PART FOUR

Part Four now returns the analysis temporarily back to the macroeconomic issues of development but will now focus more explicitly (than did Part Two) on the critical macroeconomic balances and the manner in which these can impinge on the prospects for a country's successful growth and development over time. Readers are provided below with a basic review of the key macroeconomic accounting relationships. These will then be used in an introductory manner to identify the big macroeconomic problems that all developing and transition countries need to manage. The underlying objective of the analysis expounded here is to demonstrate the difficulties of certain aspects of *macroeconomic management* in a typical developing or transition economy.

It should be noted at the outset that the basic economic principles and problems with which policymakers in developing and transition countries need to deal do *not* differ markedly from the principles and problems that apply in developed economies. However, the environments for the application of sound macroeconomic policies are frequently much more difficult and demanding and the conditions for success are less likely to be met. Effective macroeconomic policy often needs to be a compromise between the textbook ideal and the political and other pressures which impinge on the policy decision. The big institutional issues addressed in Part Three above also play a critical role here.

The various chapters of Part IV will explain and also illustrate this tension between theory and practice using practical examples based on recent real world experience of macro difficulties and the adjustments thereto. The topics include:

- public expenditure management
- monetary management
- debt management
- the role of the nominal and real exchange rate and
- the management and control of inflation.

It will explain the evolving international consensus about "good" policy that we have seen in the past thirty years (e.g. the emergence and then the subsequent dilution of the so-called Washington Consensus). Specific country examples in this and later chapters will used to show how frequently things can go wrong in developing and transition countries. Some references will also be made back to the differing economic performance of various regions of the World as introduced in the graphical analysis of experience from the 1950s as presented in Part I of the book.

Part Four comprises FIVE chapters which have the following content and objectives

- *Chapter 15* introduces the key macro relationships and then use these to illustrate some of the important balances that need to be considered by policy-makers including the savings balance, the external balance, the domestic and external financing gaps etc. Some of the policy issues that derive from this will then be introduced and the literature briefly reviewed prior to the more in-depth analysis of the literature in the subsequent chapters.
- *Chapter 16* will put the telephoto lens first on *Domestic Economic Management.* It will review the basic economics of monetary and fiscal management and the crucial

importance of macroeconomic (including inflation stability). This will include a short review of the literature about the negative impact of inflation on the poor. It will then assess the particular problems of these economic management tasks in low-income countries with, for example, very restricted sets of financial markets and instruments. It will explain the IMF monetary programming approach to economic stabilisation and its main critics – is there any real alternative? Next it will consider elaborations on the theme that there is great ambiguity concerning the "fiscal deficit" as a policy target. This will include analysis of quasi fiscal payments via the banking sector leading to fragile banks; hidden quasi-fiscal transfers associated with distortionary trade policies (e.g. dual exchange rates); the hidden fiscal implications of loss-making parastatal agencies and the pernicious impact of barter transactions and non-transparent valuations of key goods and services as exemplified in extremis by countries of the Former Soviet Union. Finally the chapter will analyse domestic debt – its importance and techniques for its effective management in a low income economy.

- *Chapter 17* will move the telephoto lens on to the topic of International *Indebtedness and the Balance of Payments*. It will explain the basic economics of the balance of payments and balance of payments adjustment. It will then explain the different categories of external debt and the evolution of their relative importance over the past 40 years: e.g. the gradual shift from high post-War dependence on official international transfers to far more dependence on private market-based transfers today. This will be followed by discussion of the key economics associated with sound debt management and an explanation of the trade-offs which countries face in maintaining sound debt dynamics and how this has been differently managed over time (e.g. Latin America versus south Korea in the 1980s.) This will include some of the economics of financial/debt strategies for particular countries including the approaches now available to developing countries to mitigate/hedge some of the external risks which they inevitable face: why choosing the "right" borrowing instruments can lessen the potential risks of debt problems in the future. The newer country debt sustainability assessments of the IMF/World Bank will be explained and used as examples. The chapter will explain why some poor countries may need debt relief and provide a factual explanation and analysis of various debt relief initiatives such as HIPC and review the criticisms of these. It will next examine exchange-rate regimes: the pros and cons of various types of fixed and flexible exchange rates and the actually revealed choices of developing countries in this arena of policy in the recent past. Selected case studies illustrating the issues/problems associated with this.

- *Chapter 18* will extend the international aspects of the discussion with a dedicated review of the *Macro and Financial Crises* that have afflicted some developing and transition countries. It will focus on the basic pathology of crisis but use detailed discussion of important and relatively recent examples (Mexico, 1994, East Asia 1996/97, Russia 1998, Argentina 2001 to bring out important common lessons. Contrasts with the major financial and banking crisis in the Western wofrld from 2007 onwards will also be brought out.

- *Chapter 19* will complete the macro analysis by linking it to one of the key structural policy questions facing developing countries namely *International Trade.* The Chapter will review briefly the basic economics of comparative advantage and the various theoretical caveats which may argue against free trade: e.g. the arguments pertaining to declining agricultural terms of trade and to dependency/unfair trade, and increasing returns to scale. It will then provide a selective overview of how different developing countries have organised their trade policies starting with the Indian/African autonomy

models of the early post-colonial years and what the outcomes from these seem to have been. e.g. selective intervention but without an obvious anti-export bias in the case of East Asia, persistent inward orientation in the case of Africa and to a lower degree India. This will include a careful analysis of the unintended consequences of highly restrictive trade policies on exports, poverty, agriculture. The Chapter will next discuss the origins/outcomes of the post-1980 zeal for trade liberalisation and its incorporation in Structural Adjustment Programs and ESAFs in many low-income countries. Was this move well conceived? Has it been successful? If not what pre-conditions for success were overlooked. How did the poverty characteristics as defined elsewhere in the book get impacted? Finally it will address the Issues of “fair” and “unfair” trade and the impact of developing country trade expansion in the past 40 years on rich countries It will end with a factual explanation and some analysis of the key issues included in the recently aborted Doha Round of WTO trade negotiations.

Chapter 15: Macroeconomics – The Basic Relationships

15.1 Introduction

In Chapter 3 of Part One of this book, we looked for a broad-based measure of "development" recognising the ambiguity of that concept. We there introduced a concept that is narrow in its scope but that can reasonably be measured for *all* countries. This is GDP or GDP per capita. We also noted that this is a macroeconomic aggregate that is employed in a large proportion of the economic development literature whenever some metric of progress towards development is called for. It has two main manifestations.

- *GDP in total* is a measure of the total productive power of a country. It is an aggregate measure of an economy's *total production of all goods and services*. But because the "value-added" concept of production is the one used to compute GDP, the total GDP is easily decomposed into the main components of income (wages, profits, rent). Hence total GDP also indicates the *total income* of an economy. This dual interpretation of the aggregate is one of its great analytical strengths.

- More useful for some analytical purposes is *GDP per person* (or *per capita* to use the Latin – the practice from hereon). This is a measure of the situation of the *average* person in the economy and is computed merely by dividing total GDP by population. It is an explicitly *individual-based* measure of development although the individual in question is the average person in a country. This is a major problem given that there is often chronic inequality within the low and low-middle income countries that are our greatest concern! Subject to that limitation, GDP per capita measures both the production generated by the average person and also the income accruing to that person

We also explored in Chapter Three some of the basis strengths and weaknesses of the GDP concept as a measure of development and briefly examined some of the ways in which the GDP aggregate can be disaggregated to throw light on various dimensions of a country's economic performance. In this present Chapter we carry that process of disaggregation quite a lot further.

15.2 Disaggregating GDP

The brief analysis in Chapter Three taught us that the economist's trick that makes the aggregation of literally hundreds of thousands of different productive activities into a single number (GDP) is the use of *money* as a common unit of measurement. Without it we would need to add tonnes of rice, numbers of cars, hours of doctor's care etc. to achieve a measure of the total national production of any economy.

But the trick in question only works so long as everything has a "price" that is defined without too much ambiguity. It works well for all goods and services produced in an economy that are sold to individuals who thereby signal *directly* the utility that they derive from the purchases. But in reality in all modern economies – rich as well as poor - a significant part of output is provided by the *public sector* (the government) as various types of public service and often free of charge services (public roads, education, police services, many medical services etc). The exact amount of "free" public provision of goods and services will vary from country to country but is typically in the range of 35-50% of total production. For this part of national

output, an alternative valuation convention has *force majeure* to be employed to compute the GDP aggregate. This alternative is that the value or utility conferred by public goods and services is indicated by the amount that they *cost to produce*.

Again money is a unifying concept that enable us to add up disparate types of service (e.g. education and roads) but now the value used is a cost-based one rather than one based on the selling price.

Production

Using this we can write as a matter of accounting definition – no economic assumptions are involved that:

$$GDP(Y) \equiv \Pr_{agriculture} + \Pr_{oil,\ gas,\ etc} + \Pr_{industry} + \Pr_{services.....} .....[15.1]$$

Where "Pr" stands for production. The sectors of agriculture, oil and gas etc. are used merely to represent the full range of goods and services that a country produces. The actual sectors that are specified in any particular country case and the detail chosen will depend on the use that is likely to be made of the disaggregated information.

What equation 15.1 does is merely add up all the production of an economy remembering that it is the ***value-added*** concept of production (and not ***gross*** output) that must be used here to avoid double the counting of the production of sector x that is used as in input into sector y (e.g. tyre production in car production).

Table 15.1(a) below provides an example of what this particular disaggregation of GDP would look like for any one country – we have chosen Uganda but exactly similar data can be obtained easily for almost every other country in the world – See Box 15.1. Table 15.(b) shows the same data for a slightly richer country namely Egypt in order to illustrate the differences in production patterns that higher incomes often bring with them

Table 15.1(a): Uganda ; GDP by Production Sector, 2004 to 2008 (% of total)[1]

	2004	2005	2006	2007	2008
Agriculture,forestry, fishing (ISIC A-B)	24.6	25.5	24.0	22.1	23.9
Mining, Manufacturing, Utilities (ISIC C-E)	11.4	11.5	11.8	12.6	12.0
of which Manufacturing (ISIC D)	7.4	7.3	7.4	7.5	7.4
Construction (ISIC F)	12.7	12.8	11.9	12.7	12.5
Wholesale, retail trade, restaurants and hotels (ISIC G-H	17.8	17.8	18.8	19.5	18.7
Transport, storage and communication (ISIC I)	5.5	5.5	6.4	6.7	6.2
Other Activities (ISIC J-P)	28.0	26.8	27.1	26.4	26.7
TOTAL	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

[1] Note that the "Other" activities listed in the table can include a significant contribution from Education, Health and other Social services as a SOURCE of incomes

Box 15.1 The UN National Accounts Database

Readers who wish to produce this or a more detailed table for any other country can easily do so. Simply use the internet to go to: http://unstats.un.org/unsd and then select from the home page "economic statistics" followed by "national accounts" followed by "National Accounts Main Aggregates Database". Data such as those shown in Table 15.1 and in the subsequent tables in this present chapter can then be created by selecting the tab headed data selection and choosing countries, years and the particulate tabulations that you seek.

Table 15.1 (b) Egypt ; GDP by Production Sector, 2004 to 2008 (% of total)

	2005	2006	2007	2008
Agriculture, forestry, fishing (ISIC A-B)	14.9	14.6	14.7	14.7
Mining, Manufacturing, Utilities (ISIC C-E)	30.8	32.3	31.4	31.5
Construction (ISIC F)	3.8	3.8	3.8	3.8
Wholesale, retail trade, restaurants and ho	13.4	13.4	13.5	13.4
Transport, storage and communication (ISI	10.2	9.2	9.4	9.6
Other Activities (ISIC J-P)	26.9	26.6	27.2	26.9
TOTAL GDP	**100.0**	**100.0**	**100.0**	**100.0**

Note the much lower shares of agricultural production in Egypt as compared to Uganda and also the significantly higher ratio of industrial activities (manufacturing and mining) in the richer of the two countries.

Expenditures - Uses of GDP

Now visualise the total production (GDP) of, say Uganda as a physical pile of goods and services. To what uses was that pile put in, for example, Uganda in 2008? The answer for Uganda (and all other countries) is again a matter of an accounting identity as shown in general in Equation 15.2. In general the whole of that pile of goods and services must *by definition* have either been consumed (by ordinary households or government); invested for the future (including the accumulation of inventories) or exported

$$GDP(Y) \equiv \text{Consumption Private } (C_{pr}) + \text{Consumption Govt.}(Cg) + \text{Investment } (I) + \text{Exports } (X) \text{ net of Imports } (M) \ldots\ldots\ldots\ldots\ldots\ldots [15.2]$$

Again a real practical example from Uganda can help to make sense of this – see Table 15.2 and also Figure 15.1

Table 15.2: Uses of Total GDP - 2004 to 2008 (% of total)

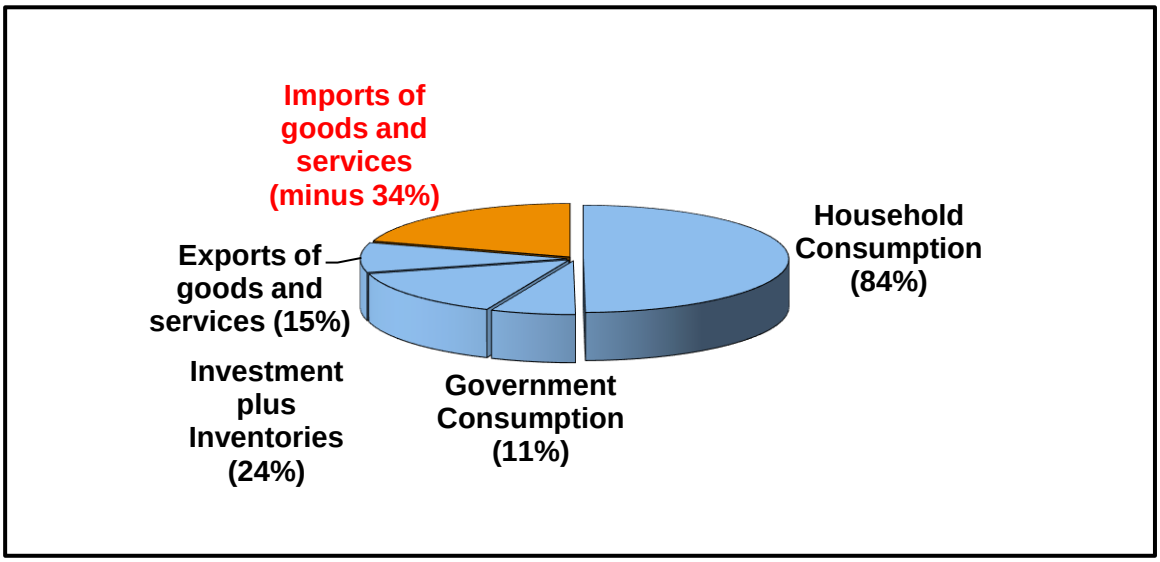
	2004	2005	2006	2007	2008
Final consumption expenditure	89.1	88.5	93.4	92.3	94.7
of which Household Consumption	*74.6*	*74.9*	*80.0*	*80.4*	*83.6*
of which Government Consumption	*14.5*	*13.7*	*13.4*	*11.9*	*11.1*
Investment plus Inventories (incl Govt Inv.)	21.7	21.6	20.7	22.6	24.1
Exports of goods and services	13.4	15.2	14.9	16.1	15.0
Imports of goods and services	24.2	25.3	29.0	31.1	33.9
TOTALS	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notice here what a high percentage of its total annual production a poor country such as Uganda needs to commit to ***consumption*** (Ugandan households using 83.6% of the total GDP in 2008 for this purpose and the government using

a further 11.1%). But notice also that Uganda also manages to ***invest*** a quite high proportion (24.1%) of its 2008 GDP for the future and to also ***export*** 15.1%.

A practical problem arises because when the statisticians measure, for example, "consumption" the figures reported to them will include consumption not only of home produced Ugandan goods and services but also those goods and services that are imported. The same is true of their measurement of the other demand components such as investment. In order to ensure the correct adding up to the total of production (GDP) it is therefore necessary to subtract all imports at some point in their calculation of GDP[2]. This is done both in Table 15.2 where the import entry is a negative and also in Figure 15.1

Figure 15.1 How Uganda used its GDP in 2008



GDP as Income

The final disaggregation of GDP relies on noting as we did also in Chapter 3 that all *production* must also (again as a matter of accounting definition) also be *income* in the hands of someone. The third equation that defines this more formally is Equation 15.3 below.

$$GDP(Y)\,(\text{at factor cost}) \equiv \text{Wages}\,(W) + \text{Salaries}\,(SA) + \text{Rents}\,(R) + \text{Interest}\,(Int) + \text{Operating Surpluses}\,(OS) \quad \text{.....[15.3]}$$

This equation slightly over-simplifies the real situation. In particular if some part of GDP is produced under foreign ownership (e.g. a foreign oil company such as Petrobras or BP produces the local (Ugandan) oil), then some part of the profits, dividends as well as the interest is likely to be paid abroad and so produce "income" for foreigners. To take account of this type of situation a revised version of GDP namely Gross National Income (GNI) can be computed as the difference between GDP and these property incomes paid abroad – let us refer to these incomes collectively as *Yf.* (Note that GNI will be less than GDP in Ugandan-type cases but can exceed GDP for those countries such as the UK and the USA that own significant productive assets abroad).

[2] This reduction could be applied to every item of expenditure separately or made as one large adjustment to all the items together as in our own examples.

Furthermore, many countries and especially lower-income countries benefit from the receipt of current transfers from abroad some of which may be to government (.g. foreign aid grants) and some part of which may be to private households (e.g. remittances paid by migrant workers working in foreign countries). The additional of these grants creates a further aggregate figure for income known as Gross National Disposable Income (GNDI).

So $$GNDI = GNI + TRf \text{.....} [15.4]$$

Where *TRf* in Equation 15.4 stands for current transfers from abroad.

15.3 The Three Main Macroeconomic Balances

The three definitional equations so far derived from our discussion are all accounting identities – they are true by definition. So too are the two further expressions which define respectively (i) a country's savings: investment balance and (ii) its external balance of payments position. These two balances are of critical importance to the macro debate since they both constrain a country in terms of what it can and cannot do as regards macroeconomic targets and policies.

The Savings Balance

The savings: investment balance is derived from Equation 15.2 by first defining a country's savings (S) as the difference between its income (GDP and its current consumption (households plus government) as follows:

$$S \equiv GDP(Y) - C_{pr} - C_g \text{.....} [15.5]$$

Using this together with Equation [15.2] we see that S can also be defined as follows:

$$S \equiv I + (X - M) \text{.....} [15.6]$$

Equation [15.6] tells us that the INVESTMENT that the economy undertakes must be identically equal to the SAVINGS of that economy plus any excess of IMPORTS over EXPORTS – this excess where it exists must in turn be financed – perhaps by foreign aid or foreign borrowing. It also reminds us that a current account deficit in real resource terms is providing foreign savings (the goods and services that the foreigners are not themselves using) for use in our domestic economy.

In Uganda's cases as shown in Table 15.2 above the large deficit of exports relative to imports means that the country (in that year) has to borrow, obtain foreign aid or run down its foreign reserves by an amount equal to the difference.

In common with many low income counties Uganda in fact has had to contemplate an export deficit for much of its post-Independence history and to find foreign financing to pay for that

If we reverse the logic, we can equally well say that any country wishing to achieve an export surplus (over imports) must save more than it invests. From Equation 15.6 it follows that:

$$S - I \equiv (X - M) \text{.....} [15.7]$$

The External Balance

The simplest definition of a country's balance of payments deficit (or surplus) on ***current account*** is also derived from Equation 15.2 as

$$GDP(Y) - C_{pr} - G_g - I \equiv X - M \equiv \text{ Current A/C Balance of Payments surplus (or CAB)} \ldots\ldots [15.8]$$

Note that the size of this deficit (or surplus) depends on how much the country spends on consumption plus investment relative to its total available production (GDP). Lavish (relative to income) levels of consumption or overly ambitious investment programmes designed to speed up economic growth can both result in a large external payments deficit.

The current deficit implies absolutely no moral or other judgements about the spending that leads to it. Poor economies are likely to consume a large proportion of their total GDP and *need* to invest a large proportion in order to boost incomes and growth.

Using the amended version of GDP (namely GNDI) described above, a more complete definition of the Current A/C Balance of Payments is obtained by taking full and proper account of the additional foreign transactions associated with foreign ownership of domestic assets and foreign transfers. Specifically, with those two amendments added, we have:

$$CAB \equiv (X - M) + TR_f - Y_f \ldots\ldots [15.8]$$

Where *TRf* = the current (unrequited) transfers to the economy in the form of foreign aid grants and migrant remittances, and *Yf* = the net property income paid abroad (interest, dividends and profits).

Box 15.2 Balance of Payments Statistics

For many years the standards concepts and definitions of the Balance of Payments have been articulated and progressively refined by the IMF. Most countries in the world now provide their BoP data in the IMF format. Details of the methods used can be found in IMF, *Balance of Payments Manual*. 5th Edition, Washington DC, 1993 and the data themselves can be found in the annual IMF publication, *Balance of Payments Statistics*. These are provided electronically on-line but there is at present a subscription charge to access them.

Having defined these two basic macroeconomic balances it is useful to examine a simple numerical example to confirm the algebra of the main equations. This is done using the same Ugandan example as we explored earlier in Table 15.3 below.

Table 15.3 Uganda: Savings and Balance of Payments balances

TOTALGDP	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
minus Household Consumption	74.6	74.9	80.0	80.4	83.6
minus Government Consumption	14.5	13.7	13.4	11.9	11.1
Equals					
Total SAVINGS (Households plus Government)	**10.9**	**11.5**	**6.6**	**7.7**	**5.2**
Note also that:					
Exports less Imports (i.e the CAB)	-10.8	-10.1	-14.1	-15.0	-18.8
plus Investment	21.7	21.6	20.7	22.6	24.1
also equals Total Savings	**10.9**	**11.5**	**6.6**	**7.7**	**5.2**

The data confirm that The data confirm that Ugandan domestic savings falls short of the amount needed to cover the level of investment. However, the large external current account deficit provides the real resources to cover that shortfall. The issues of how the CAB deficit can be financed is dealt with later.

The Government Fiscal Balance

A third macroeconomic balance is equally important in understanding the range of issues which macro analysis and policy has to address. This is the fiscal balance which has come into frightening prominence since the global financial crisis of 2007-2008 because of the ever-larger fiscal deficits seen in most of the major European economies including the UK, France, Italy and Spain. Since 2008 fiscal consolidation has become the number one macroeconomic priority in these and many other advanced economies including the USA.

In order to derive this third macro balance we proceed by (i) subtracting taxes paid from both sides of Equation 15.2 and (ii) removing the government part of investment from "I" and adding it to government consumption (C_g) to obtain:

$$Y - T \equiv C_{pr} + I + (G - T) + X - M \text{.....} [15.10]$$

Where "*G"* is now the total of government consumption spending and its investment spending

The term in brackets now provides a definition of the government's primary budget deficit and "I" is now to be interpreted as ***private*** investment alone.

Then by subtracting private consumption from both sides of Equation 15.10 and re-arranging we derive:

$$Sp - I \equiv (G - T) + (X - M) \text{ … … …..} [15.11]$$

or $$(Sp - I) \; + \; (T - G) \equiv X - M \text{ … … …} [15.12]$$

This final equation basically splits the savings: investment balance of the ***private*** sector (LH side) from the savings: investment balance of the ***government*** (first term on the RH side)[3].

One new and very important proposition is revealed by Equation 15.12. This is that there is a strong and unavoidable connection between the three main balances that have been elaborated in this sub-section of the Chapter. For example any savings surplus of the ***private***

[3] Remembering that the term Cg now includes government investment as well as consumption and that "T" is effectively the income of the government.

sector will lead to a surplus on the ***current account of the balance of payments*** IF the government fiscal balance is indeed balanced. If in the more common case – certainly in most poorer economies and in Europe after the 2007-2008 global crisis – when the fiscal account is in deficit, then any savings surplus in the private sector partly finances that deficit and partly finances the current external position. Similarly, a deficit in the external balance can be a source of financing of deficits of savings relative to investment in either the private or the public sectors of both.

Since any deficit (anywhere) needs to be financed somehow, these connections also enable us to link the national income accounts that we have so far been discussing to the financial accounts of the economy. This can be seen in the simple three sector flow of funds table that is presented in Figure 15.4 below. This is a general statement of relationships – it applies in all countries. However, to make the connection with our earlier discussion the first row is filled in with some actual numbers for Uganda for 2008.

We will make more of the relationships summarised in this flow of funds structure as we proceed through the rest of Part Four.

Figure 15.4: A Simple Flow of Funds Matrix

%ages of GDP	1. Private Sector	2. Government	3. Foreign	TOTALS
	(firms and people)	(including state firms)	(govt, firms, people)	
1. Goods and Services	16.7% (net use of funds)	2.1 % (net use of funds incl grants)	18.8% (source of funds)	Zero
	matched by:	*financed by:*	*financed by:*	
2. Non-Monetary Assets	Remittances - Purchase of Financial Assets by Private Sector	Borrowing via Bonds etc. issued by Government	Grants and Loans	**Zero**
	and	*and*	*and*	
3. Monetary Assets	Change in Money Balances held by Private Sector	Borrowing via Money Creation by Government	Foreign Reserves	**Zero**
TOTALS	**Zero**	**Zero**	**Zero**	

Notice that row 1, column 3 of the matrix repeats the current external balance in Uganda of minus 18.8% of GDP in 2008 as shown in Table 15.2 above. However, row.1 - is now subdivided as between the contribution to that deficit coming from the private sector (col 1 = 16.7% of GDP) and the government sector (col 2 = 2.1% of GDP). These contributions are as defined in Equation 15.12. So row 1 of Table 15.4 merely repeats the links between the savings: investment balance of an economy and its current account balance of payments.

Then by reading down the columns and examining the other entries underneath each of these ***national accounts*** numbers we can see how conceptually at least the various deficits/surpluses may be financed/used. The ***financial*** entries in rows 2 and 3 of the matrix also provide a complete accounting of the various possibilities. Hence each of the columns is itself an accounting identity which must sum to zero.

To illustrate this for the final column of the matrix we can see that the three elements (reading down the column) represented the three main components of the country's Balance of Payments, namely:

1. The Current Account

2. The Capital Account (Non-Monetary Assets)

3. The Monetary Assets or Reserves Account

These three components together must sum to zero since the financing involved in row 2 plus row 3 will always equal the deficit if there is one in the current account. Equally if there is a surplus in the current account then the elements of rows 2 3 will show the country building up a higher net asset position against other countries. That asset position in turn may either be in monetary form (i.e. foreign exchange reserves as in the row 3 component) or in the form of some other financial assets (as in the row 2 component).

Similarly we can see by reading along from the final row of Figure 15.4 that if the private sector chooses to hold any savings surplus in monetary form (or inversely, chooses to finance any savings deficit by borrowing from the country's monetary system) then that decision needs to be matched by some combination of the monetary borrowing by the government sector and the country's change in foreign reserves. This relationship is examined more fully and explained algebraically in Section 15.5 below.

Since exactly analogous identity relationships apply in respect of the other columns and rows of Table 15.3, that table provides a clear statement of the relationships between the monetary situation of a country and its external position as defined in the standard national accounts equations. We will make extensive use of these relationships in discussing monetary and exchange rates policies in later chapters.

A Digression on Global External Balances

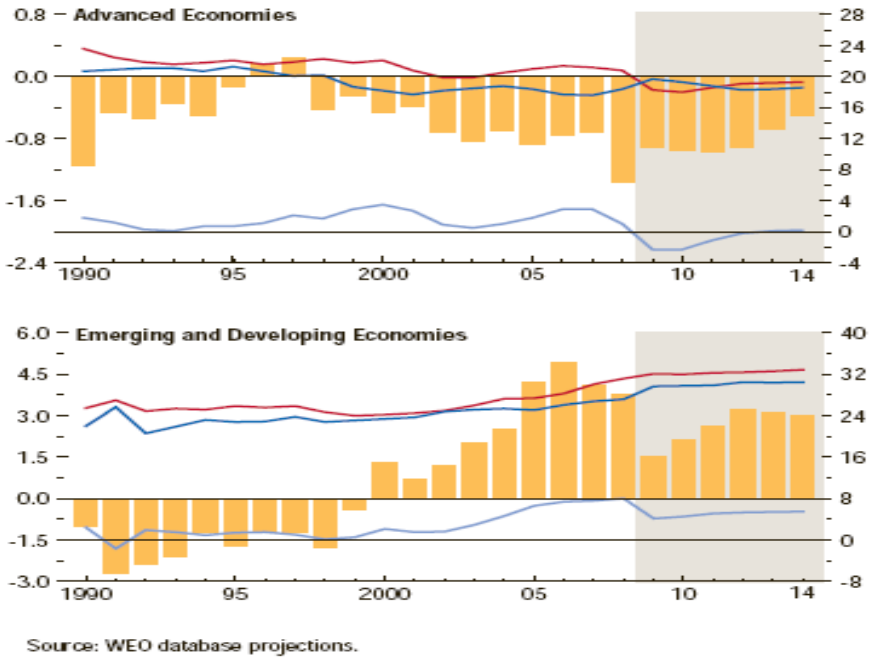
While the relationship between current account external balances and savings & investment balances are fresh in our minds, let us examine briefly the overall global position. In the past decade (but longer in the case of the USA) there has been a strange reversal in what might formerly have been thought of as the *status quo*. This would have involved significant external surpluses in richer countries and large deficits in poorer economies. This in turn would have necessitated (through the logic of our accounting identities) in richer countries transferring significant capital funds to poorer countries and poorer countries borrowing such funds or receiving them in the form of grants.

Since the turn of the millennium developing countries as a whole led by some incredibly successful export countries amongst the emerging market economies such China, Taiwan and South Korea, have collectively reversed the former status quo. Specifically they have established large current account external surpluses and have been able to use these surpluses to lend billions of dollars through various channels to many of the world's richer countries. As a result (and as shown in the IMF Figure reproduced as Figure 15.5 below), from about the year 2000 onwards a new pattern of global external balances and relationships has been established in which richer countries (taken together) are net recipients of funds from developing and emerging market economies and some emerging economies are building up very large claims on the more advanced economies.

From some points of view this pattern of global balances is perceived to be unhealthy and unsustainable and recent policies have reflected attempts to reverse the tendencies shown in Figure 15.5. This has involved some pressures (both economic and political) for various degrees of deflation in the advanced economies and for some on-going expansion moderated by a degree of exchange rate realignment in the more successful of the emerging market economies. To a degree the combination of these pressures is beginning to re-balance the global situation although it remains very unclear how far and how fast this can realistically go

without exacerbating the already recessionary situation in large parts of the developed world (at least as of 2012).

Figure 15.5 Global Current Accounts, Investment and Savings (% of World GDP) Source: IMF World Economic Outlook, April 2009



Source: WEO database projections.

15.4 Introducing the Price Level and Price Level Changes

The next basic relationship to be introduced in this chapter is between the national accounts data relating to GDP and its components and the price level in the economy.

All the GDP calculations and components so far discussed make use of prices to enable us to value and then add together the many disparate items of total production. But we always have a choice of either using (i) current prices (today's prices) or (ii) the constant prices of some previous year. The comparisons over time for Uganda and Egypt shown earlier in fact are based on constant prices. This enables us to compare one year's GDP (and its component parts) with those of other years and so see the growth in real terms without this comparison being confused by any changes in prices that may happen from one year to another.

However, price changes – either of individual goods and services or of the composite of all goods and services – are a crucial part of macroeconomic change over time. Indeed a high rate on change of the composite index of all prices (price inflation) is a very important element of macroeconomic instability. It is a cornerstone of macroeconomic policy to avoid or mitigate such instability. So it is crucial to see how changes in that price level come about and also how they fit in with our earlier discussion about GDP in constant price terms.

A Closed Economy

It is convenient to first examine the case of a country that has no international trade. In such a "closed economy", the price level will largely depend on the behaviour of (i) wages and (ii) labour productivity. This is because ***nominal*** income (namely $P \times Y$, where P= the price level) can be written as:

$$PY = wL + \lambda wL \quad \text{or} \quad PY = wL(1+\lambda) \text{.....[15.9]}$$

Where *w* = the average wage rate, *L*= the numbers of people working in the economy and *λ*= the ratio of non-wage to wage income. If *λ* = assumed constant, then equation 15.9 can be rewritten as:

$$\frac{\overset{*}{P}}{P} + \frac{\overset{*}{Y}}{Y} = \frac{\overset{*}{W}}{W} + \frac{\overset{*}{L}}{L} \quad \text{or as} \quad \frac{\overset{*}{P}}{P} = \frac{\overset{*}{W}}{W} + \{\frac{\overset{*}{L}}{L} - \frac{\overset{*}{Y}}{Y}\} \text{.....[15.10]}$$

where the dots over a symbol indicate the "change in"

If the curly brackets on the right in Equation 15.10 had a value of zero (implying that the labour force was growing at exactly the same rate as total real income) then the price level would rise in exact proportion to the rise in the average wage that was being paid. In this case the productivity change in the system would be zero.

But, if as is more usual, Y (which remember stands for constant price GDP) was rising just a bit faster than L (i.e. labour productivity was rising – perhaps by 2-3% per annum) then the term in curly brackets in Equation 15.10 would be negative. In this case, prices would be rising less rapidly than wage rates. So, for example, a 10% wage rate increase would give the workers some real gain in spending power and not merely an illusory inflation increase of no value to their livelihoods.

This analysis is very much a SUPPLY side view of inflation. DEMAND pressures can play an additional important role by making it more likely that wages will rise. For example, a very large increase in government expenditure or a big inflow of foreign capital could both put strong upward pressure on wages (as the higher demand met a relatively unchanging supply of labour) and prices (as the higher spending demand met a relative limited short run ability of the supply of goods to rise). We will have much more to say about these demand side influences at a later stage.

An Open Economy

We first remove the assumption of no foreign trade.

In the case where the economy trades internationally and acquires some part of its total supplies as IMPORTS, then the prices of these must also impact the domestic price level. Now Equation 15.10 needs to be elaborated as follows:

$$\frac{\overset{*}{P}}{P} = \alpha\left[\frac{\overset{*}{W}}{W} + \{\frac{\overset{*}{L}}{L} - \frac{\overset{*}{Y}}{Y}\}\right] + \beta\left[\frac{\overset{*}{P}_{for}}{P_{for}} + \frac{\overset{*}{ER}}{ER}\right] \text{.....[15.11]}$$

The new term on the right hand side represent the foreign price level of the goods we import (i.e. P_{for} which is measured normally in $US) multiplied by the nominal Exchange Rate (*ER*).

α and β are the weights attaching to the prices of domestically produced goods and services and internationally traded goods (imports) respectively in the country's overall price index

We can see from Equation 15.11 that if imports (of basic materials such as oil or consumer goods such as food) are large then changes in international prices and/or our exchange rate can have an important additional influence on prices and inflation

In equation 15.11 there are three especially important points to note:

(i) If the country devalues the exchange rate (so that it now pays out or receives more peso or cedi, (for example) for each dollar, then the domestic price level in peso or cedi will rise ***even if wage rates remain unchanged***. But since the higher price of imports (especially if large) may well precipitate a demand for higher wage rates, there will also be a second round effect whereby prices rise again because wage rates have risen. These ER, wage and price dynamics are particularly important when a country suffers very high rates of inflation

(ii) The foreign price level for a country that imports mainly from a non-dollar country such as Japan or the UK would more usefully be expressed in yen or pounds rather than in US dollars. But this does not change the basic logic set out in the equation

(iii) In most developing countries, and in most periods the Pf term is likely to rise only quite slowly and so be largely predictable. Many of the big externally caused rises in prices will come from changes in the exchange rate (ER). Of course there are big historic exceptions and notably the huge hike in oil prices in 1973/74 and 1980/81 and the recent (2008 onwards) substantial increases in some food prices as well as on-going oil and gas price increases that have affected almost all developing countries.

As was the case for the closed economy, this analysis is also very much a SUPPLY side view of inflation. DEMAND pressures can and do play an additional important role as we shall see later.

15.5 Introducing the Money Supply and a Fourth Important Macroeconomic Balance

Money Demand – the Basics

Our discussion around the simple flow of funds matrix of Figure 15.2 has already hinted at another very important macroeconomic balance. This is the balance between the public's willingness to hold monetary assets and the ability of the government to raise funds by issuing money. Here we will make that relationship and other aspects of it more explicit. In doing so we can draw in one of the most influential of the reasons that explains how and why there will be a DEMAND influence on a country's price level as well as the supply influences that we have just considered.

In Box 15.3 we describe the familiar quantity theory of money that, in various guises, has underpinned much of the macro-economic thinking about inflation for centuries. It is noted that this provides a very simple and easily understood explanation of what drives the price level of an economy in the long run at least. Let us state it in the following very simple terms. If the supply of money is large relative to the real goods and services that are available to be purchased using that money ("too much money chasing too few goods") then one result will be an increase in the price level. If this situation persists then the result will be on-going

inflation. This basic idea will be filled out and clarified in a more technical way as we proceed in this and the next Chapter.

For our immediate purposes we can use the simple algebra shown in Box 15.3 to begin to understand better the influences on the public's desire to hold monetary assets as shown in the bottom row of the simple flow of funds matrix (Figure 15.2)

To see this rewrite (15.12) – an equation found in Box 15.2 as follows:

$$\frac{M^D}{P} = \frac{1}{\overline{V}} Y = m(\underset{+}{Y}) \qquad (15.14)$$

Notice that expression (15.14) represents the **real** demand for money because people are interested in the amount of goods and services that a given quantity of money can buy. If velocity is assumed to be constant that demand is a function only of real GDP (i.e. Y). Note that for the moment the main influence on the money demand is the real income level "*Y*" and the price level "*P*".

Equilibrium in the money market implies that exogenous real money supply equals real money demand so that we also have:

$$\frac{M^S}{P} = \frac{1}{\overline{V}} Y \qquad (15.15)$$

The left hand side of equation (15.15) represents the supply side. M^S is the nominal money supply (or stock) – we will explain where this comes from shortly. *1/P* can be thought of as the purchasing power of that money stock. Thus, (M^S/P) is the real money supply. The right hand side of the equation represents real money demand which depends positively on the level of real GDP. If real GDP (*Y*) does not change, then we can see that any increase in M^S will have to be matched by an equal increase in *P* in order for the ratio to be kept constant. Hence, the increase in the price level will equal the difference between money supply and demand.

Note also that as the price level increases, the purchasing power of money is reduced ((*1/P*) decreases). As an illustration assume V=1. If Y=100 and if nominal money supply equals M=1000, then the price level will be P=10. If the central bank increases the money stock in the economy to M=1030, then the prices will be higher (P=10.3) and, in the end, real money supply does not change.

Box 15.3: The Quantity Theory of Money

The quantity equation (or equation of exchange) that expresses the long-run relationship between money and GDP is thought to have its origin on the work of the famous astronomer Simon Newcomb (1893) and it can be enunciated as:

$$MV \equiv PY \qquad (15.12)$$

where *M* stands for the nominal amount of money in the economy, *V* is the velocity of money (that is, the number of times in a given period that, on average, a unit of money is used in transactions), *P* is the price level and *Y* the real GDP – the country's level of activity in a given year.

The rationale for equation (15.12) is that, because money is a medium of exchange that allows people to carry out economic transactions (such as the purchase of goods and services), the money stock

available in a country should depend on the level of economic activity in that country. Accordingly, when the level of activity (GDP) of the country is high, expenditure will be high and people will carry out more transactions. Thus, the quantity of money in the economy should be higher.

Notice that equation (15.12) is merely an identity. In other words it tells us that if there is a change in the quantity of money available in the economy then, at least one of the other variables must also change. Notice also that, since in practice we can only observe values for *M*, *P* and *Y*, velocity (V) can only be computed from the other three variables.

The classical economist of the C19th used equation 15.12 to establish a ***theory*** of inflation. However, to turn the identity shown in the equation into a theory needed two main assumptions. First, the velocity of money was assumed to be stable (or at least predictable) over the long-run. Second, real GDP was assumed to be determined by real factors, such as the characteristics of the production function and the availability of productive resources and, therefore***, it would not be affected by any changes in the nominal money supply***. This is the so-called classical dichotomy – the idea that price level determination and income level determination could be separated. With these two assumptions in place, equation (15.12) can be rewritten as:

$$M\bar{V} \equiv PY \qquad (15.13)$$

Since the nominal money stock was assumed to be exogenously set by the central bank, and assuming that the level of real GDP is held constant, any increase in the money supply will have to be matched by a proportional increase in the price level in order to maintain the identity in (15.12). Thus, ***in the long-run***, the price level is directly determined by changes in the money stock. There are many other factors (such as changes in aggregate demand, supply side changes such as technological progress and others) that lead to changes in the price level besides increases in the monetary base. However these changes it was argued are only observed in the ***short-run.*** The continuous rise in the price level in classical theory can exclusively be explained by increases in the money supply.

But in reality of course, the level of real GDP does change over time and therefore, an expansion of the money supply by the central bank is not always matched by an identical increase in the price level. In fact, continuous economic growth means that people will continuously demand (need) more money to deal with the expanding volume of transactions. To avoid the damages associated with a possible shortage of money, central banks will typically adjust their monetary emissions to at least match the rate of economic growth. In terms of equation (15.14), this means that, with velocity constant, then, if the level of income increases and money supply rises by exactly the same amount, the price level will have to remain constant in order to maintain the identity. For example, if real GDP increases from 100 in year t to 103 in year t+1 and money supply increases from M(t)=1000 to M(t+1)=1030, the price level will remain equal to 10. Therefore, according to the quantity theory, the price level will only increase if money supply rises faster than real GDP.

Money Supply – the Accounts of the Banking System

The analysis here has so far avoided the question of ***how exactly does a government or central bank increase the money supply*** and how do the relationships flagged up in the last row of the flow of funds matrix actually arise? It is tempting, but unfortunately rather too poetic, to imagine the central bank actually printing new currency notes and minting new coins and somehow distributing these to the public (throwing new notes and coins from helicopters has been one analogy used to describe this).

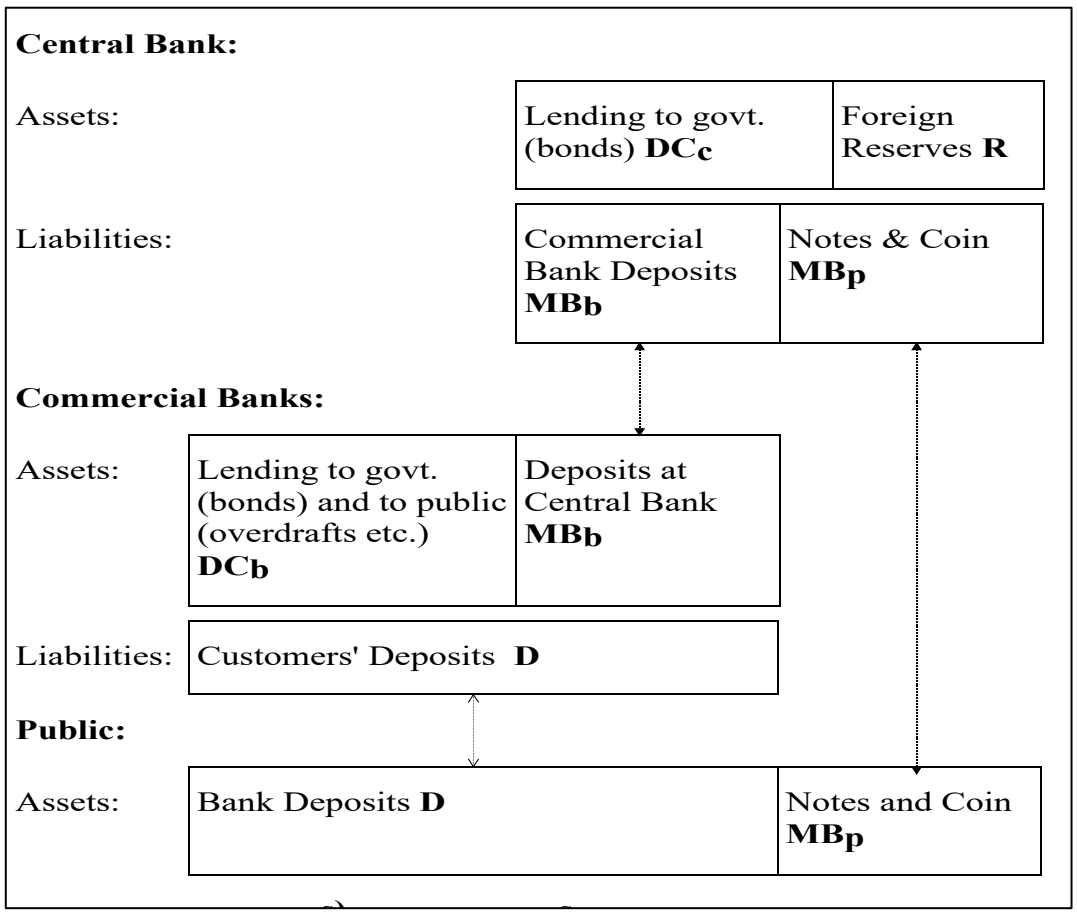
In reality, the putting into circulation of new notes and coins to replace the worn out old ones is normally a technical matter which has little or no connection to the economic need to put

more money into circulation. This is because the bulk of money in today's societies is comprised of the bank deposits that individuals and companies hold and against which they issue cheques, bankers drafts and which back up also their use of electronic card and other payments. So when a government "prints money" in the economists jargon, they normally do so by somehow creating more bank **deposits.**

To see how this is done it is useful to examine the balance-sheets of the banking system of the country – the industry that handles and moves monetary assets around. These are presented, admittedly in a highly simplified format, in Figure 15.5 below.

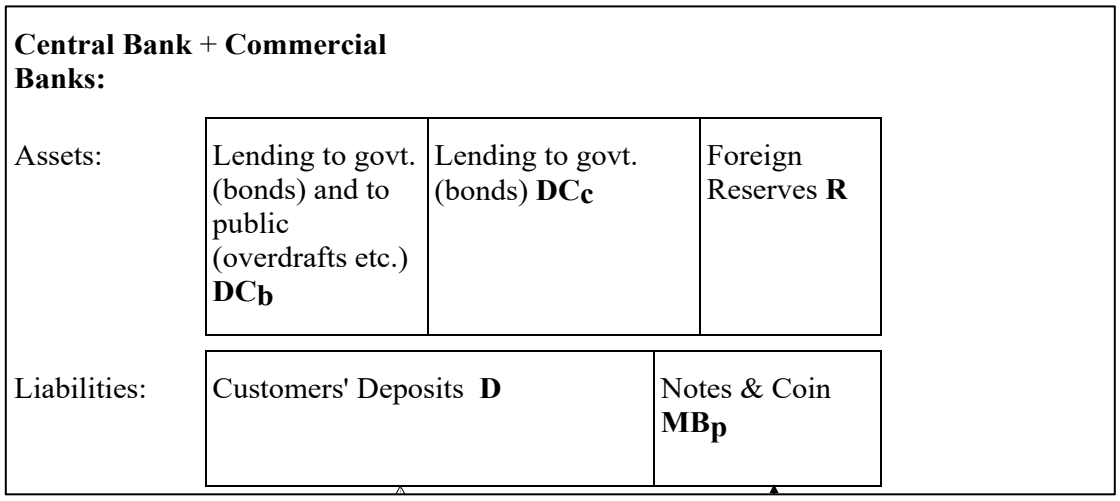
It is noted that the two main assets of the ***central bank*** are the loans made to government and the country's foreign exchange reserves. Its main liabilities are the notes and coin that it has already put into circulation (the smaller amounts held in bank tills are not shown here) and the balances that it holds on deposit from commercial banks. These balances are used by banks to settle (clear) payments between them. The ***commercial banks*** on the other hand have assets in the form of loans to and investments in many parts of the economy including the government and also hold the clearing balances with the central bank (these also appear in the central bank accounts). Commercial banks draw their resources to lend mainly from the bank deposits they mobilise from the public – individuals as well as companies. For completeness Figure 15.5 makes the possibly obvious point that all the banks deposits of the commercial banks plus all the notes and coins in circulation are held by the public – individuals and companies.

Figure 15.5: Balance Sheets of the Central Bank and Commercial Banks



If we now consolidate the two bank balance sheets we obtain the balance-sheet for the banking system as a whole. This is shown in Figure 15.6 below.

Figure 15.6: The Consolidated Bank (Monetary) Balance Sheet



This simple summary account now provides us with another and crucial identity for the monetary analysis of an economy. Simply by reading the two sides of the balance sheet and remembering that the balance sheets, by definition, must balance, we obtain.

$$D + MBp \equiv (DCb + DCc) + R \text{ .....[15.16]}$$

Where the term on the left is the total money supply comprising both notes and coins held by the public and the bank deposit of the public. These two components together enable the members of the public to make their various transactions

The term in brackets on the right can be interpreted as total outstanding domestic loans (or credit) provided by the banking system.

So the equation can be re-written as:

$$Ms \equiv DC + R \text{.....[15.17]}$$

In other words the total Money Supply of an economy is equal to the sum of all outstanding Domestic Credit plus the stock of Foreign Exchange Reserves. The alert readers will see that this balance sheet relationship mirrors the relationship that is expressed in flow terms (i.e. with a time dimension) in the bottom row of the flow of funds table in Figure 15.4 above.

It is easy from here to answer the question with which we began this sub-section. The authorities (government and central bank) will from time to time agree to provide increased loans from the central bank to the government. These loans can be provided for example, in the form of a purchase of governments securities by the central bank. They thereby add directly to the assets of the central bank (Figure 15.5) and to total domestic credit in Equation 15.17. Initially these balances are held as government balances in the central banks itself (not shown in our simplified balance-sheet). Then as the additional funds made available to government get spent on public goods and services they gradually find their way into *the bank deposits* of the public and so expand the money supply on the left hand side of equation 15.17.

This has been the technical basis of the so-called “quantitative easing” that has represented one of the main responses of the Bank of England and the US Federal Reserve to the global financial crisis since 2008. It is also the main way in which central banks in all low and middle income countries will from time to time enhance the resources at the disposal of their national governments over and above those achievable through taxation.

15.6 Conclusion

This chapter has introduced some of the basic concepts of macro-economics and shown how these can be utilized to define and explain some of the main economic balances that are the pre-occupation of macro-economic policy makers and analysts. IMBALANCES in these various areas – savings and investment, the balance of payments and the fiscal accounts – are a cause for concern since in different ways such imbalances are the root source of INSTABILITY and in economies. Macro-economic instability in turn is often a cause for slower rates of economic growth than would otherwise be possible and other related negative outcomes including worsening poverty and inequality.

The chapter has been careful to make it clear that many of the key relationships of macro-economics are little more than ***accounting identities*** – they are true (by definition) because

of the way in which particular variables are defined and then related together. So to this stage at least, no reader need feel that the understanding of the materials has committed them to any particular ideology or philosophy about how real world economies work – **all such economies are governed by these concepts and identities**. Going forward that situation will gradually become different since we need to graft some theories (and some political economy) on to the definitions in order to do any serious macroeconomic analysis.

The other point to emphasize at the end of this chapter is the distinction in our introduction of the basic concepts, between so-called "real" variables and "monetary" variables. The opposite of "real" in this context is not "imaginary" as a standard student joke would have us believe but "monetary". To make sense of this distinction readers should always try to think of ***real*** variables as those that pertain to real resources that directly deliver utility to their users (e.g. food, clothes, houses - the actual goods and services produced and used the economy in a year). The macro balances that relate to these ***real resources*** include those that utilize the national income identities in constant price terms. Changes in these variables over time (e.g. the amount of food produced and consumed) are not contaminated by any over-time rise in the price level. By contrast, the ***monetary*** variables are those that are more amorphous. Above all they include the money supply, the price-level and the interest rate (not real things but created artifacts that, unlike food and clothes and houses, cannot of themselves deliver any direct utility).

It is central to macro-economic analysis that the real and the monetary variables interact with each other in a variety of ways – many examples will follow. ***But the fundamental interest of development economics is in the real variables*** – how much of various utility-enhancing goods and services – the economy is able to produce and consume and how these amounts can be made to rise over time. To the extent that we worry also about the money supply, the price level and inflation, the interest rate and the other monetary variables, we do so because ***it is well understood that if these monetary variables are poorly set and managed they can and do seriously undermine the real resource changes in which we are mainly interested.***

We now proceed to examine and illustrate the main relationships between the real and the monetary parts of the macro economy, first in Chapter 16 by reference mainly to ***domestic*** activities and then in Chapter 17 by reference to ***external*** payment activities of various types.

Chapter 16: Domestic Macroeconomic Management

16.1 Introduction

Governments of all countries have basic functions that they need to carry out. These include the defence of the country, the maintenance of internal order, the provision of basic services such as education, health and roads, and the regulation of key activities such as banking and telecommunications. The expenditures that are needed to help deliver these functions require government to raise tax revenues in reasonable amounts. In doing so they must be aware that each dollar taken in taxation is a dollar less for spending by private companies and individuals. It follows that if the tax-raising effort is too aggressive the consequence will be that levels of economic activity in the private sector will be impaired and the country's economic growth prospects will be undermined. ***In short there is always a balance between more revenue for government and the performance of the economy in general.***

In macroeconomic terms this balance and the trade-offs that are associated with it can be encapsulated by defining a further critical function of all governments. This is the function ***to try to ensure that the economy remains reasonably stable at all times and that the domestic currency remains sound***. It is this central "monetary" function of government that is the main focus of this present Chapter.

Instability

It will be clear from our explanation of the three main national accounts balances in Chapter 15 that these balances are intimately inter-connected. For example excessive government spending relative to available tax revenues will cause not only a governmental fiscal deficit but also significant pressures that will worsen the external payments situation. Similarly, any shock to the economy such as the recent sharp increase in the costs of imported food or fuels will worsen the external payments position. But because these price rises will also lower ***real*** incomes in the domestic economy they will also be likely to worsen the fiscal position (as individuals and companies pay less tax) and also the net savings: investment position of at least some households. So government needs to react in macro terms to defend the objective of stability.

In thinking about this, readers can rely on the fact that any initial direct shock to a macro-economy is certain to result in some further indirect impacts given that the accounts always need to add up and balance in the manner indicated in Table 15.4 above.

Instability, or the threat of instability is the major single reasons why policy-makers need to concern themselves with the macro-economic aggregates in their economy. Instability in turn can be described as a situation in which one or all of the three main balances are at ***non-equilibrium*** levels: i.e. levels that cannot reasonably be sustained for any length of time. Examples would be external current account deficits that cannot be financed because the country can no longer borrow abroad at reasonable cost, or fiscal deficit that cannot be financed except by resorting to methods such as inflationary finance that do long term damage to the economy by expropriating real resources from holders of money balances.

However, for most purposes, instability is usefully defined by reference to main symptoms of that instability the main one of which is high inflation.

This pre-eminence of inflationary concerns is particularly important in the developing country context for two main reasons. First, there is plenty of evidence that high inflation is harmful both to a country's growth imperative but also to the position of poorer persons in such

economies. For many years the negative relationship between inflation and growth proved to be quite a difficult one for econometricians to establish convincingly. However, following seminal papers in the 1990s by economists such as Stanley Fischer (1993), Michael Bruno and William Easterly (1998) that relationship is now pretty much accepted. [4] Certainly inflation above certain thresholds has a clear deleterious effect on economic growth. Since high inflation invariably harms poorer persons more than richer ones, we can say with some confidence that inflation, lower economic growth and worsening inequality all tend to go together.

Second, there are many solid reasons why the poorer economies of the world are more prone to suffer from inflationary pressures. One important manifestation of the second of these propositions – that is poorly understood - is that ***poorer countries will have more inflation for any given size of fiscal deficit (relative to GDP) than will richer economies***. This has to do with the weaker institutions and especially the weaker financial institutions of poor economies. This important point will be elaborated further as we go along.

Having recognised the close inter-connections between the three main elements of the macroeconomic challenge we proceed in this present Chapter by somewhat artificially separating the discussion of the different elements into a ***domestic*** discussion (this chapter) and an ***external*** (or ***international)*** discussion (Chapter 17). This is done only to aid (hopefully) to the clear understanding of each element of the analysis and not to undermine the importance of the linkages between them. So the reader should be aware that at many places in the next two chapters, there will be re-connections made between, for example the fiscal situation and the balance of payments.

16.2 Financing a Fiscal Deficit

This present Chapter begins by putting the telephoto lens on macroeconomic issues involving the management of ***domestic demand and inflation***. The focus initially will be on the fiscal deficit broadly defined but with the sources of financing of that deficit including money creation gradually brought into closer focus.

Why focus on budget ***deficits*** and not on surpluses?

The simple answer is that in most years, many if not all low income countries have deficits and not surpluses to contend with. Table 16.1 below provides a typical picture based on the situations in 15 countries of Sub-Saharan Africa. Note both the significant sizes of some of these deficits and also the deeper slide into deficits that some of the selected countries saw after the global financial crisis of 2007-2008. [5]

[4] See Stanley Fischer (1993), "The role of macroeconomic factors in growth". Journal of Monetary Economics, 32 (3), 485-511, and Michael Bruno and William Easterly (1998), "Inflation crises and long-run growth", Journal of Monetary Economics 41 (1998) 3 26.

[5] For many years prior to 2008 it used to be argued that the advanced economies *on the whole* had seen their fiscal deficits reduce and that such economies did not face such systematic tendencies to be in deficit as did lower income countries. This idea was rather shot down by the dramatic slide into often huge levels of fiscal deficit by most advanced economies, including the USA the UK and other EU countries, as a consequence of the global crisis of 2008 and afterwards.

Table 16.1 Government Budget Deficits (including grants on the income side) - % of GDP

	2005	2006	2007	2008	2009	2010
Low-income countries	**-2.8**	**3.8**	**-3.3**	**-3.5**	**-3.9**	**-3.7**
Benin	-2.5	-0.5	1.6	-1.8	-2.6	-2.9
Burkina Faso	-5.1	16.7	-5.7	-4.5	-5.1	-4.6
Ethiopia	-4.4	-3.9	-3.6	-3.0	-1.5	-1.1
Ghana	-3.7	-7.0	-8.5	-13.5	-6.8	-8.2
Kenya	-1.8	-2.5	-3.0	-3.9	-4.2	-3.8
Madagascar	-4.3	37.4	-2.9	-2.6	-3.3	-3.8
Malawi	-1.3	1.3	-2.7	-5.8	-2.3	-3.8
Mali	-3.1	31.3	-3.2	-2.2	-4.7	-3.9
Mozambique	-2.8	-4.1	-3.0	-4.0	-7.1	-6.2
Niger	-2.0	40.3	-1.0	1.5	-4.6	-3.1
Rwanda	0.6	-0.4	-1.5	1.2	-1.4	-2.6
Senegal	-3.0	-5.7	-3.7	-4.3	-4.4	-4.0
Tanzania	-2.8	-4.7	-3.7	0.0	-4.6	-5.0
Uganda	-0.5	0.1	-1.1	-2.1	-3.9	-3.9
Zambia	-2.7	19.8	-1.3	-1.5	-2.6	-1.7

ALL countries rich and poor have essentially three ways to finance a fiscal deficit[6], namely:

- ***Local Borrowing.*** Governments can borrow in their own domestic financial markets (e.g. by selling Treasury bills and bonds to local banks, other financial institutions and even to the general public).

- ***Foreign Borrowing***, Governments can borrow in international markets by seeking sovereign loans directly from international financial institutions or by market-sales of bonds of various types.

- ***Inflationary Finance.*** Governments can raise money by requiring their domestic Central Bank to lend to them – a technique that is commonly referred to as "printing money" or "inflationary finance – as explained in Chapter 15 above.

[6] In poor economies foreign aid – official development assistance (ODA) - is commonly available in the form of grants (rather than loans). It is common practice to factor in these grants as government revenue so that they ***reduce*** any budget deficit and are not regarded as part of the ***financing*** of that deficit. This is the approach we have adopted here which is why grants are not shown as an additional method of financing the deficit. Aid that comes in the form of interest-bearing loans would be included as part of foreign borrowing. However, it is common practice in IMF and otter reporting to show budget deficits in such countries both before and after grants. There is often a large gap between them.

If a government has a deficit that can be sustainably[7] financed using the first two methods indicated, then in broad terms it need have little or no recourse to the inflationary alternative – the third of the three methods shown. But if deficits are too high or borrowing on a sustainable basis is not possible in adequate amounts, then the third method will come strongly into play. In this sense the recourse to inflation can be thought of as a function of both the size of the deficit but also of the availability and terms of possible borrowing by government

However if all else fails governments also have a fourth method to raise finance which many low and not-so-low income countries make occasional use of . This fourth method comprises a wide range of what we shall term "***Messy Finance***" whereby government use "off-budget" devices that exploit the fact of government influence over some business and other institutions in the domestic economy. Examples of this have commonly included:

- failing to pay suppliers and so building up local arrears of payment
- forcing domestic banks to "invest" in low or zero yielding government securities even though this potentially very harmful for the financial health of banks
- allowing state-owned enterprises (e.g. power companies) to charge excessively low prices but then failing to provide funds to cover their resulting losses. In this last case the SOE losses are an implicit form of deficit finance
- adopting a dual foreign exchange rate and allowing some government agencies to buy the foreign exchange they need (e.g. to purchase imports) at the less devalued of the two or more exchange rates. Such arrangements are typically financed by requiring some exporters of primary commodities to surrender their foreign exchange earnings at the less devalued of the two rates rather than at the "market" rate that would be more favourable to them.

Mots methods of "messy financing" of government can be though of also as "hidden taxes" – taxes that are not formally legislated or approved by local parliaments but which have the same effect as mainstream taxes in taking resources away from the private sector and delivering these to government.

Let us briefly consider the limits on the use of the first two mainstream methods of finance before considering the third of these which is the most common of the "hidden taxes– inflationary finance - in greater detail.

16.2.1 There are Limits on Local Borrowing

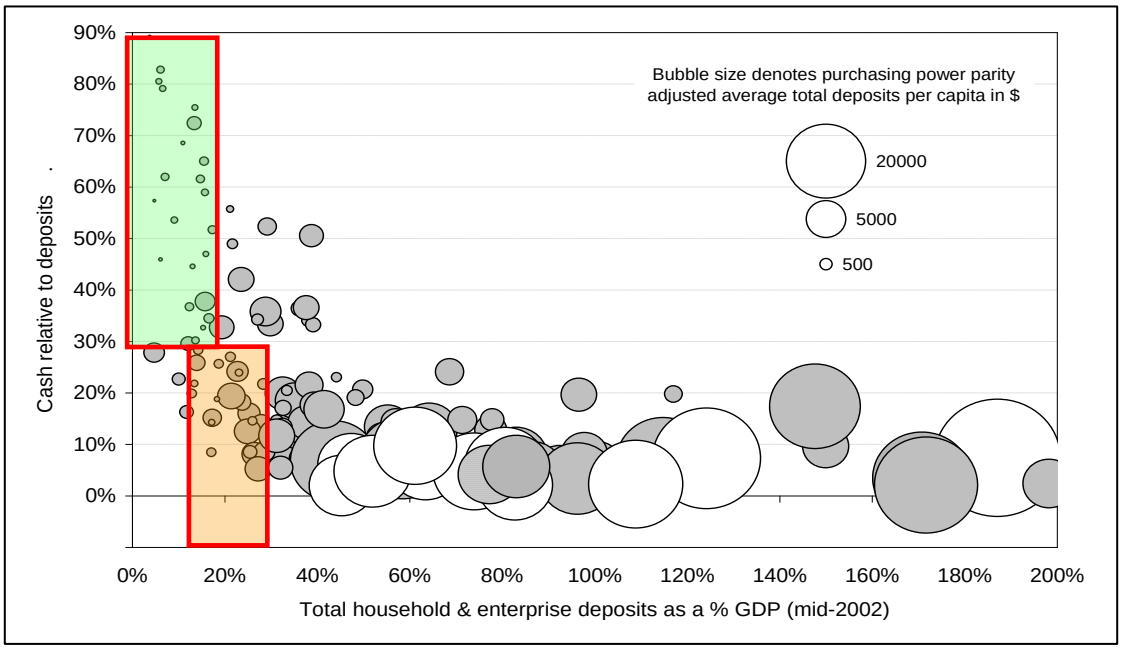
There are two main limits on government borrowing that apply in lower income countries to a much greater extent than in most richer economies. First, local financial markets (banks, insurance companies etc.) are typically very SMALL - so there is typically very little capacity to absorb (buy) new government Treasury bill and bond issues: commonly the bulk of that demand will come from commercial banks and then later, as some embryonic pension industry emerges, from pension funds. Second, the demand to buy government debt in those markets is typically unresponsive to higher interest rates. So quite HIGH interest rates may be needed to sell a relatively modest volume of new government debt.

We can see evidence of the first point in the global data presented in Figure 16.1 below. In this diagram each point and bubble indicates an individual country. Bubble sizes indicate the

[7] This concept is defined later.

average size of bank deposit holdings in the country in question in per capita terms. On the horizontal axis, the total bank deposits of households and companies together provide a broad indication of the size of the banking systems of a large number of countries of varying income levels.

Figure 16.1: Size of Banking Systems and Use of Cash in Different Countries



The African and other lower-income countries for the most part lie far to the left in this diagram with banking system resources equal to only around 15- 25%| of the countries' GDP (see pink shaded area). One reason for this low figure is the typical low absolute size of per capita bank deposits in poor countries (the size of the bubbles). A second is the often low level of trust in banks seen in many such countries and reflected in the high ratio of cash to bank deposit held by the public in some of them (see the vertical axis and the green shaded area). Since ***absolute*** incomes are also very low this means that the absolute size of those banking systems is often tiny relative to those seen in richer countries – mainly to the right in the diagram. Even IF banks in the poorer countries were to commit a very high proportion of their available funds to purchase government securities – which they cannot do since their main role is to finance production and investment in the economy - this would often finance only a small part of the prevailing fiscal deficits.

The second point about high interest rates follows from the first. If governments try to sell large amounts of their bills and bonds in a situation where there is only limited capacity and demand to purchase these, then the rates (of interest) that they will need to offer to fully sell the issues will rise very quickly.

This lesson was painfully learned in some countries in the 1990s when they sought to liberalise previously controlled interest rates. It was found, for example in Kenya in 1991/92 that their requirement to sell what initially seemed small amounts of debt quickly resulted rapidly in a huge rise in the interest rates that the authorities had to pay. The result was a fiscal deficit that quickly exploded as interest payments on the local borrowing rose hugely relatively to other budgetary expenditures on, for example education and health. In other words the "primary

deficit" of the government (which in the Kenyan case was not outrageously large) can easily become hugely increased by the debt service element of the overall deficit that also needs to be financed (Equation 16.1 below explains this point more formally). A formal algebraic explanation of this process is provided below in Section 16.5.

Similar concerns have been seen more recently during the Euro currency crisis in which countries such as Greece and Spain have often faced very high and rising interest rates on their government debt[8] that threaten to cause unsustainable increases in the total size of the fiscal deficits of those countries

This second point is more common in low-income countries but is certainly not confined to them. Apart from the recent dramatic examples in the Euro zone, very similar propositions about monetary and fiscal policy in the USA were made by various authors in the 1980s and especially in a famous paper entitled *Some Unpleasant Monetarist Arithmetic* by Sargent and Wallace (1981).[9]

It is an important proposition from this work that if the real rate of interest on government debt exceeds the growth rate of the economy, then there can be an explosive path for the levels of real government debt (McCallum, 1981)[10]. This point is explained algebraically later in this chapter. Sargent & Wallace (1981) elaborated this proposition in relation to the then high pre-tax rates of return on US government securities. They demonstrated the theoretical possibility that tighter monetary policy could possibly be associated, with a ***higher*** (not lower) rate of inflation even in the short term; that is, tight money could make inflation worse. The explanation is to be found in the fact that the intention to finance more of the deficit by ***local borrowing*** could be short-circuited if fiscal deficits are subsequently swollen by rising debt service burdens- as they certainly were in Kenya in the early 1990s. Similarly in relation to foreign borrowing we see this same problem today (2011-2013) in the high interest charges and the resultant higher deficits faced by countries like Greece, Spain and Italy in the Euro zone.

16.2.2 There are also Limits on Foreign Borrowing

This point is much easier to explain. However, here we focus briefly on the more intuitive explanations with the detail of the formal mechanism and the underlying algebra delayed until Chapter 17.

Low income countries are limited in their ability to borrow funds internationally by the supply curve (of loan financing) that faces them. In simple terms, many such countries find that the banks and other institutions globally are unwilling to lend to them in any significant amount, or to do so only at very high and so unattractive interest rates. This has been true at various times in the past thirty years of many of today's middle income countries who at various points found themselves in situations of chronic macroeconomic instability (e.g. most Latin American economies after the 1982 debt crisis, all countries in the former Soviet Union after 1989,

[8] As prospective lenders became ever more sceptical of the ability of countries such as Greece to honour their obligations to borrowers.

[9] Sargent, Thomas J. and Neil Wallace. 1981. "Some Unpleasant Monetarist Arithmetic". *Federal Reserve Bank of Minneapolis Quarterly Review* 5 (Fall): 1-17.

[10] McCallum, B. T. (1981) Monetary principles and the money stock growth rule, *American Economic Review*, 71, pp. 134–138.

Mexico again in 1994, Thailand in 1997, Russia in 1998 and Argentina after 2000). These cases are discussed more fully in Chapter 18 on financial crises.

The inability to borrow new money internationally on commercial terms has been and remains a fact of life for many of the 40 or so low-income developing economies that have acquired the label of Highly Indebted Poor Countries (HIPCs). These countries' inability to borrow new money is easily explained by the fact that they have already built up excessively high levels of debts (relative to income) that in many cases they have been unable to service in full or indeed at all. For example in the mid-1990s several of the HIPCs had debt service obligations on an annual basis that were above 60% of total government expenditures and in some case such as Nicaragua as high as 110 %. This type of problem intensified thorough the late 1970s and especially in the 1980s and early 1990s until the international community decided to address the problem head on with the HIPC initiatives from 1996. Figure 16.2 below shows that from the late 1970s through to the mid-1990s these HIPC countries were increasingly less and less able to raise loan funds from the private commercial markets charging market rates of interest. The Easterly diagram below shows that the component of the HIPC country international debt that was **not** associated with the foreign aid agenda (i.e. was not borrowed on concessional terms funds from various international donors) shrunk to become almost insignificant.

Figure 16.2 Composition of HIPC External Debt 1979 to 1997 (Source: William Easterly, *World Development,* 2002)

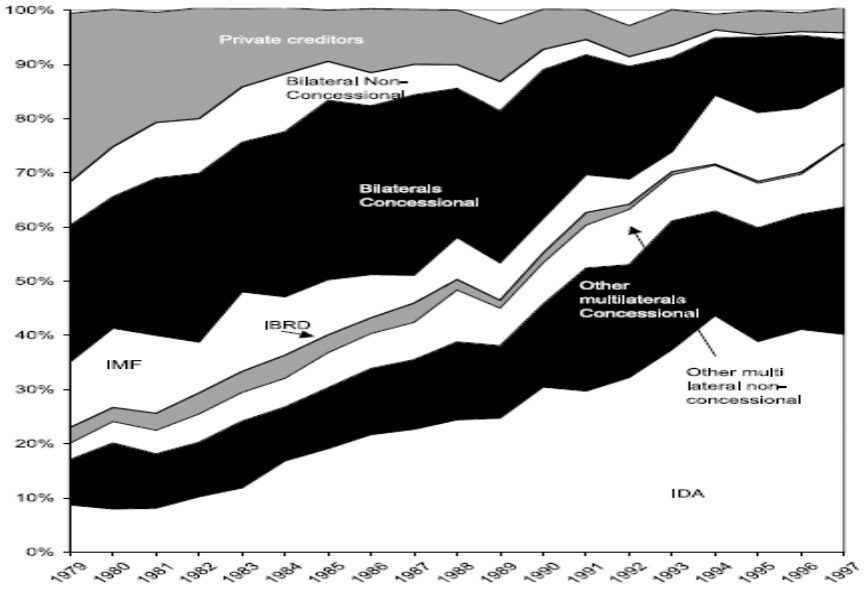


Figure 5. *Composition of gross disbursements to HIPCs.*

The debts of the HIPC countries were not necessarily particularly high in absolute dollar terms. The problem was that they had been allowed to become very high ***relative to the countries' capacity to service those debts*** either in terms of available foreign exchange resources or in terms of available fiscal revenues. In any event new borrowing on commercial terms was not a real possibility for this subset of very poor countries. Data from the World Bank's debt reporting system serve to confirm this. See Table 16.2 below. Which contrast the extremely low absolute levels of the private non-guaranteed (PNG) commercial debt of the lowest income countries through 2004 with the similar debt of all developing countries.

Table 16.2: External Debt in Developing and Low Income Countries

PNG = private and non-guaranteed debt

Public External Debt Outstanding						
(Amounts in $ million)	**1990**	**2000**	**2001**	**2002**	**2003**	**2004**
All Developing Countries						
Debt outstanding (LDOD), total long-term (US$)	1,098,884	1,909,082	1,868,399	1,925,638	2,054,118	2,164,919
PNG, total private nonguaranteed (DOD, US$)	59,996	545,210	542,731	551,384	603,082	671,482
Low Income Countries Only						
Debt outstanding (LDOD), total long-term (US$)	285,169	330,151	321,926	341,485	370,088	379,869
PNG, total private nonguaranteed (DOD, US$)	7,692	25,533	24,705	26,757	29,739	33,678

DOD = debt outstanding and disbursed

Other developing countries face a slightly easier position and together have raised more private sector debt funds from abroad (Table 16.2). But most faced, and still face a sharply upward rising supply curve of internationally available loans on a commercial basis. Amongst the world's poorer economies, the key exceptions to this rule are some oil rich low income countries such as Ghana and prospectively Tanzania that have just begun to exploit what may turn out to be very large reserves of oil, gas resources.

The situation of some middle-income emerging market economies is more nuanced. Some of these notably China, South Korea, some other East Asian economies and Brazil have been able to achieve significant levels of overseas investment and are able to borrow funds from abroad when these are needed on relatively favourable terms. However, even this ability can become a mixed blessing as the dramatic examples of financial crisis in countries such as Mexico, Argentina and Thailand in the 1990s and 200s readily demonstrates (see Chapter 18).

ALL countries face the need for self-imposed discipline on new foreign borrowing which is broadly explained by the Sargent-Wallace propositions about domestic debt as summarised above. In brief, if the real interest on the debt is likely to be significantly higher than the rate at which government revenues and the foreign exchange earnings of the country are able to grow, then debt service can potentially come to account for an ever-rising share of those total resources.

16.3 So Inflationary Financing does seem Attractive – But !

The third of the three mainstream methods for financing the fiscal deficit often SEEMS attractive to policy-makers and politicians because of the serious constraints on the other two methods as just described. But this attractiveness has a very large potential down-side that can easily damage macroeconomic stability as we shall start to see in this current sub-section.

This attractiveness of the "printing money "solution arises because governments (mainly Ministries of Finance) do in practice have some degree of control over the country's Central Bank. Notwithstanding the increasing insistence from the world's politician's that ***their*** central bank is independent (and the proliferation of formal legislation that confirms this), the reality in most countries involves some degree of influence from the government to the central bank. Hence, it may be quite a simple matter in practice for the government to ask that that the

central bank might print more money in order to finance the government deficit. In such cases, we say that there is *fiscal dominance*.

In order to understand this idea more fully, first consider the government budget constraint. The public deficit comprises expenditures, including interest payments on debt. The deficit is the total of these minus taxes and any other government revenues. The government as we have seen already may finance its deficit by borrowing from the central bank or by issuing bonds that are bought both by the domestic (and foreign) private sector. Thus, we can write the government budget constraint as:

$$\Delta D_c + \Delta D_p = P(G - T) + iD_p \qquad (16.1)$$

The primary and the overall fiscal balances

On the left-hand side of the equation, ΔD_c and ΔD_p represent the increase in government debt held by the central bank and by the private sector, respectively. The right hand side of the equation shows the components of the government deficit. The first term, *P(G-T)* is what from hereon we will refer to as the ***primary fiscal balance*** measured in nominal terms, where P denotes the price level, *G* stands for real government expenditures and *T* for the real tax revenues. If this term is positive, then the government will be running a *primary surplus*. The last term, iD_p, represents the interest payments that the government needs to make to pay to service its current debt, with *i* standing for the interest ***rate***. [11] In situations such as that described for Kenya in the early 1990s, the last term can become very large compared to the primary deficit. The ***overall fiscal balance*** can be in deficit even if the primary balance is in surplus. Equation (16.1) clearly states that, whenever the government runs a deficit, government debt increases – either debt to the private sector or to the central bank. And when it runs a surplus *(T>G),* government debt decreases.

In a situation of fiscal dominance where the government and the central bank are essentially a fully integrated unit, we can usefully look at the combination of the budget constraint of the government (as in equation 16.1) and the central bank which can be deduced from our earlier balance-sheet equation (15.16) as reproduced below as equation (16.2)

$$D + MBp \equiv (DCb + DCc) + R \quad \text{.....[16.2]}$$

By differencing this balance sheet equation to give us the flows through the year (i.e. by adding a time dimension) and recognising that the left hand side is the same as the total money supply we obtain

$$\Delta M = e\Delta R^* + \Delta DCb + \Delta DCc - i^* eR^* \quad \text{.....[16.2]}$$

Remember that DC_b is lending by the commercial banks to both government and the private sector. DC_c is lending by the central bank to government.

The right hand side of this new equation records the various possible sources of expansion of the money supply. In the case of a change in reserves this is made up of the change in volume of reserves valued at the prevailing exchange rate ("*e*"). The equation also notes explicitly that the central bank will earn income on its foreign reserves at the interest rate of *i**. This income

[11] We here simplify a little by assuming that the government only pays interest on the debt owned by the private sector. This is because we are also assuming that there is fiscal dominance and that the government does not have to pay interest on debt held by the central bank.

(profit) will join the items on the liabilities plus capital side of its balance –sheet and so reduce the volume of monetary liabilities that otherwise would dominate that side.

If this is the budget constraint of the central bank for a given year, how do we identify the funding that the central bank can provide to the government? The answer follows from the equation. The amount provided to government is the whole of the increases in the money supply less those increases that are committed either to the build-up of foreign reserves or are used to match the credit extended to the private sector. If we make the additional simplifying assumption that all central bank credit goes to the government and all commercial bank credit goes to the private sector then the resulting consolidated budget for the government and central bank together (using Equations 16.1 and 16.2) is as follows:

$$\Delta D_p + \Delta M - e\Delta R^* - \Delta DCb = P(G - T) + iD_p - i^* eR^* \text{ .....[16.3]}$$

This equation tells us that the government has **four** ways to finance its deficit: through increases in the (government) debt held by the public (*ΔDp*), increases in the money supply (*ΔM*), by running down foreign exchange reserves (*eΔR**) or by decreasing the credit provided to commercial banks (ΔDC_b). Note also that the interest on reserves becomes another source of funds to the *combined* authorities. **Above all the government can in effect lay claim to (i.e. gain real resources from) all the increase in the money supply in the year except those parts of that increase that are spoken for by a build-up of foreign reserves or by the provision of domestic credit to the private sector.**

Although this is more encouraging in some sense for the Minister of Finance, the equation is in fact provides a stern set of reminders to him or her of the trade-offs that fiscal financing involves in practice.

For example:

- any monetary financing of a deficit that is achieved by *failing to build foreign reserves* (the term $e\Delta R^*$ in the equation) has to be considered against the size of the country's existing reserves and whether these are adequate to deal with any uncertainties to future foreign earnings and the balance of payments.
- any monetary financing of a deficit that is achieved in part by *denying credit to the private sector* has to be considered very seriously in terms of what that denial might do to the ability of the private sector to grow in future and, incidentally, provide future tax revenues for the government. Such a denial is a clear example of the more general trade off between a larger fiscal deficit and potentially slower growth!

These various constraints on the cavalier use of monetary financing of deficits need also to be considered alongside other equally potent reasons why the Minister of Finance should think twice about excessive reliance of inflationary finance.

The Concept of Seignorage

To look at the other important reasons for being very cautious about the inflation-financing option, it is also necessary to introduce another critical building block to better understand what happens when money is "printed. This building block and the definition of the very important concept of seigniorage is explained in Box 16.1 below.

Box 16.1 Seigniorage and the Inflation Tax

To explain these ideas consider a government that has lost all access both to borrowing in the domestic market (from local banks etc.) and also in the international markets. In that situation and assuming also, for simplicity, that there is no debt and so no interest payments on debt i.e. $iD_p=\Delta D_p=0$. Also ignore for the moment any central banks claims on commercial banks and assume that there are no foreign reserves for the government to utilise. These assumptions allow us to write a simpler version of the consolidated budget constraint of the public sector for some given fiscal year:

$$\Delta M = P(G-T) \qquad (16.2)$$

Where "*M*" is the total domestic money supply and ΔM is the change in that money supply in the fiscal year

We can also arrange expression (16.2) to obtain:

$$S_{rev} = \frac{\Delta M}{P} = (G-T) \qquad (16.3)$$

The term on the left of expression (16.3) is the revenue created through the printing of new money. The revenue created in this way (S_{rev}) is referred to as "seigniorage". Notice that it is expressed in real terms and hence, it gives the size of the real primary deficit (also in real terms) that the government can finance by printing new money. The power of the government to create money in some very real sense gives it control over real resources equal to the seigniorage shown in the equation. ***In this respect the government has a financing advantage which no one in the private sector can possible share: a privilege but also a big responsibility.***

However, this power is very severely limited by the fact that someone needs to be willing to hold (demand) any money that the government seeks to print.

So let us also define real ***demand*** for money as:

$$m^d = \frac{M}{P} \qquad (16.4)$$

If we then take time differences from expression (16.4) we obtain the change in money demand in a given period such as the fiscal year as:

$$\Delta m = \Delta\left(\frac{M}{P}\right) = \frac{\Delta M}{P} - \frac{\Delta P}{P}\frac{M}{P} = \frac{\Delta M}{P} - \pi m \qquad (16.5)$$

Where the expression "π" is the inflation rate of the period we are considering

Thus, seigniorage revenues can be obtained by combining equation 16.3 and equation (16.5) as:

$$S_{rev} = (G-T) = \frac{\Delta M}{P} = \Delta m + \pi m \qquad (16.6)$$

This final expression (16.6) states that seigniorage revenues in any period are composed of two components. The first is the increase in the real money stock (willingly) held by the public in that period (Δm). This part of seigniorage can be regarded as the benefit that the government may naturally get as the economy expands and the public become ready and willing to hold larger money balances. The second part has more negative connotations since it measures the erosion in the value of real money balances due to inflation (πm). This last term is commonly referred to as the ***inflation tax***. It is an indirect tax on money holders – and therefore one very good reason not to hold money balances that are too large. Notice that we can also think of inflation (π) as the **tax rate** on money holdings and of money demand (*m*) as the **tax base**.

Once the reader grasps the point (from Box 16.1) that the use of monetary financing can potentially impose a (hidden) ***tax*** on the holders of money balances then various other conclusions follow. ***The most important of these is that the holders are likely to try to avoid that tax at least in part but especially if inflation becomes very high.*** This fact is not taken into account in the classical version of the demand for money in which the only arguments are the level of real income (*Y*) and the price level (*P*) – see Box 15.3 and also Equation 15.14 above.

So to make progress we must next add some more complexity to that money demand equation.

The Approaches of Keynes and Fisher

As any first year student of economies will already know, Keynesian analysis added the important point that that members of the public demand money not only to facilitate their transactions in goods and services (the transactions motive for holding money) but also for speculative purposes (the so-called "speculative" motive). The first of these motives is largely a function of real income and the price level as already explained above. But Keynes also argued that the nominal interest rate represents the opportunity cost of having money in our wallet or purses instead of having it in the form of bonds or other non-monetary financial assets that render interest. Hence, it is to be expected that a rise in the nominal interest rate will result in some *decrease* in money demand, since people would profit more from having some part of their money holdings used instead to purchases bonds or similar financial assets. Thereby, Keynes argued, besides being positively affected by real GDP and by P, the money demand function should also depend negatively on the nominal interest rate.

Accordingly, if there is an increase in the nominal interest rate, holding the level of real GDP constant, velocity should increase so that the real demand for money declines. Thus, the nominal interest rate will have a positive effect on velocity and a negative effect on real money demand. Our earlier Equation 15.14 will now become

$$\frac{M}{P} = m(\underset{+}{Y}, \underset{-}{i}) \qquad (16.7)$$

Putting this into plain English, when the nominal interest rate rises the opportunity cost of holding money increases and people will want to hold less money – hence the negative sign (partial derivative) indicated in the equation above.

Irving Fisher went a step further than this by more explicitly recognising the possibility that money-holders are likely also to try to avoid any inflation tax especially if and when inflation (and so the tax rate) becomes very high.

To explain this, consider an individual who decides to deposit a part of his money in an interest-bearing asset of some kind. During the term of the deposit, the borrower can use those funds as she chooses, provided that the money is available at the end of the agreed period. This means that the borrower is borrowing money from the individual and the nominal interest rate is the cost to him or her of that loan. However, people own assets (including money balances) to store wealth that in due course will be used to purchase goods and services or applied in other types of investments. Thus, the interest rate that is relevant to the lender (saver) is the ***real*** interest rate. This is the rate that adjusts the nominal interest rate for any increase in prices of the ultimate purchasers that are intended. In other words, ***the real interest rate indicates the true purchasing power of the assets (including money balances) that we own.***

But the future including the future level of prices is highly uncertain as we explained in some detail in Part 3 of this book. One manifestation of this uncertainty is that when borrowers and lenders (savers) agree on a ***nominal*** interest rate, they can only have ***expectations*** of what will be the rate of inflation during the term of the loan. They do not and cannot know for certain the future price level or therefore the true value of the real interest rate. This means that the actual (*ex-post*) inflation rate may turn out to be different from what the expected (*ex-ante*) inflation rate was at the time when the money was deposited by the lender (saver) with the borrower. Recognizing this we merely need to adapt the Keynesian logic to accommodate this extra angle.

To do this, we can express the relationship that links the real and nominal interest rate in the form of the so-called Fisher equation:

$$i = r + \pi^e \qquad (16.8)$$

where *i* is the nominal interest rate as before, *r* stands for the real interest rate and π^e for the ***expected*** inflation rate.

Equation (16.8) now says that the nominal interest rate equals the sum of the real interest rate and the expected rate of inflation. This means that any changes in the nominal interest rate will be driven by changes in either the real interest rate or in expected inflation. That is, the higher is the expected inflation rate, the higher will be the nominal interest rate. This one-for-one relationship between the expected inflation rate and the nominal interest rate is called the *Fisher effect*.

The implication of the Fisher effect is that, since velocity is a positive function of the nominal interest rate (as argued above and shown in Equation 16.7), then it should also be a positive function of expected inflation. *Thus, inflation expectations should have an additional negative impact on money demand.* In policy terms, if policy makers act in ways that cause inflationary expectations to rise – perhaps because they budget for a deficit that is known to be large relative to the government's capacity to borrow- then holders of money balances will try to avoid the impending higher inflation tax by reducing their existing holdings of money

The Technical Limit on the Use of Inflation Financing

We can now use the new version of the money demand equation to provide a more definitive explanation of why any Minister of Finance faces limits on the amount of monetary financing that he can achieve.

First, note from the equations of Box 16.1 that seigniorage need not necessarily impose an inflation tax on money holders. To see this, consider the case where the authorities create an amount of money that just matches the rate of real GDP growth. In this case, the money supply is growing at the same rate as money demand and there is no inflation. The government obtains resources merely from the first part of the increase in the real money stock as shown in the equations of Box 16.1 – the part willingly held by the public in the period in question (namely Δm). This is an ideal scenario in some sense because the government is gaining access to some financing without imposing an inflation tax on money holdings (πm=0). [12]

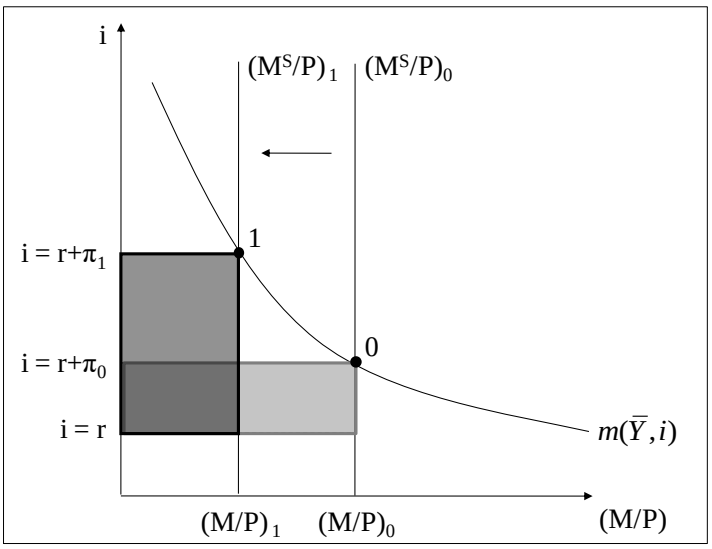
[12] In this case too and anticipating the discussion of Chapter 17, even a government operating in a fixed exchange-rate regime can earn seigniorage revenues just by increasing M at the rate of GDP growth. By exactly matching the rate of growth of the money supply to the rate of growth in money demand, the government will be raising revenue without creating an excess supply of money and without pressuring the exchange rate to depreciate.

However, the volume of financing available in this case is obviously strictly limited – it is limited in fact to the rate at which the economy is growing: (i.e. $\Delta m = g$ where g is the real rate of growth of GDP). This may not satisfy an ambitious Minister of Finance who faces a demanding electorate anxious to obtain more pubic sector goodies!

So let us allow a bit of inflation into the picture recognising as we do the point from Irving Fisher about the public's ability to avoid the inflation tax. In Figure 16.3 below, the downward sloping curve represents the Keynesian money demand equation (which depends on both Y and i). Remember also that *r* stands for the real interest rate. Assume that initially the government is printing money at a rate consistent with a positive inflation equal to π_0. (at the point shown in the diagram as $r = i + \pi_0$.). We can see that at this inflation rate, the opportunity cost of holding money (the nominal interest rate) is higher than if there was no inflation and so it also exceeds the real interest rate (r). Hence, at π_0, the government is imposing a tax on money holders equal to the area shaded in dark grey.

Assume now that the government decides to print more money in order to finance its expenditures and that as a result actual inflation increases to π_1 . So although there is more nominal money in circulation, the demand for money in real terms actually falls. (This is merely a consequence of the public's move back along the money demand equation in which the nominal interest rate is made up of both nominal and inflation components). As the graphic shows, in this situation the price level has to rise more than proportionally in order to compensate for this decrease in money demand, so the *real* (inflation adjusted) money supply moves leftward and money market equilibrium is reached at point 1. At this point, the opportunity cost of holding money is higher and agents demand less cash.

Figure 16.3: Illustrating the Inflation Tax



The diagrammatic example shows that the government faces a trade-off. The *higher* is the inflation rate pushed, the *lower* will be the tax base against which that tax is raised. The actual inflation tax revenue achieved by the government is indicated by the area of the shaded rectangle (drawn below point "O" for the initial rate of inflation and below point "1" for the higher rate). The change in this rectangular area as inflation rises will obviously depend on the

curvature of the money demand equation. *That area will not necessarily get larger as inflation rises.*

In the case when the money market is in equilibrium, ***real*** money demand and ***real*** money balances will be constant (Δ*m*=0). and seigniorage will be exactly equal to the inflation tax. From the equations shown in Box 16.1 we can therefore write that:

$$S_{rev} = \frac{\Delta M}{P} = \pi m = \mu m \qquad (16.9)$$

In other words for real money balances to be constant, inflation must eventually be equal to nominal money growth.

Finally we can use this to state that the problem of a government wishing to use the inflation tax is to find the ***optimal rate of money growth***, i.e. the rate at which the money supply should grow so that revenues from the inflation tax are ***maximized***. In terms of Figure 16.3., this means that the government has to find the point beyond which the rectangular area (e.g. below point "0" for initial inflation and point "1" for the higher assumed inflation) ceases to expand as inflation rises. After that critical point, the government will receive ***less*** and not more increases in revenues due to further increases in the rate of money growth and higher inflation.

It is possible using this logic, to show how inflation tax revenues first rise in total and then decline as the inflation tax rate (i.e. the rate if inflation rises). The curve that traces this effect is named after the American economist Arthur Laffer. This is most commonly done by specifying a particular form of the money demand equation (the exponential "Cagan" form) as follows.

$$m = m_0 e^{-\alpha\pi} \qquad (16.10)$$

Then by setting m_0 (the initial value of money holdings) equal to one and substituting this expression into the expression for the inflation tax revenues, we obtain a revised version of that expression, namely:

$$Inflation\ Tax = \pi e^{-\alpha\pi} \qquad (16.11)$$

This equation enables us to plot a range of values of the rate of inflation (horizontal axis) against the inflation tax revenues (vertical axis) to obtain the Laffer curve depicted in Figure 16.2 below.

Up to point A in that Figure, any additional increases in money growth and inflation will translate into increased revenues. However, at point A, the revenues coming from the inflation tax reach their maximum and, from that point onwards, additional increases in the growth rate of money will still lead to more inflation but to less revenue. In fact once point A is reached and then surpassed, increases in the rate of inflation will be more than offset by decreases in the tax base, so that revenues from this source will actually be declining. The exponential nature of the money demand function enables us to show that the maximum level of the inflation tax revenues will be reached when $\pi=1/\alpha$[13]. Attempts to raise more revenue after that point will be

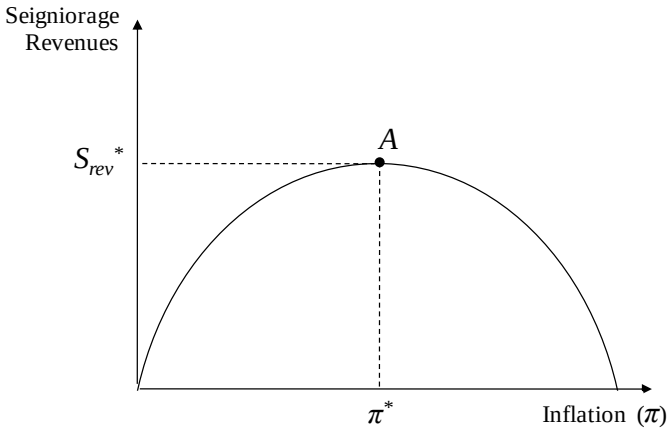
[13] This follows mathematically from the exponential relationship (α) between money demand and inflation.

self-defeating: the government can only raise more revenue from point A by printing money at a lower pace. [14]

This is the dilemma that any under-pressure Minister of Finance faces when he contemplates active use of inflationary financing of his deficits.

The practical problem for any government contemplating the use of the inflation tax as a way to finance its deficits is to find the rate of inflation that maximizes the revenue it can collect from the inflation tax. Clearly if "α" is relatively low (i.e. the public's money demand responds only sluggishly to rises in inflation, then the prospective inflation tax revenues will be higher than in countries where "α" is much higher - probably because of recent episodes where high inflation has caused large losses in real terms from holding money balances – e.g. all countries of the former Soviet Union after 1989, Argentina at many points in its recent history, Zimbabwe in the early 2000s (Chapter 17 has more examples of hyper inflation).

Figure 16.4: Inflation tax Laffer curve



A Simple Rule of Thumb

We can give the policy-maker just a bit more guidance about where this optimal point may lie by invoking a simple variant of the inflation tax model that we have so far used. This was suggested by the late Rudi Dornbsuch in a paper in XXX. Instead of relying on the exponential form of the money demand equation which enables us to mathematically define the optimal rate of inflation he uses a simple linear form. This has the advantage that we do not need to set the initial value of real money holdings (m_0) at 1.0 in order to solve for the "best" level of inflation. Instead we can recognise, as does Figure 16.1 above, that different countries at

[14] However, in slightly more complex models it can be shown that the optimal inflation tax might not be the one that maximizes seigniorage revenues. For example. Julio Olivera (1967) and Vito Tanzi (1978) point out that the existence of substantial lags in tax collection in developing countries that are likely to reduce the real value of conventional tax revenues especially when inflation is extremely high. The problem here is that tax rates are assessed at certain dates but the payments are collected only at later dates. In such a situation, an increase in inflation will cause a decline in *conventional* tax revenues. That decline will in turn offset the increase in revenue coming from the inflation tax. ~~If this is~~ the case, then the optimal inflation tax will be reduced to the left of point "A" in our diagrams. ~~π~~This phenomenon is known as the Olivera-Tanzi effect.

different levels of development have starting values for m_0 which are widely different from each other relative to GDP. So we can explore the consequences of fiscal deficits and inflation financing for these different types of countries.

Let us begin by recognising TWO separate elements in Money demand and the Velocity of circulation, namely:

- a stable element the defines normal conditions (call this *α*)
- an inflation element that reflects people's well known tendency to reduce their money holdings as inflation rises higher and higher (call this *β*). – remember the German Weimar Republic and today's Zimbabwe

Specifically: $$\frac{M_d}{PY} = \frac{1}{\sigma + \beta\pi} = MoneyDemand \text{.....} [16.12]$$

This is solved for the ***inflation rate (π)*** as follows:

Define μ = the rate of monetary growth
And *d* = fiscal deficit as a % of GDP

Then $$\mu(M / P) = dY \text{.....} [16.13]$$

OR $$\mu = dYP / M \text{.....} [16.13\,\text{a}]$$

Then using Equation [16.11]

$$u = d(\sigma + \beta\pi) \text{.....} [16.14]$$

But we know also that In the steady state (long-term equilibrium), inflation will be the difference between the rate of monetary expansion and the rate of growth of real output (this is an expression of the classical quantity theory as described in Box 15.XXX). So

$$\pi = u - y \text{.....} [16.15] \text{...}$$

Substituting from equation 16.14 now gives and expression for long term inflation in terms of an economies growth and its fiscal deficit (*d*):

$$\pi = (\sigma d - y)/(1 - \beta d) \text{.....} [16.15]$$

The numerical example shown in Table 16.2 uses the formula shown in Equation [16.15]. This enables us to examine how (for any given level of the planned fiscal deficit, and the growth rate of real income - y), how much inflation would be needed to finance that deficit IF the Minster had zero potential to borrow for that purpose.

Table 16.3: How Much Inflation for a Given Fiscal Deficit (d = 5%, y= 1%)?

1/α	α	β	g	y	ττ	depth
0.05	20.00	15	0.05	0.01	396.0%	1.3%
0.15	6.67	9	0.05	0.01	58.8%	8.4%
0.2	5.00	8	0.05	0.01	40.0%	12.2%
0.3	3.33	6	0.05	0.01	22.4%	21.4%
0.35	2.86	5	0.05	0.01	17.7%	26.7%
0.45	2.22	3	0.05	0.01	11.9%	38.8%
0.5	2.00	2	0.05	0.01	10.0%	45.5%
0.6	1.67	0.5	0.05	0.01	7.5%	58.7%
1	1.00	0	0.05	0.01	4.0%	100.0%

At the bottom of this table we see a hypothetical country where the "α " term is high implying that in normal non-inflationary times the population holds money balances that are high relative to GDP. In fact the bottom of the table has been designed to show "monetary depth" of 100% of GDP (or 1 given the way in which alpha is defined). We can also infer that that same hypothetical county also been quite inflation-stable in the recent past (i.e. it has had very limited experience of high inflation). As a consequence the beta term in the money demand equation is equal to zero – people trust money as an asset and are unlikely to run away from money in response to some small rise in inflation. At the top of the table we see the opposite – a second hypothetical country where the alpha term is very low even when today's inflation may be reasonably low. But we can infer that second this country has had bad recent experiences of high inflation and so the beta term is very high as a reflection of doubts about money being a safe asset to hold.

The final two columns of the table clearly show the strong inverse relationship between inflation and the monetary depth of an economy. In cases such as Zimbabwe in the period to about 2008 when the monetary printing presses were flat out and zeros were being added to the currency notes on an almost daily basis, the amount of money people chose to hold ***relative to nominal income*** continued to shrink. The domestic money was not trusted as an asset, people shied away from it as much as possible and used alternative means such as an international currency such as the US $ to make transactions wherever possible. So for example in the first entry in the final column, the monetary depth at the end of one year (after the year's inflation is factored in is only 1.3% as against 5% at the start of the year (column 1)

Note that for the ***same*** assumed fiscal deficit of 5% of GDP and the ***same*** growth rate of 1% per annum, the first country (bottom of the table) can finance its deficit with only 4% inflation. The second country (top of the table) needs almost 400% inflation.

Although the model used here is very simple indeed, there is a key message. This is that countries differ hugely in their ability to use the inflation tax as a means to finance fiscal deficits. Chad is a very poor country with a financial system at the extreme upper left of the graphic shown above as Figure 16.1. It has a very low ratio of bank deposit money to GDP (< 10%) and a large part of the total money supply is in the form of cash (notes and coins) (>70%). A poor country such as Chad with a very thin financial system and low money holdings (less than 10% of GDP) will struggle to finance even very small deficits (.g. 2% of GDP) without triggering rapid inflation. By contrast countries that have built a basic trust in their financial

institutions over time – examples being South Africa and China both of which have deposit: GDP ratios close to or above 100%, have much greater freedom to successfully use some inflationary financing: they both benefit from having large money balances voluntarily held by their publics. As a result that are able to absorb a modest fiscal deficit without triggering large inflation fears.

There is no fairness involved in this result – merely the technical reality that where trust in the domestic currency has been established (as it broadly has in China and South Africa and of course in most OECD countries) then Ministers of Finance do have some scope for some careful use of the inflation tax to partially finance their budget deficits. Ministers of Finance in poorer countries with very small financial systems cannot do this although they often pretend that they can! Their fiscal space in this particular dimension at least is heavily constrained. See Box 16.2 below.

Box 16.2: The Concept of Fiscal Space

Peter Heller of the IMF Heller has defined fiscal space as …. "*the availability of budgetary room that allows a government to provide resources for a desired purpose without any prejudice to the sustainability of a government's overall financial position*". This definition makes it clear that the fiscal space concept is inextricably linked to the concept of sustainable finance which Heller defines as *"the capacity of a government, at least in the future, to finance its desired expenditure programs, to service any debt obligations (including those that may arise if the created fiscal space arises from government borrowing), and to ensure its solvency."* In other words the fiscal space concept must be regarded as having an inter-temporal coherence with any borrowing in the short term to increase today's fiscal space being offset by some reduction of the future fiscal space when today's borrowing or accumulation of arrears (either domestic or foreign) is repaid in the future.

Looked at it in statistical terms, the concept of fiscal space suggests that a government may have some flexibility to adjust some elements of its budget to ensure that a larger absolute and relative volume of resources are devoted to, say, the HIV/AIDS agenda. But this proposition is inherently multi-dimensional. In reality that extra fiscal space can manifest itself statistically *inter alia* from an increase in total own-revenues from (e.g. higher tax revenues); an increase in international grants (ODA), increased borrowing whether domestic or foreign, an increase in fiscal deficits not matched by formal borrowing (implying either some inflationary finance and/or arrears of payments); some reduction in non-HIV/AIDS expenditures to make more room for the latter, or greater efficiency in the use of public funds generally implying more units of service delivery per unit of money expended.

There is also a critical *political dimension* underlying any extra fiscal space that statistical analysis might suggest to be potentially available. For example, the statistical analysis might reveal that expenditures on some non HIV/AIDS activities (e.g. the military) are unambiguously too high (e.g. relative to a comparator country) or that expenditure efficiency is woefully low. But the potential fiscal space that is revealed by such results means absolutely nothing for the HIV/AIDS agenda unless there is also a real political will to reduce the excesses and eliminate the inefficiencies. So there can be significant gaps between the *potential* and the *actual* fiscal space in any country.

16.4 Borrowing, Growth, Inflation and Interest Rates

The various parts of the macro story that have been assembled above now equip us better to examine some of the issues around borrowing and the accumulation of debt to finance itself. This examination is conducted here for the situation of domestic debt and then extended in Chapter 17 for the case where debt is partly at least from foreign sources

Let us consider first a simplified version of the consolidated budget constraint of the public sector as shown in Equation 16.3 above and reproduced below.

$$\Delta D_p + \Delta M - e\Delta R^* - \Delta DCb = P(G-T) + iD_p - i^* eR^* \ldots\ldots \text{[16.3]}$$

In particular, assume that there are no foreign reserves (so that $e\Delta R^* = i^* eR^* = 0$) and also that the consolidated public sector has no claims on commercial bank credit (so that $DC_b = 0$). Then the change in government debt in any period is given by:

$$\Delta D_p = P(G-T) + iD_p - \Delta M \ldots\ldots \text{[16.16]}$$

According to equation (16.16), the government in effect issues new bonds (domestic debt to the private sector) to finance the part of the deficit that is not financed through money printing.

How much of such debt will be consistent with macroeconomic stability? One way to answer that question is by noting first that as economies normally grow over time, the government is best advised to assess its debt level relative to some measure of the scale of the economy, such as GDP. Let us assume that they seek to stabilize the domestic debt as a given percentage of nominal GDP

The debt-to-GDP ratio (d) is defined as:

$$d = \frac{D_p}{PY} \ldots\ldots\ldots\ldots \text{[16.17]}$$

By invoking some basic algebra it is possible to obtain an expression for the evolution of that debt-to-GDP ratio over time. First, differentiate expression (16.17) and then use the approximation that:

$$\Delta d = \frac{\Delta D_p (PY) - D_p (Y\Delta P + P\Delta Y)}{PY^2} = \frac{\Delta D_p}{PY} - d\left(\frac{\Delta P}{P} + \frac{\Delta Y}{Y}\right) = \frac{\Delta D_p}{PY} - (\pi + g)d \ldots\ldots\ldots \text{[16.18]}$$

Where now π and g denote the inflation rate and the growth rate of real GDP, respectively. Since both P and Y appear in the denominator of the debt ratio (Equation 16.17) any *increase* in these variables on their own will result in a lower debt ratio. But of course any new debt will have the opposite effect on the ratio.

To see this substitute the expression for new borrowing (ΔD_p) as shown in (16.16)) into equation (16.18) and recalling also from our earlier discussion that the real interest rate is equal to $r=i-\pi$, we can re-express the change in the debt-to-GDP ratio as:

$$\Delta d = \frac{G-T}{Y} - \frac{\Delta M}{PY} + (r-g)d \ldots\ldots\ldots\ldots \text{[16.19]}$$

Equation (16.19) states that change in the debt-to-GDP ratio will be determined by three main influences:

(i) the size of the primary deficit as a percentage of GDP that drives the need for new borrowing

(ii) the amount of seigniorage revenues that are achieved also as a percentage of GDP. This reduces the amount of new borrowing needed for any given deficit
(iii) by the difference between the real interest rate (any increase raises the debt ratio) and the growth rate of GDP (any growth lowers the debt ratio).

Moreover, it says that the part of the primary deficit that is ***not*** financed through seigniorage has to be financed through the issuing of new domestic debt. Also, interest payments have to be financed with new debt. But notice that even if the primary deficit is zero, the debt-to-GDP ratio will grow at a rate equal to the difference between the real interest rate and the GDP growth rate. The problems of an economy in recession are immediately clear (e.g. most Euro area economies in 2011-2013) – the debt ratio is harder to keep under control when GDP growth is very low *for any given size of the primary deficit*. But of course fiscal deficits are likely to rise in recessions as collections of most forms of taxes will fall. So debt ratio control is doubly difficult in these situations.

Stabilizing Debt

In this sub-section we assume that the debt ratio has reached the limit that the government regards as "safe" [15] and that it now need to stabilize the ratio at that level. This requires that the change in the debt-to-GDP ratio is equal to zero so that:

$$\left(\frac{T-G}{Y}+\frac{\Delta M}{PY}\right)^{*}=(r-g)d \quad \text{.....[16.20]}$$

This equation shows the primary surplus in excess of seigniorage revenues that is required to stabilize the debt-to-GDP ratio. It is easily seen that this value is directly affected by the difference between the real interest rate and the growth rate of GDP. Hence, this difference is a crucial important determinant of the sustainability of the government deficit in any country.

Real interest rate lower than growth rate

To examine this proposition further, consider first a case where the real interest rate on debt is lower than the growth rate of output.

If this is the case, debt is eroded over time as GDP grows (the denominator of the debt ratio rises) and a government could stabilize the public debt even while running high primary deficits. A high rate of growth, other things being equal, is a positive factor in debt sustainability. This is why fast growing countries such as South Korea fared much better in the major debt crisis of the early 1980s than did the slow growing countries in Latin America in spite of similar starting levels of debt relative to GDP. A similar phenomenon occurs during bubbles, as asset prices increase faster than the cost of raising capital so that real interest rates are effectively low. However, this simple calculus is somewhat complicated when the issues of open economies and changing exchange rates are introduced into the debt equations (see Chapter 17).

[15] One specific example, now breached is that the Maastricht Treaty which set a limit of 60% on the public debt ratio of countries that wished to join the Euro currency zone. In IMF programmes for developing countries facing balance of payments problems, a debt limit is a common performance requirement of the Fund. But most prudent governments will normally have some view as to the limit on the debt ratio to which they should try to adhere.

Real interest rate higher than the growth rate

If this is the case, it becomes impossible for the government to run a primary deficit that exceeds the amount it can raise through money printing because if it does so debt will increase inexorably: the path of the debt will be explosive and so the debt ratio will continue to rise without limit. At some point, creditors will realise (correctly) that the government is unable to service the existing debt and they will cease to buy new debt. At this point the government will be forced to create a primary surplus.

The first post WWII example of this to affect the developing world came with the debt crisis that began in 1982 with the default of Mexico. The story of this crisis is presented in Box XXX in Chapter 17. In brief, after accumulating large debts following the hike of OPEC oil prices in 1973/74 at apparently low real interest rates, most oil importing developing countries (and several oil exporters such as Mexico and Venezuela) suffered a major shock in the early 1980s as the USA tightened its own monetary policies and sharply hiked interest rates. This hike in turn caused the reversal of the growth: interest rate relationship and so forced deflationary policies on many affected developing countries both low and middle income. Many countries starting with Mexico in 1982 were unable to generate the necessary primary surpluses to stabilize their debts and so were forced into a debt default or to seek various forms of debt relief. (see Box 2.9.).

The general problem of stabilizing the public debt is more clearly understood if we look at Figure 16.6 below. This plots the relationship between the debt ratio and the change in that ratio as defined in Equation 16.19 above, as the line Δd_0. It assumes that the real interest rate exceeds the rate of GDP growth ($r-g>0$) and that this difference is constant. As a result the line representing the change in debt will have a ***positive*** slope equal to $r-g$. Also, the vertical intercept of this line will depend on the size of the government primary deficit minus the available seigniorage revenues: the other term in Equation 16.19. Let us assume also that the government is running either a primary surplus (G-T<0) or can command an amount of seigniorage revenues that more than compensate for any primary deficit. This implies that the line Δd_0 will intercepts the vertical axis at a negative value.

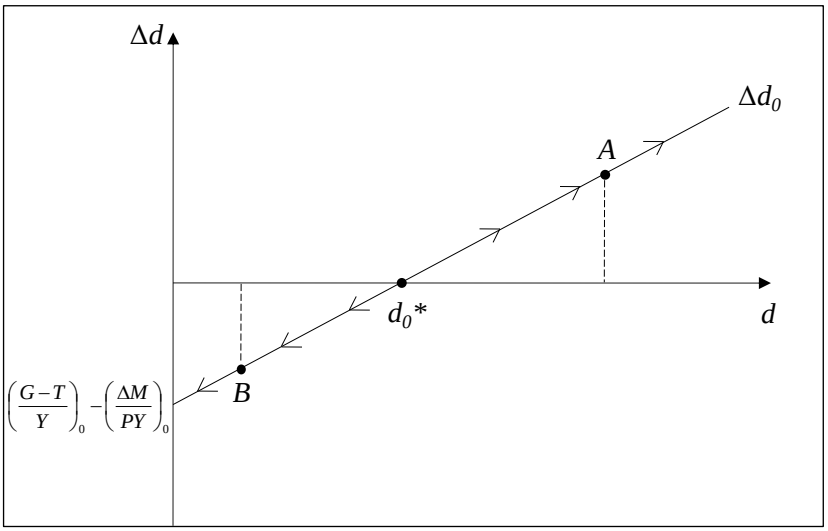
It can be seen also that the line Δd intercepts the horizontal axis at d_0*. This is the point at which $\Delta d=0$, i.e. where the public debt ratio is stable. The condition that satisfies this equilibrium is given by expression in Equation 16.20. At this point, the existing primary fiscal balance and the seigniorage revenues are together exactly sufficient to service interest payments on current debt.

But notice that d_0* is an unstable equilibrium. If for example the initial debt is to the left of d_0*, such as at point B, the change in debt is negative ($\Delta d<0$), which means that the primary surplus and existing seigniorage revenues together are *more than sufficient* to pay the interest on the current debt. In this situation the debt ratio will be falling towards zero. On the other hand, if the initial debt is to the right of d_0*, such as at point A, then the change in debt is positive ($\Delta d>0$). At this point, the primary surplus and the revenues received through seigniorage are clearly *insufficient* to service the debt interest payments. So at this point the debt will be accumulating over time and it will continue to grow without limit at an explosive rate.

The main point to stress here is that the government debt can only continue along the path indicated by points such as "A" while the public (who remember are the buyers of public debt) expects the government to remain solvent. If the public perceive that the government at some stage will no longer be able to service its debt, then they will cease to buy government bonds. Stabilization after this point will need to be addressed either by invoking an increase in the size of the primary surplus (reduction of the deficit) or by somehow engineering an increase in seigniorage revenues if the economy is at point A (B). Notice that

in either case, line Δd_0 would shift downwards as a result. **Since changes in seigniorage will imply changes in the rate of inflation, notice also the intimate connection between a debt stabilization agenda and any inflation target.**

Figure 16.6 Stabilizing Public Debt



The graphic in Figure 16.6 is a very useful analytical tool to help analyse other aspects of a country's debt situation. It will show up again in Chapter 17 where we examine the debt issues in a broader international context. We can note immediately that changes in either the government's primary deficit or in its ability to extract seigniorage revenues can be illustrated by shifting the point of *intersection* of the line Δd_0 with the vertical axis. Changes in a country's growth rate or in the real interest rate on debt which it faces can be illustrated by changing the *slope* of the Δd_0 line. We will provide examples of all of these various changes in Chapter 17.

Chapter 17: Macroeconomic Management: the International Context

17.1 Introduction

The analysis of the previous chapter was able to ignore many of the influences on the macroeconomic balances that come from the international relations of a country with the rest of the world. However, this is unrealistic since all developing economies have substantial links through trade, finance, debts and payments to the international economic system. In order to see how these international economic relations impact the macroeconomic story this present Chapter explains:

- how the consequences of attempts to use the monetary financing of fiscal deficits can have different effects depending on the type of exchange rate arrangements that a country maintains.
- the probable impacts of excessive money creation on the balance of payments and
- the limits on foreign borrowing in somewhat more depth than in Chapter 16 above.

17.2 Inflation Financing and Exchange Rates

We start with some definitions. Some of these terms have been used before in the two previous chapter but they are summarised here in Box 17.1 together with some new terms for the convenience of the reader.

Box 17.1 Definition of Terms

G = public current spending on goods and services
I_g = public sector investment
T = government revenue (taxes raised and non-tax revenues such as fees and fines)
D = the stock of domestic public debt and i_d is the associated interest rate
D_c = Domestic Credit
D_f = the stock of foreign debt and is denominated in foreign currency
i_d and i_f are respectively the interest rates paid on domestic and foreign borrowings
M = the domestic money supply
ER = the nominal exchange rate
P_d = the domestic (general) price index
P_f = the foreign price level
R = the stock of foreign reserves

First let us re-define the Government Deficit. This was done already in Equation 16.1 above where the deficit appeared as the right hand side of that equation[16]. Here we use exactly the same equation except that we now spell out more explicitly the two parts of the interest charges on debt paid by government: the domestic part and the foreign part. Since the latter is paid in

[16] That equation is $\Delta D_c + \Delta D_p = P(G - T) + iD_p$

a foreign currency such as the dollar it is necessary to explicitly include the exchange rate in that part of the equation. Also in Equation 17.1 below we show the government current expenditure separately from government investment

$$P_d(G + I_g - T) + i_d D_{t-1} + ER(i_f Df_{t-1}) \ldots\ldots\ldots \quad [17.1]$$

Within this total deficit we can once again identify the ***primary*** deficit (which takes account of all government expenditures except interest payments on debt) as:

$$P_d(G + I_g - T) \ldots\ldots\ldots [17.2]$$

So the rest of the deficit shown in Equation [17.1] shows the Interest Payments on local and foreign debt

As was recognised at the beginning of chapter 16, the government has basically *three* ways to finance its deficit: local borrowing, foreign borrowing and the "printing of money". We can represent these three algebraically by showing the three elements that together must produce enough financing to cover the full deficit including interest payments. Specifically, the Deficit as a whole is in nominal terms is financed as follows

$$P_d.Deficit = (D_t - D_{t-1}) + (M_t - M_{t-1}) + ER(Df_t - Df_{t-1}) \ldots [17.3]$$

The right hand side here shows that the deficit finance is accounted for by increases in the stocks outstanding of the three elements – local debt, foreign debt and money balances – all in nominal terms.

In the next few paragraphs we somewhat simplify the analysis by first assuming that the government has no capacity at all to borrow money from the local financial markets. So the first term on the right of Equation 17.3 can be set to zero. In this simplified case then the task facing the authorities reduces to:

$$P_d.Deficit = (M_t - M_{t-1}) + ER(Df_t - Df_{t-1}) \ldots\ldots\ldots [17.4]$$

In this case it is easily seen (i) that any monetary financing of the deficit depends on there being a rise in money holding by the public from period t-1 to period t. How large this can be depends, as we have already seen on the public's willingness to hold money balances, and (ii) that in the absence of sufficient monetary borrowing the government needs to increase its foreign indebtedness.

Fixed Exchange Rate Case

Let us examine this a bit further first in the case where the country's exchange rate is fully fixed (pegged) to a foreign currency such as the US dollar. Then by invoking a simple Keynesian form of the demand for money function as repeated below in Equation 17.5 we can deduce a simple but important proposition about the further constraint that the government now faces in trying to finance its deficit.

$$M_d / P_d = f(Y, i_d) \text{ or } \mathrm{P_d}\ f(Y, \mathrm{i_d}) = \mathrm{M_d} = \mathrm{M_t} \ldots\ldots [17.5]$$

This new constraint arises from the fact that many poorer developing economies are also small and relatively open to international trade. In their circumstances and with a fixed exchange rate, it is not wholly unrealistic to say that ***most of the supply side pressures on the domestic price level derive from international price movements and not from those engendered by domestic forces***. Put in its most extreme for this is the so-called ***Law of One Price*** which is shown algebraically in Equation 17.6 below.

$$P_d = P_f.ER.....[17.6]$$

This says that the domestic price level is set by reference to foreign prices (in, say, dollars) multiplied by the fixed exchange rate.

Although we continue to recognise that this last equation is a statement of a tendency and not a water-tight statement of fact, we can substitute for the price level term Equation 17.5 and then use this in Equation 17.4 to establish the first important point. This being done and with the exchange rate fixed and international price changes being at best quite low, there is a very clear limit on how much financing can be associated with a rise in domestic prices.

It follows that with the domestic price level pegged by international supply side forces, then most of any rise from period t-1 to period t in money demand can only come about if ***real incomes*** are rising (to stimulate higher demand for nominal money balances).[17] In most economies that rise will be limited to around 3-6 per cent per annum. In slow growing economies it will be close to 0-2 per cent. In either case, the government is clearly constrained in the amount for monetary financing (seignorage and inflation tax elements) it can achieve If there is a price peg in place as is more likely when exchange rates are fixed. It follows from Equation 17.4 that if fiscal deficits are large then the burden of financing these must fall mainly on increased foreign borrowing and debt.

In other words the commitment to a fixed exchange rate when fiscal deficit are relatively large and the scope for local borrowing is small, is tantamount to accepting an increased burden of international debt. Or, if the propositions turned around – IF a country starts with a large level of external public debt and wants to reduce this then, under a sustained regime of fixed interest rates, there will be little choice but to engineer a substantial reduction in the fiscal deficit. This in essence is the situation in which countries like Greece and Portugal found themselves in the period 2010 and 2012 with their membership of the Euro committing them to a fixed exchange rate so long as they remained members.

Flexible Exchange Rate Case

This is a more general case and one that has become relevant to more and more countries over the past 20-30 years as formerly tightly controlled exchange regimes have been relaxed round the world.

In order to identify the key distinguishing aspects of this case, we initially assume that it is difficult for the authorities to borrow either locally or in foreign markets.

[17] This also assumes that the effectiveness of changes in id are effectively ruled out in most low income countries by the absence of a local securities market (i.e. money demand is unlikely to respond much to changes in interest rates). Equation[17.4 then shows that if growth of Y is close to zero then Mt-Mt-1 also approaches zero and budget financing effectively comes from foreign borrowing

Then from the simplified version of Equation [17.4] we see that now:

$$P_d.Deficit = M_t - M_{t-1} \text{.....[17.7]}$$

or $$Deficit = \frac{M_t - M_{t-1}}{P_d} \text{.....[17.7a]}$$

The crucial importance of the flexibility of the exchange rate is that it allows domestic prices (and the inflation rate) to detach themselves from international prices (inflation).

With the same money demand as before, price level changes can now contribute to the difference between *Mt* and *Mt-1* that is crucial to monetary financing of the deficit.

To generate a useful numerical example discussed, we first invoke another familiar accounting identity that was explained in Chapter 15:

$$MV \equiv PY \text{.....[17.8]}$$

Where V is the Velocity of Circulation of Money

or $$M \equiv PY/V \text{.....[17.8}a\text{]}$$

We know from the earlier analysis that if the growth of Y is close to zero then *Mt-Mt-1* also approaches zero. But In this new *flexible exchange rate* case, P can also rise to prevent this failure to achieve any money for the deficit. Because using Equation [17.8 a] and the same assumptions as before but *allowing* Pd *to diverge* from Pf that equatio] can be re-written as :

$$M_{dt} = P_{dt}Y_t/V(i_d) = M_s \text{.....[17.8}c\text{]}$$

However ***if*** id and V are also (near) constant along with Y then the rise in money demand from one year to the next (the rise that is needed to finance the budget deficit when there is no borrowing) simplifies to:

$$Deficit = \left[\frac{P_{dt} - P_{dt-1}}{P_{dt}}\right].\frac{M_t}{P_{dt}} = \text{Infl}ationTax \text{.....[17.9]}$$

Notice that in the formulation of the deficit financing shown in Equation [17.9] the term in square brackets is the inflation tax ***rate*** and the term outside the bracket is the ***base*** to which that rate is applied. So it is evident – as we saw in Chapter 16 - that a country with a very large base (a large financial/monetary sector) will be able to achieve an absolute amount of inflation tax revenues with only a fairly modest rate of inflation. By contrast a country with a very small monetary base will need to pay a very high prices in terms of inflation to get only limited financing from this source.

The important point here is that the reintroduction of price flexibility that is allowed for once a country adopts a flexible exchange rate, does restore some ability (albeit it different for different countries) to use inflationary methods to finance fiscal deficits.

17.3 Choices in Exchange Rate Policy

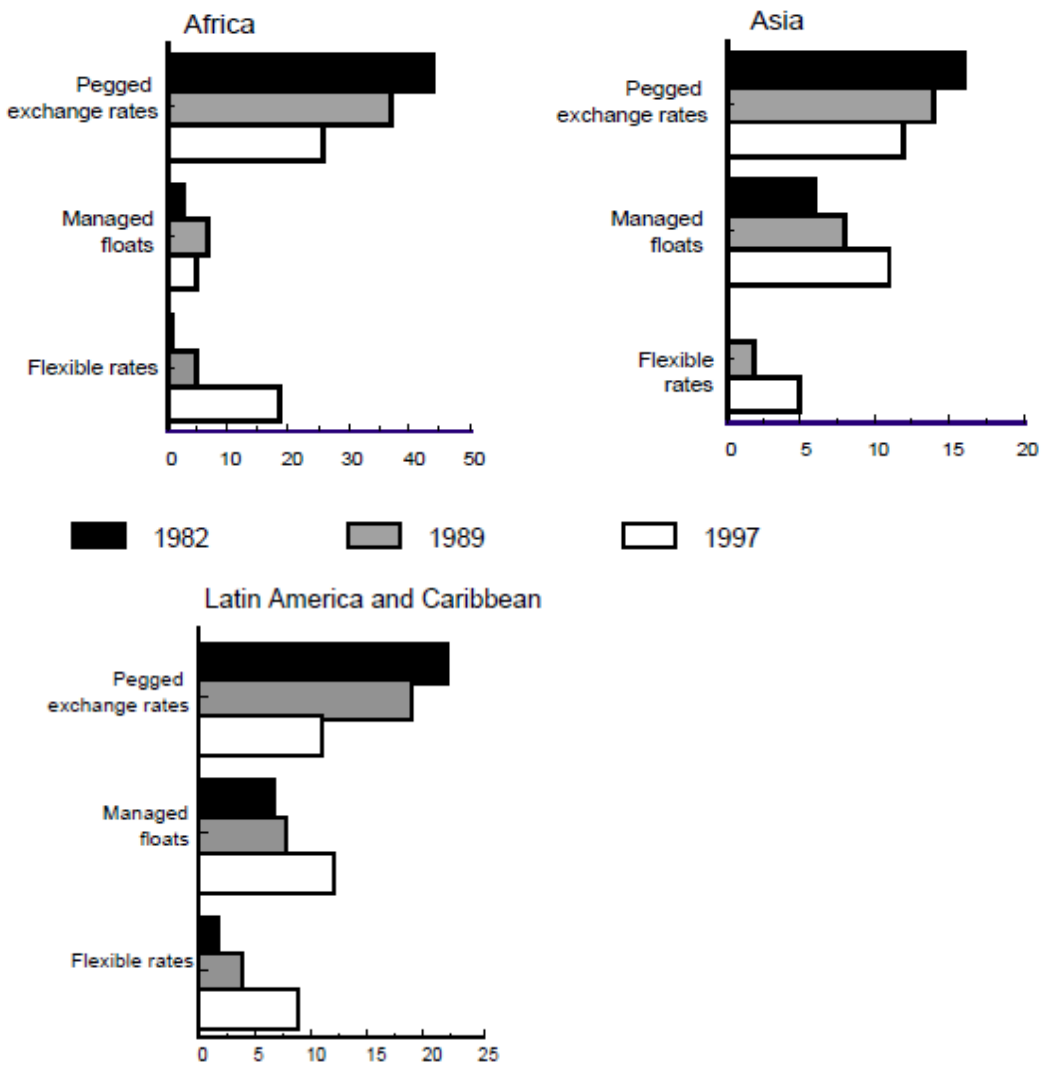
The analysis in the previous sector reminds us of an important point namely that the nominal exchange rate is a policy lever that can in principle help a country to determine its own price level. Readers can refer back to Equation [15.11] in Chapter 15 to see how this works. That "independence" in determining the domestic price level turn enables a government to have a bit more flexibility in financing a fiscal deficit using a degree of inflationary financing. This is not an un-categorical benefit because in many developing country situations the amount of such financing that can be attempted *without* triggering excessive and damaging inflation is limited for the reasons already explained above.

In fact the dominant tradition in establishing exchange rates in developing countries was until quite recently one of preferring a fixed nominal exchange rate regime in which the rate was administratively determined by the monetary authorities. That choice was made initially in the context of the post-WW2 war Bretton Woods structure in which most countries in the world adopted nominal rates that were nominally pegged for lengthy periods of time –mainly to the US dollar that in turn was pegged in terms of gold. However, after June 1971 as the more advanced countries moved progressively to adopt various forms of floating exchange rates, developing countries lagged behind this trend. This fact is shown in Figure 17.1 below for the three areas of the world where the majority of low and middle income countries are to be found. The gradual move away from fully fixed exchange rates is clear in all three continents. But nonetheless even by 1997 a fixed or pegged exchange rate system remained the most common in both Africa and Asia but with the system of managed floating (see Box 17.1) emerging as slightly more important than a fixed rate in Latin America.

As recently as 2009, 104 countries were classified as having a **fixed** exchange rate according to the classifications shown in Box 17.2 of which 13 were in various types of currency board arrangements and a further 11 were using various types of crawling peg arrangements. The majority of these are classified as low and middle income developing countries. So a degree of fixity of the nominal exchange rate is still the dominant model in the developing world.

By contrast 84 countries were operating regimes involving the different types of **floating** exchange rates. However, the 40 of these that maintain a "free float" are dominated by the advanced economies. The developing countries that join those ranks are mainly the more successful middle income economies such as Chile, Brazil, S Korea, Mexico, Philippines, South Africa, and Turkey, with only two African economies involved namely Somalia and the Congo DRC. Among the 44 that now maintain managed floats are many more low and middle income countries including Kenya, Mozambique, Nigeria, Colombia and Peru.

Figure 17.1 Exchange Rate Regimes in 1982,1989 and 1997



Source: International Monetary Fund

Box 17.2 The IMF Classification of Exchange Rate Regimes

Since 1998, the staff of the IMF has regularly published a standard classification of exchange rate regimes and has indicated to which of several different regimes each member country of the Fund belongs. The system of classification was updated from 2009 and the listing below shows that new classification.

The basic distinction is between A. a fixed rate and B. a floating rate. But the classification now allows various degrees of distinction within each of these categories. In brief the summary of those distinctions is as follows.

A. Fixed Exchange Rates

Hard Pegs

- Currencies of countries where there is no separate national legal tender – i.e. countries where the currency of a second country circulates as the sole legal tender (formal dollarization)
- Currencies of countries that are members of formal Currency Boards

Soft Pegs

- Conventional fixed (peg) exchange rate- where a country pegs its currency at a fixed rate to another currency or a basket of currencies. There is no commitment to irrevocably keep the parity indefinitely
- Stabilized (peg) arrangement – same as a fixed peg except that the commitment is to maintain the currency within a margin of 2.5% against another currency or basket of currencies for six months or longer
- Crawling peg – a peg that is fixed at each point in time is adjusted in small amounts either at a fixed rate or in response to changes in selected quantitative indicators, such as past inflation differentials vis-à-vis major trading partners
- Pegged exchange rate within horizontal bands – a "fixed" peg that can however change by small amounts within a pre-specified margins of fluctuation around a central rate. The main difference with the crawling peg systems is that the direction of periodic small movements of the rate are not known in advance.

B. Floating Exchange Rates

- A floating exchange rate is largely market determined, without an ascertainable or predictable path for the rate. Although some occasional official actions marginally to influence the market rate may be taken, policies that specifically target a specific level of the exchange rate are incompatible with floating.
- Free floating – as above but with official interventions that are either non-existent or extremely rare. This includes the countries of formal currency areas such as the Euro currency area.

Source: Karl Habermeier, A. Kokenyne, R. Veyrune, and H. Anderson, *Revised System for the Classification of Exchange Rate Arrangements*, IMF Staff Working Paper, WP/09/211

There are a variety of reasons why a country may choose to maintain a degree of fixity in its exchange rate regime and so accept a relatively higher degree of influence on its own domestic price level from international sources. There is a vast literature on this topic and no attempt is

made to comprehensively summarize this here. The interested reader is referred to ……. Our objective is to provide a tour d'horizon of some of the main issues and that is the main purpose of the sub-sections that follow.

17.4 The Case for Pegging The Rate In Developing Economies

A. Arguments related to trade

The traditional arguments in favor of fixed exchange rates for developing economies (pre- circa 1980) referred in particular to the ***trade structures*** of many such countries. It was noted that their ***export*** sales comprised heavily of primary commodities such as cotton, coffee, tea, cooper and tin. These exports were characterized by low price elasticities of demand. So even if their prices in world markets were to be lowered by any given percentage amount, the corresponding rise in the volumes purchased would be quite small. A parallel argument was that the world markets in which these products were typically traded used US dollar prices as the basis for fixing deals. So even if a small developing country were to lower the price of, say, its cocoa exports in local currency (the cedi in the case of Ghana), there would be no impact on the actual selling price in dollar terms and so no increase in volumes sold. So a devaluation of the currency (say the cedi relative to the dollar) in an attempt to lower Ghanaian coffee prices and earn more foreign exchange from the export of cocoa would be expected to be ineffective. Indeed with cocoa prices determined internationally in terms of the US dollar, a cedi devaluation would merely serve to put more cedis in the hands of the local producers for the same volume of cocoa produced and sold.

Complementary arguments were adduced on the ***import*** side of the external trade account. Since many of a developing country imports were of goods not produced in adequate volumes at home, a currency devaluation would serve merely to raise the local currency price of those goods but not stimulate much if any increase in local production or incomes. Such an argument also had quite a resonance with governments since they were often significant importers of goods and services not readily acquired on the local markets. Examples would include essential medical and book supplies for local health and education services and some of the specialized equipment needed to build much-needed local infrastructure such as for electricity generation. So any devaluation would constitute a hit on the local budget and most likely a larger deficit to be financed.

The technical analysis that demonstrates this problem and so lends support to the possible trade advantages of a fixed exchange rate derives from the work of Alfred Marshall and Abba Lerner and so is widely referred to as the Marshall-Lerner condition. That condition is stated – but not here proven - as follows.

"if the sum of the price elasticity of demand coefficients for exports and imports is ***greater than one*** then a fall (depreciation) in the exchange rate will improve the trade account in the balance of payments but will otherwise worsen that account (i.e. increase any deficit or reduce any surplus.)"

The empirical evidence largely supported the proposition that the sum of the two elasticities would indeed be less than unity at least in the short term.

In the euphoric period that followed the emergence of more and more independent developing countries from the late 1950s, many politicians and policy-makers accepted this logic as the single most important basis for determining exchange rate regimes. So there was little difficulty at least initially for developing countries complying with the prevailing Bretton Woods orthodoxy of fixed exchange rates.

However, it was an argument with many flaws.

First the Marshall-Lerner logic is essentially a demand side argument that does not factor in various things that could be happening in parallel on relation to the supply of both exports from the country in question and also the potential supply of import-competing products. To understand these points to is useful to refer back to the macroeconomic price-setting equation for an open economy as stated in Equation 15.11 and now reproduced her as Equation 17.10

$$\frac{\overset{*}{P}}{P} = \alpha\left[\frac{\overset{*}{W}}{W} + \{\frac{\overset{*}{L}}{L} - \frac{\overset{*}{Y}}{Y}\}\right] + \beta\left[\frac{\overset{*}{P}_{for}}{P_{for}} + \frac{\overset{*}{ER}}{ER}\right] \text{.....[17.10]}$$

A fixed exchange rate can potentially anchor the second component of the domestic price level as reflected in the equation but it has only indirect influence on the first term in square brackets. So if other macro policies and events (e.g. fiscal expenditures or new investment fueled by large capital flows from abroad) are working to push up wages faster than productivity, then ***overall*** inflation can be high even if the imported element (the second square bracket in the equation) remains under control. This can constitute a serious problem for local export industries since their costs are conditioned by the local inflation – affecting all home-produced goods and of course wages – whereas their revenues are fixed (for any given level of production) by the world price of, say, cocoa and the prevailing fixed exchange rate. This conjuncture of price and cost movements can quickly erode operating profits and so at the margin cause a fall in production and exports.

A numerical example to cement this point based on numbers that stylistically represent the situation of cocoa in Ghana in the late 1970s is shown in table 17.1 below.

Table 17.1: A Stylised Example from Ghana – circa 1977

	Year 1	Year 2	Year 3	Year 4
Cocoa Price $ per tonnne	100	100	100	100
E Rate	1	1	1	1
Price in cedi	100	100	100	100
Cost in Cedi	30			
Inflation Index (60%)	100	160	256	409.6
Cost in Cedi	30	48	76.8	122.88
Profit per tonne in cedi	70	52	23.2	-22.88

The example shows a situation where both the world price of Cocoa and the Ghanaian exchange rate were fixed in nominal terms. However, at the same time other polices (especially very expansionary fiscal and monetary policies) were causing overall inflation rates of around 60% per annum. So although in Year 1 the costs of producing cocoa were only 30% of the revenues that cocoa farmer could earn, by Year 3 that ratio had jumped to almost 77% and by Year 4 had wholly eliminated the profit from cocoa farming. The result as actually seen in Ghana in that period was a disastrous drop in production mitigated only by a massive increase in the smuggling of Ghanaian cocoa through the Ivory Coast where it could command a higher realized price.

The message here is not that the M-L conditions are wrong in their own terms. Rather it tells us that they constitute only one part of the trade story impact regarding exchange rates. The local production/supply conditions – which are impacted inevitably by overall inflation - also need to enter the story. Ghana's solution to its cocoa disaster in the last 1970s was eventually adopted in a reform programme from 1983 centered around an initial massive devaluation of the currency and a much tighter control on domestic fiscal expenditures and credit. A similar response to similar combinations – of excessive overall inflation leading to a deteriorating

external trade account – has been seen in many other developing countries in the past thirty years.

Second, developing countries need to seek structural change if they are to transform themselves and achieve sustained growth of incomes. As that transformation occurs it is to be expected that manufactures and other goods and services that are more price elastic will gradually increases in relative importance while traditional commodities see a relative decline. As this happens, the competitiveness of the country's exchange rate may become a more significant determinant of the ability to grow overall exports and to reduce imports that may increasingly be capable of being produced domestically. So a rigid adherence to the M-L type of logic is inadvisable at least on grounds of supporting the country's international trade. This point was vividly demonstrated by the manufactured export successes of the early Asian tiger economies of Hong Kong, Singapore and Taiwan in the late 1960s and beyond. It has become ever more evident in the remarkable economic transformations seen more recently in economies such as South Korea and China. [18]

The empirical evidence on this matter is very strong.

Equally important is the point that if the official nominal exchange rate is kept at a fixed level at which the underlying demand for foreign exchange (e.g. to purchase imports or make other international payments) clearly exceeds the supply (earned by exporting or achieved by international capital inflows) then the excess demand will find an outlet in one of two ways.

- Either it will be met by the authorities providing additional supplies from their own accumulated stocks of international foreign exchange reserves – but only to the point where such reserves are exhausted.
- Or, it will be met via the emergence of some parallel or "black" market in foreign exchange in which the rate will become more truly indicative of the true scale of total demand and supply for the currency.

The latter development was extremely common in many developing economies in the 1970s and 1980s when the commitment to fixed nominal exchange rates was at its strongest. The result was often a huge discrepancy as between the official and the parallel rates.

Such problems have become somewhat less common in recent years as more countries have adopted relatively more flexible exchange rate policies. However, the relatively recent example of Zimbabwe illustrates dramatically how this situation can and does still occur. In early 2001 inflation in Zimbabwe was already high but still arguably under some sort of control at about 4 % per month (60% per annum). At that time the official exchange rate was Z$ 55 = US$ 1.0. Although there was a parallel foreigner exchange market the premium over the official rate was only around 25 percent. However, by February 2003 by when inflation had surged to almost 10% per month (210% per annum), the official exchange rate was still set at Z$ 55 and the parallel rate – reflecting a huge excess demand at the official rate – had risen to Z$ 1,450: a premium over the official rate of more than 2,500 percent. In effect there was no available supply of foreign currency at the officially stated state and almost all transactions had to seek their foreigner change in the parallel market.

[18] Fuller analysis and examples on these points can be found in Larry Hinkle and Peter Montiel, *Exchange Rate Misalignment: Concept and Measurement for Developing Countries*, Oxford University Press for the World Bank, 1999. See especially Chapter 11 – "The Three Pessimisms, Real Exchange Rates and Trade Flows in Developing Countries" by Nita Ghei and Lant Pritchett

The important general point from this example is that in this type of Zimbabwean situation the ***parallel foreign exchange rate*** in effective replaces the official rate in Equation 17.1 and so becomes the effective driver of local inflation – irrespective of what the authorities may seek to assert to the contrary.

B. Arguments relating to other matters

In addition to the arguments linked to a country's external trade, variety of other arguments relating to the characteristics of a particular enveloping country will impact on the decision as to whether it is a good or bad idea to peg the nominal exchange rate. Some of these inter-connected arguments are considered here.

Degree of openness of the economy

If a country has very high levels of export and import trade relative to its GDP, then other things being equal it will be more problematic to allow the exchange rate to float too freely. To understand this it is important to remember (helped by the analysis around Figure 15.4 in Chapter 15 above) that other factors besides trade flows can impact a country's balance of payments and so the overall levels of the supply and demand for foreign exchange. Any period-by period variation on these other factors – for example some change in the foreign currency borrowing by the domestic banking system – will cause changes in the exchange rate under a free floating system. Those changes in turn will impact both the local currency prices of imports and the local currency proceeds associated with any given $ volume of export sales. Through these routes real incomes in the local economy will be changed by the periodic perturbations in the other elements in the balance of payments. Hence a degree of domestic instability is potentially associated with a floating exchange rate in a way that is less likely under a fixed rate. However, such considerations are clearly more important for highly open economies than for those that are relatively closed to trade.

Degree of openness to international capital flows

Using the same basic line of reasoning it is easy to see that similar propositions apply to countries that have chosen to allow their economies to be relative open to international movements of capital funds: i.e. to have allowed a high degree of so-called "capital account convertibility". [19]

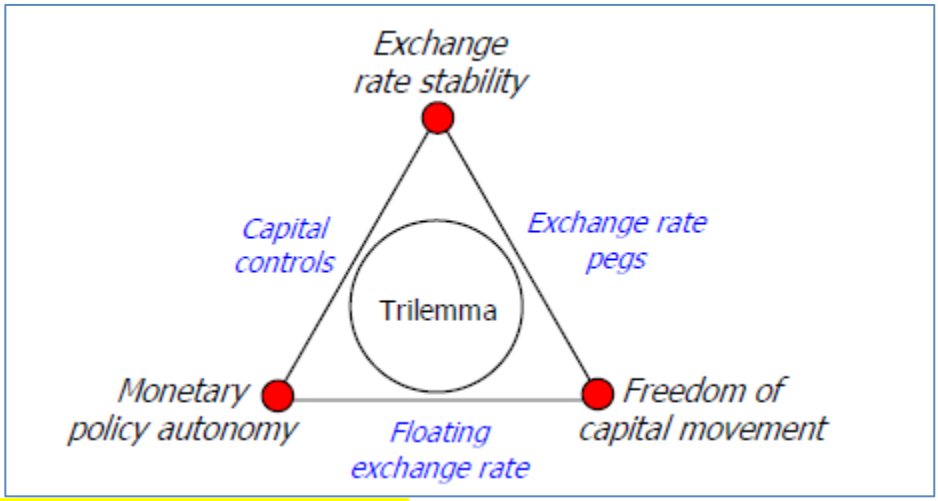
The post WWII consensus was that the majority of developing countries would be justified in maintaining relatively tight controls against the movements of international capital into and out of their economies. With such tight controls in place, the case for a fixed exchange rate was somewhat more persuasive. Further this consensus survived much longer than did the corresponding consensus that developing countries needed to maintain high levels of restrictions over their current account transactions (mainly imports and exports). [20] Especially since the 1990s there has been a great deal of *de facto* liberalization of capital account transactions by many countries – rich and poor – and this has engendered a great deal of

[19] capital account convertibility means the removal of foreign exchange and other controls on capital movements into and out of a country , but not necessarily all tax-like instruments on the underlying transactions, some of which may be incompatible with the goal of capital account liberalization. For more details see for example, Barry Eichengreen and Michael Mussa, Capital Account Liberalization and the IMF, Finance and Development, December 1998, Vol 35 No. 4.

[20] This was embodied in the rules (Articles of Agreement) of the International Monetary Fund (IMF). Article VIII of those rules has for many years pressured member countries to progressively remove restrictions on the making of international payments transactions for current account purposes (exports, imports and other current payments such as remittances). There has been so similarly hard and fast rule in relation to capital account transactions although there has been much controversy over whether such a rule is desirable.

interesting debate about the merits of such an approach. A very accessible and short summary of these issues can be found in Eichengreen and Mussa (1998). Our objective here is more limited namely to try to see how capital account liberalization might affect the choice as between fixed versus floating exchange rates. A diagrammatic representation of what Obstefeld has called the open economy trilemma is shown in Figure 17. 2 below

Figure 17.2: The Open-Economy Trilemma



Source: Krugman and Obstefeld, 2003

The answer in brief is that the more open a country is to movements of international capital, the more difficult it will be to sustain a fixed exchange rate. A floating rate by contrast gives the authorities more monetary policy autonomy. However, free capital movements in this case create a new headache and potential source of monetary volatility which an independent monetary policy may be able to mitigate in only part. In the policy trilemma diagram above, the authorities' choice of any two of the three policy objectives (shown as the vertices of the triangle) pretty much commits them to adopt the policy regime shown between those two vertices. For example it is very difficult to allow freedom of capital movements and aspire also to have some degree of monetary policy autonomy unless you also allow a flexible exchange rte regime to be in place.

If for example a country is ***losing*** large amounts of capital under a regime of free capital movements (residents are increasingly investing their available funds abroad) then under a fixed exchange rate, the authorities need to provide the foreign exchange (forex) that this entails. But this (forex) will need to come from international reserves and unless such reserves are huge, then they will at some point be depleted OR, equally bad they will be seen to be likely to be depleted in which case more domestic residents may rush to move capital abroad in order to avoid the losses that would follow any eventual devaluation. Alternatively if the country is gaining capital as foreigners seek to invest in promising economic opportunities in that country – often this may be land or property – then international reserves will be boosted. But as can readily be seen by referring back to Equation 15 this will have a direct and positive impact on the domestic money supply unless the authorities choose to offset such an impact by using their own transactions in the money markets to "sterilize" the capital inflow. This is difficult to do without limit because it means selling government securities into the domestic financial markets in order to acquire the new foreign exchange otherwise held by the public. As Eichengeen and Mussa remind us:

"There have recently been a number of episodes in which an exchange rate peg has been seen by both lenders and borrowers as a link in a chain of implicit guarantees. In these circumstances, the high nominal interest rates characteristic of emerging markets can lead to very large short-term capital inflows". We can add that in those circumstances there is also a significant fiscal cost to a sterilization operation since the domestic interest rate (charged on government borrowing) will likely exceed the foreign interest rate on the additional international reserves that the authorities acquire.

Eichengeen and Mussa are referring here to cases such as that of Mexico before its1994 crisis and Thailand before its 1996/1997 crisis of which more will be explained in Chapter 18. The important point to take from this is that once an impetus builds up for a country to attract large amounts of new capital then the combination of high nominal interest rates (one common consequence of relatively thin financial markets) with a fixed exchange rate can cause a lethal buildup of short term speculative funds that can have major destabilizing effects of domestic macroeconomic management. Greater flexibility of the nominal exchange rate can defuse such pressures to some extent by forcing investors to recognize some foreign exchange risk in their decisions to move capital into the country in question: but it is not a panacea.

The flexibility (or otherwise) of real wages
The previous two sub-sections together help to convey the idea of how truly difficult it is for many developing economies to maintain any real independence of their domestic and especially their domestic monetary policies.

The trade arguments on their own push open-economies towards a fixed exchange rate solution. But such a regime restricts the ability of the authorities to actively use monetary means to help finance government activities: the monetary policy in technical jargon is in effect "endogenous" to the authorities. At the same time the fixed exchange rate means that any perturbations of changes in international prices feed though unhindered to impact on the domestic price level. So any increase in international prices will reduce real incomes, other things being equal. If domestic nominal wage settlements respond actively to higher prices – perhaps because of strong trade unions – then levels of ***real productive activity*** would also likely fall as a consequence. So any rigidity of real wages compounds the difficulties for an economy living with a fixed exchange rate. A fixed exchange rate regime has stronger arguments in its favor if real wages demonstrate some flexibility in response to any international price shocks.

The depth (or otherwise) of the domestic financial sector

17.5 Policy Approaches to Address Excessive Inflation

There have been many examples in the post-War world of developing and transition economies experiencing inflation rates that our extremely high, often rising for sustained periods of time and apparently out-of-control. This was the situation for example in almost all economies of the former Soviet Union (FSU) for several years after the break-up of the Soviet Union in 1989. It was also common-place in many countries of Latin America in the 1970s to 1990s (Chile, Brazil, Argentina, Peru and Uruguay for example). Once inflation rates rise above rates such as 40-50% per annum economists are pretty much agreed that inflation will harm both growth and broader development and needs to be brought down if the economies in question are going to have any real hope of ongoing economic progress. See for example the papers by Dornbusch and by Bruno and Easterly cited earlier. See also Box 17.3 below.

But how to do this is a complex matter with many solutions having been tried.

Box 17.3: Hyper-Inflation – Mechanisms[21] and Examples

An extreme level of inflation is referred to as a "hyperinflation". The mechanisms that generate such a state can be readily seen in terms of our earlier monetary equations. They involve both the supply and velocity of money. However, there is no general statement about which of these elements comes first in the chain reaction: all country cases are a bit different. However, once any hyperinflation is established, the pattern of rapidly and regularly increasing the money stock, by the monetary authorities becomes a routine feature: the printing press becomes king! But since this practice in turn increases the ***supply*** of currency without any matching increase in the ***demand*** for it, prices generally rise and the price of the currency namely the nominal exchange rate, falls relative to other currencies.

Inflation can be said to have become "hyperinflation" when the increase in money supply is rapid enough to create a general frenzy of spending in which the purchasing power of the currency drops so rapidly that holding cash even for a single a day causes an unacceptable loss of purchasing power. As a result as hyperinflation proceeds, no one holds chooses to hold the local money and this in turn pushes the velocity of money to extremely high levels: approaching infinity. At the point when monetary velocity and prices both rapidly accelerate in a vicious circle, inflation is clearly out of control. The normal mechanisms of monetary management such as raising interest rates, or cutting government spending become wholly ineffective and will merely generate the response of shifting the public away from the rapidly devaluing domestic money and towards some means of exchange such as the US dollar or even into physical commodities including of course gold.

Examples:

Bolivia: Between 1984 and 1986. So bad di tis become that by 1985, the highest denomination was one of 10 million Bolivian pesos. At that stage, a Bolivian note of 1 million pesos was worth only 55 US cents – a mere one-thousandth of its exchange value of $5,000 less than three years previously.

Brazil: In the period from 1967–1994, the basic currency unit was changed no less than seven times to adjust for high inflation in the final years of the Brazilian military dictatorship era. By 1994 a cruzeiro unit of currency was worth less than one trillionth of a US cent, after adjusting for multiple devaluations and note changes. In that same year, inflation reached a record 2,075.8%. A new currency called real was adopted in 1994

Estonia: Estonia in common with other countries of the FSU experienced hyperinflation as a result of using the Russian rouble after the fall of the Soviet Union. Peak inflation of over 87% per month was reached early in 1992. However, it shortly afterwards became the first FSU country to implement a currency reform by installing a currency board.

Peru: Inflation built up in the 1980s but was at its worse in the period 1988–1990. In a currency reform of 1985, 1 inti was exchanged for 1,000 soles – the former currency and in 1986, the highest denomination was 1,000 intis. However, in September 1988, monthly inflation had already risen to 114% and by In August 1990 it recahed the level of 397% per month. In the subsequent currency reform in 1991, 1 nuevo sol was exchanged for no less than 1,000,000 (old) intis.

Ukraine: This country faced a similar inflation record as did Estonia. In 1992, the Ukrainian quasi currency the karbovanets (UAH) was introduced in exchange for the former Soviet rouble at a rate of 1 UAK = 1 rouble: the highest denomination was soon 1,000 karbovantsiv. But by 1995, this had become 1,000,000 karbovantsiv. In 1996, during with the transition to a new currency (the Hryvnya) the exchange rate was 100,000 UAK = 1 UAH. Inflation for the entire calendar year of 1993 was 10,000% or higher, with retail prices reaching over 100 times their pre-1993 level by year-end.

Zaire: (now the Democratic Republic of the Congo). Zaire suffered an acute period of inflation between 1989 and 1996. In 1988, the highest currency denomination was 5,000 zaire but juts four years later this had risen to 5,000,000 zaires. Inflation peaked at around 114% per month late in 1992. In the subsequent 1993 currency reform, 1 nouveau zaire was exchanged for 3,000,000 old

zaires. In 1997, Zaire was renamed the Congo Democratic Republic and changed its currency to francs. 1 franc was exchanged for 100,000 nouveaux zaires

Zimbabwe: At independence in 1980, one Zimbabwe dollar (ZWD) = USD 1.25. But the 1988 land reforms caused food production to plummet and lost Zimbabwe both a huge amount of export revenues and government revenues. The resulting use of aggressive inflationary finance led by 2004 to inflation of over 600%. By July 2008 the value of the new Zimbabwe dollar (ZWN) had fallen to approximately 688 billion = 1 USD. The $100 trillion banknote was issued on 16 January with inflation peaking at a near world record level of just under 8 billion percent in late 2008 after which the US dollar was sanctioned as legal tender in the country - in effect ending the life of the Zimbabwe dollar.

At moderate levels of inflation, domestic economic management can bring down inflation IF the government is willing and able to undertake an appropriate fiscal adjustment: i.e. reduce its dependence of the inflation tax element of its total revenues. If the economy is still in the happy state where either domestic or foreign creditors are willing to buy government debt (i.e lend to government) this fiscal adjustment does not have to be immediate. Then the task is relatively easy. A bit more borrowing in the short term (admittedly with higher interest charges) can take the place of the inflationary financing. However, in many of the cases seen in the developing world in the past 30-40 years including the examples in Box 17.1 above, this has not been the case – governments by virtue of very high inflation and doubts about the long terms stability of their economies have lost all the credibility of actual and potential creditors. **That credibility has to be restored.**

The key to this is that while the nominal growth rate of the money supply has to be reduced, there somehow has to be a stabilization of the real level of money balances that the public are prepared to hold: i.e. ***the runaway collapse of such balances that characterizes high inflation must be halted***. Failing that the pull-back from very high rates of inflation based on a fiscal contraction will be a massive and damaging real deflation of the economy with standards of living being very adversely affected.

The story line in a situation where we initially ignore the foreign price influences on inflation is shown in Box 17.4 below.

[21] Fuller details can be found in for example, Philip Cagan, The Monetary Dynamics of Hyperinflation, in Milton Friedman (Editor), Studies in the Quantity Theory of Money, Chicago: University of Chicago Press (1956).

Box 17.4: Reducing Inflation – the basic mechanism

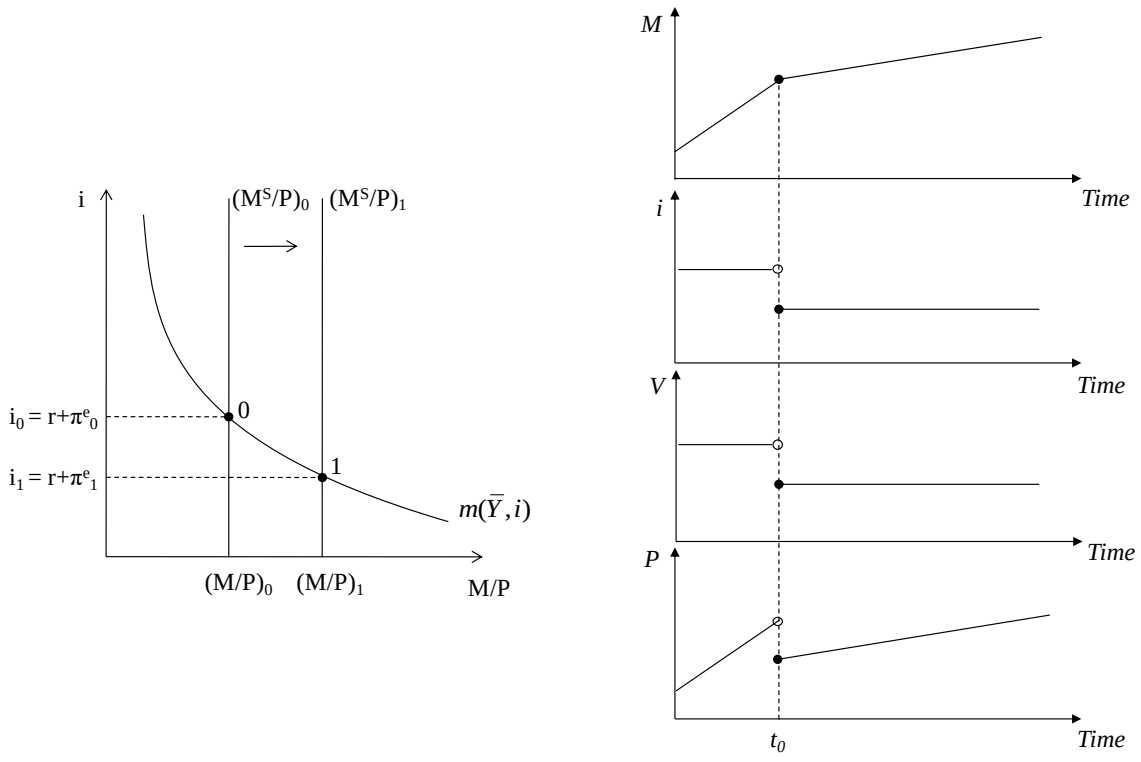
Assume that initially the economy is at a high inflation equilibrium denoted by point "0" in the diagram below. The government seeks to reduce the inflation rate from its prevailing high level.

To do that the central bank (working with the government and its financing requirements) has to reduce the ***rate of growth*** of the money supply which has become excessive as rapid inflation has gone on. IF that reduction can be credibly achieved then private agents in the economy will (hopefully) start to expect a similar rate of reduction in ***actual*** inflation and therefore will redefine their ***expectations*** of the inflation rate downwards. The result of this change in expectations will be a fall in the nominal interest rate (which we can recall from earlier discussion of the Fisher equation[22] comprises of two components) from $i_0=r+\pi^e_0$ to the new level of $i_1=r+\pi^e_1$.

Now the level of real money demand will be increased because it depends negatively on the nominal interest rate. In the diagram below (which uses the earlier money demand analysis from Chapter 16), it will move from point 0 to point 1. But at point 1, as can be seen from the diagram the demand for money ***in real terms*** exceeds the real money supply. (point 1 lies to the right of point 0 and both are defined in terms of M/P). The equilibrium is restored by some increases in the money supply ***in real terms*** so that it can come into equality with the now higher money demand caused by the lower nominal interest rate. This requires a fall in the ***price level*** and a new equilibrium at point 1. Here the (lower) growth rate of the money supply is equal to the (lower) inflation rate but agents are holding higher levels of real money balances. Slower monetary growth has resulted in a higher level of money being voluntarily held

The sequence of changes in the variables involved in this mechanism is shown on the right hand side of the diagram below.

Figure 17.3 Money Demand and an Anti-Inflation Programme



The explicit recognition of the international trade and financial linkages of an economy can intercede in this anti-inflationary process in two main ways as explained in the next few paragraphs

International Financial Support

First, if a country can design an anti-inflationary programme than can command early and substantial financial support from abroad, then the deflationary effects of that programme (e.g. on the domestic price level) can be softened. This can happen, for example if the foreign financial support can boost the country's foreign exchange reserves and so provide an offsetting boost to the money supply that is being reduced by domestic deflationary mechanisms as in Box 17.2. Readers should refer again to equation 15.17 in Chapter 15 or its more complex version 16.2 to see how this effect can happen. The time sequence of inflation adjustment is similar to that shown in the figure in Box 17.2 except that the moderation of the growth rate of nominal money can now start from a higher absolute level on the money supply. The result will be a more modest decline in the domestic price level. The extra risk is that inflationary expectations will be reduced less rapidly unless there are other elements in the programme that can also help to bring down those expectations.

In practice in the past 30 years most developing, emerging and transition countries that have addressed destabilizingly high rates of inflation have done so with some help from the International Monetary Fund (IMF). The IMF has also frequently provided the source of credibility that has encouraged other sources of both public and private foreign financial support into action to help the countries concerned to mitigate the more severe damage that undoubtedly can arise from actions designed to drive down excessive rates of inflation.[23]

Critics of the IMF commonly assert that the IMF medicine is worse than the disease that it seeks to address, and there is no doubt that some aspects of some IMF programmes have been too severe in the past. But the basic logic of the IMF's macroeconomic approach is sound and, in the words of a favorite undergraduate examination question – "if the IMF did not exist it would need to be invented – Discuss"

Using the Exchange Rate as a Nominal Anchor

Second, in an open economy an inflation-correction can and commonly is supported by some form of action targeted at the foreign component of the domestic price level as shown in Equation 17.10 above. If that component can be anchored at a rate (even if not constant) that is growing more slowly than general rate of inflation then it can help to bring down ***overall expectations*** regarding future inflation and so support the generalized reduction in monetary growth that we have already considered. The reduction in inflationary expectations that can come from the general mechanism of monetary restraint described in Box 17.2 can clearly be reinforced if the foreign component of the overall price index can also also moderated.

Let us assume initially that this anchoring of the foreign component of prices can be successfully achieved through some pegging of the nominal exchange rate. Then from Equation 17.10 it is clear that success in reducing ***overall*** inflation will then hinge on whether or not the ***domestic*** part of the price level equation (the first term in square brackets) can also be kept in check. [24] The condition for this happening as seen in equation 17.10 relates to the

[23] IMF and related foreign financial support has often been linked to other symptoms of macroeconomic instability and in particular acute foreign exchange crises. But in most cases these symptoms are linked to the underlying imbalances that also result in excessive inflation.

[24] One common paradigm seen especially in Latin American countries in the 1970s and 1980s was the exact opposite of an anchoring approach: for long periods that approach enabled the nominal exchange

behavior of nominal wages. However, it is useful in this context to broaden the interpretation of the first square bracket in Equation 17.10 so that it includes all cost elements (including wages as the main element) that can affect domestic prices and so inflation other than those originating from foreign price movements and the exchange rate. The useful descriptive term for these non-foreign elements in prices is "non-traded goods and services (NTGS)" – a term we first encountered in Part One of the book (add specific reference).

So to rephrase the problem: inflation can be brought down by using a successfully anchored nominal exchange rate IF the various forces that drive the prices of NTGS can also be brought under similar control. These forces include some on the ***demand side*** (that work though higher levels of expenditures whatever the source including but not confined to government expenditures) and also those on the ***cost/supply side*** including any spontaneous pressures for nominal wage costs to rise. In short a successful anti-inflation programme based around a nominal exchange rate anchor requires also actions that can results in the demand: supply balance for NTGS moderating so that the rate of price increase for the NTGS element in overall costs also reduces.

There are two main reasons why attempts to control inflation in this manner in the past have often failed. The first, as exemplified by Chile in the late 1970s, is when nominal wage agreements are indexed closely to past inflation. In that situation a pegged exchange rate may temporarily reduce the foreign component of inflation. However, this effect will be undermined by nominal wages continuing to rise at rates conditioned by the past (and high) levels of inflation. Such an adjustment path sustained for any length of time will clearly keep ***overall*** inflation high, progressively undermine the competitiveness of Chilean exports, and so force the eventual abandonment of the pegged exchange rate. The second as exemplified by Argentina also at the end of the 1970s is when the exchange rate peg is accompanied by continued high fiscal deficits that boost the demand for NTGS without increasing the supply. This combination will also sustain high rates of overall inflation and so will again result eventually in the abandonment of the pegged exchange rate.

Argentina has become something of a laboratory for these types of anchoring experiments. Through the 1970s, 1980s and early 1990s it was plagued with very high and occasional hyperinflation and has tried a number of slightly different anchor approaches to this persistent problem over the past thirty years – with mixed successes. A brief summary of the design and outcome of two of the best known – the "tablita programme" of the late 1970s and the currency-board approach of the period1991 to 2002 are summarized in Box 17.5.

rate "to accommodate" to large wage increases. So if the domestic component of the price level was driven up by aggressive wage demands which reduced the country's international competitiveness then an exchange rate devaluation of a similar percentage amount could be called upon to restore a degree of competitiveness at least temporarily. But of course this sort of response merely encouraged the indiscipline in wage settlements that caused any initial inflation in the firstplace and so became a recipe for on-going and high inflation. Most Latin American governments beginning in the late 1970s, recognized this reality and so sought to bring to some sort of end the vicious inflationary cycle of wage increases followed by exchange rate devaluations.

Box 17.5: Argentina and Anchored Exchange Rates

The *tablita" plan launched in December 1978 was an attempt to gradually reduce the then high rate of inflation (more than 140%) at the same time as reforming import and other structural controls so as to integrate Argentina more fully into the world economy. The tablita was basically a pre-announced sliding schedule of monthly adjustments of the nominal exchange rate (and some other nominal prices) design to help converge Argentina's inflation to world inflation rates. It was supported (i) by much lower import tariffs as a parallel structural reform that also ought to have helped moderate domestic prices; (ii) by an announced reduction in the large fiscal deficits (more than 10% of GDP in 1978); and by the opening up of the capital account of the balance of payments (given the high prevailing interest rates and the new tablita schedule for the exchange rate, this was expected to encourage capital inflows to Argentina).

This anti-inflationary policy was a failure for several inter-related reasons. First partly due to a surge in some international prices and partly due to the government wavering (initially in 1980) on the actual rate of the monthly tablit adjustment, even the *foreign component* of the overall price index failed to be stabilized. Second, there was a failure of Argentina's high interest rates to converge to international levels and large short term capital inflows established high levels of domestic liquidity which negated some of the traditional monetary contraction needed to bring inflation down. Third domestic banks used that liquidity in significant amounts to lend to state-owned enterprises-loans that were implicitly if not explicitly guaranteed by government. Hence the consolidate deficit of the government failed to decline and the pressures on the *non-traded component* of the inflation index remained high. Other specific factors (not discussed here) conspired with this broad macro picture to make the pre-announced rate of devaluation in adequate to compensate for the nominal adjustment introduced by the tablita schedule. In February 1981 an off-sechule 10% additional devaluation was suddenly announced with other monthly devaluations to follow. This effectively marked the end of the tabita experiment. In 1981 the fiscal deficit was higher at 16% of GDP of which more than 75% was being financed by money creation.. The inflation rate remained at over 70% and Argentina was running a large current account balance of payments deficits (versus a large surplus in 1978) – the counterpart to the large capital account inflows.

Main Source: Raúl Alberto Fernández, Financial Liberalization, Asymmetric Information and Inflation: A new perspective on the Argentine financial experiment of 1977-81.Phd thesis, London School of Economics, 2011. A good theoretical explanation of how the tablita was ***supposed*** to work is given in C. A. Rodriguez "The Argentine Stabilisation Plan of December 20th" World Development, Sept. 1982, No. 10.

The Currency Board scheme introduced in 1991 was a more dramatic and an allegedly irrevocable approach to pegging the nominal exchange rate – once again to try to reduce Argentina's persistently high rate of inflation. The mechanism involved establishing a fixed peg of one-to-one parity between the peso and the U.S. dollar. It also guaranteed full convertibility of pesos into U.S. dollars at that rate. Such an approach removes by law the right of the government to have ***any*** use of seigniorage revenues. It makes domestic monetary policy fully endogenous. By using this extreme approach, the Argentina government, and other governments before it, sought to establish local and international credibility in the peg by self- limiting its own local control over monetary and fiscal policy.

Initial results were positive. In particular inflation declined from several thousand percent per annum in 1991 to less than 4% by 1994, economic growth recovered and Argentina's exports grew – but not sufficiently to eliminate the large trade deficit. But the cost of these successes was high was high. Rigidity in some domestic wage rates meant that unemployment took much of the strain of the less competitive exchange rate (an exchange rate fixed to a strong dollar in the face of ongoing inflation). As in 1978-1981 the authorities – national and regional -were unable to curtail fiscal deficits. But with their use of seignorage revenues ruled out, the deficit financing route became one of extensive international borrowing. This was bolstered on the supply side of the debt markets by the apparent new stability of the exchange rate (i.e. there was much less

foreign exchange risk to foreign lenders). The result was a burgeoning of Argentina's extermalde but much of it denominated in US dollars.

But in this situation of high debt, the currency board disciplines are extremely unforgiving. Argentina by the year 2000 had high levels of external debt, a large external trade deficit, fiscal deficits that still needed to be financed and were being made increasingly worse by high external debt service obligations, and unemployment and related social problems that were getting worse. There was no way out other than to abandon the apparently irrevocable commitment to the 1: 1 peso: dollar peg. This happened in 2002 when the country's president, Eduardo Duhalde, repealed the Convertibility Law, adopted a new, provisional fixed exchange rate of 1.4 pesos to the dollar (a 29% devaluation) and announced the conversion of all the bank' accounts denominated in dollars back into pesos. Soon afterward the authorities completely abandoned the dollar peg and allowed the peso to float freely, resulting in a swift depreciation of the peso, which lost 75% of its value with respect to the U.S. dollar in a matter of months. Inflation surged as the previously "controlled" foreign component of the domestic price index was freed up.

Sources: Daniel Frank, , How Currency Boards Collapse –The Case of Argentina, Seminar Paper, Institute for Foreign Trade and Payments and European Integration, Economics Department, University of Basel, Switzerland, 2004-2005 and Steve Hanke, Why Argentina did not have a currency board, Central Banking Journal, Volume 18 Number 3,February 2008.

17.6 The Collapse of a Fixed Exchange Rate Regime

We have provide above several examples of the internal stresses that face a fixed exchange rate regime. The Argentina case in Box 17.5 provides two historical examples and the briefer references to Ghanaian experience in Table 17.1 above also indicates some of the difficulties.

The core of the problem is that in order to maintain an exchange rate peg (whether rigid as in a currency board case or a bit more flexible as in a tablita-type case), the central bank will have to prevent any possible change in the nominal rate by intervening in the foreign exchange market. This entails the sale or the purchase of its official foreign exchange reserves in order to balance the supply and demand for the currency at the fixed parity. For example, to avoid the depreciation of the currency, the central bank would need to sell foreign exchange reserves in exchange for domestic currency. The money supply can be left unchanged by this operation (see the Chapter 15 equations to see how). Insofar as the government gains fund though this route it is through ***borrowing*** and not through any new inflationary finance: the "borrowing" occurs through the running down of the central bank's holdings of foreign exchange reserves.

However the problem with this type of support operation is that the central bank's holdings of foreign exchange cannot last forever and will eventually reach zero. If and when this happens, the government will no longer be able to maintain the fixed exchange rate and the country will experience some sort of external payments crisis (see the diagrams of Box 17.4 below). That eventuality can and often has arisen in developing (and less commonly other countries) because of government attempts to monetize the public deficit under a system of fixed exchange rates. The risk of printing money when there is a peg is that the entire stock of foreign-exchange reserves can be exhausted really quickly. Once this happens, the government will no longer be able to intervene in the foreign exchange market to prevent fluctuations of the nominal exchange rate. Further, and following the logic of the so-called "first generation models" of financial crisis (e.g. Krugman (1979)), this whole process could be exacerbated and certainly accelerated by the occurrence of a sudden speculative attack that would eliminate the last of the reserves more quickly thereby rendering the government impotent to defend the exchange rate from that (earlier) point on.

This speculative attack will occur once private agents start to perceive the likely future depletion of the government's foreign exchange reserves and so lose confidence in the ability of the government to maintain the exchange rate peg. At this point foreign currency balances become far more attractive than does the holding of the domestic currency whose purchasing power seems certain to decline. Moreover, people understand that, as the exchange rate is about to depreciate, domestic inflation has to increase (according to the purchasing power parity theory and the second term in our equation for the domestic price level). Therefore, they are likely to run *en mass* to the central bank in order to exchange their holdings of domestic money for foreign money. In this process, the entire remaining stock of foreign exchange reserves is exhausted rapidly and the central bank is no longer able to defend the exchange rate from depreciating. The country will then start to operate in a floating exchange-rate regime.

A simple model based on our earlier money balance equations can provide a more precise statement about this sequence of events. This model uses formulations and equations already explained earlier but simplifies some of these.

Money Demand in real terms (*m-p)* is a simple function of real income (*y*) and the real rate of interest (*i*)

$$m_t - p_t = \bar{y} - \alpha_{i_t} \qquad [17.11]$$

Money Supply in nominal terms is a weighted average of domestic credit (D) and foreign reserves (R)

$$m_t = \gamma DC_t + (1-\gamma)R_t \qquad [17.2]$$

Domestic Credit is assumed to grow at a constant rate = μ, so that

$$\dot{D}C_t = \mu \qquad [17.13]$$

The economy is very open and so the nominal exchange rate is the dominant influence on the domestic price level (via the Purchasing Power Parity proposition) - assuming that foreign prices (Pf) = constant). So

$$P_t = \varepsilon_t \qquad [17.14]$$

The level of the domestic real interest rate is similarly driven by the foreign interest rate and the (expected) change in the exchange rate. This is the so-called Uncovered Interest Parity proposition), so

$$i_t = i^* + \dot{\varepsilon}_t \qquad [17.15]$$

Then Combining [17.11], [17.14] and [17.15] we obtain $m_{t_t} - \bar{\varepsilon}_t = \delta_t - \alpha\dot{\varepsilon}_t \qquad [17.16]$

Initially the Exchange Rate is FIXED, so $\varepsilon_t = \bar{\varepsilon}_t = \text{constant and } \dot{\varepsilon} = 0$

So Money DEMAND can be re-written as $m_t - \varepsilon_t = \delta \qquad [17.17]$

Then Combining [2] and [7] we obtain $R_t = (\delta + \bar{\varepsilon}_t - \gamma DC_t)/(1-\gamma) \qquad [17.18]$

We can clearly see from this last expression that if μ (the rate of growth of domestic credit) is high , foreign reserves will deplete very fast depending also on the weight attached to D versus reserves in the money supply equations.

$$\dot{R}_t = \frac{-\mu}{(1-\gamma)/\gamma} \qquad [17.19]$$

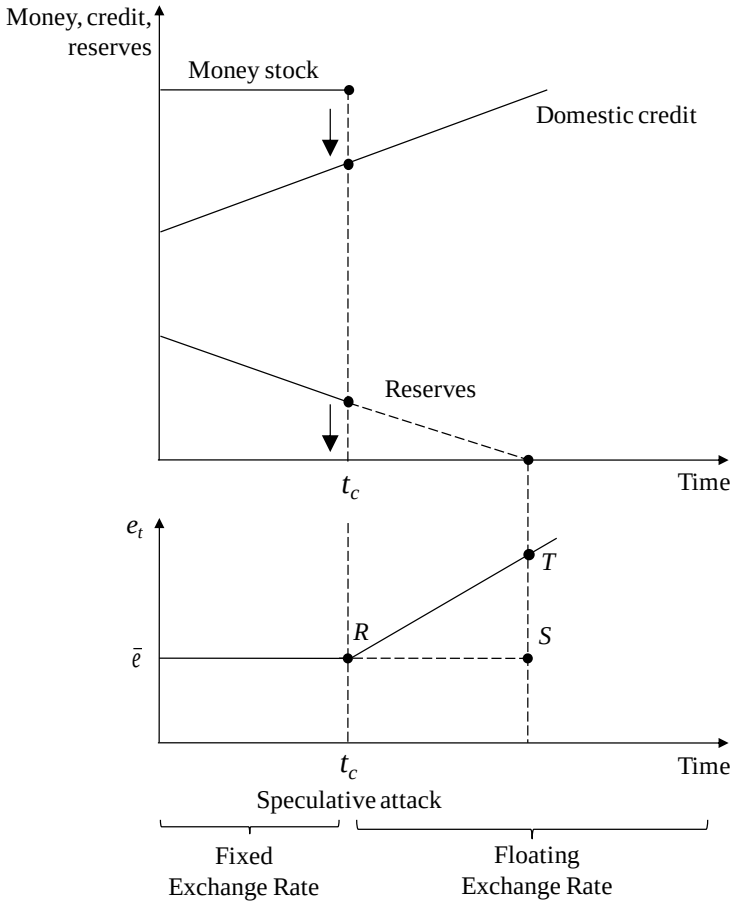
Figure 17.4. uses these various equations to illustrate the simple dynamics of the type of balance of payment crisis – caused by excessive domestic credit growth - that can cause a fixed exchange rate regime to be abandoned (as for example in the cases of Argentina and Ghana already discussed).

Initially, the money stock in the economy is shown to be constant but its composition is changing because foreign exchange reserves are decreasing with the inexorable growth in domestic credit (possibly due to the government's own debt to the central bank increasing). Then, at a certain point, time t_c, with expectations of excess money supplies, domestic agents begin to act on anticipations of an exchange rate depreciation. Specifically, there is a speculative attack that eliminates the remaining of foreign exchange reserves and reduces the money stock. Notice that before time t_c, the exchange rate was constant at $\bar{e}$ but thereafter, the exchange rate starts floating and it can no longer be controlled by the central bank.

Notice also that if there was no speculative attack, the nominal exchange rate would continue along the path indicated by the horizontal line RS and then, at the time when foreign reserves fell to zero, the exchange rate would jump discontinuously from S to T. Thus, speculators have the effect of hastening but also somewhat smoothing the transition to the floating exchange rate regime, (Agénor and Montiel, 1996).

There are other mechanism that can cause balance of payments problems and crises – for example the so-called second and third generation models. Examples of these are presented in Chapter 18.

Figure 17.4 The Collapse of a Fixed Exchange Rate



Source: Agénor and Flood (1994)

17.7 Some Economics of External borrowing and Debt

In Chapter 16 above some important proposition about public debt were established. Here we need mainly to extend these to deal with the situation where the debt that the government is building up is from foreign sources and so denominated, most commonly in a foreign currency such as the US dollar, the Euro or the Japanese yen.

In order to examine this it is helpful to make a slight redefinition of the debt: GDP ratio as used in Chapter 16. Equation 16.17 from that chapter is reproduced here as Equation 17. 20.

$$d = \frac{D_p}{PY} \text{ .....[17.20]}$$

Now let us assume that the debt outstanding is denominated wholly in a foreign currency namely, as an example the US dollar. Then the debt ratio in local currency terms can be written as follows:

$$d = \frac{\frac{D\$}{P\$}.\frac{ER.P\$}{P_d}}{Y} = \frac{D\$.ER}{P_dY} \text{.....[17.21]}$$

P$ and P_d represent respectively the foreign ($) and the domestic price levels; *D$* is the outstanding debt denominated in dollars; and *ER* is once again the nominal exchange rate. It is noted also that the term in the numerator namely $ER.P\$/P_d$ is an expression for the real exchange rate.

It is immediately clear from this new equation that an additional consideration has now entered the story about a country's (or a government's) debt dilemma namely the behaviour of the exchange rate. In particular if there is a nominal devaluation that is ***not accompanied by an equal proportionate rise in the domestic price level***, then the debt ratio will rise even if all the other influences on it as already discussed remain unchanged (e.g. *G-T*, *r,* and *g* – see Chapter 16). This however is unlikely. As shown in the pricing equations used earlier, a nominal devaluation will normally cause some increase in the domestic price level P_d. But since this term appears in the denominator of Equation17.21, such as rise will offset the debt ratio effects of the nominal devaluation.

So the new ingredient in the debt sustainability analysis is the ***real*** exchange rate. ***A real devaluation (nominal devaluation greater than the rise in the domestic price level) will increase the debt ratio other things remaining equal***. A real appreciation by contrast will reduce that ratio.

Relating external debt to the government budget

So far we have thought about all debt being the debt of government and being used therefore as a means to finance any ***public*** sector deficits. This is too restrictive because ***private*** companies and individuals can also borrow from foreign sources in most developing countries that have some degree of free capital movements. But let us stay with the restrictive assumption just for moment longer.

Then the problem of government debt as stated in Chapter 16 can be restated as follows. For any configuration of the key terms that together determine the sustainability of government debt (see Equation 16.20 as reproduced below), a real depreciation will lower the level of ***new borrowing*** that is consistent with a stable debt ratio and will also reduce the level of that stable debt ratio. In graphical terms the line Δd_0 in Figure 16.6 will shift upwards. (Remember that the positioning of that line assumed either a primary surplus (*T>G*) or that the seignorage revenues ($\Delta M/PY$) were larger than the size of a fiscal deficit). A real depreciation thereby shifts the point of intersection of the Δd_0 line with the horizontal line axis (denominating the debt ratio "*d*") to the left. [25] The task of financing the deficit will have become more problematic since the instantaneous change in debt (i.e. Δd) caused by the depreciation will now be larger for any given level of the primary fiscal surplus and seignorage revenues.

$$\left(\frac{T-G}{Y}+\frac{\Delta M}{PY}\right)^{*}=(r-g)d \quad \text{..... [16.20]}$$

Relating external debt to the broader economy

Let us now look at a country's external debt in a context broader than that of the government's own borrowing alone. This can be done by drawing on slightly broader definitions of the ratios and concepts so far considered.

[25] Algebraically the new terms that needs to enter the left hand side of Equation 16,.20 to reflect this new element is $\dot{ER}.D\$$ where $D\$ = \text{government debt in \$}$ and $\dot{ER}$ = the percentage change in the exchange rate.

First redefine the debt ratio in equation [17.20] so that it now refers to ***all external debt*** of the country (private and public) and not just to government debt. So we basically remove the subscript from the debt term to get a new external debt ratio (call it d_a) as shown in Equation [17.21].

$$d_a = \frac{D}{PY} \text{.....[17.22]}$$

Next use the transformation of that ratio as shown in Equation [17.21] combined with the same basic logic about government debt as was developed in Chapter 16 but replace the government's primary fiscal surplus by the equivalent non-interest surplus in the balance of payments current account. This enables us to see that increases in the external debt ratio will depend on three basic elements as defined in the following equation developed by Sweder van Wijnbergen (1989).

$$d_a = -NICA + ((r^{\$} - P^{\$}) - g_a)d_a + \frac{\overset{*}{ER}}{ER} d_{a.} \text{.....[17.23]}$$

Where *NICA* = the non-interest current account surplus in the balance of payments

g_a = the overall growth of output in the economy
$r^{\$}$ = the average rate of interest on external debt and
$r^{\$} - P^{\$}$ = the real interest rate on external debt
* = percentage change in

This equation provides us with a powerful way to look at and understand the choices and dilemmas that developing countries face in dealing with their external debts.

The first term on the right shows the difference between total expenditures in a country (net of payments on foreign debt) and nationally generated incomes. (Readers can refer back to Chapter 15 to remind themselves of the link between a current balance of payments surplus and domestic incomes and expenditures). If NICA is positive (there is a surplus) then other things being equal the level of external debt and the debt ratio will both decline. Indeed the classic way to reduce an excessive external debt burden is to deflate the economy so that the level of expenditures – including imports – is reduced. This is largely what happened in most Latin American economies after the early 1982 debt crisis precipitated by the debt default of Mexico. A decade of deflation and generally slow growth followed for most of the impacted countries.

However, the second term in the equation shows that there is a possible way to avoid the deflationary solution to excessive debt. Specifically if the overall growth of output in the economy (GDP) is high relative to the real interest rate on external debt then, other things being equal, the debt ratio will decline. Essentially what is happening here is that the denominator of the debt ratio is rising strongly relative to the numerator thereby lowering the overall ratio.

A high growth strategy was successfully used by some of the highly indebted Asian countries – notably South Korea - as their alternative way to address the debt problems of the 1980s. However, it can be seen from the equation that the key element in external debt sustainability is the same as was the case for government debt namely the relative sizes of the *growth rate* versus the *real rate of interest* on debt (*r-g*). If the growth rate is high but still lower than the real rate of interest then the debt ratio will continue to rise in the manner depicted graphically

in Figure 16.6. For most developing countries the nominal and real interest rate on their external debt is largely exogenous to them – i.e. beyond their control. So an otherwise sustainable borrowing and debt strategy can be thrown off course by unexpected changes in the real interest rate. This is largely what happened in the early 1980s when very high levels of third world debt were made unsustainable because of hikes in interest rates caused by a marked tightening of US (in particular) monetary policies.

The third term in the equation is defined in terms of the change in the exchange rate and the level of the debt ratio. This term in effect measures the capital loss that a country inevitably sustains when the exchange rate depreciates in real terms. Specifically, depreciation changes any given level of debt in dollar terms into an ***increased*** level of debt in local currency terms.

This factor too can be an offset to any strategy that seeks to escape from excessive debt by adopting a high growth strategy. Such a strategy may well include an aggressive approach towards the real exchange rate in an attempt to make the country's exports more competitive in world markets. But we can clearly see from the equation that such an approach by depreciating the exchange rate will, up to a point, negate the beneficial effects of the high growth. So a balance has to be drawn if such as approach is to be adopted.

Solvency
The van Wijnbergen equations also provide us with a useful way to link propositions about the sustainability of a country's external debt with the concept of the solvency of the country.

A country's "solvency" is defined on to its ability to pay its external creditors in the long term. To be able to do this it should not undertake total expenditures that are higher in discounted terms than its current and future discounted streams of income minus any initial debt. Algebraically this can be written as shown in Equation 17.24

$$\sum_{t=t_1}^{t=t_n}\left[\frac{Yt - Ct - It - Gt}{(r^{\$} - P^{\$}) - g_a}\right] > d_{at1} \text{.....[17.24]}$$

The numerator of this expression defines the export: import balance from the familiar national income accounting identities (again refer to Ch15). The denominator works to adjust the initial values of that balance over time to allow both for the growth of the economy and for the time discounting at a rate equal to the real rate of interest. For solvency to be achieved, the discounted value of the accumulated over-time balance must exceed the initial level of the debt ratio.

Three fairly obvious propositions derive from this expression namely:

- Countries with LOW initial debt ($d_{a)}$ are more likely to be solvent
- Countries with HIGH growth rates (g_a) are more likely to remain solvent
- Countries with HIGH borrowing costs ($r^{\$}$-$P^{\$}$) will find it less easy to remain solvent

A simple numerical example further explains these points.

IF d_a =50%; $r^{\$}$-$P^{\$}$=8%; g_a=6%

THEN by consulting the relationships in the expression, NICA must be equal to a better than 1% of GDP if the solvency condition is to be met. Since in this particular country the real interest rate exceeds the growth rate of output, the country cannot run a long term current account

deficit and remain solvent. Readers may like to experiment with other values of the key parameters to assess the consequences of these for solvency. Debt information for most countries of the world can be found in the World Bank's on line publication Debt Statistics. See also Box 17. 6.

Box17.6 Statistics on External Debt

Comprehensive data are readily available from internet sources for most countries of the world about the size and composition of their stocks of external debt, the key ratios including those considered in this present Chapter and the servicing costs of that debt.

Currently the best single source is the World Bank's *International Debt Statistics*. This contains data for some 128 countries and covers the period from 1970 to 2011 (though not all those years for all counties). It is published annually – normally in December – and also includes forward looking "pipeline" data for up to 8 years ahead. It is accessible at *http://data.worldbank.org/data-catalog/international-debt-statistics*.

A far smaller number of countries provide data to the quarterly publication World Bank *Public Sector Debt Statistics* that is compiled jointly by the Bank and the IMF.

A third source owes its origins to the initiaves launched by the IMF in the aftermath of the mid-1990s global financial crisis – see Chapter 18 for more details of that crisis. Specifically, the IMF established a two-tier standard to guide IMF member countries in the provision of economic and financial data to the public, namely the Special Data Dissemination Standard (SDDS) and the General Data Dissemination System (GDDS). Participation in both data initiatives is voluntary. Some countries that have volunteered to participate in these two initiatives also provide data for a quarterly publications entitled World Bank *Quarterly External Debt Statistics*. Currently (early 2013), seventy countries have agreed to participate in the SDDS/QEDS database and forty-eight low-Income Countries (LICs) to provide data to the GDDS/QEDS database.

Another Digression on the HIPC Countries

In our earlier discussion in Chapter 16 above we briefly examined the problems of the 40 or so highly indebted poor countries (HIPCs) for whom special debt relief measure have been in place since 1996. The problems of these countries can be elucidated first by looking at their situation relative to the parameters of Equation 17.24. Most of them have (or had in 1996) very high initial debt ratios in almost all cases and often suffered from slow growth. [26]These two factors together made it more likely that the HIPC countries would have difficulties in meeting the solvency condition. In other words they would need high values of NICA surpluses if they were to achieve solvency. This is in spite of the typically ***low*** real rates of interest on debt that they have increasingly faced.

But even so the solvency condition is not really the main debt problem of the HIPCs – and other similar countries. For example even with an initial debt ratio as high as 2 (200%), and with an *r-g* term having a value of, say only 1% (because of the concessionary interest rates

[26] The statistical facts about the HIPC countries is very well summarised in an IMF paper published before the HIPC Initiative started to take effect. See Anthony Boote and Kamau Thugge, *Debt Relief for Low Income Countries and the HIPC Initiative*, IMF Working Paper WP/97/24, 1007. Several of the countries had public external debt charges that exceeded 100% of total government revenue on an annual basis. One namely Zaire had a ratio of such revenues greater than 300%. Clearly these burdens were wholly impossible to deal with.

that these countries can enjoy), then the necessary NICA at 2% of GDP does not seem too daunting.

BUT consider now the 200% debt: GDP ratio in terms of what this means for exports – after all to service its external debt, any HIPC country needs to earn sufficient foreign exchange to make the annual dollar payments and exports is the main route to achieve this. If exports are equal to, say 40% of GDP then the country's external debt will be the equivalent of 500% of annual exports. Even allowing for very low interest rates, the debt has to be repaid and with an average maturity of debt of, say 10 years, this will mean that something like half of the country's annual export earnings will be given over to debt service rather than to the financing of new imports for consummation and investments purposes.

However, the point here is not the actual numbers but rather the perception of actual or potential creditors that in countries with debt:export ratios such as these, it will become increasingly difficult for the debt service payments to be made: because such high proportions of the country's total foreign exchange earnings (or government revenue for that matter) have to be deployed for this purpose. In short creditors may quite reasonably start to assume that a country may at some point fail to pay its debts even if it remains technically solvent as defined above. At this point, new lending to the country in question will dry up, and/or the cost of any such lending will be raised to reflect the higher risks that seem to be involved. This drying up of all but concessional lending had been the fate of all 40 HIPC countries and several others that were on the margin of being included as eligible for HIPC dent relief.[27]

A Debt Overhang

At various times in the past developing countries individually or collectively have become seriously over indebted for various different reasons. The collective group of the HIPCs is merely one extreme example from the 1990s. Developing countries – low and middle income collectively suffered from this problem in the 1970s building to the debt crisis of 1982 and beyond. Many of the same countries had seen similar debt problems in the global recession of the 1930s.

A useful framework to analyse this particular problem is that of the Debt "Laffer Curve" illustrated in Figure 17.5 below. The vertical axis of this graphic measures the ***market value*** of debt (e.g. government bonds). The horizontal axis measures the ***face value*** of the debt.

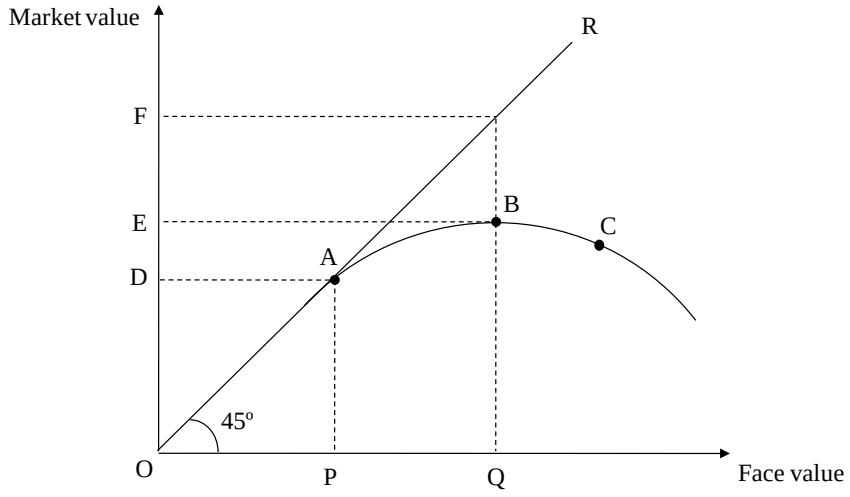
In the normal situation of borrowing and lending, the lenders (creditors) believe that the debt will be fully repaid. The being the case, the market value is equal to the face value of the debt and the relationship between the two values is represented by the line segment OR. So for example, at a point such as A, the face value of the debt, OP, is exactly equal to the market value, OD. But if the debt becomes excessively large, it will be associated with lower probabilities of debt repayment – the creditworthiness of the borrowers will be in question. Specifically, beyond the debt level shown by point A in the graphic, creditors do not expect that debtors will be able to fully repay the face value of their debts. So to the extent that the debt is marketable, it will be sold in the secondary market at a discount.

As one example look at point B. At this point, a face value of OQ debt is being sold at a discount equal to FE/FO. After point B, more borrowing will no longer impact positively on investment and growth. In fact, any further increases in debt that are achieved will actually damage

[27] Critics of HIPC argue that the criteria for including countries in the initiative and that as a result some other low income countries in deep difficulties with their external debts were excluded. See for example, Sarajuddin Isar, Was the Highly Indebted Poor Country Initiative (HIPC) a Success?
Consilience: The Journal of Sustainable Development Vol. 9, Iss. 1 (2012), Pp. 107 – 122

investment, thereby having a negative marginal impact on growth. Thus, the market value of the debt will decline because of the even lower probability of repayment.

Figure 17.5 The Debt Laffer Curve



It is highly plausible given the logic of this Laffer curve, that a reduction in the face value of developing countries' debt, (for example through voluntary debt write-offs), could enhance growth, and that this would also diminish the probability of default. There are many reasons for expecting such benefits from a debt reduction and these are summarised in Box 17.7 below. Hence, those creditors that decided on partial debt forgiveness could avoid losing the entire amount of their debt.

The Mathematics

In this sub-section we build the story just told somewhat more rigorously starting with the case where the lender to the (sovereign) borrower knows for sure whether the borrower is solvent or not and will eventually have the ability to repay existing debts: i.e. there is no uncertainty. We then consider the alternative case where the (solvency) status of the borrower is uncertain.

Case with no uncertainty

Let D_0 = Initial inherited debt (assume a bond)

$s_1 < D_0$ = Primary surplus today – think of this as the numerator in Equation 17.24 above

s_2 = Primary surplus tomorrow

i = opportunity cost of funds to creditors

If $D_0 - s_1 \leq \frac{s_2}{1+i} = D_1^{Max}$, the sovereign will be ***solvent***. In this case, there will be every possibility of a new (rollover) loan when the initial loan matures: $L_1 = D_0 - s_1$. The interest rate in the new loan will be the risk free one. The ***face value*** of the new debt (bond) will be $D_1 = L_1(1+i)$. The ***market value*** of

the new debt will be equal to the present value of repayment: $V_1 = \frac{D_1}{1+i} = L$. Hence, the secondary market price of each individual bond will be $q = \frac{V_1}{D_1} = \frac{1}{1+i}$. This discount delivers exactly a yield equal to the opportunity cost of funds to creditors.

The other possibility is that $D_0 - s_1 > \frac{s_2}{1+i} = D_1^{Max}$. In this case the sovereign borrower is ***not solvent.***

In this case, the country will not be able fully to roll over existing debt. Holders of the previous debt have to accept a loss: either through rescheduling, debt forgiveness or via other mechanisms. Any new lending has to be, at most: $L_1 = \frac{s_2}{1+i}$. Hence, holders of the initial debt will face a loss equal to $D_0 - s_1 - \frac{s_2}{1+i}$. If any new loan takes place at the risk free rate, then the face value of the new debt will be $D_1 = L_1(1+i) = s_2$. As before, the secondary market price of this debt delivers a yield equal to the opportunity cost of capital.

The case with uncertainty

Here we need to consider the ***probabilities*** of certain future states of the borrower's situation.

Let p=probability of bad state

s_2^G =primary surplus in the good state

s_2^B = primary surplus in the bad state

In this case, the present value of the maximum amount of resources the country is expected to generate in the future is

$$D_1^{Max} = \frac{E(s_2)}{1+i} = \frac{ps_2^B + (1-p)s_2^G}{1+i}.$$

There are then two sub-cases as follows:

The country will **not be solvent** if $D_0 - s_1 > \frac{s_2^G}{1+i}$ But the country **will be solvent** if $D_0 - s_1 < \frac{s_2^B}{1+i}$

Then first assume that the expectation (but not the certainty) is that the borrower is ***solvent.***

In this situation risk-neutral lenders will be willing to roll over the existing debt. The only issue is to set a high enough interest rate in the new loan.

Example: (*where the probability of the bad state occurring is 1/3*)

$D_0 - s_1 = 100$, i=1%, $s_2^G = 120$, $s_2^B = 75$, p=1/3.

In this case and substituting for, D_1^{Max} in the equation above we have

$$D_1^{Max} = \frac{E(s_2)}{1+i} = \frac{25+80}{1+0.01} = 103.96 > 100$$

The interest rate on the new loan, i_G has to be such that the promised repayment (the face value of the new debt), $D_1 = L(1+i_G)$), obeys the condition $V_1 = \frac{(1-p)D_1 + p(75)}{1+i} = L = 100$. Solving for the face value of the new debt gives us the result that $D_1 = 114$.

In other words, the borrower (government) sells today a new debt (a bond) of 100 but with the promise to repay 114 in one year's time. Given the non-trivial possibility of a bad outcome, the ***expected*** repayment of these bonds is 101, which means that the present value (market value of the new debt) is exactly $V_1 = 100$. The new debt must be sold at a discount ("q"):

Next assume that the expectation (but not the certainty) is that the borrower is ***insolvent.***

In this case, no lender will voluntarily engage in new lending unless it has a stake in the old debt. Those with such as stake have an incentive to keep lending in order to protect their existing claims. By rolling over the *existing* debt, they preserve the possibility of getting paid in case the favourable outcome materializes. This is called ***defensive lending***: by lending enough to avoid an immediate default and accepting a loss on their old loans, creditors can actually raise the value of the claims they already have. See the Laffer curve depiction of this possibility in Figure 17.5 above. Note however that each creditor will only engage in a new loan, provided the others do the same. There is a free rider failure is some creditors stand back waiting for others to provide the new money that will enhance the market value of old debt. Knowing that others may seek to do this, the otherwise "willing" lenders will themselves hold back from new lending – and a rescue based on new lending will fail to occur. This is why a so-called "collective action" is needed if the benefits of a debt bail-out are to be achieved. (see Box 17.6 below)

If no new lending takes place, the borrowing country will find impossible to meet all its obligations with the current resources, s_1, and so will need to default.

The maximum possible interest rate on the new loan is such that $D_1 = L(1+i_G) = s_2^G$. In this case, creditors get all the reward in the good state.

> ***Example***: *(where again the probability of the of the bad state occurring is 1/3 but the bad state is worse than previously assumed)*
>
> $D_0 - s_1 = 100$, i=1%, $s_2^G = 120$, $s_2^B = 30$, p=1/3. In this case,

$$D_1^{Max} = \frac{E(s_2)}{1+i} = \frac{10+80}{1+0.01} = 89.109 < D_0 - s_1$$

The maximum achievable interest rate on any new loan can now be calculated (as before) as, i_G = 20% (that is, $D_1 = 120$).

This being the case, the market value of the new debt will be $V_1 = \frac{(1-p)120 + p(30)}{1+0.01} = D_1^{Max}$. Hence, the new loan will involve an immediate loss equal to 10.9 to creditors (100-89.1).

The secondary market price of the new bonds will be:

$$q = \frac{V_1}{D_1} = \frac{89.109}{120} = 0.7425$$

The implied yield is 34.6% (120/89.109) but this will happen with probability 2/3. With probability 1/3 the buyer of this bond will get a meagre 30 out of an investment of 89.109, which delivers a yield of *minus* 66.3%. On average, the expected yield is only 1%. [28]

Some Further Implications

It can be noted from the mathematics above that there can be inherent and conflicting incentives as between the borrower (country) and its creditors. For example when the probability of a bad state that is likely to lead to insolvency is high, it might be thought that the borrower would chose to set the interest rate (on any new loan) at the maximum possible level $D_1 = L(1+i_G) = s_2^G$. But notice if he or she does so and then a good state materializes, all the rewards of that good state accrue to the creditors. Why is that a problem? The answer is that sensible economic management (monetary and fiscal policies) may well be needed to increase the likelihood of the good state emerging. But these policies may well be politically unpopular and thus politically harmful to the government of the borrowing country. If there are to be zero local gains as the reward for adopting unpopular policies then no rational government would ever undertake them. Creditors needs tor recognise this – by setting a lower than maximum interest rate they can increase the probability of a good state emerging by providing the borrowing government with more incentive to take the measure needed to achieve that state.

In general, as long as the debtor has the capability to influence the probability of the good state, it is a sound approach idea to let him share the benefits. In other words creditors – in their own interests - may wish to forgive part of a country's debt in order to increase the likelihood of the good scenario

[28] Note that the maximum possible interest rate in the new loan can be lower than the risk free rate. If, for instance, $s_2^G = 100$, the maximum interest rate in the new loan will be zero, while the risk free rate is 1%.

Box 17.6: The Benefits of Debt Reduction

There are several good theoretical reasons for expecting excessive debt (a debt overhang) to have adverse effects on the incomes, growth and development prospects of a low or middle-income country. It follows that a debt reduction will in principle eliminate at least some of these adverse effects. These reasons include the following:

- Adverse Expectations – high levels of external debt will invariably give rise to expectations of lower future levels of government expenditures; higher future levels of inflation (as seignorage revenues try to replace some of the excessive debt); higher levels of other taxation; and the likely need for exchange rate depreciation. All these factors together are likely to result in, among others lower post-tax expected returns on domestic investment and possibly capital flight.

- Costs of Future Outlays - when the government is insolvent or close to being so, i.e. when the FACE value of debt exceeds the MARKET value, then government spending is effectively rationed in terms of any marginal unit of spend. This is because the opportunity cost of any additional unit of resource is very high. The discount rate > market rate of interest - any debt repayments impose excessive costs on the economy .

- Uncertainty. The insolvency situation also creates great uncertainty about possible policy regime shifts. For example, how large will be the resources the government actually commits to debt service, will they change the amounts and in which direction, will new external funding be obtained to help and at what cost? Again the result of this uncertainty is less domestic investment

- Debt Overhang and Incentives. The Market Value of Debt (MV) = the present value of the future ***expected*** Debt Service. If that MV arises from a ***partial*** service of a larger debt (i.e. Face Value > Market value) then the ***actual*** level of Future Debt service is itself uncertain. IF the Economy does relatively well that debt service will be ***higher*** than if the economy does badly. This acts as a serious disincentive for highly indebted countries to achieve strong/improved performance. The effect is equivalent to a large TAX on good performance as this pays off creditors more rapidly.

These four possible routes to lower growth are additional to the obvious direct route that large government outlays on debt service mean lower outlays on other government goods and services some of which would be beneficial to growth.

Further reading on this matter:

D. Rodrik, "Policy Uncertainty and Private Investment in Developing Countries," Journal of Development Economics 36, November 1991.

S. Claessens, World Bank Policy Research paper, No 1147, 1993.

This argument is part of the economic justification for the HIPC debt relief programmes introduced in 1996 although moral and other arguments were also adduced in its favour since only very poor countries were involved. More generally the argument justified the application of the Brady Plan in 1989, a debt reduction plan proposed by the Secretary of the U.S. Treasury, Nicholas Brady. The strategy involved the creation of a pool of money by the IMF and the World Bank that was available to finance debt reductions operations, either through principal-reducing operations such as buybacks of discounted debt, or through reduction of debt service with negotiated reductions in the interest rates (Boughton, 2001). Measure such

as these are designed to write-down the face value of the debt from a point such as C, in Figure 17.5. to a point in the segment AB.

17.8 Balance of Payments Adjustment – a Very Simple Model

This Chapter has so far concentrated on explaining the links between the fiscal financing problems described in Chapter 16 and the international dimensions of that same problem. We have focused in particular on (i) exchange rate policies and (ii) the policies involving external debt. It has been shown that national decisions about both the exchange rate and about external borrowing provide countries with some flexibility that is not available to a fully closed economy, or one that has a fixed exchange rate and is unable to access any international borrowing. But the analysis has also shown that that apparent flexibility is itself highly constrained by the economics that define the iron discipline associated with both a floating exchange rate and with apparently easy access to external borrowing.

Having provided these additional insights we can return now to the question of a balance of payments adjustment. What happens to an economy when the external balance on current account (as in Equation 15.8 reproduced below as Equation 17.25) is in deficit to such an extent that it cannot be realistically financed by available private or official *capital* transfers or by any further reduction of international reserves?[29]

$$CAB \equiv (X - M) + TR_f - Y_f \quad \text{.....[17.25]}$$

The answer to that question is that policies have to be mobilised to reduce the deficit. Some countries in deficit may try really very hard to raise new external loans – even at much higher interest rates than before - and/or to reduce their international reserves to bare minimum levels. Some such as the HIPC countries have in the past allowed their debt stocks to go well beyond the limits of borrowing that by any objective standard are sustainable given their levels of incomes and assets. Such countries have thereby become dependent on special concessional loans and eventually on various types of debt forgiveness. Something similar happened to many low and middle income developing countries in the period of the 1980s debt crisis (of which more in Chapter 18).

In this section we deal with the more common and mainstream situation where the country in question seeks to make an adjustment to a CAB deficit before some of these extreme situations set in. It is stressed that having recourse to debt forgiveness or even to a major restructuring of existing debts is not a "solution" that most countries would voluntarily choose to rebalance their financial positions.[30]

A first point to note in this context that the world economy is by no means "fair" or "consistent" in terms of the pressures that different countries face and at different times to make (or avoid)

[29] It is noted that the possible help to the CAB from *current account* transfers are already factored into the CAB balance as defined here.

[30] And not least because such recourse will potentially undermine the credit-worthiness of such countries for the future and so likely reduce the availability and increase the costs of any new commercial loans that they are able to arrange. Some lower income countries that were potentially eligible for HIPC debt relied chose not to participate in the initiative because they wanted to avoid any such stigma: e.g. Senegal.

a balance of payments adjustment. To illustrate this point, let us compare the following examples.

- large numbers of developing countries in the period 1973 to 1981 were able to avoid the large BoP adjustment necessitated by abrupt rise in oil prices (1972-73) caused by the near-400% hike in OPEC- controlled prices, and the consequent increase in CAB deficits They could do so because for 7-8 years most were able to borrow large amounts of so-called petro-dollars through Western banks[31] at low interest rates that for most countries remained affordable.
- but this situation was not SUSTAINABLE. In 1982 after a general hike in international rates of interest precipitated by domestic monetary policy changes in the USA, Mexico was forced to default on her high levels of debt. Immediately after this initial default, the flows of new lending dried up and many other developing countries needed suddenly to make the BoP adjustments that they had avoided up until that date. This heralded a decade long period of austerity and slow growth for many countries and not least in Latin America: the so-called "lost decade".
- compare those situations with the longstanding position of the USA itself. *The* USA has for many years been running huge current A/C deficits (often >5% of GDP). But the USA to date (2014) has **not** been forced to make any major adjustment to that deficit. This is for the simple reason that the US has remained able to raise large amounts of new borrowing from surplus countries. From the 1980s onwards, these countries - led initially by Japan but then later by China, have been prepared to buy (invest in) US Treasury and other securities the surplus funds that they have been accumulating on current account. In short the creditworthiness of the USA has remained high in spite of large, and some would argue potentially unsustainable deficits.
- Look also at the situation of countries such as Greece and Portugal in the aftermath of the 2007/2008 global financial crisis. Although this crisis affected the economies of all the major European countries, several of them including Britain and Germany were able to finance their enlarged current account deficits by continuing to borrow at really very low rates of interest in the world capital markets. For example yields on government bonds remained as low as 1.2% in Germany and 1.5% in the UK. This was not the case for some smaller EU countries notably Greece where the pre-existing high levels of indebtedness combined with doubts about the fiscal competence of the authorities, led quickly to rocketing rates of interest on any new debt (in excess of 13% in Greece for example) and to an unavoidable draconian balance of payments adjustment that imposed much pain on the economy and suffering to the Greek population.

The Simple IMF-Polak Model

The IMF has remained for many years the main international agency charged with supporting balance of payments adjustment in its member countries. The power granted to the IMF by its large membership of sovereign governments enables it both to provide temporary balance of payments financial support but also to help individual countries develop policy packages to reduce balance of payments deficits to manageable levels. The basic macroeconomic model that defines the Fund's approach to balance of payments adjustment is remarkably simple. This model – the so-called Financial Programming Model - evolved from the work of IMF staff during the 1950s and 1960s mainly on Latin American countries. It was formalized initially by

[31] So-called because after the oil price hikes in 1972/73 OPEC countries initially had huge external surpluses most of which were deposited in Western banks in dollars. Those banks in turn faced large internal and external pressures to lend these dollars to whoever needed them.

Jacob Polak (1957)[32] with early small refinements by Robichek (1967)[33]. Although further refined over many years in various directions it is arguably the most widely utilised macro model ever devised. The next few paragraphs explain the essential features of this model as one key component of this present chapter.

In what follows the model is explained in several sequential stages starting – purely for reasons of exposition - with an assumption (later removed) that nominal GDP is fixed and therefore known to policy-makers.[34]

The model with fixed nominal income

Let us first define the basic flow of funds balances of each of three sectors as identified in our earlier embryonic flow of funds matrix in Chapter 15 (see Table 15.4): the private sector, the government sector and the government.

Private sector
The private sector savings balance is used partly for the direct financing of private investment (I_p) with that balance being supplemented potentially by additional domestic borrowing (DC_p). Any funds remaining are committed to some mix of an increase in money balances (M_d) and an increase in holdings of foreign assets (F_p) of various types.

$$Y - T - C_p - I_p = \partial M_d + \partial F_p - \partial DC_p \qquad [17.26]$$

Government sector
The government's savings balance is used in part to finance government investment (I_g) and is supplemented potentially by borrowing from the domestic banking system (DC_g). Any funds remaining are invested in various types of foreign assets (F_g)

$$T - G - I_g = \partial F_g - \partial DC_g \qquad .....[17.27]$$

Foreign sector
The foreign sector earns income from the imports purchased by our economy (Z) and spends part of the proceeds on the exports (X) that our economy sends abroad. If there a surplus between these two elements (i.e. a deficit in the CAB from the point of view of our economy) then that surplus is used to buy back foreign assets owned by either the government or the private sector of our economy, or to acquire reserves held by our banking system. If on the other hand the foreign sector runs a deficit (which is a surplus in our economy's CAB) then foreign assets and or reserves will be acquired by various agents in our economy.

$$Z - X = -(\partial F_p + \partial F_g + \partial R)..... \qquad [17.28]$$

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[32] Polak, Jacques J., "Monetary Analysis of Income Formation and Payments Problems", International Monetary Fund Staff Papers, November 1957, pp. 1-50.
[33] Robichek, E. Walter, "Financial Programming Exercises of the International Monetary Fund in Latin America", address to a seminar of Brazilian professors of economics, Rio de Janeiro, September 1967.
[34] This presentation follows closely the useful synopsis of the monetary programming model set out in Mohsin Khan, P. Montiel and N. Haque, Adjustment with Growth: Relating the Analytical Approaches of the World Bank and the IMF", *Journal of Development Economics,* January 1990. That paper provides a fuller algebraic specification of the model than is given here for those readers who need this.

In order to keep the explanation as simple as possible the variable Z can here be thought to represent imports adjusted for the other two non-export items in the CAB shown in equation 17. 25 above

Banks
In these various relationships the banking system plays an intermediary role lending and borrowing funds to the other three sectors. We have derived the sectoral balance for the banking system earlier (see Equation 15.17 in Chapter 15). Written in a slightly amended way in first differences this can be stated as follows:

$$\partial M_d = \partial M_s = \partial DC_p + \partial DC_g + \partial R..... \quad [17.29]$$

The real economy balances from the national income accounts can be expressed as:

$$Y - [C_p + I_p + G + I_g] = X - Z..... \quad [17.30]$$

Now let us *temporarily* assume a fixed nominal level of income (GDP) so that

$$Y = Y^* = \text{fixed} = \text{nominal GDP}.....[17.31]$$

Assume also a simple money demand equation in which the velocity of circulation of money is also constant, then we know that:

$$\partial M_d = v\partial Y ..... \quad [17.32]$$

From this equation and the balance sheet of the banks [17.29] we can deduce that

$$\partial R = v\partial Y^* - [\partial DC_p + \partial DC_g]..... \quad [17.33]$$

This is the key equation. It tells us that if policy makers wish to achieve an improvement in the balance of payments as represented by the state of the country's foreign reserves (*R*) then they can simply proceed as follows

- Select a Target level for "*R*" and by implication for *δR* then
- place a ceiling (a limit) on $\partial DC_p + \partial DC_g$ to achieve the reserve target *given the stable monetary demand* and so the known level of *v*δY*.

Since it is invariably an *improvement* (increase) in reserves that policy-makers seek, this approach justifies the familiar IMF use of a *ceiling* on the growth of domestic credit as the means to achieve the improvement. Other insights can be added by assuming that other variables are exogenous (i.e. unaffected by the policy stance). For example if both exports and changes in foreign asset holdings are assumed to be exogenous, then the process of improving reserves in the BoP is achieved by the squeezing of imports (*Z)* with imports formally the residual in the equation system.

Introducing the Price Level

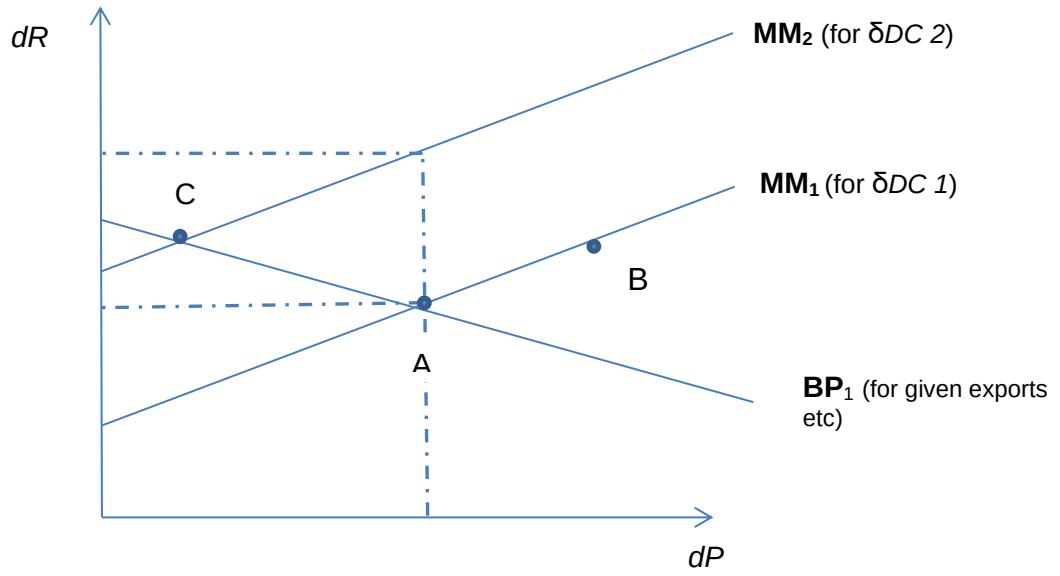
This is all too oversimplified. So let is now bring prices into the picture by recognising that nominal income (GDP) is the product of real income (*y*) and the price level. This being the case equation (17.33] can be re-written as

$$\partial R = v\partial(Py^*) - [\partial DC_p + \partial DC_g] \ldots\ldots\ldots\ldots \quad [17.34]$$

Where it is assumed that **real** income is now an exogenous variable but *P* is endogenous. We know also from the simple money demand equation that a higher level of P will result in higher demand for money balances. Hence, as P rises the change in reserves that results from our new equation will be higher *for any given level of change in domestic credit.* But we have now introduced an indeterminacy into the model. Specifically, until we know what the price level will be we can no longer be sure what will happen to international reserves. That situation is depicted in the MM line of Figure 17.6 below.

MM_1 traces the possible locus of combinations of δ*R* and δ*P for any given level of change in domestic credit.* But we can clearly see from Equation [17.34] that if domestic credit growth were to be restrained (capped) then a higher level of reserve growth would be possible for any given price level. That possibility is shown in the locus of points MM_2 in Figure 17.6.

Figure 17.6: The Polak Model diagrammatically



To mathematically resolve the indeterminacy now present in the model we need to specify another equation that will give us additional statements about the link between the domestic price level and the change in international reserves. This is most commonly done by reconsidering the BoP element of the model and by now assuming that at least one part of the CAB will be affected directly by any change in the domestic price level.

In our most simple version of the model let us assume that imports (Z) are so affected. For example we could assume a very simple linear relationship that states that imports rise directly in line with nominal income as below:

$$Z = aY = \text{a Py}^* \text{ .....[17.35]}$$

Using this and the same assumption as earlier that both exports and changes in foreign asset holdings are exogenous, then any increase in the domestic price level P will lead (through the effect on imports) to some reduction in the change in reserves. This basic direction of causation (that can be made ever more complex by also evoking price level effects on competitiveness and exports etc.) gives us a new locus of links as between δ*R* and δ*p* which is depicted in the diagram above as the line BP_1. This is drawn consistently with our explicit assumptions assuming a given level for exports and the change in holdings of foreign assets. So if for example exports were to increase then the BP line would shift upwards in the north easterly direction.

Assuming that this economy started at position "A" in the diagram then for any given level of δ*DC*, an improved export performance would establish a new equilibrium at a new point on the MM line such as point "B" (the new BP line is not shown).

The mechanics of the model can now be explained in a somewhat more intuitive way. First changes in monetary policy (represented by the rate of expansion of domestic credit) can only move the economy's equilibrium point ***along*** the BP line and only combinations of δR and δP that lie along this locus can be attained by using such a policy alone: e.g. the move from "A" to "C". This move happens because the reduction in domestic credit causes price level effects (a lower price level) that clears the money markets partly (i) by reducing the demand for money (as nominal income falls) but partly (ii) by impacting the endogenous part of the money supply as reserves rise because of the declining level of imports associated with lower nominal income. The gain in reserves is positive but smaller than would have been the case had the price level remained constant– because in that case there would have been no reduction in the demand for money.

The final step in this slimmed down version of the model is to introduce a second policy instrument that can give the authorities some influence over the ***position*** of the BP line – the relationship between δ*R* and δ*P* that ensures compliance with the balance of payments condition of the model. The obvious policy instrument in this context is the nominal exchange rate which can exert an influence over several components of the BoP in the manner already partly analysed earlier.

The simplest approach is to recognise an import function in which the relative prices of foreign versus domestic goods exerts an additional influence on import volumes – additional that is to the effects shown already in Equation 17.35 above. Then provided that the volume of imports is sufficiently responsive to relative prices, an exchange rate devaluation will raise foreign prices (in domestic currency) and make imports less attractive. An exchange rate appreciation will do the opposite. So provide that the authorities have some control over the nominal exchange rate, they can shift the BP line upwards in the north easterly direction for a devaluation and in the opposite direction for a revaluation.

Assuming that a balance of payments adjustment typically requires an ***improvement*** (increase) in foreign reserves, then the standard policy package that emerges from this programming model is some reduction in the rate of domestic credit expansion (which on its own is deflationary in prices) and some devaluation of the nominal exchange rate (which taken

on its own has expansionary effects). Significantly both these policy interventions work in the same direction to raise the level of foreign reserves. But they work in opposite directions as regards their impact on the price level.

18. Economic and Financial Crises