African Economic Research Consortium

The Collaborative Masters Degree Programme (CMAP) in Economics for Anglophone Africa (Except Nigeria)

Joint Facility for Electives (JFE)

ECON 552: INTERNATIONAL ECONOMICS II

Module Teaching Materials

Module Title

Lecture 6. Models Of Balance Of Payments Adjustments (BOP)

Learning Outcomes

- At the end of the lecture students should be able to understand:

- Balance of Payments Accounting
- Balance of Payments Adjustments

- The Specie Flow Mechanism
- Elasticity Approach

- The Absorption Approach

- Monetary Approach

- Transmission of Disturbances, Exchange Rate Pass-through and the Open Economy Multiplier
- Empirical Evidence & Applications to Africa

ACKNOWLEDGEMENT

The African Economic Research Consortium (AERC) wishes to acknowledge and express its immense gratitude to the following resource persons, for their tireless efforts and valuable contribution in the development and compilation of this teaching module and other associated learning materials.

1. Prof. Albert Makochekanwa, University of Zimbabwe, Zimbabwe.

Thank you.

ACKNOWLEDGEMENT

The African Economic Research Consortium (AERC) wishes to acknowledge and express its immense gratitude to the following resource persons, for their tireless efforts and valuable contribution in the development and compilation of this teaching module and other associated learning materials.

1. Prof. Albert Makochekanwa, University of Zimbabwe, Zimbabwe.
2. Prof. Steven Buigut, Canadian, University in Dubai, UAE
3. Prof. Emmanuel Ziramba, University of Namibia
4. Dr. Baboo Nowbutsing, University of Mauritius
5. Dr. Mutiu A. Oyinlola, University of Ibadan, Nigeria

Lead Reviewer

1. Prof. Pol Antras, Harvard University, USA

Thank you.

Introduction

- Recalling from the B.O.P. Accounting, an open economy identity can be expressed as:

$$Y = C + I + G + X - M \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

- The difference between the exports (X) and the imports (M) (net exports) of a country is reflected in the balance of payments as the economy's current account balance (CAB).

- While the current account is not the only component of the BOP of a country, it is perhaps the most important component of these items in the BOP that reflect the fundamental performance of an economy vis-à-vis the rest of the world.

- A surplus or deficit in the current account is therefore an indicator of the relative performance of an economy visa-vis the rest of the world.

- As seen from identity (i) above, a deficit in the current account indicates that residents of a country are buying more goods and services from foreign countries than foreigners are buying from the domestic economy. This raises an important analytical question about why this is so. The same question would arise even if the CAB was in surplus.

- This hence is the question:

Introduction

- **How can the economy correct the current account disequilibrium?**
- Answers to these questions can provide insights that can guide domestic policy formulation for the management of the external sectors of an economy.

- A close examination of BOP disequilibrium and adjustment would provide insights in the forces that determine a country's BOP position, which is the foundation of the macroeconomic analysis of an open economy and the related international finance issues.

- Traditionally a number of approaches have been used to analyse the adjustment process of the BOP. **The adjustment process of BOP refers to how the BOP reacts to certain economic fundamentals such as relative prices charges, variations in income and aggregate demand and monetary disequilibrium**.

- The main approaches to understanding the BOP adjustment include:

1) Elasticity Approach
2) The Absorption Approach
3) The Monetary Approach
4) The Specie Flow Mechanism

The Elasticity Approach

- This approach attempts to analyse the adjustment of the BOP to changes in relative prices. Because of its focus on relative prices it is only relevant to the CAB of the BOP and neglects the capital account. There is a historical justification for this limited focus of the elasticity approach.

- Until the recent liberalization of capital movements by many countries, capital flows were of little significance relative to the flow of goods and services across International Borders.

- The CAB derives its analysis on its own merit by virtue of the fact that it is still a significant component of the international transactions of most open economies today.

- And for the debt-burdened developing countries, the source of their external debt problems can, in most cases, be traced to their current performance.

- Finally a more general theory of the BOP which extends the analysis to the capital account can best be developed from a foundation of a current account theory.

- The elasticity approach examines the effect of the changes in the terms of trade on the balance of payments.

The Elasticity Approach

- The terms of trade is defined as:

$$\pi = Px/rPm \quad \text{.....(1)}$$

- Where ***Px*** is the price of the domestic goods in domestic currency, ***Pm*** is the foreign currency price of foreign goods, r is the exchange rate measured in units of domestic currency per unit of foreign currency.
- Thus ***Π*** is the Terms of Trade (ToT) in terms of domestic currency.
- The analytical problem is to examine how BOP reacts to changes in the relative price of domestic goods vis-à-vis that of foreign goods.
- The intuition underlying the analysis is that a relative price change will switch expenditures in the two countries (home and foreign) away from the relatively more expensive goods in favour of the goods which are now cheaper. Thus, if relative prices moves in favour of the home good both domestic and foreign consumers would switch demand from the foreign to the home goods. This would lead to changes in the flow of exports and imports.
- The analytical question then is how such changes in the flow of trade in goods and services affect the BOP?

The Elasticity Approach

- Note that a change in the quantities of exports and imports will not necessarily change the value of net exports in the same direction as the change in the quantities. It is therefore necessary to investigate the conditions under which the changes in export and import quantities would lead to the desired effect on the BOP.

- The approach makes the following **assumptions**:

  i. ***Px*** and ***P*m*** do not change as a result of changes in demand for exports and imports induced by a change through the change in ***r***.

  ii. The demand for and supply of foreign exchange as functions of the exchange ate are derived solely from trade flows and that the capital flows play no part in such demand for or supply of foreign exchange.

- The 1st assumption implies that the elasticity's of supply of exports and imports are infinite. The seconds implies that capital flows are independent of the exchange rate.

- The central message of the elasticity approach is that there are two directs effects of a devaluation on the CAB, one of which works to reduce a deficit whilst the other actually contributes to making the deficit worse than before.

The Elasticity Approach

- Lets consider the two effects in some detail:
- The CAB when expressed in domestic currency is given as: $B = P_x X - rP^*mM \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (ii)$
- Where ***Px*** is the domestic price of exports, ***X*** is the volume of domestic exports, **r** is the exchange rate, ***P*m*** is the foreign price level of imports, ***M*** is the volume of imports.
- Suppose we assume that ***Px=P*m=1***, and then the value of exports and imports become X, and M respectively such that equation (ii) becomes:

$$B = X - rM \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (iii)$$

- In differential form it becomes:

$$dB = dX - rdM - Mdr \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (iv)$$

- Divide both sides by **dr** to get:

$$dB/dr = dX/dr - rdM/dr - M \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (v)$$

The Elasticity Approach

- We define the price elasticity $\ni_x$ of demand for exports as the percentage change in exports ***x*** over the percentage change in price such that:

$$\ni x = dX/X/dr/r$$

$$\text{Such that } dX = \ni x\, dr/r.X \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(vi)}$$

- And similarly the price elasticity for imports $\ni_m$ is defined as the percentage change in imports over the percentage change in their price such that:

$$\ni m = -dM/M/dr/r$$

$$\text{Such that } dM = -\ni m\, dr/r.M \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(vii)}$$

$$dB/dr = \ni xX/r + \ni m M - M$$

- Substituting (vi) and (vii) into equation (v), we obtain:
- Dividing by M:

$$dB/(dr)/M) = \ni xX/rM + \ni m - 1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (viii)$$

- Assuming that initially we have balance of trade such that X=rM and rearranging (viii) we get:

$$dB/dr = M[\ni x + \ni m - 1] \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(ix)}$$

The Elasticity Approach

- Equation (ix) is known as the **Marshall-Lerner**, condition and say that, starting from a position of equilibrium in the current account, a devaluation will improve the current account; that is ***dB/dr*** , only if the sum of the foreign elasticity of demand for exports and the home country elasticity of demand for imports is greater than 1, that is,

$$\exists x + \exists m > 1$$

- If the sum of the two elasticities is less than unity then devaluation will lead to a deterioration of the current account.

- **What explains this?**

- There are two effects that can explain why when $\exists_x + \exists_m > 1,$ a devaluation leads to an improvement in the current account.

1) The price effect

2) The volume effect

The Elasticity Approach

1. The price effect

- Exports become cheaper measured in foreign currency, while imports become expensive measured in home currency. The price effect therefore contributes to the worsening of the current account

2 The volume effect

- The fact that exports become cheaper should encourage an increased volume of exports, and the fact that imports become more expensive should lead to a decreased volume of imports. The volume effect contributes to the improving of the current account (BoP).

- The two effects contributes to improving the current account, depending on the M-L conditions, that is if

$$\exists_x + \exists_m < 1, \exists_x + \exists_m = 1 \; etc$$

- Other complicated version of the elasticity approach to BOP adjustment exists in the literature and are not going to be covered in this course.

Elasticity Approach - Empirical evidence

- The possibility that devaluation may lead to a worsening rather than improvements in the BOP has been a subject of empirical research attempting to estimate elasticity for exports and imports. This research can be divided into two:

  1) **Elasticity optimists**: Who believe that the sum of these two elasticity's tended to exceed unity.

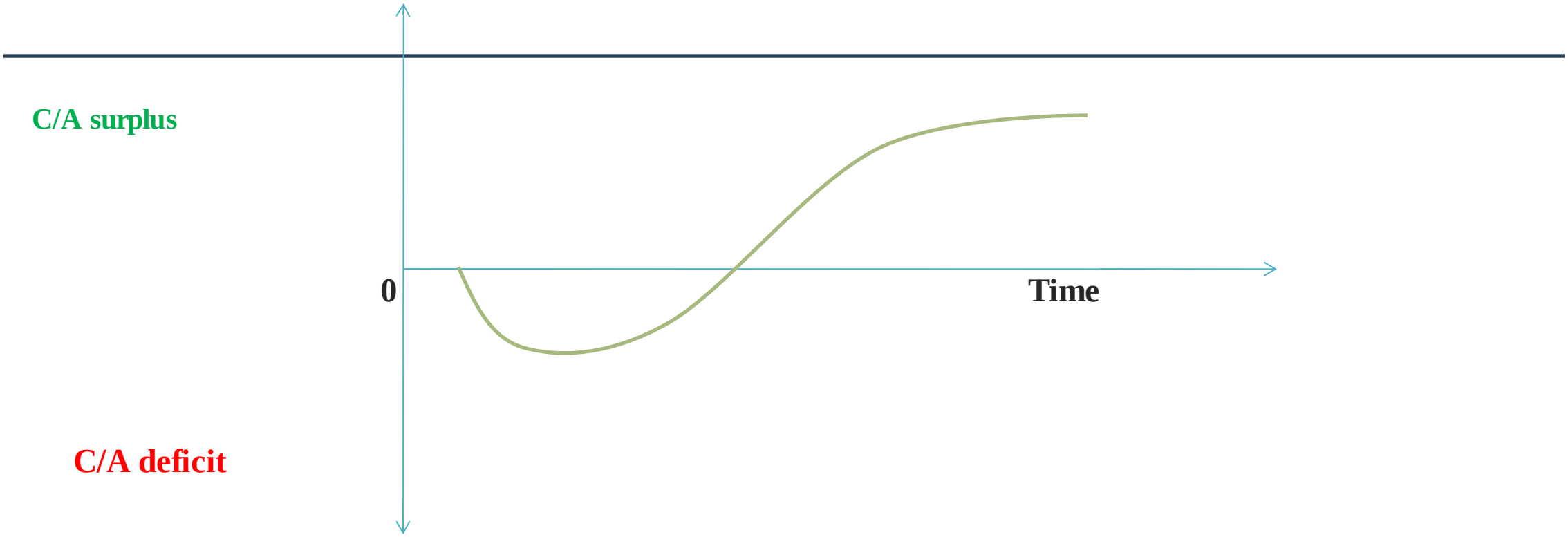
  2) **Elasticity pessimists**: who believe that the sum of the two elasticity's tended to be less than one.

- In general, it is argued that a devaluation may work better for industrialized countries than for developing countries. Many developing countries are heavily dependent upon imports so that their price elasticity of demand for imports is likely to be very low.

- However, developed countries face competitive export markets, making their price elasticity of demand for their exports quite elastic. The implication of the M-L condition is that a devaluation may be a cure for some countries BOPs deficits but not for others.

- In addition, the empirical literature show consensus that elasticity's are lower in the short-run than in the long-run mostly due to the **J-curve** effects.

The J-curve effect



Elasticity Approach - Empirical evidence

- The idea underlying the J-curve effect is that in the short run export volumes and import volumes do not change much, so that the price effect outweighs the volume effect leading to a deterioration in the current account.

- However, after sometime export volumes start to increase and import volumes start to decline, consequently, the CA deficit starts to improve and eventually move to a surplus.

Why slow response of exports and imports in short-run?

- A number of various reasons have been advanced to explain the slow responsiveness of export and import volumes in the short run and why the response is far greater in the long run: three of the most important are:

1) A time lag in consumer responses
2) A time lag in producer responses
3) Imperfect competition

Why slow response of exports and imports in short-run?

1) A **time lag in consumer responses**

- It takes time for consumers in both the devaluing country and the rest of the world to respond to the changed competitive situation.

2) A time lag in producer responses

- Even though devaluation improves the competitive position of exports it will take time for domestic producers to expand production of exportable. In addition, orders for imports are normally made well in advance and such contracts are not readily cancelled in the short run. Factories will be reluctant to cancel orders for vital inputs and raw materials. For instance, the waiting period for a Boeing aeroplane can be five years,

3) Imperfect competition

- Building up a share of foreign markets can be a time-consuming and costly business. This being the case, foreign exporters may be very reluctant to lose their market share in the devaluating country and might respond to the loss in their competitiveness by reducing their export prices. To the extent that they do this the rise in the cost of imports caused by the devaluation will be partly offset. These effects rely upon some degree of imperfect completion which gives foreign firms some supernormal profit margins enabling them, to reduce their prices.

Absorption approach

Absorption Approach

- The main weakness of the elasticity approach is that it is based on the assumption that all other things are equal.

- However, changes in export and import volumes will by definition have implications for national incomes and consequently income effects need to be incorporated in a more comprehensive analysis of the effects of devaluation.

- Alexander (1952) gave an important evaluation of this effect, focusing on the fact that a current account imbalance can be viewed as the difference between domestic output and domestic spending (absorption), hence the name.

- Recall that: $Y = C + I + G + X - M \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (i)$

- Where A = C + I + G, then **Y = A + X – M** …………(ii)

B = Y – A = X – M ……………..(iii) (**Current Account)**

Absorption Approach

B = Y – A = X – M ……..(iii) **(Current Account)**

- This equation says that the current account (B) represents the difference between domestic output and domestic absorption.
- A current account surplus means that domestic output exceeds domestic spending, while a current account deficit means that domestic output is less than domestic spending.

- If we introduce taxes (T) into equation (i), the absorption approach can also be expressed as:

$$Y = C + I + G - T + X - M$$

$$Y - C = I + G - T + X - M$$

$$(S - I) + (T - g) = (X - m) \qquad \text{……(IV)}$$

- Implying that net savings (private net savings plus the budget surplus) equals the current account surplus.

Absorption Approach - Twin deficits

- From equation (iv) a current account deficit arises if a budget deficit, $T - G < 0$, is not offset by an excess of private saving over investment. In other words, a payments deficit arises if net national saving is insufficient to purchase all of the net increase in the volume of bills/bonds being issued by the government to finance its deficit.

- **The term "twin deficits" was used to describe the concurrent US budgets and trade deficits (1981-1998).** If private sector saving and investment are broadly in balance, then equation (iv) indicates that a budget deficit and a trade deficit will be found together.

- The US slashed taxes and raised some government expenditures, generating both a big government deficit and a sharply increased current account deficit.

- However, other countries experiences (EU) shows that the 'twin deficits' may not always occur with such twin policies – after all, this is just an identity.

- The main reason why the 'twin deficit' may not apply is because the current account may not change as much, owing to a likely fall in private savings. In such a case, the behaviour of private savers just about neutralizes government efforts to raise national savings.

Absorption Approach - Twin deficits

- **But why does offsetting effect occur?**

- One possible explanation is based on economic theory known as the "**Ricardian Equivalence**" (RE) of taxes and government deficits.

- RE argues that when the government cut taxes and raises it expenditure, consumers anticipate that they will face higher taxes later to pay off the resulting government debt.

- In anticipation, they raise their own (private) saving to offset the fall in government savings. Conversely, governments that lower their deficits through higher taxes (thereby increasing government saving) will induce the private sector to lower its own saving.

- Because S=I, CAB and Government Deficit are jointly determined variables, we cannot use equation (iii) alone to fully determine the cause of a C/A change.

- However, some other lessons require we explore equation (iii) in more details.

Absorption Approach - Twin deficits

- Recall: $B = Y - A = X - M \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(iii)$

- We can differentiate equation (iii) into: $dB = dY - dA$ ……..(iv)

- Which implies that the effects of devaluation on the C/A will depend upon how it affects national income relative to domestic absorption?

- If devaluation raises domestic income relative to domestic absorption, the current account improves and vice versa.

- Understanding how devaluation affects both the income and absorption is therefore crucial to the absorption approach of BOP analysis

- Absorption can be divided into two parts; a rise in income will lead to an increase in absorption which is determined by the marginal propensity to absorb, **a**. There is also a 'direct effect' on absorption which is all the other effects on absorption resulting from devaluation denoted by $\bar{A}$.

Absorption Approach - Twin deficits

- Thus the change in total absorption becomes: $dA = adY + d\bar{A} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (vi)$

- Substituting in equation (v), we get: $dB = dY - [adY + d\bar{A}]$

$$dB = (1-a)dY - d\bar{A} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (vii)$$

- These equations imply that there are **3** factors to be considered when examining the impact of devaluation:

1) Is the marginal propensity to absorb greater or less than unity?
2) Does devaluation raise or lower national income?
3) Does devaluation raise or lower direct absorption?

- For the current account to improve then $(1-a)dY > d\bar{A},$ that is, any change in income not spent on absorption must exceed any change in direct absorptions.

Effects of devaluation on national income

- For this condition to hold we need to know whether the economy is in full employment (so that national income cannot rise) or below (so that national income may rise).

- If the marginal propensity to absorb is less than 1, then a rise in income will raise the income to absorption ratio and so improve the current account. Whereas, if income were to fall, this would raise the absorption to income ratio (as absorption would fall by less than income) which would worsen the current account. There are two effects on income.

1. **Employment Effect**

- In a situation of less than full employment, and if the Marshall-Lerner conditions hold, a devaluation will increase net exports leading to an increase in national income and employment via the foreign trade multipliers hence improve the C/A.

- If M-L condition does not hold however, net exports would fall, implying national income falls.

- Hence it is not clear whether the employment effect raises or lowers national income.

Effects of devaluation on national income

2 Terms of trade (ToT) effect

- ToT are the price of exports divided by the price of imports, that is, $\pi = P/rP^*$
- Devaluation $(\uparrow r)$ tends to make imports more expensive in domestic currency terms and this is not matched by a corresponding rise in export prices, which means TOT deteriorates.
- Deterioration in TOT represents a loss of real national income because more units of exports have to be given up to obtain a unit of imports. Hence TOT effect lowers national income.
- Overall, the effects of devaluation on national income of the devaluing country are ambiguous. Even if there are increased net exports earnings (M-L holds), the negative TOT effects works to reduce national income.
- Hence, even when income rises, overall, the effect on current account depends on the marginal propensity to absorb.

Effects of devaluation on national income

2 Terms of trade (ToT) effect

- If it is less than1, then ↑ Y leads to an improvement in the C/A because Y rises by more than absorption.
- But if marginal propensity to absorb is greater than 1, (how?), then would lead to an even bigger rise in absorption resulting in worsening C/A.
- Marginal propensity to absorb can be greater than 1 in the short run, when unemployed workers get jobs spend more by borrowing against future prospective income. Firms may also spend more than their revenues as they take significant investments in the expectations of high future profits.
- Under full employment, income may not increase. For devaluation to improve the C/A, direct absorption must fall and vice versa. How?

Effects of devaluation on Direct absorption

1 Real Balance Effect

- A simple formulation of the demand for money is that it is a demand to real money balances. If prices double, then agents will demand twice as much money as before, that is,

$$M/P_1 = k \quad \text{.....(viii)}$$

- Where P_I (the price index) = $\alpha P + (1-\alpha)rP^*$..... (ix)

- Where α is the percentage of expenditure on domestic goods.

- Given unchanged money stock, and the assumption that economic agents aim to maintain a given amount of real money balances, then a devaluation $\uparrow r = \uparrow PI$, means that for real balances to remain constant, economic agents must cut down on absorption.

- Economic agents will attempt to increase their money balances by selling bonds, which pushes down the price of bonds raising the domestic interest rate. The rise in interest rates will reduce investment and consumption, so reducing direct absorption.

- This can however, only happen if authorities do increase money supply to accommodate the increase in money demand.

Effects of devaluation on Direct absorption

2 Income redistribution effect

- The increase in $\mathbf{P_I}$ has a number of effects on income redistribution to the extent that it redistributes income from those with a low marginal propensity to absorb (MPA), to those with a high MPA, this will increase direct absorption, while to the extent the reverse is true, and it will lower direct absorption.

- For example:

a) Fixed income versus variable income earners:

➢ $\uparrow r \rightarrow \uparrow PI \rightarrow$ Fixed income earners loss most likely the poor with high MPA. Hence, income is redistributed to the better off-variable income earners with low MPA, leading to in direct absorption, which imply that the C/A improves.

b) Export and import competing industries and wage earners

➢ Profits for companies increases, while real wages decrease by a rise in P_I following increase in exchange rate (i.e., devaluation). The effect on direct absorption is not clear since firms have lower absorption than workers, but it depends on future profit prospects where firms may increase investments and increase absorption.

Effects of devaluation on Direct absorption

2 Income redistribution effect

c) Income adjustments within groups, companies and workers

- Exporting companies benefit from devaluation.
- Input importing companies incur a loss from devaluation
- Unionizable workers benefits from wages increase.

- The overall effect on direct absorption will depend on whether companies and workers that gain have a higher MPA, than the losers. Overall, it is extremely difficult to say whether the income redistribution effects will raise or lower direct absorption.

Effects of devaluation on Direct absorption

3 Money Illusion Effect

- Even with increased price , consumers may suffer money illusion and buy exactly the same bundle of goods as before even though their spending power has declined. This means they are spending more than before hence an increase in absorption worsens C/A.

- However, money illusion may work in reverse where consumers cut bulk spending (because of price rises) more than the increase in PI, so that direct absorption falls, hence absorption decreases leading to an improved C/A.

- Overall, the money illusion effect is unlikely to be that significant and most probably only, a temporary rather than a permanent factor.

4 Expectations Effect

- Economic agents may regard increased PI due to increased r as likely to spark further price rises. This would lead to an increase in absorption and worsens the C/A. But also inflationary expectations may decrease investments (I) leading to decreased absorption and an improvement in the C/A.

Effects of devaluation on Direct absorption

5 Laursen-Metzler (1950) Effect

- They argue that the deterioration in TOT following devaluation has two effects on absorption; income and substitution effect.
- Deterioration in TOT lowers national income and thereby income related absorption, it also makes domestically produced goods relatively cheaper compared to foreign goods, which implies a substitution effect in favour of increased consumption of domestically produced goods.
- If the positive substitution effect outweighs the negative income effect, **Laursen-Metzler** noted that a devaluation which results in a deterioration of the TOT could actually lead to a rise in absorption (worsen C/A.)
- In summary, the effects of devaluation on direct absorption are ambiguous. We do not know if the MPA is greater or less than 1, if income rises or falls, or if direct absorption rises or falls.

Effects of devaluation on Direct absorption

5 Laursen-Metzler (1950) Effect

- Hence, the effects of devaluation on direct absorption are indeterminate since it has many diverse and often conflicting effects (at different speeds) on the current account. However, the absorption approach has important lessons for policy makers.

- Its central message is that raising domestic income relative to domestic absorption will improve the C/A. In this respect, devaluation is more likely to succeed if it is accompanied by economic policy measures that concentrate on raising income while constraining absorptions.

Monetary Approach to the BOP (MABP) Adjustments

Monetary Approach to the BOP (MABP) Adjustments

- The approach argues that BOPs is essentially a monetary phenomenon. BOP is seen not only a measure of monetary flows, but such flows can only be explained by a disequilibrium in the stock, demand for and supply of money.

- The central message of MABP is that disequilibrium in the BOPs reflects disequilibrium in the money markets and hence BOP adjustments needs to focus on both the supply (SS) of and demand (DD) for money.

Assumptions

1) A stable money demand function
2) A vertical aggregate supply schedule
3) PPP holds

A stable money demand function

- The most basic postulate of the monetary approach to the BoPs is that there is a stable demand for money function that is made up of only a few variables.

- Based on the quantity theory of money, where

$$M^d = kPy \text{ where } k > 0 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

- Where $\boldsymbol{M^d}$ = demand for nominal money balances, $\boldsymbol{P}$ is the domestic price level, y is real domestic income, $\boldsymbol{k}$ is a parameter that measures the sensitivity of money demand to changes in nominal income.

- The equation implies that the demand for money is positively related to real domestic income, such that, a rise in real income will ceteris paribus lead to an increase in the transactions demand for money.

A stable money demand function

- From equation (1), we can deduce that, if we hold the money supply or money demand fixed, and assume (k) to be fixed, an increases in Y requires on equip-proportional fall in prices. This can be graphed as a an aggregate demand schedule as;

Figure 6.2: The aggregate demand schedule (See Notes page 25)

- A fall in the price levels from P1 to P2 given a fixed money supply will create excess real money balances (M/P) and this leads to increased aggregate demand from Y1, to Y2.

- Increased money supply shifts the curve outwards, from AD1 to AD2. This is because at any given price level there is a rise in real money balances which leads to increased aggregate demand.

Vertical aggregate supply schedule

- The model assumes that the labour market is sufficiently flexible that the economy is continuously at the full employment levels of output.

- A rise in the domestic price level does not lead to an increase in domestic output because wages adjust immediately to the higher price level so that there is no advantage for domestic producers to take on more labour.

- This means that the aggregate supply schedule is vertical at the full employment level of output i.e.

Figure 6.3: The aggregate supply schedule **(See Notes page 26)**

- Although the aggregate supply schedule if vertical at the full employment level of output y1, this does not mean that output is always constrained to be fixed at y1; the aggregate supply schedule may shift to the right say to y2 if there is an improvement productivity due to technological progress, which means that full employment is associated with a higher level of real output.

- A shift of the aggregate supply (AS) means an improvement in productivity due to technological progress.

Purchasing power parity (PPP)

- In its simplest form, the PPP theory state than the exchange rate adjusts so as to keep the following equation in equilibrium:

$$r = P/P^f, \qquad i.e. P = rP^f$$

- Figure depict the PPP relationship between the domestic price and the exchange rate

Figure 6.4: The PPP schedule **(See Notes on page 27)**

- Point PPP schedule shows combination of domestic price level and exchange rate which are compatible with PPP given the foreign price.

- It has a slope given by Pf, and implies that a x per cent rise in domestic price level requires an x per cent depreciation (rise) of the home currency to maintain PPP.

- Points to the left of the PPP schedule depict an overvaluation of the domestic currency in relation to PPP, whereas points to the right depict undervaluation.

Purchasing power parity (PPP)

- Based on these assumption, the monetary approach to BoP adjustment model is developed as follows

$$M^s = CBC + R \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

- Where M^s is the domestic monetary base which is assumed to constitute money supply. CBC is the central bank credit reflecting domestic bond holdings of the monetary authority, and R the reserves of foreign currencies valued in the domestic currency.

- Equation (1) says that the monetary base can come into circulation in 2 ways.

1) CBC – Central bank credit – the Central Bank may conduct OMO which is a purchase of treasury bonds held by private agents. This increases the Central Bank monetary liabilities but increases its assets of domestic bond holdings which is the domestic component of the monetary base as represented by D.

2) R – Reserves – The Central Bank may conduct foreign exchange operations (FXO) which is a purchase of foreign currency assets (money or foreign treasury bonds). This increases Central bank's monetary liabilities but increases its assets of foreign currency and bonds.

Purchasing power parity (PPP)

- The difference form of equation (1) becomes

$$dM^s = dCBC + dR \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

- Which can be represented graphically as

Figure 6.5: The money supply and reserves **(See Notes on page 28)**

- At point D_1, No international reserves, but CBC is equivalent to D_1

- An OMO will have the effect of shifting the Ms schedule by the amount of increase in central bank credit (CBC) from D_1 to D_2 (central bank domestic bond holding), which shifts M_s to M_2 and total money supply rises from M_1 to M_2.

- By contrast, an expansion of the money supply due to a purchase of foreign currencies, increases reserves from R_1 to R_2.

- This also has the effect of rising money stock from M_1 to M_2 and is represented by a movement along the money supply schedule from point A to B.

The Monetarist concept of the BoP disequilibrium

- The monetarists view BoP surplus/deficit as monetary flows due to stock disequilibrium in the money market.

- Thus a BoP disequilibrium is merely a reflection of a disequilibrium in the money market.

- BOP consists of the current account balance (CA), the capital account (KA) balance and change in the authorities reserves (R) i.e.

$$BoP = CA + KA + dR = 0$$

$$CA + KA = -dR \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

- Where CA = current account, KA = capital account, dR = change in reserves.

The Monetarist concept of the BoP disequilibrium

- If the recorded dR in the BoP account is positive, this means that the combined current account and capital accounts are in deficit.

- This implies that reserves have fallen as the authorities have purchased the home currency with foreign currency reserves.

- Equation (3) implies that increases in reserves due to purchases of foreign currencies constitute a surplus in the BOPs, while falls in reserves resulting from purchases of the domestic currency represents a deficit in BOPs.

- If the authorities do not intervene in the foreign exchange market, that is the currency is left to float, then reserves do not change and as far as monetary view is concerned the BoPs is in equilibrium.

- Under a floating ex-rate regime a current account deficit must be financed by an equivalent capital inflow so that BOP is in equilibrium.

The Monetarist concept of the BoP disequilibrium

- This model is in equilibrium when aggregate demand (AD) is equal to aggregate supply (AS) so that there is no excess demand for goods, as depicted by (b) below:

Figure 6.6: Equilibrium of the model (See Notes on page 30)

- Also, PPP holds in the foreign exchange market as depleted as depicted by figure (a) (the exchange rate –r- is compatible with PPP at r_1). Finally, the money market is in equilibrium such that M_1 (CBC +R) equals to money demand (Md). The precise position of the money demand schedule is determined by the domestic price level and domestic income level.

- Equilibrium in the money market also implies equilibrium in the BoP.

- We are now in a position to examine the effects of various shocks within the context of the monetary approach to the BoPs

Effects of a Devaluation

- The monetary approach to BoP (MABP) argues that a devaluation can only have an effect on the BoP by influencing the demand for and supply of money. How?

Figure 6.7: The effects of a devaluation (See Notes on page 31)

- Devaluation from r_1 to r_2 has following effect:

  - The immediate effect is to make domestic goods competitive (compared to foreign goods) in relation to PPP at point A. This increase the demand for domestic currency leading to a shift in money demand from Md_1 to Md_2. This means that money demand M_2 exceeds money supply M_1.

  - The competitive advantage of the devaluation means that the BOPs moves into surplus as domestic residents demand less foreign goods/services, while foreigners demand more domestic goods. To prevent the domestic currency appreciating, the authorities have to purchase foreign currency with new domestic money base.

  - This increases the reserves and leads to an expansion of the domestic money supply which in turn raises aggregate demand for domestic goods. The aggregate demand schedule shifts from AD_1 to AD_2 and starts pushing up domestic prices until PPP condition is restored at P_2- as the new equilibrium.

Effects of a Devaluation

- Devaluation from r_1 to r_2 has following effect:

  - In the long-run, the effect of a devaluation is an equal proportional increase in domestic prices, and money stock. The surplus resulting from a devaluation is hence a merely a transitory phenomenon.

  - Noteworthy is the fact that the transitory beneficial effect on the BOP takes place as long as authority do not simultaneously engage in OMO.

  - If authorities immediately increase money stock to M_2 via an OMO, aggregate demand and price will immediately increase so that the competitive advantage conferred by a devaluation is eliminated.

  - In conclusion, devaluation has no lasting changes in BOP.

A monetary exchange rate equation

- Derived in Pilbeam (1992: 116), the exchange rate equation is:

$$r = \frac{M^s / M_s^f}{kY / k^f Y^f}$$

- The equation says exchange rate is defined by the relative supply and demand for the different national money stocks.

- In this context; an increase in the domestic money stock relative to the foreign money stock will lead to a depreciation (rise) of the home currency, while an increase in domestic income relative to foreign income leads to an appreciation (fall) in the exchange rate.

- The reason being that an increase in domestic income leads to an increased transactions demand for the home currency leading to an appreciation.

- With this simple model of exchange rate determination in mind we can proceed to analyse in more detail the effects of money supply, income changes and changes in the foreign price level.

A money supply expansion under fixed exchange rates

- If the exchange rate of a currency is fixed, this means that the authorities have to buy the currency when it is in excess supply and sell it when it is in excess demand in the private market to avoid currency depreciation or appreciation. When the authorities sell the domestic currency this leads to a rise in their reserves of foreign currency. If authorities buy the domestic currency they do so with foreign currency, and so their reserves fall.

Figure 6.8: A monetary expansion under fixed exchange rates (See Notes on page 33)

- An expansionary OMO shifts money supply schedule from M_1^s to M_2^s, with domestic moneys supply increases from M_1 to M_2, and domestic component of the monetary base (CBC) rising from D_1 to D_2.

- Immediate effect, domestic residents have excess real money balances ($M_2 > M_1$); To reduce the excess real balances, aggregate demand increases shift AD_1 to AD_2, puts upward pressure on domestic goods whose prices rise from P_1 to P_2. At P_2 and fixed ex-rate r_1, the economy is uncompetitive in relation to PPP. This moves the BOP to a deficit.

A money supply expansion under fixed exchange rates

- To prevent a devaluation, the Central bank intervenes to purchase the domestic currency, declining the reserve towards R_2, and at the same time aggregate demand start to shift back towards AD_1.

- As excess money balance start to reduce, it puts downward pressure on prices to its original level P_1 to be compatible with PPP. Once money supply returns to M_1 along the M^s_2schedule, the excess supply of money is eliminated and the economy is back to equilibrium.

- In the long run, price level, output and money stock return to their initial level. Thus, an increase in the domestic component of the monetary base from D1 to D2 will, because of the foreign exchange intervention in necessitates to maintain a fixed exchange rate, lead to an equivalent fall in the reserves from R1 to R2.

- The fall in the reserves due to purchase of the home currency leads to a return of the money stock to its original level.

A money supply expansion under fixed exchange rates

- The monetary approach regards the BoPs deficits result from the expansion in the stock of money to be merely a temporary and self-correcting phenomenon. An expansion of the money supply causes a temporary excess supply of money and a combined current and capital account deficit, which to maintain the exchange rate necessitates intervention in the foreign exchange market which eventually eliminates the excess supply of the currency.

- There are two circumstances under which a balance of payments deficit or surplus can become more than a transitory feature.

1) When Central banks practice sterilization of their Foreign exchange operations. When authorities intervene to purchase their currency to prevent it from being devalued there is a reduction of monetary base. The authorities could try to offset these monetary-base implications by conducting further open market purchase of bonds from the public; however, as we have seen such an OMO causes further BoPs deficit, requiring a further foreign exchange intervention. Hence sterilization polices can cause a prolonged BoPs deficit, and the pursuit of such operations will be limited by the extent of a country's reserves.

A money supply expansion under fixed exchange rates

- There are two circumstances under which a balance of payments deficit or surplus can become more than a transitory feature.

2) Another factor that can lead to a continuous deficit would be if the surplus foreign countries are prepared to purchase the deficit country's currency and hold it in their reserve. In such circumstances the deficit country will have its exchange rate fixed by foreign central bank intervention, and such a process can continue so long as foreign central banks are prepared to accumulate the home country's currency in their reserves. Although in this case reserve changes are zero, the deficit is reflected as an increase in liabilities to foreign authorities.

Money supply expansion under floating exchange rates

- In this case the MABP maintains that there is no such thing as a BOP deficit or surplus as authorities do not interview in purchase or sell domestic currency. How?

- Given that change in reserves is zero (.e.,), there is no BoP deficit or surplus, such that CA= -K implying that any C/A deficit must be offset by a net capital inflow of a like amount.

Figure 6.9: A monetary expansion under floating exchange rates **(See Notes on page 35)**

- The graph shows that a increase in money supply (M_s) from M_1 to M_2 leads to excess money balance, aggregate demand shifts from AD_1 to AD_2 with demand Y_2exceeding domestic output Y_1. This excess demand for goods translates into increased expenditure on foreign goods/services leading to a depreciation of the exchange rate.

Money supply expansion under floating exchange rates

- Excess demand for goods raises prices from P_1 to P_2, leads to increased money demand, shift Md_1 to Md_2. Rises in prices increases demand for money, leading to a contraction in aggregate demand along AD_2 until equilibrium price P_2 is restored.

- In the long run, the effect of an x percent increase in the money stock is an x percent depreciation of the exchange rate, and an x percent increase in the domestic price level. The rise in the price level induces a rise in the demand for money so that the excess money balances created by the OMO are eliminated.

- One of the arguments against fixed exchange rates is that the authorities can no longer conduct independent monetary policies, while with floating exchange rates they are free to expand and contract money supply to their desired levels.

Effect of an increase in income under fixed exchange rate

Figure 6.10: An increase in income under fixed exchange rates (See Notes on page 37)

- An increase in real domestic income shifts aggregate supply curve from AS_1 to AS_2. Demand for money increases from Md_1 to Md_2, money demand at Md_2 is greater than money supply at M_1, implying a fall in expenditure that leads to a fall in prices from P_1 to P_2.

- With a fixed ex-rate at r_1, the country become competitive, Current account (C/A) and capital account (K a/c) more to surplus, to prevent appreciation, the central bank purchase the foreign currency.

- With newly created money base, reserves increases to R_2 as well as domestic money supply, which shifts the AD_1 to AD_2 leads to an increase in price level to P_1 (PPP). Once the money stock reaches M_2, excess money balances are eliminated and equilibrium is restored at P_1, but with higher money stock M_2 because of transitory BOP surplus, and an increased domestic income.

Effects of an increase in income under floating ex-rate

Figure 6.11: An increase in income under floating exchange rates (See Notes on page 38)

- Increasing income (Y) means a shifts of the aggregate supply curve AS_1, to AS_2, this leads to an increase in transaction demand for money and implies an excess supply of goods ($Y_2 > Y_1$) at the existing price level P_1. There is down ward pressure for price to fall from P_1 to P2, as price falls, the exchange rate appreciates to maintain PPP. A new equilibrium is obtained at a lower domestic price P_2 and an appreciated exchange rate r_2.

- The money demand schedule did not shift because while the fall in prices leads to less money demand, this is exactly offset by the rise in money demand due to the increase in real income.

- Under fixed exchange rates with an increase domestic income, eventual adjustment was obtained via an increase in the domestic money supply and reserves so as to satisfy the increased money demand. While under a floating exchange rate equilibrium is obtained by an appreciation of the exchange rate and fall in the domestic price level (to maintain PPP) with the domestic money supply unchanged.

An increase in foreign prices under fixed exchange rate

Figure 6.12: An increase in foreign prices under fixed exchange rates (See Notes on page 39)

- An increase in foreign prices tilts the PPP upward to PPP_2. This is because at r_1, increase in foreign prices means at P_1, the domestic economy is now more competitive than PPP. Accordingly, to maintain PPP at r_1 requires a rise in the domestic price level to say P_2

- The increase in foreign prices means that domestic goods are more competitive, leading to a fall in the demand for foreign goods, leads to a BOP surplus and increased demand for domestic currency, Md_1 shifts to Md_2.

- To prevent an appreciation of the currency the authorities have to purchase foreign currencies with newly created domestic monetary base. The reserves rise from R_1 to R_2 and money supply rises from M_1 to M_2.

An increase in foreign prices under fixed exchange rate

- The increased money supply and undervaluation of the domestic currency in relation to PPP leads to a shift in aggregate demand to AD_2, which pushes up domestic prices to P_2, where PPP is restored, and BoP surplus ceases.

- Note: Fixing the exchange rate means that increases in domestic price level are determined by changes in world prices and hence risk of imported inflation.

- If foreign inflation is determined by changes in foreign money surplus, MABP suggest that if a country fix the exchange rate, it must change its money supply in line with changes in the foreign money supply. Hence fixing exchange is like giving up monetary autonomy.

An increase in foreign prices level under floating exchange rate

- The rise in foreign price level leads to a tilt of the PPP to PPP_2. With the floating exchange rate the competitive advantage of the domestic economy is offset by an appreciation of exchange rate from r_1 to r_2 to maintain PPP at the existing domestic price level P1.

Figure 6.13: An increase in foreign price level with floating exchange rates **(See Notes on page 40)**

- Hence with a floating exchange rate, the domestic price level and aggregate demand and output are unaffected by the foreign price shock.

- The authorities are able to operate an independent monetary policy avoiding imported inflation under flexible / floating ex-rate regime.

- The ex-rate adjusts to offset an inflation differential and maintain PPP.

The Implications of MABP

1) Under fixed exchange rate regime authorities lose control over their domestic monetary policy as the price of fixing exchange rate. Authorities lose the ability in pursue on independent monetary policy. Under floating, monetary expansion leads to currency depreciation. Reckless monetary expansion can lead to BOP problems under fixed or a currency problem under floating.

2) It is irrelevant whether the change in money supply results from an OMO or FXO. Both bring dis-equilibrium in the money market. Under fixed ex-rate, an increase in domestic monetary base whether arising from OMO or FXO, causes an excess of real money balances, and leads to a BOP deficit, requiring authorities to intervene to support the currency. Reserves declines until money supply is brought back to its original level and equilibrium restored.

3) The contrast between fixed and floating ex-rate regime is pronounced. Under fixed ex-rate monetary policy is endogenously determined by the need to peg the ex-rate, while floating regime, the domestic economy can exogenously determine its money supply because it is the ex-rate not monetary changes that restore equilibrium.

Empirical evidence and criticisms on MABP

- Under MABP, empirical evidence concentrates in measuring the "offset coefficient'. This measures the extent to which an increase in the domestic component of the monetary base leads to a fall in reserves of a like amount in a fixed exchange trade regime. They therefore require the offset coefficient to be equal to **-1**.

- The empirical evidence remains mixed. The main criticisms on MABP include the following:

1. The different estimation techniques applied tend to yield different results leading to lack of consensus in the empirical literature.

2. The empirical literature remains controversial as to whether or not account for sterilization.

3. Most of the assumptions applied by MABP such as exogeneity of the price level, real output and interest rates are most unlikely to be fulfilled in the real world. The MABP provides insight into the short-run equilibrium but uses assumptions that are valid in long-run i.e. assumption of full employment, purchasing power parity and a stable money demand function are highly questionable in the short run.

Empirical evidence and criticisms on MABP

- The main criticisms on MABP include the following:

4 The different estimation techniques applied tend to yield different results leading to lack of consensus in the empirical literature.

5 Another criticism of MABP is that no attention is paid to the composition of the deficit or surplus in BOP. Monetarist argue that there is no policy concern if the two (current account and the capital account) balances offset each other. This ignores the dangers of increasing indebtedness, due to current a/c deficits being financed by capital inflows i.e. The third world debt crisis.

6 In the presence of unemployment, an expansionary monetary policy may lead to some increase in output (reflected in a positively – sloping aggregate, supply function), which by raising demand will reduce the devaluation pressures on home currency. In such a case, reserves will not need to fall in exact proportion to the initial rise in money supply as some of the expansion would be willingly held as transaction balances.

The Specie Flow Mechanism

- The classical Humean *Price-Sepcie-Flow Mechanism* theory can be summed up as follows: under the gold standard (hence with fixed exchange rates) a surplus in the BoPs causes an inflow of gold into a country, that is to say – as there is a strict connection between gold reserves and the amount of money – it causes an increase in prices (the quantity theory of money is assumed to be valid).

- This increase tends on the one hand to reduce exports, as goods of the country in question become relatively more expensive on the international market, and on the other hand, it stimulates imports, as foreign goods become relatively cheaper. There is thus a gradual reduction in the BoPs surplus.

- An equivalent explanation is used to explain the adjustment in the case of a deficit: there is an outflow of gold which causes a reduction in the stock of money and a reduction in domestic prices, with a consequent equilibrium stimulation of exports and a reduction of imports, which thus lead to a gradual elimination of the deficit itself.

Thank You

Matendwa

Siyabonga

Kea leboga

Zikomo

Muito Obrigado

Merci Beaucoup

Asante Sana!

Xie-Xie