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CENTER DISCUSSION PAPER NO. 246

MONETARY AND UNEMPLOYMENT ASPECTS OF TRADE-BALANCE ADJUSTMENT

Richard A. Brecher

May 1976

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1. Introduction

In the theory of international economics, considerable attention is devoted to integrating barter aspects of world trade with monetary features of international payments. This effort in most cases, including the work of Dornbusch (1973a), Frenkel (1971), Johnson (1975) and Mundell (1968), is in the flexible-wage full-employment tradition. The literature on barter-monetary integration pays relatively little attention to the alternative tradition of unemployment with wage rigidity, although the trade-theoretic significance of this domestic distortion is well established elsewhere, by writers such as Bhagwati (1968), Brecher (1974a, 1974b), Haberler (1950) and Johnson (1965). The present paper, therefore, explores the integration of monetary and barter theory of international economics in the context of rigid-wage unemployment.

More specifically, this paper considers monetary and unemployment aspects of trade-balance adjustment under a pegged (but parametrically alterable) rate of exchange, after adding a wage floor to the popular "dependent economy" model[1] of a small country producing traded and nontraded goods. The approach is related to rigid-wage sections of work by Bhagwati (1975), Dornbusch (1974), Helpman (1975) and Jones and Corden (1976), but it departs from theirs in the following important respect: the present

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*For helpful discussion, thanks go to Thomas B. Birnberg, Lucy A. Cardwell, Vahid F. Nowshirvani and Gustav Ranis. Of course, the author alone is responsible for any remaining errors or shortcomings.

discussion of wage rigidity (with exchange-rate stabilization) assumes no other market imperfection or systematic intervention.[2] For this reason, the analysis here is able to determine and highlight the effects due specifically to wage inflexibility in isolation. To help maintain a sharp focus on rigid-wage implications for barter-monetary integration, the exposition is simplified by having money as the only asset.[3] In developing the model below, Brecher's (1974a, 1974b) treatment of a minimum real wage is extended to include both money and nontraded goods and then used (in the small-country case) to consider real-wage and nominal-wage rigidity.[4]

Section 2 sets up the model, introducing the two alternative types of wage rigidity, real and nominal. Distinguishing between short-run and long-run equilibrium, Section 3 analyzes balance-of-trade adjustment with a given rate of exchange. Section 4 discusses the effects of exchange-rate devaluation. A brief summary of main propositions is given by Section 5, which concludes the paper. All of these sections underline the analytic significance of factor-intensity differences between traded and nontraded goods.

2. The Model

This section outlines the real and monetary aspects of the model, to be used in Sections 3 and 4.

Before introducing a wage constraint, recall the real aspects of the standard small-country model with traded and nontraded commodities. Each of these two types of goods is treated as a composite-commodity group, within which relative product prices are constant. With the country's fixed homogeneous endowments of capital and labor both fully employed, production under perfect competition takes place on the conventional production-possibility frontier, $Q_N Q_T$ in Figures 1a and 1b (whose differences are explained below). Full equilibrium is reached at point Q, where a community indifference curve[5] (II) is tangent to $Q_N Q_T$. The economy at Q has both external balance, in the sense that home demand equals home supply in the market for traded goods, and internal balance in the sense that demand equals supply in the market for nontraded goods.

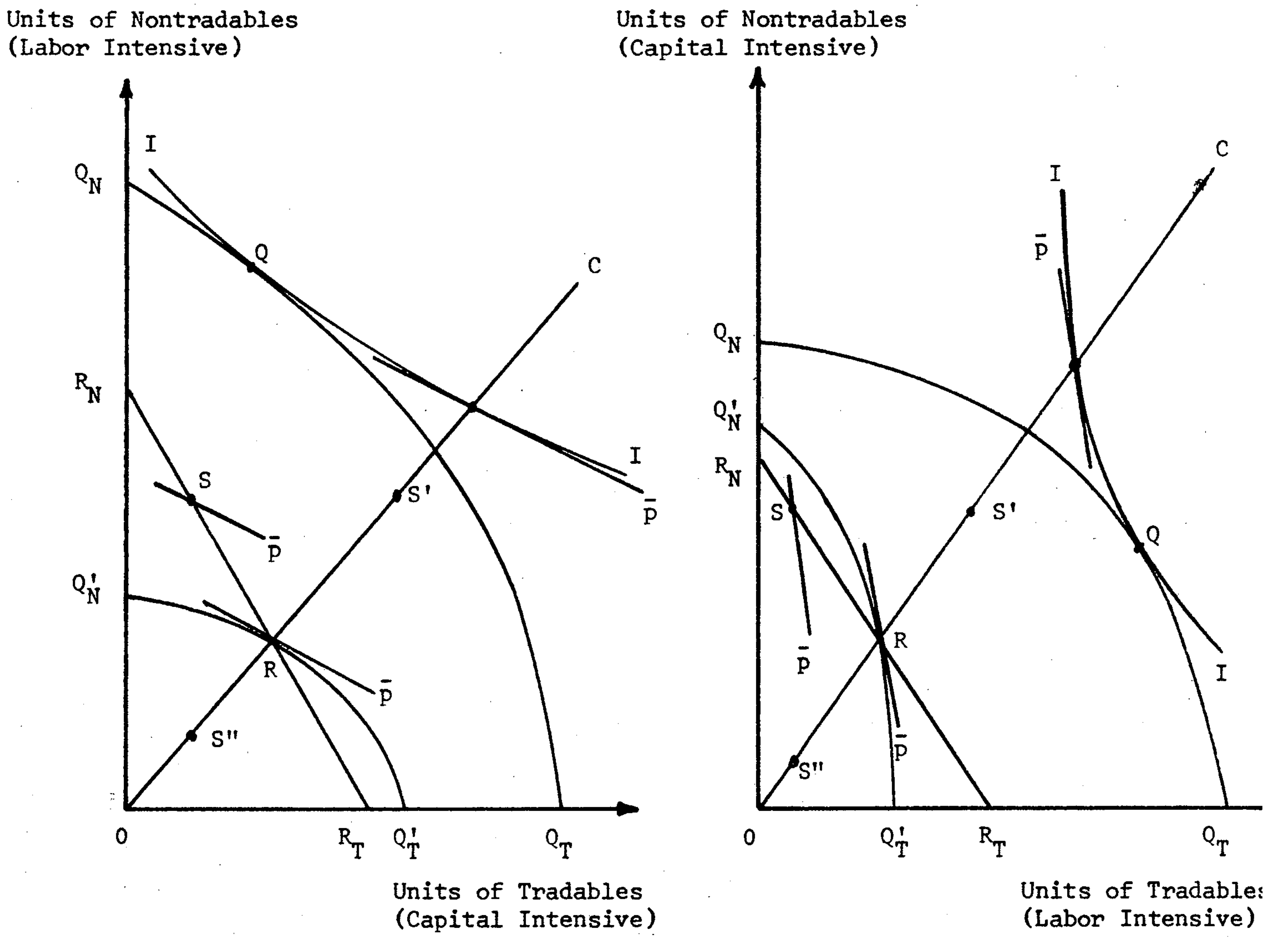
Now subject the country's (uniform) wage to an exogenously specified floor, or minimum, assumed to be a binding constraint throughout the economy. Two polar types of wage rigidity are examined here, to distinguish between the absence and presence of money illusion in the wage constraint. In the first case where money illusion is absent, the wage floor is specified in real terms, such that the (binding) constraint is

$$w/p_T = \bar{w}_T \quad , \tag{1}$$

where w is the nominal wage in terms of home currency; p_T is the nominal price of traded goods in terms of home currency; $w/p_T \equiv w_T$, which is the economy's real wage in terms of tradables; and $\bar{w}_T$ is the (exogeneously given) minimum value of w_T. In the second case where money illusion is present, the wage floor is specified in nominal terms, so that the (binding) constraint is

$$p_T w_T = \bar{w} \quad , \tag{2}$$

where $\bar{w}$ is the (exogenously given) minimum value of w. For deriving the qualitative results of this paper, the particular specifications of



(a) (b)

<u>Figure 1</u>

constraints (1) and (2) are less important than their different degrees of money illusion.[6]

In examining the implications of these two constraints, it is assumed here that both labor and capital are perfectly mobile domestically, while completely immobile internationally. Also by assumption, each industry produces with constant returns to scale and always operates at a positive level.

If constraint (1) applies, then by the reasoning of Brecher (1974a, 1974b), the minimum-wage transformation curve is Rybczynski line $R_N R_T$ in Figure 1(a and b) where the following properties are noted briefly without repeating the proofs here. First, $R_N R_T$ is a negatively sloped straight line, which may be described by the equation

$$X_T = \alpha - \beta X_N \quad , \tag{3}$$

where X_T and X_N denote output of tradables and nontradables, respectively; and α and β are positive constants. Second, different points on $R_N R_T$ involve different levels of labor unemployment (but the same full-utilization level of capital) corresponding to different production-possibility frontiers like $Q_N' Q_T'$, such that

$$L = \delta + \varepsilon X_N \quad , \tag{4}$$

where L denotes the economy's total employment of labor; δ is a positive constant; and ε is a constant, which is positive or negative as nontradables are relatively labor intensive or capital intensive (in comparison with tradables), in Figure 1a or 1b, respectively. Third, profit-maximizing production at each point on $R_N R_T$ requires that $p = \bar{p}$; where $\bar{p}$ is some particular value of product-price ratio $p \equiv p_N/p_T$, p_N being the (flexible) nominal price of nontradables in terms of home currency; and $\bar{p} \gtrless \beta$ as nontradables are labor intensive or capital intensive, so that the price line for $\bar{p}$ is flatter or steeper than R_NR_T in Figure 1a or 1b, respectively. Fourth, assuming that w_T exceeds labor's marginal product in terms of tradables at every point on Q_NQ_T, this full-employment frontier lies entirely above R_NR_T, thereby ensuring the existence of unemployment in equilibrium.

The implications of constraint (2) are essentially the same as the above ones of constraint (1), provided that the exchange rate is kept constant (as in the present section and the next one only). To see the basis for this claim, first note that international competition in commodity markets ensures that

$$p_T = e\bar{p}_T^* \quad , \tag{5}$$

where the nominal price of tradables in terms of foreign currency is denoted p_T^*, which is exogenously fixed (by the small-country assumption) at $\bar{p}_T^*$; and the nominal price of foreign exchange in terms of home currency is denoted e, which is pegged at the level $\bar{e}$, so that

$$e = \bar{e}. \tag{6}$$

For expositional simplicity without loss of generality, let

$$\bar{e} = \bar{w}/\bar{w}_T\bar{p}_T^* \quad . \tag{7}$$

Then, from equations (5) - (7) and constraint (2), $w_T = \bar{w}_T$ as in the case of constraint (1). Therefore, Figure 1 applies equally for both constraints.

Equilibrium is at point R, where $R_N R_T$ intersects the aggregate income-consumption curve, which (given $\bar{p}$) is OC in Figure 1. For expositional simplicity, it is assumed that tastes are homothetic so that OC is linear, although this assumption is not crucial for the following analysis. Given linearity, the equation for OC may be written as

$$C_T = \mu C_N \, , \tag{8}$$

where C_T and C_N denote national consumption of tradables and nontradables, respectively; and μ is a positive constant. When expenditure is distinguished from income in Section 3 below, the demand ray (OC) shows total consumption of each good at every level of aggregate expenditure.

With the real aspects of equilibrium determined in Figure 1, monetary equilibrium can be described as follows, assuming that money is the only asset. As with Dornbusch (1973b,1974), stock equilibrium occurs when

$$M = \kappa p_i Y_i , \qquad i = N,T, \tag{9}$$

where M is the nominal supply of money; κ is a positive constant, denoting the desired money/income ratio; Y_N and Y_T denote the real value of national income in terms of nontradables and tradables, respectively; and

$$\bar{p} Y_N = Y_T = \bar{p} X_N + X_T \, . \tag{10}$$

In Figure 1, the equilibrium value of Y_T is measured by the horizontal intercept of the price line (for $\bar{p}$) drawn through R. Once Y_T is known, equations (5), (6) and (9) determine M. The equilibrium value of p_N is simply $\overline{pep}{}^*_T$, given equation (5) and recalling that $\bar{p} = p \equiv p_N/p_T$.

Also, $w = \bar{w}$ not only when constraint (2) applies but [given equation (7)] also when constraint (1) instead is imposed.

3. Adjustment with a Fixed Exchange Rate

This section considers adjustment to equilibrium when the exchange rate is maintained at its initial level. By assumption, the government does not "sterilize" the money-supply effects of any trade-balance deficit or surplus, but instead lets M respond in the familiar way to any balance-of-trade disequilibrium. Because of real-wage rigidity--due either to constraint (1) or, given $\bar{e}$, to constraint (2)--L rather than p ($= \bar{p}$) responds to commodity-market disequilibrium

An important link between real and monetary aspects of the equilibrating process is now presented. If equation (9) is not satisfied, individuals adjust their actual to their desired stock of money as with Dornbusch (1973b, 1974), in such a way that

$$p_i H_i = \sigma(\kappa p_i Y_i - M), \qquad i = N,T, \tag{11}$$

where H_N and H_T denote the real value of national hoarding (or dishoarding if $H_i < 0$) in terms of nontradables and tradables, respectively; σ is a positive constant, denoting the speed of adjustment; $\sigma\kappa$ is the marginal propensity to hoard, so that $1 - \sigma\kappa$ is the marginal propensity to consume; and, by assumption,

$$1 - \sigma\kappa > 0. \tag{12}$$

The difference between income and expenditure is then given by

$$Y_i - E_i = H_i, \qquad i = N,T \quad , \tag{13}$$

where E_N and E_T denote the real value of national expenditure in terms of nontradables and tradables, respectively; and

$$\bar{p}E_N = E_T = \bar{p}C_N + C_T. \tag{14}$$

To understand the forces causing the supply of money and the employment of labor to adjust toward equilibrium, it is helpful to derive the schedules showing the combinations of M and L that provide internal or external balance. At point R in Figure 1, the economy achieves internal balance, in the sense that

$$C_N = X_N. \tag{15}$$

(Note that the concept of internal balance here carries no connotation of full employment.) At R, there is also external balance, in the sense that

$$C_T = X_T. \tag{16}$$

Although equations (15) and (16) are simultaneously satisfied only when production and consumption are both at point R, other production-cum-consumption combinations can yield either internal or external balance (but not both together). For example, with production at S, internal balance requires consumption at S' (on OC at the same height as S) while external balance requires consumption at S" (on OC directly below S).

Each internal-balance or external-balance situation involves a different combination of M and L. For internal balance, equations (3), (4), (5), (6), (8), (10), (11), (13), (14) and (15) may be manipulated easily to yield

$$L = \delta + \varepsilon[\alpha(1 - \sigma\kappa) + \sigma M/\bar{e}\bar{p}_T^*]/[\mu + \bar{p}\sigma\kappa + \beta(1 - \sigma\kappa)]. \qquad (17)$$

For external balance, equations (3), (4), (5), (6), (8), (10), (11), (13) (14) and (16) may be manipulated easily to yield

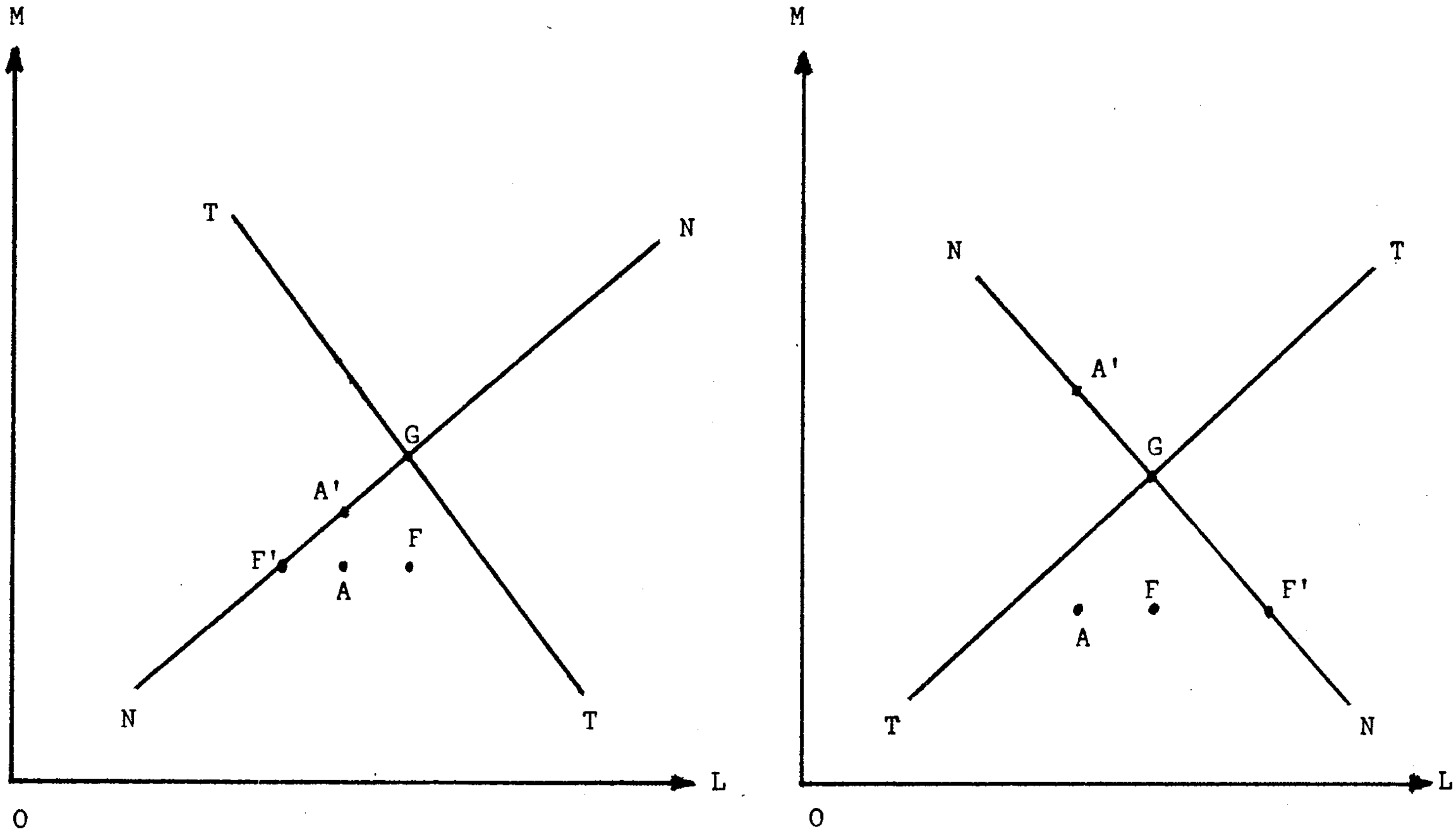
$$L = \delta + \varepsilon[\alpha(\bar{p} + \mu\sigma\kappa) - \mu\sigma M/\bar{e}\bar{p}_T^*]/\bar{p}[\beta + \mu(1 - \sigma\kappa)]. \qquad (18)$$

Equations (17) and (18) may be represented by straight lines NN and TT in Figure 2a or 2b, which assumes that nontradables are labor-intensive or capital intensive, respectively. From equation (17), the slope of NN is given by $dL/dM = \varepsilon\sigma/[\mu + \bar{p}\sigma\kappa + \beta(1 - \sigma\kappa)]\bar{e}\bar{p}_T^*$, and hence $dL/dM \gtrless 0$ as $\varepsilon \gtrless 0$ using inequality (12); where $\varepsilon \gtrless 0$ as nontradables are labor intensive or capital intensive in Figure 2a or 2b, respectively, recalling Section 2. From equation (18), the slope of TT is given by $dL/dM = -\varepsilon\sigma\mu/[\beta + \mu(1 - \sigma\kappa)]\bar{p}\bar{e}\bar{p}_T^*$; and thus $dL/dM \lessgtr 0$ as $\varepsilon \gtrless 0$, in Figure 2a or 2b, respectively.

The signs of the slopes for NN and TT can be understood intuitively as follows. Beginning at point G in Figure 2, an increase in the money supply (with employment temporarily held constant) leads to dishoarding, which raises aggregate expenditure and creates an excess demand for each type of good. Clearing the market for nontraded goods would require an increase in their

Labor-Intensive Nontradables
Capital-Intensive Tradables

Capital-Intensive Nontradables
Labor-Intensive Tradables



(a)

(b)

<u>Figure 2</u>

output and a corresponding decrease in tradable production (given the fixed stock of fully utilized capital), thereby implying an increase or decrease in employment for the return to NN as nontradables are labor intensive or capital intensive in Figure 2a or 2b, respectively. By similar reasoning, to eliminate the excess demand for traded goods instead, the opposite changes in employment (and output) would be required for the return to TT.

Figure 2 can be used to analyze adjustment to equilibrium, given a fixed rate of exchange. The analysis below distinguishes between short-run and long-run equilibrium in the following sense. The economy is said to be in short-run equilibrium only when there is internal balance, assuming no holding of inventories to satisfy any excess demand or supply in the market for nontraded goods. Long-run equilibrium, however, requires not only internal but also external balance (recalling that no sterilization is assumed).

Starting at point G in Figure 2, conduct Hume's (1752) familiar experiment of partial monetary "annihilation," by which the money supply is suddenly decreased to the level at F. Corresponding to this particular supply of money, short-run equilibrium is at F' on the internal-balance schedule, NN. The short-run change in employment is therefore a decrease or increase as nontradables are labor intensive or capital intensive, in Figure 2a or 2b, respectively.

The economy cannot remain indefinitely at F', since this point corresponds to a balance-of-trade surplus, as does any point below the external-balance schedule (TT). As the surplus causes a rise in the money supply, the economy moves up NN through successive positions of short-run equilibrium, until final (long-run) equilibrium is reattained at G. The move from F' to G requires an increase or decrease in employment as nontradables are labor intensive or capital intensive, in Figure 2a or 2b, respectively. When the economy is back at G, all real and nominal variables clearly are again at their initial levels.

Although a decrease in the money supply has no long-run effects on equilibrium values, the equilibrating path of employment over time depends upon the relative factor intensities of the two types of goods. The particular path presumably would be relevant in assessing the costs and benefits of adjustment to equilibrium. In the textbook type of more aggregative models with no factor-intensity distinction, the possibility of a short-run increase in employment does not arise when the money supply is reduced.

4. Devaluation

This section drops equation (6) and considers a once-for-all devaluation by the home country, which raises e to a new level (maintained thereafter). This exchange-rate policy could be analyzed as a tool for trade-deficit elimination, for a country seeking to avoid the balance-of-trade effects on the money supply, which are central to the adjustment mechanism of Section 3 above. To keep the exposition simple and consistent with the bulk of the theoretical literature, however, devaluation here is conducted from an initial position of external as well as internal balance. The following analysis of exchange-rate alteration considers both the short-run (disequilibrating) impact, given the initial supply of money, and the long-run (equilibrium) outcome reached with the help of money-supply response to the balance of trade. As could be verified readily, the short-run propositions derived below would continue to hold for the situation in which a country (with internal balance) devalues to correct an initial balance-of-trade deficit, thereby enabling the supply of money to remain constant. The case of constraint (1) is discussed first, and then the more complex case of constraint (2) is analyzed.

4.1 Real-wage Rigidity

Consider the case of constraint (1). Since w_T is assumed to remain constant (at $\bar{w}_T$) despite the devaluation, the long-run equilibrium illustrated in Figure 1 is unchanged. Thus, all real variables (including p and Y_T) remain constant in long-run equilibrium. The long-run values of all nominal variables, however, increase in the same proportion as e. For example, p_T, $p_N(= \bar{p}p_T)$, w and M all undergo the same proportionate increase as e, in view of equations (1), (5) and (9).

In the short-run, on the other hand, there will be equilibrating adjustments which may be studied with the help of Figure 2. To avoid complicating this diagram unnecessarily with devaluation-induced shifts of NN and TT, let these curves now be reinterpreted as corresponding to the post-devaluation situation. Since the long-run effects of devaluation include a rise in the money supply but no change in employment (as just shown), the pre-devaluation long-run equilibrium is at a point such as F, which must lie directly below G. Beginning at F with the exchange rate pegged at its initial level, devaluation leads (by the reasoning of Section 3) to short-run equilibrium at F', reached by a fall or rise of employment as nontradables are labor intensive or capital intensive in Figure 2a or 2b, respectively. Also, short-run equilibrium at F' corresponds (as before) to a balance-of-trade surplus, no matter which commodity is relatively labor intensive. From F', the economy adjusts back to long-run equilibrium at G, as in Section 3 for a decrease in the supply of money.

It is important to emphasize that the sign of the devaluation's impact on employment in the short-run depends crucially upon the relative factor intensities of the two classes of goods. The possibility of economic depression induced by devaluation, however, appears to be underestimated by some national authorities.[7] It is also important to stress that the devaluation always creates a balance-of-trade surplus in the short run, no matter what the factor-intensity ranking. There seem to be fears, however, that the effects of devaluation are nullified if nominal wages increase with domestic prices to prevent real-wage reductions.[8]

4.2 Nominal-Wage Rigidity

In the case of constraint (2), a rise in e lowers w_T, in view of equation (5). This decrease in w_T implies a fall or rise in the equilibrium p as nontradables are labor intensive or capital intensive, respectively, according to the Stolper-Samuelson (1941) Theorem. Letting the new value of p be denoted p', then $p' \lesseqgtr \bar{p}$ as nontradables are labor intensive or capital intensive, respectively, in Figure 3 (which reproduces the essential parts of Figure 1). Thus, the relevant Rybczynski line shifts outwards to become $R_N'R_T'$, which forms the new transformation curve (corresponding to p') and which clearly passes through the region northeast of R (the initial equilibrium) in Figure 3. Given well behaved indifference curves, the demand ray (initially OC in Figure 1) rotates counter-clockwise (for $p' < \bar{p}$) or clockwise (for $p' > \bar{p}$) to become OC' in Figure 3a or 3b, respectively. Thus, the long-run equilibrium (initially at R) shifts to point R'.

Employment is greater at R' than at R, since R' must lie outside the production-possibility frontier ($Q_N'Q_T'$) drawn through R.[9] Also, the equilibrium supply of money is greater at R' than at R, by the following reasoning. If nontradables are capital intensive, then $dY_T/de > 0$ (as Y_T rises from point B_T to point B_T' in Figure 3b), so that $dM/de > 0$ using equations (5) and (9). If nontradables are labor intensive on the other hand, $dY_N/de > 0$ (as Y_N rises from point B_N to point B_N' in Figure 3a),

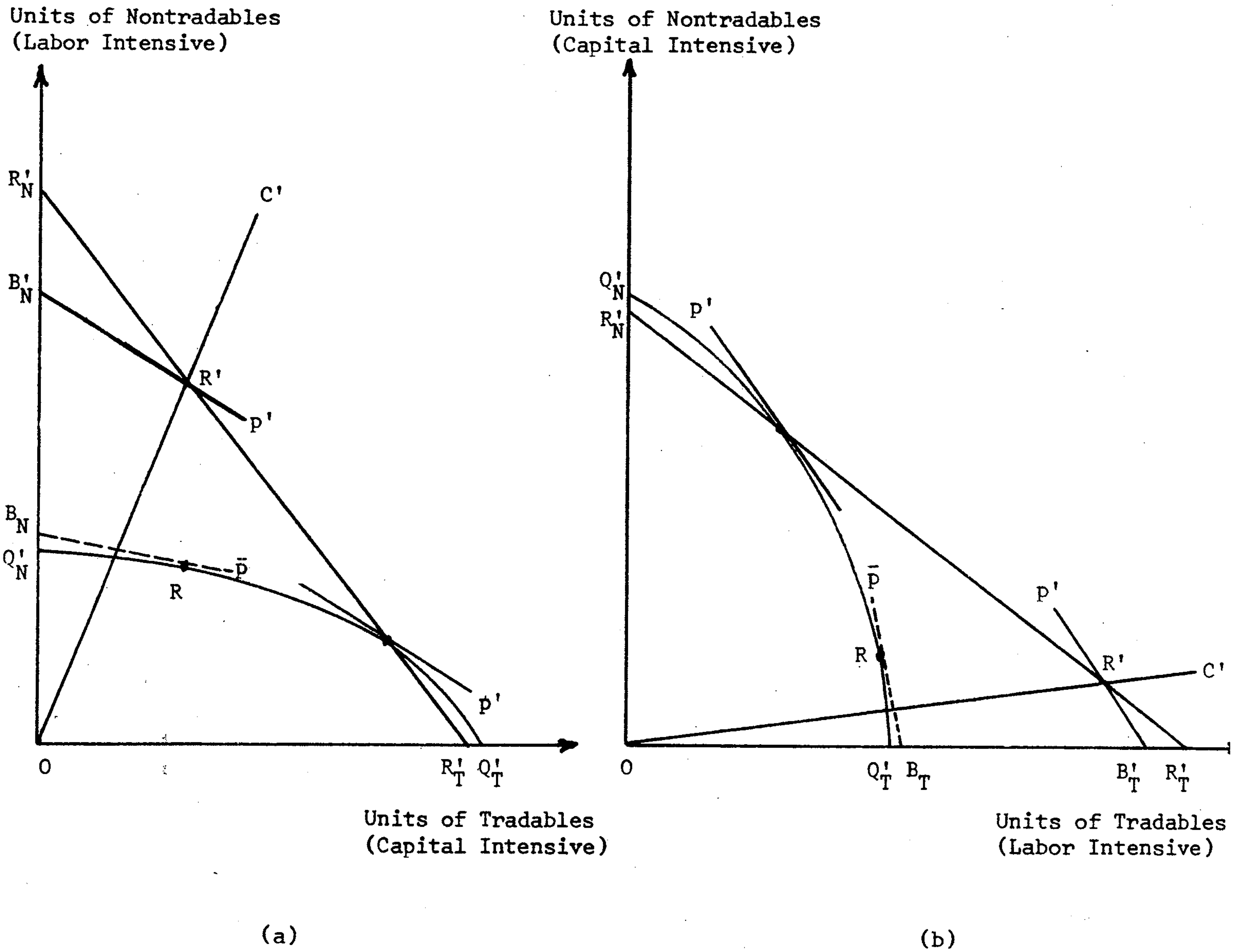

Units of Nontradables
(Labor Intensive)
R'N
C'
B'N
R'
p'
BN
Q'N
p̄
R
p'
0
R'T Q'T
Units of Tradables
(Capital Intensive)
Units of Nontradables
(Capital Intensive)
Q'N
R'N
p'
p̄
p'
R
R'
C'
0
Q'T BT
B'T R'T
Units of Tradables
(Labor Intensive)
(a)
(b)

Figure 3

and $dp_N/de > 0$ [since w_N ($\equiv \bar{w}/p_N$) and w_T both decrease together by Stolper-Samuelson (1941) reasoning]; so that $dM/de > 0$ once more.

Since the initial long-run equilibrium has less employment and less money, this equilibrium lies southwest of point G at (say) point A in Figure 2, whose NN and TT curves again are interpreted as corresponding to the exchange rate in the post-devaluation situation. When the devaluation occurs, short-run equilibrium is achieved at point F', which means a fall or rise of employment in Figure 2a or 2b as nontradables are labor intensive or capital intensive, respectively; however, if point A were on or left of NN in Figure 2a, employment in this case would stay constant or rise, respectively.[10] Also, since point F' lies below TT, the devaluation creates a balance-of-trade surplus in the short run, no matter which good is labor intensive. From F', the economy adjusts to long-run equilibrium at G, as above in Section 4.1.

It is important to emphasize that the devaluation's impact on employment in the short-run is ambiguous when nontradables are labor intensive. In more aggregative models with no factor-intensity distinction, the possibility of employment reduction does not arise.[11] It is also important to stress that devaluation creates a balance-of-trade surplus in the short-run, no matter what the factor-intensity ranking, assuming that the money supply is temporarily constant.[12] If instead the government were to adjust the money supply to keep employment constant at the pre-devaluation level, short-run equilibrium would be attained at point A' with the balance of trade showing a surplus or deficit in Figure 2a or 2b, where nontradables are labor intensive or capital intensive, respectively.[13] By excluding monetary (and fiscal) policy, the present analysis of short-run equilibrium has the advantage of separating the effects of devaluation from those of other policy action.

5. Summary

The foregoing sections of this paper examine monetary and unemployment aspects of trade-balance adjustment under a pegged (but devaluable) rate of exchange, for a small country producing traded and nontraded goods in the presence of wage inflexibility. As suggested by Section 2, real-wage and nominal-wage rigidity have qualitatively identical implications (only) when the exchange rate is held constant. With a given rate of exchange, Section 3 analyzes balance-of-trade adjustment in the short and long runs. The short-run analysis shows that a decrease in the money supply will raise or lower employment as nontradables (versus tradables) are relatively labor intensive or capital intensive, respectively, but unambiguously will reduce the deficit (increase the surplus) in the balance of trade. In long-run equilibrium, however, money is "neutral." Section 4 discusses the short-run and long-run effects of exchange-rate devaluation. The short-run discussion indicates that a devaluing country must have an increase in employment if nontradables are capital intensive; must or may undergo a decrease in employment if nontradables are labor intensive under real-wage or nominal-wage rigidity, respectively; and unambiguously must experience a reduced deficit (increased surplus) in the balance of trade. Devaluation as a policy for expanding employment in long-run equilibrium, however, is ineffective or effective as wage rigidity is real or nominal, respectively. Broadly speaking, this paper explores rigid-wage implications for integrating monetary and barter theory of international economics.

Footnotes

[1]This model is developed in the work of a number of writers, including Corden (1960), Meade (1956), Salter (1959) and Swan (1960, 1963). For other examples, see references cited by Dornbusch (1975).

[2]In this previous literature, wage rigidity occurs only in the presence of at least one of the following features, none of which characterizes the present model: domestic immobility of capital; product-price inflexibility for nontraded goods; factor-reward rigidity for capital; fiscal policy to keep employment constant; continuous spending by the government; and "sterilization" of trade-balance effects on the supply of money.

[3]The particular asset-market specification is essentially the same as that of Dornbusch (1974), and is consistent with Bhagwati's (1975) discussion of money-market equilibrium. Instead of a cash-balance approach, a fiscal-policy procedure is emphasized by Jones and Corden (1976). Assets are excluded explicitly from the private sector of Helpman (1975), whose analysis is extended in his (1974) doctoral dissertation to incorporate simultaneously bonds and money.

[4]Bhagwati (1975) also discusses both kinds of rigidity, while Dornbusch (1974) and Jones and Corden (1976) consider nominal-wage rigidity. See also footnote 6 below.

[5]Community indifference curves simplify the analysis but are not crucial for the present paper.

[6]Noting the formulation of Helpman (1975), the (binding) wage constraint could be written generally as follows:

$$w = W(p_N, p_T) \ ,$$

where p_N is the nominal price of nontradables in terms of home currency; the partial derivatives of function W are $\partial W/\partial p_N \geq 0$ and $\partial W/\partial p_T \geq 0$; and money illusion is said to be absent if and only if W is homogeneous of degree one. As could be demonstrated readily, the following analysis for constraint (1) holds qualitatively whenever money illusion is absent, while the corresponding analysis for constraint (2) holds qualitatively for any money-illusion case in which W is homogeneous of degree less than one. In addition to constraint (1), other wage-floor examples lacking money illusion include minimum real wages specified either in terms of nontradables or in terms of a constant-utility combination of both types of goods.

[7] On this point, see Cooper's (1973) observations on authorities in developing countries. When nontradables are relatively labor intensive, the present conclusions are consistent with the theoretical arguments of Cooper (1971, 1973), when he considers what would happen if nominal wages were to rise in the same proportion as nominal prices.

[8] Cooper (1971) notes that such fears are expressed often.

[9] Full employment, at point Q in Figure 1, could always be achieved by a sufficiently great devaluation.

[10] Choosing units (without loss of generality) so that $p_N = \bar{p}_T^* = e = 1$ initially, it is possible to show that

$$(\partial L/\partial e)_{\bar{M}} \lesseqgtr 0 \text{ as } [(\partial Z_N/\partial p)_{\bar{L},\bar{H}_T} - m_N\sigma\kappa X_N]q - m_N\sigma M \lesseqgtr 0,$$

when nontradables are labor intensive; where $(\partial L/\partial e)_{\bar{M}}$ is the rate of devaluation-induced response of employment in the short run, given the supply of money at the initial level; $Z_N \equiv C_N - X_N$; $(\partial Z_N/\partial p)_{\bar{L},\bar{H}_T}$ is the familiar rate of price-induced response of excess demand for nontradables along the conventional production-possibility frontier, given employment at the initial level and ignoring hoarding; m_N is the marginal propensity to consume nontradables, for a change in aggregate expenditure, with $0 < m_N < 1$; and $q \equiv (dp/de)e/p$, with $-1 < q < 0$ under the assumptions of the present paper.

[11]See Tsiang (1961), for example.

[12]When nontradables are labor intensive given nominal-wage rigidity (or, more generally, given money illusion in the sense of footnote 6 above), the present conclusions concerning balance-of-trade and employment response are generally consistent with the empirical summary of Cooper (1973, p. 193).

[13]Similarly, as shown by Jones and Corden (1976), devaluation can lead to a deficit (when nontraded goods are capital intensive) if fiscal policy is used to freeze the nominal wage while keeping employment constant.

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