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FLEXIBLE EXCHANGE RATES, MACROECONOMIC POLICY AND ALTERNATIVE WAGE-SETTING REGIMES*

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Abstract

This paper analyses the price and output effects of monetary and fiscal policy in a small open economy with perfect capital mobility, flexible exchange rates and alternative wage - setting regimes. In the canonical models of Mundell - Fleming monetary policy is effective while fiscal policy is completely ineffective to raise domestic output. When real wage resistance prevails, though, the order is reversed. It is shown that the effects of monetary and fiscal policy depends not only on the wage regime that prevails, but also on the assumptions we make about the form of the demand for money function.

1. Introduction

The intellectual debate about the effectiveness of alternative macrostabilisation policies has been going on for many decades, but it was only in the 1950s that macroeconomic models of a closed economy were widened to embrace fully the presence of a foreign trade sector. It was the time that the world was moving from exchange controls and trade discrimination to a situation which could be characterised by increasing openness. Although international transactions were governed, at that time, by a fixed exchange rate regime, the feeling was that the international economy was moving towards aa more flexible exchange rate that could reflect the changes in the demand and supply in the foreign exchange market and that eventually the world financial markets will become highly integrated, both features being very familiar

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today. In their seminal papers, Mundell (1963) and Fleming (1962) were the first to recognize and analyse the different effects that stabilisation policies can have on output and exchange rate of a small open economy when perfect capital mobility prevails in the world. Their analysis is done within the traditional Keynesian fixed wage - price world. Their results are well known today, namely, that fiscal policy is completely ineffective in stimulating output due to the complete crowding out generated by the appreciation of the exchange rate, while monetary policy is an expansionary policy, since an initial decline in the interest rate forces a depreciation of the exchange rate and a further increase in output. The Mundell - Fleming results had therefore provided the policy prescription for the years to come. However, the recession of 1974-75 which was attributed to rising oil prices and restrictive fiscal and monetary policies in the western economies, has caused concern amongst several economists of how appropriate it is to treat wages and prices constant in a world of accelerating inflation. It became clear in the mid - seventies that we could no longer abstract from the effects that exchange rate movements have on prices. The implications of such considerations immediately led to the recognition that such exchange rate movements cause a different impact on the decisions of employers and of the workers. The implications of the assumption that a divergence can exist in the labour market between the producer's real wage and the consumer's real wage were far reaching for assessing the effectiveness of fiscal and monetary policy in a small open economy. As Casas (1975), Argy and Salop (1979) and Sachs (1980) have shown with alternative models when real wage resistance prevails in the labour market we have a complete reversal of the results of the two policies. To recapitulate, when domestic workers are assumed to deflate their nominal wage with the consumer price index, which is a weighted index of the prices of home and foreign goods adjusted by the exchange rate, then fiscal policy becomes effective and output and employment will be increased. By contrast monetary policy is completely ineffective in stimulating domestic output. A complete reversal of the Mundell - Fleming results is then shown. As far as monetary policy is concerned, it will affect prices and the exchange rate equiproportionately leaving output unchanged. Expansionary fiscal policy can raise output because of the different impact which it will have on the real product wage and the real consumer wage. It is possible that with the exchange rate effect on prices taken into consederation, the consumer price index remains unaltered, while the real product wage falls and therefore output rises. It becomes obvious therefore that the type of wage regime can help determine the final effectiveness of the various economic policies.

This paper addresses itself to the central issue of macroeconomic policy in a small open economy in the presence of flexible exchange rates and perfect capital mobility

once again, and so we will develop our model along similar lines[1]. The model that we utilise extends the standard Mundell - Fleming analysis as well as the subsequent results derived by Casas (1975), Argy and Salop (1979) and Sachs (1980) who employ models which take fully into consideration supply side implications. We too employ a consistent aggregate demand/supply model for our analysis. However, we adopt a form for the demand for money function which is more general than the one specified in the current literature and which we believe exploits to a great extent the "Cambridge k" nature of the Keynesian demand for money function, when the interest rate is fixed (here via the interest parity), and such that it always implies that the income elasticity of demand for real balances equal unity. Our money market equation is such that the demand for real money balances is not homogeneous of degree one in the consumer price index, and therefore we take into consideration the impact that the consumer price index via exchange rate movements will have on the effectiveness of the stabilisation policies. Indeed, the adoption of a more general form for the real demand for money than the one which previous models have used is shown to have far reaching implications. While our results concerning the effectiveness of monetary policy under both real wage resistance and nominal wage rigidity are generally in line with those of the standard analysis, we thorougly show that the neutrality of fiscal policy implied by the Mundell - Fleming analysis or the expansionary effect of fiscal policy implied by Casas (1975), Argy and Salop (1979) and Sachs (1980), are truly a subset of a broader set of plausible outcomes. The final outcome crucially depends on the value of income elasticity of demand for money, and we show that fiscal policy can be *contractionary,* too. In addition, we stress the importance that the sign of the Laursen - Metzler effect has on both the monetary and fiscal multipliers, as has been thoroughly discussed by Ford and Sen (1988).

The organisation of this paper is as follows. Section 2 outlines the important behavioural equilibrium conditions of a small open economy which captures the main characteristics of most of the western industrialised economies. In Section 3 we solve the model for the case of real wage resistance by requiring the simultaneous clearing of the markets for domestically produced goods, money and labour, and we then discuss the effectiveness of fiscal and monetary policy. Using the same apparatus, Section 4 examines the effects of the alternative stabilisation policies when nominal wage rigidity prevails in the small open economy. Section 5 summarizes our results.

1. For an analysis of the effects of commercial and stabilisation policies in the case of a two - country model, see J.L. Ford and Georgios P. Kouretas "Co - ordination, Commercial and Stabilisation Policies under alternative wage - setting regimes in a two - country model with a flexible exchange rate" in J.L. Ford, *Current Issues in Open Economy Macroeconomics*, (1990), Edward Elgar (Gower Press).

2. The model

We consider an economy which produces a single aggregate good that is both consumed (absorbed) domestically and exported. There is also a foreign aggregate good that is imported. These goods are traded internationally at different prices with the exchange rate converting the imported good price to home prices. This will create an assymetry in the economy since producers consider a different price index than the workers (per consumers) do. The small open economy is a price taker for the imported good in the world markets, while it faces a downward sloping demand curve for its exportables.

Furthermore, our model of the small open economy consists of an aggregate demand schedule and of an aggregate supply schedule. We adopt the following standard notation throughout this paper.

Y = real income in domestic units or output
M = quantity of imports
X = quantity of exports
P = domestic price level
P* = foreign price level
e = exchange rate (units of domestic currency required for the purchase of a unit of foreign currency)
Q = consumer price index
r = rate of interest
G = real government expenditure
H = nominal money supply
σ = eP*/P (the terms of trade)

The goods market equilibrium of the small open economy will be given by:

$$PY = PE + PX - eP^*M + PG \tag{1}$$

that is, the nominal value of output supplied must equal the nominal value of the aggregate demand for domestic output.

$$E = E(Y, \sigma, r) \qquad E_1 > 0, \quad E_2 > 0, \quad E_3 < 0 \tag{2}$$

$$X = X(eP^*/P) \qquad X_1 > 0 \tag{3}$$

$$M = M(Y, \sigma, r) \qquad M_1 > 0, \quad M_2 < 0, \quad M_3 < 0 \tag{4}$$

To these relationships we also add the consumer price index

$$Q = \psi(P,\ eP^*) \qquad \psi_1 > 0, \quad \psi_2 > 0 \tag{5}$$

Equation (2) provides us with domestic absorption (expenditure) measured in terms of the home good and it depends on real income in terms of the home good, the terms of trade, and the domestic interest rate. Equations (3) and (4) give the export and import functions. Exports are assumed to be a function of the terms of trade, while imports are assumed to be a function of the income in terms of the home good, the terms of trade and the domestic interest rate. Finally, equation (5) describes the consumer or the "basket" price index. It is assumed to be a weighted average of the domestic price level and the domestic price of the foreign good. Following Samuelson and Swamy (1974) we can derive from (5) a true, ideal, cost of living index such as:

$$Q = P^{\beta}\ (eP^*)^{1-\beta} = P^{1-\beta}\ \sigma^{1-\beta} \tag{6}$$

where $(1-\beta)$ is the share of imports in total domestic expenditure.

The sign of the partial derivative E_2 gives us the Laursen – Metzler effect, which we will assume does hold and of which we will make extensive use in our analysis. It is important to note that the sign of the Laursen – Metzler effect is crucial for the final policy results (see Ford and Sen (1985)).

The government is assumed to have a role in the economy. By the use of a fiscal policy variable in the goods market, it endeavours to stabilise the economy. The government is assumed to finance its expenditure through a lump sum tax Φ. At any time period $G = \Phi$ and Φ has no other effect in the model.

Substituting equations (2) – (4) in (1) and dividing through by the domestic price level we have the goods market equation as:

$$Y = E(Y,\ \sigma,\ r) + X(\sigma) - \sigma M(Y,\ \sigma,\ r) + G \tag{7}$$

We also note that the goods market is posit to clear instantaneously.

In regard to the financial sector of the economy, we assume the existence of only a limited asset menu. It consists of home currency, home government bonds, and foreign bonds. These financial markets are also assumed following convention to clear instantaneously.

The money market equilibrium condition is given by

$$\frac{H}{Q} = L\left[\frac{PY}{Q},\ r\right] \tag{8}$$

Substituting Q in (8) by (6) we get that

$$\frac{H}{P} = \sigma^{1-\beta} L \left[\frac{Y}{\sigma^{1-\beta}}, r\right] \tag{9}$$

The home money supply (high – powered money supply) has been deflated by the consumer price index as this is described by equation (6). The money supply is controlled by the government or its Central Bank. The bond market is excluded from the model via Walras's Law.

We now turn our attention to the development of the aggregate supply schedule. The one we use is a standard aggregate supply equation which can be derived from the equilibrium condition for the labour market. Exogeneity of either nominal wages or price expectations ensures a positively sloped supply schedule. The production function is of a Cobb – Douglas type and is given by:

$$Y = K^{\gamma} L^{1-\gamma} \tag{10}$$

Firms are assumed to be perfect competitors in output markets, and to face a perfectly elastic supply of labour to operate on their demand curves. Then from the profit maximizing conditions and the marginal product function we have the relationship between output and the real wage.

$$Y = a \left[\frac{P}{W}\right]^{\delta} \qquad a, \delta > 0 \tag{11}$$

For any change in the level of nominal money supply and the level of government expenditures the aggregate supply schedule (11) will determine the differential impacts on output and prices. There is an assymetry in the economy since the relevant price to the producers is the price of the home produced goods which is the domestic price level (P) while the relevant price to the consumers is the consumer price index (Q) which is a weighted index of the prices of home and foreign goods adjusted by the exchange rate. Therefore, for a given policy change producers' employment requirements might be different from what the workers are willing to supply in the labour market. In addition to changes in the price of the domestic and foreign goods, variations in the exchange rate can cause a different impact on the decisions of the employers and of the workers.

We postulate the following wage – specification:

$$\frac{W}{Q} = \kappa \bar{w} + (1 - \kappa) \frac{\bar{W}}{Q} \tag{12}$$

where $\bar{w}$ is the fixed real wage and $\bar{W}$ is the fixed nominal wage. Standard microeconomic theory suggests that firms will determine the level of employment demanded at the current wage rate as it is derived by (12). The aggregate supply function (11) then transforms this level of employment into real output. But the main purpose of a specification like (12) is to permit us to distinguish between the two alternative wage – setting regimes under consideration.

First, we can assume that the nominal wage adjusts fully to changes in the overall price level (Q), so we have the situation of real wage rigidity, since workers will always seek to maintain their purchasing power. This implies that $\kappa = 1$ (with κ the coefficient of indexation) and therefore we have that $W/Q = \bar{w}$. Second, we can assume that workers have "money illusion" and they are interested in keeping a fixed nominal wage; i.e., we have nominal wage rigidity. In such a case we must have that $\kappa = 0$ and $W = \bar{W}$. Certainly for $0 < \kappa < 1$ we have some "money illusion". Substituting equation (12) in equation (11) we then have:

$$Y = a \left[\frac{P}{\kappa \bar{w} Q + (1-\kappa) \bar{W}} \right]^{\delta} \tag{13}$$

If we now apply the specific wage – setting regime that prevails under our alternative hypotheses the supply schedule will finally be:

$$Y = a \left[\frac{P}{Q \bar{w}} \right]^{\delta} \qquad \text{(RWR)} \tag{13a}$$

and

$$Y = a \left[\frac{P}{\bar{W}} \right] \qquad \text{(NWR)} \tag{13b}$$

We further introduce the assumption of perfect capital mobility between countries. Perfect capital mobility means that bonds issued by the government of the home country are perfect substitutes for bonds issued by the government of the foreign country. Therefore, the following relationship exists:

$$r = r^* + \left[\frac{\dot{e}}{e} \right]^{exp} \tag{14}$$

where $(\dot{e}/e)^{exp}$ is the expected rate of depreciation of the home currency. Thus when r is higher than r* economic agents will expect that the home currency will depreciate, while if r is less than r* then they expect that the home currency will appreciate. In addition, we assume that economic agents form static expectations with respect to expectations about the exchange rate depreciation, implying that $(\dot{e}/e)^{exp} = 0$. This leads to equality of the two interest rates throughout the world. When there is *perfect*

capital mobility the balance of payments equilibrium condition now over both trade and capital accounts, must be explained by the equilibrium condition given by $r = r^*$. With flexible exchange rates and perfect capital mobility, the balance of payments must balance in full equilibrium, (as well as the trade balance and the capital account must also do).

We close the model with the definition of the terms of trade, defined previously:

$$\sigma = \frac{eP^*}{P} \tag{15}$$

We employ this equation, rather than incorporate it into our basic equations (such as the expenditure equation) since it does simplify the mathematical analysis of the model and the interpretation of its results, despite preventing us from reducing the dimensions of the model. For the same reason, we utilise the goods market equilibrium equation (7) together with the country's supply schedule, rather than substituting the latter with the left hand side of (7). Hence, we have four equations to solve for four unknowns, Y, P, e and σ given the values of the exogenous variables G, H, P^* and r^*. When it is assumed that real wage resistance prevails in the economy the relevant equation system is given by (7), (9), (13a) and (15), while in the presence of nominal wage inertia the system to be solved is given by (7), (9), (13b) and (15).

3. Real wage resistance

In this section we analyse the effects of monetary and fiscal policy in a small open economy under the hypothesis of real wage resistance. This is a common feature in most of the western industrialised countries and its implication is to impose an additional constraint on economic policymaking. Under RWR the workers are assumed to be aware of the central role that exchange rate movements which affect the consumer price index have for the determination of their *real wage*. Therefore, it is assumed that workers bargain for a fixed level of *real wage* which takes into consideration domestic and foreign prices. Furthermore, it becomes clear then from the aggregate supply given by equation (13a) that the supply of domestic output is solely determined by the terms of trade. Therefore, the crucial feature in this situation is certainly the impact which a change in the money stock or a change in the level of government expenditures, will have on the terms of trade.

When we totally differentiate the system of equations (7), (9), (13a) and (15), and assume that the initial values of e, P, P^* and σ are unity, we derive that:

$$Ady = dx \tag{17}$$

where A, the Jacobian of the system is:

$$\begin{bmatrix} (E_1 - M_1 - 1) & 0 & 0 & (X_1 - \in M - M_2) \\ L_1 & H & 0 & (1-\beta)\, L(1-\eta) \\ 1 & 0 & 0 & a\delta(\beta-1)(\bar{w}^{-1})^{\delta} \\ 0 & 1 & -1 & 1 \end{bmatrix} \tag{18}$$

and:

$$dy = [dY,\ dP,\ de,\ d\sigma] \tag{19}$$

$$dx = \begin{bmatrix} -dG \\ dH \\ 0 \\ 0 \end{bmatrix} \tag{20}$$

Several important qualifications have been utilised so that we were able to simplify considerably the matrix of the Jacobian given by (18). First, we have invoked the *Laursen – Metzeler effect,* as this is formulated in the literature, so that $E_2=(1-E_1)\,M$ (see Ford and Sen (1985)). As Ford and Sen (1988) have shown, we are allowed to do so because of our assumptions about the construction of the consumer price index. We maintain the standard assumption that the Marshall – Lerner (M – L) condition given by $(X_1 - \in M - M_2)$ holds good. We further define $\in$ as the own – real income elasticity of real expenditure in the small open economy. Following convention we denote a partial derivative of a function with respect to one of its arguments by the order of the argument in the function: $\partial E/\partial Y = E_1$. Stability requires that $|J| < 0$ given that we actually have a system of five equations. This is true since although the balance of payments equilibrium condition has been dropped from the explicit solution of the model, because of the assumption of covered interest parity, it maintains an essential role for the analysis of the dynamic movements of the economy. Hence, we must have:

$$|J| = H[(1 + M_1 - E_1)a\delta(\beta-1)(\bar{w}^{-1}) - (X_1 - \in M - M_2)] < 0 \tag{21}$$

which holds provided that the Marshall – Lerner condition is satisfied.

The effects of monetary policy (operating via increase in H) and of fiscal policy (operating via increase in G) can be now readily derived from the solution of the system given by (17), (18), (19) and (20). The qualitative outcomes for both policies are presented in Table 1. (See also Appendix A).

Table 1

Qualitative effects of monetary and fiscal policy under RWR

	Y	P	e	σ
Expansionary Monetary policy	0	+	+	0
Expansionary Fiscal Policy	$+^{\varepsilon}$	$-^{\varepsilon}$	−	−

ε denotes most likely outcome.

Table 1 indicates that monetary policy provides unambiguous results. These have been indeed expected. Any effort by the Central Bank to raise output and employment will be unsuccessful. Thus in a country with RWR monetary policy fails to create real effects and we once again are faced with the long — run neutrality of money. The expansionary monetary policy will only raise the domestic price level (P) and the exchange rate (which according to out definition implies a depreciation) equiproportionately leaving , the world terms of trade (the important real variable) unaltered. The immediate impact of the change in the money stock will be a decrease in the domestic interest rate, below the level of the fixed *world* interest rate and thus there will be capital outflows and this will result in a depreciation of the exchange rate. Aggregate demand now rises via increase in exports and import substitution, which results in a rise in the interest rate. At the same time, the implied exchange rate depreciation (e rises according to our definition) will lead to a rise in the consumer price index forcing the domestic workers to demand higher money wage levels, in order to maintain their real wage. Consequently, profit maximizing producers reduce the level of domestic output to its original level. Eventually, when the new equilibrium is reached, all previous variables return to their previous levels.

The case of monetary expansion in the small open economy can be directly seen with the use of the aggregate demand and aggregate supply. Figure 1 illustrates these two schedules for the small open economy. The aggregate supply schedule (AS) (given by equation (13(a)) relates output solely to the terms of trade. Assuming that government expenditures remain constant we can also derive the aggregate demand schedule (AD) such that it provides us with the relationship between Y and σ, for given r* (from equation (7)).

Obviously, a change in the money stock (H) will only affect the AD schedule of the small open economy, since its position can be altered by changes in the rate of interest. But although r, will be lowered with a rise in H, resulting in a rise in

aggregate demand for domestic output, since at the final equilibrium the latter has to remain unchanged at its initial level, then any change in the money stock will leave Y and σ unchanged. Monetary policy has the classical neutrality effect in the small open economy.

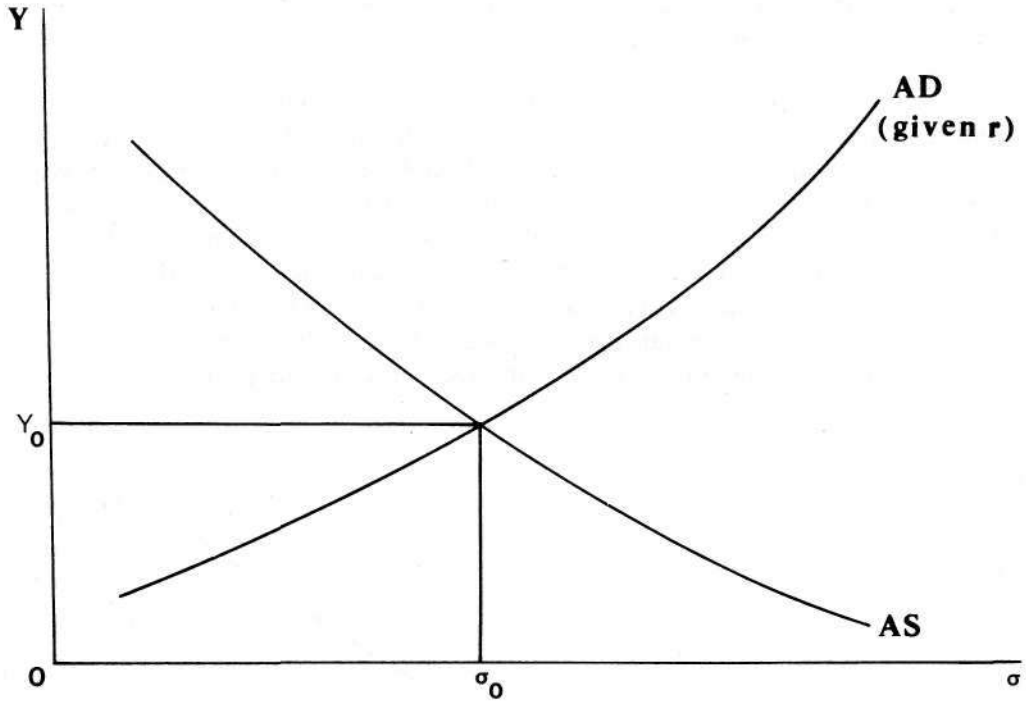

Figure 1. Monetary Expansion under RWR

We turn now to the situation when government expenditure (G) increases. Table 1 suggests that this fiscal expansion will have real effects in the economy, and domestic output will expand. It is also made clear though that the effect of fiscal expansion on the domestic price level and the exchange rate are not as clear cut as indicated by Casas (1975, 1977), Argy and Salop (1979) and Sachs (1980). Indeed, the final outcome depends on the value of the income elasticity of demand for money (η). In the case where $\eta \geq 1$, then the domestic price level falls while the exchange rate unambiguously appreciates. In contrast, though, when $\eta < 1$, then the final outcome on both (P) and (e) is much more difficult to uncover. There exists the possibility that both rise in a way that results in a *contraction* of the domestic output. We will pursue further our analysis for the case of an expansionary fiscal policy only. This

positive effect will come through the fall in the exchange rate which given also the fall in the domestic price level will lead to a lower level of the consumer price level lowering wage demands of workers, therefore increasing output.

The position for fiscal policy can be summarized graphically by means of the AD and AS schedules. Once again, the position of AD is fixed by the rate of interest which equals to the world level.

As in the case of monetary policy, aggregate supply is fiscally neutral. For a given rate of interest the aggregate demand schedule will shift to the north - west with any increase in government expenditure. But then the domestic interest will begin to rise, because of the excess demand for real balances caused by the increase in income. Furthermore, this will initiate capital inflows into the domestic economy resulting in an appreciation of the exchange rate will be the main tool through which fiscal policy will be also efficacious in increasing the level of output and employment. The appreciation of the exchange rate opens up a wedge between the real wage of workers and the real wage of the employers, since it affects the consumer price level and the

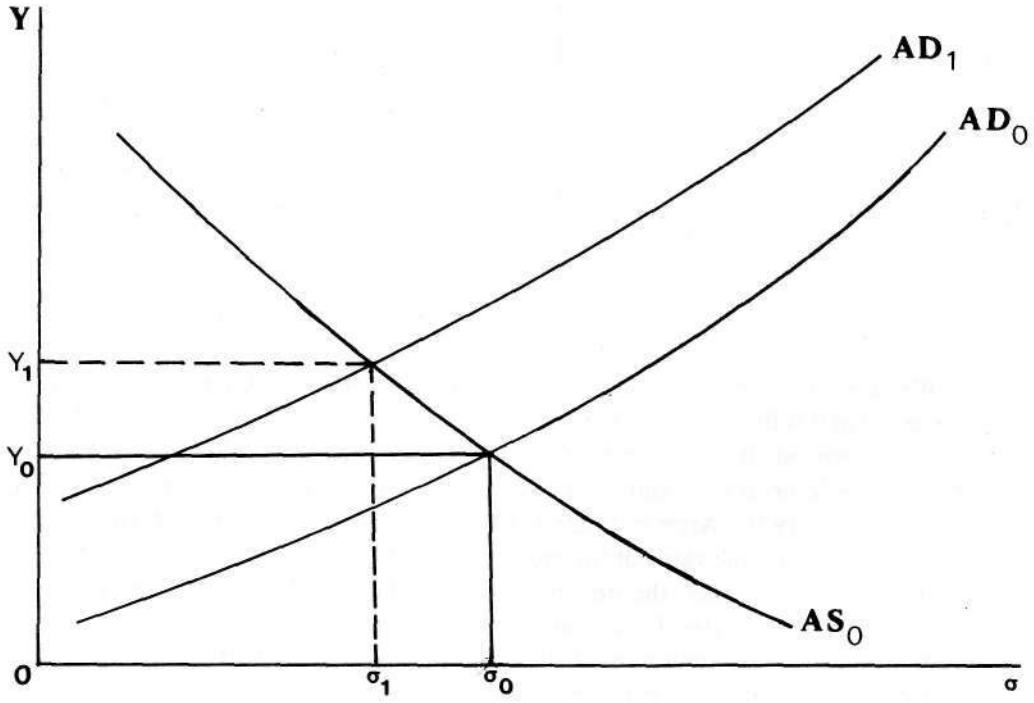

Figure 2. Fiscal Expansion under RWR.

money wage bringing the economy to its new equilibrium position. The exchange rate appreciation will make imported goods cheaper and that implies a lower level of cost of living for the workers. Since workers care about keeping a target real wage rate, w, money wages demanded fall and therefore w is sustained. But that will imply a lower cost of production for the employers, since the real wage in terms of domestic goods has fallen, and there will be an increase in domestic production. The economy eventually reaches its new equilibrium position at point B where output and employment level is higher, the terms of trade have been improved and the interest rate has returned to the *world* interest rate level. The latter is obtained via money market clearing afjustments caused by an increase in the real money supply which is implied by the exchange rate appreciation (and the subsequent fall in the domestic price level).

4. Nominal wage rigidity

In this section we analyse the effectiveness of monetary and fiscal policy to raise output and employment in a small open economy which faces nominal wage rigidity. The model that we utilise is almost identical to the one we used in the previous section, apart from the wage equation for which we assume that workers have a degree of "money illusion" and they are concerned, in a Keynesian framework, with the level of the nominal wage they receive rather than maintaining a target real wage rate. Therefore, workers do not concern themselves about the level of the consumer price level, when they make decisions about employment, but they negotiate for a certain level of money wage. In such a case the relevant aggregate supply schedule is described by equation (13b). In contrast to the previous case of real wage resistance hypothesis, we observe that while in the former aggregate supply of output solely depends on the terms of trade, here we conclude that the supply of output is determined by the domestic price level.

Hence, we once again solve a system of four equations, which are now given by (7), (9), (13b) and (15) for the values of the endogenous variables Y, P, e and σ given the values of the exogenous variables, H, G, P* and r* (via the assumption of interest parity).

Total differentiation of the above system of equations and assuming that initial values of e, P, P* and σ are equal to unity initially, will provide us with the following Jacobian matrix of the complete system.

$$J=\begin{bmatrix} (E_1-M_1-1) & 0 & 0 & (X_1-\in M-M_2) \\ L_1 & H & 0 & (1-\beta)L(1-\eta) \\ 1 & -\alpha\delta(\bar{W}^{-1})^{\delta} & 0 & 0 \\ 0 & 1 & -1 & 1 \end{bmatrix} \tag{22}$$

The vector of policy changes (dy) is:

$$dy=[dY,\ dP,\ de,\ d\sigma] \tag{23}$$

and the vector of policy changes (dx) is:

$$dx=\begin{bmatrix} -dG \\ dH \\ 0 \\ 0 \end{bmatrix} \tag{24}$$

Finally, the determinant of (22) is:

$$|J|=a\delta(\bar{W}^{-1})^{\delta}\ [(1-\beta)L(1-\eta)(E_1-M_1-1)-(X_1-\in M-M_2)L_1]-H(X_1-\in M-M_2) \tag{25}$$

We have already pointed out, in the previous section, the importance of the specific form of the demand for money function and in consequence the value of the income elasticity of demand for money, η, for the derivation of the effects of the monetary and fiscal policy. In the analysis which follows this will become more evident. Indeed, the sign of $|J|$ is ambiguous because of the presence of η, although the stability rules help us to sign it uniquely. The dynamics of the system imply that $|J|$ must be negative since there is the balance of payments equation (which we recall has been omitted because of the interest parity), so our system is one, effectively, of five equations. As always, we have been concerned with the sign of the Laursen - Metzler effect which has to be positive, and the Marshall - Lerner condition assumes to hold good.

Table 2 summarises the qualitative results of monetary and fiscal policy in a small open economy under the hypothesis of nominal wage rigidity.

In contrast to the case of RWR, an expansion of the money supply will have a positive effect on domestic output, as in the Mundell - Fleming type models, although we have included an aggregate supply function. (Similar results have been obtained by Casas (1975), Argy and Salop (1979) and Sachs (1980)). Therefore, in the presence of nominal wage rigidity monetary policy gains its usual effectiveness when nominal wage rigidity prevails. The effect that the increase in money supply

Table 2

Qualitative effects of monetary and fiscal policy under NWR

	Y	P	e	σ
Expansionary Monetary policy	+	+	+	+
Expansionary Fiscal Policy	?	?	?	–

? denotes ambiguous outcome.

will have on the domestic price level and the ecxhange will be such that an increase in output can be sustained in the new equilibrium. The monetary expansion will cause, usually, an increase in the domestic price level which will then, through the loss of competitiveness, reinforce an exchange rate depreciation. But, in contrast with the case of RWR monetary expansion it does not increase the price level and the exchange rate by the same percentage, but the exchange rate now depreciates more which results in an increase in the demand for domestic output, while on the other hand the price level increases with the money wage rigid at a specific level; the real wage for the employers falls and the production of output rises. In the final equilibrium σ will increase (deteriorate) by a size equal to the difference between the exchange rate depreciation and the rise in the domestic price level.

The case of monetary expansion in a small open economy, under NWR can be readily seen with the use of an expanded IS - LM apparatus. In Figure 3, the IS and LM schedules represent as always the equilibrium in the goods and money market respectively for given pairs of r and Y. In addition, the horizontal line at the fixed rate of interest explains the interest parity equation. Finally, we add the aggregate supply schedule which is shown to be vertical at a given level of output since the supply of output is independent of the rate of interest.

With the increase in the money supply the LM_0 schedule moves righwards to reflect the increase in real money balances. The interest rate begins to fall, which increase the demand for real money balances and this will lead to a rise in demand for output, and the IS_0 schedule begins to move rightwards as well. The economy, at the moment, is at point Π_2 where $r<r^*$. This point, though, cannot be sustained under interest parity. At Π_2 we observe capital outflows which force the exchange rate to depreciate increasing the demand for domestic goods even more: and that capital outflows and the exchange rate depreciation will continue until $r = r^*$.

Meanwhile, the domestic price also begins to rise because of the excess money supply and given the fixity of the money wage, the real wage W/P relevant to the producers goes down and hence the supply of output rises. The exchange rate effect on the consumer price index is irrelevant here since workers do not link the level of Q to their money wage demand. The economy then moves to its new final equilibrium at point Π_3 with the supply and demand of output increased, and with all three markets being in equilibrium once again.

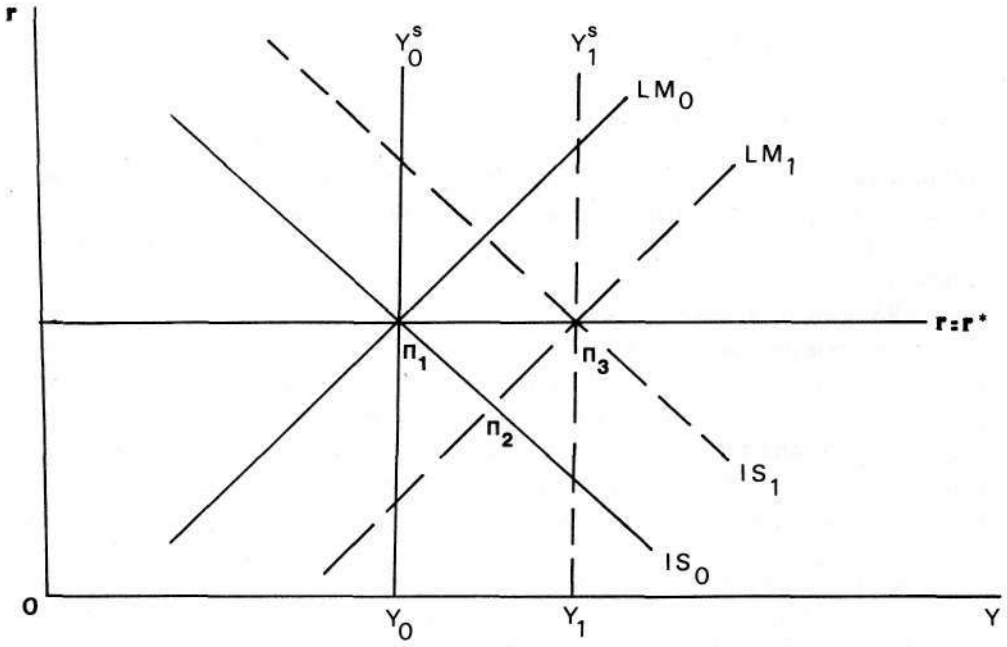

Figure 3. Monetary Expansion under NWR

In the case of a fiscal expansion in the small open economy the results are not clear-cut, in contrast to the classic Mundell - Fleming results of complete fiscal' ineffectiveness (Sachs (1980) also shows this impotency) or the expansionary effect that is shown by Casas (1975) as well as Argy and Salop (1979). Indeed, as it becomes obvious from the fiscal multipliers on output, the price level and the exchange rate (Appendix A) the final outcome of the increase in the level of the government expenditures crucially depends on the value of η which further stresses the fact that the specific form of the demand for money function plays a central role in the economy. This implies a differential impact of the increase of government expenditures on the money market and through that on the domestic price level, the interest rate and the exchange rate.

We can, therefore, distinguish three possible cases for the effects of expansionary fiscal policy.

(a) If $\eta < 1$ then fiscal policy is expansionary and $\partial Y/\partial G > 0$, $\partial P/\partial G > 0$, $\partial e/\partial G > 0$.
(b) If $\eta > 1$ then fiscal policy is contractionary and $\partial Y/\partial G < 0$, $\partial P/\partial G < 0$, $\partial e/\partial G < 0$.
(c) If $\eta = 1$ then fiscal policy is ineffective and $\partial Y/\partial G = 0$ (M – F result).

The unique result of a rise in G on the terms of trade further help us to discuss the effects of such a policy on the domestic price level and the exchange rate. In case (a) the exchange rate depreciates by less than the price level increases, while in case (b) the exchange rate will appreciate by more than the fall in the domestic price level.

In Figure 4(a) we show the case for an expansionary fiscal policy. The initial increase in government expenditures will raise aggregate demand and therefore the IS_0 schedule will begin to shift rightwards. The rise in income will then create excess demand for real balances and that will cause the interest rate to rise given the supply of money balances. However, because $\eta < 1$ the demand for money will rise less than income rises, and this will imply that the interest rate will rise by less than otherwise, in order to bring about equilibrium in the money market. But certainly we now have $r > r^*$ and there will be capital inflows which will make the exchange rate to appreciate but by not enough to crowd out completely the initial fiscal expansion. On the supply side of the economy nothing will happen initially since aggregate supply only depends on the nominal wage level and not on the terms of trade as in the case of RWR. But the increase in demand will cause the price level to increase. That will lead to an increase in production of domestic output, since producers consider in their employment decisions a lower real wage, given that nominal wage demands are fixed. Thus the Y_0^S schedule begins to shift to the right, as well. However, Π_2 is a point which cannot be sustained in the long – run since the interest rate must equal r^* at the final equilibrium. This will take the economy to point Π_3 where output is higher than before. The LM_0 schedule will shift rightwards because of the following argument. The LM schedule is fixed in position by a *given* level of real balances H/P; due to the increase in government expenditures the terms of trade are improving (falling). Additionally the demand for money $L(Y/\sigma, r)$ rises for a *given* interest rate. Because $\eta < 1$ the product $\sigma L(Y/\sigma, r)$ falls in final equilibrium and therefore we face an excess supply of money. To preserve equilibrium in the money market, Y rises to increase the real demand for money and therefore the LM_0 shifts rightwards, and the economy finds itself at the new final equilibrium at point Π_3. Finally, because of higher income (output) the increase in imports will cause the exchange rate to depreciate at the full equilibrium.

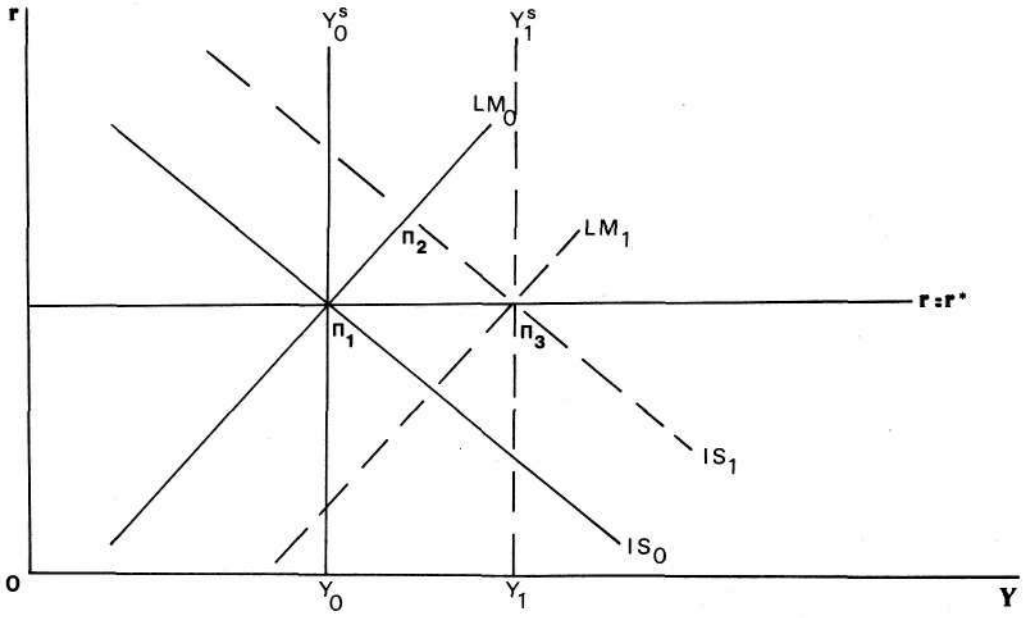

Figure 4(a). Fiscal Expansion under NWR

We now turn our attention to Figure 4(b) where we discuss the economics of a contractionary fiscal policy, an outcome which has been missed by Mundell (1963), Fleming (1962), Casas (1975), Argy and Salop (1979) and Sachs (1980).

Fiscal expansion will raise aggregate demand initially and the IS_0 will shift rightwards. But that will be the immediate effect. The effect of the government expenditure increase will cause income to rise and therefore the demand for real balances to rise. But since $\eta > 1$ the demand for money will rise by more than income rises and that will force the interest rate to rise much more than it would otherwise do, and that will engender a high capital inflow; the exchange rate will appreciate; strongly. The rise in the interest rate along with the exchange rate appreciation will cause domestic private expenditure to decline strongly; and aggregate demand falls causing the IS_1 curve to move leftwards. The initial fiscal expansionary effect has been eliminated and we are moving to a situation where the economy will settle to a lower point at the final equilibrium. The strong currency appreciation and the increase in the interest rate have caused a more than complete crowding out of the initial fiscal expansion. Moreover, the domestic price level and output begin to fall, and the economy moves to the new equilibrium at point Π_3. Since the domestic price level falls the real wage increases and therefore output decreases: The Y^S schedule moves leftwards. The LM_0 schedule also shifts leftwards, since there is an excess

demand for money. Why? Simply because with the fall in the terms of trade the demand for money $L(Y/\sigma,r)$ rises for a *given* interest rate. Since $\eta > 1$ the product $\sigma L(Y/\sigma,r)$ rises in final equilibrium and that creates an *excess* demand for money. To preserve equilibrium in the money market Y falls to decrease the real demand for money and therefore the LM_0 schedule shifts leftwards, with the economy setting down to the new equilibrium at point Π_3.

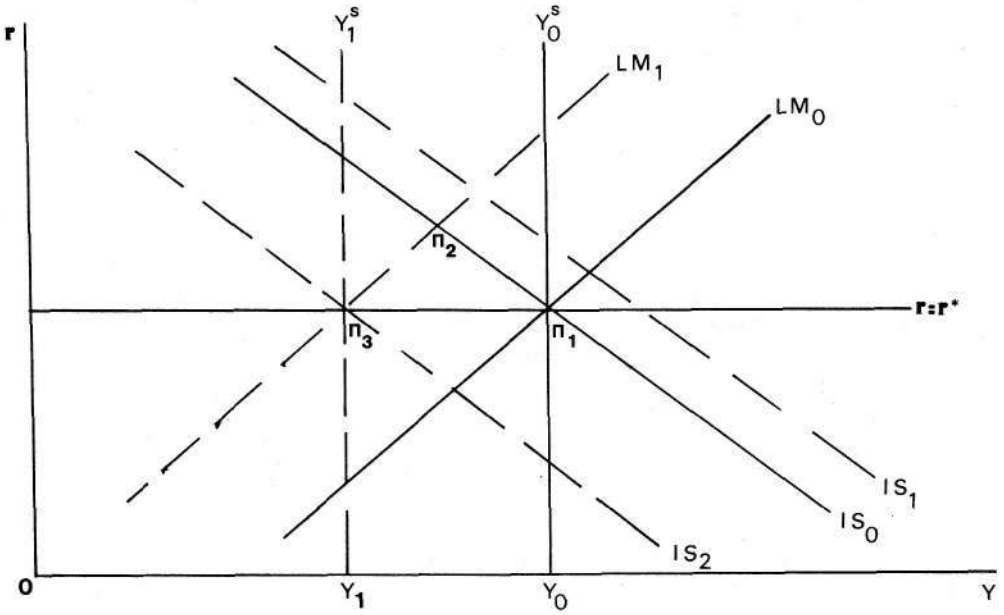

Figure 4(b). Fiscal Contraction under NWR

The analysis of expansionary or contractionary fiscal expansion has made clear that the final outcome depends on the assumptions we make about the demand for money equation and particularly about the value of η. From the solution of the model for the case of fiscal expansion we can see that if $\eta = 1$, fiscal policy becomes neutral with respect to changes on output and prices, precisely the result that Mundell – Fleming as well as Sachs (1980) have argued. This leads us to believe that previous models have extensively used a Keynesian money demand function of the type $M = yL(r)$ when the interest rate is fixed; and therefore always assuming that $\eta = 1$ (in a similar analysis Findlay and Rogriguez (1977)). Our money market equation is such that the demand for real money balanees is not homogeneous of degree one in Q, the consumer price index, and therefore we take into consideration the impact that Q could have, something that a Keynesian money demand function of the above type fails to do.

5. Conclusions

We have developed and analysed in this paper a one country model for a small open economy with a flexible exchange rate, perfect capital mobility and alternative wage regimes. After the formal derivation of the model we move on to the analysis of monetary and fiscal policies and their effectiveness on output, employment as well as on prices. Although we used a pseudo - dynamic model with the above features, we were able to provide a set of results for both cases which describe quite extensively the final outcome of alternative policies.

In the case where workers are aware of changes in the consumer price index and therefore "full indexation" prevails in the economy, workers are always keen to keep a target real wage fixed. In this situation, monetary policy was proved to be completely neutral and unable to cause any real effect in the economy. It raises the domestic price and the exchange rate one-for-one and nothing else. By contrast, a fiscal expansion was shown to be an effective policy since the exchange rate appreciates strongly creating changes in the consumer price level, and through that in the supply side of the economy. A lower cost - of - living makes workers lower their money wage demands and therefore production of domestic output increases; while the domestic price level falls below its long-run trend. These results are quite in line with the findings of other contributors such as of those by Casas (1975), Argy and Salop (1979), and Sachs (1980).

It was also made clear that the value of the income elasticity, η, is important in determining the effects of fiscal policy on output and prices under the hypothesis of real wage resistance.

When nominal wage rigidity prevails in the economy then monetary policy becomes an effective policy and output increases with a monetary expansion, while prices grow (and therefore real wages fall, so increasing production) and the exchange rate depreciates enough to increase the demand for output. Fiscal policy, however, can be either expansionary or contractionary. The value of the income elasticity of demand for money, η, is crucial now. That further implies that the assumptions we make about the demand for money function can affect the results. If $\eta < 1$ fiscal policy will be expansionary, while if $\eta > 1$ fiscal policy will be contractionary. Again this result is very much in contrast to conventional findings. Since earlier works have exploited the use of the Keynesian type demand for money $M = yL(r)$ and therefore $\eta = 1$, fiscal policy can be ineffective. Using our model and $\eta = 1$ we can show that this is true. Casas (1975), and Argy and Salop (1979), show that fiscal policy is expansionary, but they fail to recognise that the demand for money function can create a *contractionary* effect. Our findings on the effect of the change in government expenditure also contradict their results as well.

APPENDIX A

I. Real Wage Resistance

The solution of (18), (19) and (20) provides the respective multiplies for output, the domestic price level, the exchnage rate and the terms of trade for the case of monetary and fiscal policy.

$$\frac{\partial Y}{\partial H}=0; \qquad \frac{\partial P}{\partial H}=H>0; \qquad \frac{\partial e}{\partial H}=H>0; \qquad \frac{\partial \sigma}{\partial H}=0 \tag{1}$$

$$\frac{\partial Y}{\partial G}=\frac{Ha\delta(\beta-1)(\bar{w}^{-1})^{\delta}}{|J|}>0 \tag{2}$$

$$\frac{\partial P}{\partial G}=\frac{(\beta-1)[L(1-\eta)-a\delta(\bar{w}^{-1})^{\delta}\,L_1]}{|J|}\gtrless 0 \tag{3}$$

$$\frac{\partial e}{\partial G}=\frac{(\beta-1)[L(1-\eta)-a\delta(\bar{w}^{-1})^{\delta}\,L_1]+H}{|J|}\gtrless 0 \tag{4}$$

$$\frac{\partial \sigma}{\partial G}=\frac{\partial e}{\partial G}-\frac{\partial P}{\partial G}=\frac{H}{|J|}<0 \tag{5}$$

provided that $|J|<0$.

II. Nominal Wage Rigidity

In this case we can derive the multipliers monetary and fiscal policy from the solution of (22), (23) and (24), and we get:

$$\frac{\partial Y}{\partial H}=\frac{-(X_1-\in M-M_2)\,a\delta(\bar{W}^{-1})^{\delta}}{|J|}>0 \tag{6}$$

$$\frac{\partial P}{\partial H}=\frac{-(X_1-\in M-M_2)}{|J|}>0 \tag{7}$$

$$\frac{\partial e}{\partial H}=\frac{(E_1-M_1-1)\,a\delta\,(\bar{W}^{-1})^{\delta}-(X_1-\in M-M_2)}{|J|}>0 \tag{8}$$

$$\frac{\partial \sigma}{\partial H} = \frac{(E_1 - M_1 - 1)\, a\delta\, (\bar{W}^{-1})^{\delta}}{|J|} > 0 \tag{9}$$

$$\frac{\partial Y}{\partial G} = \frac{(\beta - 1)\, L\, (1-\eta)\, a\delta\, (\bar{W}^{-1})^{\delta}}{|J|} \gtreqless 0 \tag{10}$$

$$\frac{\partial P}{\partial G} = \frac{(\beta - 1)\, L\, (1-\eta)}{|J|} \gtrless 0 \tag{11}$$

$$\frac{\partial e}{\partial G} = \frac{(\beta - 1)\, L\, (1-\eta) + [L_1\, a\delta\, (\bar{W}^{-1})^{\delta} + H]}{|J|} \gtrless 0 \tag{12}$$

$$\frac{\partial \sigma}{\partial G} = \frac{[L_1\, a\delta\, (\bar{W}^{-1})^{\delta} + H]}{|J|} < 0 \tag{13}$$

provided that $|J| < 0$.

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