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AN ANALYSIS OF SOME PROPOSALS OF THE CAMBRIDGE ECONOMIC POLICY GROUP

by

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**Protection, Real Wage Resistance and Employment:  
An Analysis of Some Proposals of the Cambridge Economic Policy Group**

by Barry J. Eichengreen\*

The protectionist proposals of a group of economists affiliated with the Department of Applied Economics at Cambridge University (also known as the "Cambridge Economic Policy Group," hereinafter CEPG) have generated considerable controversy. According to the CEPG, the only feasible combination of policies with which the U.K. and other "relatively unsuccessful" industrial countries can achieve full employment in the next decade is import controls (either tariffs or quotas) plus expansionary fiscal policy.<sup>1</sup> The basic argument is that alternative policies, such as exchange rate depreciation, will be rendered ineffective by compensating wage and price inflation; hence protection is the only sustainable means of stimulating British industry in the face of balance of payments constraints. Critics of the "New Cambridge" view contend that import controls "are a snare and a delusion which will help to cripple the British economy in the long run, while having at best very doubtful merit in the short and medium run. Exchange rate adjustment is much to be preferred."<sup>2</sup> The controversy has entered its fifth year without showing signs of abating.

The CEPG proposals have been analyzed previously by Corbet, Corden, Hindley, Batchelor and Minford (1977), Corden, Little and Scott (1975), Blinder (1978), Hall (1978) and Dornbusch and Fischer (1979). Unfortunately, none of these authors succeeds in highlighting those characteristics of the British economy, or of the CEPG outlook, which make restrictive commercial policy a necessary adjunct to any plan for stimulating

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British output and employment. Cripps and Godley (1976) suggest that CEPG's conclusions follow from their adoption of three critical assumptions: (i) that all the disposable income of the private sector is spent on goods and services in the current or subsequent year; (ii) that the nature of the wage formation process in the U.K. is somehow unique; (iii) that concern with income distribution plays an unusually important role in this process. The assumption most frequently identified with the "New Cambridge" view is (ii); Corden, Little and Scott (1975), for example, organize much of their discussion of the CEPG proposals around the implications of real wage resistance for British economic policy. Fetherston and Godley (1978) contend that the central hypothesis of the "New Cambridge" School is (i); the nature of the British expenditure function is what constrains the set of feasible policy options. Yet the policy implications of these assumptions remain the subject of dispute.

This paper attempts to evaluate the CEPG proposals by analyzing the effects of macroeconomic policy under real wage resistance and flexible exchange rates. In the next section, the proposals of the CEPG are discussed in greater detail. The remainder of the paper is devoted to a theoretical analysis of the effects of protection and alternative policies when real wages are rigid. The model presented in subsequent sections is designed to emphasize the role of commercial policy as a tool of aggregate supply and aggregate demand management. Because real wages are fixed in this model, monetary policy and exchange rate depreciation exhibit conventional neutrality properties in the long run but also have no discernable impact effect. Commercial policy, on the other hand, raises output and employment in the long run if tariff revenues are used to finance production subsidies on domestic goods but is likely to lower output and employment in the long if tariff proceeds are neutrally redistributed. When nominal

wages are sticky or expectations are rational, there may be increasing scope in the short run for expansionary monetary and commercial policy.

### Section I

The crucial assumptions underlying the "New Cambridge" approach to British macroeconomic policy concern the determination of gross private expenditure and the determination of real and nominal wages. The proposition that the whole of U.K. private disposable income is spent on goods and services with a fairly short lag is based on econometric findings of the CEPG. A persistent feature of their results is that, with total private expenditure as the dependent variable, the regression coefficients on the current and previous years' nominal private disposable income sum to roughly unity.<sup>3</sup> Blinder's (1978) interpretation of this finding as a behavioral relation is that consumers spend their wealth at the beginning of each period and then save a fixed fraction of current income.<sup>4</sup> Fetherston and Godley's (1978) interpretation is that asset markets adjust completely within the span of a year; desired wealth is a fixed fraction of current income, and desired and actual wealth are equalized quickly. The assumption that asset markets clear more rapidly than commodity markets is common to many contemporary macro-models, although the assumption of a unitary marginal propensity to spend out of wealth is certainly at variance with assumptions commonly made about consumer behavior in the United States and elsewhere. The policy implications of this finding are not apparent, nor is it obvious why this result renders restrictive commercial policy more effective than exchange rate depreciation for stimulating output and employment. Implicit in the CEPG approach may be

the idea that any policy which causes capital losses on existing wealth induces a large decline in aggregate demand for British goods. Thus a devaluation of sterling may actually reduce aggregate demand for British goods if its expenditure-switching effect is more than offset by the expenditure-reducing effect of devaluation-induced capital losses. However, according to the CEPG assumptions, the expenditure-reducing effect of a devaluation runs its course in the first year. Hence, even if one accepts the econometric findings of the CEPG, the nature of the expenditure function in the U.K. may render devaluation ineffective only in the short or medium run.

To understand why the CEPG contend that devaluation cannot affect aggregate demand in the long run, the "New Cambridge" assumptions concerning the wage formation process must be considered. Members of the "New Cambridge" School have modeled British wage formation in a variety of ways. However, the basic proposition underlying each approach is that money illusion is absent from the labor market. Workers, who are fundamentally concerned with real disposable earnings, bargain on the basis of their expectations of future levels of prices and taxes. In one paper, Cripps and Godley (1976) assume that workers' expectations are static. Wage bargaining is based on the "taxes and price that prevail at the time of settlement," and real wages decline as a result of inflation over the duration of the contract period.<sup>5</sup> Other analyses by the CEPG and its critics recognize that the process according to which workers select wage targets is more complicated than Cripps and Godley suggest. These authors stress the role played by inflationary expectations and by concern with relative as well as absolute

real earnings. In addition, secular changes in the tightness of the labor market and in the government's role in the bargaining process may have had some permanent impact on labor's demands.<sup>6</sup> Fetherston and Godley (1978) and Posner (1978) emphasize that the degree of real wage resistance depends on institutional and political as well as economic factors.<sup>7</sup>

The two prevalent explanations for the rigidity of real wages in the U.K. focus on the political and economic power of trade unions and on government intervention in the bargaining process. Hicks (1975) and Corden, Little and Scott (1975) stress the role of market power in introducing real wage resistance into the labor market. They contend that certain trade unions have succeeded in obtaining sufficient market power to enforce a trend rate of real wage growth, at least in the short run. According to this explanation for British real wage resistance, the political and economic power of the trade unions limits the scope for real wage adjustment even in the face of large swings in the international terms of trade or in the rate of productivity growth. Increases in taxes or import prices which reduce real wages lead mechanically to a "catch-up" phenomenon in subsequent bargaining rounds.<sup>8</sup> Traditionally, there has been some dispute over the question of the extent to which fiscal policies should be considered in measuring labor's target real wage. From all appearances, British workers are becoming increasingly conscious of the effect of taxation of the real disposable wage.<sup>9</sup> The extent to which government spending is taken into account in figuring wage demands remains more of a question.<sup>10</sup>

The other institutional determinant of British wages in the

1970's has been incomes policy. Although U.K. governments traditionally have relied on moral suasion in attempting to control the rate of wage inflation, the Heath Government's 1972-74 incomes policy was a notable exception. The 1972-74 program began when the government introduced a five-month-long freeze on wages and salaries in November of 1972.<sup>11</sup> This phase of the program was followed by Stage 2, under which wage increases not in excess of certain weekly and annual ceilings were permitted, and then by Stage 3, beginning in October of 1973 and lasting for approximately twelve months, under which the wage ceilings were raised and provisions for wage indexation were introduced. Under Stage 3, wage increases were allowed to exceed the ceiling level of seven per cent per annum when the retail price index exceeded its level of October, 1973 by more than seven per cent.<sup>12</sup> Pay increases of up to 40 pence per week were permitted for every subsequent percentage point added to the retail price index. An increase of 40 pence a week for all workers was equivalent to roughly one per cent of the weekly wage bill, the idea being that a one per cent rise in retail prices would set in motion a one per cent rise in average wages.<sup>13</sup>

Stage 3 was designed with the presumption that Britain was entering a period of relative price stability, making it unlikely that threshold payments would have to be made.<sup>14</sup> However, the dramatic oil price increases of 1974-75 invalidated this assumption. When in April of 1974 the cost of living rose to 9.8 per cent above its October, 1973 level, three threshold payments were triggered. By June, 1974 only about twenty per cent of the labor force was covered by threshold agreements, but over the course of the year threshold provisions were included in

an increasing number of contracts.<sup>15</sup> Thus Stage 3 of the incomes policy had the effect of first delaying the impact of rising import prices on wages and then, once the threshold had been exceeded, accelerating the rate of wage increase despite the slowing of import price inflation. After lagging behind prices for much of 1974, real wages returned to their trend rate of growth in 1975. (See Table 1.)

Following the end of Stage 3 and the abolition of incomes policy, the rate of real wage increase accelerated noticeably.<sup>16</sup> Miller (1976) attributes this trend to the Labour Government's inability to resist wage increases in the public sector, with consequent spill-over effects in the private sector. 1977-78 was a period of relative stability for real wages in Britain; in fact, real earnings actually declined over much of this period. However, the recent rise in import prices has generated demands for wage increases in the range of 12-15 per cent which may reverse this trend.<sup>17</sup>

Table 1:

Inflation and Real Earnings

	Rate of Inflation			Real Earning Index	
	WPI	RPI	Earnings	WPI	RPI
1970	7.1	6.4	12.8	107.0	107.0
1971	9.1	9.4	11.1	109.1	108.7
1972	5.3	7.1	12.9	116.9	114.5
1973	7.4	9.2	12.9	122.9	118.4
1974	22.6	16.1	17.2	116.7	119.5
1975	22.2	24.2	26.1	118.7	121.4
1976	17.3	16.5	16.5	118.8	121.3
1977	19.7	15.8	10.2	109.9	115.5
1978*	8.1	7.7	15.5	107.8	114.5

\*Note: The rates for 1978 represent the inflation rates 77/II-78/II and appreciation 77/III-78/III. The last two columns show the average earnings index deflated by wholesale and retail prices respectively. Source: Dornbusch and Fischer (1979), p. 52.

Thus members of the "New Cambridge" School emphasize the automaticity with which price increases lead to wage increases. Real wage resistance is seen as placing significant limits on the effectiveness of economic policy. Writing in 1975, Hicks contended that, "Again, so long as Real Wage Resistance is unimpaired, neither exchange depreciation, nor import controls, nor increases in indirect taxation, nor removal of subsidies can be relied upon to do anything but set up a vicious circle... they simply accelerate the rise in wages. Thus, they lead to more inflation, and cannot be relied upon even to have a favourable effect on the balance of payments."<sup>18</sup> Devaluation, for example, does not succeed in changing relative prices because any rise in import prices is rapidly passed through into wages and into domestic prices. More recently, Hicks and members of the CEPG have asserted that import controls represent an important exception to this rule. According to Cripps and Godley (1978), import controls need have no inflationary consequences. Cripps and Godley recognize that import prices may rise, but they suggest that any tariff revenue accruing to the government may be used to reduce direct or indirect taxes or to place subsidies on home goods, thereby lowering other prices.<sup>19</sup> There may be a terms of trade gain from the imposition of a tariff and, other things remaining equal, this may increase the level of employment compatible with any real wage rate. Furthermore, given real wage resistance, a tariff is seen as capable of raising incomes sufficiently to increase the volume of international trade, and therefore its imposition should not provoke retaliation.

Critics of the CEPG question whether import restrictions can

be more effective than devaluation or expansionary monetary policy in raising output and employment when price increases are rapidly passed through into wage increases. Hall (1978), for example, emphasizes that tariffs or import quotas drive up domestic prices of imports and contends that the CEPR fails to recognize this fact. Corbet et al (1977) suggest that quotas or tariffs drive up the prices of import competing goods and contend that the CEPR disputes this position. The critics emphasize the additional disadvantages of protection: tariffs and quotas invite retaliation, tend to become increasingly pervasive over time, require extensive administration, and foster productive inefficiency.

In subsequent sections of this paper, some of these issues are analyzed in the context of a portfolio balance model of the British economy. In Section II the basic model is presented, and the effects of monetary, fiscal and commercial policy are analyzed. Lags in the adjustment of real wages are introduced in Section III, and the implications of adopting the assumption of rational expectations are examined in Section IV. The final section of the paper contains a brief conclusion.

## Section II

### A. The Basic Model

The model presented in this section is designed to illustrate the circumstances under which a tariff can be used to raise output and employment in the presence of real wage resistance and flexible exchange rates. It draws on previous work by Kouri (1975, 1976), Calvo and Rodriguez (1977), Argy and Salop (1978), Dornbusch and Fischer (1978) and Sachs (1979). To capture the essence of the real wage resistance

hypothesis, it is assumed, except where noted to the contrary, that labor is perfectly elastically supplied at a fixed real wage rate. This is the assumption adopted by Argy and Salop (1978), who defend it on grounds of analytical convenience, on the basis of econometric work which can be invoked in its support, and as a reasonable approximation to reality.<sup>20</sup> In the next section the behavior of the model is analyzed when the wage rate is sticky; following Sachs (1979), it is assumed that labor has a constant target real wage rate toward which the actual wage adjusts over time.

As in Kouri (1975), Dornbusch and Fischer (1978) and Argy and Salop (1978), domestic residents consume two goods, one of which is produced domestically and traded internationally and a second which is not produced at home but imported. The home country is sufficiently competitive in the market for its imports to take the world price of imports as given but sufficiently specialized in its exports that export prices are determined in the domestic output market. The supply side of the economy is drawn from Argy and Salop (1978). Real output is taken as an increasing function of labor and other inputs and can be written as:

$$(1) \quad Y = Y(L, \hat{Z}) \quad Y_L > 0 \quad Y_{LL} < 0$$

where  $Y$  is real output (GNP),  $L$  is employment (man-hours per year) and  $Z$  is other inputs.<sup>21</sup> The marginal product of labor is positive but declines with additional employment. Therefore a decline in the money wage or a rise in the output price make increased production and employment profitable.

$$(2) \quad Y = Y(P/w) \quad Y' > 0$$

where  $P$  is the price of the exportable and  $w$  is the nominal wage rate.

Labor supply is a function of the real wage. In this section it is assumed that the real wage demanded by labor is exogenous and that the labor supply curve is infinitely elastic. Thus:

$$(3) \quad w = \theta P^\alpha (TeP^*)^{(1-\alpha)}$$

where  $P^*$  is the world price of the imported commodity,  $e$  is the flexible exchange rate (defined as the domestic price of a unit of foreign currency),  $T$  is the tariff wedge (defined as one plus the rate of ad valorem taxation of imports), and  $\alpha$  is the share of domestic goods in domestic consumption.<sup>22</sup>  $P^*$  and  $\theta$  are exogenous and can be set equal to unity without loss of generality. It will be convenient to normalize  $e$  and  $P$  to one in the initial steady state. Given the assumption that the tariff is imposed rather than raised,  $T$  can also be set to one initially.

The supply side of this model is consistent with the assumption that firms are perfect competitors and profit maximizers and that they operate continuously on their demand curves for labor. In contradistinction to Fetherston and Godley (1978) and Sachs (1979), the level of output is not purely demand determined. As Blinder (1978) has noted, the assumption of a constant real wage is consistent with the assumption of a perfectly elastic aggregate supply curve only if firms do not operate on their production (and labor demand) functions. The inclusion of a fully articulated aggregate supply side is particularly important when analyzing the steady state properties of the model.<sup>23</sup>

Substituting (3) into (2) and simplifying yields the aggregate supply curve:

$$(4) \quad Y = Y((tT)^{\alpha-1}) \quad Y' > 0$$

where  $t$  ( $t = eP^*/P$ ) denotes the terms of trade.

Equation (4) embodies the crucial assumptions of the model. Aggregate supply depends on relative prices because producers choose the level of production so as to equate the value of labor's marginal product with the wage rate. Since the share of expenditure allocated to home goods ( $\alpha$ ) is necessarily less than one, a rise in domestic output prices relative to import prices raises the producer price index by more than the consumer price index. Producers respond by increasing employment and production until the marginal productivity of labor falls sufficiently to restore the equality of marginal cost and marginal revenue. Thus a deterioration in the terms of trade (an increase in  $t$ ) or imposition of a tariff (an increase in  $T$ ) ceteris paribus reduce aggregate supply. While the assumptions underlying equation (4) are highly restrictive, they highlight a principal channel through which tariffs affect production. A more general formulation is introduced subsequently.

Following Kouri (1976), residents allocate their wealth between domestic- and foreign-currency-denominated assets.

$$(5) \quad M = a(r)W$$

$$(6) \quad eM^* = (1-a(r))W$$

$$(7) \quad W = M + eM^*$$

where  $W$  is nominal wealth,  $M$  is outside money,  $M^*$  is foreign-currency-denominated assets held by home country residents, and  $r$  is the relative rate of return on the two assets.<sup>24</sup> Interest bearing assets are excluded from the model for sake of simplicity.<sup>25</sup> Initially it is assumed that expectations are static. Thus there are no expectations of capital gains and losses on assets, and "a" can be taken as a constant ( $0 < a < 1$ ). The case of a country which is a net foreign currency debtor is not considered.

The implications of assuming that expectations are rational are discussed in Section IV.<sup>26</sup>

Given the wealth identity (7), only one of the two asset demand functions is independent. Substituting (7) into (5) yields:

$$(8) \quad \frac{M}{eM^*} = c \quad \text{where } c = \frac{a}{1-a}$$

Note that this specification of the financial sector insures that what Kouri (1978) calls the "acceleration hypothesis" will hold: a current account surplus is associated with an appreciating exchange rate. So long as foreigners do not hold the home country's assets, residents of the home country accumulate foreign-currency-denominated assets whenever they run a current account surplus. Assuming that expectations are static,  $c$  in equation (8) is constant, and existing asset stocks will be willingly held only if any rise in  $M^*$  is accompanied by a fall in  $e$ .

A feature which distinguishes this portfolio balance model from the models presented by Argy and Salop (1978) and Sachs (1979), which are also concerned with stabilization policy in the presence of real wage rigidity, is that the link between the balance of payments and changes in the stock of foreign-currency-denominated assets is explicitly considered. In Argy and Salop (1978) and Sachs (1979) the economy is depicted as three markets -- goods, money and labor. Adding an external balance condition along with the requisite accounting identities to this framework makes clear the distinction between the short run and long run effects of a policy and facilitates analysis of the dynamic adjustment path. The current account of the balance of payments equals the excess of domestic income over domestic absorption. Recalling that  $P^* = 1$  by assumption, the current account, valued at world prices, can be identified

with the change in domestic holdings of foreign money:

$$(9) \quad M^* = \frac{1}{t} (Y - \frac{E}{P}) = \frac{1}{t} S/P$$

where E is domestic expenditure (or absorption) and S is domestic saving. Following Metzler (1949), "new saving" (as distinct from saving due to capital gains or losses on existing wealth) is a function of the discrepancy between actual and desired wealth, where desired wealth is proportional to income. As in Frenkel and Rodriguez (1975) and Dornbusch and Fischer (1978), all unanticipated capital gains are saved while consumption plans are exactly fulfilled.

$$(10) \quad S = u(v(PY + R) - M - eM^*) \quad u > 0 \quad v > 0 \quad uv < 1$$

where R denotes government transfer payments, discussed below. With  $u=1$  this specification is consistent with the Fetherston-Godley assumption that actual and desired wealth are equalized quickly. Note that it is necessary to assume  $uv < 1$  to assure that the marginal propensity to consume is positive.

The domestic goods market is assumed to clear continuously.

$$(11) \quad Y = \delta(tT)\frac{E}{P} + X(t) \quad X' > 0 \quad \delta' > 0$$

The number of units of the domestic good consumed by home-country residents and exported both depend positively on the relative price of foreign goods. Note that, with all prices normalized to one initially,  $\delta = \alpha$ .

Following Kouri (1976), the relationship between the government budget and the domestic money supply is simplified by assuming that the Central Bank acquires all government debt and does not intervene

in the foreign exchange market. Thus the exchange rate is allowed to float freely. Tariff revenues, denominated in terms of domestic goods, equal expenditure on imports times the ad valorem tax rate.

$$(12) \quad R = (T-1) (1-\delta) (Y - (uvY - uM/P - utM^*))$$

Making the appropriate substitutions, the system can be reduced to three equations in three unknowns:

$$(13) \quad M/P = ctM^*$$

$$(14) \quad Y((tT)^{\alpha-1}) = \delta(tT)((1-uv) Y((tT)^{\alpha-1}) + uM/P + utM^*) + X(t)$$

$$(15) \quad \dot{M}^* = \frac{1}{t} u (vY((tT)^{\alpha-1}) - M/P - tM^*)$$

In the long run, the steady state values of three endogenous variables  $(t, P, M^*)$  are determined so as to satisfy the portfolio balance (13), internal balance (14), and external balance (15) conditions. In addition, at every moment in time the temporary equilibrium values of  $t$  and  $P$  are determined so as to clear the domestic commodity and financial markets. To establish that this system satisfies the requirements for local dynamic stability, the portfolio balance condition can be substituted into the internal balance and external balance conditions, which then can be totally differentiated in the neighborhood of long run equilibrium, yielding:

$$(16) \quad \frac{dt}{dM^*} = \frac{-\delta u(1+c)}{(1-\delta(1-uv))Y'(1-\alpha) + \delta'Y + X' + \delta uW} \quad \text{Internal balance}$$

$$(17) \quad \frac{dt}{dM^*} = \frac{-(1+c)}{(1-\alpha)vY' + W} \quad \text{External balance}$$

Given the assumption that domestic commodity and financial markets clear continuously but that the change in foreign asset stocks need not

equal zero except in the steady state, dynamic stability requires that the absolute value of the slope of the internal balance condition (the GG curve in Figure 1) be less than the absolute value of the slope of the external balance condition (XX in Figure 1). Examination of (16) and (17) indicates that the system is stable.

B. Employment and Trade in a "Relatively Unsuccessful" Country

This model can be used to illustrate the plight of the "relatively unsuccessful" industrial country. According to Cripps and Godley (1978), the "relatively unsuccessful" country finds competing in international markets increasingly difficult due to both price and quality factors. In this model, a deterioration in the home country's competitive position can be represented by a series of shifts in the  $X(t)$  and  $\delta(tT)$  functions. A decline in the volume of goods which can be exported or sold at home at each value of the terms of trade shifts the GG curve to the right. The relative price of domestic goods must fall or the foreign-currency-denominated component of domestic wealth must rise if absorption is to increase sufficiently to clear the goods market. This rightward shift in the internal balance locus, from GG to G'G', is depicted in Figure 1. A one-time deterioration of the home country's competitive position shifts the point of temporary equilibrium from  $E_0$  to  $E_1$ . Thus the terms of trade deteriorate instantaneously. At  $E_1$  the economy lies to the right of the XX locus, indicating that actual wealth is greater than desired wealth. A series of current account deficits take place over time, and the economy traverses from the initial point of temporary equilibrium  $E_1$  to the steady state  $E_2$ . As foreign-currency-denominated assets are deaccumulated, the terms of trade continue to deteriorate. Since the

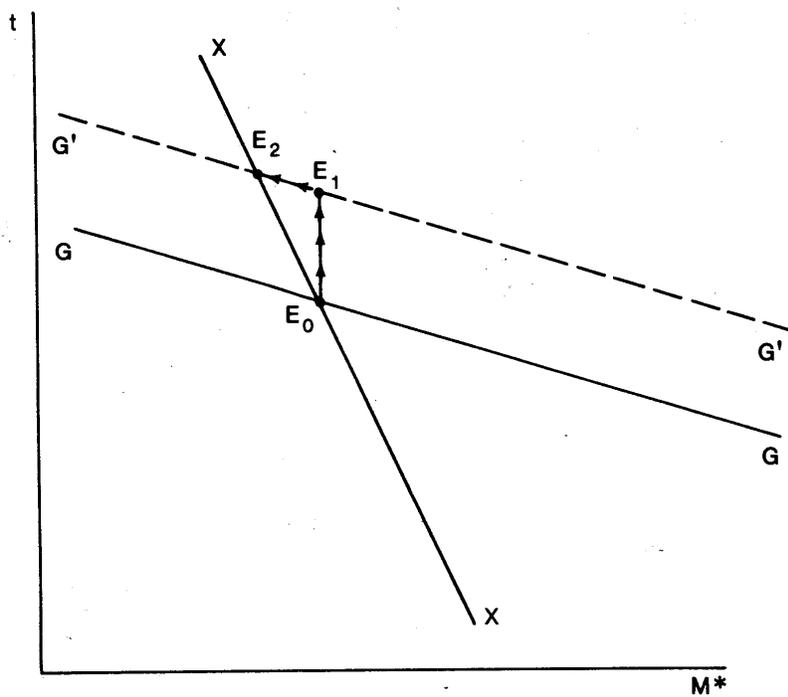


Figure 1

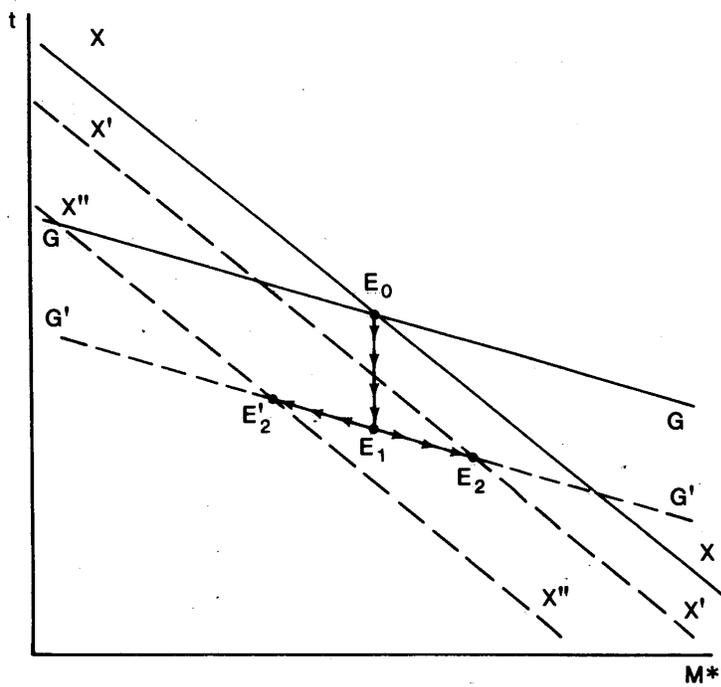


Figure 2

elasticity of the XX curve is greater than negative one, the value of foreign assets ( $tM^*$ ) is lower at  $E_2$  than at  $E_0$ . Since output and employment depend only on the terms of trade, the shift in the GG locus leads to an instantaneous decline in output and employment followed by continued deterioration of the domestic employment situation. As Cripps and Godley (1978) suggest, a deterioration in the relatively unsuccessful country's competitive position decreases output, employment and the value of external assets, is responsible for continued deterioration of the home country's terms of trade, and leads to a series of current account deficits.

C. Monetary and Fiscal Policy Experiments

This sub-section demonstrates that certain propositions about the effectiveness of monetary and fiscal policy under real wage rigidity established by Argy and Salop (1978) and Sachs (1979) also hold in this model.

In the absence of money illusion in the labor market, the critical determinant of the effectiveness of policy is whether it has a differential impact on the consumer price index and the producer price index or, equivalently, whether it has a differential impact on the value of the marginal product of labor and wage demands. For example, monetary policy and exchange rate depreciation are neutral not only in the long run but also instantaneously because they raise domestic output prices and nominal wages to the same extent. A doubling of the money supply leads to a doubling of all prices. Since wages are perfectly indexed in terms of the domestic price level, the demand and supply of labor are unchanged, and monetary policy has no employment effect in the short run and in the long run. Since real wealth and relative prices (the terms of trade) are unchanged, monetary policy has no impact on the balance of trade. On the other hand, fiscal policy is expansionary in the short run and in

the long run because it leads to excess demand in the goods market which is eliminated by an improvement in the terms of trade. This reduction in the relative price of imports lowers the consumer price index (and hence wage demands) relative to the producer price index (the domestic output price). The value of labor's marginal product rises relative to the wage rate, leading producers to increase output and employment until diminution of labor's marginal productivity restores the equality of marginal cost and marginal revenue.

The effects of expansionary monetary policy (a "helicopter-drop" of domestic currency), which is equivalent to exchange rate devaluation in this model, can be analyzed by totally differentiating equations (13) - (15), yielding:

$$(18) \begin{bmatrix} M \\ \delta uM \\ M \end{bmatrix} \begin{bmatrix} M \\ -\delta'Y - \delta uM^* - X' \\ -(1-\delta(1-uv))Y'(1-\alpha) \\ -(1-\alpha)vY' - M^* \end{bmatrix} \begin{bmatrix} c \\ -\delta u \\ -1 \end{bmatrix} \begin{bmatrix} dP \\ dt \\ dM^* \end{bmatrix} = \begin{bmatrix} dM \\ \delta u dM \\ dM \end{bmatrix}$$

The determinant of the Jacobian  $|A|$  is positive. Solving by Cramer's Rule reveals that  $\frac{dt}{dM} = \frac{dM^*}{dM} = 0$  and  $\frac{dP}{dM} \frac{M}{P} = 1$ . Just as in the models of Argy and Salop and Sachs, the system is homogeneous of degree one in money, the domestic price level, and the exchange rate. To establish that a doubling of the money supply leads to a doubling of the exchange rate, it is only necessary to recall that  $t=e/P$  and that, since  $e$  and  $P$  are normalized to one initially,  $dt = de - dP$ . Since output depends only on the terms of trade, which are unaffected by expansionary monetary policy, the level of employment and production is unchanged. In



Other things remaining equal, the increase in taxation reduces disposable income and desired wealth, shifting the XX locus to the left. Whether an increase in tax financed government spending leads to a series of current account deficits or surpluses depends primarily on the size of the desired wealth-income ratio  $v$ . If  $v$  is large, then increased taxation causes a large decline in desired wealth, and a series of current account deficits are required to reduce the value of external asset holdings. In this case, the XX curve shifts to  $X''X''$  and the steady state shifts from  $E_0$  to  $E_2'$ . If  $v$  is small, then increased taxation causes a relatively small decline in desired wealth and a series of current account surpluses is required to offset the capital losses resulting from the initial improvement in the terms of trade. In this case, the XX locus shifts to  $X'X'$  and the new steady state is located at  $E_2$ .

In contradistinction to the result derived by Argy and Salop (1978), in this model the balanced budget multiplier is unambiguously positive. Solving (19) for  $dt/dG$  and substituting into (4) yields the expression:

$$(20) \quad \frac{dY}{dG} = (1 - \alpha)Y' M(1 - c)(1 - \alpha(1-uv))$$

The balanced budget multiplier is larger the more elastic the aggregate supply curve ( $Y'$ ), the larger the proportion of domestic wealth held in the form of foreign-currency-denominated assets, the smaller the weight of home goods in the consumer price index ( $\alpha$ ) and the smaller the private sector's marginal propensity to consume ( $1 - uv$ ). The balanced budget multiplier is larger in the short run than in the long run if an increase in tax financed government spending leads to a series of current account deficits. In this case the instantaneous improvement in the terms of

trade from  $E_0$  to  $E_1$  is larger than the improvement in the terms of trade which takes place by the time the economy reaches the new steady state  $E_2'$ .

D. Commercial Policy Experiments

Having established that, as in the models presented by Argy and Salop (1978) and Sachs (1979), under real wage rigidity fiscal policy is effective and monetary policy is ineffective in raising output and employment, the uses of commercial policy can be considered. Here the analysis is restricted to the effects of imposing a uniform ad valorem tariff. Initially it will be assumed that tariff proceeds are neutrally redistributed via lump-sum subsidies. Subsequently it will be assumed that tariff proceeds are used to finance specific production subsidies on domestic goods. The effectiveness of a tariff in raising output and employment will be shown to depend largely on the disposition of tariff revenues. When revenues are neutrally redistributed, a tariff will raise the domestic relative price of imports unless a Metzler Paradox occurs. Except in this unusual case, this increase in the cost of living relative to the domestic output price raises wage demands (and producers' costs) relative to producers' receipts and induces firms to contract production until labor productivity rises sufficiently to restore the equality of marginal cost and marginal revenue. When revenues are used to finance a production subsidy, the increase in producers' revenues attributable to the subsidy is precisely large enough to offset the effect of the tariff on the cost of living and on wage demands. As long as imposition of a tariff improves the terms of trade, it decreases nominal wages and leads to the expansion of output and employment.



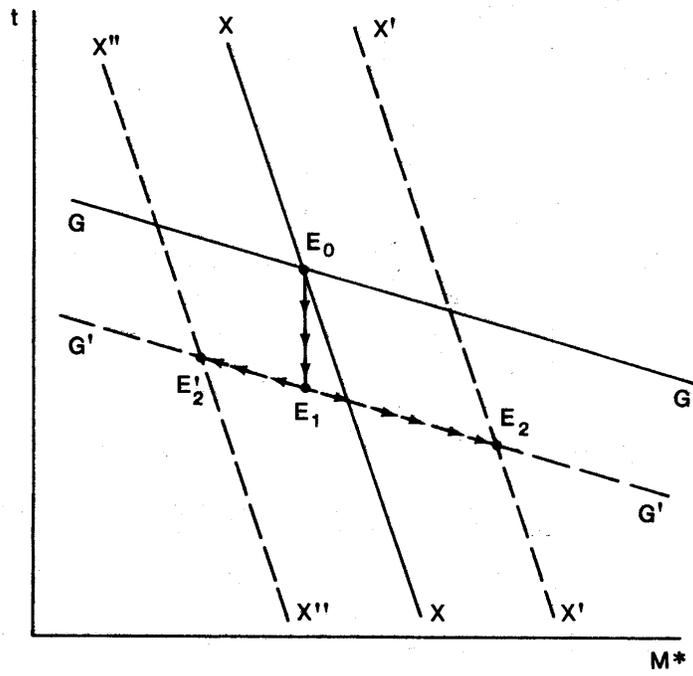


Figure 3

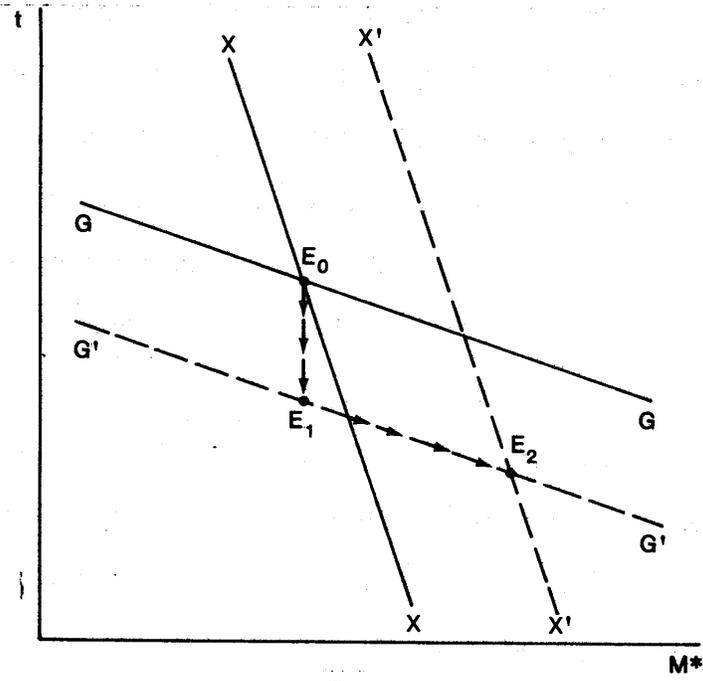


Figure 4

low, then XX shifts to the right, and the tariff unambiguously leads to a series of current account surpluses. However, if  $Y' > R'/(1-\alpha)$ , then XX shifts to the left, and a series of current account deficits is possible although not inevitable. These are the two cases depicted in Figure 3. A highly elastic aggregate supply curve is associated with current account deficits because the domestic relative price effect of the tariff leads to reductions in domestic production and desired wealth sufficiently large to induce the deaccumulation of foreign-currency-denominated assets. At the other extreme, if the aggregate supply curve is inelastic, the addition of redistributed tariff proceeds to producers' incomes raises desired wealth and leads to the accumulation of foreign-currency-denominated assets through the current account.

Using Cramer's Rule to solve (21) for a tariff's effect on the terms of trade when revenues are neutrally redistributed yields:

$$(22) \quad \frac{T}{t} \frac{dt}{dT} \Big|_{M^*=\hat{M}^*} = \frac{-(\psi + \delta(1-uv)R')}{\psi + X' + \delta uW}$$

$$(23) \quad \frac{T}{t} \frac{dt}{dT} = \frac{-(\varphi + \delta R')}{\varphi + X'}$$

where  $\psi = \delta'Y + (1-\delta(1-uv))(1-\alpha)Y'$

$$\varphi = \delta'Y + (1-\delta)(1-\alpha)Y'$$

It is clear from Figure 3 that the impact effect of a tariff when real wages are fixed is to improve the terms of trade. Equation (22) captures the extent of this improvement. From (23) it is clear that a tariff also improves the terms of trade in the long run regardless of whether it leads to a series of current account surpluses or deficits. Even in

the second case, when the tariff is followed by a series of deficits and the terms of trade deteriorate following their initial improvement, the post-tariff steady state value of  $t$  will be lower than the pre-tariff steady state value of  $t$ .

Equations (22) and (23) also illustrate the conditions necessary for the occurrence of a Metzler Paradox. The possibility that a tariff might depress the world relative price of importables to such an extent that the domestic relative price of imports falls as well, discussed by Metzler (1949), Södersten and Vind (1968) and Jones (1969), is more than a curiosity in this model. Given the rigidity of real wages, output depends exclusively on domestic relative prices, so only in the event of a Metzler Paradox does a tariff increase production and employment. The imposition of a tariff raises output instantaneously when:

$$(24) \quad \delta R' > X' + \delta u v R' + \delta u W$$

A tariff leads to a higher level of output and employment in the steady state when:

$$(25) \quad \delta R' > X'$$

From (24) and (25) it is apparent that the conditions necessary for a tariff to raise output are more restrictive in the short run than in the long run. As in Metzler's original article, the tariff-inclusive relative price of imports will fall in the long run if the foreign import demand elasticity ( $X'$ ) is sufficiently small.  $R'$  will be large if  $\delta'$  and  $\delta$  are small. Thus both inelastic domestic and inelastic foreign price elasticities of demand contribute to this possibility. In the short run,

a large marginal propensity to consume  $(1-uv)$  increases the likelihood that a Metzler Paradox will occur.

The results presented above derive from the assumption that the manner in which the government turns back tariff receipts to the private sector has no direct incentive effects. Government transfer payments affect supplies and demands for assets, goods and factors of production only as they alter the values of the model's endogenous variables. Cripps and Godley (1978) appear to suggest that commercial policy can be more effective than depreciation for raising output and employment precisely because tariff proceeds can be redistributed in non-neutral ways. It can be shown that replacing the assumption of lump-sum redistribution with the assumption that tariff proceeds are used to finance production subsidies on home goods in fact renders commercial policy effective in increasing output and employment whether or not a Metzler Paradox occurs.

Recalling that  $\delta=\alpha$  initially, that these two variables  $(\delta, \alpha)$  continue to be approximately equal for small changes in prices, and that tariff proceeds  $R$  can be approximated by the expression  $R = (1-\delta)Ye(T-1)$  (see footnote 28), the production subsidy  $(s)$  financed by tariff revenues can be taken to equal  $s = (1-\alpha)e(T-1)$ . The aggregate supply curve (2) is replaced by:

$$(2') \quad Y = Y \left( \frac{P + s}{w} \right)$$

Substituting (3) into (2') and simplifying yields the version of the aggregate supply curve analogous to (4):

$$(4') \quad Y = Y \left( (T - \delta(T-1)) (tT)^{(\alpha-1)} \right)$$

The differential of this expression with respect to T is zero. Since all terms in T cancel, the aggregate supply relation simplifies to:

$$(4'') \quad Y = Y (t^{(\alpha-1)}) \quad Y' > 0$$

All terms in T cancel because, for a given value of the world terms of trade, imposition of a tariff cum production subsidy raises receipts accruing to producers and wages paid by producers by precisely the same amount. Import prices (and wages) rise because of the tariff wedge, but subsidy-inclusive output prices rise by the same amount. Thus when tariff proceeds are used to finance production subsidies, aggregate supply depends exclusively on world relative prices and is independent of the tariff wedge. A tariff increases domestic output if it leads to an improvement in the terms of trade. Differentiating the portfolio balance, internal balance and external balance relationships with (4'') in place of (4) yields an expression for the system analogous to (21). The Jacobian A presented in (21) is unchanged. The vector on the RHS of (21) is altered only in that all terms in Y' drop out, since aggregate supply now is independent of changes in T. Due to the elimination of these terms, the imposition of a tariff cum production subsidy unambiguously raises desired wealth, shifting the XX locus to the right. Under neutral redistribution of tariff proceeds, imposition of a tariff ceteris paribus lowers the relative price of home goods, depressing production and reducing desired wealth; at the same time, the addition of redistributed tariff proceeds to other sources of income ceteris paribus raises desired wealth. Hence the direction in which the XX curve shifts is ambiguous. When tariff proceeds are used to subsidize domestic production, the first of these two effects is absent and the ambiguity is

eliminated. The tariff creates an incipient excess demand for home goods, for the same reasons as before, shifting the GG curve to the left. As depicted in Figure 4, imposition of a tariff shifts the point of temporary equilibrium from  $E_0$  to  $E_1$ . Since desired wealth rises, the tariff leads to a series of current account surpluses, and the terms of trade continue to improve over the course of the traverse. Output rises instantaneously and continues to rise over time until the steady state obtains. Once again it is possible for a Metzler Paradox to occur. However, in this case output rises whether or not there is a Metzler Paradox. (22) and (23), which capture the effect of the tariff on the terms of trade in the short run and long run, become, in the case where revenue is redistributed in the form of production subsidies:

$$(22') \quad \left. \frac{T}{t} \frac{dt}{dT} \right|_{M=\hat{M}^*} = \frac{-(\delta'Y + \delta(1-uv)R')}{\psi + X' + \delta uW}$$

$$(23') \quad \frac{T}{t} \frac{dt}{dT} = \frac{-(\delta'Y + \delta uvR')}{\varphi + X'}$$

where  $\psi$  and  $\varphi$  are defined as in (22) and (23). Note that, other things remaining equal, substituting a production subsidy for neutral redistribution of tariff proceeds reduces the size of the terms of trade effect which follows the imposition of a tariff. That is, the numerators of (22') and (23') are smaller in absolute value than the numerators of (22) and (23) respectively. For given values of  $t$  and  $T$ , output is larger when production is subsidized, so the size of the improvement in the terms of trade required to clear the domestic goods market is reduced.

According to the "New Cambridge" view, protection imposed by a "relatively unsuccessful" industrial country will stimulate international trade by increasing home country incomes and therefore raising import demand. Thus retaliation is said to be unlikely. However, if real wage resistance operates in the rest of the world as well as in the home country, then any measure, such as a tariff, which raises output and employment at home by improving the terms of trade does so at the expense of output and employment in the rest of the world. In this model, output and employment in a country with real wage resistance depend only on the terms of trade, and imposition of a tariff by the home country causes the terms of trade of the rest of the world to deteriorate. Other countries can raise their own levels of output and employment by imposing retaliatory tariffs or by adopting other measures which improve their own terms of trade. Thus if real wage resistance is a widespread problem, the possibility of retaliation should not be minimized.

The principal finding of this section is that whether a tariff can be used to raise output and employment under conditions of real wage resistance depends largely on the disposition of tariff proceeds. If tariff receipts are neutrally redistributed via lump-sum subsidies, a tariff will raise output and employment only if its imposition lowers the tariff-inclusive relative price of imports, or if a Metzler Paradox occurs. The occurrence of a Metzler Paradox is possible in the short run and the long run. However, given Britain's limited amount of monopoly power in markets for internationally traded goods, it appears unlikely that a tariff can be used to raise output and employment under these circumstances. On the other hand, if tariff receipts are used to finance

production subsidies on domestic goods, a tariff unambiguously raises output and employment both in the short run and in the long run. The subsidy raises producers' revenues to the same extent that the tariff increases their costs. Since imposition of a tariff improves the terms of trade, output rises instantaneously with the imposition of a tariff and continues to rise over time. Hence the viability of the proposals of the CEPG hinge crucially on the realism of their assumption that tariff receipts will be available to finance subsidies on domestic production.

### Section III

A highly restrictive assumption imposed throughout the previous section is that wages are precisely and continuously indexed in terms of the cost of living. In reality, it appears that British wages tend to lag behind prices, especially during periods of rapidly accelerating inflation, catching up only after two quarters or more.<sup>32</sup> In this section the model is extended so as to capture this phenomenon of wage stickiness.

As in Section IV, it is again assumed that tariff revenues are neutrally redistributed via lump-sum subsidies. This is the version of the model least favorable to proponents of the "New Cambridge" view. Since assuming that real wages adjust with a lag increases the scope for expansionary commercial policy, it is useful to "stack the cards" against the "New Cambridge" School in order to highlight this result.

The idea of a constant (or trend) real wage target, toward which actual wages adjust gradually over time, can be included in the model with the addition of a second differential equation:

$$(26) \quad \dot{w} = \gamma(w_t - w) \quad \gamma' > 0$$

where  $w$  is the actual nominal wage prevailing at a point in time and  $w_t$  is labor's target nominal wage, now defined by the RHS of equation (3). Equation (3) is reproduced here for the sake of clarity.

$$(3) \quad w_t = \theta P^\alpha (TeP^*)^{1-\alpha}$$

Except for the definition of  $w_t$ , (26) is identical to a formulation presented in Sachs (1979). In the steady state,  $\dot{w}=0$ , and the wage equals its target level. Since this target level is the same as in Section II, it follows that the long run effects of a tariff are the same as when the constancy of the real wage is maintained continuously. However, it is possible for a tariff to have quite different effects in the short run.<sup>33</sup>

The impact effect of a tariff now is defined as its effect on  $Y$ ,  $t$  and  $P$  before  $w$  and  $M^*$  are allowed to adjust. Just as is the case when the real wage is constant, the imposition of a tariff creates an incipient excess demand for domestic goods, which must be eliminated by some combination of an improvement in the terms of trade (which raises the relative price of home goods) and a rising domestic output price (which reduces wealth and absorption while increasing domestic production). As depicted in Figure 4, the impact effect of a tariff is to shift the point of temporary equilibrium from  $E_0$  to  $E_1$ . The instantaneous improvement in the terms of trade induced by the tariff causes capital losses on foreign assets. From (13) it is evident that portfolio balance

requires this decline in the value of foreign balances to be accompanied by a rise in the price of domestic output, which decreases the value of domestic-currency-denominated real balances. Since  $P$  rises and  $w$  is fixed, the tariff instantaneously raises the level of domestic production.

The dynamic response which follows this impact effect can be analyzed by recognizing that equations (15) and (26) constitute a two-variable differential equation system. The local stability conditions can be examined by linearizing (15) and (26) around steady state values of  $w$  and  $M^*$  (where steady state values are denoted by a zero subscript) and studying deviations from long run equilibrium. The signs of the elements of the Jacobian are indicated:

$$(27) \quad \begin{pmatrix} \dot{w} \\ \dot{M}^* \end{pmatrix} = \begin{bmatrix} - & - \\ ? & - \end{bmatrix} \begin{pmatrix} w - w_0 \\ M^* - M_0^* \end{pmatrix}$$

The sign of  $\dot{w}_1$  follows from differentiation of (26), noting that  $dw_t/dw < 1$ .<sup>34</sup>  $\dot{w}_2$  is negative because current account surpluses are associated with an appreciating exchange rate, and the fall in  $e$  induces a decline in the nominal wages over time.  $\dot{M}_2^* < 0$  because a rise in  $M^*$  increases actual wealth relative to desired wealth, raising absorption relative to income. The sign of  $\dot{M}_1^*$  is the same as the sign of (28):

$$(28) \quad 1 - Y' (\delta + \delta^*) \gtrless 0$$

If the aggregate supply curve is inelastic ( $Y'$  is small), then (28) is positive and the  $\dot{M}^*=0$  locus is upward sloping in  $M^*-w$  space. A rise in  $w$  induces a rise in  $P$  which, other things being equal, causes capital losses on existing wealth, reduces absorption relative to income and leads to the accumulation of assets through the current account. The

trace and determinant conditions on the Jacobian in (27) sufficient for local dynamic stability of the system are satisfied unambiguously. This is the case depicted in Figure 5. Imposition of a tariff shifts both the  $\dot{w}=0$  and the  $\dot{M}^*=0$  loci to the right. A tariff raises the price level, increasing the target wage consistent with any level of foreign-currency-denominated assets and shifting the  $\dot{w}=0$  curve to the right. The addition of redistributed tariff revenues to producers' incomes increases desired wealth, shifting the  $\dot{M}^*=0$  to the right. In the case of a positively sloped  $\dot{M}^*=0$  curve, a tariff unambiguously leads to a series of current account surpluses. Nominal wages may either rise or fall in the long run. (The borderline case is depicted in Figure 5.) The instantaneous effect of the tariff is an increase in the level of domestic production. Over time nominal wages begin to rise, and current account surpluses occur. The accumulation of foreign assets induces exchange rate appreciation, and as the price of imports falls the rise in the domestic price level is moderated or reversed. Whether output rises or falls over time following the initial rise in production depends on elasticity conditions similar to those presented in (22) and (23).

If the aggregate supply curve is relatively elastic, then the  $\dot{M}^*=0$  curve will be negatively sloped. The determinant condition for local dynamic stability will be satisfied only if the  $\dot{M}^*=0$  curve is steeper in  $M^*-w$  space than the  $\dot{w}=0$  curve. This is the case depicted in Figure 6. Assuming that the determinant condition holds, a variety of stable dynamic paths are possible. One set of trajectories is similar in nature to those which obtain when the  $\dot{M}^*=0$  curve is positively sloped. Once again the borderline case, connecting  $E_0$  and

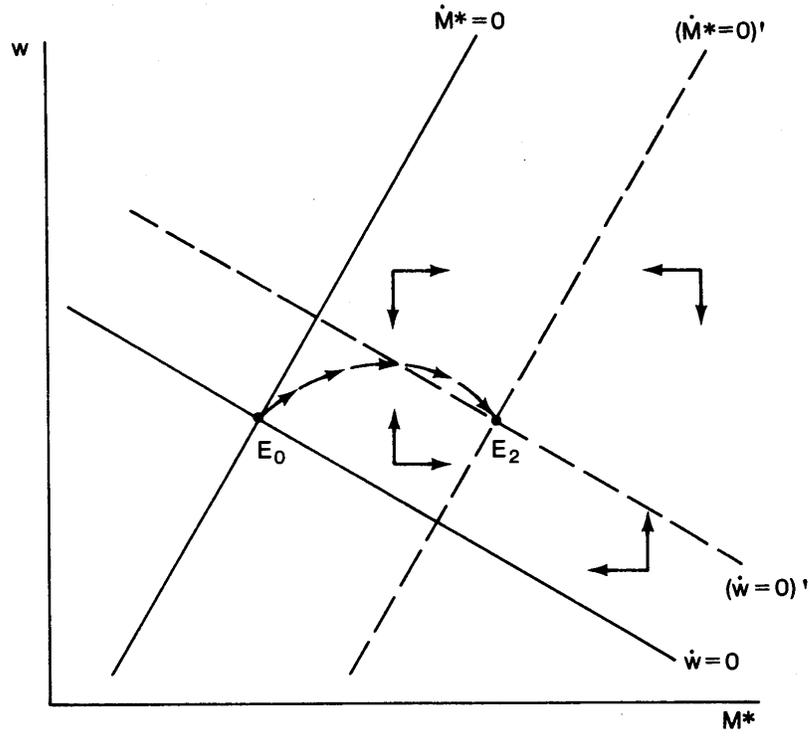


Figure 5

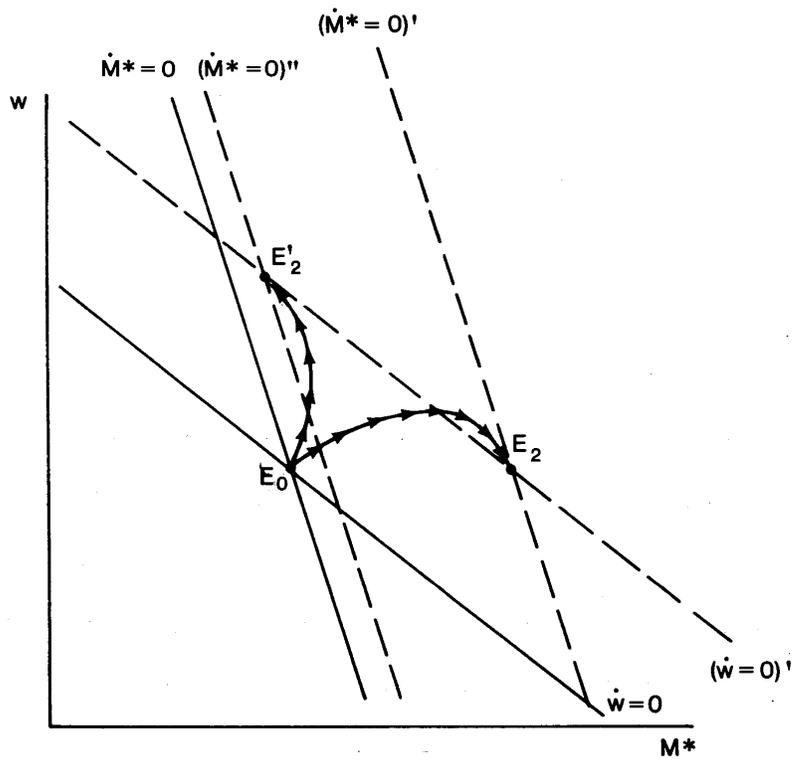


Figure 6

$E_2$ , is depicted in Figure 6. However, when the aggregate supply curve is extremely elastic, an increase in nominal wages reduces output and desired wealth considerably, inducing a series of current account deficits and reducing  $M^*$  in the long run. A trajectory such as that connecting  $E_0$  and  $E_2'$  is possible. Imposition of a tariff will lead to a series of current account surpluses followed by a series of current account deficits. If stocks of foreign-currency-denominated assets are permanently reduced, the wage rate will be higher in the post-tariff steady state than in the pre-tariff steady state.

In this section it has been shown that, when labor maintains a constant target real wage but actual wages adjust toward target wages with a lag, there is increasing scope for expansionary commercial policy in the short run. Even if tariff proceeds are neutrally redistributed, production will rise in the short run because wages are sticky and a rise in the domestic output price must accompany the tariff-induced improvement in the terms of trade if portfolio balance is to be maintained. Since the steady state properties of the model are unaltered, given neutral redistribution of tariff proceeds this increase in the level of production will be more than offset in the long run unless a Metzler Paradox occurs.

#### Section IV

The analyses of previous sections suggest that a tariff is unlikely to raise the steady state levels of output and employment in the presence of real wage resistance and neutral redistribution of tariff proceeds but that, depending on the characteristics of the dynamic adjustment path, under certain circumstances it becomes increasingly

likely that a tariff will have expansionary effects in the short run. One characteristic of the economy which alters the nature of the dynamic adjustment path and is likely to influence the effectiveness of commercial policy in the short run is the nature of expectations.

In this section expectations are assumed to be rational rather than static. Hence portfolios are adjusted in response to relative rates of return on alternative assets. The rate of return on domestic real balances  $M/P$  is simply the rate of domestic output price deflation  $-\dot{P}/P$ . The rate of return on foreign-currency-denominated real balances  $tM^*$  is equal to the rate of change of the terms of trade. Given the assumption of constant world prices,  $\dot{t}/t = \dot{e}/e - \dot{P}/P$ . Thus the difference between the two rates of return is simply the rate of exchange depreciation.<sup>35</sup> In a non-stochastic model, rational expectations are equivalent to perfect foresight, so in the rational expectations version of the model anticipated rates of return on alternative assets are merely the actual rates of return. There remains room for greater realism in the modeling of expectations formation, but the rational expectations hypothesis is a useful simplification in a model designed to explore the implications of the premise that investors adjust their portfolios in response to sophisticated forecasts of relative returns.

In this model, adding the assumption of rational expectations increases the scope for expansionary commercial policy. If investors' rational expectations lead to instantaneous appreciation of the exchange rate, then the size of the improvement in the terms of trade necessary for maintenance of portfolio balance is increased. Since output depends only on the terms of trade, a tariff's initial output effect may be magnified.

As in a variety of models, expectations affect the path by which the economy approaches the steady state but not the characteristics of that steady state. Thus substituting rational expectations for static expectations does not change the results in the long run.

In equations (5) - (6),  $r$  can be replaced by  $\dot{e}/e$ , and (8)

becomes:

$$(29) \quad \frac{M}{eM^*} = c \left( \frac{\dot{e}}{e} \right) \quad c' < 0$$

If the exchange rate depreciates, the relative rate of return on domestic assets is reduced. Therefore anticipations of depreciation motivate investors to shift into foreign-currency-denominated assets. Equivalently, higher values of  $M^*$  and  $e$  are compatible with portfolio balance only if there exist expectations of exchange rate depreciation. Plotting those combinations of  $e$  and  $M^*$  compatible with portfolio balance given no anticipated change in the exchange rate yields the downward sloping  $\dot{e} = 0$  locus in Figure 7.

Next it is necessary to determine those combinations of  $e$  and  $M^*$  compatible with external balance. It will be assumed that the Marshall-Lerner condition holds: that exchange rate depreciation improves the current account.<sup>36</sup> It will also be assumed that an increase (decrease) in foreign assets creates a current account deficit (surplus).<sup>37</sup> Given these assumptions, the combinations of  $e$  and  $M^*$  compatible with external balance can be plotted in  $M^*-e$  space, yielding the upward sloping  $\dot{M}^*=0$  locus depicted in Figure 7.

The local stability conditions can be examined by linearizing (29) and (15) around equilibrium values of  $e$  and  $M^*$  and studying deviations from that equilibrium. The signs of the elements of the Jacobian are indicated below:

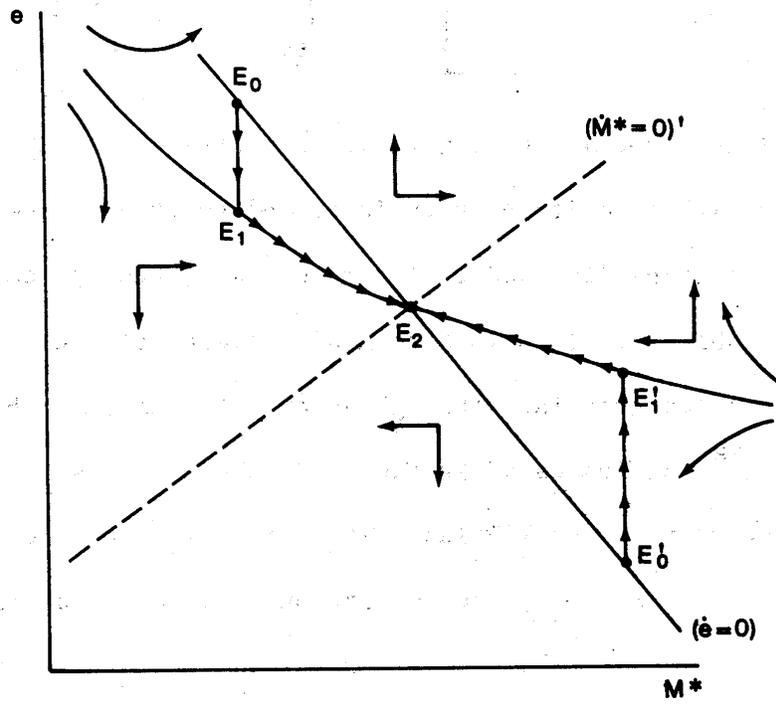


Figure 7

$$(30) \begin{pmatrix} \dot{M}^* \\ \dot{e} \end{pmatrix} = \begin{bmatrix} - & + \\ + & + \end{bmatrix} \begin{pmatrix} M^* & - & M_0^* \\ e & - & e_0 \end{pmatrix}$$

Sufficient conditions for local stability of the  $M_0^*, e_0$  equilibrium are a Jacobian with a positive determinant and negative trace. It is obvious that the stability conditions are not met; the system exhibits knife-edge instability. This is a commonly encountered result in rational expectations models, although unconventional cases have been shown to exist.<sup>38</sup> As indicated in Figure 7, there exists a unique path converging to full equilibrium. However, given the indeterminacy of the exchange rate, only the assumption that full equilibrium is achieved eventually (that the exchange rate does not appreciate or depreciate without end) assures that the initial exchange rate will be chosen so as to put the economy on the stable arm. This assumption is reasonable so, following Brock (1974) and others, it is adopted and the dynamic adjustment to the imposition of a tariff is examined.

The nature of expectations formation does not affect the steady state values of the endogenous variables, although it alters the path by which the economy approaches the steady state. In this section again it is assumed that tariff receipts are neutrally redistributed via lump-sum subsidies. Because the stable arm in Figure 7 is negatively sloped, it follows that, just as under static expectations, current account surpluses (deficits) are associated with exchange rate appreciation (depreciation). The imposition of a tariff shifts the  $\dot{M}^*=0$  to the right or the left, depending on whether the tariff ultimately raises or lowers domestic stocks of foreign-currency-denominated assets.<sup>39</sup> If the tariff shifts the  $\dot{M}^*=0$  locus

to the right, leading to a series of current account surpluses, then the point of temporary equilibrium in Figure 7 shifts from  $E_0$  to  $E_1$ . Given expectations of appreciation, a given level of foreign assets will be willingly held only if its domestic value is reduced; that is, if the exchange rate appreciates instantaneously. If the tariff shifts the  $\dot{M}^*=0$  locus to the left, leading to a series of current account deficits, then the point of temporary equilibrium shifts from  $E'_0$  to  $E'_1$ . In this case, expectations of eventual exchange rate depreciation induce instantaneous depreciation followed by continued depreciation over the traverse from  $E'_1$  to  $E_2$ .

The question motivating this section is whether the substitution of rational expectations for static expectations magnifies or moderates the initial improvement in the terms of trade. The impact effect of a tariff under rational expectations is given by (31):

$$(31) \quad \frac{T}{t} \frac{dt}{dT} \Big|_{\hat{M}^*=\hat{M}^*} = \frac{-(\psi + \delta(1-uv)R')}{\psi + X' + \delta uW} - \frac{M^* \delta u W c' (d(e/e)/dT)}{\psi + X' + \delta uW}$$

where  $\psi$  is defined as in equation (23). The first term on the RHS of (31) is merely the impact effect of a tariff on the terms of trade under static expectations as it appears in equation (22) of Section II. The second term is the additional impact effect when expectations are rational. If imposition of a tariff leads to current account deficits and exchange rate depreciation, then  $d(e/e)/dT$  is positive. The second term on the RHS of (31) is positive; hence the size of the instantaneous improvement in the terms of trade required to clear the domestic goods

market is reduced. The instantaneous depreciation of the exchange rate causes capital losses, thereby reducing absorption. Indeed the possibility that the absolute value of the second term will be larger than the absolute value of the first cannot be ruled out. If capital losses are large and the speed at which actual and desired wealth are equalized ( $u$ ) is high, then it is possible under rational expectations for the terms of trade to deteriorate instantaneously. In this case a tariff must reduce output and employment in the short run. As a rule, the short run effects of a policy are more similar to its long run effects under rational expectations than under alternative expectational structures. In the case where the imposition of a tariff leads to exchange rate depreciation this model exhibits a notable exception to this rule: it is possible for the terms of trade to deteriorate initially while improving in the long run.

If imposition of a tariff leads to current account surpluses and exchange rate appreciation, the effect of second term on the RHS of (31) reinforces the effect of the first term. In this case, substituting rational expectations for static expectations magnifies the tariff's initial terms of trade effect. Expectations-induced capital gains raise absorption relative to output, and the size of the instantaneous improvement in the terms of trade necessary to shift demand away from the domestic goods market is increased. As long as the tariff leads to a series of current account surpluses, it is more likely to increase output and employment in the short run under rational expectations than under static expectations.

#### Section IV

The model of tariffs and real wage resistance presented in this paper suggests that implementation of the protectionist proposals of the

CEPG is likely to raise output and employment in the long run only if tariff proceeds are used to finance production subsidies or to reduce indirect taxes. If tariff receipts are redistributed via lump-sum subsidies, a tariff will raise output and employment only if it improves the terms of trade sufficiently to lower the tariff-inclusive relative price of imports. It appears unlikely that, in the long run, the imposition of a tariff by the British government would have such a large effect.

The story may be quite different in the short run. If nominal wages adjust toward the real wage target with a lag, then there is increasing scope for raising output and employment in the short run through restrictive commercial policy. Similarly, if the imposition of a tariff leads to exchange rate appreciation, investors' expectations of appreciation give rise to immediate capital gains which magnify the tariff's terms of trade effects and increase the likelihood of a rise in output and employment in the short run. Thus whether one views the proposals of the CEPG as a sensible policy prescription for British unemployment depends, first, on whether one perceives as realistic the assumption that tariff receipts will be available to finance production subsidies and, second, whether one has a short run or a long run perspective on the unemployment problem.

Footnotes

- 1/ For example, see Cripps and Godley (1978), p. 327.
- 2/ Corden, Little and Scott (1975), pp. 1-2.
- 3/ See Fetherston and Godley (1978).
- 4/ See Blinder (1978).
- 5/ Cripps and Godley (1976), pp. 341-2.
- 6/ Hicks (1975), p. 5; Dornbusch and Fischer (1979), pp.56-7.
- 7/ See Fetherston and Godley (1978), passim, and Posner (1978), passim.
- 8/ Dornbusch and Fischer (1979), pp. 56-7.
- 9/ According to page 1 story in the Financial Times, "A big increase in indirect taxes in tomorrow's UK Budget could lead to claims for wage rises of 20 per cent or more in the next pay round, according to the leaders of two of Britain's biggest trade unions ..." See Riddell (1979), p. 1.
- 10/ See Miller (1976), p. 515.
- 11/ The freeze was responsible for a large number of anticipatory settlements in preceding months, and the pre-freeze agreements were allowed to stand. See Miller (1976), p. 503.
- 12/ Unlike Denmark's indexing scheme, the price index used to compute real wages included import prices. See Braun (1976), p. 251.
- 13/ However, 40 pence represented considerably more than one per cent of the wages of low paid workers; hence the wages of the low paid were more than fully indexed while the wages of the high paid were less than fully indexed. See Braun (1976), pp. 250-3.
- 14/ Sachs (1979), p. 10.
- 15/ Braun (1976), p. 250.
- 16/ Miller (1976), p. 515.
- 17/ Dornbusch and Fischer (1979), pp. 51-2.
- 18/ Hicks (1975), pp. 12-3.
- 19/ Cripps and Godley (1978), p. 331.

20/ See Argy and Salop (1978), p. 3, p. 8, p. 9. This formulation can be viewed as an extension of a class of open economy Income-Expenditure models in which labor is infinitely elastically supplied at a fixed nominal wage. See Mundell (1961), Fleming (1962), Tobin and Macedo (1979), and Eichengreen (1979).

21/ The usual convention is followed of letting dots denote time derivatives, primes denote derivatives, and subscripts indicate partial derivatives. A "hat" over a variable indicates that the variable is fixed.

22/ In the more general case, the labor supply curve may be upward sloping or backward bending. In this case,  $\theta' \geq 0$ .

23/ See Blinder (1978).

24/ It is assumed throughout that foreigners do not hold the home country's assets. On the implications of relaxing this assumption, see Kouri (1978). For an identical formulation of the financial sector see Dornbusch (1979).

25/ Thus no distinction between the balance of trade and the current account is necessary.

26/ Note that static expectations are validated in the long run, since in the steady state realized capital gains and losses on assets are absent.

27/ An alternative fiscal policy experiment involves computing the effects of a bond-financed increase in government spending. However, in this framework the modeling of a bond-financed increase in government spending presents analytical difficulties. In this two-asset model it must be assumed that the government finances its purchases through sales of bonds which are perfect substitutes for the foreign asset  $M^*$ . Ceteris paribus, an increase in the size of the government budget deficit causes  $M^*$  to rise. An increase in government spending creates an incipient excess demand for domestic goods. This can be eliminated either by a rise in their relative price or by a reduction in foreign asset holdings. Private holdings of  $M^*$  will rise over time unless the value of domestic wealth is increased either by a rise in  $t$  or a rise in  $M^*$ . Thus expansionary fiscal policy shifts the GG curve to the left and the XX curve to the right, as depicted in Figure 4. The impact effect of an increase in government spending is to shift the point of temporary equilibrium from  $E_0$  to  $E_1$ . An immediate improvement in the terms of trade is necessary to clear the domestic goods market. As foreign assets are accumulated, the terms of trade continue to improve, and the economy traverses from the initial point of temporary equilibrium  $E_1$  to the steady state  $E_2$ . At  $E_2$ ,  $M^* = 0$  but, since the government continues to purchase domestic goods by selling foreign-currency-denominated assets (or domestic assets which are perfect substitutes for them), at  $E_2$  there exists a persistent current account deficit precisely equal in size to the government budget deficit. These results are consistent with the "New Cambridge" proposition that expansionary fiscal policy raises output and employment but in the absence of other measures also leads to a series of current account deficits.

28/ Differentiating (12) with respect to T yields  $dR = (1-\delta)YdT$ . The change in revenues following the imposition of a tariff is roughly proportional to that portion of income spent on imports. This expression overstates the value of tariff proceeds, except in the case of an inelastic demand curve, due to the omission of second order effects. Using a Taylor Series to expand (11) around  $T=1$  yields the more accurate expression  $dR = (1-\delta)YdT - \delta'Y(dT)^2$ .

29/ It is important to clarify the sense in which the redistribution of tariff proceeds raises income. Y is not real income, but rather nominal income accruing to producers deflated by the domestic output price. R is nominal transfers to domestic residents, also deflated by the output price. Therefore the two sources of income must be added together if all sources of income are to be accounted for.

30/ See footnote (28).

31/ If it is assumed that workers are concerned with after-tax wage rates and that government revenues are used to finance production subsidies, the output and employment effects of a tariff and a uniform consumption tax are identical. Both a tariff and a consumption tax cum production subsidy increase output and employment by raising the domestic output price inclusive of subsidies relative to the consumer price index inclusive of taxes.

32/ Sachs (1979), pp. 19-21.

33/ It is noteworthy that monetary policy is no longer neutral in the short run once lags in the adjustment of wage rates are added. See Sachs (1979).

$$34/ \quad dw_e/dw = -1 + \alpha dP/dw = -1 + \alpha \frac{(1-\delta(1-uv))Y'}{((1-\delta(1-uv))Y' + \delta'Y + \delta uW)}$$

35/ Strictly speaking, the Marshall-Lerner condition refers to the effect of a depreciation on the current account in a pure trade model. Here it is taken to refer to the total effect of depreciation on the current account in a financial model. Substituting (14) into (15) and differentiating with respect to e reveals that  $\frac{dM^*}{de} > 0$  when  $(1-\delta(1-uv))Y' > X' + \delta'Y + \delta uW$ . In this unusual case, large supply elasticities and small demand elasticities are consistent with the Marshall-Lerner condition.

36/ If domestic- and foreign-currency-denominated real balances are measured in terms of the consumer price index ( $M/P^{\alpha(1-\alpha)}$  and  $eM^*/(P^{\alpha}e^{(1-\alpha)})$ , respectively), the rate of exchange rate depreciation is still the relative rate of return.

37/ This is equivalent to assuming that:

$$(c+1) > (W + (1-\alpha)vY') \frac{\psi + \delta(1-uv)R'}{\psi + X' + \delta uW}$$

where  $\psi$  is defined as in (23).

38/ See Blanchard (1979).

39/ As in Section II, whether a tariff leads to a series of current account surpluses or deficits depends largely on the elasticity of the aggregate supply curve.

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