Title	Real Effects of Orthodox Stabilization under Convertible Currency : A Dependent Economy Model of Financial Repression
Sub Title	
Author	Nag, Ranjanendra Narayan
Publisher	Keio Economic Society, Keio University
Publication year	2003
Jtitle	Keio economic studies Vol.40, No.2 (2003.) ,p.51- 71
JaLC DOI	
Abstract	
Notes	
Genre	Journal Article
URL	https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=AA00260492-20030002-0051

KEIO ECONOMIC STUDIES 40(2), 51–71 (2003)

REAL EFFECTS OF ORTHODOX STABILIZATION UNDER CONVERTIBLE CURRENCY: A DEPENDENT ECONOMY MODEL OF FINANCIAL REPRESSION

Ranjanendra Narayan NAG

Lecturer, St. Xavier's College, Kolkata

First version received August 1998; final version accepted March 2004

Abstract: This paper develops a monetary, dependent economy model of financial repression to examine macrodynamic implications of orthodox stabilization. The model incorporates currency convertibility with currency substitution, sticky inflation and wage-indexation. The main result of the paper is that any particular stabilization measure, if implemented in isolation, might lead to a serious macroeconomic disaster. This result does not deny the importance of stabilization as a package of measures. In fact, the paper underscores the need of interelatedness among the stabilization measures.

Key words: Dependent Economy, Real Exchange Rate, Stabilization.
JEL Classification Number: E63, F41.

1: INTRODUCTION

Macro-level stabilization programme for the developing countries has emerged as a central issue to policy makers and academicians since the early 80s.[1] The key variable in the existing literature is the real exchange rate in a world of convertible currency. The real exchange rate is the key measure of international competitiveness and its movement governs the allocation of resources in the real sector and interaction between the real and the monetary sector. Since the focus of adjustment programmes is on 'getting prices right', the dynamics of real exchange rate needs to be examined so as to give a clear accent on the design of appropriate adjustment programmes.

Currency convertibility, on the other hand, is being increasingly recognized as an in-

Acknowledgements. I am grateful to Professor Arup Mallick and two anonymous referees for their constructive comments. However, the usual disclaimer applies. E-mail: rnnag12@rediffmail.com

[1] See the entire reference list.

tegral part of stabilization.[2] It simply means the ability of residents and non-residents to exchange domestic currency for foreign currency without limits at market rates. Thus convertible currency implies absence of restrictions on foreign exchange transactions and not necessarily on international trade or capital flows. The advantage of currency convertibility is to be located in the solidarity of the monetary system and the restoration of real exchange rate at a competitive level without involving intervention of the central bank in the foreign exchange market. In fact, along with greater capital account convertibility, there has been a marked trend towards greater exchange rate flexibility in recent times.[3]

In the present paper, we attempt to develop a dependent economy model under the assumption of convertible currency on both trade and capital accounts. The model in the present paper is an offshoot of the Calvo-Rodriguez model (1977) of currency substitution. The two major features of a developing country, as identified in the Calvo-Rodriguez model, are (a) dependent economy structure in the sense of existence of composite traded goods along with non-traded goods[4] and (b) financial repression in the sense of very rudimentary asset structure (that is, money and foreign asset) combined with portfolio balance approach to exchange rate determination.[5] The model is based on money wage flexibility which maintains full employment. The model leads to the standard classical dichotomy result in the sense that the real exchange rate is ultimately a real factor, though its short run variation can be governed by monetary disturbances. The central result of their paper is that monetary expansion leads to real exchange rate depreciation on impact and rise in foreign asset through current account surplus. Ultimately real exchange rate is unchanged in the long run at the end of adjustment process. Liviatan (1981) introduced intertemporal utility maximization of consumers and asset-holders in an otherwise Calvo-Rodriguez model and arrived at exactly

[2] Many developing countries are increasingly encouraged to dismantle capital controls. Financial openness is expected to generate economic benefits through increased opportunities for intertemporal trade and cross-border portfolio diversification in both assets and liabilities. However success of financial openness depends on establishment fiscal consolidation and strengthening of prudential supervision to cope with systematic risk of financial system. See Fischer and Reisen (1992), Greene and Isard (1996).

[3] According to the classification of the IMF, the share of its developing countries with some from of exchange rate flexibility rose from a little over 15% of total in 1978 to about 50% in 1999 (see Mussa, Masson, Swobda, Jadresie, Mauro and Berg, 2000 and Kawai and Akiyama, 2000).

[4] The concept of dependent economy has its roots in two-sector open economy models popularized by Dornbusch (1974, 1980), Liviatan, (1979), Edwards (1984, 1988), among others. In the present paper the choice of a dependent economy model is motivated by the simple fact of transition of many developing countries from a closed and controlled economy framework to an increasing exposure to openness. One major advantage of two sector models is that they are better suited to examine supply side issues than the one-sector models. Clearly different policies affect the two sectors differently with implications for sectoral composition of output, current account balance, inflation and unemployment.

[5] The central features of portfolio balance model are that domestic and forign assets are imperfect substitutes and portfolio diversification is determined by relative returns and output level in presence of unemployment, as is done in the present paper. The portfolio balance approach is perfectly consistent with the currency substitution approach. Both the approaches integrate the current and capital accounts through wealth effect and output effect, if unemployment is allowed for (see Kouri, 1976, Zervoyianni, 1988, Branson and Buiter, 1983).

opposite conclusions. However these models of real exchange rate determination in a dependent economy did not specifically focus on macro level stabilization programme. These papers have been used as a basis for study of stabilization programme.

The literature on the study of stabilization dynamics in dependent economy format has proceeded in two major directions. Monetary open economy macromodels have been formulated essentially under full employment conditions to focus on problems of inflation and current account imbalance with specific reference to the real exchange rate dynamics. On the other hand nonmonetary macromodels have been developed to focus on adjustment in labour market and employment implications of stabilization programme. Unemployment in this class of models is primarily an outcome of labour market segmentation and efficiency wage considerations. However this second class of models leaves out issues of inflation dynamics.[6]

The purpose of the present paper is to modify the Calvo-Rodriguez construct in a different direction from what has been pursued earlier. The distinguishing features of the present paper are wage indexation by a social pact, inertial inflation and perfect foresight. As a consequence of wage indexation we no longer get full employment. Moreover, disequilibrium in the nontraded sector can persist even in the long run and hence, inflation dynamics is shaped by both monetary and real factors. Thus the model in the present paper is a monetary model of dependent economy with a clear focus on three major aspects of a national economy, namely inflation, current account balance and unemployment. Clearly the present paper offers wider range of implications, both financial and real, of the stabilization programme. Any particular stabilization measure, taken by itself, involves critical trade-offs among the targeted variables. It is in the context of an interactive model between the monetary sector and the real sector that we study these trade-offs. Given the trade-offs the ultimate policy choice is sensitive to initial long run equilibrium.

The paper is organized as follows. In section 2, we provide the model for the study of real exchange rate behaviour and asset dynamics. In section 3, we examine dynamic adjustments and the saddle path stability. In section 4, we carry out certain comparative static exercises which mainly reckon with the effects of policy-induced shocks. Section 5 contains remarks on the effectiveness of policies. Section 6 concludes the paper.

[6] Aizenman (1985) modified the Calvo-Rodriguez model to examine dynamics of tariff-liberalization under dual exchange rate. Park (1995) investigated exchange rate dynamics in dual exchange market by utilizing the Calvo-Rodriguez model. Again Park (1996) used the Calvo-Rodriguez model to address issues of financial liberalization. Khan and Montiel (1987) extended the Calvo-Rodriguez model to explore real exchange dynamics in a small, primary exporting country. These monetary models are primarily full employment models. In a market clearing, non-monetary dependent economy model, Agenor and Aizenman (1994) studied effects of permanent reduction in government expenditure on nontraded goods and different labour market policies. Their model introduces unemployment through efficiency wage considerations. The novelty of the Calvo-Rodriguez model is that it can be used as a benchmark model to reflect on different aspects of stabilization.

2: THE MODEL

We attempt to develop a dependent economy model in which exportables and importables are simply aggregated into a composite commodity, called traded goods. Traded goods are distinguished from non-traded goods (or home goods). We assume wage indexation which allows for unemployment and sticky price of the non-traded goods which permits disequilibrium in the home good's market. The model in this paper is therefore a disequilibrium dependent economy model with unemployment and perfect foresight.

This section is subdivided into four subsections. The first subsection (2.1) contains the description of the supply side followed by a description of asset structure with portfolio choice in the second subsection (2.2). The demand side is analyzed in the third subsection (2.3). The fourth subsection (2.4) deals with the inflation-inertia in the non-traded goods sector.

2.1. Supply

Labour (N) is the only variable factor which is used in the production of both the traded (T) and non-traded (Z) goods. Production functions for all goods take the following form:

$$Y_i = Y_i(N_i), \quad Y_i^{'} > 0, \quad Y_i^{''} < 0 \tag{1}$$

where Y denotes output of good $i, i = T, Z$ and a prime significances a derivative, $Y_i' = \frac{dY_i}{dN_i}$

Employment in each sector is derived from the profit maximizing condition, namely the equality between the marginal product of labour and the sector-specific real product wage.

Thus, we get the labour demand functions as:

$$N_T = N_T\left(\frac{W}{e}\right) N_T^{'} < 0 \tag{2a}$$

$$N_Z = N_Z\left(\frac{W}{P_Z}\right) N_Z^{'} < 0 \tag{2b}$$

where W is the money wage rate, e is the nominal exchange rate and is the price of traded goods and P_z is the price of non-traded goods.

Next consider money wage determination. Instead of assuming flexible adjustment in money wage to be compatible with labour market equilibrium, we take money wage to be determined as an outcome of a bargaining process. Specifically money wage is determined by a social pact which protects the real consumption wage. In other word money wage is linked to the consumer price index,

$$W = P_Z^{\alpha} e^{1-\alpha} \tag{3}$$

where α and $1 - \alpha$ are constant expenditure share of non-traded and traded goods. Clearly,

$$\frac{W}{e} = \theta^{-\alpha} \tag{4a}$$

and

$$\frac{W}{P_Z} = \theta^{1-\alpha} \tag{4b}$$

where $\theta = e/P_Z$, is the real exchange rate.

From (1), (2), (3) and (4) we get the supply functions of traded and nontraded goods:

$$Y_T = Y_T(\theta) \tag{5.1}$$

with

$$\frac{dY_T}{d\theta} = -\alpha Y_T' N_T' \theta^{-(1+\alpha)} > 0 \tag{5.2}$$

and

$$Y_z = Y_z(\theta) \tag{6.1}$$

with

$$\frac{dY_Z}{d\theta} = (1-\alpha) Y_Z' N_Z' \theta^{-\alpha} < 0 \tag{6.2}$$

With real depreciation domestic production of tradeables becomes more profitable and that of non-tradeables less attractive. Whether or not the aggregate output measured in terms of non-traded goods increases, depends on the structural features of the economy. Let Y denote the aggregate output in terms of non-traded goods,

$$Y = Y_z + \theta Y_T$$

We can find out sifficient condition such that Y rises in response to real depreciation:

$$\frac{dY}{d\theta} = Y_T + \theta^{-1}[\alpha\theta Y_T' e_T N_T - (1-\alpha) Y_Z' N_Z e_Z| \tag{7}$$

where e_i is the elasticity of demand for labour in the ith sector, $i = T, Z$.

The sufficient condition such that

$$\frac{dY}{d\theta} > 0 \quad \text{is} \quad \left(\frac{\alpha}{1-\alpha}\right)\left(\frac{\theta Y_T'}{Y_Z'}\right)\left(\frac{e_T}{e_Z)}\right) > \frac{N_Z}{N_T} \tag{8}$$

This condition is more likely to be satisfied in small open economies which go through a process of structural reforms with a marked emphasis on expansion of the traded goods sector. In particular, real depreciation raises aggregate output if the consumption share of the non-traded goods is quite large, productivity is relatively higher in the traded goods sector and the employment contribution of the traded goods sector is not insignificant. In what follows we take $\frac{dY}{d\theta} > 0$.[7]

2.2. Asset Structure and Portfolio Choice

A very rudimentary asset structure is employed in consonance with the basic features of financial repression in developing countries. Financial repression means underdevelopment of capital market in the sense that markets for government bonds and equities

[7] The effect of change in on employment can be obtained as $dN/d\theta = e_T N_T \alpha - (1-\alpha) e_z N_z$. Now $dN/d\theta > 0$ if $(\alpha/1-\alpha)(e_T e_z) > N_z/N_T$. In what follows we assume $dN/d\theta > 0$.

are virtually non-existent. The only available assets are domestic money and foreign asset. Moreover, in a repressed economy the government uses a pleathora of controls, including restriction on free capital movement, for example a tax on the return on foreign assets (Sussman, 1992). However the new structuralist analysis (for example, Wijnbergen, 1983; Buffie, 1984; Taylor, 1991) lays a great stress on curb market loans which feature in the portfolio of wealth-owners and serve as a source of production loans. The new structuralist treatment of curb market is hardly consistent with the LDCs' reality (Owen & Solie-Fallas, 1989). The curb markets are risky, fragmented markets with hardly any link between them. Moreover, loan transactions in the curb market are based on very personal knowledge which limits the spread of curb market. Even the casual empirical evidence suggests that the scale of productive activity financed by curb market loans is insignificant. The exclusion of curb market is therefore not unjustified.

Now, the real value of assets (a) measured in units of non-traded goods is,

$$a = \frac{M}{P_Z} + \frac{eF}{P_Z} = m + \theta F \tag{9}$$

where

$$m = \frac{M}{P_Z} \text{ real money balance}$$
$$F = \text{the stock of foreign assets}.$$

Following Calvo and Rodriguez (1977) the ratio of domestic to foreign asset is a function of the expected (and actual, under perfect foresight) difference of the nominal rates of return on both assets and output level.

The portfolio balance is given by the following equation:

$$\frac{m}{\theta F} = g\left(\frac{\dot{e}}{e} + r* - \tau, Y\right), \quad g_1 < 0, \quad g_2 > 0$$

Since $\frac{dY}{d\theta} > 0$, we can choose the following specific form

$$\frac{\frac{\dot{e}}{e} + r^* - \tau}{\theta} = L\left(\frac{m}{\theta F}\right), \quad L' < 0$$

or,

$$\frac{\dot{e}}{e} = \theta L\left(\frac{m}{\theta F}\right) + \tau - r^* \tag{10}$$

where $\dot{e} = \frac{de}{dt}$ and τ is the (Tobin) tax levied on the return on foreign asset and r^* is the foreign interest rate. A dot denotes a time derivative.

2.3. Demand

Real household consumption (C) measured in units of non-traded goods is taken to depend on total income (Y) and real value of assets (a):

$$C = C(Y, a), \quad 0 < C_1 < 1, \quad C_2 > 0 \tag{11}$$

The effects of θ and F on consumption are,

$$\frac{dC}{d\theta} = C_1 \frac{dY}{d\theta} + C_2 F \tag{12}$$

and

$$\frac{dC}{dF} = \theta C_2 > 0 \tag{13}$$

If we take $\frac{dY}{d\theta} > 0$, we have $\frac{dC}{d\theta} > 0$.

Since we assume constant expenditure shares, the real consumption of traded and non-traded goods are,

$$C_z = \alpha C \tag{14.1}$$

and

$$C_T = (1-\alpha)\theta^{-1} C \tag{14.2}$$

Clearly real depreciation raises consumption of the non-traded good, provided $\frac{dC}{d\theta} > 0$. However, the effect of real depreciation on C_T depends on the elasticity of consumption with respect to the real exchange rate:

$$\frac{dC_T}{d\theta} = \left(\frac{1-\alpha}{\theta^2}\right) C \left(\frac{\delta C}{\delta \theta}\frac{\theta}{C} - 1\right) \tag{15}$$

2.4. Pricing of Home-Goods and Inflation-Inertia

Instead of allowing instantaneous market clearing of home goods through price adjustment, we assume the home goods' price to be sticky. However, the inflation rate can change in response to excess demand for home goods (Wijnbergen, 1983, Blejer and Liviatan, 1987). In particular it is important to note that when inflation becomes ingrained, it acquires its own dynamics. Few comments on the price level are in order. Since the price of home goods cannot jump, the home goods' market can remain in disequilibrium. The form of disequilibrium determines the inflation rate. Thus the current price level is determined by the past rates of inflation and the current inflation rate determines the future price level. At any particular point in time the price level is pre-determined. Now inflation adjustment can be expressed as:

$$\pi_Z = \bar{\pi} + \beta E D_Z, \quad \beta > 0 \tag{16}$$

where π_Z denotes the current inflation rate, $\bar{\pi}$ denotes the components associated with the inflation-inertia ($\bar{\pi}$ may be considered as a function of all past variables, including the past inflation rates) and $E D_Z$ denotes current excess demand for home goods,

$$E D_Z = C_z + G_z - Y_z \tag{17}$$

where G_Z is the real government expenditure on home goods.

In an implicit form, π can be expressed as

$$\pi_Z = \pi_Z(\bar{\pi}, \theta, a, G_Z) \tag{18}$$

with

$$\frac{\partial \pi_Z}{\partial \bar{\pi}} = 1\,, \quad \frac{\partial \pi_Z}{\partial \theta} = \beta\left(\frac{\delta C_Z}{\delta \theta} - \frac{\delta Y_Z}{\delta \theta}\right) > 0$$

$$\frac{\partial \pi_Z}{\partial a} = \beta \frac{\partial C_Z}{\partial a} > 0 \quad \text{and} \quad \frac{\partial \pi_Z}{\partial G_Z} = \beta > 0$$

3: STABILITY ANALYSIS

Equations (10) and (18) can be combined together to produce the dynamic adjustment in the real exchange rate. Noting that $\theta = \frac{e}{P_Z}$, we get

$$\begin{aligned} \frac{\dot{\theta}}{\theta} &= \frac{\dot{e}}{e} - \pi_Z \\ &= \theta L\left(\frac{m}{\theta F}\right) + \tau - r^* - \pi_Z \end{aligned} \tag{19}$$

In an implicit form the real exchange dynamics can be expressed as:

$$\dot{\theta} = g(\theta, F, m, G_Z, \tau, r^*) \tag{20}$$

with

$$g_1 = L - L'\frac{m}{\theta F} - \frac{\partial \pi_Z}{\partial \theta} ?$$

$$g_2 = -L'\frac{m}{F^2} - \theta \frac{\partial \pi_Z}{\partial a} ?$$

$$g_3 = \frac{L'}{F} - \frac{\partial \pi_Z}{\partial a} < 0\,.$$

$$g_4 = -\frac{\partial \pi_Z}{\partial G_Z} < 0\,.$$

$$g_5 = 1 > 0\,.$$

$$g_6 = -1 < 0\,.$$

As regards the signs of g_1 and g_2 we assume that the inflation-induced effect is more than offset by the asset substitution or portfolio effect and output effect on real exchange rate. Thus we assume that $g_1 > 0$ and $g_2 > 0$.

Next consider the dynamics of foreign asset. The total stock of foreign assets can not change in the short run; it can only accumulate or decumulate on a flow basis through the trade surplus or deficit which in turn is given by the excess supply or demand of the traded goods:

$$\dot{F} = Y_T - C_T - G_T \tag{21}$$

where G_T is the government expenditure on the traded goods.

Equation (21) can be written as:

$$\dot{F} = f(\theta, F, m, G_T) \tag{22}$$

with the following restrictions:

$$f_1 = \frac{dY_T}{d\theta} - \frac{dC_T}{d\theta} ?$$

$$f_2 = -\theta \frac{dC_T}{da} < 0 .$$

$$f_3 = -\frac{dC_T}{da} < 0 .$$

$$f_4 = -1 < 0 .$$

As regards the sign of f_1 we assume that the effect of real exchange depreciation on production prevails on the effect on the consumption if $\frac{dC_T}{d\theta} > 0$, such that $f_1 > 0$.

Equations (20) and (22) constitute a system of differential equations in real exchange rate and foreign asset. The real exchange rate is free to jump in response to news which include unanticipated current or future changes in exogenous variables and policy instruments. However, the stock of foreign assets is a predetermined variable which can change only on a flow basis in response to the trade surplus or deficit. In presence of perfect foresight the existence of unique convergent saddle path requires that there must be one positive and one negative root such that the determinant $\Delta < 0$, where

$$\Delta = \begin{vmatrix} g_1 & g_2 \\ f_1 & f_2 \end{vmatrix}$$

Given our sign restrictions, we always get unique convergent saddle path.

The dynamic behaviour is illustrated in Figure 1. We draw the $\dot{\theta} = 0$ and $\dot{F} = 0$ curves. Their respective slopes are:

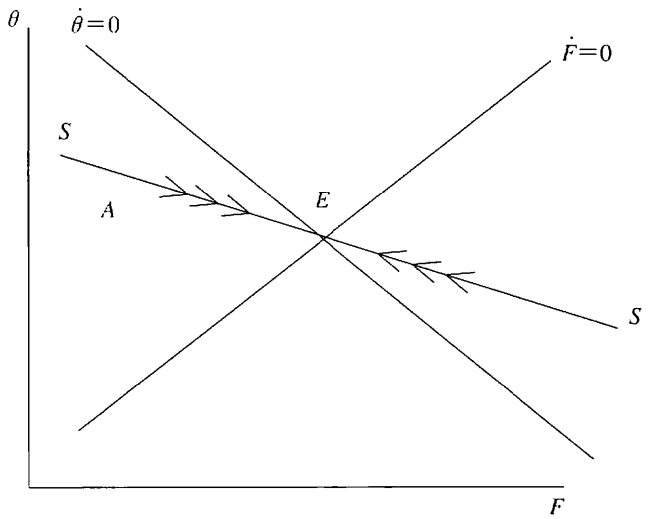

Figure 1. Saddle path stability.

$$\left.\frac{d\theta}{dF}\right|_{\dot{\theta}=0} = -\frac{g_2}{g_1} < 0 \tag{23}$$

and

$$\left.\frac{d\theta}{dF}\right|_{\dot{F}=0} = -\frac{f_2}{f_1} > 0 \tag{24}$$

The saddle path SS is downward slopping and flatter than the $\dot{\theta} = 0$ curves.

If we start from a point A, the real exchange rate is higher than its long run equilibrium value, which in turn causes trade surplus to emerge. Consequently the stock of foreign asset accumulates leading to expected depreciation of the real exchange rate such that the real exchange rate appreciates. Thus the economy moves from point A to its long run equilibrium position E along the saddle path.

4: COMPARATIVE STATICS

To study the dynamics of adjustment to long run equilibrium we consider the time path of the response of real exchange rate and foreign asset to a variety of policy induced shocks. The shocks are fairly consistent with the broad contours of stabilization. The specific shocks examined are:

1) Reduction in money supply;
2) Fiscal adjustments;
3) Financial liberalization in the form of lowering tax on foreign asset (Sussman. 1992).

4.1. 'Tight Money' Policy

In the present model real money supply in units of nontraded goods is fixed and serves as a policy parameter. Consider a fall in money supply which governments in most reforming countries consider to be a reliable antiinflationary measure and an effective balance of payment strategy. The monetary contraction reduces demand for both traded and non-traded goods. Moreover at unchanged real exchange rate, reduction in money supply implies increase in the proportion of foreign asset to domestic asset. Consequently $\dot{\theta} > 0$ and $\dot{F} > 0$ at the initial equilibrium values of θ and F : $\dot{\theta} = 0$ curve shifts downward and $\dot{F} = 0$ curve shifts to the right. Clearly the real exchange rate appreciates, but the effect on foreign asset is ambiguous.

The adjustment pattern is shaped by all the parameters. including particularly the dynamics of asset, output and consumption elasticity with respect to the real exchange rate and strength of the wealth effect. What is crucial to the behaviour of the real exchange rate is the long run adjustment of foreign asset. If the foreign asset decreases in the long run, the real exchange rate overshoots as shown in Figure 2. In contrast, if foreign asset increases, the real exchange rate appreciates on impact, but this is a more moderate appreciation. In the subsequent adjustment process the exchange rate will continue to appreciate. This is traced out in Figure 3.

An important aspect of the adjustment process is that either the real exchange rate or the trade surplus must overshoot. In Figure 2 we have short-run appreciation of

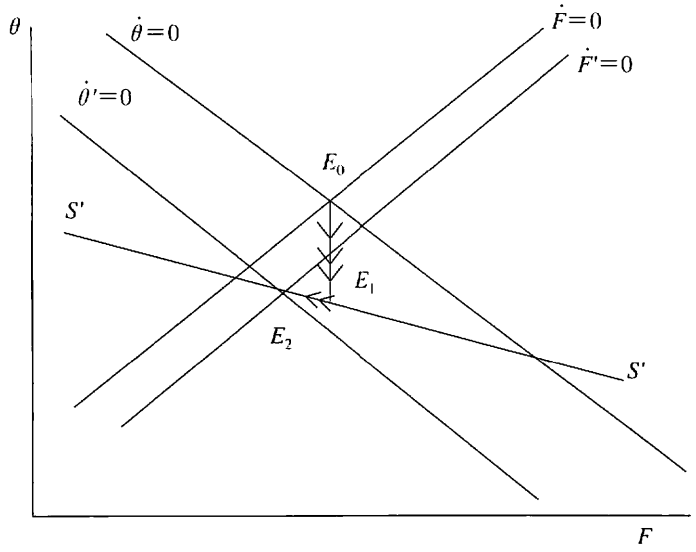

Figure 2. Exchange rate overshooting.

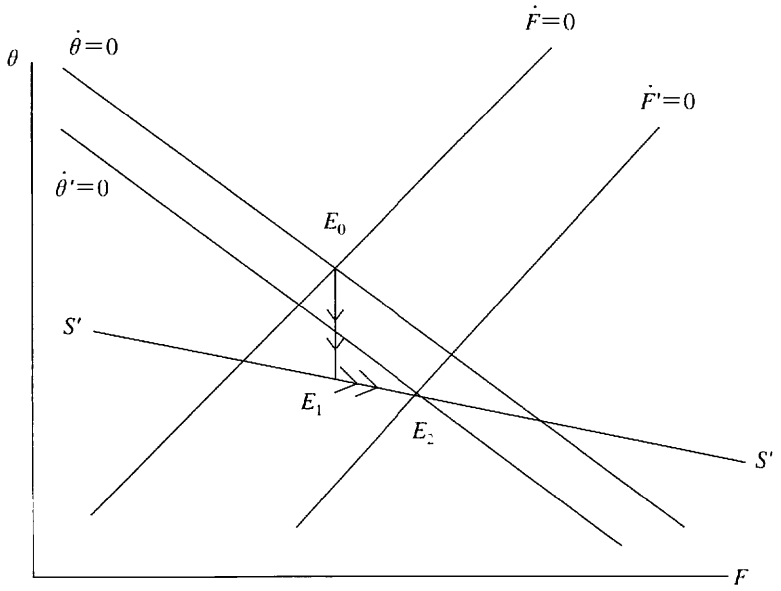

Figure 3. Trade surplus overshooting.

real exchange rate exceeding the magnitude of long run appreciation. The appreciation of real exchange rate causes resources allocation in favour of non-traded goods. On

impact the real exchange rate falls so much that a trade deficit emerges, leading to decline in the stock of foreign asset. On the other hand Figure 3 shows the overshooting of trade surplus. At point E_1 the real exchange rate is higher than its long run value. Consequently the value of trade surplus at E_1 is greater than what it will be in the long run at point E_2.

Since either the real exchange rate or the trade surplus overshoots, we examine the factors which make one or the other case more likely. A high price elasticity of production and weak wealth effect make the exchange rate overshooting a more likely phenomenon. The intuition is quite simple. A high price elasticity of production of traded goods means a significant fall in the production of traded goods in response to real exchange appreciation with adverse effect on trade balance. Weak wealth effect suggests relatively moderate improvement in trade balance starting from the initial steady state. If the adverse effect of real exchange appreciation dominates the favourable effect due to fall in wealth and reduced consumption. trade balance worsens and the outcome is exchange rate overshooting.

The foregoing discussion suggests the following results of monetary contraction:

The real exchange rate appreciates with a possibility of overshooting and possible deterioration of the trade account. The real wage measured in units of traded goods increases which entails contraction of the traded goods sector relative to the non-traded goods sector. The inflation rate of non-traded goods falls, but the unemployment cost of adjustment is high due to real appreciation.

4.2. Fiscal Adjustment

Most successful stabilization programmes typically include a drastic fiscal adjustment that features lower expenditure on both traded and nontraded goods. The fiscal austerity measures are expected to reduce the inflation rate and to improve the balance of payment. In this section we examine implications of these fiscal austerity measures.

4.2.1. Reduction of expenditure on tradeables

This leads to incipient current account surplus. The $F = 0$ shifts to the right. This is shown in Figure 4.

The incipient current account surplus leads to accumulation of foreign asset. To maintain the portfolio balance the real exchange rate appreciates: the economy moves from E_0 to E_1 without involving any short run effect. The real wage measured in units of tradeables increases. This causes contraction of the traded sector. Thus the initial current account surplus is partly eroded through real appreciation, since fall in production exceeds fall in consumption of traded goods. On the other hand real wage in units of nontradeables falls, which induces expansion of the nontraded sector and drop in inflation. Since $\frac{dN}{d\theta} > 0$ real appreciation involves contraction of employment. In other words the adjustment process involves low cost of inflation and high cost of unemployment—clearly an uneasy trade-off for policy makers. However for all practical purposes it is difficult to slash down government expenditure on traded goods,

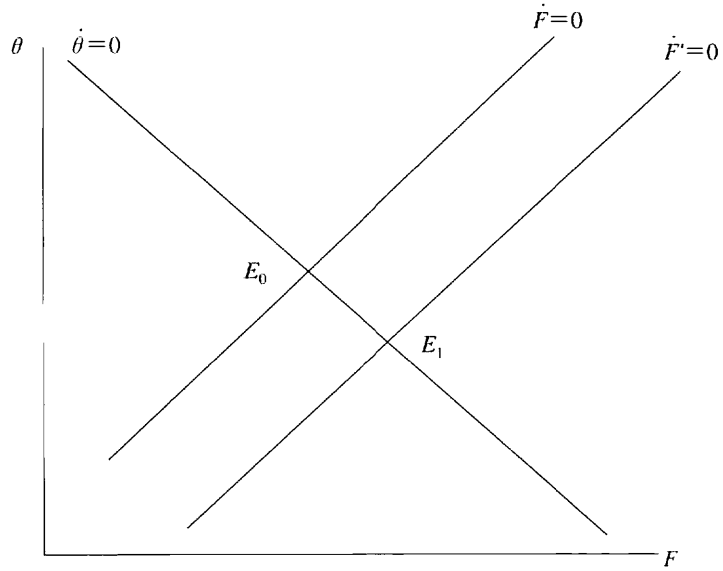

Figure 4. Cut in government expenditure on traded goods.

mainly because of existence of certain internationally binding fixed contracts. Moreover most of the imports routed through the government channels are essential imports, which cannot be controlled straightaway.

4.2.2. Reduction in expenditure on nontradeables

This reduces inflation rate of nontraded goods. The $\dot{\theta} = 0$ curve shifts downwards alongside downward displacement of the saddle path: the associated saddle path is $S'S'$. To clear the asset market the real exchange rate appreciates on impact, overshooting its long run value. The real appreciation leads to labour reallocation from tradeables and towards nontradeables. Since fall in production of the traded sector exceeds fall in consumption of traded goods, a real appreciation leads to incipient trade deficit, which results in decumulation of foreign asset. The inflation rate in the nontraded sector falls further, thanks to expansion of the nontraded sector and fall in foreign asset leading to fall in consumption of nontraded goods. Since $\frac{dN}{d\theta} > 0$, the real appreciation on account of cut in government expenditure on nontraded goods entails rise in unemployment. The adjustment process is traced out in Figure 5.

An interesting implication of the model is that while in most one sector open economy models with fixed exchange rate a fall in government expenditure on nontraded goods usually results in foreign exchange accumulation, in our dependent economy model with currency convertibility, wage indexation and sticky inflation, a permanent reductioon in government expenditure on nontraded goods causes decumulation of foreign exchange. Our result also needs to be contrasted with the result obtained by Agenor

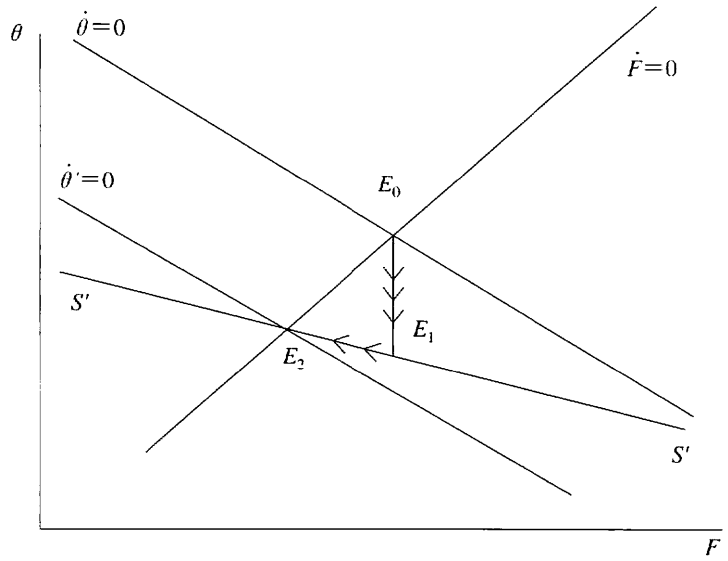

Figure 5. Reduction in expenditure on nontraded goods.

and Aizenman (1994). In a market clearing dependent economy model, Agenor and Aizenman obtained that cut in government expenditure on nontraded goods leads to a depreciation of the real exchange rate and an increase in production and consumption of traded goods. Since in their model rise in consumption exceeds increase in production, trade deficit emerges, leading to lower stock of net foreign assets. The results in present paper arrive at exactly opposite conclusion as regards the effect on the real exchange rate. Since the primary impact of cut in government expenditure on nontraded goods is fall in inflation rate, the real exchange rate appreciates to maintain the portfolio balance which in turn leads to contraction of the traded sector and expansion of the nontraded sector. The difference in result owes to sticky price combined with inertial inflation and wage indexation in the present paper. A pertinent observation is that the fiscal impacts depend heavily on the type of expenditure that is reduced. In particular, reduction in government expenditure on tradeables generates trade surplus, while reduction in government expenditure on nontraded goods causes trade deficit. In both the cases the real exchange rate appreciates, but the underlying mechanisms are different.

4.3. Financial Liberalization

Financial liberalization is a generic term which includes inter alia abolition of controls over the financial sector. In the present model we mainly consider a reduction in tax on return on foreign asset so as to permit free capital flows. It is important to note that in many of the Latin American cases liberalization was a part of a broader stabilization plan. However, financial liberalization in most of the cases turns out to be a

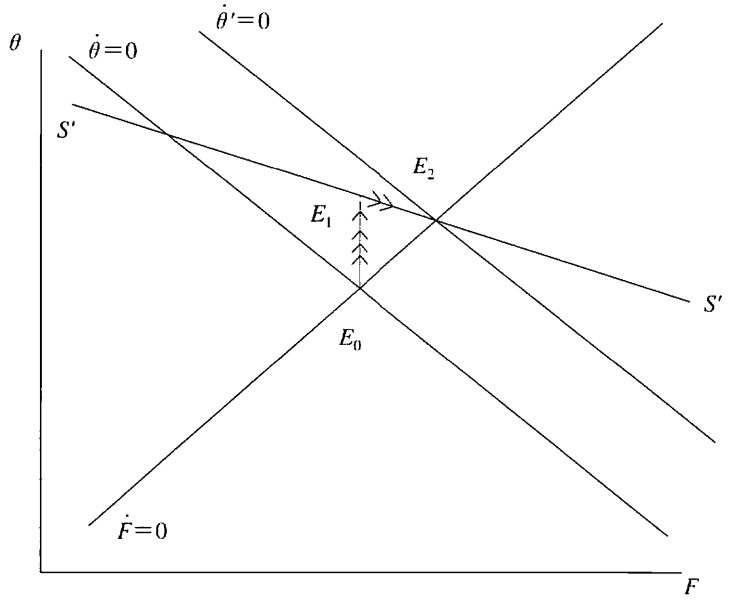

Figure 6. Effects of financial liberalization.

perilous undertaking, since it disturbs the macro economic stability. In particular, inflation rate rises abnormally without any noticible balance of payment improvement. As Sussman (1992) points out, liberalization is a serious macro economic shock. He uses a Dornbusch type sticky-price monetary model (1976) to explore the nature of shock; his main result is that liberalization has no long run effect on real exchange rate though it involves current account surplus with surge in inflation in the short run. In our dependent economy model with inflation inertia, we obtain both temporary and permanent effects of financial liberalization on real exchange rate.

Consider equation (19) and allow for a reduction in 'τ'. At the initial steady state value of θ and F, immediately $\dot{\theta} < 0$. Clearly $\dot{\theta} < 0$ curve shifts upward; (Figure 6): a decrease in τ generates an expectation of appreciating real exchange rate such that the real exchange rate depreciates.

The short-run equilibrium is E_2 on the new saddle path $S'S'$. The real depreciation causes the traded sector to expand and the non-traded sector to contract. Real depreciation leads to increase in employment. But a trade-off between employment and inflation occurs. The inflation rate in the non-traded sector rises on account of intersectoral allocation of labour and wealth effect both of which are involved in real depreciation. During the period of adjustment the current account is in surplus leading to accumulation of foreign asset. This again generates a wealth effect which adds to the inflation

of non-tradeables. Thus, the details of adjustment process comprise real exchange depreciation with overshooting, emergence of current account surplus and accelerating inflation.

5: EFFECTIVENESS OF POLICIES

Stabilization programme aims at control of inflation and a reasonably healthy current account position. It is true that trade deficit (or surplus) is eventually eliminated through the stock adjustment. However external balance remains an objective if we think of current account target. A country often strives for a particular curent account target so as to eschew excessive borrowing or lending abroad (Dornbusch 1980). Policy effectiveness is to be assessed with reference to the objectives of controlling inflation, maintaining a desireable trade balance and reducing unemployment.

The long run effects of different stabilization measures can now be examined very conveniently by means of Figure 7. Consider the following equations:

$$\theta L\left(\frac{m}{\theta F}\right) = \pi_Z + r^* - \tau \tag{25}$$

$$Y_T = C_T + G_T \tag{26}$$

Equation (25) gives portfolio balance and is represented by the LL curve which is downward sloping. Any rise in θ is accompanied by decrease in foreign asset so as to maintain portfolio balance. Equation (26) gives equilibrium condition for traded goods. Rise in F leads to rise in consumption of traded goods. To maintain equilibrium in the traded goods sector θ must rise (increase in output exceeds increase in consumption of

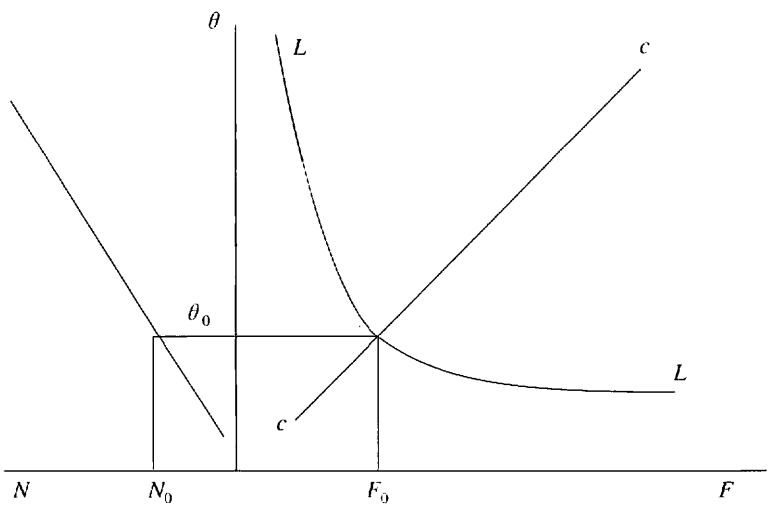

Figure 7. Long run equilibrium.

traded goods in response to rise in θ). Hence the CC curve representing equilibrium in the traded sector is positively sloped.

A tight monetary policy (reduction in m) causes leftward shift of the LL curve and downward shift of the CC curve. Definitely the real exchange rate appreciates, but effect on foreign asset is ambiguous. Fall in government expenditure on traded goods causes rightward shift of the CC curve. The real exchange rate appreciates and the foreign asset increases. Fall in expenditure on non-traded goods reduces the inflation rate and hence the LL curve shifts downwards. The real exchange rate appreciates and the foreign asset held by the private sector declines. Thus the conventional orthodox stabilization measures are effective anti-inflationary policies, but reduction in inflation is attained at the cost of rising unemployment. Financial liberalization (fall in tax on foreign asset) causes upward displacement of the LL curve. The real exchange rate depreciates and the foreign asset increases. Thus the adjustment process involves inflation, fall in unemployment and current account surplus.

Any particular stabilization measure, taken in isolation, can only be partially successful. The orthodox stabilization measures always involve real appreciation and cause labour allocation in favour of non-tradeables. These measures are clearly anti-inflationary but their cost lies in (possible) trade deficit and unambiguous rise in unemployment that follow in the trail of these stabilization measures. On the other hand financial liberalization causes real depreciation, generates trade surplus, reduces unemployment but produces unfavourable inflationary effects. Therefore the conclusion is that stabilization can not afford to rely on any particular measure; it has to be a package of interrelated measures[8]. Another worth-nothing observation is that though the real exchange rate is an endogenous variable, policy makers should try certain policies to achieve desired values of real exchange rate. If the objectives of stabilization are to be realized, erratic fluctuation in real exchange rate needs to be avoided[9].

[8] Effectiveness of policies depends on the initial conditions. In particular, unemployment is high for low value of θ; current account deficit is significant for low value of foreign asset; inflation rate is high for high value of inertial rate. Though we cannot rely on any particular policy for control of inflation, current account balance and unemployment, policies are to be chosen in response to the initial conditions. Any serious discussion on stabilization cannot be content with only financial implications; it should make an assessment of real effects. The model in the present paper can examine employment implications of each stabilization measure.

[9] The model can also examine dynamic considerations involved in the heterodox stabilization programme. It is important to recognize that, when inflation becomes ingrained, it acquires its own dynamics. This requires comprehensive heterodox stabilization packages (tight incomes policies) containing specific transitional mechanisms to d al with the inertial forces (Blejer and Liviatan, 1987, Agenor and Montiel, 1996). Any given fall in $\tilde{\pi}$ generates expectation of depreciating exchange rate such that the $\dot{\theta} = 0$ curve shifts downward. The real exchange rate appreciates, overshooting its long run equilibrium value on impact. This amounts to rise in real wage measured in units of traded goods, leading to contraction of the traded sector and emergence of an incipient trade deficit. As a result the foreign asset begins to decline. The expansion of the nontraded sector causes further drop in the inflation rate. Since the real rate appreciates, the adjustment to the new long run equilibrium involves rise in unemployment. Consequently both the orthodox and the heterodox stabilization measures involve, more or less, identical implications.

6: CONCLUSIONS

The present paper attempts to build up a dynamic dependent economy model of a small open economy to examine macro economic consequences of stabilization measures under flexible exchange rate. The primary advantage of dependent economy model is that it leaves room for intersectoral considerations. In our model existence of both the short run and long run effects of stabilization measures on real variables owes much to the inflation inertia, wage indexation and disequilibrium scenario in which the non-traded sector is located. The inflation inertia is very much context specific: since the late 1940s many developing countries have been experiencing high and persistent inflation. Unlike hyper inflation, chronic inflation is relatively stable and may last for decades. Countries acquiesce to high inflation by establishing various indexation mechanisms in financial, labour and goods market which tend to perpetuate the inflationary process (Bruno, 1993), By incorporating sticky inflation and wage-indexation we can abandon homogeneity and long run neutrality of stabilization policies.

The analysis in the paper suggests that each specific measure of macro economic reform can not simultaneously achieve the objectives of stabilization. While the orthodox stabilization measures are reliable anti-inflationary measures, they involve uneasy trade-off between fall in inflation and rise in unemployment. The financial liberalization is favourable to current account, but it involves serious inflationary consequences. If all the stabilization measures are not taken, as is the case in many reforming countries, macro economic disaster might be a natural outcome. This failure is primarily due to lack of basic understanding of both the qualitative and the quantitative effects of stabilization. Therefore the broad message of the paper is that stabilization cum liberalization should be recognized as a package of inter related measures and not be treated and implemented in a piecemeal manner.

REFERENCES

Agenor, P. R. and Montiel, P. J., 1996: Development Macroeconomics, Princeton University Press.

Agenor, P. R. and Aizenman, J., 1994: Macroeconomic Adjustment with segmented labour markets, NBER working paper, no 4769.

Aizenman, J., 1985: Trade Liberalization Policy and Financial Restrictions, Journal of International Economics, 19, 241–55.

Blejer, M. I. and Liviatan, N., 1987: Fighting Hyperinflation: Stabilization Strategies in Argentina and Israel, IMF Staff Papers, 34, 409–38.

Branson, W. H. and Buiter, W., 1983: Monetary and Fiscal Policy with Flexible Exchange Rates, in J. S. Bhandari and B. H. Putnam (eds.): Economic Independence and Flexible Exchange Rates, Cambridge Mass: MIT Press.

Bruno, M., 1993: Crisis, Stabilization and Economic Reform: Therapy by Consensus, Oxford University Press.

Buffie, E., 1984: Financial Repression, the New Structuralists and Stabilization Policy in the Semi-Industrialized Economies, Journal of Development Economics, 14, 305–22.

Calvo, A. and Carlos, A., 1977: A Model of Exchange Rate Determination under Currency Substitution and Rational Expectations. Journal of Political Economy. 85, 617–26.

Dornbusch, R., 1974: Real and Monetary Aspects of the Effects of Exchange Rate change, in National Monetary Policies and the International Financial System, ed. by R. Z. Aliber (Chicago: University of Chicago Press).

———— 1976: Expectations and Exchange Rate Dynamics, Journal of Political Economy, 84, 1161–76.

———— 1980: Open Economy Macroeconomics. New York: Basic Books.

Edwards, S., 1984: The Order of Liberalization of the Current and Capital Accounts of the Balance of Payments, NBER working paper, no 2721.

———— 1988: Real and Monetary Determinants of Real Exchange Rate Behaviour: Theory and Evidence from Developing Countries. NBER working paper, no 328.

Fischer, B. and Reisen, H., 1992: Towards Capital Account Convertibility, OECD Development Centre, Policy Brief No. 4.

Frenkel, J. A. and Goldstein, M. (ed.), 1996: Functioning of the International Monetary System, International Monetary Fund.

Greene, J. E. and Isard, P., 1996: Exchange Rate Policies in Developing Countries in Frenkel et al. (ed.): Functioning of the International Monetary System.

Khans, M. S. and Monteil, P. J. 1987: Real Exchange Rate Dynamics in a Small Primary Exporting Country, IMF Staff Papers 34, 687–710.

Kouri, P. J. K., 1976: The Exchange Rate and the Balance of Payments in the Short Run and in the Long Run: A Monetary Approach, Scandinavian Journal of Economics, 78, 280–308.

Kawai, M. and Akiyama, S., 2000: Implications of the Currency Crisis for Exchange Rate Arrangements in Emerging East Asia, Mimeographed, East Asia and the Pacific Region, World Bank.

Liviatan, N., 1979: A Diagrammatic Exposition of the Monetary Trade Model, Economic Record, 55, 222–229.

———— 1981: Monetary Expansion and Real Exchange Rate Dynamics, Journal of Political Economy, 89, 1218–1228.

Mussa, M. et al., 2000: Exchange Rate Regimes in an Increasingly Integrated World Economy, Occasional Paper, 193, IMF.

Park, W. A. 1995: Exchange Rate Dynamics in Dual Exchange Markets, International Economic Journal, Vol. 9, no. 1, 89–109.

———— 1996: Financial Liberalization: The Korean Experience in Ito, T. and Krueger, A. O. (ed.): Financial Deregulation and Integration in East Asia, Chicago Press.

Owen and Solie-Fallas, 1989: Unorganized Money Market and Unproductive Assets in the New Structuralist Critique of Financial Liberalization, Journal of Development Economics, 31, 341–355.

Sussman, O., 1992: Financial Liberalization: The Israeli Experience, Oxford Economic Papers 44: 387–402.

Taylor, L. 1991 : Income Distribution, Inflation and Growth. Lectures on Structuralist Macroeconomic Theory. MIT Press.

Wijnbergen, S., 1983: Credit Policy, Inflation and Growth in a Financially Repressed Economy. Journal of Development Economics 13: 45–65.

Zervoyianni, A., 1988: Exchange Rate Overshooting, Currency Substitution and Monetary Policy, The Manchester School, 56, 247–67.

APPENDIX

A.1. Derivation of Equation (7)

Elasticities of demand for labor in the traded and the non-traded sector are:

$$e_T = -N_T' \frac{\theta^{-\alpha}}{N_T}.$$

$$e_Z = -N_Z' \frac{\theta^{-\alpha}}{N_Z}.$$

Now,

$$Y = Y_Z + \theta Y_T$$

$$\begin{aligned}\frac{dY}{d\theta} &= \frac{dY_Z}{d\theta} + Y_T + \theta\frac{dY_T}{d\theta} \\ &= Y_T + \theta^{-\alpha}[-\alpha Y_T' N_T' + (1-\alpha)Y_Z' N_Z'] \\ &= Y_T + \theta^{-\alpha}[\alpha Y_T' e_T N_T \theta^{\alpha} - (1-\alpha)Y_Z' e_Z N_Z \theta^{\alpha-1}] \\ &= Y_T + [\alpha Y_T' e_T N_T - (1-\alpha)Y_Z' e_Z N_Z \theta^{-1}] \\ &= Y_T + \theta^{-1}[\alpha\theta Y_T' e_T N_T - (1-\alpha)Y_Z' e_Z N_Z]\end{aligned}$$

The sufficient condition for $\frac{dY}{d\theta} > 0$ is

$$\alpha\theta Y_T' e_T N_T > (1-\alpha)Y_Z' e_Z N_Z$$

or,

$$\left(\frac{\alpha}{1-\alpha}\right)\left(\frac{\theta Y_T'}{Y_Z'}\right)\left(\frac{e_T}{e_Z}\right) > \frac{N_Z}{N_T}$$

A.2. Derivation of comparative static results

The steady-state effects of policy-induced shocks can be obtained from the following equations:

$$\dot{\theta} = g(\theta, F, m, G_Z, \tau, r^*) = 0$$
$$\dot{F} = f(\theta, F, m, G_t) = 0$$

1) Tight Money:

$$\frac{d\theta}{dm} = \frac{-g_3 f_2 + f_3 g_2}{\Delta} > 0$$
$$\frac{dF}{dm} = \frac{f_1 g_3 - g_1 f_3}{\Delta}$$

Exchange rate overshoots if $\frac{dF}{dm} > 0$

Thus the condition for exchange rate overshooting in response to monetary shock is $f_1 g_3 - g_1 f_3 < 0$.

2) Reduction in expenditure on traded goods:

$$\frac{d\theta}{dG_t} = \frac{f_4 g_2}{\Delta} > 0$$
$$\frac{dF}{dG_t} = \frac{-g_1 f_4}{\Delta} < 0$$

3) Reduction in expenditure on non-traded goods:

$$\frac{d\theta}{dG_Z} = \frac{-f_2 g_4}{\Delta} > 0$$
$$\frac{dF}{dG_Z} = \frac{f_1 g_4}{\Delta} > 0$$

4) Financial Liberalization:

$$\frac{d\theta}{d\tau} = \frac{-g_5 f_2}{\Delta} < 0$$

$$\frac{dF}{d\tau} = \frac{f_1 g_5}{\Delta} < 0$$