Kyoto University,
Graduate School of Economics
Research Project Center Discussion Paper Series

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Discussion Paper No. E-14-017

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February 2015

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Abstract

This study builds a two-country Kaleckian model and investigates the effect of one country's economic policy on both countries. In contrast to preceding studies, we consider monetary aspects as well as real aspects. Our results show that the effects on output of an increase in the nominal wage rate and in the mark-up rate differ from the results obtained from one-country Kaleckian models. Moreover, we show that the success of monetary easing in one country may depend on the other country's policy, implying the need for policy coordination between the two countries.

Keywords: two-country Kaleckian model; income distribution; monetary policy

JEL Classifications: E12, E41, E52, F31, F41, F42

1 Introduction

One of the macrodynamic models typically used to investigate the relationship between income distribution and output is the so-called Kaleckian model.[1] Here, income distribution means the wage share and profit share, that is, the ratio of total wage income to national income and that of total profit income to national income. Most Kaleckian models treat wage share as an exogenous variable and investigate how an increase in wage share affects output, employment, and the economic growth rate.

The economy exhibits a wage-led (profit-led) regime if a rise in the wage share increases (decreases) output and the growth rate. Thus far, many Kaleckian models have theoretically investigated the conditions under which a wage-led or profit-led regime is obtained (Marglin and Bhaduri, 1990; Blecker, 2002; and Sasaki, 2012). In addition, many empirical studies have examined whether the economy exhibits a wage-led or profit-led regime (Azetsu et al., 2010; Barbosa-Filho and Taylor, 2006; Naastepad and Storm, 2007; Nishi, 2010; Sonoda, 2014; Stockhammer and Onaran, 2004; and Storm and Naastepad, 2012).

* We would like to thank seminar participants of the 18th Conference of Japan Association for Evolutionary Economics at Kanazawa University for their useful comments.
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[1] For the explanation of basic Kaleckian models, see Lavoie (1992, 2014) and Sasaki (2014).

The type of regime the economy exhibits has important implications for economic policy. If the economy exhibits a wage-led regime, an effective policy to stimulate the economy would be to raise the wage rate of workers. On the contrary, if the economy exhibits a profit-led regime, an effective policy to restrain the wage rate of workers would be deregulation of the labor market.[2]

Existing studies on the Kaleckian model consider a closed economy that does not trade with foreign countries. However, some studies consider an open economy—with focus on a small open economy (Blecker, 2011; Cassetti, 2012; La Marca, 2012; and Sasaki et al., 2013).[3] The small open economy model assumes that the home country is very small compared to the rest of the world, and that its economic policy does not affect the rest of the world.

However, in reality, the economic policy of a home country does affect foreign countries, entailing foreign country feedback to the home country. Moreover, an economic policy desirable for a closed economy need not necessarily be desirable for an open economy in case there are feedback effects. For example, even if the home country exhibits a wage-led regime, a wage increase would lower the international price competitiveness of the home products, depress export demand, and lead to a fall in output and economic growth.

From the above observation, we build a two-country Kaleckian model and investigate how the economic policy of one country affects both countries. Our investigation shows how the policy coordination between two countries should be when both the countries simultaneously conduct economic policies.

With regard to two-country or multi-country Kaleckian models, there are some studies in the literature.

Rezai (2014) builds a two-country Kaleckian model and analytically investigates how changes in an exogenously given profit share and real exchange rate affect the equilibirum capacity utilization rate. In his model, all imports are intermediate inputs for final goods production, and there are no imports for final consumption purposes. The investment function is a Marglin and Bhaduri (1990) type: the capacity utilization rate and profit share are explanatory variables of the investment function. However, the profit share of Rezai's (2014) model is defined as the ratio of total profit income to total output that includes intermediate inputs, and not the ratio of total profit to national income that excludes intermediate inputs. Thus, his definition is not strict. In addition, the profit share in Rezai's (2014) model is directly connected to changes in the real exchange rate. To be specific, the model introduces a

[2] The wage share is obtained by dividing the real wage rate by labor productivity. Thus, although the economy exhibits a profit-led regime, firms do not need to decrease the real wage rate. By increasing labor productivity, we can decrease the wage share without decreasing the real wage rate.

[3] Cordero (2008) builds a small open economy post-Keynesian model and compares two alternative monetary regimes: an inflation-targeting regime, and a real exchange rate-targeting regime. Vera (2014) also studies a small open economy post-Keynesian model that considers both inflation targeting and real exchange rate targeting, and investigates the interactions between the two monetary regimes.

mechanism by which an increase in the wage share of one country decreases the wage share of the other country through changes in the real exchange rate. His contribution lies in investigating the effect of a distributive change on output by using a two-country model with feedback effect from the foreign country, and not by using a small open economy.

Von Arnim et al. (2012) also build a two-country Kaleckian model, and analytically and numerically investigate the effect of an exogenous change in profit share on the equilibrium capacity utilization rate. Unlike Rezai (2014), their model does not include intermediate inputs, and hence, imports are dedicated to final consumption. In addition, the import demand function depends on the capacity utilization rate and real exchange rate. The investment function is a Marglin-Bhaduri type. Since the price equation does not appear explicitly, the relationship between the profit share and mark-up rate is unclear. In this regard, they define the real exchange rate as the ratio of unit labor costs of home to those of foreign countries, which is different from the usual definition.[4]

Von Arnim et al. (2014) also build a two-country Kaleckian model and investigate how an increase in money wage affects income and distribution, and hence growth. Unlike von Arnim et al. (2012), they explicitly specify the price equations and distributive pass-through from money wage to income distribution and the real exchange rate.

Von Arnim et al. (2013) build a multi-country Kaleckian model and numerically investigate the dynamics of the capacity utilization rate and wage share. This model does not include intermediate inputs, and hence imports are entirely used for final consumption. In addition, the wage function is such that the nominal wage rate is an increasing function of the employment rate, and, hence, the nominal wage rate is endogenously determined. Labor productivity is also endogenized and an increasing function of the capacity utilization rate. Unlike Rezai (2014) and von Arnim et al. (2012, 2014), they consider more than two countries and endogenize the profit share, which are their important contributions to the literature. However, investment is assumed to be exogenously given, which is inappropriate in a Kaleckian model emphasizing the role of investment. Furthermore, they investigate only the real aspects, as well as the entire abstract monetary aspects, of the economy, which is also inappropriate.

Unlike these Kaleckian models, some studies extend the Stock Flow Consistent (SFC) model to the open economy settings[5].

Lavoie and Daigle (2011) build an SFC model and introduce the expectation of the nominal exchange rate. They explicitly introduce the expectation of the exchange rate into Godley and Lavoie's (2007) SFC model. However, they do not consider the effect of distributive change on the economy.

Greenwood-Nimmo (2013) presents an SFC model, simultaneously considering fiscal and monetary policies. Following Godley and Lavoie's (2007) model, they extend their model in

[4] The definition of the real exchange rate, such as this, is also adopted by Blecker (1998).
[5] For the explanation of basic SFC models, see Godley and Lavoie (2007) and Ohno and Nishi (2011).

two aspects: first, they specify the dynamics of inflation by using the theory of conflicting-claims inflation; second, they specify the marginal propensity to consume as a decreasing function of the real interest rate.

Contrary to the above studies, our contribution to the literature lies in introducing the LM as well as IS curves into a two-country Kaleckian framework and endogenizing the interest rate and nominal exchange rate. We investigate the following two issues.

First, our model investigates how the distributive change of one country affects the aggregate demand of that country and the other country through monetary aspects as well as real aspects. For example, an increase in the nominal wage rate of one country affects demand components such as investment and consumption through changes in income distribution. However, the effect of an increase in this rate is not restricted to the above effects. Such an increase affects the real money balance as well as interest rates of both countries through changes in price levels, which in turn affect the investments and trade balances of both countries.

Second, by introducing the LM curve, we investigate how the monetary policies of one country or of both countries affect the aggregate demand of each country. The analysis of monetary policy is very important. However, most preceding studies, except for Greenwood-Nimmo (2013), do not investigate the effects of monetary policy.

In our model, following Rezai (2011), imports are entirely used for intermediate inputs, and not for final consumption. Similar to the usual Kaleckian model, savings comprise only profits. The investment function is a Marglin–Bhaduri type and in addition, includes the negative effect of an increase in the interest rate. The dynamic system comprises four endogenous variables, that is, the capacity utilization rates and interest rates of both countries. Note that capital accumulation is beyond the scope of this study and the long-run equilibrium value of the nominal exchange rate is exogenously given. That is, this study is restricted to short-run analysis.

We investigate the effects of parametric changes in the mark-up rate, nominal wage rate,[6] and money supply on the equilibrium values of the capacity utilization rates and interest rates and on the transitional dynamics.

The rest of the paper is organized as follows. Section 2 presents our two-country model and defines the equilibrium of the final goods and money markets. Section 3 investigates how the changes in parameters with regard to income distribution and monetary policy affect the steady-state equilibrium. Since our model is rather complicated, we assume that some endogenous variables are constant, and we clarify the channel through which a change in parameter affects the equilibrium as much as possible. Therefore, the analysis in this section is

[6] The usual Kaleckian model investigates the effect of an increase in profit share on capacity utilization. In contrast, we investigate the effect of an increase in the nominal wage rate on the capacity utilization rate. Note that in our model, profit share is an endogenous variable.

not a perfect comparative static analysis. In section 4, we use numerical simulation to show the effect of changes in parameters on the steady-state equilibirum values. Furthermore, we compare the transitional dynamics before and after a change in parameter. Section 5 concludes the paper.

2 The model

2.1 The goods market

Our model has two countries, Home and Foreign. Home imports final goods made in Foreign and uses them as intermediate inputs to produce final goods in Home. Foreign also imports final goods made in Home and uses them as intermediate inputs to produce final goods in Foreign. The prices of Home's final goods and Foreign's final goods are determined respectively by the following mark-up pricing rules:

$$p = (1+z)(wb + ep'a) = \frac{(1+z)[wb + (1+z')w'b'ea]}{1-(1+z)(1+z')aa'}, \tag{1}$$

$$p' = (1+z')\left(w'b' + \frac{1}{e}pa'\right) = \frac{(1+z')[w'b' + (1+z)wb(a'/e)]}{1-(1+z)(1+z')aa'}, \tag{2}$$

where p denotes the price of final goods, z the mark-up rate, w the nominal wage rate, a the intermediate input coefficient defined as the ratio of intermediate input to total output, b the labor input coefficient defined as the ratio of labor input to total output, and e the nominal exchange rate in terms of home currency. The variables without the prime denote Home's variables, whereas those with the prime (e.g., p') denote Foreign's variables. We assume that z, w, a, and b are all positive constants. Moreover, we assume that the condition $1-(1+z)(1+z')aa' > 0$ holds, to ensure that the price levels of Home's and Foreign's final goods are positive.

Let X denote the total output. We decompose the value of the total output pX into wage income, profit income, and intermediate input as follows:

$$pX = wbX + vpK + ep'aX, \tag{3}$$

$$p'X' = w'b'X' + v'p'K' + \frac{1}{e}pa'X', \tag{4}$$

where v denotes the profit rate and K the capital stock. Let Y denote the real national income. From equations (3) and (4), the nominal national income pY is given by

$$pY = pX - ep'aX = wbX + vpK, \tag{5}$$

$$p'Y' = p'X' - \frac{1}{e}pa'X' = w'b'X' + v'p'K'. \tag{6}$$

From equations (1) through (6), we obtain the profit share π, that is, the ratio of total profit income to nominal national income, as follows:

$$\pi = \frac{vpK}{pY} = 1 - \frac{wb}{p - ep'a} = \frac{z[wb + (1+z')w'b'ea]}{(1+z)[1-(1+z')aa']wb + z(1+z')w'b'ea}, \tag{7}$$

$$\pi' = \frac{v'p'K'}{p'Y'} = 1 - \frac{w'b'}{p' - (pa'/e)} = \frac{z'[w'b' + (1+z)wb(a'/e)]}{(1+z')[1-(1+z)aa']w'b' + z'(1+z)wb(a'/e)}. \quad (8)$$

Moreover, from equations (3), (4), (7), and (8), we obtain the profit rate as follows:

$$v = \left(1 - \frac{wb}{p} - qa\right)u = (1-qa)\pi u, \quad (9)$$

$$v' = \left(1 - \frac{w'b'}{p'} - \frac{a'}{q}\right)u' = \left(1 - \frac{a'}{q}\right)\pi' u', \quad (10)$$

where $u\ (\equiv X/K)$ denotes the capacity utilization rate,[7] and $q\ (\equiv ep'/p)$, the real exchange rate, defined as

$$q \equiv \frac{ep'}{p} = \frac{e(1+z')[w'b' + (1+z)wb(a'/e)]}{(1+z)[wb + (1+z')w'b'ea]}. \quad (11)$$

Next, we specify each component of the final demand. We assume that capitalists save a constant fraction of their total profit income, whereas workers consume all their wage income and hence never save. From equations (3), (4), (9), and (10), we obtain the nominal consumption C normalized by value of the capital stock pK as follows:

$$c \equiv \frac{C}{pK} = (1-s_c)v + \frac{wbX}{pK} = (1-qa)(1-s_c\pi)u, \quad (12)$$

$$c' \equiv \frac{C'}{p'K'} = (1-s_c')v' + \frac{w'b'X'}{p'K'} = \left(1 - \frac{a'}{q}\right)(1-s_c'\pi')u', \quad (13)$$

where s_c denotes the propensity of capitalists to save, which is assumed to be constant ($0 < s_c < 1$). Note that Foreign (Home) never consumes final goods made in Home (Foreign).

We assume that nominal investment I normalized by pK is an increasing function of both the profit share and capacity utilization rate, as in Marglin and Bhaduri (1990), and a decreasing function of the interest rate.

$$i \equiv \frac{I}{pK} = g_0 + g_\pi \pi + g_u u - g_r r, \quad (14)$$

$$i' \equiv \frac{I'}{p'K'} = g_0' + g_\pi' \pi' + g_u' u' - g_r' r', \quad (15)$$

where r denotes the interest rate.[8]

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[7] We assume that the ratio of the potential output to capital stock is constant. Thus, the ratio of output X to capital stock K is a proxy variable of the capacity utilization rate.

[8] To examine the effect of an increase in the nominal wage rate or mark-up rate, we consider a case in which the price level increases at once. However, we do not consider a case in which the price level persistently

The nominal import IM normalized by pK is equal to Home's intermediate input, leading to[9]

$$\mu \equiv \frac{IM}{pK} = \frac{ep'aX}{pK} = aqu\,. \tag{16}$$

In addition, the nominal import normalized by $p'K'$ is given by

$$\mu' \equiv \frac{IM'}{p'K'} = \frac{pa'X'}{ep'K'} = \frac{a'}{q}u'\,. \tag{17}$$

Since Foreign's import is equal to Home's export, Home's nominal export EX normalized by pK is given by

$$\varepsilon \equiv \frac{EX}{pK} = \frac{eIM'}{pK} = \frac{a'X'}{K} = a'\frac{K'}{K}\frac{X'}{K'} = a'\kappa u'\,, \tag{18}$$

where $\kappa\ (\equiv K'/K)$ denotes the ratio of Foreign's capital stock to Home's capital stock, which is assumed to be constant over time.[10]

The excess demand in Home's final goods market D_G is given by

$$D_G = c + i + \varepsilon - \mu - \frac{Y}{K}. \tag{19}$$

Note that equation (5), that is, the relationship $Y/K = u - \mu$, holds, because the total output is the sum of Home's national income and the intermediate inputs made in Home. Following the usual Kaleckian model, we assume that the excess demand of the final goods market is adjusted by changes in the capacity utilization rate.

$$\begin{aligned}\frac{du}{dt} &= f(u,u',r,r') \equiv \alpha(c + i + \varepsilon - u)\\ &= \alpha\{[(1-qa)(1-s_c\pi) + g_u - 1]u + a'\kappa u' - g_r r + g_\pi \pi + g_0\},\end{aligned} \tag{20}$$

where $\alpha\ (>0)$ denotes a positive parameter showing the adjustment speed of the final goods market. Note that π and q in equation (20) are given by equations (7) and (11), respectively. In addition, as shown below, the nominal exchange rate is a function of Home's and Foreign's interest rates. Therefore, in Home's IS curve $f(u,u',r,r') = 0$, Home's capacity utilization rate u is a function of its own interest rate r, Foreign's interest rate r', and Foreign's capacity utilization rate u'.

On the other hand, since the nominal import IM of Home in terms of its own currency is given by equation (16), the nominal export of Foreign in terms of its currency EX' is given by

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increases. Accordingly, the inflation rate is zero, and hence we do not need to distinguish between the nominal interest rate and real interest rate.

[9] In our model, an increase in the real exchange rate increases imports. Note that since all imports are intermediate inputs, they never affect the GDP. For this, see equation (20) below.

[10] Accordingly, this study investigates only the short-run dynamics.

$$\varepsilon' \equiv \frac{EX'}{p'K'} = \frac{\mu}{q\kappa} = \frac{a}{\kappa}u. \tag{21}$$

The excess demand of Foreign's final goods market D'_G is given by

$$D'_G = c' + i' + \varepsilon' - \mu' - \frac{Y'}{K'}. \tag{22}$$

In Foreign too, the relationship $Y'/K' = u' - \mu'$ holds. Assuming that the excess demand of Foreign's final goods market is adjusted by changes in Foreign's capacity utilization rate, we obtain the following dynamic equation of u':

$$\begin{aligned} \frac{du'}{dt} &= f'(u,u',r,r') \equiv \alpha'(c' + i' + \varepsilon' - u') \\ &= \alpha'\left\{\left[\left(1 - \frac{a'}{q}\right)(1 - s'_c\pi') + g'_u - 1\right]u' + \frac{a}{\kappa}u - g'_r r' + g'_\pi \pi' + g'_0\right\}, \end{aligned} \tag{23}$$

where π' and q are given by equations (8) and (11), respectively. Therefore, in Foreign's IS curve $f'(u,u',r,r') = 0$, Foreign's capacity utilization rate u' is a function of Home's capacity utilization rate u, Home's interest rate r, and Foreign's interest rate r'.

2.2 The money market

We assume that real money demand is an increasing function of the capacity utilization rate and a decreasing function of the interest rate. Excess demand in the money market D_M is given by

$$D_M = l_0 + l_u u - l_r r - \frac{M}{pK}, \tag{24}$$

$$D'_M = l'_0 + l'_u u' - l'_r r' - \frac{M'}{p'K'}, \tag{25}$$

where l_0, l_u, and l_r denote positive parameters, and M denotes nominal money supply, which is assumed to be constant. Note that money supply is normalized by pK.

We assume that excess demand in the money market is adjusted by changes in the interest rate as follows:

$$\begin{aligned} \frac{dr}{dt} &= g(u,r,r') \equiv \beta\left(l_0 + l_u u - l_r r - \frac{M}{pK}\right) \\ &= \beta\left\{l_0 + l_u u - l_r r - \frac{[1 - (1+z)(1+z')aa']M}{(1+z)[wb + (1+z')w'b'ea]K}\right\}, \end{aligned} \tag{26}$$

$$\begin{aligned}\frac{dr'}{dt} &= g'(u', r, r') \equiv \beta'\left(l'_0 + l'_u u' - l'_r r' - \frac{M'}{p'K'}\right) \\ &= \beta'\left\{l'_0 + l'_u u' - l'_r r' - \frac{[1-(1+z)(1+z')aa']M'}{(1+z')[w'b' + (1+z)wb(a'/e)]K'}\right\},\end{aligned} \tag{27}$$

where a positive parameter $\beta\ (>0)$ denotes the adjustment speed of the money market. In addition, as shown below, the nominal exchange rate is a function of Home's and Foreign's interest rates. Therefore, in Home's LM curve $g(u, r, r') = 0$, Home's own interest rate is a function of its capacity utilization rate and Foreign's interest rate. Moreover, in Foreign's LM curve $g'(u', r, r') = 0$, Foreign's own interest rate is a function of its capacity utilization rate and Home's interest rate.

Assume that uncovered interest rate parity holds. Now, the expected rate of change in the nominal exchange rate can be given by

$$\frac{e^E - e}{e} = r - r', \tag{28}$$

where e denotes the actual nominal exchange rate, and e^E, the expected nominal exchange rate.

We now turn to the specification of expectation formation. Assume that when the given equilibirum nominal exchange rate e^* exceeds the actual nominal exchange rate e, that is, when Home's currency is overvalued, the expected rate of change in the nominal exchange rate increases. Then, we obtain the expectation formation as follows:

$$\frac{e^E - e}{e} = \theta(e^* - e), \tag{29}$$

where positive parameter $\theta\ (>0)$ denotes the adjustment speed of the nominal exchange rate. From equations (28) and (29), we obtain

$$e = e^* + \frac{1}{\theta}(r' - r). \tag{30}$$

Therefore, the nominal exchange rate depends on Home's and Foreign's interest rates.

2.3 Dynamical system

From the above discussion, we obtain the following system of differential equations:

$$\frac{du}{dt} = \alpha\{[(1-qa)(1-s_c\pi) + g_u - 1]u + a'\kappa u' - g_r r + g_\pi \pi + g_0\}, \tag{20}$$

$$\frac{du'}{dt} = \alpha'\left\{\left[\left(1 - \frac{a'}{q}\right)(1 - s'_c\pi') + g'_u - 1\right]u' + \frac{a}{\kappa}u - g'_r r' + g'_\pi \pi' + g'_0\right\}, \tag{23}$$

$$\frac{dr}{dt} = \beta\left\{ l_0 + l_u u - l_r r - \frac{[1-(1+z)(1+z')aa']M}{(1+z)[wb+(1+z')w'b'ea]K} \right\}, \tag{26}$$

$$\frac{dr'}{dt} = \beta'\left\{ l'_0 + l'_u u' - l'_r r' - \frac{[1-(1+z)(1+z')aa']M'}{(1+z')[w'b'+(1+z)wb(a'/e)]K'} \right\}. \tag{27}$$

Note that the profit share, real exchange rate, and nominal exchange rate ultimately depend on the interest rates. Thus, the above dynamic system consists of the capacity utilization rates and interest rates, and the model is closed.

From equations (20) and (23), when the final goods markets are in excess demand (supply), the capacity utilization rate increases (decreases).

From equations (26) and (27), when the money markets are in excess demand (supply), the interest rate increases (decreases).

The steady state is defined as a situation in which all the capacity utilization rates and interest rates are constant. The model has four endogenous variables, Home's capacity utilization rate, Foreign's capacity utilization rate, Home's interest rate, and Foreign's interest rate, and four corresponding equations, the Home's IS curve, Foreign's IS curve, Home's LM curve, and Foreign's LM curve, each of which is a function of the capacity utilization rates and interest rates. Thus, we can solve the model for the steady-state equilibrium values.

3 Comparative static analysis

In this section, we investigate the effects of changes in Home's nominal wage rate, mark-up rate, capitalists' propensity to save, and money supply on its own and Foreign's demand formation. However, it is difficult to conduct a complete comparative static analysis because our two-country model is complicated. Thus, keeping some values constant, we try to explain the partial mechanism of changes in such parameters on aggregate demand in both countries. We then proceed to verify the results using simple numerical simulations in the next section.

3.1 Nominal wage rate

First, we investigate the effect of a change in Home's nominal wage rate on the real side of its own and Foreign's economies. We represent Home's IS curve as follows:

$$f(u,u',r,r') = \alpha\{[(1-qa)(1-s_c\pi)+g_u-1]u + a'\kappa u' - g_r r + g_\pi \pi + g_0\} = 0. \tag{31}$$

For the sake of simplicity, we assume Foreign's capacity utilization rate and the interest rates of both countries to be constant. From equation (30), we find that constant interest rates imply a constant nominal exchange rate.

From equation (31), we obtain the effect of a rise in Home's nominal wage rate on its capacity utilization as follows:

$$\frac{du}{dw} = -\frac{\partial f(u;w)/\partial w}{\partial f(u;w)/\partial u} = -\frac{\partial f(u;w)/\partial w}{(1-qa)(1-s_c\pi)+g_u-1}. \tag{32}$$

The denominator of the right-hand side of equation (32) shows the Keynesian stability condition. We assume that the stability condition is satisfied; that is, $(1-qa)(1-s_c\pi)+g_u-1<0$. Thus, the numerator of the right-hand side in equation (32) determines the effect of an increase in Home's nominal wage rate on its own capacity utilization rate. Then, the numerator can be rewritten as follows:

$$\frac{\partial f(u;w)}{\partial w} = \frac{\partial c}{\partial w} + \frac{\partial i}{\partial w}. \tag{33}$$

Note that we consider Home's export, ε, constant since Foreign's capacity utilization rate is assumed to be constant. Thus, in order to understand the sign of du/dw, it suffices to examine the signs of $\partial c/\partial w$ and $\partial i/\partial w$. In the following analysis, using this procedure, we clarify the partial relationship between parametric changes and aggregate demand.

From equation (12), we obtain the effect of an increase in the nominal wage rate on consumption in Home as follows:

$$\frac{\partial c}{\partial w} = -s_c(1-qa)\frac{\partial \pi}{\partial w}u - a(1-s_c\pi)\frac{\partial q}{\partial w}u. \tag{34}$$

The first term on the right-hand side of equation (34) shows the effect of a change in the nominal wage rate on consumption via the profit share, and the second term shows the effect via the real exchange rate. From equations (7) and (11), we obtain the following equations under a constant nominal exchange rate.

$$\frac{\partial \pi}{\partial w} = -\frac{z(1+z')w'b'bea[1-(1+z)(1+z')aa']}{\{(1+z)[1-(1+z')aa']wb+z(1+z')w'b'ea\}^2} < 0. \tag{35}$$

$$\frac{\partial q}{\partial w} = -\frac{e(1+z)(1+z')w'b'b[1-(1+z)(1+z')aa']}{\{(1+z)[wb+(1+z')w'b'ea]\}^2} < 0. \tag{36}$$

A rise in the nominal wage rate decreases the profit share in Home. In addition, in the Home economy, a rise in the nominal wage rate decreases the real exchange rate through a product price rise, which in turn raises the national income by decreasing the price of the intermediate input goods made in Foreign. Thus, from equations (35) and (36), we find that $\partial c/\partial w>0$, which implies that a rise in the nominal wage rate has a positive effect on Home's consumption.

Assuming Home's capacity utilization rate and both countries' interest rates to be constant, we can represent the effect of a change in Home's nominal wage rate on Foreign's consumption as follows:[11]

$$\frac{\partial c'}{\partial w} = -s_c'\left(1-\frac{a'}{q}\right)\frac{\partial \pi'}{\partial w}u' + \frac{a'}{q^2}(1-s_c'\pi')\frac{\partial q}{\partial w}u'. \tag{37}$$

[11] We also assume that the Keynesian stability condition is satisfied in Foreign.

From equation (8), we obtain the following equation:

$$\frac{\partial \pi'}{\partial w} = \frac{z'(1+z)w'b'b(a'/e)[1-(1+z)(1+z')aa']}{\{(1+z')[1-(1+z)aa']w'b' + z'(1+z)wb(a'/e)\}^2} > 0. \tag{38}$$

From equations (36), (37), and (38), we find that $\partial c'/\partial w < 0$, which implies that a rise in Home's nominal wage rate decreases Foreign's consumption. This result is based on the following mechanism. A rise in Home's nominal wage rates leads to a rise in Foreign's price of goods, because the production of Foreign's goods requires intermediate inputs made in Home. Thus, Foreign's real wage rates would decrease unless its nominal wage rates increase. Moreover, Foreign's national income also decreases because the share of the intermediate input produced in Home in the total output increases in the Foreign economy.

Now, we turn to investment. We find that $\partial i/\partial w < 0$, which implies that a rise in Home's nominal wage rate has a negative impact on Home's investment. This is because we use the Marglin–Bhaduri-type investment function, to obtain $\partial \pi/\partial w < 0$. On the other hand, we find that $\partial i'/\partial w > 0$, which implies that a rise in Home's nominal wage rates has a positive impact on Foreign's investment because $\partial \pi'/\partial w > 0$.

Next, we investigate the monetary side of Home's and Foreign's economies. From equations (26) and (27), we find that a rise in Home's nominal wage rate reduces the real monetary stock and raises the interest rates in both countries. Thus, an increase in interest rates has a negative impact on investment in both countries. Moreover, the nominal exchange rate decreases if Home's interest rate rises higher than Foreign's interest rate, and vice versa.

A change in the nominal exchange rate influences Home's consumption demand. That is, it impacts the profit share as well as national income through changes in the price of import goods, which in turn influences the level of consumption:

$$\frac{\partial c}{\partial e} = -s_c(1-qa)\frac{\partial \pi}{\partial e}u - a(1-s_c\pi)\frac{\partial q}{\partial e}u. \tag{39}$$

Partially differentiating π and q with respect to e, we obtain

$$\frac{\partial \pi}{\partial e} = \frac{z(1+z')wbw'b'a[1-(1+z)(1+z')aa']}{\{(1+z)[1-(1+z')aa']wb + z(1+z')w'b'ea\}^2} > 0, \tag{40}$$

$$\frac{\partial q}{\partial e} = \frac{(1+z')wbw'b'[1-(1+z)(1+z')aa']}{(1+z)\{[wb+(1+z')w'b'ea]\}^2} > 0. \tag{41}$$

From equations (40) and (41), we obtain $\partial c/\partial e < 0$. Thus, Home's consumption demand increases if an increase in its own interest rate reduces the nominal exchange rate.[12]

[12] The effect of a rise in Home's nominal wage rate on the nominal exchange rate is not uniquely determined. This is because a rise in Home's nominal wage rate increases the interest rates of both countries. However, our numerical simulation in section 4 shows that a rise in Home's nominal wage rate raises Home's price (and the rate of interest) level higher than Foreign's price (and the rate of interest) level, which leads to a decrease in the nominal exchange rate. Such results seem to depend on the fact that two countries are assumed to have symmetrical structures and parameters. In other words, under asymmetric structures and parameters, a rise in Home's nominal wage rate may *not* raise Home' price (and the rate of interest) level higher than Foreign's price (and the rate of interest) level.

The effect of a change in the nominal exchange rate on Foreign's consumption can be shown as

$$\frac{\partial c'}{\partial e} = -s_c'\left(1-\frac{a'}{q}\right)\frac{\partial \pi'}{\partial e}u' + \frac{a'}{q^2}(1-s_c'\pi')\frac{\partial q}{\partial e}u' . \tag{42}$$

Partially differentiating π' with respect to e, we obtain

$$\frac{\partial \pi'}{\partial e} = -\frac{z'(1+z)wbw'b'\left(a'/e^2\right)[1-(1+z)(1+z')aa']}{\{(1+z')[1-(1+z)aa']w'b' + z'(1+z)wb(a'/e)\}^2} < 0 . \tag{43}$$

From equations (42) and (43), we obtain $\partial c'/\partial e > 0$, which implies that a rise in the nominal exchange reduces Foreign's consumption.

Now, let us summarize the above discussion. In the Home economy, a rise in the nominal wage rate has a positive impact on consumption and a negative impact on investment through changes in the profit share, as is in the usual Kaleckian models. Moreover, a rise in the nominal wage rate has a negative impact on investment as well as on the nominal exchange rate by increasing the interest rate. A decrease in the nominal exchange rate raises Home's consumption by decreasing the price of import goods. Thus, a possibility arises in Home that a rise in the nominal wage rate stimulates the capacity utilization rate by increasing consumption.

A rise in Home's nominal wage rate, on the other hand, has a negative impact on Foreign's consumption and a positive impact on Foreign's investment via changes in the profit share. In addition, a rise in the nominal wage rate has a negative impact on Foreign's investment by increasing Foreign's interest rate. If a rise in Home's nominal wage rate reduces the nominal exchange rate, then Foreign's consumption demand decreases by increasing Foreign's price of import goods. Thus, in the Foreign economy, a possibility arises that a rise in Home's nominal wage rate reduces its capacity utilization rate by decreasing consumption.

Table 1 and Figure 1 in section 4 show that a rise in Home's nominal wage rate increases its own capacity utilization rate but decreases that of Foreign. One of the sufficient conditions for this result is that a coefficient of the interest rate in the investment function be sufficiently small. This is because, under this situation, the negative effect of a rise in Home's interest rate on investment from a rise in Home's wage rate can be weakened. On the contrary, if the coefficient of the interest rate in the investment function is sufficiently large, an increase in Home's nominal wage rate decreases the capacity utilization rates of both countries. This result is represented in Table 2 and Figure 1 in section 4.

Here, we need to distinguish the so-called wage-led demand regime and profit-led demand regime. We define these regimes as follows:

Definition 1. We call the economy a wage-led demand regime if a rise in Home's nominal wage rate increases its own equilibrium capacity utilization rate. On the contrary, we call the

economy a profit-led demand regime if a rise in Home's nominal wage decreases its own equilibrium capacity utilization rate.

3.2 Mark-up rate

First, we investigate the effect of a change in Home's mark-up rate on the real side of Home's as well as Foreign's economies. We assume that Foreign's capacity utilization rate and the interest rates of both countries are constant. Then, the effect of an increase in Home's mark-up rate on consumption demand can be given by

$$\frac{\partial c}{\partial z} = -s_c(1-qa)\frac{\partial \pi}{\partial z}u - a(1-s_c\pi)\frac{\partial q}{\partial z}u. \tag{44}$$

We obtain the following equations under a constant nominal exchange rate:

$$\frac{\partial \pi}{\partial z} = \frac{[wb+(1+z')w'b'ea]\{[1-(1+z)(1+z')aa']wb+z(1+z')w'b'ea\}}{\{(1+z)[1-(1+z')aa']wb+z(1+z')w'b'ea\}^2} > 0, \tag{45}$$

$$\frac{\partial q}{\partial z} = -\frac{e(1+z')w'b'}{(1+z)^2[wb+(1+z')w'b'ea]} < 0. \tag{46}$$

In the Home economy, an increase in the mark-up rate has opposite effects on consumption demand. On one hand, an increase in the mark-up rate reduces consumption because it raises the profit share; on the other hand, an increase in the mark-up rate raises Home's price and reduces the real exchange rate, leading to a rise in Home's national income and consumption.

The effect of an increase in Home's mark-up rate on Foreign's consumption can be shown as follows:

$$\frac{\partial c'}{\partial z} = -s_c'\left(1-\frac{a'}{q}\right)\frac{\partial \pi'}{\partial z}u' + \frac{a'}{q^2}(1-s_c'\pi')\frac{\partial q}{\partial z}u', \tag{47}$$

where

$$\frac{\partial \pi'}{\partial z} = \frac{z'wbw'b'(a'/e)[1-(1+z)(1+z')aa']}{\{(1+z)[1-(1+z')aa']wb+z(1+z')w'b'ea\}^2} > 0. \tag{48}$$

We obtain $\partial c'/\partial z < 0$, which implies that an increase in Home's mark-up rate has a negative effect on Foreign's consumption.

Moreover, from equations (45) and (48), a rise in Home's mark-up rate has a positive impact on Home's as well as Foreign's investments.

Next, we consider the monetary side of Home's and Foreign's economies. From equations (1) and (2), we obtain $\partial p/\partial z > 0$ and $\partial p'/\partial z > 0$. This implies that a rise in Home's mark-up rate increases prices, which in turn raises the interest rates by reducing the real monetary stocks in both countries. A rise in interest rate has a negative effect on investment demand.

Furthermore, the nominal exchange rate decreases if Home's interest rate rises higher than Foreign's interest rate. Thus, from $\partial c/\partial e < 0$, Home's consumption increases when a rise in its own mark-up rate decreases the nominal exchange rate. Moreover, from $\partial c'/\partial e > 0$, a

decrease in the nominal exchange rate leads to a decrease in Foreign's consumption.

To summarize the above discussion, a rise in Home's mark-up rate has a negative impact on its own consumption through an increase in its profit share but a positive impact on its consumption through a decrease in the nominal exchange rate. Furthermore, a rise in Home's profit share has a positive impact on its investment, whereas a rise in Home's mark-up rate has a negative influence on its investment through an increase in its interest rate.

On the contrary, a rise in Home's mark-up rate has a negative effect on consumption and a positive effect on investment through an increase in Foreign's profit share. Moreover, a rise in Home's mark-up rate increases the interest rate, which in turn has a positive influence on investment in the Foreign economy. Furthermore, a rise in Home's mark-up rate reduces the nominal exchange rate and leads to a decrease in Foreign's consumption.

Tables 1 and 2 and Figure 2 show that a rise in Home's mark-up rate decreases its own as well as Foreign's capacity utilization rates. Unlike in the case of nominal wage rate, the effect of a change in mark-up rate on aggregate demand does not depend on the demand regime. In particular, a rise in mark-up rate does not lead to a gain for capitalists even under the profit-led regime. Such a result is peculiar to open economy models.

3.3 Savings rate of capitalists

The effect of an increase in the savings rate of Home's capitalists on Home's capacity utilization rate can be represented as follows:

$$\frac{\partial f(u;s_c)}{\partial s_c} = -\alpha\pi u(1-qa) < 0 . \tag{49}$$

For the sake of simplicity, we assume that Foreign's capacity utilization rate and the interest rates of both countries are constant. Equation (21) shows that a decrease in Home's capacity utilization rate reduces Foreign's exports as well as capacity utilization rate. Thus, an increase in Home's savings rate has a negative effect on its own and Foreign's capacity utilization rate. However, a decrease in capacity utilization rate leads to a decrease in money demand and interest rates, which in turn eases the demand decrease in both countries.

Our numerical simulations presented in Tables 1 and 2 and Figure 3 show that a rise in the savings rate of Home's capitalists reduces both countries' capacity utilization rates, irrespective of whether the economy exhibits a wage-led or profit-led demand regime.

3.3 Money supply

An increase in money supply in Home generally reduces Home's interest rate and leads to an increase in its investment demand and capacity utilization rate. Moreover, a rise in Home's capacity utilization rate expands Foreign's export and thus raises Foreign's capacity utilization rate.

However, an increase in Home's money supply does not always raise its capacity utilization

rate. Here, we consider the situation where Home's economy exhibits a wage-led demand regime. We assume that the two countries start with the same money supply, but when Home increases one unit of its money supply, Foreign decreases one unit of its money supply. In this case, Home's capacity utilization rate deteriorates whereas Foreign's capacity utilization rate improves.

This scenario is based on the following mechanism. An increase in Home's money supply reduces Home's interest rate, and a decrease in Foreign's money supply raises Foreign's interest rate, which, according to the uncovered interest rate parity, leads to a big rise in the nominal exchange rate. From equation (39), a rise in the nominal exchange rate has a negative effect on Home's consumption from increases in Home's profit share and the real exchange rate. Under the wage-led regime, the decrease in consumption exceeds the increase in investment from an interest rate decrease in Home. Furthermore, the more Foreign reduces its money supply, the higher the nominal exchange rate. As the negative impact of the exchange rate on consumption becomes larger, Home's capacity utilization rate decreases. On the contrary, from equation (42), a rise in the nominal exchange rate increases Foreign's consumption through a decrease in Foreign's profit share and an increase in the real exchange rate. Thus, we find that Home's capacity utilization rate decreases while Foreign's capacity utilization rate increases.

From Table 2 and Figure 4, a rise in Home's money supply increases the capacity utilization rate of both countries. In addition, from Table 1, Home's capacity utilization rate deteriorates and Foreign's capacity utilization rate improves when Home's money supply increases and Foreign's money supply decreases.

4 Numerical simulations

In this section, using numerical simulations, we examine how changes in the money wage rate, mark-up rate, the savings rate of capitalists, and money supply affect the equilibrium values of the capacity utilization rate and transitional dynamics. This task is significant because we have to check the results and clarify the ambiguous points of the previous section.

We use numerical examples for Definition 1.

We set benchmark parameters for the wage-led demand regime as follows:

●Benchmark parameters for the wage-led demand regime

$e^*=1$, $\theta=9$, $z=1/5$, $w=1$, $b=1/10$, $a=1/5$, $z'=1/5$, $w'=1$, $b'=1/10$, $a'=1/5$, $s_c=4/5$, $s_c'=4/5$, $g_0=1/40$, $g_m=5/100$, $g_u=8/100$, $g_r=1/100$, $g_0'=1/40$, $g_m'=5/100$, $g_u'=8/100$, $g_r'=1/100$, $K=1$, $K'=1$, $M=4.5$, $M'=4.5$, $l_0=30$, $l_u=2/10$, $l_r=30$, $l_0'=30$, $l_u'=2/10$, $l_r'=30$.

Next, we set benchmark parameters for the profit-led demand regime as follows:

●Benchmark parameters for the profit-led demand regime

$e^* = 1$, $\theta = 9$, $z = 1/5$, $w = 1$, $b = 1/10$, $a = 1/5$, $z' = 1/5$, $w' = 1$, $b' = 1/10$, $a' = 1/5$, $s_c = 4/5$, $s_c' = 4/5$, $g_0 = 1/40$, $g_m = 5/100$, $g_u = 8/100$, $g_r = 1/10$, $g_0' = 1/40$, $g_m' = 5/100$, $g_u' = 8/100$, $g_r' = 1/10$, $K = 1$, $K' = 1$, $M = 4.5$, $M' = 4.5$, $l_0 = 30$, $l_u = 2/10$, $l_r = 30$, $l_0' = 30$, $l_u' = 2/10$, $l_r' = 30$.

There is only one difference of the coefficient of interest rate, g_r, between wage-led and profit-led regime benchmarks in the investment function. If the coefficient of interest rate in the investment function is sufficiently large, the following causal relationship wherein a rise in Home's nominal wage rate leads to decreases in Home's real money stocks and investment becomes reinforced, and the economy is inclined to exhibit the profit-led regime.

Moreover, irrespective of demand regime, we set positive parameters to denote the adjustment speed of the goods and money market as follows:

●Other parameters

$\alpha = 1$, $\alpha' = 1$, $\beta = 0.1$, $\beta' = 0.1$

In general, the adjustment speed of the money market is faster than that of the goods market. However, to clarify the transitional process, we adopt a small value for the adjustment speed of the money market.

4.1 Nominal wage rate

Figure 1 shows the transitional dynamics when Home's nominal wage rate increases from 1 to 1.1. In the parameter settings of the wage-led demand regime, an increase in Home's nominal wage rate raises Home's capacity utilization rate but reduces Foreign's capacity utilization rate, as explained in section 3.1. Moreover, an increase in Home's nominal wage rate raises the interest rates of both countries. Under the profit-led demand regime, an increase in Home's nominal wage rate reduces the capacity utilization rates and raises the interest rates of both countries.

(Insert Figure 1 around here)

4.2 Mark-up rate

Figure 2 shows the transitional dynamics in the economy when Home's mark-up rate increases from 0.2 to 0.3. Irrespective of whether the economic regime is wage-led or profit-led, an increase in Home's mark-up rate reduces the capacity utilization and interest rates of both countries.

(Insert Figure 2 around here)

4.3 Savings rate of capitalists

Figure 3 shows the transitional dynamics in the economy when Home's savings rate increases from 0.8 to 0.9. Irrespective of whether the economic regime is wage-led or profit-led, an

increase in Home's savings rate reduces the capacity utilization and interest rates of both economies.

(Insert Figure 3 around here)

4.4 Money supply

Figure 4 shows the transitional dynamics in the economy when Home's money supply increases from 4.5 to 4.6. Irrespective of whether the economic regime is wage-led or profit-led, an increase in Home's money supply raises the capacity utilization rates but reduces the interest rates of both economies. Because the coefficient of the interest rate in the profit-led regime is larger than that in the wage-led regime, the positive effect of a rise in money supply on the capacity utilization rate is greater in the profit-led regime than in the wage-led regime.

(Insert Figure 4 around here)

5 Conclusion

In this study, we built a two-country Kaleckian model and investigated how the economic policy of one country affects both countries.

First, we summarize the results under the wage-led demand regime.

A rise in Home's nominal wage rate increases its own capacity utilization rate but decreases Foreign's capacity utilization rate. Thus, the Foreign economy suffers a negative effect of Home's nominal wage rate increase. Therefore, Foreign may raise its nominal wage rate to avoid the negative effect. However, as long as Foreign's increased nominal wage rate is the same as Home's nominal wage rate, the capacity utilization rates of both countries decrease. Thus, the economy of one country can be stimulated by means of a wage increase at the cost of demand decrease in the other country.

A rise in Home's money supply increases the capacity utilization rates but decreases the interest rates of both countries. Thus, an easy money policy in Home has a positive impact on Foreign's as well as Home's economy. However, when Home adopts monetary easing but Foreign adopts monetary tightening, the result obtained is interesting in that Home's capacity utilization rate decreases whereas Foreign's capacity utilization rate increases, greatly differing from the result of a closed economy. This result implies that under the wage-led demand regime, Home's monetary easing policy loses its effect on its economy as long as Foreign follows a tightening policy. In other words, to gain satisfactory result from the monetary policy of one country, the two countries need policy coordination.

Second, we summarize the results under the profit-led regime.

A rise in Home's mark-up rate decreases the capacity utilization rates and interest rates of both countries. As suggested by the normal Kaleckian model, under the profit-led demand regime, the capacity utilization rate moves in the same direction with the profit share, whereas according to our model with endogenous profit share, the capacity utilization rate moves in the

opposite direction to that of the profit share. This implies that firms aiming to improve their profit share by raising the mark-up rate will not be able to increase their output even under the profit-led regime.

A rise in Home's money supply increases the capacity utilization rates of both countries. This result is the same as in the wage-led demand regime. Thus, Foreign benefits from an easing monetary policy in Home. In addition, if Home adopts monetary easing and Foreign adopts monetary tightening, the capacity utilization rate of Home increases, but that of Foreign decreases, which is the same with the usual IS-LM model. Thus, in the profit-led regime, the two countries do not need policy coordination.

Finally, under both the wage-led and profit-led demand regimes, a rise in the savings rates of capitalists decreases the capacity utilization rate of both countries. This means that the paradox of thrift appears globally in the two-country framework.

Future extensions to our model remain. This study assumed two countries with symmetrical structure and behavioral parameters and investigated the effect of a parametric change on symmetric equilibriums. In a future study, we need to investigate the effect of an economic policy of one country on two economies under symmetric structure and parameters. Furthermore, for the sake of simplicity, we assumed the equilibrium rate of the nominal exchange rate to be constant—especially when it is equal to unity in numerical simulation—in the equation of uncovered interest rate parity. However, in our model, the nominal exchange rate is the endogenous variable, so that we have to calculate the equilibrium value of the nominal exchange rate from the dynamic system.

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Figures

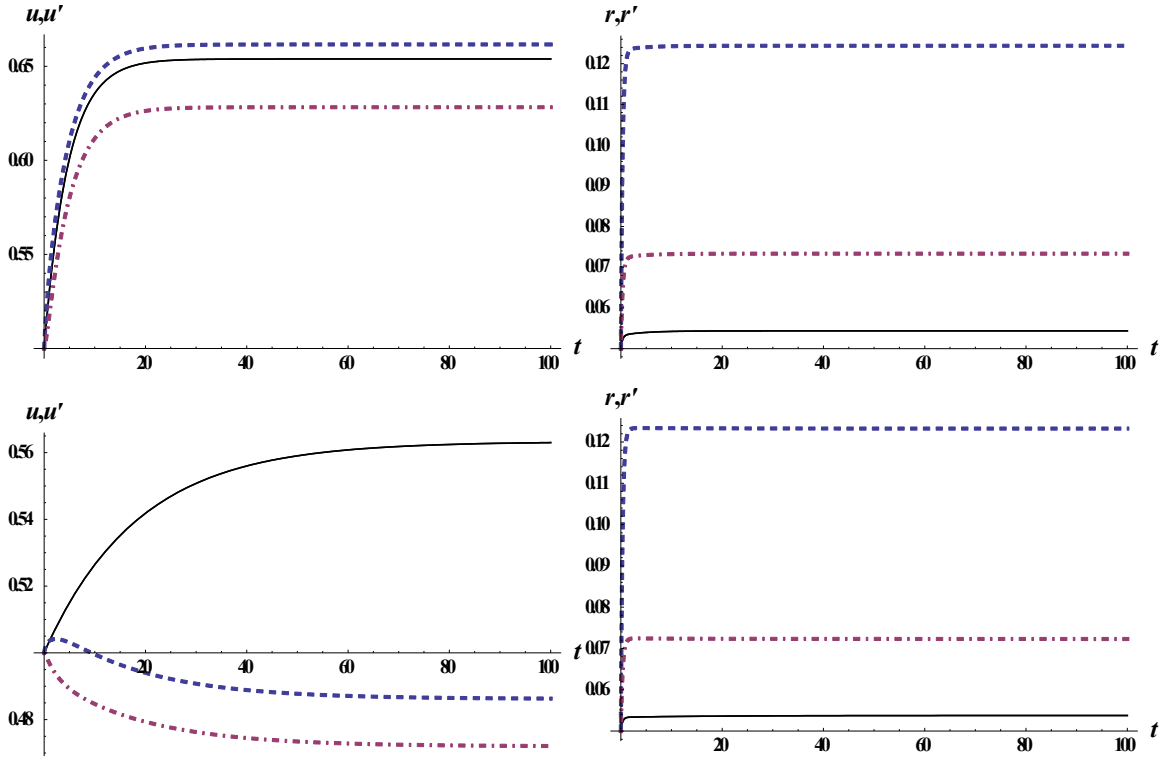

Figure 1: Transitional dynamics when Home's nominal wage rate increases

Note: In the following figures, the north-west panel shows the transitional dynamics of the capacity utilization rate under the wage-led regime, the north-east panel shows the transitional dynamics of the interest rate under the wage-led regime, the south-west panel shows the transitional dynamics of the capacity utilization rate under the profit-led regime, and the south-east panel shows the transitional dynamics of the interest rate under the profit-led regime. In addition, the solid line in each panel represents the benchmark case, the blue dashed line represents Home's variable, and the purple dashed line represents Foreign's variable.

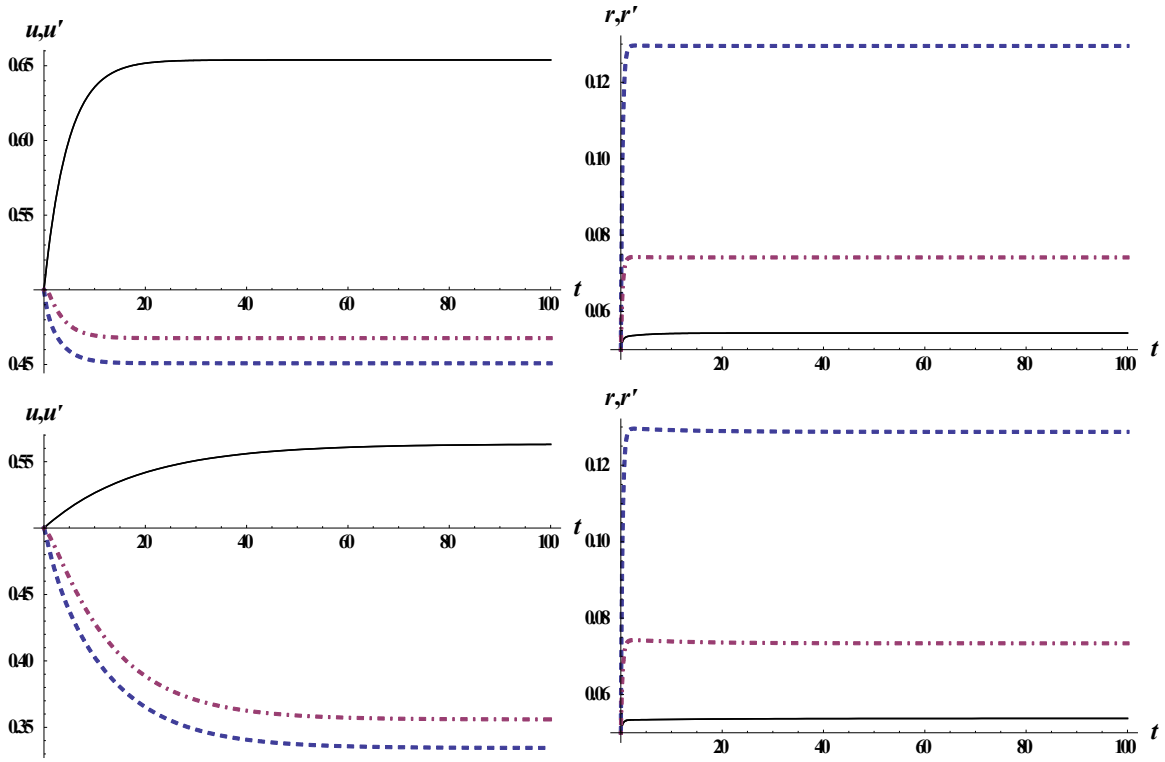

Figure 2: Transitional dynamics when Home's mark-up rate increases

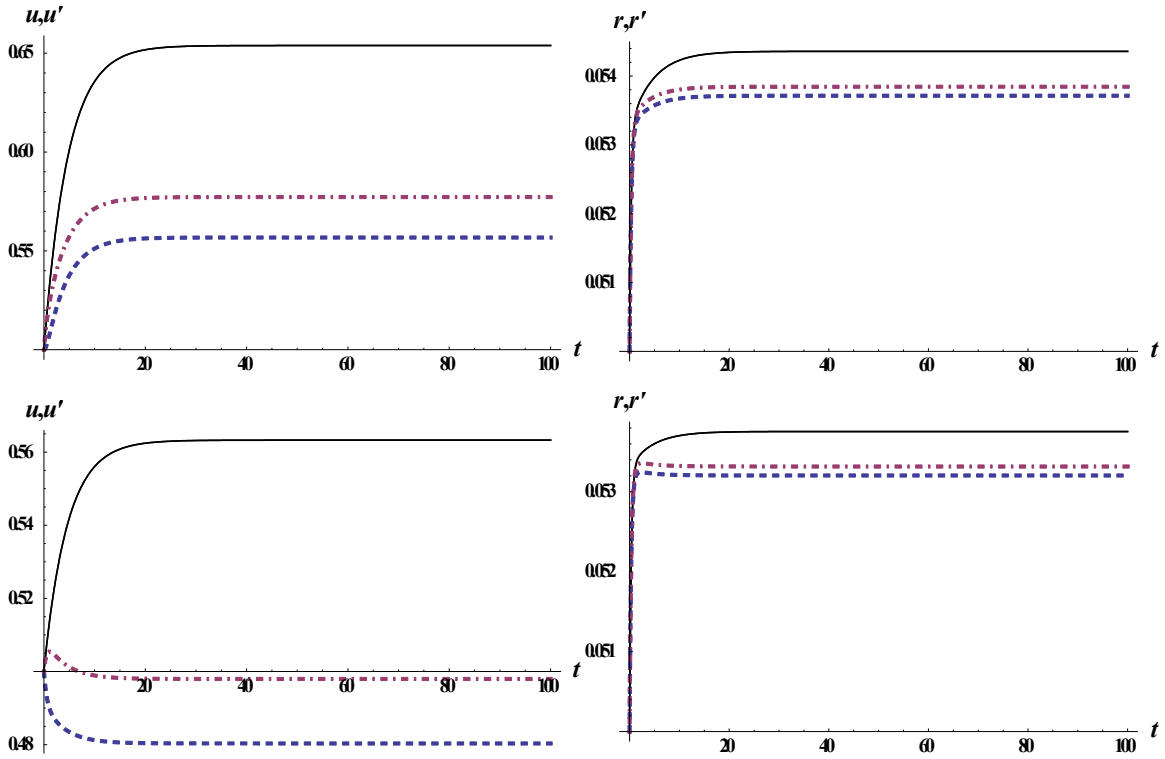

Figure 3: Transitional dynamics when Home's savings rate increases

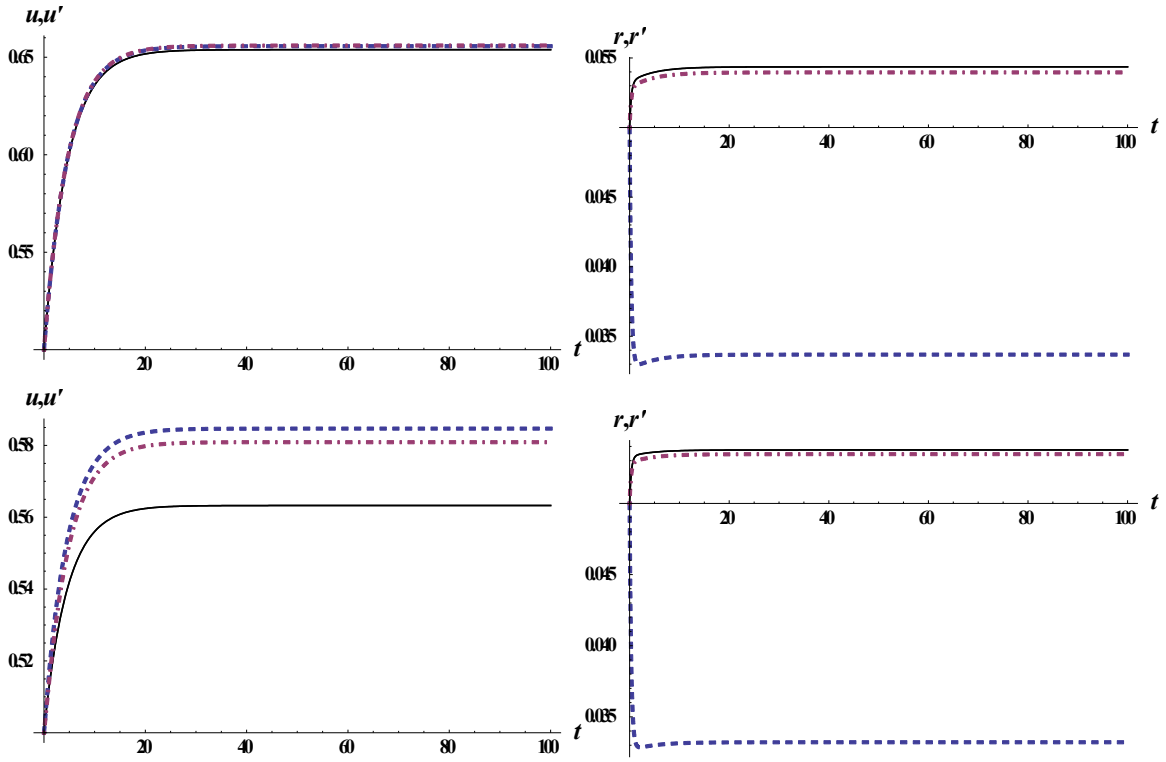

Figure 4: Transitional dynamics when Home's money supply increases

Table 1: The results of numerical simulations under the wage-led demand regime

	Benchmark (symmetric equilibrium)		Nominal wage increase (w=1.1)		Nominal wage increase (w=w'=1.1)		Saving rate increase (sc=9/10)	
	Home	Foreign	Home	Foreign	Home	Foreign	Home	Foreign
Capacity utilization rate	0.65387	0.65387	+	−	−	−	−	−
Interest rate	0.0543591	0.0543591	+	+	+	+	−	−
Interest rate disparity (Foreign – Home)	0		−		0		+	
Profit share	0.208333	0.208333	−	+	−	−	+	−
Price level	0.157895	0.157895	+	+	+	+	−	−
Consumption	0.435913	0.435913	+	−	−	−	−	−
Invesmment	0.0871827	0.0871827	−	−	−	−	−	−
Exports	0.130774	0.130774	−	+	−	−	−	−
Imports	0.130774	0.130774	−	+	−	−	−	−
National income per capital	0.523096	0.523096	+	−	−	−	−	−
Trade balance	0	0	+	−	0	0	+	−
Nominal exchange rate	1		−		1		+	
Real exchange rate	1		−		1		+	

	Mark-up rate increase (z=0.3)		Mark-up rate increase (z=z'=0.3)		Money supply increase (M=4.6)		Money supply increase (M=4.6, M'=4.4)	
	Home	Foreign	Home	Foreign	Home	Foreign	Home	Foreign
Capacity utilization rate	−	−	−	−	+	+	−	+
Interest rate	+	+	+	+	−	−	−	+
Interest rate disparity (Foreign – Home)	−		0		+		+	
Profit share	+	+	+	+	+	−	+	−
Price level	+	+	+	+	+	−	+	−
Consumption	−	−	−	−	+	+	−	+
Invesmment	−	−	−	−	+	+	+	−
Exports	−	−	−	−	+	+	+	−
Imports	−	−	−	−	+	+	+	−
National income per capital	−	−	−	−	+	+	−	+
Trade balance	+	−	0	0	−	+	−	+
Nominal exchange rate	−		1		+		+	
Real exchange rate	−		1		+		+	

Table 2: The results of numerical simulations under the profit-led demand regime

	Benchmark (symmetric equilibrium)		Nominal wage increase (w=1.1)		Nominal wage increase (w=w'=1.1)		Saving rate increase (sc=9/10)	
	Home	Foreign	Home	Foreign	Home	Foreign	Home	Foreign
Capacity utilization rate	0.563272	0.563272	–	–	–	–	–	–
Interest rate	0.0537551	0.0537551	+	+	+	+	–	–
Interest rate disparity (Foreign – Home)	0		–		0		+	
Profit share	0.208333	0.208333	–	+	–	–	+	–
Price level	0.157895	0.157895	+	+	+	+	–	–
Consumption	0.443933	0.443933	–	–	–	–	–	–
Invesmment	0.0751029	0.0751029	–	–	–	–	–	–
Exports	0.112654	0.112654	–	–	–	–	–	–
Imports	0.112654	0.112654	–	–	–	–	–	–
National income per capital	0.450617	0.450617	–	–	–	–	–	–
Trade balance	0	0	+	–	0	0	+	–
Nominal exchange rate	1		–		1		+	
Real exchange rate	1		–		1		+	

	Mark-up rate increase (z=0.3)		Mark-up rate increase (z=z'=0.3)		Money supply increase (M=4.6)		Money supply increase (M=4.6, M'=4.4)	
	Home	Foreign	Home	Foreign	Home	Foreign	Home	Foreign
Capacity utilization rate	–	–	–	–	+	+	+	–
Interest rate	+	+	+	+	–	–	–	+
Interest rate disparity (Foreign – Home)	–		0		+		–	
Profit share	+	+	+	+	+	–	+	–
Price level	+	+	+	+	+	–	+	–
Consumption	–	–	–	–	–	–	–	–
Invesmment	–	–	–	–	+	+	+	–
Exports	–	–	–	–	+	+	–	+
Imports	–	–	–	–	+	+	+	+
National income per capital	–	–	–	–	+	+	+	–
Trade balance	+	–	0	0	–	+	–	+
Nominal exchange rate	–		1		+		+	
Real exchange rate	–		1		+		+	