}{\theta}(\theta - \Delta). \end{aligned} \tag{19}$$

Again, taking the result in eq. (6) into consideration, the following results are obtained:

(C1) If an economy has the DLCU regime, then $\Delta - \theta > 0$. Therefore, only $G(\Delta) < (\Delta + s_C)\pi$ is possible.

(C2) On the contrary, if an economy has the DBCU regime, then $\Delta - \theta < 0$. Therefore, only $(\Delta + s_C)\pi < G(\Delta)$ is possible. Thus, this inequality fully corresponds to the DLCU and DBCU regimes. In this regard, DBCU never leads to DLG. Therefore, if an economy is debt-led, $G(\Delta) < (\Delta + s_C)\pi$ always hold.

By using these conditions, I will present the conditions for the coexistence of the finance- and income distribution-growth regimes. To simplify the discussion, only the relationships that satisfy condition (B) are presented below.

(1) WLG and DBG For this regime to exist, the following formal conditions are candidates. For $\Delta < \Delta^*$,

$$F(\Delta) < \gamma < (\Delta + s_C)\pi < G(\Delta), \tag{20}$$

$$F(\Delta) < \gamma < G(\Delta) < (\Delta + s_C)\pi. \tag{21}$$

First, I consider eq. (20). Condition (A) indicates that $F(\Delta) < G(\Delta)$ is possible if an economy has the DLCU regime and θ is large, or if an economy has the DBCU regime. From condition (B), $F(\Delta) < (\Delta + s_C)\pi$ is always possible. Finally, condition (C) indicates that $(\Delta + s_C)\pi < G(\Delta)$ is also possible only if an economy has the DLCU regime.

Second, I examine eq. (21). I have proven that condition (A) indicates that $F(\Delta) < G(\Delta)$ is possible if an economy has the DLCU regime and θ is large, or if an economy has the DBCU regime. From condition (B), $F(\Delta) < (\Delta + s_C)\pi$ is always possible. Finally, condition (C) indicates that $G(\Delta) < (\Delta + s_C)\pi$ is also possible only if an economy has the DLCU regime.

γ is independent of these functions and terms. Therefore, by choosing an appropriate γ, the above inequalities are possible. Hence, these two cases give that the WLG and DBG regime can be established regardless of the DLCU and DBCU regimes.

(2) WLG and DLG For this regime to exist, the following formal conditions are candidates. For this regime to be the case, the following formal conditions are candidate. First, for $\Delta < \Delta^*$,

$$F(\Delta) < G(\Delta) < \gamma < (\Delta + s_C)\pi. \tag{22}$$

Condition (A) indicates that $F(\Delta) < G(\Delta)$ is possible if an economy has the DLCU regime and θ is large, or if an economy has the DBCU regime. Condition (B) yields

that $F(\Delta) < (\Delta + s_C)\pi$ is always satisfied. Finally, condition (C) indicates that $G(\Delta) < (\Delta + s_C)\pi$ is also possible only if an economy has the DLCU regime, which is compatible only with the DLCU case in condition (A).

Second, for $\Delta^* < \Delta$,

$$G(\Delta) < F(\Delta) < \gamma < (\Delta + s_C)\pi. \tag{23}$$

Here, condition (A) indicates that $G(\Delta) < F(\Delta)$ is possible if an economy has the DLCU regime and θ is small. Condition (B) yields that $F(\Delta) < (\Delta + s_C)\pi$ is always satisfied. Finally, condition (C) indicates that $G(\Delta) < (\Delta + s_C)\pi$ is also possible only if an economy has the DLCU regime, which is compatible only with the DLCU case in condition (A).

Therefore, for an appropriate γ, inequalities (22) and (23) are possible. Hence, we get that this regime can be established only under the DLCU demand regime.

(3) PLG and DLG For this regime to exist, the following formal conditions are candidates. For $\Delta > \Delta^*$,

$$G(\Delta) < \gamma < F(\Delta) < (\Delta + s_C)\pi. \tag{24}$$

With regard to eq. (24), I have proven that condition (A) indicates $G(\Delta) < F(\Delta)$ is possible if an economy has the DLCU regime and θ is small. Condition (B) yields that $F(\Delta) < (\Delta + s_C)\pi$ is always satisfied. Finally, condition (C) indicates that $G(\Delta) < (\Delta + s_C)\pi$ is also possible only if an economy has the DLCU regime, which is compatible with condition (A).

By choosing an appropriate γ, inequality (24) is possible. Hence, we get that this regime can be established only under the DLCU demand regime.

(4) PLG and DBG For this regime to exist, the following formal conditions are candidates. First, for $\Delta < \Delta^*$,

$$\gamma < F(\Delta) < (\Delta + s_C)\pi < G(\Delta), \tag{25}$$

$$\gamma < F(\Delta) < G(\Delta) < (\Delta + s_C)\pi. \tag{26}$$

For inequality (25), condition (A) indicates that $F(\Delta) < G(\Delta)$ is possible if an economy has the DLCU regime and θ is large, or if an economy has the DBCU regime. Condition (B) yields that $F(\Delta) < (\Delta + s_C)\pi$ is always satisfied. Finally, condition (C) indicates that $(\Delta + s_C)\pi < G(\Delta)$ is also possible only if an economy has the DBCU regime, which is compatible only with the DBCU case in condition (A).

With regard to inequality (26), condition (A) indicates that $F(\Delta) < G(\Delta)$ is possible if an economy has the DLCU regime and θ is large, or if an economy has the DBCU regime. Condition (B) yields that $F(\Delta) < (\Delta + s_C)\pi$ is always satisfied. Finally, condition (C) indicates that $(\Delta + s_C)\pi > G(\Delta)$ is also possible only if an economy has the DLCU regime, which is compatible only with the DLCU case in condition (A).

Second, for $\Delta^* < \Delta$,

$$\gamma < G(\Delta) < F(\Delta) < (\Delta + s_C)\pi. \tag{27}$$

With regard to eq. (27), the condition (A) indicates that $G(\Delta) < F(\Delta)$ is possible if an economy has the DLCU regime and θ is small. Condition (B) yields that $F(\Delta) < (\Delta + s_C)\pi$ is always satisfied. Finally, condition (C) indicates that $G(\Delta) < (\Delta + s_C)\pi$ is also possible only if an economy has the DLCU regime, which is compatible only with the DLCU case in condition (A).

Therefore, for an appropriate γ, inequalities (25)-(27) are possible. Hence, we get that this regime can be established if for an economy, $\Delta < \Delta^*$ and the DLCU or the DBCU demand regime is in place, and if for an economy, $\Delta > \Delta^*$ under the DLCU demand regime is in place.

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