56 Stabilization policy and structural adjustment

Valpy FitzGerald

Introduction[1]

Economic development strategy in open industrializing economies is dominated by stabilization policy and structural adjustment. Developing countries are faced by an exogenous and changing set of world prices and export demand schedules on the one hand, and rationed global credit markets whose dynamic is determined by financial cycles in the core economies on the other. In consequence, domestic demand stabilization in response to unexpected temporary shocks and supply adjustment to permanent shifts in global markets determine the growth path, rather than a process of intertemporal optimization in the stable and foreseeable world of textbook economic theory.

Global economic shocks are exacerbated by armed conflicts and natural disasters, which often affect entire regions, while accumulated debt positions affect not only fiscal and current account balances but also the future expectations (and thus current behaviour) of the private sector. The political economy issues arising from accompanying changes in employment levels, wage rates and sectoral output are complicated by the key role played by international institutions – particularly the International Monetary Fund (IMF) and the World Bank – both as providers of financial resources to governments and as arbiters of 'sound' economic management.

These orthodox macroeconomic management criteria are based on specific models of economic behaviour for small open economies as well as a bias against active intervention in markets. In consequence the disappointing record of orthodox stabilization and adjustment policies in Eastern Europe, Latin America and Asia in the 1990s has led to a renewed interest in 'heterodox' methods of macroeconomic management that correspond more closely to the structure and behaviour of the emerging market economies with domestic capital markets integrated to the international financial system. However, an alternative set of underlying macroeconomic models with the generality and power of the orthodox models has yet to be constructed.

This chapter opens with a brief survey of the analytical literature that reveals an excessive emphasis on inflation targeting in stabilization policy

and a lack of attention to issues of investment and distribution in structural adjustment. It then outlines an alternative new-Keynesian approach to stabilization policy that explicitly contrasts with the standard IMF monetary programming framework. When capacity utilization and open capital account are included, inflation targeting is shown to have destabilizing consequences, requiring a return to active fiscal and monetary policy. The chapter then presents a new-Keynesian view of structural adjustment in explicit contrast to the standard '1-2-3' open economy model that underpins World Bank analysis. It is shown that resource reallocation in the medium term can only take place through new investment, with significant distributional effects via employment and real wages. The chapter concludes by suggesting that emerging market authorities should and can engage in active macroeconomic intervention based on a more realistic analysis of the structure and behaviour of their economies.

Stabilization policy and structural adjustment: the analytical debates

I start by examining the macroeconomic programming models used by the Fund and the Bank in designing stabilization policy and structural adjustment, respectively.[2] These two models are not entirely consistent as they are built on different assumptions as well as referring to different time horizons, despite earlier attempts to reconcile them (Khan et al., 1990), and thus must be treated separately.

The IMF Basic Financial Programming Framework (BFPF) is the standard model used by the Fund in designing stabilization programmes, the object of which is to reduce inflation to as near zero as possible and ensure debt service payments (IMF, 1987; Mussa and Savastano, 1999). The intellectual origins of the BFPF are Hicks's interpretation of Keynes, expressed as the 'absorption approach' where excess domestic demand creates current account deficits and/or domestic inflation when imports are constrained by lack of external finance (Polak, 1957). The model subsequently metamorphosed into a version of the Chicago 'monetary approach to the balance of payments'. It is concerned with the short run, where both real output and exports are taken as given, so the focus is on aggregate demand management. The budgetary balance plays a key role in this (particularly when financed by money supply) as does the nominal exchange rate because it sets import purchasing power.

Apart from the usual set of national accounting identities linking the macroeconomic and monetary variables, there are only two behavioural relationships in the BFPF: the demand for money and the demand for imports. A budget deficit beyond that warranted by output growth and the inflation target (that is, 'seignorage') is then reflected fully in the current account deficit if the exchange rate is fixed and foreign finance is available;

or fully in domestic inflation if the exchange rate is flexible and foreign finance constrained. Stabilization policy design then consists in the required fiscal adjustment[3] in order to bring inflation down to target and restore external reserve levels to a prudent proportion of imports. This is supported by last-resort short-term lending from the Fund, which alleviates the fiscal adjustment required to meet these targets; and also provides powerful external leverage ('conditionality') to ensure compliance with this form of stabilization policy (Collier and Gunning, 1999). However, the behavioural relationships are clearly far too simplistic in the BFPF: for instance, interest rates and wealth (especially debt) stocks do not enter the model, while capital flows are exogenous, despite the central place of both in modern monetary theory.

The World Bank Revised Minimum Standard Model (RMSM) is used in designing structural adjustment programmes, the object of which is to restore current account stability and raise output growth (Addison, 1989 [1999]). The RMSM has Keynesian roots too: in the Harrod–Domar theory of growth constrained by savings, modified to include an external constraint reflecting the dependence of developing countries on imports of producer goods, leading to the 'two-gap' model (Chenery and Strout, 1966). However, it has since involved into the more neoclassical framework of a 'computable general equilibrium' model discussed below. The RMSM is concerned with the medium term, so aggregate supply is endogenous. Exports respond to the real exchange rate, which acts so as to allocate production factors between the traded and non-traded sectors: in other words, a relative price effect on supply instead of the income effect of the nominal exchange rate on demand in the Fund model. Investment is simply driven by the availability of savings: private saving (a constant proportion of disposable income) less the budget deficit plus external finance ('foreign saving').

In addition to the usual national accounting identities, the RMSM contains five behavioural relationships for the investment–growth linkage, import demand and export supply, fiscal income and private saving. Structural adjustment design seeks to relax the current account constraint on growth by raising exports through real exchange rate devaluation; and to raise the growth rate itself by reducing government expenditure and thus reversing the 'crowding-out' of private investment. Regulatory reforms follow the same logic, emphasizing trade and financial liberalization combined with extensive privatization to reduce the size and scope of the public sector. External finance in the RMSM plays three roles therefore: directly increasing public investment (for example in infrastructure) and output growth; reducing domestic borrowing to fund the budget deficit, and thus allowing private investment to rise; and funding more imports and thus

output.[4] As in the case of the Fund, the Bank's role as a leading provider of long-term official loans to poor countries, and its influence on other aid donors, ensures the adoption of this 'sound' approach to structural adjustment (Mosley et al., 1995).

As the RMSM is a one-sector model it is useful for macroeconomic programming, but not entirely appropriate for the analysis of structural adjustment, so World Bank policy design also has analytical foundations derived from the 'dependent[5] economy' model set out by Dornbusch (1986) and Buiter (1988). This is disaggregated to generate what has now become the 'industry standard'[6] with three products – exportables, importables, and non-tradable or 'home' goods and services – which we use as a framework in the fourth section below. This '1-2-3' model[7] has generated a wide range of applied computable general equilibrium models (Devarajan and Robinson, 1993) used by the World Bank to inform structural adjustment programmes and to link macroeconomic policy to poverty reduction strategies (Bourgignon and Morrison, 1992).

A number of significant lessons are drawn from this simple yet powerful model. One of these is the well-known 'Dutch disease'[8] interpretation of the effect of an unexpected increase in world primary commodity prices or a rise in external aid flows: the real exchange rate appreciates, the non-traded sector expands, other traded sectors contract, so imports rise and exports fall, which is unsustainable in the long run. Another lesson is the effect of fiscal expansion: as government expenditure is intensive in non-traded goods and services, the real exchange rate appreciates and traded export production falls as non-traded output rises, leading to unsustainable debt problems.

However, neither the RMSM nor the 1-2-3 model are dynamic and thus do not allow for intertemporal optimization by economic agents: that is, the fact that households, firms and governments take investment, saving and borrowing decisions looking forward over many years. This is the basis of modern neoclassical macroeconomics and allows resource allocation behaviour to be endogenized.[9] Further, they fail to reflect the elements of modern growth theory in general and the role of public expenditure in physical and human capital formation in particular.[10] Last but not least, the simplistic view of the negative effects of budget deficits (on inflation for the Fund and on private investment for the Bank) ignores the modern macroeconomic theory of intertemporal budgetary and financial policy.[11] Indeed from a strictly neoclassical viewpoint this persistence of the 'financing gap' tradition can be seen as invalidating the proposals from the Bank and the Fund on additional lending and debt forgiveness (Easterly, 1999).

These orthodox models have also been subjected to a much broader critique from non-neoclassical standpoints. Four such lines of argument are:

(1) the Keynesian critique of the failure to understand the exogenous nature of cycles in open economies; (2) the structuralist critique of the neglect of supply constraints in developing countries; (3) the Kaleckian critique of implausible assumptions on investment and savings; and (4) the Fabian critique of the exclusion of poverty reduction from macroeconomic strategy. These critical theoretical views have been fuelled by the evident failure in most cases of stabilization policy to get beyond inflation reduction, and of structural adjustment to achieve sustained growth (Williamson, 1997).

The underlying assumption in the IMF model that output is unaffected by demand and indeed that the economy operates at full factor employment is clearly implausible. Excess capacity in the Keynesian sense is often present in practice, as well as chronic underemployment in the Lewis sense. Moreover, the central issue in monetary policy for most developing countries today[12] is not inflation as such but rather countering the effects of externally generated cycles exacerbated by inherited debt positions (Ocampo, 2000). In the upswing of a cycle the interest rate declines and the exchange rate appreciates, but any attempt to counter the boom attracts still more funds and the exchange rate appreciates still further. In the downswing, markets push for devaluation but this forces up interest rates and exacerbates production declines, promoting further capital flight and debt default. Moreover, the budgetary dependence on foreign borrowing makes the fiscal stance automatically procyclical. The application of the standard IMF policy model during these financial crises worsens economic recessions and further destabilizes capital flows (Stiglitz and Greenwald, 2003).

A central feature of the standard theory of structural adjustment is that any imbalance between traded and non-traded sectors in the dependent open economy is a result of distorted domestic relative prices (that is, differing from 'world' prices): thus the emphasis on real exchange rate correction and trade liberalization. However, this analysis rests on the twin assumptions of full employment of labour and capital on the one hand and the perfect substitution of existing factors between sectors in response to relative prices on the other; which is clearly unrealistic. Indeed, excess capacity and immobile factors explain much of the lack of supply response to structural adjustment (Taylor, 1993). Moreover, the assumption that domestic prices are not affected by exchange rates (and thus that devaluation is not 'passed through' into inflation) is similarly implausible for small open economies (Taylor, 1988). These supply response failures are exacerbated by the lack of business liquidity caused by restrictive monetary policies, because even under normal circumstances credit rationing prevails and output as well as prices are affected by interest rates (Blinder, 1987).

More generally, there is a clear parallel between orthodox structural adjustment theory and neoclassical trade theory because the internalization

of world prices is intended to bring about an intersectoral resource reallocation in line with comparative advantage. Trade liberalization raises the return to the abundant factor of production (assumed to be unskilled labour in developing countries); and because primary exports are taken to be more labour-intensive than tariff-protected industry there should also be a net employment creation (Obstfeld and Rogoff, 1997). However this does not often occur in practice: either because exports are based on natural resources in which case rents rise and little unskilled employment is generated; or because skilled labour is the scarce resource and export expansion opens up wage differentials (Wood, 1994). Moreover, there is in consequence no theoretical reason to believe that income distribution will necessarily improve with structural adjustment.

Central to the theoretical approach of both Bank and Fund is that private saving[13] is a fixed proportion of disposable private income, and that private investment (and thus growth) is determined by private savings less the budget deficit plus external finance. However the large fluctuations observed in the savings rate for developing countries and the empirical evidence of the influence on private investment of other factors such as profit rates, credit conditions, public infrastructure, debt overhang, regulatory change and political stability all suggest that in developing countries at least investment is not constrained by private saving (FitzGerald, 2003). Indeed, the policy uncertainty caused by violent and unpredictable stabilization and adjustment episodes is among the most depressive influences on investment in developing countries (Rodrick, 1991). Nonetheless, successful structural adjustment and sustained growth require high rates of investment so that production capacity can change and thus the desired structural adjustment takes place.

This process cannot simply be considered as an overall proportionate expansion based on a fixed savings rate (augmented as necessary by external funds) once domestic resources have been reallocated, as the RMSM does; nor as a smooth process of reallocation of labour and capital between sectors in response to changing relative prices as the 1-2-3 model does. Both modern intertemporal macroeconomics and traditional Keynesian theory tell us that the investment process has its own dynamic based on future profitability, and this has profound implications for adjustment policy. Further, the financing gap theory used in both Bretton Woods models assumes that extra external finance always contributes to growth, by simply and directly adding to investment funds: but it is well established that capital inflows often lead to increased consumption (Jansen and Vos, 1997).

Last, but far from least, the neglect of distributional considerations in both the Bank and Fund models is not only inconsistent with their institutional commitment to poverty reduction but also leads them to

underestimate the political economy constraints on macroeconomic policy. There exists a long-standing critique of adjustment policy in this respect in terms of the negative effect on social service provision of fiscal expenditure cuts as the central macroeconomic policy tool (Cornia et al., 1987). Targeted poverty reduction programmes, while desirable in themselves, do not redress the effects of macroeconomic policy design on employment and wages, which are more significant in determining the welfare of the majority of the population. These effects in turn determine social support for economic policy, and thus its political sustainability.

Stabilization policy, inflation targeting and monetary autonomy

We have seen that the open developing macro-economy works in a different way from that which the Fund model supposes – the role of domestic credit rationing and external capital flows being crucial in the short-run context. This section sets out, therefore, a model with a formal framework similar to that in IMF (1987) except that: (1) output can be below capacity and is determined by the level and costs of credit; and (2) the interest rate and exchange rate are related though arbitrage across the capital account.

The standard inflation-targeting model can be set out as follows (IMF, 1987). As this is a short-run model exports (X) and real output (Q) are exogenous, as are the capital flows, net of debt service, that determine the net change in external liabilities ($\dot{F}$). The level of domestic debt (D) and foreign exchange reserves (R) are set according to fixed prudential rules. The endogenous variables are thus domestic aggregate income (Y), the level of imports (M) and the demand for money (B) and for credit (H) from the private sector. The nominal exchange rate (E) floats under the current Fund doctrine, and thus is also endogenous. The target variable is the price level (P) and the policy instrument is the interest rate (i).

I start with three accounting identities. Nominal income (Y) and inflation (p) are:

$$Y \equiv Q \cdot P$$

$$p = \frac{\dot{P}}{P} \tag{56.1}$$

The balance of payments (denominated in foreign currency) is the familiar:

$$X - M \equiv \dot{R} - \dot{F} \tag{56.2}$$

and the domestic monetary balance (Khan et al., 1990, p. 158) is:

$$B \equiv D + H + E \cdot R \tag{56.3}$$

There are three behavioural equations in this standard model, each of which reflect a key aspect of aggregate private sector macroeconomic behaviour. Import demand in nominal terms is a proportion (m) of aggregate income (Y):[14]

$$M \cdot E = mY \tag{56.4}$$

Deposits in the banking system (that is, 'demand for money') depend on income (Y) and the interest rate (i) for a given velocity of circulation (v) and positive interest 'elasticity' coefficient (α):

$$B = Yv + \alpha i \tag{56.5}$$

The credit (and cash) requirements of the private sector – that is, the supply of money – have a similar form because the Fund model assumes that the authorities always accommodate the monetary needs of the market (that is, passive rather than active monetary stance) and that the impact (β) of the interest rate on this demand is of course negative:

$$H = Yu - \beta i \tag{56.6}$$

The 'prudential rules' for domestic debt (D) and reserves (R) are:

$$\begin{aligned} \dot{D} &= \lambda Y \\ R &= \theta M \end{aligned} \tag{56.7}$$

The reserves rule (θ) is based on a specific degree of 'liquidity' in the form of import coverage;[15] while the domestic debt rule (λ) effectively constrains the fiscal deficit as a proportion of GDP.[16]

This model is simple to solve because it can be distilled down to two reduced-form equations based on (56.2) and (56.3). The domestic price level (P) is determined from the domestic monetary balance by substituting (56.5), (56.6) and (56.7) into (56.3) using (56.1) and (56.4) to yield:

$$P = \frac{D_{-1} - (\alpha + \beta)i}{Q\{v - u - \lambda - m\theta\}} \tag{56.8}$$

from which it is clear not only that higher interest rates (i) reduce the price level and thus inflation, but also that a key determinant of inflationary pressure is the domestic debt overhang (D_{-1}), as indeed is the prudent fiscal deficit (λ), thus the emphasis on fiscal retrenchment in Fund stabilization programmes.

An alternative formulation of the reserves rule that has recently found favour in the Fund with the spread of full currency convertibility is that there should be maintained a constant proportion (κ) of the money supply (H). This gives a similar result:

$$ER = \kappa H \tag{56.7a}$$

$$P = \frac{D_{-1} - \{\alpha + \beta(1+\kappa)\}i}{Q\{v - u(1+\kappa) - \lambda} \tag{56.8a}$$

The external foreign currency balance found by substituting (56.1), (56.4) and (56.7) into (56.2) and using (56.8) serves to determine the nominal exchange rate (E) for a given domestic price level under the floating exchange rate regime espoused by the Fund:

$$E = \frac{mQP(1+\theta)}{X + (\theta M_{-1} + \dot{F})} = \frac{\{D_{-1} - (\alpha + \beta)i\}}{(v - u - \lambda - m\theta)} \quad \frac{m(1+\theta)}{\theta M_{-1} + F} \tag{56.9}$$

This in turn implies that the real exchange rate (e) using world prices as numeraire[17] – and thus export competitiveness in the medium term – is endogenous and appreciates (that is, e falls) with positive external shocks such as capital inflows ($\dot{F}$) or increased commodity export income (X) because:

$$e = \frac{E}{P} = \frac{mQ(1+\theta)}{X + (\theta M_{-1} + \dot{F})} \tag{56.10}$$

However, note also that although from (56.9) inflation targeting will affect the nominal exchange rate (higher interest rates leading to appreciation) the real exchange rate in (56.10) remains unaltered. As a whole, therefore, the policy stance applied by the Fund model is procyclical because not only is the impact of external shocks on the economy unmitigated by active domestic fiscal or monetary policy, but also any unexpected decrease in output (Q) must be met by higher interest rates to keep P (in 56.8) stable and vice versa in the inflation targeting approach.

I now adapt the model to allow for the two characteristics noted at the beginning of this section, which are essential in order adequately to describe middle-income 'emerging market' economies and the larger low-income countries with a domestic capital market open to foreign investment. I retain the same basic modelling framework in order to facilitate comparison between our new-Keynesian approach and the orthodox model.

The first modification is to the private credit channel. The relationship in (56.11) appears superficially similar in form to (56.6) but in fact causality

has been reversed: in a credit-rationed economy monetary policy determines the level of real output (Q) as this responds to credit supply (H) within the limit of capacity (AK).[18] This response comes about from both consumer credit expansion affecting demand and working capital availability affecting supply, and is a more realistic representation of emerging market economies than the Fund model. The authorities can alter the supply of money by straightforward monetary emission as an alternative to debt issue for fiscal deficit finance, by varying reserve requirements on banks or by changing the mode of financing foreign exchange reserve holdings. Note that this relationship means that raising interest rates (i) will reduce output. Only with full capacity utilization is the demand effect felt on prices (P) rather than output, and only then will reductions in money supply or higher interest rates reduce inflation. In contrast, my bank deposit function (B) function is similar to that of the Fund model:

$$\begin{aligned} Y &= H(\phi - \beta i) \\ Y &= QP \\ Q &= \frac{H}{P}(\phi - \beta i) \text{ when } Q < AK \\ P &= \frac{H}{K}(\phi - \beta i) \text{ when } Q = AK \\ B &= Y(v + \alpha i) \end{aligned} \tag{56.11}$$

The second modification is to open up the capital account of the balance of payments in (56.2) by expressing capital flows – changes in external liabilities (F) – as a function of domestic interest rates (i) and changes in the nominal exchange rate (E).[19] This contrasts with the Fund model where capital flows (limited to aid and foreign direct investment, FDI) are entirely exogenous:

$$\dot{F} = \gamma\left(i - \frac{\dot{E}}{E}\right) \tag{56.12}$$

Note also that foreign investor risk appetite or world interest rates (both reflected in the parameter γ) can shift suddenly in practice, and that a sufficient imbalance between interest rates and exchange rate changes can lead to a capital outflow ($\dot{F} < 0$).

Reflecting observed practice in emerging market economies, the 'prudential rules' for the management of external reserves and domestic debt in our model need to be adapted to these structural characteristics. Thus instead of the import coverage rule in (56.7), the central bank maintains a reserve level adapted to the external debt position (F) as a form of insurance against external capital account shocks:[20]

$$R = \pi F \tag{56.13}$$

And the debt solvency rule in (56.7) is applied in an intertemporal context, changing with the primary fiscal deficit (Z) and limited to a given ratio (λ) of output at full capacity:[21]

$$\begin{aligned} D &= Z + (1 + i)D_{-1} \\ \frac{D}{PK} &\leq \lambda \end{aligned} \tag{56.14}$$

Finally, although the emerging market economy is exposed to external shocks even if the nominal exchange rate is allowed to float, the real exchange rate in our model is no longer determinate, unlike the Fund model (56.10), because it is affected by the domestic interest rate through the capital account. This endows the monetary authorities with a degree of freedom both to ensure that exports remain competitive and to respond adequately to external shocks. The primary deficit (Z) thus becomes the policy instrument affecting inflation, while interest rates set the real exchange rate and credit levels determine capacity utilization.

We can see how this policy framework works in practice by condensing the model into three reduced-form equations.[22] The first is that real credit supply (H/P) be set so as to ensure full capacity utilization. From (56.11) we have this condition as:

$$\begin{aligned} Q &= K \\ \frac{H}{P} &= \frac{K}{\phi - \beta i} \end{aligned} \tag{56.15}$$

The second is the balance of payments identity (56.2), re-expressed in terms of the exchange rate, interest rates and output by substituting in equations (56.1), (56.4), (56.12) and (56.13). Assuming that the target of stabilizing the real exchange rate is in fact achieved (that is, $\dot{e} = 0$ and thus $p = \dot{E}/E$), inserting expressions for the real exchange rate (56.10) and inflation (56.1) yields the real exchange rate (e):

$$\begin{aligned} X - \frac{mPK}{E} &= (\pi - 1)\gamma\left(i - \frac{\dot{E}}{E}\right) \\ e = \frac{E}{P} &= \frac{mK}{X + \gamma(1 - \pi)(i - p)} \end{aligned} \tag{56.16}$$

In other words, the policy instrument that determines the real exchange rate in an emerging market economy with an open capital account is the real interest rate ($i - p$). The higher the real interest rate, the more the real

exchange rate will appreciate (that is, e falls). The desirable policy target is thus clearly to maintain the real exchange rate at a stable and competitive level, keeping real interest rates low and adjusting them actively according to world market conditions.

The third reduced-form equation is derived from the monetary balance (56.3): substituting in (56.5), (56.13), (56.14) and (56.15) yields an equation for the price level (P) in terms of the other targets and instruments:

$$P = \frac{Z + (1+i)D_{-1}}{K\left\{(v + \alpha i) - \frac{1}{\phi - \beta i}\right\} - e\pi\{F_{-1} + \gamma(i-p)\}} \tag{56.17}$$

Because the interest rate (i) instrument is already employed to stabilize the real exchange rate (e), and the credit level (H) is already set so as to stabilize output ($Q = K$), the budget deficit (Z) plays the key role of price stabilization. However from (56.17) it is clear that a low level of inflation does not mean that that the budget should always be in balance ($Z = 0$) or even a fixed proportion of aggregate income ($Z = \lambda Y$), but rather should compensate for exogenous shocks to international asset demand (γ) or production capacity (K) even when international price fluctuations are smoothed by the real exchange rate.

In sum, in this type of open economy integrated – albeit asymmetrically – to international capital markets, a decision by the central bank to raise the interest rate in order to curb inflation from (56.17) will actually have three undesirable effects: inflation will rise due to the effect of debt service on the budget deficit; the exchange rate will appreciate through the capital account effect; and real output will fall from the credit channel effect. My more realistic new-Keynesian model for the emerging market economy thus shows not only that this is a misguided stabilization policy, but also that a wider range of policy instruments should be used to achieve multiple stabilization targets, with particular emphasis on trade competitiveness and full employment. These instruments include low real rates of interest, a balanced budget over the cycle and above all strong prudential control of bank credit.

Structural adjustment, sectoral investment and income distribution

We have also seen that emerging market economies work in different ways from that which the World Bank model supposes – the existence of surplus labour and sector-specific installed capital being crucial. This section sets out, therefore, a medium-term model with a framework similar to the 1-2-3 model used as a formal analytical basis for the RMSM, except that: (1) although production capacity may be fully utilized, this does not involve

the full employment of the labour force; and (2) shifts in production patterns are not possible except through new investment.

In the canonical dependent economy model[23] there are two sectors producing traded (T) and non-traded (N) goods from homogeneous production functions with sector-specific labour (L) that is intersectorally mobile, so that the nominal wage (W) is equalized across sectors. Total labour supply is fixed and fully employed at the equilibrium wage. For the two sectors (j):

$$Q_j = Q_j(L_j) \tag{56.19}$$

and the real exchange rate (e) is now defined as the ratio of traded (P_T) to non-traded prices (P_N):

$$e = \frac{P_T}{P_N} \tag{56.20}$$

Each sector employs labour up to the point where the marginal product of labour is equal to the single intersectoral wage,[24] which is thus equalized between the two sectors. Defining the real wage (w) in terms of non-traded prices (P_N) we thus get:

$$\begin{aligned} w &= \frac{W}{P_N} \\ Q'_T(L_T) &= \frac{w}{e} \\ Q'_N &= w \end{aligned} \tag{56.21}$$

It follows that the ratio of the marginal products of labour in the two sectors is equal to the real exchange rate (e) at equilibrium:[25]

$$\frac{Q'_N(L_N)}{Q'_T(L_T)} = e \tag{56.22}$$

Demand for labour is the inverse function of the product wage and there is full employment of the total labour force ($\overline{L}$):

$$L_T(ew) + L_N(w) = \overline{L} \tag{56.23}$$

The real exchange rate thus drives labour allocation across the two sectors, and hence output. The sectoral supply functions become:

$$\begin{aligned} Q_j &= Q_j(e/w) \\ Q'_T &> 0,\ Q'_N < 0 \end{aligned} \tag{56.24}$$

And generally an inverse relationship between the real wage (w) and the real exchange rate (e) is also implied by this result, because with full employment in (56.23) and exploiting the implicit function rule:[26]

$$w' = -\frac{wL'_N}{L'_T + eL'_N} < 0 \tag{56.25}$$

Disaggregating traded goods into exportables (x), importables (m) and non-tradable or 'home' goods and services (h) generates the 1-2-3 model (Devarajan and Robinson, 1993), which we use as a framework in order to facilitate comparison. The prices for exportables (P_x) and importables (P_m) are determined by world prices multiplied by the nominal exchange rate (E), while home goods prices (P_h) depend upon supply conditions, as the domestic market must clear to ensure full capacity utilization.

However, in addition to the unwarranted assumption of full employment of labour, the notion in the 1-2-3 model that capital can simply be moved between sectors with a constant elasticity of transformation (CET) production function is obviously implausible. In fact the key issue in structural adjustment is investment behaviour because installed capital cannot be shifted between traded and non-traded sectors, while labour cannot easily be substituted for capital when technology is largely imported. The sectoral production functions are thus better seen as separate, limited by the installed capital stock in each.[27]

World prices for exports and imports (P_f, P_m) and thus terms of trade (τ) are exogenous, while the unit import (m_j) and labour (l_j) input coefficients are technologically fixed. As before there is a single nominal wage rate (W), but in our model it is set either institutionally or by the reserve price of labour from the household sector, rather than by labour market clearing, and unemployment persists. Sectoral employment (L_j) is thus determined by output and there is excess labour supply, due to the Leontief fixed technical coefficients:

$$\begin{aligned} Q_j &\leq A_j K_j \\ G_j &= Q_j(P_j - Wl_j - m_j EP_m) \\ L_j &= l_j Q_j, \quad \sum_j L_j < \overline{L} \\ \tau &= P_f / P_m \end{aligned} \tag{56.26}$$

Traded exportable prices (P_x) are as before, but home goods prices (P_h) are formed by a mark-up (g) on production costs, where the nominal wage as well as the exchange rate plays a central role. I use home goods prices (P_h) as the numeraire in order to define the real exchange rate (e) and the real wage rate (w):

$$
\begin{aligned}
P_x &= EP_f \\
P_h &= (1+g)(Wl_h + Em_hP_m) \\
e &= \frac{EP_f}{P_h} \qquad w = \frac{W}{P_h}
\end{aligned} \tag{56.27}
$$

I assume as before that the export sector produces at capacity because world demand is infinitely elastic to supply by our country. The demand for home goods is a proportion (a) of the aggregate factor income,[28] but the domestic market clearing condition will not now determine price as in the standard model, but will rather determine output within the capacity constraint. Substituting the income (56.26) and price (56.27) equations into the demand function for home goods gives the output level, therefore:

$$
\begin{aligned}
Q_x &= A_xK_x \\
Q_hP_h &= a\sum_j (G_j + WL_j) \\
Q_h &= \frac{a}{P_h}\left[Q_h\left\{1 - \frac{m_he}{\tau}\right\} + Q_x\left\{e - \frac{m_xe}{\tau}\right\}\right] \\
&= Q_x\frac{\tau - m_x}{\frac{(1-a)\tau}{ae} + m_h} \leq A_hK_h
\end{aligned} \tag{56. 28}
$$

Note the so-called 'Dutch disease' effect of an improvement in the terms of trade (τ) leading to an expansion of the home goods sector as incomes rise.

Taking the home good price (P_h) as the numeraire and rearranging (56.27), we now have real sectoral profit levels ($\overline{R}_j$) in terms of the real exchange rate (e_j), the real wage rate (w_j) and sectoral output (Q_j):

$$
\begin{aligned}
\overline{G}_x &= Q_x\left[e\left(1 - \frac{m_x}{\tau}\right) - wl_x\right] \\
\overline{G}_h &= Q_h\left[1 - \frac{em_h}{\tau} - wl_h\right] \\
\overline{G}_x(e) &> 0, \qquad \overline{G}'_h(e), < 0\ \overline{G}'_j(w) < 0
\end{aligned} \tag{56.29}
$$

The channel through which the real exchange rate and the real wage rate affect profits is now evident and the implications for investment decisions and income distribution can be explored properly – something that is not done in the standard model.

I now examine in detail the investment decision for the case when e rises (that is, real depreciation) but the obverse is simple to work out; as are the consequences of other shocks such as changes in labour productivity (l). I assume for convenience that in previous periods firms have been able to adjust their capital stocks to the desired level (that is, $Q_j = A_j K_j$). From (56.29) real depreciation will raise real profits in the traded export sector and reduce them in the non-traded home goods sector; but any shift in output depends on investment, which is irreversible. The two-period (*0, 1*) problem for firms in each sector is whether to invest or not. If they do not invest, then capacity (and thus production) falls by the amortization rate (δ). If they do invest then they must do so at the level that maximizes its present value (V) discounted at the interest rate (i) where the installation cost (J) expressed in home goods prices is an increasing function[29] of real investment (I) using imported equipment at the world price (P_m) and the corresponding import coefficient (m_k):

$$\begin{aligned} V_{j,0} &= \overline{G}_{j,0} + \frac{\overline{G}_{j,1}}{1+i} - J_j \\ J_j &= I_j(em_k P_m + \tfrac{1}{2}\sigma I_j) \\ I_j &\geq 0 \\ K_{j,1} &= K_{j,0}(1-\delta) + I_j \end{aligned} \tag{56.30}$$

The optimal investment level ($\tilde{I}$) is simply found by differentiating V with respect to I in order to maximize the present value of the firm:

$$\begin{aligned} \frac{dV}{dI} &= \frac{1}{1+i}\frac{d\overline{G}}{dI} - e\frac{m_k}{\tau} - \sigma I = 0 \\ \tilde{I} &= \frac{1}{\sigma}\left\{\frac{1}{1+i}\frac{d\overline{G}}{dK} - e\frac{m_k}{\tau}\right\} \end{aligned} \tag{56.31}$$

Because the capital stock in the home goods sector (K_h) was adjusted to the previous real exchange rate so as to maximize profits, from (56.29) no investment takes place in the sector (that is, $I_h = 0$) and capacity declines by the amortization rate:

$$K_{h,1} = K_{h,0}(1-\delta) \tag{56.32}$$

In contrast, the export firms do invest as real profits have risen and:

$$\tilde{I}_x = \frac{1}{\sigma}\left\{\frac{A_x}{1+i}\left[e\left(1-\frac{m_x}{\tau}\right)-wl_x\right]-e\frac{m_k}{\tau}\right\}$$

$$K_{x,1} = K_{x,0}(1-\delta)+\tilde{I}_x$$

$$\tilde{I}'_x(e)>0,\ \tilde{I}'_x(\tau)>0,\ \tilde{I}'_x(w)<0,\ \tilde{I}'_x(i)<0 \qquad (56.33)$$

Note that improved terms of trade or real depreciation raise export sector investment, while higher wages or interest rates reduce it.

Traded output capacity thus rises while non-traded output capacity falls, due to the changes in their respective capital stocks. Aggregate real output (Y) only rises if the net output capacity shift is large enough:

$$Y = eQ_x + Q_h$$

$$Y_1 > Y_0 \ \textit{ if } eA_x(K_{x,1}-K_{x,0}) > \delta A_h K_{h,0} \qquad (56.34)$$

Moreover, even if the adjustment is sufficient to cause aggregate real output to rise, there is no necessary reason why net employment should do so as well. The general condition for this to happen is found by substituting the employment functions from (56.27) into (56.33) to yield:

$$L_1 > L_0 \ \textit{ when } \ Y_1 > Y_0 \ \textit{ if } \ l_x > el_h \qquad (56.35)$$

This result has three interesting characteristics. First, there is no guarantee that total employment will increase with real devaluation because this depends on the labour intensities (l) of each sector as well as the investment outcome: clearly only if the export sector is the more labour-intensive ($l_x > l_h$) is this likely to occur. Second, the ratio of the real wage rate to the real exchange rate (w/e) is clearly critical to the outcome. If real wages fall then employment will rise, although this trade-off is not the result of factor substitution along the constant elasticity of transformation (CET) curve, but rather of investment incentives. Third, an increase in the interest rate (i) will reduce the employment gain due to the investment disincentive (56.33): this is the reverse of the factor substitution effect textbook theory would predict. Moreover, for investment to take place, private investors must have confidence in future profits and be provided with sufficient credit and infrastructure.

As we have seen in (56.25), the dependent economy model implies that depreciation of the real exchange rate will reduce the real wage rate, which with full employment implies a deterioration of the overall distribution of income. The new-Keynesian model reveals a more complex relationship. Rearranging (56.27) we have:

$$w = \frac{W}{P_h} = \frac{1}{l_h}\left\{\frac{1}{1+g} - e\frac{m_h}{\tau}\right\} \tag{56.36}$$

which has interesting characteristics: there is again a negative relationship between real wages and the real exchange rate; but the home goods profit mark-up also plays an important part in income distribution, and productivity in the home goods sector (the inverse of the labour input coefficient l_h) is also a key determinant of real wages. This last point should remind us that while traded investment is the central focus of adjustment policy, improved living standards require a greater supply of wage-goods.

Further, if I define workers' living standards (ω) as the nominal wage deflated by the cost of living (P_c) defined by the mean domestic product prices weighted by home goods consumption propensity (a) in (56.28):

$$\omega = \frac{W}{P_c}$$

$$P_c = aP_h + (1-a)P_x \tag{56.37}$$

Substituting the relevant definitions from (56.29) into (56.37) then gives:

$$\omega = \frac{w}{a + (1-a)e} \tag{56.38}$$

Here the welfare consequence of the fall in the w/e ratio in (56.33) required to raise investment and permit structural adjustment is clearly revealed as a deterioration in workers' living standards.

In other words, the targeting of the real exchange rate necessary in order to maintain export competitiveness is in fact an 'incomes policy'. If employment expands then overall income distribution can improve, but this requires active intervention in order to raise investment rates as we have shown. Monetary policy should be geared to low real interest rates and producer credit provision on the one hand, and an active fiscal stance geared to damp exogenous macroeconomic shocks on the other. This desirable outcome can be reinforced by a system of dividend taxation (designed to stimulate investment) and social spending specifically aimed at raising the living standards of employees' families.[30]

Conclusions

In this chapter we have seen how the macroeconomic models conventionally used to analyse stabilization policy and structural adjustment are open to a wide range of criticism from both neoclassical and Keynesian standpoints. Specifically, the existence of excess productive capacity, mark-up pricing by firms, credit rationing by banks and open capital accounts on the

one hand; and the central role of investment in determining sectoral output and the impact of the real exchange rate on both export levels and real wages on the other; mean that the standard IMF and World Bank models can become seriously misleading as the basis for macroeconomic policy.

By including more realistic formulations of credit supply and external capital flows for emerging markets in the standard stabilization model, I have shown not only that inflation targeting using the interest rate can have serious procyclical consequences, but also that a more active monetary policy based on fiscal and credit instruments can make for higher and more stable output solutions – that is, sustainable stabilization. Similarly, by including the pricing and investment behaviour of firms in the standard adjustment model, I have shown that effective structural adjustment will not take place unless active exchange rate and monetary policies are implemented in support of traded production.

Finally, this new-Keynesian approach also differs from that of the Bretton Woods institutions in its attitude to macroeconomic intervention. The Bank and the Fund insist that inflation-reduced public expenditure and balanced budgets are essential in order to promote growth. This passive 'rules-bound' approach is central to their lending conditionality, and is built into significant institutional reforms such as central bank independence. In marked contrast, this chapter has shown how emerging market authorities can combine active fiscal and credit management with real exchange rate targeting in order to cope with exogenous shocks and promote longer-term export-led growth in a more purposive stabilization policy. Finally, it has demonstrated that active intervention to maintain both a competitive real exchange rate and a low real interest rate is necessary in order to promote sufficient investment in the traded sector and thus ensure not only export growth but also employment expansion so that real wage constraints do not lead to a worsening income distribution as a consequence of structural adjustment.

Notes

1. This chapter does not address issues such as privatization of public enterprise or government expenditure reform that, while central to structural adjustment and stabilization policy in practice, are covered in other chapters of this *Handbook*.
2. These two well-known models can be found in the official sources referenced below and are summarized clearly in Khan et al. (1990) and Agénor (2000).
3. Usually government expenditure cuts rather than increases direct tax pressure – which would depress saving, assumed to be a constant proportion of private disposable income in this model – with obvious distributional consequences.
4. In consequence, it might better be described as a 'three gap model' (Bacha, 1990).
5. In the sense a small open economy that is a price-taker in world markets, popularized by Dornbusch (1986), rather than the wider Latin American notion of *dependencia*.
6. This model is lucidly set out in Montiel (2003, Part V).
7. Because there are one country, two sectors and three products in the model.

8. See Corden (1984). In fact 'British disease' would be more appropriate. The Netherlands did indeed experience real exchange rate appreciation in the 1980s due to North Sea gas finds, which rendered manufactured exports uncompetitive; but the fiscal resources were reinvested in infrastructure and skills, with subsequent growth based on advanced services exports. The Thatcher administration used the North Sea royalties to reduce UK profit taxes, stimulating consumption and depreciating the real exchange rate; but the consequences are now visible in deteriorating public transport and education.
9. See Obstfeld and Rogoff (1997).
10. See Aghion and Howitt (1998).
11. See Buiter (1990).
12. As opposed to the justifiable concern with hyperinflation in the 1980s.
13. Strictly speaking, bank deposits in the Fund's BFPF model.
14. This implies unitary price and income elasticities of import demand, which are much higher than those found empirically and means that import contraction through reductions in real demand (Y/P) become the main channel for stabilizing the current account of the balance of payments.
15. The conventional rule of thumb is three months' cover (that is, $\theta = 0.25$).
16. As in the 'Maastricht Criteria', where $\lambda = 0.03$.
17. This corresponds to the IMF definition of the 'effective real exchange rate' as the nominal rate divided by the ratio of the domestic price level (P) to the weighted mean of the price levels in trading partners (unity in our case). The alternative definition of the real exchange rate in terms of the ratio of traded to non-traded prices is discussed below. On both definitions, see Dornbusch and Helmers (1988) and Montiel (2003).
18. Which in turn is given in the short run but depends on investment in the medium term, a point taken up below.
19. This is a simplified form of the full international demand function for emerging-market assets, which itself can be derived from standard portfolio theory (FitzGerald, 2006).
20. The most cautious position would be to maintain reserves equal to short-term external liabilities, commonly known as the 'Greenspan rule'. The value of π will then depend on the maturity structure of external liabilities (F).
21. See Missale (1999) for a discussion of optimal debt models in a full intertemporal context, from which this familiar rule is derived.
22. Formally, Walras' Condition is satisfied because the model has 11 equations and 11 variables (eight endogenous and three targets); while Tinbergen's criterion is met by having three instruments (H, i and Z) with which to hit the three targets (Q, e and P).
23. The model is very well explained in Chapter 2 of Agénor and Montiel (1999).
24. That is, $P_j Q_j'(L_j) = W$
25. Note that this is the formulation used to derive the Harrod–Belassa–Samuelson model of real exchange rate trends in the long run.
26. If $F(x,y) = \text{constant}$, then $dx/dy = -F'_x / F'_y$
27. In the standard 1-2-3 model set out above, there is a domestic production function with a constant elasticity of transformation (σ)

$$Q = A[\gamma Q_x^{\rho} + (1-\gamma) Q_h^{\rho}]^{\frac{1}{\rho}} \qquad \sigma = \frac{1}{\rho - 1}, \qquad 0 < \sigma < \infty$$

where the convention is to adopt a Cobb–Douglas unitary elasticity ($\sigma = 1$). Below I adopt the more realistic Leontief form ($\sigma = 0$) to reflect the fact that once installed, capital is entirely immobile.
28. This form is in fact the constant elasticity of substitution (CES) consumption function used in the canonical 1-2-3 model discussed above, but with unitary own-price elasticity and zero (Leontief) substitution between home and export goods.
29. This is a standard representation of the intertemporal optimisation process for the firm, which as part of the 'AK' model underpins endogenous growth theory – see Heijdra and van der Ploeg (2000, Chapter 2). In developing countries this can also be seen as reflecting limited local project implementation capacity.

30. This topic lies beyond the scope of this chapter, but see FitzGerald (1993) for a further discussion of such a policy based on dividend taxation and social expenditure; and FitzGerald (2002) for the derivation of an optimal profits tax to fund infrastructure provision.

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