

**Centre for Development Policy and Research
(CDPR), SOAS, University of London**



Thornhaugh Street
Russell Square
London WC1H 0XG
United Kingdom

Workshop on Macroeconomic Policy Convergence in Southern Africa

**23-26 September 2008
Pretoria, South Africa**

Policy Analysis Training Reading Material 1: Basic Macroeconomics

**Authors:
Sedat Aybar & John Weeks**

Basic Macroeconomics

- 1 What is macroeconomics:
- 2 Basic macroeconomic concepts
- 3 A brief history of macroeconomics
- 4 Two basic frameworks
 - 2.4.1 Price constrained Models
 - 2.4.2 Quantity Constrained (Structuralist)
- 5 The basic functional relationships of the macro economy
 - 5.1 Four Macro Markets
 - 5.2 The market for goods
 - 5.3 The market for money
 - 5.4 The market for labour
 - 5.5 The external sector
 - 5.6 The Three 'Gaps'
- 6 Reduced Form Equilibrium Analysis
 - 6.1 The 'Saving-Investment' Reduced Form
 - 6.2 The Liquidity-Money Reduced Form
 - 6.3 Balance of Payments Equality
 - 6.4 IS, LM and BoP General Equilibrium
- 7 Adjustment between Equilibria
- 8 Summary: Macro analysis and policy

Annex: Guide to the Algebraic Macro Model

Tables and Diagrams

- Table 1 Summary of Different Approaches to Key Behavioural Relationships, Neoclassical and Structuralist
- Figure 1 Short Term Capital Flows, Various Possibilities
- Figure 2 IS, LM, BoP with Neoclassical Assumptions
- Figure 3 IS, LM, BoP with Structural Assumptions
- Figure 4 Fiscal Policy with a Fixed Exchange Rate
- Figure 5 Monetary Policy with a Fixed Exchange Rate
- Figure 6 Fiscal Policy with a Flexible Exchange Rate
- Figure 7 Monetary Policy with a Flexible Exchange Rate

1. What is macroeconomics?

Macroeconomics is the analysis of the behaviour of the economy as a whole, in the aggregate. While this definition seems simple, within it is an analytical distinction that is the basis of two fundamentally different approaches to how market economies function. In what we shall call the Neoclassical approach, the aggregate economy is the sum of the behaviour of individual buyers, sellers and producers (the equilibrium resulting from their separate decisions), so the whole (aggregate) is the sum of the parts. In what we shall call the Structuralist approach, causality is reversed: the behaviour of individual buyers, sellers and producers is derivative from the general solution (general equilibrium) of the aggregate economy.

The basic relationships of the macro economy can be summarised in simple algebraic functions. However, these functions **summarise** extremely complex behaviour by buyers, seller and producers. For policy analysis it is necessary to understand this complexity. This module presents the familiar functional relationships in standard, simple form, then goes on to explore the complexity they implicitly incorporate.

This model will cover topics familiar to anyone who has studied economics, and at some points what appear to be quite simple relationships. The purpose is to demonstrate the definitional ambiguities that policy makers must recognise, and to stress the difference between the theoretical categories of economics and their empirical counterparts. The theoretical categories are the basis for general policy rules. The empirical categories are the basis for concrete policy decisions.

Thus, the emphasis in the module is on understanding how actual economies function. Mathematics is a tool to do this. Mathematics can also obscure the behavioural interaction of economic categories, and the graphical presentation of the mathematical relationships is frequently a better vehicle for understanding than the mathematical functions themselves. For that reason, the module primarily uses diagrams. Understanding of the diagrams then facilitates more realistic mathematical modelling.

2. Basic macroeconomic concepts

At the macro level, a market economy consists of at least four markets that are continuously in the process of being cleared of their excess demand or excess supply: the market for final outputs, the labour market, money market and the external sector (exports and imports and capital flows).

Partial equilibrium is a condition in one market in which all buyers, sellers and producers have no desire to alter their decisions about buying, selling and producing.

General equilibrium occurs when all markets simultaneously reach a condition in which all buyers, sellers and producers have no desire to alter their decisions. Except in unusual cases, the conditions determined by a partial equilibrium analysis will not

be the same as the outcome in each market which results in general equilibrium. Therefore, partial equilibrium is a first approximation of the outcome for each market.

Fiscal policy includes the taxation and expenditure policies of the central government, which are normally implemented by the ministry of finance. Other functions of fiscal policy involve the use of the composition of expenditure and tax structure to affect income and wealth distribution and other social goals of governments.

Monetary policy refers to the government's regulation of the money supply and the level of interest rates. It is typically executed by the central bank, either in its capacity as the regulator of the financial sector, or through its participation in open market operations (the Central Bank's buying and selling of government securities on the open market to control the money supply) and government deficit financing. In its execution of policy, a central bank operates under varying degrees of accountability, sometimes inaccurately subsumed under the term 'central bank independence'. There is a close interaction between fiscal policy and monetary policy.

Macroeconomic stability is one of the goals of fiscal and monetary policy. The term is sometimes used without a clear indication of its operational meaning. For policy purposes, the term almost always refers to lowering inflation and maintaining a sustainable balance of payments. The exact level of inflation and condition of the balance of payments that constitutes 'stability' must be established in the specific context of each country. Stability is one of several goals of macroeconomic policy, and its definition derives from the government's balancing of inflation and the balance of payments. Some argue that macroeconomic stability is a necessary and *prior* condition for all other policy goals. Whether this is the case depends upon the operating definition of macroeconomic stability, and in all countries is an empirical issue. As Dornbusch (1991) famously stated, stability is not a ticket to prosperity.

Full Employment is synonymous with **macroeconomic general equilibrium**. At this point, the economy is at its peak capacity. When output exceeds this level, the standard textbook mechanism by which the economy is returned to the full employment level is related to the Phillip's Curve and Okun's Law stylised facts. The Phillip's Curve represents the empirical trade-off between inflation and unemployment, and the Okun's Law (or 'rule of thumb') relates output to unemployment. If output is above the full employment level, then unemployment is below its long run level. The drop in unemployment beyond the 'natural' level leads employers to mark up prices to pay for increased labour costs. Workers begin to bargain for higher nominal wages as their real wages decline as a result of price inflation, and the ensuing wage inflation drives unemployment back to its full employment level.

Macroeconomic general equilibrium should not be confused with macroeconomic stability. The latter is an empirical outcome, while the former is a construct within an abstract model with no empirical counterpart. An economy is unstable at the macroeconomic (aggregate) level if key *economic aggregates fluctuate excessively* over time. To be operational, this definition requires the identification of the

aggregates that signal the need for a policy response, and a definition of excessive fluctuations, because market economies are dynamic and in continual flux to some degree. Fluctuations can be judged as excessive on the basis of two general rules: 1) when they undermine the achievement of outcomes that are policy goals of the government; or 2) inherent in them is the tendency to increase in amplitude which will undermine those outcomes at some future time. Fluctuations in variables that have no impact on desired outcomes, even if they are extreme by some reasonable judgement, are of no policy importance.

The key variables to monitor to maintain macroeconomic stability are investment (public and private), current government expenditure on economic and social services, and exports, since they each affect both growth and distribution, and growth on both the demand and supply sides.

Distributional effects result when inflation has a direct impact on the distribution of income, either the functional distribution (by group or class) or the size distribution (across households). It is sometimes argued that ‘inflation is bad for the poor’; i.e., even if it has no significant impact on the rate of growth, it reduces the poverty reducing effect of growth by redistributing income from poor to the non-poor. While this may be the case in some countries in some periods, there is no evidence of a general rule, and no obvious reason why there should be under a reasonable threshold level (see Galli & van der Hoeven 2001)

In as far as stability impacts on growth and poverty reduction, its specification in terms of the rate of inflation will vary across countries. Furthermore, there is no theoretical or empirical support for a policy to target the same inflation rate in each country. Instead, policy makers can make macroeconomic stability derivative from growth and poverty goals rather than the reverse. Another way to put this is if stabilisation is defined with respect to the inflation result, there are desirable and undesirable stabilisation outcomes. Low inflation associated with low growth may be defined as a stabilised economy by some, but it is an unacceptable outcome that requires policy intervention to correct.

3. Brief history of macroeconomics

David Ricardo at the beginning of the nineteenth century was the first person to develop a systematic analysis of economies in the aggregate. His work focussed on growth, the behaviour of economies in the long run. From the middle to the end of the nineteenth century, the focus of economic analysis was almost exclusively microeconomics, the study of markets and individual behaviour.

In the twentieth century macroeconomic analysis in the current sense emerged in the work of the ‘Classical school’, a name given to them by John Maynard Keynes (Keynes 1973), who himself had been ‘Classical’ in his economics prior to the late 1920s. The Classical theory of the aggregate economy was based on what came to be called the Classical Dichotomy. In this dichotomy the quantities in an economy (the

'real' side) could be established independently of the determination of the general price level. These quantities and relative prices measured in quantities ('barter' prices) derived from relative factor scarcities because the real economy was always at full employment general equilibrium. This approach implied that there could be involuntary unemployment only if the labour market were 'distorted' by government intervention or excessive trade union power. The Classical Dichotomy was demonstrated to be false by orthodox economists in the 1930s (Weeks 1989, Chapter 4), but this has not prevented its perseverance in subsequent analysis.

The theory of the price level in Classical Dichotomy was based on the quantity theory of money, summarised by the following expression.

$$vM = Py$$

Where

M = money supply,
v = velocity of circulation,
P = price level, and
y = real output.

It should be noted that $vM = Py$ is true by definition, because every sale of value $P_i y_i$ is associated with some form of payment (cash, credit card, credit by the seller, etc). For the Classical economists $vM = Py$ was a **behavioural** relationship. In its simplest version, the quantity theory presumed that v was constant and that y was always at the full employment level of output as a result of perfectly competitive markets. This implied a direct relationship between money and prices. The money supply, M, was treated as exogenously determined by the central bank, so that changes in M cause changes in P. Inflation was due to money growth or, 'too much money chasing up after too few goods'. Because the economy is treated as being at full employment, there is no role for an active fiscal or monetary policy. Instead, these are viewed as bound by strict rules to prevent policy makers from 'distorting' effective and efficient markets.

High levels of unemployment in Great Britain in the 1920s, and the Great Depression of the 1930s that affected most developed countries had a profound influence on economic thought. A growing number of economists challenged the Classical view that the analysis of economies should be based on the assumption of full employment. The most famous critique of the Classical framework was by Keynes, in his path-breaking work, *The General Theory of Employment, Interest and Money* (1936). Keynes considered his theory of the aggregate economy to be general because it allowed for the analysis of the economy at all output levels, not just full employment. The essence of the theory of Keynes was that economies should be viewed as constrained by the level of aggregate demand, except in the special case of full employment. Thus, the Classical approach was to treat economies as **price constrained** (the full employment case), and the Keynesian approach was to treat them as **quantity constrained** (less than full employment). These terms are discussed in detail in the next section.

In the 1940s and into the 1950s, there emerged a ‘synthesis’ of the Classical and Keynesian approaches, called the Neoclassical Synthesis, and mainstream economics was called Neoclassical economics. Among the prominent developers of the Synthesis were the English economist John Hicks and the American Paul Samuelson. During the 1960s the Keynesian elements of the Synthesis dominated policy making, while the Classical elements were the core of high theory. In the 1980s the Classical approach steadily increased its influence, and today Neoclassical economics retains very little of the contributions of Keynes. Those economists who remain strongly influenced by Keynes identify themselves by various terms, Neo-Keynesians, Post-Keynesians, and Structuralists. In this module we shall refer to them as the Structuralists. Leading Structuralists are Lance Taylor and Joseph Stiglitz.

4. Two basic frameworks

4.1 Price constrained Models

The policy application of the price constrained framework is epitomised in the financial programming model of the IMF. Though developed in the late fifties, its emergence as the accepted macro policy framework for developing countries, beyond the IMF itself and its client governments would not come until the 1980s. It provides an instructive guide to fiscal and monetary policy to achieve macroeconomic stabilisation in developing countries from a Neoclassical perspective. The model aims to demonstrate how policy can achieve internal and external macroeconomic equilibrium at the same time. The model extends the quantity theory of money (QTM) from a closed economy into an open one, in order to link domestic equilibrium in the money market with external (balance of payments) equilibrium. As a result, it offers policy recommendations that apparently allow governments to address both sources of disequilibria simultaneously.

The essential characteristic of the Neoclassical framework, and its application in the financial planning model, is Walrasian general equilibrium. The discussion below will consider disequilibrium as well as equilibrium state. The term excess demand will be used to refer to a disequilibrium state, and can be positive or negative (negative excess demand is by this definition excess supply). Walras’ Law, which states that if each individual’s excess demand is zero then the sum of excess demands is zero leads to what is called the Walrasian general equilibrium.

In a system of Walrasian general equilibrium there is an omniscient auctioneer who presents to buyers and sellers the prices at which they can carry out exchanges. Under this assumption, one can say that buyers and sellers are **price-takers**; that is, they can buy or sell any amount at the price quoted by the auctioneer, but are unable to affect the price. How much a producer sells will simply be determined by the marginal cost of production, and how much a consumer buys, likewise, will be determined by marginal utility.

On the basis of the assumption of Walrasian general equilibrium, the basic Financial Programming model has six behavioural assumptions (these are explained in detail in Section 2.5):

1. $M^s = DC + IR$
(money supply = domestic credit + domestic equivalent of the international reserves.)

The domestic money supply consists of two components: 1) domestic credit (DC) created through the monetisation of public deficits by the central bank, and multiplied through the commercial banking system; and 2) the conversion of net foreign currency inflows, international reserves, into domestic currency (IR).

2. $M^d = vPy$
(money demand is a stable function of the price level and the real output.)

This assumption is the Quantity Theory of Money, and states that the velocity of circulation is stable.

3. $y = y^*$
(real output always approximates its full employment level.)

This assumption implies that the economy is in full employment general equilibrium. Since y is constant, determined by unregulated markets, any changes in nominal GDP ($Y = Py$) must be due to changes in the price level.

4. A fixed exchange rate.

5. International immobility of capital.

These two assumptions reflected the institutional arrangements of 1950s and 1960s under the Bretton Woods System when the IMF policed a system of fixed exchange rates. The international system of exchange rates fixed to the US dollar ended in 1971 when the US government unilaterally cancelled the treaty that required the conversion of its currency into gold at a fixed dollar price. This institutional change does not affect consideration of the FP model as an abstract framework.

6. $x = x^*$
(fixed exports.)

The assumption that exports are fixed simplifies the analysis. It presumes that a country's exports depend primarily on demand from the rest of the world.

7. $n = n(y)$

Imports are function of national income. Imports for production are a derived demand and consumer imports a direct demand.

Assume that the economy begins from internal and external equilibrium. If domestic credit (DC) increases, the supply of money will exceed the demand for money. In the quantity theory, money is never held idle, so excess real balances will be spent purchasing goods and services. These goods and services can include non-tradables and tradables. Excess demand for non-tradables will generate domestic inflation, and excess demand for tradables will cause greater imports and, therefore, a balance of payments deficit.

In order to pay for the increase in imports, the buyers will purchase part of the country's international reserves with domestic currency and send the foreign currency abroad. The domestic money supply declines together with the reserves (IR falls). The balance of payments deficit will be eliminated when the money supply returns to its initial level, but it will have a different composition, a higher share of domestic credit and a lower share of international reserves.

If domestic credit increases continuously, the economy will suffer persistent inflation and a continuing balance of payments deficit, potentially leading to the exhaustion of the country's foreign currency reserves. In this model a monetised fiscal deficit will generate inflation and balance of payments deficits simultaneously. Because in this model the only agent that can increase DC at will is the government, if a country experiences continuing inflation and balance of payments deficits this must be the result of excess domestic money created by a fiscal deficit and a fiscal contraction will resolve both problems.

Three implications follow:

1. Inflation and balance of payments deficits are caused by macroeconomic mismanagement.
2. Governments should limit domestic credit creation to levels compatible with price stabilisation and balance of payments equilibrium.
3. The correction of policy mistakes has no lasting impact on real output and income.

These conclusions hold if the assumptions are valid: if markets clear their excess demands instantaneously, if the economy is fully competitive, if the Quantity Theory is valid, and if there is full employment. If these assumptions do not hold in practice, the model may provide unreliable guidance for economic policy-making.

4.2 Quantity Constrained Models

In a quantity constrained framework, it is presumed that the typical condition of a market economy is underutilisation of resources (unemployment of labour and excess capacity of the capital stock). This presumption results from the Structuralist analysis of markets. Remember that the price determined framework predicated on Walras' Law achieves market clearing by assuming that exchange can only occur at the prices that will bring general equilibrium. This assumption is typically explained in terms of

an all-powerful auctioneer who prohibits any exchanges at non-equilibrium prices (what John Hicks called 'false trading'). Structuralists argue that in practice, buyers and sellers do not know the equilibrium price of goods in advance, with the result that most exchanges will be at non-equilibrium prices. There is no general theoretical mechanism by which inter-connected markets converge to general equilibrium if exchanges are initially at disequilibrium prices. In other words, there is no accepted theory of the move from general disequilibrium to general equilibrium (see Hahn 1984, p. 13).

Even so, in most actual markets excess supplies do not persist indefinitely. Rather, they are eliminated either through prices changes over time, or through producers reducing the quantities they supply. This means that the adjustment from general disequilibrium to general equilibrium is quite different from the Walrasian process. First, the adjustment takes time. In the labour market, for example, the time required for adjustment implies a period of involuntary unemployment. Second, the adjustment may occur through changes in quantities, rather than changes in prices. A market in which producers adjust their quantities to disequilibrium prices are said to be **quantity constrained**. That is, businesses are limited (constrained) in how much they produce by their estimation of how much they can sell.

In the quantity constrained framework, fiscal and monetary policy can be used to control aggregate demand and changes in the general price level (i.e., the rate of inflation), with a view to *achieving* full employment with price stability. In a closed economy, aggregate demand includes three elements, consumption, investment and government spending. An open economy aggregate demand also includes net exports (exports minus imports). Consumption is a positive function of disposable (post-tax) income, and positively but weakly related to the level of the interest rates. For example, when consumer credit and mortgages become more expensive, disposable income falls and consumption tends to decline with it. In this framework, investment is a negative function of the level of interest rates (though the relationship is considered weak), and, more importantly, a positive function of the level of output anticipated by entrepreneurs.

When the economy is operating below capacity, the government could impart a fiscal stimulus either by increasing expenditure or reducing taxes, both of which would increase the fiscal deficit (or reduce a fiscal surplus). This will increase the level of demand, output and employment in the economy. Conversely, if the economy is near full employment and there is inflationary pressure, then the government would do the opposite. The ensuing spending cuts, higher taxes would reduce inflationary pressures. In principle, if the government manipulates its fiscal and monetary policy stance competently, it should be able to eliminate the economic cycle and maintain high levels of employment continuously.

During the thirty years from 1945 to 1975 the demand determined framework represented economic orthodoxy. The large increases in petroleum prices during 1973-1974 brought inflationary pressures in the economies of most developed countries, which rejuvenated the pre-Keynesian price determined framework of full

employment general equilibrium. In the realm of economic policy, inflation control became the priority of economic policy, based on the price determined conclusion that establishing a low-inflation macroeconomic environment would allow unregulated markets to restore growth.

That fiscal policies influence aggregate nominal output was not controversial. The two schools disagreed over whether 1) policy would be effective in influencing real output and employment; and 2) its effect on macroeconomic stability. Like the pre-Keynesians, the explicit or implicit neoclassical approach is to analyse economies on the presumption of continuous full employment. Within this analysis it is obvious that neither fiscal policy nor monetary policy can affect real output, since it is always near its maximum value. As a result, the role of fiscal and monetary policy became purely defensive, to avoid mistakes and correct them if they occur. Thus, it is logical that the Neoclassicals would stress *policy rules* for governments, rather than the *policy discretion* which had characterised the demand determined framework.¹ Very much a part of the pre-Keynesian revival were the alleged inefficiency and wastefulness of the public sector, a tendency of public intervention to undermine private sector activity ('crowding out'),² and the inherent costs of an active monetary policy.³ Thus, this framework stresses inflation control rather than full employment and equity. The present incarnation of Neoclassical economics in adjustment and stabilisation programmes stresses limiting government action to the improvement of markets, establishing 'confidence' in economic policy, and promoting trade and foreign investment.

5. Behavioural Functions of a Macro Economy

5.1 Four Macro Markets

Actual economies are far too complex to be analysed in their entirety. Economic theory is a process of abstraction, in which a model is constructed of the key behavioural elements of the economy. The selection of the elements derives from the theory itself, and different frameworks will have a few or many different key elements. A model need not be formulated with mathematics, and translating models into

¹ Policy rules are predetermined policies that ignore changes in circumstances due to the economic cycle or to other shifts in the economic 'fundamentals'. Adherence to rules supposedly reduces distortions and facilitates market-based economic stabilisation in the long-run. In contrast, policy discretion allows the government to decide its policy responses in the light of concrete problems and events, and to shift policies at its convenience.

² Crowding out is the process by which expansionary fiscal policy financed through the sale of government securities causes the real interest rate to rise and, therefore, private investment to fall.

³ Monetary policy is accommodating when, in a fiscal expansion, the central bank increases the supply of money in order to prevent the real interest rates from rising. This means that the central bank is, in effect, printing money to finance the government deficit (monetisation).

mathematics can mislead one into believing that the analysis of the economy is simpler and the analysis more precise than is the case.

This problem of misleading simplification is particularly serious in what is called 'reduced form' expressions of the aggregate economy. As shown below, a simple macro model involves many behavioural relationships. If these are all expressed mathematically, through substitution the system of equations can be reduced to fewer or even a single equation (the **reduced form**). IS and LM schedules, below, are examples of reduced form equations. However, the reduction invariably is at considerable cost to the understanding of how the economy operates, because the reduced forms conceal a multitude of specific behavioural relationships.

Thus, it is important, as a preliminary to a discussion of policy analysis, to stress that the aggregate economy has four markets: goods, money, labour and the external sector. For some purposes the four can be considered separately, but adjustment in one cannot be considered separately from adjustment in the other three. The interaction of the markets is formalised in Walras' Law. For example, if there are unsold goods (negative excess demand for goods), this must be matched by an equal positive excess demand across the other markets.

If Walras' Law does not hold (excess demands sum to a positive or negative value), a general equilibrium solution cannot be achieved even in theory. However, the application of Walras' Law to the aggregate economy presents a major problem for policy analysis. Perhaps the most common analytical scenario in macroeconomics is one in which the economy is in equilibrium at less than full employment. This is a case important to both the Neoclassical and Structuralist policy discussions, though the cause of the unemployment is different in the two frameworks. In the Neoclassical framework, unemployment results from public intervention in the market such as a minimum wage, or the intervention of organised labour to prevent the necessary wage adjustment for full employment. In a Structuralist framework, unemployment is caused by the inefficiency of the labour market adjustment process. In both cases, all other markets are in equilibrium. This violates Walras' Law; one market has excess supply, but all the others are in equilibrium. For the analysis of short run macro management this problem is not serious. The discussion below follows the standard practice of ignoring this basic theoretical contradiction.

The basic equations of the macro model are the following, in general form. Lower case letters indicate real (price-deflated) values. See the Annex for a complete guide to symbols.

$$(1) \quad y_a = c + i + g + (x - m) \quad \text{[aggregate demand]}$$

$$(2) \quad c = f(y_s, r, w) \text{ and } s = f(y_s, r, w) \text{ [consumption \& saving]}$$

$$(3) \quad i = A_1 - a_2 r \quad \text{[private investment]}$$

$$(4) \quad t = a_3(y_s), y_d = y_s - t \quad \text{[taxes \& disposable income]}$$

- (5) $g = g^*$ [public expenditure, fixed, policy variable]
- (6) $x = A_2 \cdot a_4 e$ [exports]
- (7) $n = a_5 y_d$ [imports]
- (8) $y_s = f(k, l)$ [aggregate production function, aggregate supply]
- (9) $w = y'(l)$, or $l_d = f(w)$ [wages, demand for labour, partial derivative of the production function]
- (10) $l_s = f(w)$ [labour supply]
- (11) $r = y'(k)$ [rate of return on capital, partial derivative of the production function & interest rate]
- (12) $k = k^*$ [capital stock, fixed in the short run]
- (13) $y_s = rk + wl_d$ [total value added, profits & wages]
- (14) $y_s = y_d$ [equilibrium in the goods market]
- (15) $l_s = l_d$ [equilibrium in the labour market]
- (16) $M_d = f(r, p, y_a)$ [nominal demand for money]
- (17) $M_d = M^*$ [nominal supply of money, fixed, policy variable]
- (18) $F = a_7(r/r_w)$ [International capital flows]

The eighteen elements of the model can be used to solve for all real and nominal variables. Each market is discussed below.

5.2 The Market for Goods

The market for goods might also be called the market for final outputs, and consists of domestically produced commodities bought by domestic households (consumption), businesses (investment), government (public expenditure), and foreigners (exports). There is a degree of arbitrariness in the definition of final outputs. All inputs consumed in the production process are excluded as ‘intermediate’ goods. However,

all investment in plant and equipment is treated as ‘final’, even though its value is passed to final output over time. Further, all government expenditure is considered ‘final’, though some of it is not different from what is treated as ‘intermediate’ for the private sector.

There is a second extremely important difference between the theoretical and empirical categories in the analysis of the market for goods. While actual economies produce many commodities, the model assumes that the economy produces only one good (or many commodities always in the same proportions, which is analytically equivalent to a single commodity). If there were more than one commodity, and the relative amounts were to change, there would be two problems. Consider the simplest case in which there were two commodities. To obtain aggregate output, it would be necessary to weight the commodities by their prices. If the relative amounts were to change, other things equal (for example, consumer tastes), their relative prices would have to change as well, but this would violate the principle upon which the commodities are being aggregated to obtain real output (constant prices). This is commonly known as the ‘index number problem’. Second, and more serious, assume the quantity of one commodity rose and the other fell such that aggregate output remained the same. Since one commodity would use more labour per unit of value added and the other would use less, the relationship between aggregate output and aggregate employment would no longer be unique. It would no longer be possible to construct a unique aggregate demand for labour schedule with respect to aggregate output.

Because there is only one good in the model, there is no difference between the consumption good and the investment good on the supply side. However, there is a fundamental difference on the demand side. Because consumption goods last only one period (they are consumed in one period), they are treated as a function of household income after taxes, and the cost of borrowing (the interest rate). Structuralists tend to place less importance on the cost of borrowing than Neoclassicals. In practice, the difference in emphasis can be verified empirically. In countries in which the consumer credit market is underdeveloped, as in sub-Saharan countries, current and anticipated income will tend to be considerably more important than the cost of borrowing.

By definition, investment goods last more than one period, and the value added in any period is limited by the size of the capital stock. Therefore, current output is determined by the current capital stock, and additions to the capital stock, investment, are induced by the anticipated increase in output over future periods, and the cost of borrowing. Neoclassicals view market economies as inherently stable and characterised by risks, whose outcomes can be assigned probabilities. As a result, the cost of borrowing becomes the most important price for planning investments. This implies a relatively high elasticity of investment with respect to the interest rate. Arguments that government borrowing by pushing up interest rates ‘crowds out’ private investment derives from the view that investment is interest rate elastic.

In contrast, Structuralists stress the uncertainties in a market economy, which affect the economy in ways whose probabilities are not known. Uncertainty implies that the cost of borrowing would be less important when planning investment than other factors affecting anticipated profits. As a result, Structuralists consider the elasticity of investment with respect to the interest rate to be relatively low. In the circumstances of Africa the assumption of relative inelasticity is likely to be closer to actual behaviour of private investors. This is because foreign investors have the option of raising funds on international markets, making the domestic rate of interest of limited importance.

In summary, for internal consistency, the aggregate goods market assumes that the economy produces only one commodity. While this is satisfactory for much of short term macro analysis, it creates problems when considering an open economy. The standard trade models have three goods, each with different production conditions, importables, exportables and non-tradables. Neither Neoclassical nor Structuralist macro analysis has produced a feasible way to integrate multi-commodity trade models into short term macro models. This problem does not undermine the analysis of aggregate demand in the short term. In terms of policy analysis, the most important difference in the two frameworks is their treatment of investment demand.

5.3 The Market for Money

The demand for money refers to the demand by economic agents to hold money idle. Idle money is money that does not enter circulation. Both Neoclassicals and Structuralists agree that the demand for money is primarily determined by four variables, the aggregate amount of goods to be exchanged, the prices of those goods, the interest rate, and the aggregate level of real wealth. This discussion will ignore the wealth effect.

In the Neoclassical approach, economic agents are assumed to face a future that they can predict with considerable accuracy. Therefore, their demand for money is almost exclusively for transactions, whose anticipated value is determined by anticipated output and the anticipated price level. The interest rate is interpreted as the opportunity cost of holding money idle. The assumption that economic agents can anticipate risk implies that the demand for money should be highly inelastic with respect to the interest rate. As shown below, this implies that monetary policy will tend to be ineffective in managing the level of monetary demand.

Structuralists view market economies as characterised by uncertainty. Unlike risk, for which the probability of outcomes is known, uncertainty involves unknown probabilities. To protect themselves against the uncertainty of outcomes, economic agents take a number of protective measures, one of which is to hold money. In this specification, the demand for money can be highly elastic with respect to the interest rate, which can reduce the effectiveness of monetary policy in managing aggregate demand.

While an African country may have a number of banks and institutions of financial intermediation, a large portion of the population does not use the formal banking system. As a result, the effectiveness of monetary policy in influencing the macro economy may be limited, or be difficult to project with models of the type presented in this module.

5.4 The Market for Labour

Of the three markets, the labour market is the most problematical for aggregate analysis. As discussed above, for the aggregate demand for labour to be unique with respect to the level of real output one must assume that an economy produces only one good. This may limit the applicability of macro models to short term analysis of the labour market, because a basic characteristic of the short terms is changes in the ratio of consumption goods to investment goods.

A further problem arises from the basic distinction between the notional and effective demand for labour. The demand for labour schedule based on the aggregate production function shows the demand for labour at each real wage rate if profit maximising employers believe that they can sell as much as they wish at the prevailing price of output. In other words, the demand for labour schedule assumes that the economy is price constrained, and the real wage simultaneously determines the level of employment and the level of output. However, if employers believe that their output is demand (quantity) constrained, employment is determined by the anticipated level of sales at the prevailing price of output and real wage.

The standard labour market model, be it Neoclassical or Structuralist, is of limited relevance for sub-Saharan countries, because the vast majority of the labour force is not in wage employment. The high proportion of self-employment, in both urban and rural areas, implies that models assuming an efficient process of labour market clearing could produce misleading results.

5.5 The External Sector

The external sector of a market economy has two components, the current account and the capital account. In most short term macro models these are treated simply, with the current account including only goods (exports and imports), and the capital market only portfolio capital. Other current account items, for example remittances and interest payments on external debt, are treated in more complex balance of payments analysis. Similarly, the capital account is quite complicated in practice, covering official development assistance, various forms of private capital flows (portfolio and direct investment) and repayment of principle of external debt.

In the standard macro models imports are usually assumed to a component of household consumption, determined by disposable income. Exports are treated as independent of the level of domestic income and sensitive to the exchange rate.

Inflows of portfolio capital are assumed to respond to differences in rates of return across countries, in a simple formulation in which this difference is manifested in the ratio of the domestic interest rate to interest rates available in other countries (with the latter summarised as the ‘world rate of interest’). In a world without uncertainty (as defined above), capital controls (qualitative or quantitative), and efficient domestic capital markets, portfolio flows would be perfectly elastic with respect to the difference between the domestic and world rate of interest. This implies that any difference would be immediately eliminated by capital inflow or outflow. This is the simplifying assumption in the Neoclassical framework. If there is uncertainty, capital controls, or underdeveloped capital markets, the relationship between portfolio flows and the interest rate differential will be less than perfectly elastic. In the case of developing countries, a typical source of uncertainty for portfolio investors is exchange rate instability, which may arise from inflationary concerns. The simplifying assumption in the Structuralist framework is that the relationship between capital flows and interest rates is less than perfectly elastic.

5.6 The Three ‘Gaps’

A useful framework for summarising macro economic policy issues and options is what is called the ‘three gap model’. If one assumes that all value added becomes household income, national income can be represented by two definitions, aggregate demand and total value added:

[the upper case letters indicate nominal values of the variables]

Aggregate demand = household consumption + private investment
+ government expenditure + exports

[output is sold to households, businesses, government or abroad]

$$AD = C + I + G + X$$

Value added = household consumption + private savings + taxes
+ imports

[household income falls into four categories, consumption, taxes, saving and imports]

$$VA = C + S + T + M$$

If all output is sold, aggregate demand equals value added. Thus, Subtracting VA from AD,

$$[I - S] + [G - T] + [X - M] = 0$$

The first bracket gives the net expenditure of the private sector, the second the net expenditure of the public sector, and the third net expenditure abroad. This is a useful summary of the aggregate economy because it demonstrates that the sum of the net expenditures must be zero in macroeconomic equilibrium. For example, if the net expenditure of the private sector is positive (saving exceeds investment), then there

must be net saving by the public sector or the external sector, or both. This summary can be used to link to the financial sector, since a non-zero value for a sector implies the accumulation or de-accumulation of debt.

This three gap summary of the macro model will be used in the training presentations in this module, and also in the second module on macroeconomic stability.

6. Reduced form equilibrium analysis

6.1 The 'Saving-Investment' Reduced Form

In this section we derive a multi-market equilibrium for the macro economy. For this exercise we ignore the labour market. The goods market is in equilibrium when aggregate demand equals aggregate supply. In symbols,

Behavioural equations:

$$c = a_1 y_d = a_1(y - t) = a_1(1 - a_3)y$$

$$i = A_1 - a_3 r$$

$$g = g^*$$

$$x = A_2 - a_4 e$$

$$n = a_5 y_d = a_5(1 - a_3)y$$

For simplicity we do not include the exchange rate in the import function.

Aggregate demand equals aggregate supply:

$$y = c + i + g + (x - n)$$

$$y = \frac{[(A_1 - a_3 r) + g^* + (A_2 - a_4 e)]}{\{(1 - a_1) + a_5\} \{1 - a_3\}}$$

In the simplest model that has no government and no external sector this reduces to saving equals investment, and for this reason is called the IS curve. The IS curve is not an equilibrium relationship, for equilibrium refers to a state in which the variables do not change. In the general case, along the IS curve $g \neq t$. If there is a deficit, $g > t$, this may be unsustainable, requiring an increase in t or a decrease in g . Also, it may be that $x \neq n$, which implies a trade deficit or surplus. This also may be unsustainable. Therefore, the IS curve should be treated as a **reduced form** equality that summarises the goods market. It should be used as an aid to organising one's analysis of the adjustment process to equilibrium, not as a locus of equilibrium points.

6.2 The Liquidity-Money Reduced Form

Money market equality is considerably simpler than for the goods market, and can be viewed as an equality that is also a partial equilibrium.

$$M_S = M^* \text{ (the monetary authorities determine the money supply)}$$

$$M_D = pvy + (A_4 - a_6r)$$

Equality and equilibrium:

$$M^* = pvy + (A_4 - a_6r)$$

$$y = \frac{M^* - (A_4 - a_6r)}{pv}$$

This is the LM curve, and for all points along it the demand and supply of money are equal.

6.3 Balance of Payments Equality

Balance of payments equality requires that foreign exchange inflows equal foreign exchange outflows. Let the net change in foreign exchange be F . In this simple model, the balance of payments includes trade (the current account) and capital flows (capital account). We assume that the exchange rate is fixed by the government. The assumption of a market determined exchange rate would greatly complicate the model by requiring a further equation in which e would be a function of F .

$$F = (x - n) + F$$

$$F = (A_2 - a_4e) - a_5(1 - a_3)y + a_7(r/r_w)$$

$$e = e^*$$

For $F = 0$,

$$y = \frac{(A_2 - a_4e^*) + a_7(r/r_w)}{a_5(1 - a_3)}$$

As in the case of the IS curve, the BoP curve is not a true equilibrium because it does not require that $x = n$.

7. Adjustment to Equilibria

The application of the concepts presented in this module will involve ‘thought experiments’ (a term first used by Albert Einstein), in which changes in which the effect of changes in key variables are followed through the economy. Figures 2.1 through 2.8 give the basic tools for considering the process of adjustment to equilibrium. Prior to the training sessions, trainees should use the diagrams to consider the adjustment process in response to the changes specified below. The purpose of the thought experiments is to demonstrate the effect on equilibrium outcomes of assuming different behavioural responses (which are summarised in Table 2.1).

To carry out the thought experiments, one must be able analyse excess demand effects. Figure 2.1 provides a basic element of the analysis, showing three possibilities for the relationship between capital flows and the ratio of the national rate of interest to the ‘world’ rate of interest. The steepest line shows the sum of export earnings and capital flows when the latter are relatively unresponsive to the interest rate differential. It is likely that this is most appropriate for sub-Saharan countries with their underdeveloped financial intermediation (South Africa being the exception). The less steep line indicates a relatively elastic response of capital flows to interest rates, and the horizontal line is the special case of perfectly elastic capital flows.

Figure 2.2 represents a pure Neoclassical case in which capital flows are perfectly elastic with respect to relative interest rates, so the BoP curve is horizontal. The LM curve is relatively inelastic, and the IS curve relatively elastic. The Structuralist case is drawn in Figure 2.3, with inelastic capital flows and investment, and an elastic LM curve. For either case, the following comments apply.

The three lines, IS, LM and BoP, intersect at a general equilibrium in which there are no excess demands. The three intersecting lines divide the diagram into six disequilibrium regions. These are noted by Roman numerals, I-VI, in clock-wise order in Figures 2.1 and 2.2. The regions are characterised by the following.

IS curve: above the IS curve the demand for domestic goods is less than the supply ($I + G + X < (S + T + N)$), so output falls (Regions I, II and III in both diagrams); below the IS curve the demand for domestic goods is greater than the supply, ($I + G + X > (S + T + N)$), so output expands (Regions IV, V and VI in both diagrams).

LM curve: above the LM curve the demand for money is less than the supply, so the interest rate falls and the amount of money held idle increases (Regions I, V and VI in Figure 2.1, and II, IV and V in Figure 2.2); below the LM curve there is an excess demand for money, the interest rate rises and the amount of money held idle declines (Regions II, III and IV in Figure 2.1, and III, IV and V in Figure 2.2).

BoP curve: above the BoP curve the balance of payments is in surplus with net capital inflows which increases the monetary base (Regions I, II and IV in Figure 2.1, and I, V and VI in Figure 2.1); below the BoP curve the balance of payments is in deficit (Regions III, IV and V in Figure 2.1, and Regions II, III and IV in Figure 2.2).

It should be noted that for no region do all of the markets have negative or positive signs. This is potentially consistent with Walras' Law that excess demands should sum to zero.⁴ The characteristics of these regions allow one to engage in pseudo-dynamic thought experiments.⁵ Consider, for example, Region I in Figure 2.1, and begin at point a.⁶ There is an excess supply of goods (negative excess demand), which would tend to generate a fall in output. There is also an excess supply of money, which would tend to push interest rates down and stimulate an investment increase. Simultaneously, there are capital inflows, increasing the money base. The net affect of these is to move from disequilibrium to the intersection of the three lines at point e.

The preceding analysis can be re-stated in terms of a parameter change if point a is explicitly treated as a point of general equilibrium. From point a, assume a fall in the world rate of interest. This brings down the BoP curve. With a fixed exchange rate, the capital flows result in an increase in the monetary base which shifts the LM curve to the right. The resulting excess supply of money brings down interest rates, which eliminates the incentive for capital inflows and stimulates a higher level of investment. The new equilibrium at point e is at a higher level of output, lower interest rate, and balance of payments equilibrium. Thus, wherever one begins in the diagrams, each thought experiment begins, 'from a position of equilibrium, analyse the adjustment in response to...' Following the example above of a change in the world rate of interest, trainees should explain how a new equilibrium is reached for the following parameter changes.

1. an increase and a decrease in the money supply;
2. an increase and a decrease in government expenditure;
3. an increase and decrease in the tax rate;
4. a rise and a fall in external demand.
5. a rise and a fall in expectations of investors in plant and equipment.

⁴ If the labour market is ignored and the excess demand functions are of the appropriate form, the sum will be zero.

⁵ More precise terminology is that the analysis is of comparative statics in which one begins from a disequilibrium point. A dynamic analysis would include an explicit time variable.

⁶ Point a is actually a general equilibrium formed by IS, LM and BoP curves that are not shown in Figure 2.1. It would correspond to an equilibrium at a higher world rate of interest.

To facilitate the analysis of the use of policy instruments, Figures 2.3 – 2.7 can be used to solve for a temporary, multi-market equality response to changes in the central bank rate, government expenditure, tax rates and the exchange rate. The diagrams treat both monetary and fiscal policy, on the assumptions of a fixed and a flexible exchange rate.

8. Summary: Macro Analysis and Policy

Policy analysis is **not** an exercise in specifying the values of policy instruments for solving a system of equations for equilibrium outcomes. There are several reasons for this. First, equilibrium itself is a theoretical concept useful for simplifying complex relationships, but actual economies are always in a state of change.

Second, the equilibrium values produced by a set of equations assume that many things affecting the economy do not change (parameters). In some cases, the things that are assumed not to change may be relatively stable, such as consumer preferences. In other cases, they are assumed constant because they cannot be directly affected by changes in policy variables or changes in the domestic economy. An example of a parameter that in practice is highly variable is the external terms of trade. A model that sought to make the terms of trade endogenous would be far too complicated to be useful for policy.

Third, and related to the second, there is a substantial random (stochastic) element in all outcomes that policy seeks to influence. For example, in an open economy the rate of inflation will be affected by inflation in the country's major trading partners. Thus, using the most appropriate forecasting model, a government may set its policy instruments such that the model predicts the desired inflation outcome. Factors beyond the control of government policy, such as the terms of trade, may produce an inflation rate substantially different from the one a model generates. Therefore, on the best information and analysis available, the government may discover that it has not achieved the inflation outcome it desires.

The indeterminate nature of economic outcomes is especially important for sub-Saharan countries, because all major economic aggregates are affected by the world prices of commodities, over which the government in practice has no control. This does not mean that policy analysis has no use; rather, it indicates the limits to formal modelling. Formal modelling should always be treated as providing indications of potential outcomes, rather than as yielding confident predictions.

Table 2.1: Summary of Different Approaches to Key Behavioural Relationships, Neoclassical and Structuralist

Elasticities with respect to: the interest rate:	IS		LM		BoP	
	Neo-classical	Structuralist	Neo-classical	Structuralist	Neo-classical	Structuralist
Investment	E	I				
saving	E	I				
money demand			I	E		
capital flows					E	I

If the investment function is interest elastic [inelastic], a fall in the interest rate has a large [small] aggregate demand effect.

If the saving function is interest elastic [inelastic], a fall in the interest rate results in large [small] fall in saving, which results in a large [small] rise in aggregate demand.

If the demand for money is interest elastic [inelastic], a fall in the interest rate stimulates a large [small] rise in hoarding, which has a large [small] contractionary effect.

If capital flows are elastic [inelastic] with respect to the interest rate, a fall in the interest rate will provoke a large and immediate [small and lagged] capital outflow.

Annex: Guide to the Algebraic Macro Model

This annex provides a quick reference to the symbols used in the algebra in the module. Roman letters represent variables and parameters according to the following rules.

1. Variables are assigned the first letter of the first word of a variable; for example, the ‘money supply’ is m and M . The small letter is the price-deflated (‘real’) value and the large letter is the nominal value. The exceptions to this rule occur when more than one variable begins with the same letter; for example, C is nominal consumption and K is the nominal capital stock. There is one exception: the price level is by definition nominal and can have no ‘real’ value. None-the-less, the module follows standard practice by using p for the price level.
2. Constant terms are avoided when possible. When necessary, a constant term is always the letter A (for ‘autonomous’), and differentiated across equations by a number subscript.
3. Coefficients of marginal change are always the letter a , and differentiated across equations by a number subscript. The only exceptions are made to conform to common practice. For example, in the production function the Greek letter α is used, and v in the money demand equation.
4. There are six policy variables; that is, variables over which the government has direct control: a) the level of government expenditure, b) the tax rate, c) the central bank lending rate (assumed equal to the commercial borrowing and lending rate), d) the exchange rate, e) the nominal money supply, and f) the share of the fiscal deficit that is monetised. The last is implicit in the model. The value assigned to a policy variable by the government is noted by a $*$; for example, if the government fixes the nominal exchange rate, $e = e^*$.

The equations are presented and explained in the text. Only the real variables are listed below unless the nominal value appears in an equation.

Variables:

Goods market

y = national income

y_a = aggregate demand

y_s = aggregate supply (= value added)

y_d = disposable income ($y - t$)

c = consumption

i = private investment

s = private saving

g = government expenditure (current capital expenditures are not distinguished)

t = taxes (all government revenue)

x = exports
n = imports
e = exchange rate ($e = E$ and a fall is a devaluation/depreciation)

Labour market

l_s = labour supply
 l_d = labour demand
k = capital stock
W = nominal wage
w = W/p

Money market

M_s = money supply
 M_d = money demand
p = price level
m = M/p
r = interest rate (= central bank rate, and $r = R$)
v = velocity of money

External Capital Flows:

F = net external capital flows ($F = f$)
 R_w = 'world' rate of interest

Constant terms:

A_1 = autonomous term in the private investment equation
 A_2 = autonomous term in the export equation
 A_3 = autonomous term in the production function
 A_4 = autonomous term in the demand for money equation

Marginal coefficients

v = velocity of money
 α = coefficient on the capital stock in the production function
 a_1 = marginal propensity to consume
 a_2 = marginal relationship between the interest rate and private investment
 a_3 = marginal propensity to tax
 a_4 = marginal relationship between exports and the exchange rate
 a_5 = marginal propensity to import
 a_6 = marginal relationship between the interest rate and the demand for money
 a_7 = marginal relationship between domestic and world rate of interest

Other symbols

XD = excess demand, which can be positive or negative
 $E[i]$ = equilibrium point

Figure 1
Short Term Capital Flows, Various Possibilities

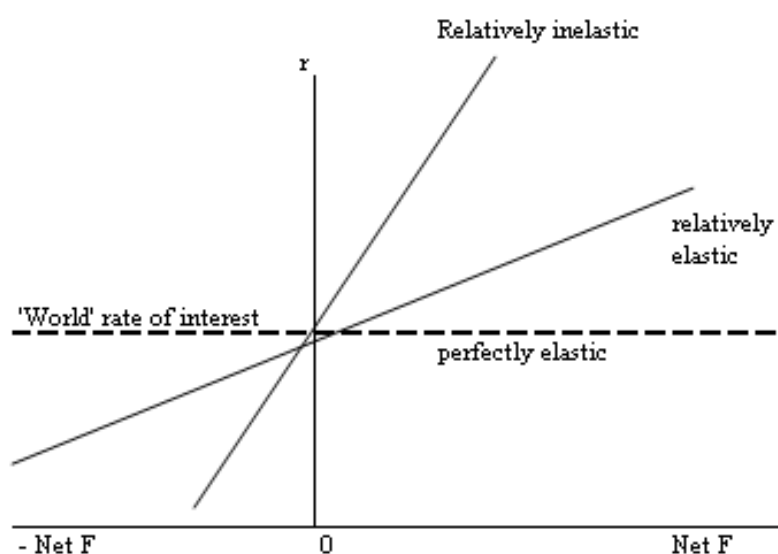


Figure 2
IS, LM, BoP with Neoclassical Assumptions

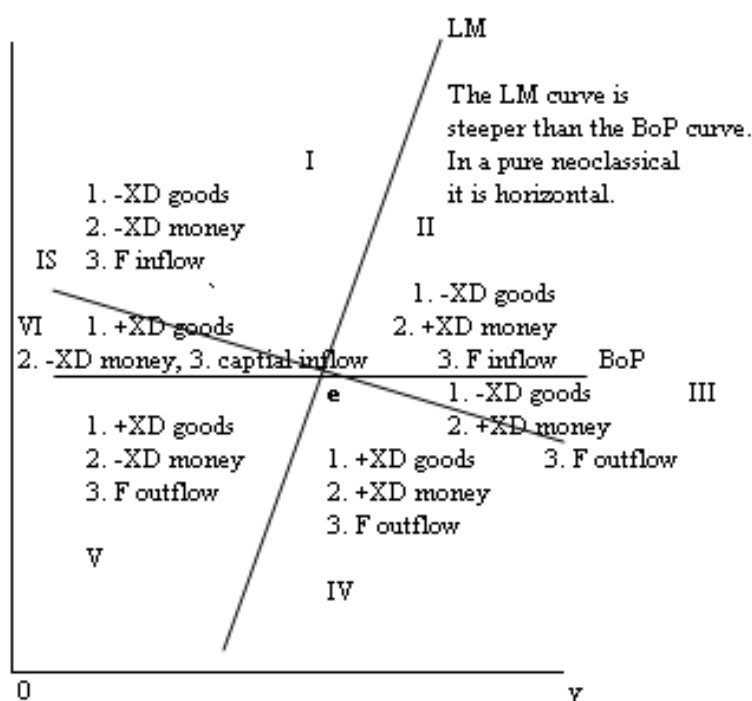


Figure 3
IS, LM, BoP with Structural Assumptions

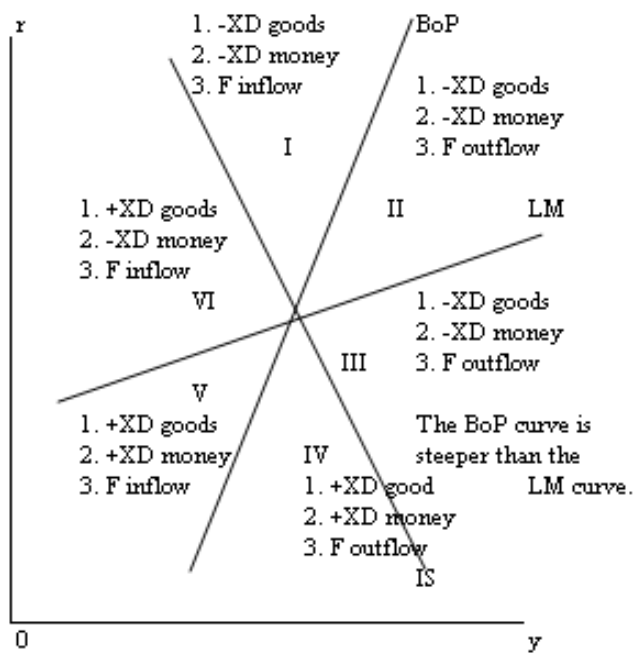
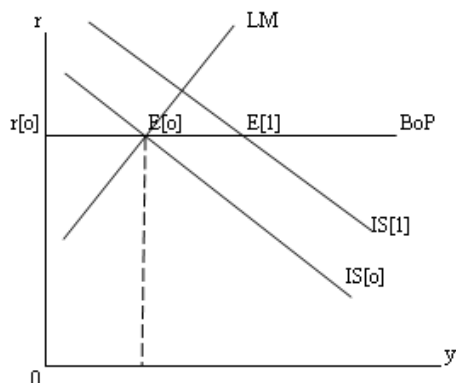
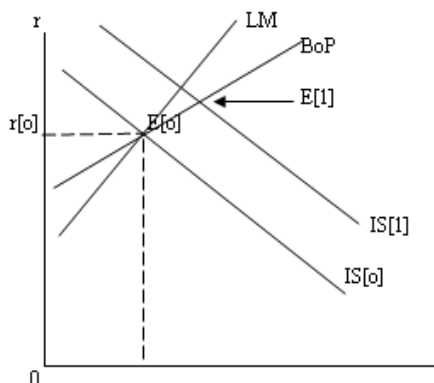


Figure 4: Fiscal Policy with a Fixed Exchange Rate, standard analysis

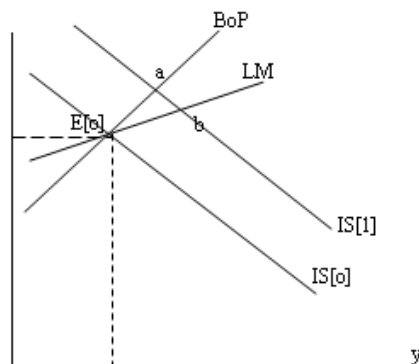
Part 1:
Fixed Exchange rate, fiscal policy,
Perfectly elastic capital flows



Part 2:
Fixed Exchange rate, fiscal policy,
Imperfectly elastic capital flows, slope LM > BoP



Part 3:
Fixed Exchange rate, fiscal policy,
Imperfectly elastic capital flows, slope LM < BoP



NOTE: In each case, the rise in the level of output creates a trade deficit which must be covered by capital flows.

From the initial equilibrium at point E[0], there is an increase in government expenditure. The immediate impact is to increase the interest rate. This increase immediately provokes an inflow of capital. The inflow is instantaneous, cancelling the rise in the interest rate. The capital inflow increases the monetary base & shifts the LM curve to the right. The new equilibrium is E[1], at a higher level of output and employment.

Fiscal policy is completely effective.

From the initial equilibrium at point E[0], there is an increase in government expenditure. The immediate impact is to increase the interest rate. This increase immediately provokes an inflow of capital. The inflow is NOT instantaneous. In order to achieve the capital inflow to offset the trade deficit, the interest rate rises. The rise in the interest rate reduces private investment. However, the LM curve shifts to the right, to an equilibrium such as E[1], with higher output and employment, but not the increase achieved with perfectly elastic capital flows.

Fiscal policy is partly effective.

From the initial equilibrium at point E[0], there is an increase in government expenditure.

Assume that the economy finds an initial equilibrium at point b, which gives internal equilibrium with a balance of payments deficit (the interest rate is below the equilibrium level). This results in an outflow of reserves, which shifts the LM curve to the left, to point a. Fiscal expansion is partially cancelled.

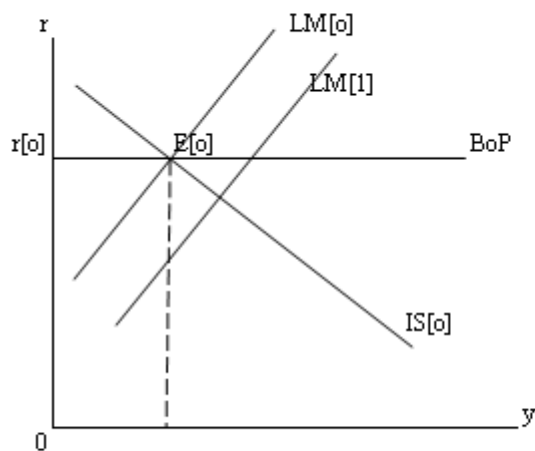
Assume that the economy finds an initial equilibrium at point a, which gives external equilibrium with excess supply in the money market. This drives the interest rate down.

As the interest rate drops below the BoP line, reserves decline, and the LM curve shifts back to the left. The equilibrium is reached at a.

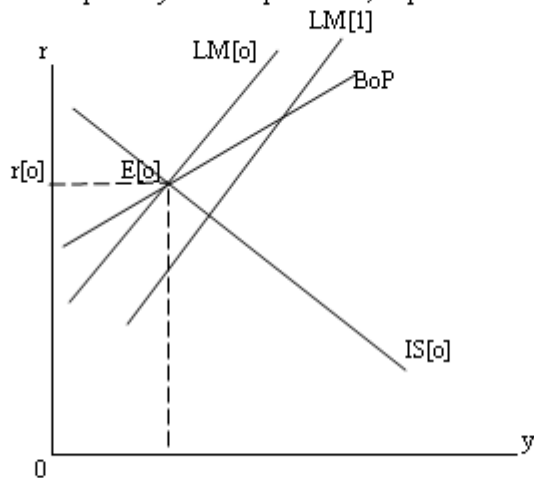
Fiscal policy is partially effective.

Figure 5: Monetary Policy with a Fixed Exchange Rate, standard analysis

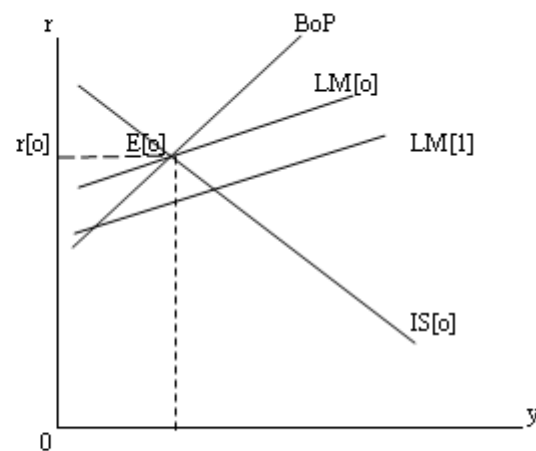
Part 1:
Fixed Exchange rate, monetary policy,
Perfectly elastic capital flows



Part 2:
Fixed Exchange rate, monetary policy,
Imperfectly elastic capital flows, slope LM > BoP



Part 3:
Fixed Exchange rate, monetary policy,
Imperfectly elastic capital flows, slope LM < BoP



NOTE: In each case, the rise in the level of output creates a trade deficit which must be covered by capital flows.

From the initial equilibrium at point E[0], an increase in the money supply results in a fall in the interest rate, which provokes capital outflow. The outflow reduces the monetary base, cancelling the initial increase in the money supply.

Monetary Policy is NOT effective.

Same story as for perfectly elastic capital flows.

Monetary Policy is NOT effective.

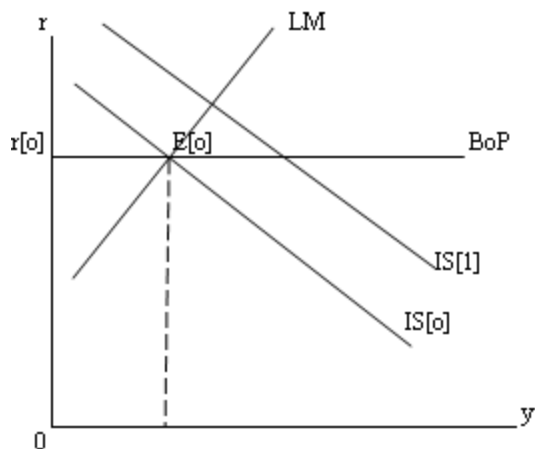
Same story as for perfectly elastic capital flows.

Monetary Policy is NOT effective.

Figure 6: Fiscal Policy with a Flexible Exchange Rate, standard analysis

Part 1:

Flexible Exchange rate, fiscal policy,
Perfectly elastic capital flows



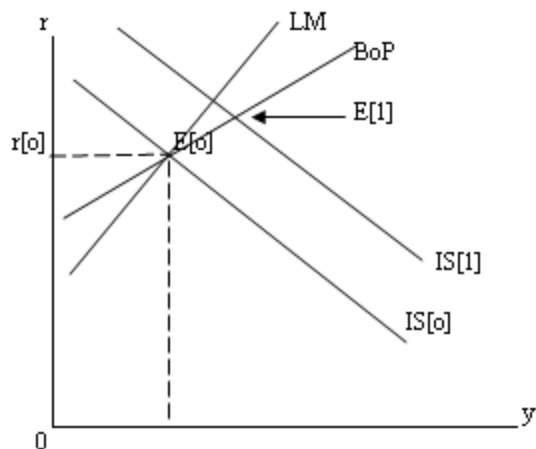
NOTE: In each case, the rise in the level of output creates a trade deficit which must be covered by capital flows.

From the initial equilibrium at point $E[0]$, there is an increase in government expenditure. The immediate impact is to cause the exchange rate to appreciate. This causes the IS curve to shift back to its original position.

Fiscal policy is ineffective.

Part 2:

Flexible Exchange rate, fiscal policy,
Imperfectly elastic capital flows, slope $LM > BoP$

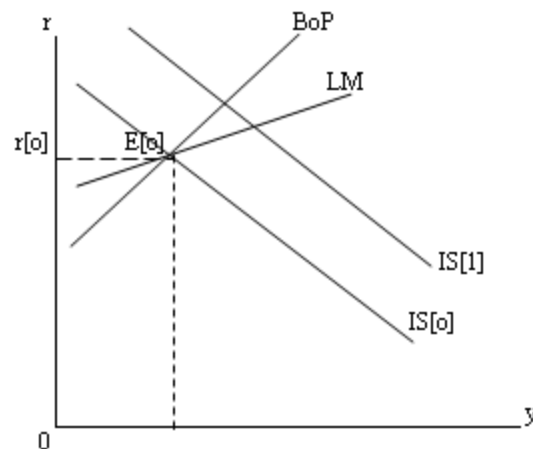


From the initial equilibrium at point $E[0]$, there is an increase in government expenditure. The immediate impact is to cause the exchange rate to appreciate AND to generate net inflows of capital. The LM curve shifts to the right, the IS curve shifts back to the left, the BoP curve shifts to the right. The final equilibrium is somewhere between $E[0]$ and $E[1]$.

Fiscal policy is only partly effective, tending to be ineffective.

Part 3:

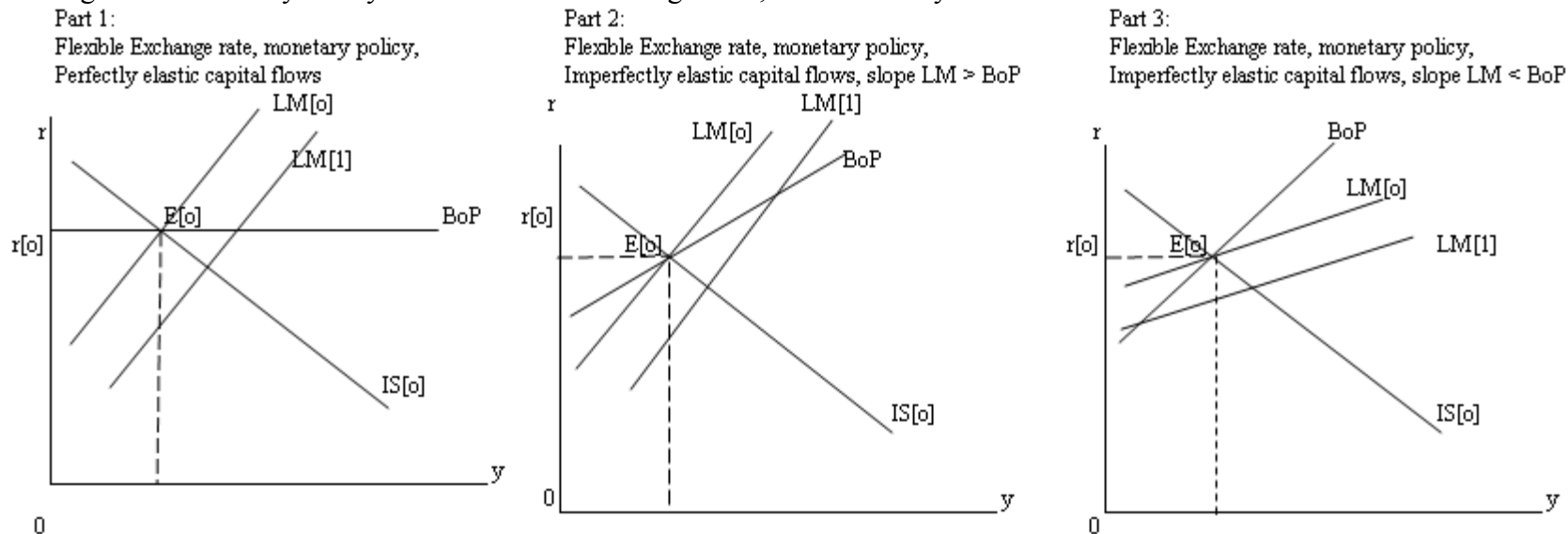
Flexible Exchange rate, fiscal policy,
Imperfectly elastic capital flows, slope $LM < BoP$



From the initial equilibrium at point $E[0]$, there is an increase in government expenditure. Assume that IS/LM holds, so the movement is along the LM curve. Since the movement is below the BoP curve, there is a balance of payments deficit, and the currency depreciates. As a result, the BoP curve shifts to the right. The new equilibrium lies to the right of $E[0]$.

Fiscal policy is effective.

Figure 7: Monetary Policy with a Flexible Exchange Rate, standard analysis



NOTE: In each case, the rise in the level of output creates a trade deficit which must be covered by capital flows.

From the initial equilibrium at point $E[0]$, an increase in the money supply results in a depreciation of the currency. This shifts the IS curve out to join the LM curve.

Monetary policy is effective.

From the initial equilibrium at point $E[0]$, an increase in the money supply results in a depreciation of the currency. This shifts the IS curve out to join the LM curve and shifts out the BoP curve.

Monetary policy is effective.

From the initial equilibrium at point $E[0]$, an increase in the money supply results in a depreciation of the currency. This shifts the IS curve out to join the LM curve and shifts out the BoP curve.

Monetary policy is effective.

References:

- Andolfatto, David
2005 *Macroeconomic Theory and Policy* (Vancouver: Simon Fraser University, <http://www.sfu.ca/~dandolfa/macro2005.pdf>).
- Corce, Enzo, and Moshin Khan
2000 'Monetary Regimes and Inflation Targeting,' *Finance and Development* 37, 3 (<http://www.imf.org/external/pubs/ft/fandd/2000/09/croce.htm>).
- Galli, Rossana, and Rolph van der Hoeven
2001 'Is inflation bad for the poor? The importance of the initial rate of inflation,' *Employment Paper* 2001/29 (Geneva: International Labour Organisation).
- Hahn, Frank
1984 *Equilibrium and Macroeconomics* (Oxford: Basil Blackwell)
<http://cepa.newschool.edu/het/schools/neow.htm>.
- Hicks, John
1937 'Mr Keynes and the Classics: A Suggested Reinterpretation,' *Econometrica*
http://en.wikipedia.org/wiki/IS/LM_model
Kanbur, Ravi and Nora Lustig
1999 'Why is distribution back on the agenda?' Paper Prepared for the Annual World Bank Conference on Development Economics, April (Washington).
- Ul Haque, Nadeem, and Mohsin Khan
1998 'Do IMF-Supported Programs Work? A Survey of the Cross-Country Empirical Evidence,' *IMF Working Paper* 98/169.
- Weeks, John
1989 *A Critique of Neoclassical Macroeconomics* (London and New York: Macmillan and St Martin's Press).
- Williamson, John
1995 'The Management of Capital Inflows,' *Pensamiento Iberoamericano*
(<http://www.iie.com/publications/papers/paper.cfm?ResearchID=277>)