MACROECONOMICS SIMPLIFIED

Understanding Keynesian and Neoclassical Macroeconomic Systems

Nicoli Nattrass • G. Visakh Varma

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Dedication

This book is dedicated to the memory of Visakh's parents,
K. R. Goda Varma and Malathi Goda Varma, and Nicoli's mother, Jill Nattrass.

Thank you for choosing a SAGE product! If you have any comment, observation or feedback, I would like to personally hear from you. Please write to me at contactceo@sagepub.in

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CHAPTER 1

Introduction

Macroeconomics is an exciting and fiercely contested branch of economics. It deals with economy-wide processes such as the business cycle, inflation and unemployment. These are the big questions in economics. Attempts by governments to address them through economic policy have major social, political and economic ramifications. Macroeconomic debates are thus heated and highly political as well as technical.

This introductory text reflects this contestation by presenting simple macroeconomic models in Keynesian and neoclassical versions. This serves the dual purpose of introducing the long-standing cleavage in macroeconomics as well as allowing for an informed discussion of the difference between market-clearing (neoclassical) and Keynesian models. The book shows how the various models can shed light on some important macroeconomic issues, but that their use needs to be accompanied by a critical understanding of their origins and limitations.[1]

Neoclassical economists typically assume that the free operation of market forces will result in the macroeconomy adjusting quickly and efficiently to full-employment equilibrium. Keynesians start out from a different premise, namely that markets function imperfectly, and that individual maximising behaviour in the presence of uncertainty can lead to socially irrational outcomes—like extended recessions.

Our primary aim is to show that competing theories are logical constructs based on different premises using simple algebra and graphs rather than complicated mathematics. A secondary aim is to point out the intellectual origins of key concepts and to provide Indian examples where appropriate. We concur with Paul Krugman that the economics profession was unable to see the 2008 financial crisis coming in large part because 'economists, as a group, mistook beauty, clad in impressive-looking mathematics, for truth'.[2] We believe that this has skewed economics teaching towards developing mathematical skills to explicate a single all-encompassing (broadly neoclassical) vision—rather than showing students how competing visions imply different adjustment processes and that real-world decision-makers are torn between different models at different times.

[1] This book draws on some material previously published in Nattrass, N. 2000. *Macroeconomics: Theory and Policy in South Africa*. Cape Town: David Philip.

[2] Krugman, P. 2009. 'How Did Economists Get It So Wrong?' *New York Times*, 2 September. http://www.nytimes.com/2009/09/06/magazine/06Economic-t.html?pagewanted=all

The Continuing Divide in Macroeconomics

John Maynard Keynes in the early 1930s: 'On the one side are those that believe that the existing economic system is, in the long run, a self-adjusting system, though with creaks and groans and jerks and interrupted by time lags, outside interference and mistakes… On the other side of the gulf are those that reject the idea that the existing economic system is, in any significant sense, self-adjusting.'[3]

Stanley Fischer in the late 1980s: 'One view and school of thought, associated with Keynes, Keynesians and new Keynesians, is that the private economy is subject to co-ordination failure that can produce excessive levels of unemployment and excessive fluctuations in real activity. The other view, attributed to classical economists and espoused by monetarists and equilibrium business cycle theorists, is that the private economy reaches as good an equilibrium as is possible given government policy.'[4]

Paul Krugman in 2009: 'Macroeconomics has divided into two great factions: "saltwater" economists (mainly in coastal US universities), who have a more or less Keynesian vision of what recessions are all about; and "freshwater" economists (mainly at inland schools), who consider that vision nonsense. Freshwater economists are, essentially, neoclassical purists. They believe that all worthwhile economic analysis starts from the premise that people are rational and markets work.'[5]

Source: Authors.

The Indian national accounts are introduced in Chapter 2. Chapter 3 opens the theoretical discussion with an outline of the neoclassical general equilibrium model. This is followed by an introduction to Keynes' economics and to the simple Keynesian model of income determination (Chapter 4). Chapter 5 introduces the relationship between investment and the interest rate. Chapters 6 and 7 show how the real and financial sectors can be brought together in the same (*IS–LM*) model as a tool for discussing the impact of fiscal and monetary policies.

Chapter 8 introduces the labour market by means of the *AS–AD* model. It shows how the basic framework can be used in a more dynamic way to discuss the relationship between unemployment and inflation. Unemployment and related issues in the Indian economy are discussed in this chapter.

[3] Quoted in Snowdon, B., H. Vane and P. Wynarczyk. 1994. *A Modern Guide to Macroeconomics: An Introduction to Competing Schools of Thought*. p. 4. Aldershot: Edward Elgar.

[4] *Ibid*.

[5] Krugman, *How Did Economists Get it so Wrong?*

Chapter 9 extends the conventional Keynesian *IS–LM* framework to the open economy, and discusses the role of prices, exchange rates and interest rates in an open economy context. Chapter 10 concludes the book with a brief discussion of the proclivity of capitalism to financial crisis and the insights offered by Hyman Minsky and Joseph Schumpeter.

Technical and Ideological Issues

Macroeconomic models are collections of simultaneous equations designed to approximate key economic relationships. They are highly simplified versions of reality which give the appearance of empirical truth and scientific objectivity—but which, at heart, are driven by their underlying theoretical assumptions about how economies work.

Economists start off the modelling exercise with a mind-map that they impose on the data. Once this theoretical framework is in place, the modeller uses empirical data and econometric techniques to determine the empirical parameters of the equations. Depending on the econometric results (and on the integrity of the economist), this mind-map might be adjusted slightly. However, to a very important extent, macroeconomic models are generated according to the ideological vision the modeller has of reality.

Theoretical appeal and ideological persuasion both influence one's choice of macroeconomic framework. It is no accident that those with more neoclassical leanings tend to have a greater suspicion of state intervention than Keynesians. As Milton Friedman (the guru of free-marketeers) notes:

> What really distinguishes economists is not whether they recognise market failure, but how much importance they attach to government failure, especially when government seeks to remedy what are said to be market failures. ... Speaking for myself, I do not believe that I have more faith in the equilibrating tendencies of market forces than most Keynesians, but I have far less faith than most economists, whether Keynesian or monetarist, in the ability of government to offset market failure without making matters worse.[6]

In the final analysis, one's choice of theory depends on how convincing it seems (on its own terms), on how it gels with one's political attitudes and how the theory fits the facts at hand. Understanding the basic theoretical constructs lying behind rival understandings is an essential pre-condition to forming good judgements in this regard. But it is just a beginning. As John Maynard Keynes (the father of macroeconomics) argued 'the master economist must possess a rare combination of gifts... He must be a mathematician, historian, statesman, philosopher—in some degree ... as aloof and incorruptible as an artist, yet sometimes as near to earth as a politician.'[7]

[6] Quoted in Snowdon et al. *A Modern Guide to Macroeconomics*. p. 174.

[7] Quoted in Skidelsky, R. 1992. *John Maynard Keynes: The Economist as Saviour, 1920–1937*. p. 411. London: Macmillan.

And even if one does not aspire to become such a 'master economist', getting to grips with the language economists speak is an important skill—if only to prevent them from pulling the wool over your eyes. To quote Keynes once again:

> Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back. I am sure that the power of vested interests is vastly exaggerated compared with the gradual encroachment of ideas. Not indeed, immediately, but after a certain interval; for in the field of economic and political philosophy, there are not many who are influenced by new theories after they are twenty-five or thirty years of age, so that the ideas which civil servants and politicians and even agitators apply to current events are not likely to be the newest. But sooner or later, it is ideas, not vested interests, which are dangerous for good or evil.[8]

So, now is the time to make sure that you are not enslaved later by some half-understood idea you picked up in economics lectures or in the newspaper. It is also the time to equip yourself with the tools for understanding and criticising the economic policies which may be thrust upon you by 'madmen in authority'.

[8] Keynes, J. M. 1936 (Reprinted in 1964). *The General Theory of Employment, Interest and Money*. pp. 383–84. London: Macmillan.

CHAPTER 2

The National Accounts

Macroeconomic models deal with aggregate economic data. Most of these come from the national income and product accounts—usually referred to simply as the 'national accounts'. Before moving on to the terrain of macroeconomic theory, it is useful to revise some basic national income accounting concepts. This chapter does so with reference to India.

National Income Accounting Concepts

The national accounts estimate the value of output, expenditure and incomes earned in an economy over a specified time period (usually a year). In India, national accounting follows the system adopted by the United Nations. Under this system, three methods are used for the estimation of national product. They are the production (value-added) method, income method and expenditure method. A core principle of national income accounting (based on the circular flow of income model; see Figure 2.1) is that one should get roughly the same estimate of the gross domestic product (GDP) irrespective of whether the production (value-added), income or expenditure method of valuation is used.

- The *production method* sums up the value-added in each industry, that is, the value of each industry's output minus intermediate inputs.

Value-added

National income accountants measure the value-added at each stage of production so as to avoid double counting. For example, if a farmer sells coconuts to an oil mill for ₹100, and if the mill processes the coconuts and sells coconut oil to a hotelier for ₹125, then the value-added by the oil mill is ₹125 – 100 = ₹25. If the hotelier cooks food with coconut oil and sells it for ₹200, then the value-added by the hotelier is ₹200 – 125 = ₹75. The value-added in production is equal to ₹100 + 25 + 75 = ₹200. In the absence of indirect taxes, subsidies, etc., this figure is the same as the final value of the food at market price.

Source: Authors.

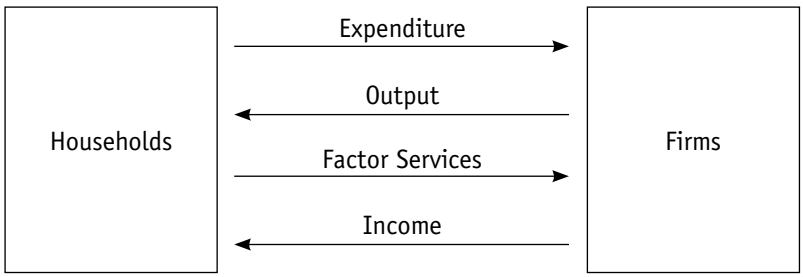


Figure 2.1 The Circular Flow of Income

Source: Authors.

- The *income method* sums up all payments to the factors of production, that is, the remuneration of workers, and the gross operating surplus (i.e., profits) of firms. This gives an estimate of GDP at factor incomes. This should, in principle, be equal to value-added.
- The *expenditure method* sums up the components of final demand (expenditure on final goods) in estimating expenditure on the GDP.

As outlined in the circular flow of income model, expenditure on goods and services provides firms with the income used to pay the factor services (labour and capital) used

Simon Kuznets and National Accounting

National income accounting was developed during the 1930s and 1940s largely through the work of Simon Kuznetz, a Russian born economist who was educated and lived in the USA. His meticulous work on how to measure savings, investment and consumption was crucial to the development of macroeconomics. He assisted the US Department of Commerce to standardise their measure of GDP, but was unable to convince them to include an estimate of the value of unpaid domestic work (which Kuznets believed as an important component of economic life). Many people believe that Kuznets won the Nobel Prize in 1971 for his work on national income accounting, but in fact he won it for his work on economic growth.[1]

Source: Authors.

[1] For more information on Kuznets, see, http://www.econlib.org/library/Enc/bios/Kuznets.html and Fogel, R. W. 2001. Simon Kuznets: 1901–1985, A Biographical Memoir. In *Biographical Memoirs*, Vol. 79. Washington, DC: National Academy Press.

in producing value-added. Thus, as long as all incomes are channelled back into the economy in the form of consumption and investment expenditure, income will equal the expenditure and output.

Note that the national accounts only include flows that are evident in the monetary economy. Thus, if a man paints his house by himself, then this work is not counted. But if the man pays a firm to do it for him, then the work will be counted as additional income and economic activity. Similarly, the work of cleaners and house-keepers only appears in the national accounts if this is paid work; women who work for no pay are not counted. This is a problem for India because many economic activities in villages are non-monetary and hence do not appear in the national accounts.

Expenditure on the GDP

Expenditure on the GDP is the value of aggregate spending on all final goods and services in the economy valued at market prices. In the national accounts, expenditure on GDP is calculated as follows:

$$C + GCF + G + X - Z,$$

where C = private consumption spending; GCF = gross capital formation = gross fixed capital formation (by firms, households and government) + changes in inventories + valuables; G = government consumption spending; X = exports; Z = imports.

Exports are added to total expenditure because export sales are an injection of foreign demand. Imports are subtracted from total expenditure because they are a leakage of domestic spending on foreign products. Gross domestic expenditure (GDE) is simply $C + GCF + G$.

Private consumption expenditure (C) comprises current spending by households on final consumer goods and services. Spending on new houses and buildings is counted as part of investment rather than consumption in the national accounts. Private consumption expenditure tends to be the largest component of domestic demand (as was the case in India in 2011–12 [Table 2.1]). However, the importance of investment and government consumption spending has been rising over the past two decades (see Figure 2.2).

Table 2.1 shows the breakdown of GDP at market prices in India during 2011–12. Note that 'discrepancies', otherwise known as residual items, are reported in the table. This oddity arises as a result of accounting conventions which attempt to reconcile different measures of the GDP based on different data sources. In principle, the production, expenditure and income methods of estimating the national output should yield the same results. In practice, however, this is unlikely owing to data measurement problems and discrepancies which are therefore inevitable. Note also that the components do no sum to the total owing to 'errors and omissions' in the data collection and estimation process.

Table 2.1 India's GDP at Market Prices (₹, Billion) in Current Prices

	2011–12	
	₹ Billion	%
Private final consumption expenditure	50,562.19	56.4
Government final consumption expenditure	10,426.77	11.6
Gross fixed capital formation	27,490.72	30.6
Change in stocks (inventories)	1,893.84	2.1
Valuables (e.g., art, antiques, jewellery)	2,429.68	2.7
Plus exports	21,436.47	
Less imports	27,224.54	−6.5
Discrepancies	2,734.33	3.0
GDP at market prices	89,749.47	100

Source: Reserve Bank of India: Components of GDP (at market prices). Available on: http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics (downloaded 29 March 2013).

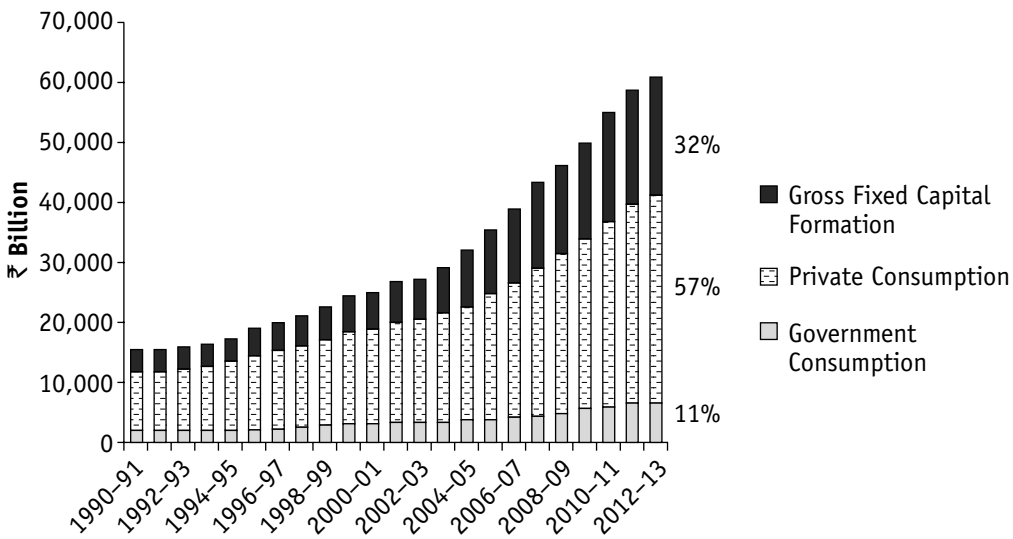


Figure 2.2 Components of GDE in India: 1990–91 to 2012–13

Source: Reserve Bank of India: http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics (downloaded 29 March 2013).

Consumption expenditure by general government (G) is estimated as the current expenditure on salaries and wages and on goods and other services of a non-capital nature by the general departments of public authorities. Government includes central, state and local government. Note that G does not include transfer payments (such as

pensions and disability grants). There is thus a difference between government spending on goods and services and the size of the government budget, which includes a significant amount of transfers.

Gross capital formation consists of investment spending (i.e., gross fixed capital formation) plus changes in stocks (i.e., inventories) and valuables. Investment is the total amount spent by producers in the private and public sectors on capital goods during the period concerned before provision is made for depreciation. It is made up of fixed investment in machinery, construction and the change in inventories.

Note that investment refers to additions to the physical stock of capital (hence the term 'fixed capital formation'). It does *not* include financial 'investments' such as the purchase of bonds or shares. Such purchases would be regarded as 'savings' rather than as investments in the national accounts.

Investment has planned and unplanned components. Spending on plant and machinery (fixed capital expenditure) is obviously planned. Some inventory accumulations are also probably planned, but most inventory accumulations are unplanned—that is, the accumulation of unsold inventories which firms would have preferred to have sold. Keynesian economic thinking draws an important conceptual distinction between planned and unplanned inventory accumulations—but the national accounts simply estimate the total value of inventories (planned and unplanned). When this is added to investment, the result is an estimate of gross capital formation.

Investment growth is typically the most volatile of all the components of GDE. Figure 2.3 tracks the growth rate of GDE in India from 1990–91 to 2012–13. It shows

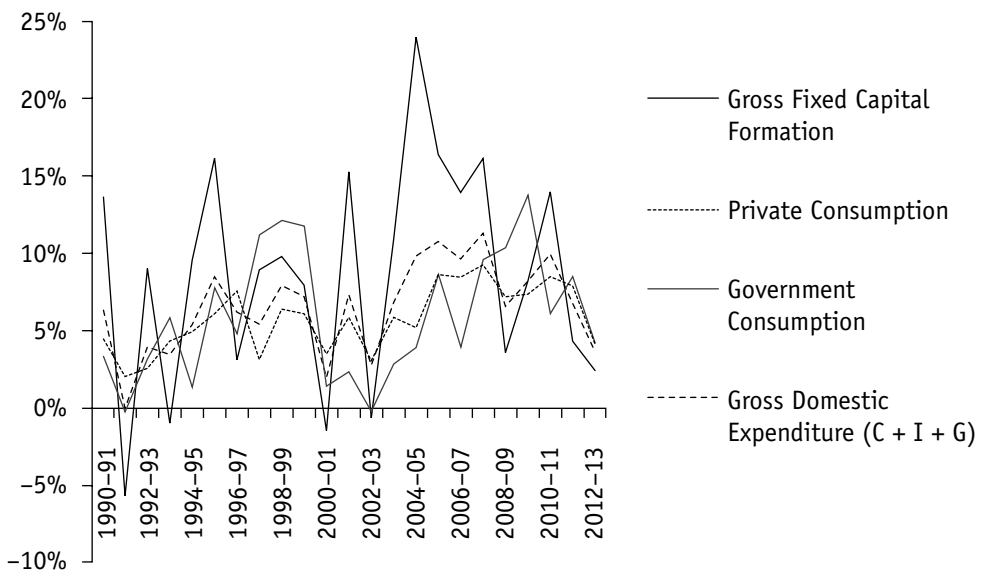


Figure 2.3 Growth in Real GDE in India

Source: Reserve Bank of India: http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics (downloaded 29 March 2013).

that investment is indeed the most volatile component, whereas consumption is relatively stable and government spending becomes more important in periods of economic downturn, notably in 2008. Variation in consumption in India is often driven by weather conditions that affect agricultural output.

Other Macroeconomic Aggregates

The GDP at factor incomes measures the value of economic output by summing the incomes earned by workers and firms. The existence of indirect taxes and subsidies results in a discrepancy between market prices and factor incomes. To move from GDP at factor incomes to GDP at market prices (or 'basic prices'), it is necessary to add indirect taxes minus subsidies to factor incomes (Table 2.2).

GDP at factor incomes can be expressed in various ways. One of the most useful is to see it in terms of different purposes to which incomes can be allocated, namely consumption, savings and taxation (T). GDP at disposable income is measured

Table 2.2 Macroeconomic Aggregates of India (2011–12) in Current Prices

	₹ Billion
1. GDP at factor cost	83,535
2. Consumption of fixed capital (depreciation)	8,767
3. NDP at factor cost (1–2)	74,768
4. Indirect taxes minus subsidies (net indirect taxes)	6,214
5. GDP at market prices (1+4)	89,749
6. NDP at market prices (5–2)	80,982
7. Net factor income from abroad	–768
8. GNP at factor cost	82,767
9. NNP at factor cost (8–2)	74,000
10. GNP at market prices (5+7)	88,981
11. NNP at market prices (5–2)	80,214
12. Personal disposable income	60,158
13. Gross domestic capital formation	31,415
14. Net domestic capital formation (13–2)	22,647
15. Gross domestic savings	26,519
16. Per capita GNP at factor cost (₹)*	68,858
17. Per capita NNP at factor cost (₹)*	61,564

Source: Reserve Bank of India: http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics (downloaded 29 March 2013).

Note: *Divided by a population of 1.202 billion.

post-tax. As will become clear later on in the text, macroeconomic models often use these formulations.

The GNP at Market Prices

GNP at market prices provides a measure of the income earned by citizens. It includes remittances from citizens working abroad, and excludes incomes earned by foreigners and repatriated abroad. Table 2.2 provides the relevant figures for India for the 2011–12 financial year.

- GDP at market prices = GDP at factor cost + net indirect taxes.
- Net domestic product (NDP) at market prices = GDP at market prices minus consumption of fixed capital.
- NDP at factor cost = NDP at market prices minus net indirect taxes = GDP at factor cost minus consumption of fixed capital.
- GNP at market prices = GDP at market prices + net factor income from abroad.
- Net National Product (NNP) at market prices = GNP at market prices minus consumption of fixed capital.
- GNP at factor cost = GNP at market prices minus net indirect taxes.
- NNP at factor cost = GNP at factor cost minus consumption of fixed capital = NNP at market prices minus net indirect taxes.

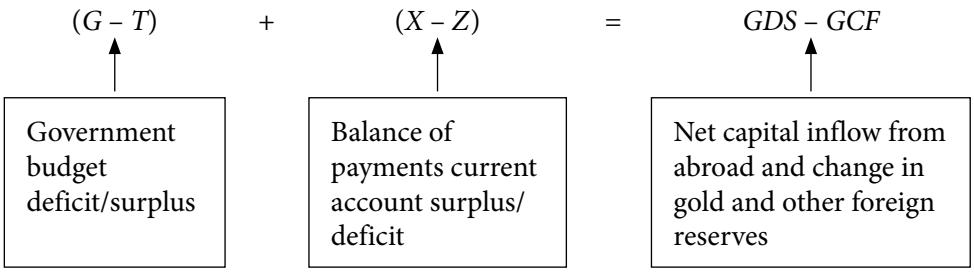
Income of the private sector is calculated by subtracting income from property and entrepreneurship accruing to government administrative departments and savings of non-departmental enterprises from NDP at factor cost. When interest paid on national debt, net factor income from abroad, current transfers from the government and current transfer from the rest of the world are added to the income of the private sector, we get private income. Personal income is calculated by subtracting the savings of the corporate sector (net of retained earnings of foreign companies) and corporate taxes from personal income. Finally, subtracting direct taxes on the households and the miscellaneous receipts of the government from personal income gives an estimate of personal disposable income.

Net value-added at factor cost is the current flow of goods and services resulting from the productive activity of the economic factors land, labour, capital and entrepreneurship. It is distributed to them as factor payments, that is, rent, wages, interest and profit. These are called factor incomes. Net value-added and factor incomes are equal.

A Few Identities

Expenditure on GDP = $C + GCF + G + X - Z$;
GDP at factor incomes = $C + GDS + T$;
where GCF = gross capital formation and GDS = gross domestic savings.

Both estimates of the GDP should yield the same figure.
Therefore, $C + GCF + G + X - Z = C + GDS + T$.



National accounting conventions ensure that *GDS* and *GCF* are by definition equal. In a closed economy (i.e., assuming no international trade or capital flows), *GDS* and *GCF* will always be equal because any difference between savings and investment will be reflected in inventory accumulation (and in India, also by accumulation of valuables), which, when added to investment, becomes *GCF*. In an open economy, any difference between savings and investment will be reflected in net capital inflows from abroad. In order to ensure that savings equal investment, national income accountants add the change in gold and other foreign reserves to *GDS*. This means that *GDS*–*GCF* will necessarily (by definition) be equal to zero.

National accounting identities are *ex post* (i.e. after the fact) identities. These differ from the planned (or *ex ante*) relationships used in Keynesian macroeconomic models. Whereas *GCF* and *GDS* are necessarily equal, planned investment (*I*) and planned savings (*S*) are not necessarily equal. This is because *I* does not include unplanned inventory accumulation and *S* does not include changes in foreign reserves. $GCF = GDS$ is a national accounting identity, whereas $I = S$ is an equilibrium condition in a Keynesian model. Do not confuse the *ex post* national accounting identities with the *ex ante* equilibrium condition.

Real and Nominal GDP

There are two measures of GDP: nominal and real. The nominal (or current) price GDP measures the GDP at prices prevailing during the period of measurement. The real (or constant price) GDP is measured at prices ruling in a specific base year. This allows us to eliminate the effect of inflation and hence measure the 'real' growth of the economy.

To capture a real change in the GDP, we need to strip out the effect of price inflation (or deflation). We do this by dividing the estimates of GDP at current prices by a price index known as the GDP deflator. (You can work out what GDP deflator was used by dividing the GDP at current prices by the GDP at constant prices.)

Table 2.3 Inflation and Real GDP Growth in India (₹, Billion)

	GDP at Factor Cost Current Prices	Growth (%)	GDP at Factor Cost Constant Prices (Base Year: 2004–05)	Growth (%)	GDP Deflator	Growth (%)
2005–06	33,905.03	14.1	32,530.73	9.5	1.042	4.2
2006–07	39,532.76	16.6	35,643.64	9.6	1.109	6.4
2007–08	45,820.86	15.9	38,966.36	9.3	1.176	6.0
2008–09	53,035.67	15.7	41,586.76	6.7	1.275	8.5
2009–10	61,089.00	15.2	45,161.00	8.6	1.353	6.1
2010–11	72,670.00	19.0	49,370.00	9.3	1.472	8.8
2011–12	83,535.00	15.0	52,436.00	6.2	1.593	8.2
2012–13	94,619.79	13.3	55,034.76	5.0	1.719	7.9

Source: Reserve Bank of India: http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics (downloaded 29 March 2013).

When national accountants formulate the GDP deflator, the first step they need to take is to select a base year. The base year should ideally be a 'normal' year (i.e,. it should not be a drought year). Next, a representative basket of goods (for the economy as a whole) needs to be selected, and its price changes recorded over time.

The most recent base year used by the Reserve Bank of India is 2004–05. Table 2.3 shows that in this year, the GDP at factor cost was the same for constant and current prices estimates. Table 2.3 records the growth rates for the current price estimates, the constant price estimates and the GDP deflator. The growth in the GDP deflator gives us an estimate of inflation for the economy as a whole (i.e., for producers and consumers). The difference between the growth rates for the constant and current price GDP estimates is approximately equal to growth in current price GDP minus inflation.

The data in Table 2.3 show that the Indian economy grew strongly between 2004–05 and 2010–11, but slowed down significantly over the following 2 years. The global financial crisis slowed real income growth in 2008–09, but unlike most of the rest of the world, Indian growth recovered quickly. Inflation, however, continued to be a problem, indicating that growth was beginning to push up against structural and other constraints. It was thus to be expected that as growth slowed subsequently in 2012–13, so did inflation.

The GDP, Economic Development and Welfare

National accountants present economic data in various ways—one of them being according to economic sector. Table 2.4 presents data on the sectoral composition of the Indian economy. Agriculture and allied services (forestry and logging), along with mining and

Table 2.4 Distribution of India's GDP by Economic Sector

Year	Agriculture and Allied Activities (%)	Industry (%)	Services (%)
1951–52	50.7	12.1	36.5
1961–62	42.6	16.0	42.3
1971–72	40.2	16.4	43.1
1981–82	34.1	20.5	45.0
1991–92	29.4	20.0	50.4
2001–02	23.0	19.2	57.8
2011–12	17.4	18.5	63.9

Source: Reserve Bank of India: http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics (downloaded 29 March 2013).

quarrying constitute the primary sector of the Indian economy. The share of this sector has fallen from about half of value-added in the 1950s to 18 per cent today. The secondary sector (industry, manufacturing, electricity, gas and water supply and construction) rose over the same period (now amounting to over 20 per cent of the economy)—but it was the tertiary sector (especially services) which has seen the fastest growth—accounting for almost two-thirds of the economy today.[2]

Some commentators now worry that the growth has been 'unbalanced', that it has not provided an adequate boost to industry or jobs—and that 'neoliberal' economic policies exacerbated the relative decline of manufacturing whilst privileging large corporations.[3] Others are concerned about the impact of this structural change on inequality as the spread of earnings is wider in industry and services than in agriculture.[4]

Structural change away from agriculture and towards industry and services is typical of the process of economic development. Table 2.5 shows that India shares many characteristics of low income countries, including a relatively large agricultural sector. However, India has made great progress, especially during the 2000s, in terms of growth and development and poverty rates have fallen in urban and rural areas.[5] However, many challenges remain both in terms of maintaining growth and ensuring that it enhances

[2] For an accessible introduction to economic sectors in India, see, http://www.youtube.com/watch?v=VdiT7qlEhFs

[3] See for example, Alternative Survey Group. 2012. *Alternative Economic Survey, India 2007–08: Decline of the Developmental State*. p. 113. Delhi: Daanish Books.

[4] Pieters, J. 2010. 'Growth and Inequality in India: Analysis of an Extended Social Accounting Matrix,' *World Development* 38 (3): 270–81.

[5] See for example, Binswanger-Mkize, H. 2012. *India 1960–2010: Structural Change, the Rural Nonfarm Sector, and the Prospects for Agriculture.* Berkeley: Department of Agricultural and Resource Economics, University of California. http://areweb.berkeley.edu/documents/seminar/Binswanger.pdf

Table 2.5 India in Comparative Perspective

	High-income Countries	Middle-income Countries	Low-income Countries	India
GDP per capita in 2010 (constant $, 2000)	26,945	2,081	291	589
Literacy rate (%)	98.4	82.9	61.4	62.8
Life expectancy (2009)	79.6	68.8	58.4	64.8
Agriculture as % of GDP	1.5	9.7	25.7	17.8
Human Development Index (HDI) (2011). The HDI takes into account life expectancy, income and educations.	India was ranked 134 out of 187 countries by the UNDP. The India Human Development Report gave regional scores: Kerala had the highest HDI score and Gujarat the lowest. This reflects Kerala's relatively progressive social policies.			

Sources: UNDP (http://hdr.undp.org/en/data/profiles/), World Bank (http://data.worldbank.org/indicator) and http://www.firstpost.com/india/hdi-in-india-rises-by-21-kerala-leads-gujarat-far-behind-114044.html

welfare, notably by ensuring that the economy delivers on-job creation for relatively unskilled people whilst also allowing high-wage, high productivity jobs to expand. Indian policy makers also have to contend with great regional variations across the country (Table 2.5).[6]

The GNP and Welfare

Finally, it is worth noting an important limitation of national income accounting: it does not take into account negative externalities (e.g. pollution from factories causing damage to farmers or undermining the health of children). There is also growing concern with the way that the national accounting framework ignores the depletion of scarce natural resources. For this reason, there have been various 'green accounting' initiatives, including by the World Bank, which adjust national savings downwards to take into account pollution damage and the erosion of natural resources. In India's case, net national savings were 17 per cent lower by this measure than indicated by conventional national accounts.[7] If we take the view of heterodox economists like Nicholas Georgescu-Roegen and Herman Daly that economy is a subsystem of the larger ecosystem of the earth and that earthly resources are limited and cannot grow forever, then there is a case for abandoning entirely the idea that economic growth is an indicator of human welfare.

[6] For more information on the Indian economy and its regional distribution, see, http://www.economist.com/blogs/graphicdetail/2012/09/india-figures-interactive-guide

[7] For more information on green accounting, see, web.worldbank.org

Politicians and mass media often give the impression that a rising GNP means that the welfare of citizens is also rising. Although economic growth makes it easier to reduce poverty and improve social services, there is no one-to-one correlation between growth and welfare as economists James Tobin and William Nordhaus pointed out over 40 years ago in their book *Is Growth Obsolete*.[8] Remember, GNP measures only production, trade and consumption and it does not include welfare measures such as happiness, inequality or environmental sustainability and does not take into account externalities such as congestion and pollution.

Source: Authors.

Green accounting and critiques of the GNP as an indicator of welfare draw attention to the fact that growth should not be the sole objective of macroeconomic policy, but that policy makers should also worry about the sustainability of that growth.

A noteworthy attempt to broaden the focus of measuring welfare beyond economic indicators is the project of measuring gross national happiness. This idea, pioneered in Bhutan (and praised recently in a lecture by Joseph Stiglitz at the Indian Statistical Institute), holds that human happiness is multi-dimensional and that social, spiritual and environmental factors matter as well as material.[9]

The idea of measuring human happiness originates with the utilitarian philosopher Jeremy Bentham, but has largely been conflated with income by economists. This appears to be changing. For example, French President Sarkozy asked renowned economists Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi to assemble a 'Commission on the Measurement of Economic and Social Progress' to point out the limitations of the GDP as an indicator of economic performance and social progress and to search for better indices of human welfare and development. In another development, the *World Happiness Report* was commissioned for the 2 April 2012 United Nations conference.[10] It argues that happiness can be reliably measured, that it should be taken seriously and that we need to include other dimensions of human well-being (community trust, environment, governance, etc.).

Welfare economists typically assume that income and well-being move together: as individuals get richer, they become happier, and as economies grow, the average level of happiness rises too. This notion was challenged fundamentally by Richard Easterlin in a

[8] Tobin, J. and W. Nordhaus. 1972. *Is Growth Obsolete?* New York: Columbia University Press.

[9] Stiglitz, J. 2012. 'Indian Economy Doing Well: Joseph Stiglitz.' *Indian Express.com*, 14 February 2012. http://www.indianexpress.com/news/indian-eco-doing-well-joseph-stiglitz/898557/2).

[10] Helliwell, J., R. Layard and J. Sachs. 2012. *World Happiness Report*. Produced for the UN by the Earth Institute, Columbia University. http://issuu.com/earthinstitute/docs/world-happiness-report

Gross National Happiness

The term gross national happiness was coined by Bhutan's King Jigme Singye Wangchuk in 1972 when he used the term in discussing his commitment to building Bhutan's economy on Buddhist spiritual and cultural values. Karma Ura of the Centre for Bhutan Studies subsequently developed a survey instrument to measure well-being. The most recent survey in Bhutan (2010) measured happiness along nine dimensions: psychological well-being, time use, community vitality, cultural diversity, ecological resilience, living standard, health, education and good governance. The survey found that there was zero unhappiness amongst monks, and that of the 10.4 per cent of Bhutanese who were deemed to be unhappy, 90 per cent of the unhappy people had no education and 84 per cent lived in rural areas. For more information on measuring gross national happiness in Bhutan, see the World Happiness Report (pp. 108–48).

Source: Authors.

1974 paper '*Does Economic Growth Improve the Human Lot? Some Empirical Evidence*'.[11] In this classic article, which ironically was rejected by the *American Economic Review*,[12] Easterlin argued that even though richer people were happier than poor people, the average level of measured well-being for a country changed little over time, even when there was substantial growth in average incomes. This suggests that people compare themselves to those around them, and that growth may well have other costs to human well-being even as living standards rise. His paper sparked significant work on the economics of happiness and to cross border researches in economics and psychology to find out the determinants of human well-being/happiness.

Thirty-six years later, Easterlin and others published a paper using data from 37 countries (both developed and underdeveloped) showing that this happiness–income paradox (sometimes called the Easterlin paradox) still holds, notable: 'at a point in time both among and within nations, happiness varies directly with income, but over time, happiness does not increase when a country's income increases.'[13] They note that in the short run, happiness does fluctuate with income because happiness falls during

[11] Easterlin, R. 1974. 'Does Economic Growth Improve the Human Lot? Some Empirical Evidence,' *Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz*, (eds) David, P. and M. Reder, 89–125. New York: Academic Press.

[12] Powdthavee, N. 2010. *The Happiness Equation: The Surprising Economics of Our Most Valuable Asset*. London: Icon Books.

[13] Easterlin, R. A., L. A. McVey, M. Switek, O. Sawangfa and J. S. Zweig. 2010. 'The Happiness-Income Paradox Revisited.' *Proceedings of the National Academy of Sciences* 107 (52): 22463–68.

recessions and rises during booms. But in the longer run, that is, over periods of 10 years or more, there is no correlation between economic growth and happiness. But as the *World Happiness Report* notes, this finding depends on the data sources used for measuring happiness, so one needs to be cautious about drawing firm conclusions. Even so, the report strongly endorses the need for policy makers to target many other aspects of human welfare besides income (health, education, work satisfaction, psychological well-being, social solidarity, etc.) in order to promote happiness and human development.[14]

Review Questions and Answers

Imports are subtracted when summing the expenditure components of GDP:

a) Because they constitute net foreign income earned abroad
b) Because they are intermediate goods, not final goods
c) To avoid double counting
d) To correct for the fact that the other components include purchases not produced in the domestic economy and therefore not part of GDP
e) None of the above

Answer: d

One difference between GDP and GNP is that:

a) GDP eliminates net exports because it is measuring only domestic production
b) GDP eliminates imports because it is measuring only domestic production
c) GDP is production only by firms located within India's boundaries even if they are foreign owned
d) GDP is production by Indian-owned firms regardless of geographic location
e) None of the above

Answer: c

Which of the following is true?

a) The Easterlin paradox means that as people become richer they become happier but that richer countries are less happy than poorer countries
b) Green accounting means that the output from firms using solar energy counts for more than firms using coal
c) If the GDP goes up, gross national happiness necessarily goes down
d) Economic growth can never promote human happiness
e) None of the above

Answer: e

[14] *World Happiness Report*. 2012. pp. 65–66.

CHAPTER 3

The Neoclassical Macro Model

The essential difference between neoclassical and Keynesian perspectives is whether market economies, if left to themselves, function efficiently and adjust to full employment or not. Neoclassical economists (including the 'New Classical' school) assume that markets, if left alone, work well and that price adjustment ensures that supply equals demand in all markets. They accept that the macroeconomy might deviate from equilibrium output and employment levels, but assume that such disturbances are temporary. They believe that government intervention to smooth out the business cycle is neither necessary nor desirable, as it is likely to exacerbate economic problems rather than rectify them.

Neoclassical models rest on the assumption that under conditions of perfect competition, the operation of market forces will ensure that all resources are optimally allocated. Price adjustment in goods markets ensures that no surpluses or gluts prevail; wage adjustment ensures full employment, and the interest rate fluctuates in order to bring savings into line with investment. These assumptions, which go back to Alfred Marshall's *Principles of Economics*,[1] constitute what are called the 'microfoundations' of neoclassical macroeconomic models.

Real-world fluctuations in output are typically attributed to external shocks or unexpected government intervention and regarded as temporary in nature. Governments are advised to create an institutional-legal environment for competitive markets to function

Assumptions of the Standard Neoclassical Model

- All agents are rational and maximise utility and profits.
- All markets are perfectly competitive.
- All agents have perfect information and stable expectations.
- Trade takes place only when market-clearing prices have been established in all markets by a fictional auctioneer.

Source: Authors.

[1] Marshall, A. 1920. *Principles of Economics*. London: Macmillan.

well and otherwise to interfere as little as possible and only when market failures are obvious.

This chapter outlines the basic stylised neoclassical general equilibrium macroeconomic model. Markets are assumed to be perfectly competitive, that is, characterised by many buyers and sellers, homogeneous products, free entry and exit, perfect knowledge and perfect mobility of capital and labour (factor mobility). Following Léon Walras, the first general equilibrium theorist, economies are modelled as a continuous competitive exchange equilibrium in which a mythical auctioneer is assumed to manage an instantaneous bidding process between buyers and sellers in all markets, thereby ensuring that market-clearing is reached. This process, known as *tâtonnement*, that is, making offers to buy and sell which are carried out when an economy-wide set of market-clearing prices is found, is central to neoclassical dynamics. The model assumes instantaneous adjustment in all markets (i.e., the role of an auctioneer is over in a flash and functions merely as a metaphor to justify the market-clearing assumption).

Nominal and Real Values

Economic values (wages, output, etc.) expressed in current prices are known as 'nominal values'. Real values are obtained by deflating nominal values by a price index. See Chapter 2 for more details.

Source: Authors.

The Classical Dichotomy and the Homogeneity Postulate

Another important characteristic of the stylised neoclassical model is the *classical dichotomy* between the real and the monetary sectors. This refers to the classical theory first put forward by David Hume that changes in money supply have no effect on real economic variables such as output and employment. This is because it is assumed that a doubling of money simply results in a doubling of price level with no impact on the real economy. This is because it is assumed that firms, consumers and workers care only about real opportunities, that is, if they demand one particular bundle of goods (or jobs) at a given set of prices (or wages), then their preferences will remain unaltered if prices rise everywhere at the same rate. This is known as the *homogeneity postulate*.

This term was coined by Wassily Leontief who described the homogeneity postulate as:

> [A]n important universal property of all supply and demand functions by stating that the quantity of any service or commodity demanded or supplied by a firm or an individual remains unchanged if all the prices upon which it (directly) depends increase or decrease

> exactly in the same proportion. In mathematical terms, this means that all supply and demand functions, with prices taken as independent variables and quantity as a dependent one, are homogeneous of the zero degree.[2]

As discussed in more detail later, neoclassical models assume that the equilibrium values of real variables (i.e., employment and output) are determined in the labour and goods markets, whereas nominal variables (in current prices) are determined in the money market (banking and financial sector). Given that real variables are not affected by changes in money supply in this model (because all markets are assumed to be clear), money is said to be 'neutral'—that is, it facilitates exchange, but does not affect the overall income or output. The stylised neoclassical model accordingly has two parts in it: a theory of how equilibrium output and employment are determined, and a theory of how the aggregate price level is determined.

The Determination of Employment and Output

For the sake of simplicity, let us assume a closed economy (i.e., no trade or capital flows with other economies). Equilibrium output is then determined in a neoclassical model by an interaction between the labour market and the (short run) domestic production function.

The production function

The production function is a technological relationship between inputs (usually labour, capital, land, technology) and output. A simple aggregate production function can be expressed as follows: given a country's land, natural resources and technology, economic output will be a function of the capital stock and the amount of labour employed.

$$y = f(K, N) \tag{3.1}$$

where y = real output (i.e., Y/P; Y = nominal output and P = price index); K = capital stock; and N = amount of labour employed.

Because output is a positive function of both the inputs of capital and labour, increasing the employment of either factor of production will have a positive effect on growth. However, in light of the logistical problems and time delays associated with increasing the stock of capital, a standard assumption is that only labour can be varied easily in the short term.

[2] Leontief, W. 1936. 'The Fundamental Assumption of Keynes' Monetary Theory of Unemployment.' *Quarterly Journal of Economics* 51 (1): 192–93. Leontief argued that Keynes' attempted repudiation of the homogeneity postulate was based on the assumptions he made about the labour market. The 'neoclassical synthesis' approach of Keynes discussed in Chapter 8 also assumes the key difference between Keynes and the classical approach lies in the labour market failing to clear.

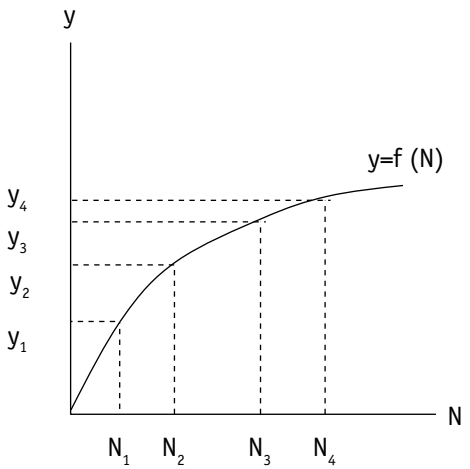


Figure 3.1 The Production Function

Source: Authors.

Short-term models of the business cycle and income determination thus regard capital and technology as constants. With technology and capital as constants, output becomes a function of employment (as shown in Figure 3.1).

Given that any additional employment has to be combined with a fixed capital stock and technology, the model assumes that each additional worker contributes less to output than is contributed by their already-employed fellow workers. This can be seen in Figure 3.1. As employment increases from N_1 to N_4, output rises from y_1 to y_4 but by ever-decreasing amounts. The marginal product of labour (MP_N) thus decreases as employment increases. Although each additional worker contributes positively to output, the ever-flattening shape of the curve indicates diminishing marginal returns to labour.

In agriculture, of course, output fluctuates as a result of external shocks such as rainfall, locust infestations. Thus, it is possible for employment and technology to remain constant, but for output to fluctuate for these reasons. Thus, in case of a bumper crop, every level of employment would be associated with a higher output, that is, the production function would shift up (i.e., N_1 might now be associated with y_2 and N_2 with y_3 in Figure 3.1).

The demand for labour function

The demand for labour curve can be derived from the production function as follows: Assuming perfect competition, firms will hire workers until the (average) money wage (W) is equal to the general price level (P), multiplied by the marginal product of labour (MP_N).

$$W = P \cdot MP_N. \tag{3.2}$$

The marginal product of labour (MP_N) is the change in output per unit change in the quantity of labour employed. MP_N is thus the slope of the production function. The additional revenue associated with the employment of an additional worker is given by $P.MP_N$. As long as the cost of hiring a worker (i.e., the wage) is less than the revenue gained, firms will continue to hire workers. As more workers are hired, $P.MP_N$ declines. Employment will thus increase until $W = P.MP_N$. Firms have no incentives to increase employment beyond this point as marginal cost will exceed marginal revenue from such employment. $W = P \cdot MP_N$ can also be expressed in terms of the real wage:

$$W/P = MP_N, \tag{3.3}$$

W/P = the real wage (i.e., money wage deflated by the price index).

In short, assuming a fixed capital stock and perfect competition, the real wage (W/P) will equal the marginal product of labour (MP_N). Once this relationship is established, the demand for labour function can be derived from the production function.

Consider employment level N_1 in Figure 3.2. As can be seen from the production function (the left-hand diagram), N_1 is a relatively low level of employment and hence is associated with a relatively high marginal product. The slope of the production function (which is equal to the MP_N) is relatively high. Let us assume that MP_N at N_1 = ₹800. Now consider employment level N_2, which is a relatively higher level of employment associated with a correspondingly lower MP_N. Assume that MP_N at N_2 = ₹600.

Given the assumption of perfect competition, this model depicts firms as employing workers up to the point where the real wage equals the marginal product of labour. This can be expressed in terms of demand for labour function (D_N). As is evident from the demand for labour function, when the real wage is ₹800, then only N_1 amount of employment will be demanded. When the real wage is ₹500, then more workers (N_2) will be employed. The demand for labour function is thus a negative function of the real wage.

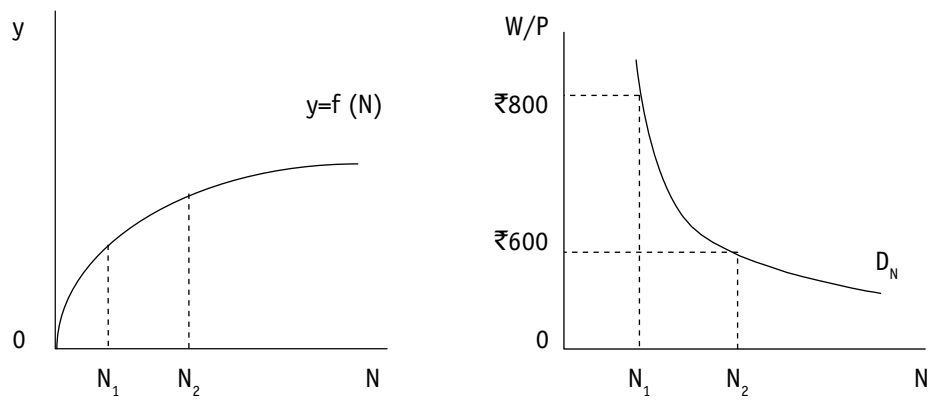


Figure 3.2 The Production Function and Demand for Labour

Source: Authors.

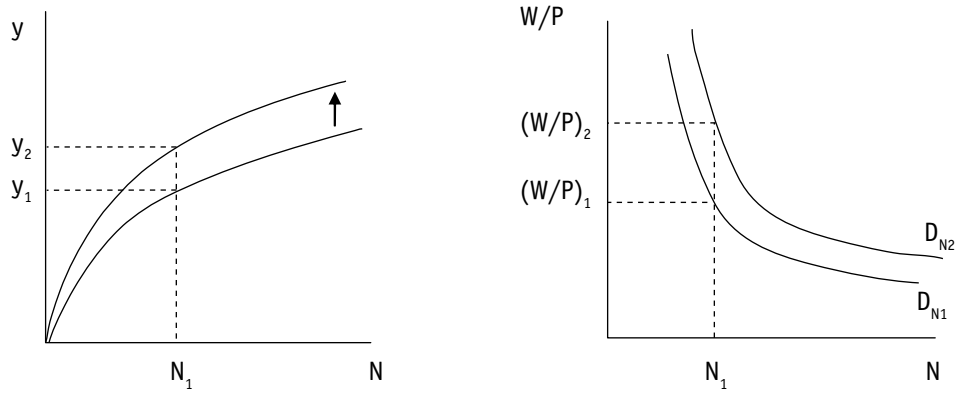


Figure 3.3 An Upward Shift in the Production Function

Source: Authors.

Note that the demand for labour function is drawn for a given production function. If, for example, we move to a longer-term scenario and allow for an increase in capital stock, then the production function will shift up, and the demand for labour function will shift outwards accordingly. This is shown in Figure 3.3. Technical change (which increases productivity) has the same effect.

The supply of labour function

The supply of labour (S_N) is a positive function of the real wage (Figure 3.4.). The higher the real wage, the greater will be the number of workers offering their services to employers. By making the supply of labour a function of the real wage (rather than the nominal, i.e., money, wage), the model assumes that workers value their wages in terms

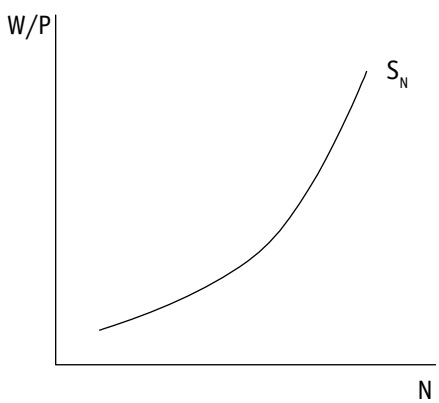


Figure 3.4 The Supply of Labour

Source: Authors.

of purchasing power. Thus, for example, if the money wage was ₹600 and the price index was 2, then the real wage would be equal to ₹600/2 = ₹300. If, however, the economy experienced some inflation and the price index rose to 3, then the real wage would fall to ₹600/3 = ₹200. Although the money wage (₹600) remains the same, the number of workers prepared to offer their services will decline owing to the fall in the real wage.

Note that the supply of labour function is drawn for a constant labour force. If the labour force were to expand (as happens when soldiers re-enter the labour market after a war, or as it becomes more socially acceptable for women to work in an industry), then the labour supply curve would shift outwards.

Equilibrium in the labour market

For the labour market to be in equilibrium, the amount of labour supplied must equal the amount of labour demanded: $S_N = D_N$. The equilibrium point is shown in Figure 3.5 by $(N_f, (W/P)_f)$. At that point, all the workers who are prepared to offer their services to employers at the going wage ($(W/P)_f$) will have jobs. Those who still want jobs, but are not prepared to work at that equilibrium wage are seen as choosing not to work, that is, withdrawing from the labour force. Thus, there is no involuntary unemployment and full employment is said to prevail.

If, however, the real wage happened to be $(W/P)_1$, then the labour market would be characterised by excess supply. At $(W/P)_1$, only N_1 amount of workers will be demanded, yet N'_1 amount of labour will be supplied. In other words, $N'_1 - N_1$ workers will be unable to find jobs at the going wage $(W/P)_1$. They will fall into the category of involuntarily unemployed.

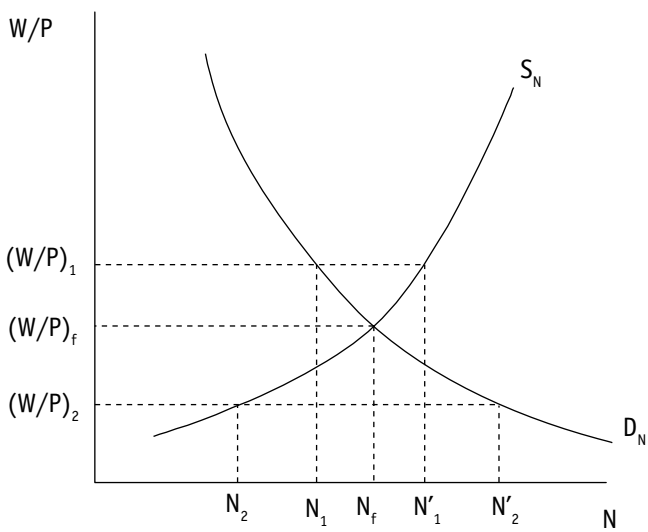


Figure 3.5 Equilibrium in the Labour Market

Source: Authors.

Assuming a perfectly competitive labour market, this situation will be resolved through downward pressure on the money wage. As is the case with any other market, the theory suggests that the price of labour will be bid down until equilibrium is restored. In other words, the involuntarily unemployed workers will offer their services to employers at a lower money wage than that currently ruling in the market. Assuming a constant price level, this will translate into a lower real wage. As the real wage falls, some of the N'_1–N_1 workers will withdraw from the labour force. Eventually, the real wage will fall to $(W/P)_f$, at which point the labour market will clear.

Alternatively, if the real wage is $(W/P)_2$, then the labour market will be characterised by excess demand for labour. At that low real wage, only N_2 workers will be prepared to work, yet N'_2 amount of labour will be demanded by employers. The labour shortage will be equal to N'_2–N_2. Under these conditions, the perfectly competitive model assumes that employers will compete for additional labour by offering higher money wages. Assuming a constant price level, this will translate into higher real wages. As the real wage increases, more workers will be tempted back into the labour force until equilibrium is restored.

The Determination of Output and Employment

Once the level of employment is determined, the associated level of output can be read off the production function. As shown in Figure 3.6, the full-employment level of employment is N_e, which produces the full-employment level of output y_f.

The aggregate supply (AS) *function*

Armed with the above understanding of the production function and the labour market, we can now proceed to derive the neoclassical aggregate supply (*AS*) curve, which depicts the relationship between output and the price level.

The *AS* curve can be derived by means of a four-quadrant diagram (Figure 3.7). The production function is reproduced in the southeast quadrant of the diagram. Although the production function is drawn at an unusual angle, you ought to be able to see that output increases as employment increases (from the origin down towards the bottom of the page), albeit at a decreasing rate.

The labour market is reproduced in the south-west quadrant. Again, it should not take you too long to get used to looking at the labour market from this angle. As the real wage increases (from the origin out towards the left), the supply of labour will increase and the demand for labour will decrease.

The north-west quadrant depicts the average money wage (W) in the form of a rectangular hyperbola. As indicated in Figure 3.8, a rectangular hyperbola with W/P on the horizontal axis, and P on the vertical axis, will have the value of W for all points along it. This is because the rectangular hyperbola has the form: xy = constant. In the north-west quadrant of the diagram above, this translates into $W/P.P = W$.

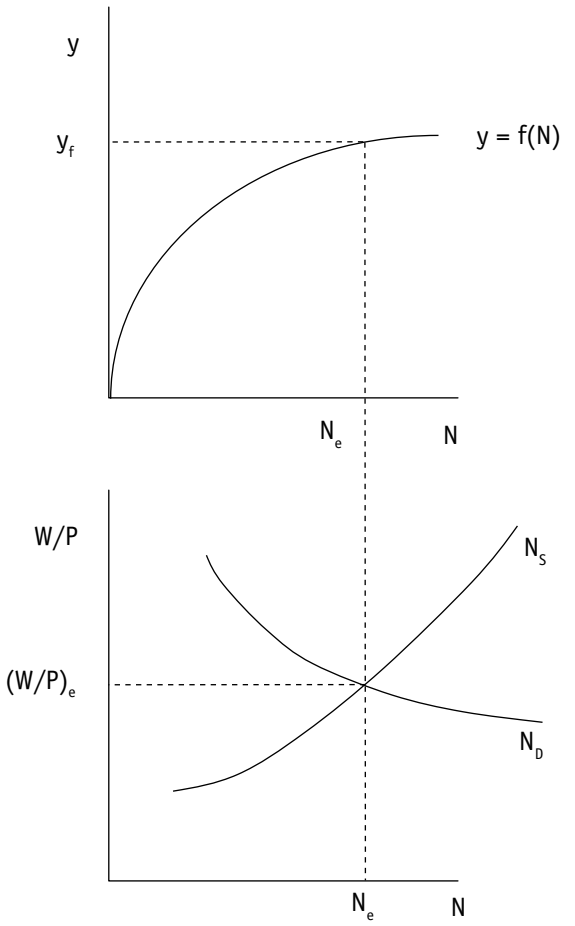


Figure 3.6 The Full-employment Level of Output

Source: Authors.

The Rectangular Hyperbola

Figure 3.8 provides a numerical example to illustrate how the rectangular hyperbola works. The rectangular hyperbola is drawn for $xy = 10$. As can be seen from the diagram, the co-ordinate on the *x*-axis multiplied by the co-ordinate on the *y*-axis always equals 10. The defining characteristic of a rectangular hyperbola is that at any point on the curve, the multiplication of the corresponding point on the *x*-axis with that on the *y*-axis will result in a constant (in this case, 10).

Source: Authors.

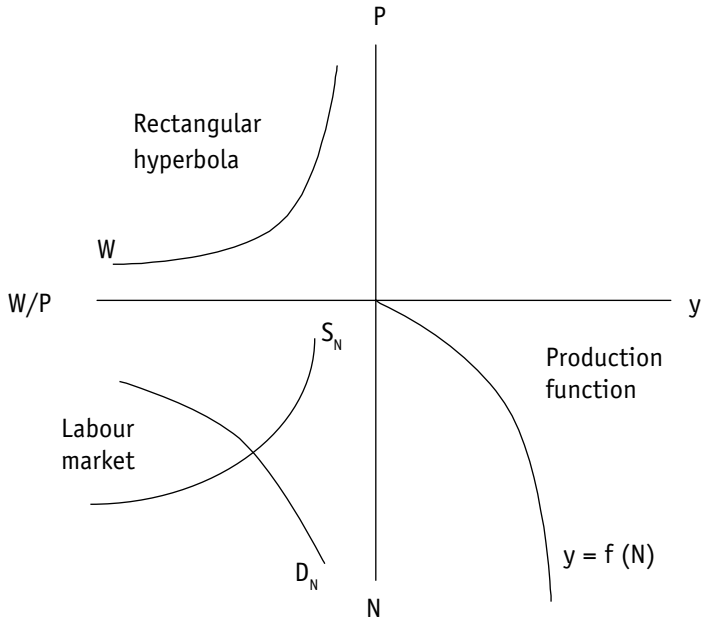


Figure 3.7 The Basic Four-quadrant Diagram

Source: Authors.

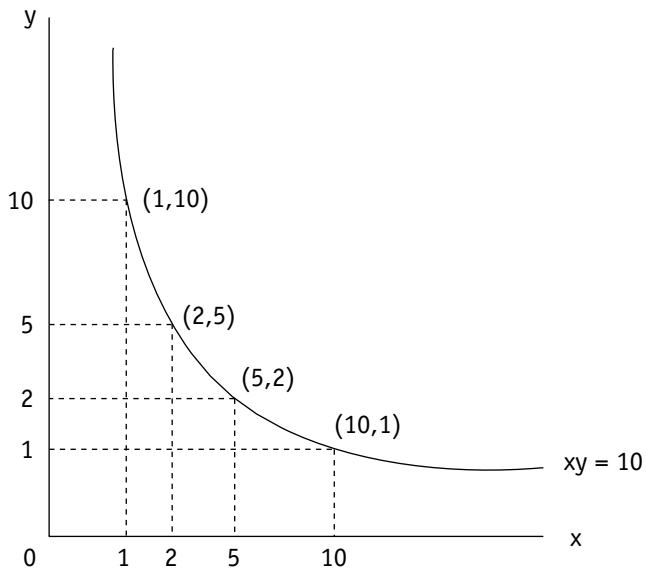


Figure 3.8 The Rectangular Hyperbola: *xy* = 10

Source: Authors.

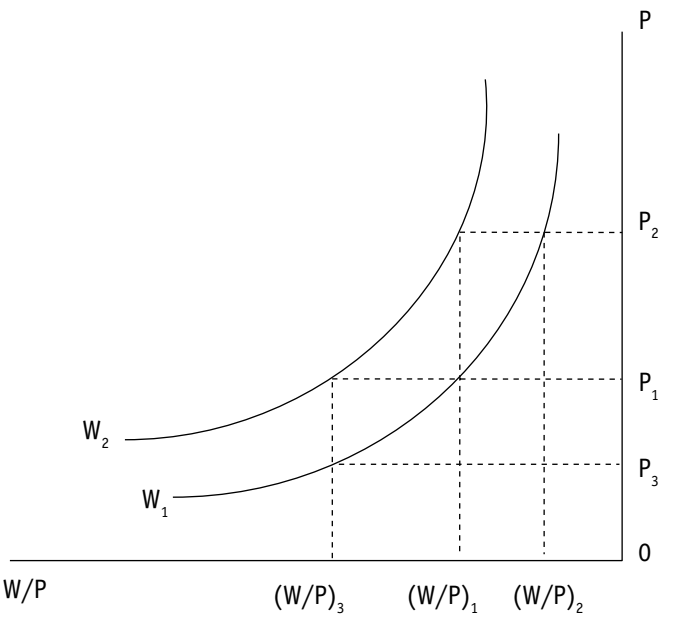


Figure 3.9 Real Wages, Nominal Wages and Prices

Source: Authors.

Returning to the north-west quadrant of Figure 3.7, the rectangular hyperbola allows us to link the price index, the money wage and the real wage together in the same diagram.

For example, if we know the real wage $(W/P)_1$ and the money wage (W_1), but not the price level, we can simply read off the corresponding price level (P_1) by tracing $(W/P)_1$ up to the money wage curve (W_1) in Figure 3.9 and then finding the appropriate price level (P_1). Similarly, if the price level changes and the money wage stays the same, we will be able to read off the resulting real wage. If, however, the price level rises from P_1 to P_2, this will result in a fall in the real wage from $(W/P)_1$ to $(W/P)_2$. Alternatively, if the price level falls to P_3, the real wage will rise to $(W/P)_3$.

If the money wage were to rise, from W_1 to W_2, then this would be represented by an outward shift in the rectangular hyperbola from $W/P.P = W_1$ to $W/P.P = W_2$ in Figure 3.9. For example, let us suppose that the price level was P_1, the money wage was W_1, and hence the real wage was $(W/P)_1$. If the price level was to rise to P_2, then the real wage would decline from $(W/P)_1$ to $(W/P)_2$. If the money wage subsequently rose in order to restore the previous real wage, it would have to rise to W_2.

Let us now turn to deriving the *AS* curve in the north-east quadrant of the four-quadrant diagram (Figure 3.10). On the assumption that money wages are flexible (i.e., bid can be upwards and downwards depending on labour market conditions), we will proceed to derive the neoclassical version of the *AS* curve.

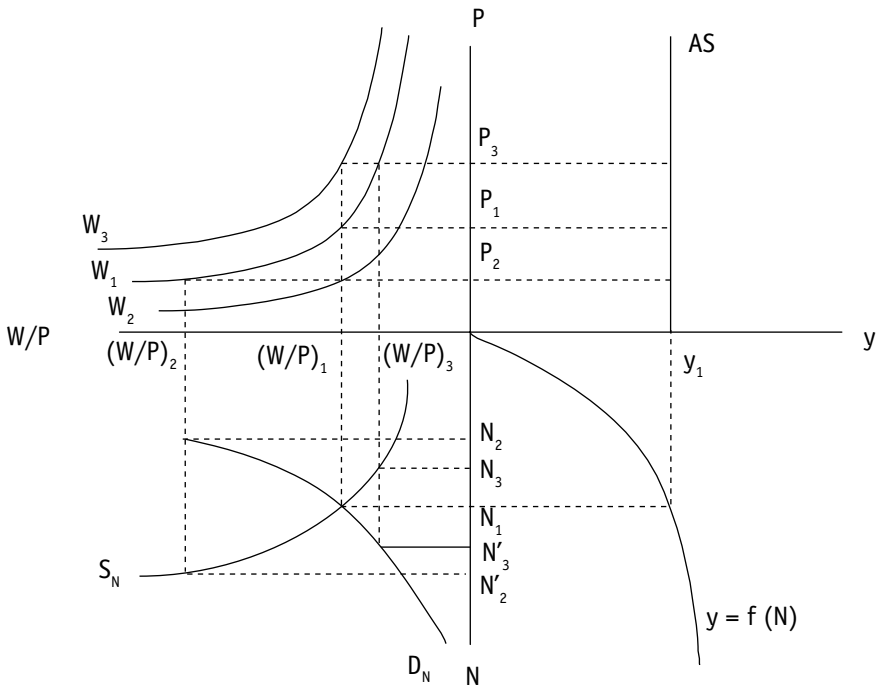


Figure 3.10 The Neoclassical Supply Curve

Source: Authors.

The *AS* curve depicts the relationship between the aggregate supply of real output (y) and the price level (P). When plotting the *AS* curve, it is useful to begin by finding the combination of y and P associated with equilibrium in the labour market. As is clear from the south-west quadrant, a real wage of $(W/P)_1$ will clear the labour market and determine the full-employment level of N_1. Given N_1 amount of employment, the production function in the south-east quadrant tells us that the full-employment level of output (y_1) will be produced. To find the price level associated with y_1, we need to track the real wage $(W/P)_1$ up into the north-west quadrant. Assuming that W_1 is the ruling money wage, the price level associated with the labour market-clearing real wage is P_1. The co-ordinate (y_1,P_1) is our first point on the *AS* curve.

To obtain a second point on the *AS* curve, pick a lower price level, P_2. A lower price level, in combination with the same money wage (W_1), will result in a higher real wage $(W/P)_2$ (note that $(W/P)_1 = W_1/P_1$ and that $(W/P)_2 = W_1/P_2$). The higher real wage will result in disequilibrium in the labour market: at real wage $(W/P)_2$, N_2 labour will be demanded, yet N'_2 will be supplied. In other words, N'_2–N_2 people will be unemployed.

Assuming that wages are flexible, the labour market will respond to this situation of excess supply of labour by bidding down the money wage until the equilibrium real wage is restored. The diagram shows that money wages will fall from W_1 to W_2, at which point

the equilibrium real wage will be restored (note that $(W/P)_1 = W_1/P_1 = W_2/P_2$). As a result of this adjustment in the labour market, the price level P_2 will also be associated with the full-employment level of output y_1. The second point on the *AS* curve is thus y_1, P_2.

To obtain a third point on the *AS* curve, pick a higher price level, P_3. Assuming the original money wage of W_1, the higher price level, P_3, will result in a lower real wage of $(W/P)_3$. At this lower real wage, only N_3 of labour will be supplied, yet N'_3 of labour will be demanded. Given our assumption of flexible wages, this situation of excess demand in the labour market will result in bidding up of the money wage so as to restore the equilibrium real wage. As shown in the diagram, money wages will rise to W_3, at which point the market-clearing real wage will have been restored (note that $(W/P)_1 = W_1/P_1 = W_2/P_2 = W_3/W_3$).

By joining the three points together, we get an *AS* curve which is perfectly inelastic at the full-employment level of output (y_1). Other price levels can be considered. However, given the assumption of flexible money wages, the labour market will always adjust to full employment through changes in money wage. This means that N_1 of employment will always be created, which in turn implies (via the production function) that the full-employment level of output, y_1, will always be produced. Thus, the *AS* curve will always be vertical at the full-employment level of output. Changes in the price level have no effect on real output. The classical dichotomy thus prevails.

Say's law

As will become clear in Chapter 4, a central tenet of Keynesian economics is that it is possible for an economy to come to rest at a less than full-employment situation owing to a deficiency in aggregate demand (i.e., total spending). Neoclassical economics has two answers to this proposition. First is the claim that if wages are sufficiently flexible, then full employment will always be maintained (as illustrated in Figure 3.10). Second is an appeal to Say's law, that is, the proposition that supply creates its own demand. This is tantamount to declaring the very idea of output running ahead of income or expenditure to be incoherent.

The essence of Say's law is that the very act of production results in incomes to the producers (wages and profits), which are then used to purchase the output. In this framework, output, income and expenditure will necessarily always be equal—as indicated by the circular flow of income diagram in Chapter 2. Keynesian theory assumes that 'leakages' from this circular flow are not only possible but likely, and hence is dismissive of Say's proposition.

Say's law is facilitated in neoclassical macroeconomics by the theory of interest rate determination. According to neoclassical theory, interest is the reward for delayed consumption. Thus, consumption is negatively related to interest rate, whereas saving is positively related.

According to the neoclassical theory, interest rate is determined by an intersection between the supply of loanable funds (from savers) and the demand for loanable funds (from borrowers for investment purposes). In other words, the intersection of the supply

Say's Identity and Say's Equality

'Say's law was wonderfully simple: from the sale of any product comes the wherewithal to buy it in the market. In the price, as a matter of utter inevitability, are the wage cost, the interest cost, the rent and profit (or loss) all together equalling in amount what is necessary to buy it. The flow of income back from the price totals precisely the purchasing power necessary to buy the product. There would, in the nature of the arithmetic, be no shortage of demand. This was revealed truth to conventional economics, and so it was to the world beyond. To question Say's law was to invite the accusation that one was, if not a crackpot, at least grossly defective in economic training.'[3]

During the 1950s, a re-examination of Say's law by economists like Oscar Lange[4] took place leading to the distinction between two related concepts. The first is the concept of Say's identity which states that the 'supply of commodities will create its own demand irrespective of the behaviour of cash and the price level'.[5] In other words, this means that the output and money markets will always be in equilibrium. In this sense, Say's identity is applicable to a barter economy (or in an economy where money is only a medium of exchange). Say's law expressed as Say's identity thus proposes a strict proportionality between the stock of money and the level of prices leading to the dichotomisation between the real sector and the monetary sector. Say's equality, on the other hand, states that output market will be in equilibrium if and only if excess demand in the money market is zero.

Source: Authors.

of savings and the demand for investment determines the equilibrium rate of interest. This is shown in Figure 3.11. Put differently, fluctuations in the interest rate ensure that savings and planned investment will always be equal. Assuming a closed-economy model with no government sector, income is divided between consumption (C) and savings (S) as follows:

$$y = C(i) + S(i). \tag{3.4}$$

Expenditure will consist of:

$$E = C(i) + I(i). \tag{3.5}$$

[3] Galbraith, J. 1994. *The World Economy Since the War: A Personal View*. pp. 80–81. London: Macmillan.

[4] Lange, O. 1942. 'Say's Law: A Restatement and Criticism.' (eds.) Lange, O. F. McIntyre and T. Yntema, *Studies in Mathematical Economics and Econometrics*. pp. 49–68. Chicago, IL: University of Chicago Press.

[5] Becker, G. and W. Baumol. 1952. 'The Classical Monetary Theory: The Outcome of the Discussion.' *Economica* XIX, November: 276–355.

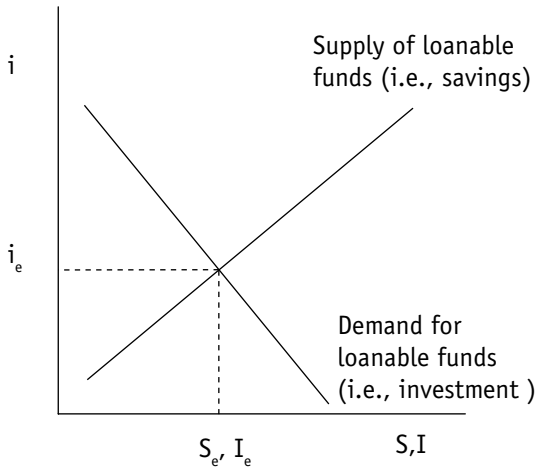


Figure 3.11 The Supply and Demand for Loanable Funds

Source: Authors.

If Say's law holds, then it follows that $y = E$ therefore:

$$C(i) + S(i) = C(i) + I(i). \tag{3.6}$$
$$S(i) = I(i).$$

Note that in national accounts, savings are by definition equal to gross domestic capital formation. In other words, $S = I$ + change in inventories. The national accounting identity should not be confused with the equilibrium condition $S = I$. According to the Keynesian model, there is no inherent reason why S should equal planned investment (I). In a neoclassical model, by contrast, savings and investment will always be brought into line by fluctuations in the interest rate. Hence, $S(i)$ will always equal $I(i)$ and therefore the economy will always be in equilibrium. Assuming wage flexibility, such equilibrium will be at a full-employment level.

If interest rate fluctuations ensure the equivalence of savings and investment, then there will never be deficient demand. For example, consider what happens in the model if households decide to save more and spend less. The increase in savings (represented in Figure 3.12 as an outward shift in the savings function from S_1 to S_2) would result in an equivalent cut in consumption ($-\Delta C$). However, because the interest rate has adjusted downwards from i_1 to i_2 as a result of the outward shift in S, investment increases by exactly the same amount as the drop in C.

In other words, changing the level of savings does not affect total aggregate demand—it merely affects its composition (i.e., less consumption, more investment). The implication here is that there will be no income which is neither invested nor consumed, and hence there will be neither shortages or gluts nor unexpected changes in inventories.

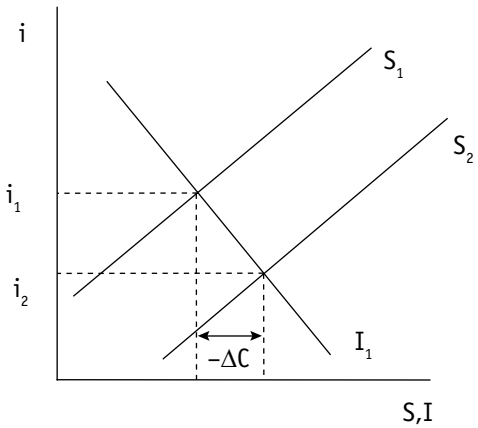


Figure 3.12 The Effects of a Cut in Consumption

Source: Authors.

The Quantity Theory of Money

If the economy adjusts to full employment irrespective of the general price level, then what determines the aggregate price level? The typical neoclassical answer is 'the money supply'. The earliest and most enduring statement of this theory is the Quantity Theory of Money developed by David Hume in the mid-18th century. There are two versions of the Quantity Theory of Money: the transactions-velocity approach of Irving Fisher; and the cash-balance approach of the Cambridge economists. First, let us discuss Fisher's version of the Quantity Theory.

The Quantity Theory of Money sees price level as a function of money supply, and as having no impact on real output. Two assumptions underpin the theory:

- Real output comes to equilibrium at full-employment level (y_f).
- Money (M) is used exclusively as a means of exchange and is passed on between individuals at a constant income velocity of circulation (V).

Given the above, it follows by definition that the nominal stock of money (M) multiplied by the average time it changes hands (i.e., V) will equal the nominal value of income (Y) in an economy over the specified time period.

$$MV = Y \tag{3.7}$$

For example, if the stock of money in an economy was ₹10 million, and each bank note exchanged hands 40 times during the year in income-generating transactions, then the nominal value of income that year must be ₹10 million × 40 = ₹400 million. To isolate the effect of price changes, the following manipulations are useful:

$$MV = Y,$$
$$y = Y/P,$$
$$Y = Py,$$

$MV = Y$ can therefore be rewritten as:

$$MV = Py,$$
$$MV/P = y. \tag{3.8}$$

Given that V is assumed to be constant and that y is assumed to come to rest at full employment, any change in M will automatically translate into a change in P. This can easily be seen by continuing the above example where M = ₹10 million; V = 40; $Y = MV$ = ₹400 million.

If P = 1, then y = ₹400 million/1 = ₹400 million. If the money supply is doubled, and V stays constant (by assumption), then nominal income (Y) rises to ₹800 million (i.e., ₹20 million multiplied by 40). However, given that real output is assumed to be at a full-employment level, this neoclassical model assumes that prices will simply be driven up until the real value of national income is restored at ₹400 million. The equations imply that the price level would rise until it is doubled. In other words, if money supply doubles, so will the price level. Increasing the money supply will have no lasting effect on real income. It will simply fuel inflation.

An alternative cash-balance version of the Quantity Theory of Money was developed by Alfred Marshall,[6] A. C. Pigou,[7] John Maynard Keynes in his youthful period[8] and D.H. Robertson.[9] This Marshallian version can be summarised in terms of the following equation:

$$M = kPY, \tag{3.9}$$

where (M) is the exogenously determined money supply, (k) is that fraction of money income (PY) which people want to hold in the form of cash or cash balance, (P) is the general price level and (Y) is total output. The above equation states the equilibrium condition in the money market.

According to the cash-balance version, the value of money is a function of the demand for money which is influenced by the demand for cash balances. This version of the Quantity Theory assumes that when people demand more cash balances, it will reduce their demand for commodities and as a consequence the price level will fall. Conversely, as people demand less cash balances in their hands, this will lead to higher demand for goods and services and as a result, the price level will increase.

Both versions of the Quantity Theory of Money consider only the transaction or active demand for money and neglect the speculative demand for money or the demand for idle cash balances. The demand for money is discussed in more detail in Chapter 6.

[6] Marshall, A. 1960. *Money, Credit and Commerce*. New Jersey: M Kelley Publishers.
[7] Pigou, A. C. 1949. *The Veil of Money*. London: Macmillan.
[8] Keynes, J. M. 1923. *A Tract on Monetary Reform*. London: Macmillan and Co.
[9] Robertson, D. H. 1966. *Essays in Money and Interest.* London: Fontana Library.

New Classical Stories about the Business Cycle

Walrasian general equilibrium models have a rather serious and obvious shortcoming. By assuming full employment, they have nothing much to say about real-world problems of large fluctuations in output and employment. For this reason, some neoclassically minded theorists have attempted to construct more convincing stories which explain fluctuations, whilst remaining true to market-clearing assumptions. Modern neoclassical arguments which try to accommodate the real-world phenomenon of business cycles fall under the umbrella of what has come to be known as the 'New Classical' school of economics.

One of the first such explanations of the business cycle is that associated with the guru of New Classical macroeconomics, Robert Lucas. He argues that short- run fluctuations in an economy result from economic shocks and errors arising from people having to use today's information to forecast tomorrow's events.[10] This view blames erratic and unpredictable government policy for disruptive and unforeseen fluctuations in aggregate demand. Monetary policy is regarded as a particular culprit. Imagine that the government decides to pursue an (unexpected) restrictive monetary policy. As the supply of money declines, so too does the price level. If everyone realised that all prices were declining, then the Quantity Theory of Money would hold. All prices would fall and no one would cut back on output. However, according to this 'equilibrium theory of business cycle', individual firms first experience a decline in price level as a decline in price for their product. Mistaking this for a decline in relative prices, they cut back on output, thus causing a recession.[11]

Despite allowing for the theoretical possibility of a recession, the New Classical thinkers stop short of recognising unemployment. When firms cut back on output and reduce their demand for labour, the labour market is simply assumed to clear at a lower wage and level of employment. In this way, Lucas was able to destroy the classical dichotomy (in that money has an effect on output), whilst hanging on to the fundamental axiom of continuous market-clearing.[12]

In a Lucas world, rational economic agents soon realise their mistake about the price level, and correct it by increasing output and employment once again. They likewise learn about the economic effects of policy interventions and never make systematic errors. They learn to second-guess government policy proposals and plans, and as a result, policy quickly becomes ineffective. In the New Classical world, an optimal economic policy is one which follows clear and steady rules, such as expanding the money

[10] See, Lucas, R. and T. Sargent (eds.). 1981. *Rational Expectations and Econometric Practise*. Minneapolis, MN: University of Minnesota Press.

[11] An unexpected increase in money supply has an opposite effect: firms mistake the rise in prices for a rise in the relative price of their product, and hence they increase output.

[12] See, Mankiw, N. 1989. 'Real Business Cycles: A New Keynesian Perspective.' *Journal of Economic Perspectives* 3 (3): 80.

supply at a stable and predictable rate in order to accommodate the expansion of output whilst avoiding inflation. Under these conditions, as the claim goes, business cycles will be avoided.

The Lucas argument is flawed theoretically and empirically. Firstly, the theoretical assumption that fluctuations in output are caused by people, confusing relative with general price changes lacks credibility. It is an unconvincing microfoundation. People certainly cannot predict the future, but by reading newspapers and listening to radio, they ought to be able to pick up information very quickly about changes in the general price level.

Secondly, the model fails to fit reality, as recessions tend to be deeper and longer than predicted by such models. There is also something unsatisfactory about the assumption that people's choices concerning how much to work and produce are simply based on wages and prices determined competitively in the market. Unlike the real-world, New Classical economic agents are never constrained by a shortage of jobs or customers.

Assumptions about perfectly competitive labour markets are the hallmark of New Classical thinking. They are central to the modern variant of New Classical explanations of the business cycle. The recent 'real business cycle' theory developed by Kydland and Prescott (which has largely superseded the Lucas explanation in New Classical circles) attributes declines in output to productivity shocks resulting from changes in technological capacity.[13] The argument goes something like this: a change in technological capacity may cause the marginal productivity of labour to fall, which in turn reduces the amount of labour demanded. As the wage falls, people increase leisure and reduce consumption.

Like the Lucas explanation, real business cycle theories do not stand up well to empirical testing. Most observers remain sceptical about unexplained changes in technological capacity being at the root of recessions. Even more controversial, however, is the real business cycle theory's claim that given individual tastes and available technology, levels of output and employment are efficient, even in recessions. The classical dichotomy is reinstated with a vengeance.[14] Attempts by government to boost the economy are regarded as being at best ineffectual, and at worst harmful. As Mankiw puts it:

> Of all the implications of real business cycle theory, the optimality of economic fluctuations is perhaps the most shocking. It seems undeniable that the level of welfare is lower in a recession than in the boom that preceded it.[15]

[13] See, Kydland, F. and E. Prescott. 1982. 'Time to Build and Aggregate Fluctuations.' *Econometrica* 50 (6) and Snowdown, B., H. Vane and P. Wynarczyk. 1994. *A Modern Guide to Macroeconomics: An Introduction to Competing Schools of Thought.* Chapter 6. Aldershot: Edward Elgar.

[14] See, Plosser, C. 1989. 'Understanding Real Business Cycles.' *Journal of Economic Perspectives* 3 (3): 51–77.

[15] Mankiw, *Real Business Cycles*, 83.

Characteristics of Real Business Cycle Theories

- Agents form rational expectations and maximise profit and utility.
- Prices are flexible (and hence there is continuous market-clearing).
- Monetary policy has no effect on real variables (i.e., the classical dichotomy holds).
- Fluctuations in employment are the result of voluntary changes in the number of hours people want to work.
- Fluctuations in output are driven by large random changes in technology (and the associated dynamic changes).

Source: Authors.

Keynesians agree. They start out with the assumption that recessions and their accompanying human misery are the result of massive market failure that needs correction through judicious state intervention.

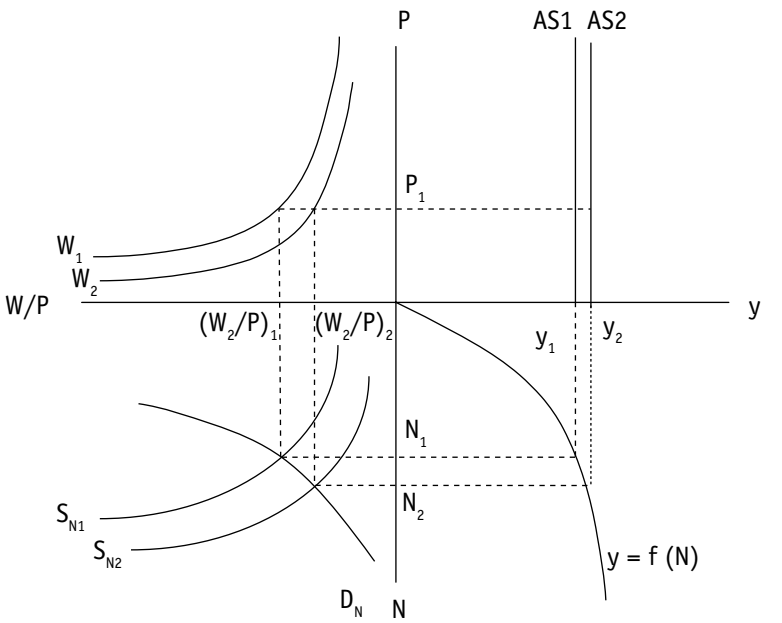
Review Questions and Answers

The velocity of circulation of money is:
a) Total real output per rupee
b) The liquidity of the banking system
c) Total nominal spending per rupee
d) The speed at which the money affects the price level
e) None of the above
Answer: c

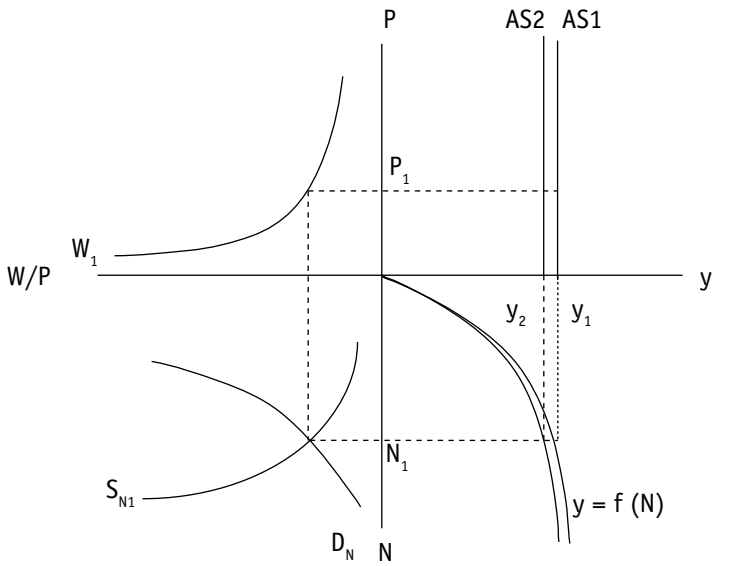
If employment falls by 1 million, does unemployment automatically rise by 1 million?
No. It is possible that some people who lost their jobs will not look for new ones, in which case they fall outside the labour force. They will be jobless, but will not be counted as unemployed. Only if all the people who lost their jobs look actively for new work, the government census will count them as unemployed.

Using a four-quadrant diagram, show what happens to the neoclassical supply curve when young soldiers return to the labour market after a war?

Young men returning home from a war will increase the supply of labour at all wages—hence the supply of labour function will shift outwards. This will result in more employment at a lower wage. As this does not affect the price level, nominal and real wages will fall. As there are now more people employed (assuming that women are not pushed out of jobs to accommodate the men), output rises and the aggregate supply function shifts outwards.



Using a four-quadrant diagram, show what happens to the neoclassical supply curve when there is a drought which reduces agricultural output?



If we assume that drought has no impact on the economy other than to reduce agricultural output, then the *AS* curve will shift backwards as agricultural output falls at all levels of employment (i.e., the production function shifts inwards).

CHAPTER 4

The Simple Keynesian Model

In contrast to neoclassical thinkers, Keynesians assume that markets function imperfectly, and that individual maximising behaviour in the presence of uncertainty can lead to socially irrational outcomes. As Mankiw puts it, 'the Keynesian school believes that understanding economic fluctuations requires not just studying the intricacies of general equilibrium, but also appreciating the possibility of market failure on a grand scale.'[1]

Keynesians believe that there are no inherent or inevitable reasons why savings should equal investment, or why market forces should result in full employment. In the Keynesian world view, prices do not adjust quickly and economic adjustment takes place primarily through changes in output and employment. For most Keynesians, the role of an economist is to develop policies which nudge the economy towards full employment—and not to waste time developing Walrasian general equilibrium models which are relevant only in the long run (if at all).

John Maynard Keynes on the Long Run

'In the long run we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past the sea is flat again.'[2]

Keynes operated on the assumption, borne of dramatic real-world experience, that market forces can easily generate perverse and socially undesirable outcomes such as extended and deep depressions. For him, this alone was enough to jettison the idea of the self-adjusting, market-clearing economic model. In a letter to John Hicks, he observed that 'Walras's theory and all others along those lines are little better than nonsense.'[3]

[1] Mankiw, N. G. 1989. 'Real Business Cycles: A New Keynesian Perspective.' *Journal of Economic Perspectives* 3 (3): 79.

[2] Keynes, J. M. 1971. *Tract on Monetary Reform,* in Collected Works, (4) 65. Cambridge: Cambridge University Press.

[3] Quoted in Skidelsky, R. 1992. *John Maynard Keynes: The Economist as Saviour, 1920–1937*. p. 615. London: Macmillan.

The standard neoclassical response to Keynesian macroeconomics is to question the microfoundations. How can it be that markets do not clear? What is preventing gains from trade taking place? Rather than assuming that prices do not adjust quickly and efficiently, neoclassical economists demand to know what is causing such 'market failure'. Neoclassical economists challenge Keynesians to provide adequate microfoundations, that is, logically consistent, underlying economic arguments in support of the argument that a less than full-employment equilibrium is possible.

'New Keynesian' macroeconomics arose in response to this challenge, providing a set of alternative narratives as to why prices are 'sticky' (we touch on some of these at the end of the chapter). However, one does not need to adopt such alternative microfoundations to think like a Keynesian macroeconomist: all one needs to do is assume that people do not necessarily have the right information, that they may react to it more emotionally than rationally when they have it, and that this can cause huge swings in investment and in the financial sector which reverberate through the economy. Keynes was not trying to develop a perfect mathematical model—he was trying to give policy makers a set of tools for thinking about how to get economies out of recessions and to deal with fickle and unpredictable financial markets and nervous investors.

The General Theory

Although Keynes produced several major works, 'Keynesian' economics is associated primarily with *The General Theory of Employment, Interest and Money,* which appeared in 1936 in the aftermath of the Great Depression.

How to Pronounce Keynes

Keynes is pronounced 'Kains' and not 'Keens'. Hence, we have 'Kainesian', not 'Keensian' economists. As Keynes wrote in a letter to a friend (who had named his son Keynes Don Von Eisner):

> He must undertake that he will not only always pronounce the name rightly himself, but will never allow the slightest mispronunciation on the part of others. Tell him firmly that it rhymes with 'brains' and that there is no harm in that.

Source: Authors.

Unlike his *Treatise on Money* (1930), which explored the problem of economic fluctuations rather than extended depressions, the *General Theory* was a specific response to the dire economic situation of the time. As Skidelsky notes:

> To read the book in an empty landscape is no longer possible, indeed it was not possible then. It appeared at the tail end of the greatest depression in modern history, and straightaway became a central part of the argument about what caused it and what could be done to cure it, and prevent further depressions in the future.[4]

The Great Depression was a serious, unparalleled economic disaster. The immediate cause was the US stock market crash on 'Black Thursday', 24 October 1929, but this was preceded by another acknowledged cause: overheated asset prices and tight monetary policy (which was an attempt to stem the tide of stock market speculation). When the stock market bubble burst in the context of this constrained demand, the financial crisis amplified its way through the real economy. The USA economy sunk into a protracted depression, experiencing massive retrenchments and bankruptcies on a wide scale. The shock reverberated across international boundaries, especially in Europe, but also in many developing countries including India. It took the Second World War to rid the world finally of the recessionary fall-out.

India and the Great Depression

India's experience of the Great Depression was profoundly shaped and exacerbated by British colonial policy. The decline in global demand and the rise of trade protectionism had a crippling effect on Indian exports (including cotton). Export revenues fell, prompting a balance of payments crisis. Whereas other agricultural producers such as Brazil and Australia reacted by depreciating their currencies and expanding government spending, the British reduced government spending in India, raised taxes and forced the country to sell gold reserves to meet the 'home charges' imposed by Britain on the colony. These policies led to widespread protests and were instrumental in creation of the Indian Central bank in 1935.[5]

Source: Authors.

Writing in the 1930s, it is hardly surprising that Keynes rejected the neoclassical market-clearing model. He argued that it was largely irrelevant to 'the economic society in which we actually live, with the result that its teaching is misleading and disastrous if we attempt to apply it to the facts of experience.'[6] Keynes believed that the neoclassical

[4] Skidelsky, *John Maynard Keynes*, p. 538.

[5] See, Manikumar, K. 2003. *A Colonial Economy in the Great Depression, Madras (1929–1937)*. Hyderabad: Orient Blackswan.

[6] Keynes, J. M. 1936. (Reprinted in 1964). *The General Theory of Employment, Interest and Money*. p. 3. London: Macmillan.

vision of perfectly functioning markets leading to full employment was a 'special case' only, whereas his unemployment equilibrium was the more 'general' case—hence Keynes's '*General Theory*'.

Like the orthodox economists of the time,[7] Keynes believed that individuals were capable of rational economic thinking. However, in contrast to standard perfect-competition analysis, he argued that economic decision-making, particularly as it pertained to investment, was profoundly structured by imperfect information, business confidence, risk and, most importantly, uncertainty. Business people, in his opinion, operated in an uncertain murky world where information was often unavailable or too expensive (in terms of time and effort) to obtain—and where decisions were often made on the basis of emotions or gut instincts. Under these conditions, Keynes insisted that it was incorrect to depict the macroeconomy as being driven towards some socially optimal full-employment position by Adam Smith's 'invisible hand'.

Today's 'New Keynesians' have explored further the issue of decision-making under conditions of uncertainty and imperfect information. There is work showing that if you remove the assumption of perfect rationality, then less than perfect economic outcomes will result. Akerlof, for example, argues that it is often rational for economic agents to be 'near-rational', that is, to operate according to good 'rules of thumb' rather than invest extra time and money in getting better information. An economy full of 'near-rational' individuals working in a context of less than perfect competition could very well end up in a Keynesian world of strong fluctuations in output and employment.[8]

Skidelsky on Keynes

'Marx accused economists of his day of abstracting from the class struggle; Keynes accused economists of his day of abstracting from the existence of uncertainty. For Keynes, most of the things which go wrong—and right—in decentralised market economies stem from the central fact that human beings take decisions in ignorance of the future. Ignorance enters into all the motives for forward-looking action, investing them, at the limit, with the character of dreams and nightmares.'[9]

Keynes started out with the assumption that the circular flow of income had many leakages and that especially in times of insecurity, income can be hoarded, either in cash

[7] The orthodox economists of the time were the neoclassical economists (Pigou, Marshall, etc.). Keynes is responsible for much semantic confusion by labelling these economists as 'classical' economists, when in fact they were neoclassical. The label 'classical' is normally reserved for the likes of Smith, Ricardo and Marx.

[8] See, Akerlof, G. A., and J. L. Yellen. 1985. 'A New Rational Model of the Business Cycle with Wage and Price Inertia.' *Quarterly Journal of Economics,* 100 (supplement): 823–38.

[9] Skidelsky, R. John Maynard Keynes, p. 539.

or by banks fearing to lend to risky borrowers. In such conditions, savings will exceed investment and aggregate demand (i.e., total expenditure) will fall short of aggregate supply (*AS*)—and thus Says law would no longer hold.

Keynes believed it was the duty of government to counter the failings of market processes through judicious application of economic policy. This, of course, implies a faith in the ability of civil servants to understand the macro picture, and act reasonably and appropriately—an idea which has earned Keynesianism much criticism from both the left and the right. Whether justified or not, Keynes's *General Theory* provided a theoretical rationale for the interventionist demand-management economic policies that have become associated with Keynesianism.

The *General Theory* is the most influential economics book ever written, with the possible exception of Karl Marx's *Capital*. Yet many of Keynes's ideas were poorly developed, obscurely expressed, and often consisted of little more than throw-away lines. As a result, economic theorists have been arguing ever since about what Keynes 'really meant', and even what Keynes 'should have meant'.[10] (They have been doing the same with Marx, but that is another story.)

Because *The General Theory* is long, complex and difficult to understand, Keynes's theories have entered into standard economic texts via interpreters. The earliest of these was Hicks, who in 1937 published his very famous summary of Keynes's ideas in terms of an *IS–LM* framework.[11] Reading this has subsequently become a rite of passage for all aspirant economists.[12] Indeed, you too are about to experience this necessary trauma in later chapters.

Textbook interpretations are inevitably simplifications that give priority to some ideas over others.[13] Nevertheless, Keynes's most powerful and clear idea—namely that an economy can come to rest at a less than full-employment equilibrium owing to a deficiency in aggregate demand—can be represented in terms of a simple model of income determination (the Keynesian Cross discussed later), or in terms of a simple model of *AS* and aggregate demand (and its more complex version presented in Chapter 8).

The Principle of Effective Demand and Keynes's Economics

In the opening single-paragraph chapter of the *General Theory*, Keynes distinguishes his position from that of the classical position:

[10] See, King, B. 1994. 'Aggregate Supply and Demand Analysis since Keynes: A Partial History.' *Journal of Post-Keynesian Economics* 17 (4): 3–31, for an overview of the various and many confused attempts to depict Keynes's aggregate supply and demand analysis.

[11] Hicks, J. 1937. 'Mr. Keynes and the Classics.' *Econometrica* (5) 2: 147–59.

[12] See, Leijonhufvud, A. 1973. 'Life among the Econ.' *Western Economic Journal* (11) 3: 327–37, for an ironic description of various economic totems and rites.

[13] As Blaug notes, 'the striking feature of virtually all these interpretations is that they typically adopt one or another chapter of the *General Theory* as the essential chapter bearing the central message of the book' (Blaug, M. 1994. 'Recent Biographies of Keynes.' *Journal of Economic Literature*, 32: 1211).

> I shall argue that the postulates of the classical theory are applicable to a special case only and not to the general case, the situation which it assumes being a limiting point of the possible positions of equilibrium. Moreover, the characteristics of the special case assumed by the classical theory happen not to be those of the economic society in which we actually live, with the result that its teaching is misleading and disastrous if we attempt to apply it to the facts of experience.[14]

It is thus ironic that the neoclassical synthesis model (discussed in Chapter 8) ends up treating the Keynesian case as a special short-run situation explainable within the confines of classical theory as caused by a malfunctioning labour market. For Keynes, the classical approach was wrong headed, and he devotes his second chapter to explaining why. Then, in Chapter 3, he introduces his centrally important principle of effective demand. As Alvin Hansen notes, this chapter 'is a highly important part of Keynes's epoch-making book. This chapter is of special significance because here, after repeated failures, an impressive attack was at long last made upon Say's law'.[15]

Keynes argued that supply does not create its own demand (as Say argued) but rather that the level of employment (and hence output) depended on effective demand—that is, actual spending and the expectations that firms make about it. As Keynes put it:

> [I]n a given situation of technique, resources and factor cost per unit of employment, the amount of employment, both in each individual firm and industry and in the aggregate, depends on the amount of the proceeds which the entrepreneurs expect to receive from the corresponding output.[16]

Keynes goes on to describe a simple model which captures the 'substance of the *General Theory*':

> Let Z be the *AS* price of the output from employing N men, the relationship between Z and N being written $Z = \phi(N)$, which can be called the *AS Function.* Similarly, let D be the proceeds which entrepreneurs expect to receive from employment of N men, the relationship between D and N being written $D = f(N)$, which can be called the *Aggregate Demand Function*.
>
> Now if for a given value of N, the expected proceeds are greater than Z, there will be an incentive to entrepreneurs to increase employment beyond N and, if necessary, to raise costs by competing with one another for the factors of production, up to the value of N for which Z has become equal to D. Thus, the volume of employment is given by the point of intersection between the aggregate demand function and the *AS* function; for it is at this point that the entrepreneurs' expectation of profit will be maximised. The value of D at the point of aggregate demand function, where it is intersected by the *AS* function, will be called the *effective demand*.[17]

[14] Keynes, *The General Theory*, p. 3.
[15] Hansen, A. 1953. *A Guide to Keynes*. New York: McGraw-Hill.
[16] Keynes, *The General Theory*, p. 24.
[17] *Ibid.*, p. 25.

There are many complex ideas buried in these two paragraphs. Indeed as Keynes remarks, the rest of *The General Theory* is 'largely occupied with examining the various factors upon which these two functions depend'.[18] But the Keynes's central insight—that expectations matter in determining the level of employment—is evident in the above quote. In essence, employment is ultimately determined by effective demand which is that level of spending in the economy which equals what firms expected to be the case. Put differently, if actual spending was higher than what firms expected would be the case, then they would hire more workers and produce more output until actual spending in the economy = expected spending = effective demand. And, if actual spending was less than expected spending, firms would find themselves with unsold stock, and so they would adjust their expectations downwards and reduce employment and output.

The representation of *AS* and aggregate demand in relation to employment is an essential characteristic of Keynes' approach. His argument can be expressed in graphical form in Figure 4.1. The aggregate demand price function slopes upwards because as total employment rises, there is more spending in the economy, and hence firms expect sales to sell more output. At full employment, L_{full}, employers expect no further increase in the demand for their output and so the curve becomes infinitely elastic at that point. The *AS* price function also increases with employment. We depict it as rising relatively slowly at first (as labour is abundant and so wages are initially subdued and the costs of production rise slowly), but then as employment increases, the *AS* cost function rises faster as costs are driven upwards as full employment approaches, at which point the curve becomes perfectly inelastic.

In Figure 4.1, *D* is the point of intersection between the *AS* price and aggregate demand price functions. At levels of employment below L_1, aggregate demand is greater than *AS* which means that firms had underestimated demand and that they could make money by hiring more workers and increasing output for the booming market. Employment and output will thus rise. At levels of employment above L_1, it makes sense for firms to reduce their employment and output as the revenues they get from sales is less than their production costs. Employment and output will thus fall.

What this model shows, in essence, is that an economy can come to rest at a less than full-employment position (i.e., there is involuntary unemployment equal to the difference between L_{full} and L_1) because of a shortfall in aggregate demand. The centrally important policy implication is that if a government can boost aggregate demand, then it can push an economy out of recession and towards full employment. Expansionary fiscal and monetary policies can help boost demand, potentially from D_1 to D_2 in Figure 4.1 (and we use the *IS–LM* model to explore this further in Chapters 6 and 7). The *AS–AD* 'neoclassical synthesis' model in Chapter 8 introduces the role of prices. The model assumes that expansionary economic policy boosts employment by sending a signal to firms to increase employment (as sales increase), but it also makes it economically feasible for firms to do so by inflating the price level and eroding real wages (which lowers to cost to firms of hiring workers).

[18] *Ibid.*

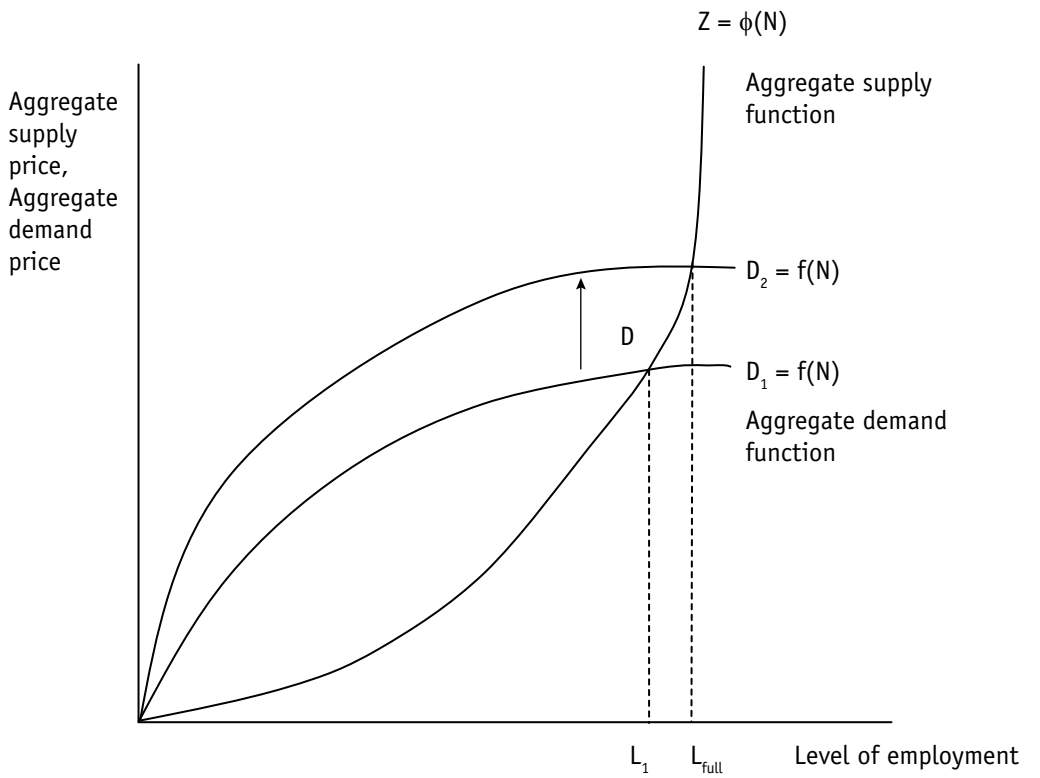


Figure 4.1 Keynes's Economics

Source: Authors.

Keynesian Economics and the Economics of Keynes

After the *General Theory* was published, several economists tried to summarise its content. The first text book attempt was made by Lorie Tarshis[19] with his 1947 text book. But his representation of Keynes' approach to *AS* and demand was overshadowed by Hick's representation of Keynes in his *IS–LM* model—a fact which Harcourt describes as a 'tragedy'.[20] (John Hicks' famous article 'Mr. Keynes and the

(Box Continued)

[19] Tarshis, L. 1947. *The Elements of Economics: An Introduction to the Theory of Price and Employment*. Boston, MA: Houghton Mifflin.

[20] Harcourt, G. 2010. 'The Crisis in Mainstream Economics.' *Real World Economics Review* 53: 47–51.

(Box Continued)

Classics' introduced the *IS–LL* analysis which was changed to *IS–LM* by Alvin Hansen.) Oscar Lange[21] also produced an interpretation of Keynes which was to become the foundation for the neoclassical synthesis.[22] Later in the 1948 edition of Paul Samuelson's classic introductory text book *Economics*, he introduced the Keynesian cross analysis. Both these fix-price frameworks were followed by the *AD–AS* framework with flexible prices by Modigliani and others. Only post-Keynesians such as Sidney Weintraub, Hyman Minsky and others tried to extend the original *AD–AS* theory of employment of Keynes further in to the analytics of income distribution.

Source: Authors.

The various 'Keynesian' models discussed later in the book are all interpretations and adaptations of Keynes's economics and many scholars believe that they are poor reflections of the richness of Keynes's economic thought. Indeed, Axel Leijonhufvud argues that it is necessary to distinguish clearly between 'Keynesian economics' (such as the *IS–LM* and *AS–AD* interpretations presented in this text book) and the economics of Keynes, discussed above.[23] At best, the mainstream Keynesian models capture key elements of his work, though often at the cost of ignoring many of his richer insights.

In any event, what is central to all Keynesian models is the idea that output adjusts in response to aggregate demand, and that it is the expectations of firms about the level of spending that is crucial. The simple one-sector Keynesian model captures this by being entirely driven by output-adjustment dynamics.

Quantity Adjustment

In contrast to the neoclassical model, in which flexible prices ensure that the economy only comes to rest at full employment, the simple Keynesian model assumes that equilibrium output and employment are ultimately determined by the point of intersection between (planned) output and aggregate demand (i.e., actual spending). The key idea is that entrepreneurs plan their output in accordance with expectations about demand. If the business community expects the economy to be characterised by strong consumption and

[21] Lange, O. 1938. 'The Rate of Interest and the Optimum Propensity to Consume.' *Economica* V (new series) No. 17, February: 12–32.

[22] Toporowski, J. 2012. 'Lange and Keynes', SOAS Department of Economics, working paper no. 170. http://www.soas.ac.uk/economics/research/workingpapers/file74887.pdf. Accessed on 28 March.

[23] For example, see, Leijonhufvud, A. 1968. *On Keynesian Economics and the Economics of Keynes: A Study in Monetary Theory*. New York: Oxford University Press.

investment demand, then more workers are likely to be employed, and more output will be produced. If, however, they decide that it will be weak, they will employ fewer workers and produce less output.

According to the Keynesian framework, the economy comes to rest—that is, reaches an 'equilibrium position'—when aggregate demand (i.e., actual spending) is equal to the level of demand expected by firms. In other words, when the amount of output that firms produce (given their expectations about demand) is exactly sufficient to meet what consumers are prepared to spend, then the economy will be in equilibrium. If aggregate demand is greater than the expected (and hence is greater than the output supplied to the market by firms) demand, then buoyant business conditions will be reflected in falling inventories. Firms will respond to their fall in inventories by increasing production and hence also employment. If, however, aggregate demand is less than expected, then firms will experience rising inventories and falling profits, and reduce employment and output accordingly.

Note that aggregate demand (E) consists of the total amount of actual planned spending in the economy. In an open economy, $E = C + I + G + X - Z$. Unlike the estimate of 'Expenditure on the GDP' (which appears in the national accounts), aggregate demand in Keynesian models only includes planned investment in capital goods (i.e., excludes inventory accumulation).

The distinction between planned investment, that is, investment demand (I), and unplanned investment in inventories is central to the Keynesian process of output adjustment. Investment in inventories is assumed to be mostly unplanned, in the sense, that it fluctuates owing to unexpected changes in demand. When actual demand is greater than expected, then stocks will disappear off shop shelves faster than expected. In other words, inventory investment falls. This sends a signal to producers to increase output until actual demand is equal to expected demand. When actual demand is less than expected, shops will experience an unwanted accumulation in stocks and they will reduce their orders to firms. This sends a signal to firms to reduce output until actual and expected demand is equal.

Because the output adjustment story is so central to Keynesian thinking, simple Keynesian models tend to assume that prices are fixed. This happens in the Keynesian cross model (discussed later) and in the *IS–LM* framework. However, this over-simplifies the Keynes's thought. Keynes argued that prices and output were likely to rise as demand rose, especially as the economy moved towards full employment. The three-sector *AS–AD* model presented in Chapter 8 captures this dynamic more explicitly by including price adjustment.

The 'Keynesian Cross' Model of Income Determination

In the simple Keynesian model of income determination, the equilibrium level of output is entirely demand-determined. If the level of demand is too low to absorb all the output capable of being produced under conditions of full employment, then producers will

adjust their expectations about what the economy can absorb in terms of output, and the economy will come to rest in a state characterised by unemployment and surplus capacity. The model is thus demand-driven. Output adjusts accordingly. Pretty much the same result will be obtained whether prices are assumed to be completely fixed, or simply very slowly adjusting.

These ideas can be illustrated by means of a simple Keynesian model of income determination, the so-called 'Keynesian Cross'. Assuming a closed economy (i.e., no foreign trade), and no government sector, the model can be depicted as follows:

$$E = C + I \tag{4.1}$$
$$C = a + by \qquad a>0 \;\; 1>b>0. \tag{4.2}$$
$$y = E \tag{4.3}$$

where E = aggregate demand, C = consumption demand and I = investment demand.

Recall that as prices are assumed constant, the above variables are real and nominal. Equation 4.1 is a definitional relationship. It defines aggregate demand (E) as being equal to the sum of consumption demand (C) and investment demand (I). It is equal to the amount that is actually spent in an economy on consumption and investment.

Investment is *exogenous* (i.e., determined outside the model). In this simple model, it is assumed that real income has no effect on investment. In the two-sector *IS–LM* Keynesian model, I is an endogenous function of the interest rate. As there is no financial sector in the simple Keynesian model of income determination discussed here (and hence no interest rate in the model), investment appears as an exogenous variable. Investment is thus represented as a horizontal line in Figure 4.2. Because exogenous variables are determined by forces which have not been modelled by equations within the model, any change in an exogenous variable is regarded as an autonomous change.

Consumption, however, is *endogenous* because it is determined within the model. Equation 4.2 is a behavioural relationship which states that C is a linear function of real

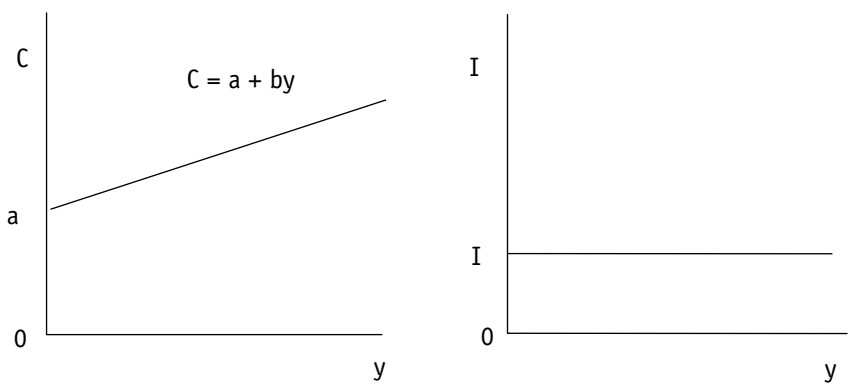


Figure 4.2 The Consumption and Investment Functions

Source: Authors.

income (y). Note that this is a radical departure from the neoclassical orthodoxy which regards consumption as being a function of the interest rate (Chapter 3).

C is the *dependent variable*, and y is the *independent variable* in the Keynesian consumption function. The positive intercept (a) is exogenous and represents autonomous consumption spending, that is, spending occurs even when real income is zero (note that for an economy to do this, it would have to be living off savings).

The parameter (b) is the behavioural coefficient for real income and gives the slope of the line. It tells us the rate at which consumption rises as income rises. It is, in other words, the marginal propensity to consume out of income. It gives the proportion of any increment in income which will be spent on consumption. As specified above, b is greater than zero, but less than 1.

For example, if $C = 15 + 0.8y$, this tells us that consumption would be 15 even if income was zero, and that for every increase in real income, 80 per cent will go towards consumption. It is assumed that even if income rises or falls sharply, this fixed proportion will not change.

Other Theories of Consumption

Keynes looked at consumption in the aggregate. He did not distinguish between the consumption of different classes, such as the rich or the poor, workers or capitalists. Following Kalecki, others (such as Kaldor and Robinson) have linked investment and consumption to different classes—the idea being that workers 'spend what they get' (i.e., have very high marginal propensities to consume) and that by investing their profits and savings in firms and then reaping the benefits through buoyant sales (demand), the capitalists 'get what they spend'.

The idea that distribution matters for consumption is also reflected in a different discussion, this time about its trend over time. If we assume that poorer people spend more of their income because they need to obtain 'basic necessities' then it follows that over time, the average propensity to consume out of income will fall for the economy as a whole as per capita income rises. However, empirical studies (starting with Kuznets in 1946) found that the average propensity to consume remained fairly stable over time. Arthur Smithies suggested that this could be a function of urbanisation, aging populations and changing perceptions (what were once luxuries become necessities).

Duesenberry also considered distribution, hypothesising that consumption is influenced by relative income (where a person is in the income distribution—the idea being that people try to match their consumption to those around them) and subject to a 'ratchet effect' (consumption does not fall from the previous peak following a fall in income). Thus, as aggregate income grows over time, these dynamics will boost consumption.

(Box Continued)

(Box Continued)

Neoclassical economists disagree with the Keynesian consumption function, arguing that consumption is a function of expected income over the life cycle. Modigliani, Ando and Brumberg's 'life-cycle hypothesis' points out that people maximise utility over their lifetimes, with young people being net borrowers, middle-aged people net savers and retirees live on their savings. Milton Friedman argued that people base their consumption on their 'permanent income' (the level of income they expect to persist) and save their 'transitory income' (windfall gains) which they draw during times of unexpected shortfall. Such theories imply that consumption is subject to strong smoothing forces and will not vary sharply with changes in current income (as assumed by Keynesians).[24]

Source: Authors.

Equation 4.3, namely $y = E$, is the *equilibrium condition*. It states that for the model to come to rest in a state of equilibrium, real output or income (y) must equal aggregate demand. In other words, actual spending (E) equals the amount produced—which implies that actual aggregate demand equals the level expected by producers. The economy will be in a state of quantity adjustment until $y = E$.

Equations 4.1–4.3 are the *structural equations* of the model. By manipulating them to yield solutions for the endogenous variables (C and y) in terms of exogenous variables and parameters only, we can create *reduced form equations*.

For example, to find the reduced form for y, substitute Equation 4.2 in Equation 4.1, to get Equation 4.4. Then substitute Equation 4.4 in Equation 4.3 and re-arrange terms to get Equation 4.5.

$$E = C + I, \tag{4.1}$$
$$C = a + by, \tag{4.2}$$
$$y = E, \tag{4.3}$$
$$E = a + by + I. \tag{4.4}$$

$$\begin{aligned} y &= a + by + I, \\ y - by &= a + I, \\ y(1 - b) &= a + I, \\ y &= (a + I).\,(1/1 - b). \end{aligned} \tag{4.5}$$

[24] See, Modigliani, F. and R. Brumberg. 1954. 'Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data' in *Post-Keynesian Economics*, ed. Kurihara K. New York: Rutgers University Press.

Ando, A. and F. Modigliani.1963. 'The Life Cycle Hypothesis of Saving: Aggregate Implications and Tests.' *American Economic Review* 53 (1): 55-84.

Friedman, M. 1957. *A Theory of the Consumption Function*. New Jersey: Princeton University Press.

See also, Brown, W. 1988. *Macroeconomics*. New Jersey: Prentice-Hall, for a user-friendly summary of the debates on the consumption function.

$1/(1 - b)$ is known as the *multiplier*. Equation 4.5 shows that any change in the exogenous variables (a and I) will result in a change in y equal to a change in the exogenous variable multiplied by $1/(1 - b)$. The multiplier effect shows that an autonomous increase in demand will initially boost income by an equivalent amount, but that this increase gives rise to further rounds of demand stimulus and output growth.

If we introduce the government sector into this simple model, then Equation 4.1 will be altered as follows:

$$E = C + I + G. \tag{4.6}$$

Through a similar process of substitution and re-organisation, the reduced equation for y becomes:

$$y = (a + I + G)/(1 - b) \tag{4.7}$$

As can be seen in Equation 4.7, the government can influence y by adjusting its expenditure (G). More specifically, if G goes up by an amount ΔG, then y will go up by an amount $\Delta G/(1 - b)$. Because b is less than 1 but greater than 0, the term $(1 - b)$ will always be positive, but less than 1. This means that the increase in y (i.e., Δy) will always be greater than ΔG. For example, assume that b (i.e., the slope of the consumption function) is 0.8. If G goes up by ₹2,000 billion, then y will go up by ₹2,000 billion divided by 1 – 0.8, that is, by ₹10,000 billion. $\Delta y = \Delta G/1 - b =$ ₹2,000 billion/1 – 0.8 = ₹2,000 billions/0.2 = ₹10,000 billion.

In other words, any increase in government spending has a much greater (or 'multiplied') effect on y. In the above example, the effect on y was 5 times greater than the original increase in G. This is the result of a multiplier, that is, $1/(1 - b)$, which in the above example was $1/0.2 = 5$.

Note that the multiplier is driven by the slope of consumption function, that is, by the marginal propensity to consume. In the above example, the reason why an injection of ₹2,000 billion of government spending results in a 5 times greater increase in real income, is simply because the model assumes that people will spend 80 per cent of any income they receive.

For example, the Government of India's Mahatma Gandhi National Rural Employment Guarantee Act provided 2.55 billion person days of work to poor people in rural areas in the financial year 2010–11, resulting in significant multiplier effects in terms of higher incomes, improved economic outcomes and reduced distressed migration and greater investment on small farms.[25] According to recent estimates, the multiplier effect of an expansion in agricultural output is high, in the region of about 13.4.[26] This implies

[25] See for example: Shar, M. 2009. 'Multiplier Accelerator Synergy in NREGA'. *The Hindu*. http://www.thehindu.com/2009/04/30/stories/2009043055630800.htm. Accessed on 28 March.

Binswanger-Mkize, H. 2012. *India 1960–2010: Structural Change, the Rural Nonfarm Sector, and the Prospects for Agriculture*. Department of Agricultural and Resource Economics. Berkeley: University of California. http://areweb.berkeley.edu/documents/seminar/Binswanger.pdf

[26] Pal, B., S. Pohit and J. Roy. 2012. 'Social Accounting Matrix for India.' *Economic Systems Research* 24 (1): 77–99.

that for every ₹1,000 allocated to this programme, national Indian output could rise by as much as ₹13,400 as this increased rural income is spent on other products (e.g., food, clothes, agricultural equipment, services), thereby boosting the incomes of people selling those products, which in turn boosts their spending and the incomes of other suppliers and so on.

This is why government spending on the poor, if appropriately targeted, can benefit not only the poor but also the entire economy, resulting eventually in higher incomes and tax revenues. It suggests that by manipulating the level of demand, the government could—at least theoretically—ensure that all available resources were drawn into productive use.

The multiplier theory shows how relatively small injections (or withdrawals) can have a multiplied effect on output. As Keynes explained, it is 'to the general principle of the multiplier to which we have to look for an explanation of how fluctuation in the amount of investment, which are a comparably small proportion of the national income, are capable of generating fluctuations in aggregate employment and income so much greater in amplitude than themselves.'[27]

Keynes articulated the concept of a 'multiplied' effect of an autonomous increase in spending on output for the first time in 1929. In a pamphlet entitled 'Can Lloyd George Do It?', Keynes and Henderson attacked the orthodox view that boosting expenditure through a public works programme would have a negligible effect on output and employment. They argued that the prevailing orthodoxy ignored the indirect effects of expenditure, or what they called the 'cumulative force of trade activity'.[28] It was Keynes's 'favourite student', R. F. Kahn, who formulated the multiplier in mathematical terms as the sum of cumulative but diminishing effects over successive rounds of spending.

Source: Authors.

The idea that people will spend a constant proportion of current income gives the multiplier its power. This assumption has been contested, the key idea being that consumption is smoothed over people's lifetimes and hence is not subject to significant fluctuation with income (see box above). Keynes himself acknowledged that there were factors besides current income which affected consumption—including expectations of future income, windfall changes in asset prices, large alterations in government policy—but that when it came to analysing fluctuations in economic activity (short-run cycles), he concluded that 'the aggregate income measured in terms of the wage-unit is, as a rule, the principal variable upon which the consumption constituent of the aggregate demand

[27] Keynes, *The General Theory*, p. 122.
[28] Skidelsky, R. *John Maynard Keynes*, pp. 303–4.

function will depend.'[29] In other words, he believed that there was a sufficiently strong relationship between current income and consumption that it significantly affected fluctuations in aggregate demand—and hence also income.

Professor V. K. R. V. Rao's Views on Keynesian Multiplier in India

Professor V. K. R. V. Rao (1908–91) was one of the best economists India has ever produced. He helped in founding some of the country's top research institutes in economics like the Delhi School of Economics (1948), the Institute of Economic Growth (1957) both at New Delhi and the Institute for Social and Economic Change (1971) at Bangalore. His work extended over many fields in economics, including pioneering contributions to India's early national income accounting.

In a famous article titled 'Investment, Income and the Multiplier in an Underdeveloped Economy',[30] Professor Rao examined the validity of the Keynesian multiplier in underdeveloped countries. He argued that the basic assumptions underlying the Keynesian multiplier such as involuntary unemployment, excess capacity in consumption goods industries and upward-sloping supply curve probably did not hold in underdeveloped countries and that a thoughtless application of the Keynesian multiplier formula could cause more harm than good by simply contributing only to inflation. In his view, the old 'work harder and save more' principle would be a better alternative than relying on the Keynesian multiplier in underdeveloped countries. These conclusions of Professor Rao resulted in great debate concerning the relevance of Keynesian multiplier theory in underdeveloped countries like the then India.

Source: Authors.

Keynes' simple model of income determination and the consumption-driven multiplier can be presented diagrammatically in terms of the famous Keynesian cross diagram (Figure 4.3). The 45° line represents the equilibrium condition, $y = E$ (i.e., Equation 4.3). A 45° line converts any distance along the vertical axis (the *ordinate*) into an equal distance on the horizontal axis (the *abscissa*). At all points along the line, aggregate demand is equal to output. For there to be exactly enough output to meet aggregate demand, it must be the case that actual demand is the same as the level expected by firms when making their output decisions. In other words, at all points along the 45° line, aggregate demand = expected demand = output.

[29] Keynes, *The General Theory*, p. 96.

[30] Rao, V. K. R. V. 1952. 'Investment, Income and the Multiplier in an Underdeveloped Economy.' *Indian Economic Review,* February. (Eds.) A. N. Agarwala and S. P. Singh. Reprinted in 1958. *The Economics of Underdevelopment.* London: Oxford University Press. pp. 205–18.

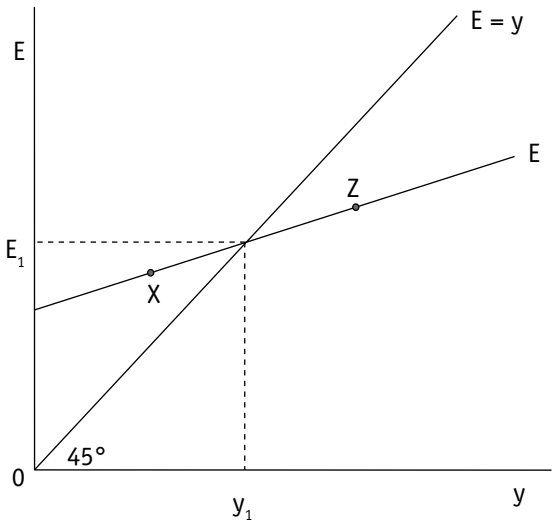


Figure 4.3 The Keynesian Cross

Source: Authors.

In Figure 4.3, the economy is in equilibrium at the point (y_1, E_1) where aggregate demand (i.e., the $E = C + I + G_1$ line) cuts the 45° line. Note that because G and I are exogenous (and thus would be represented by horizontal lines) the slope of the $C + I + G_1$ line is b (i.e., given by the consumption function). It cuts the vertical axis at $a + I + G_1$ when $y = 0$.

In order to clarify exactly what is meant by the equilibrium position, consider point X. At point X, aggregate demand exceeds output. In other words, actual expenditure exceeds the expectations of firms. This is not a position of equilibrium because it means that inventories will start dropping in response to the greater-than-expected demand. As inventories start to drop, this sends a signal to firms to revise their expectations upwards and produce more output. As they do this, output rises to y_1, that is, until it is sufficient to meet available demand. At (y_1, E_1), aggregate demand = expected demand.

By contrast, aggregate demand will be less than the output at point Z. In other words, actual expenditure will be less than expected by firms. Inventories will start to accumulate in the form of unsold stocks. This will send a signal to producers to revise their expectations downwards and cut back on production. As they do this, output falls to y_1, that is, until it is sufficient to match the reduced level of demand.

Given that all it takes to bring an economy to a point of equilibrium is equality between actual and expected levels of expenditure, Keynes argued that equilibrium positions such as y_1 could easily be positions of less than full employment. Because government spending is a large component of aggregate demand, and can be manipulated as a policy variable, he argued that the state could help move the economy towards full employment by increasing spending.

If government spending was to increase from G_1 to G_2, this would, through the effect of the multiplier, increase y by substantially more than the increase in government spending. As shown in Figure 4.4, output would rise from y_1 to y_2, which is more than the increase in G.

However, there are many informational problems facing a government when it attempts to boost an economy to full employment. Firstly, the government has to have a reasonable estimate of what the full-employment level of output actually is. Secondly, the government's economists must have a pretty good estimate of the value of the multiplier, and of the time it is likely to take entrepreneurs to revise their expectations sufficiently quickly (and appropriately) to create the additional desired output.

These are all fairly bold assumptions, and none of them appear (at least not in such unqualified terms) in the *General Theory*. Nothing, in fact, even approximating the Keynesian cross diagram appears in Keynes's book.[31] It is highly unlikely that Keynes would have subscribed to the notion that expectations could be manipulated through fine-tuned demand adjustment on the part of government to bring the economy to a state of full-employment equilibrium. Keynes was certainly of the view that boosting demand could help in times of recession, but he would have balked at the idea that demand-led government spending could target full-employment output in such a neat and effective manner.

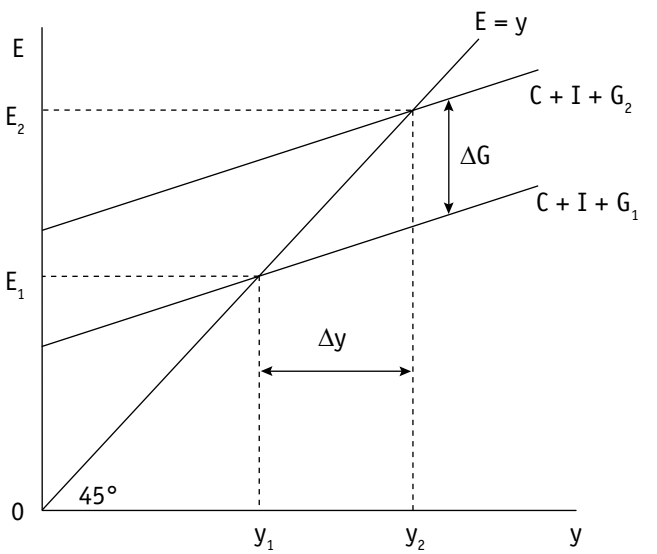


Figure 4.4 An Increase in Government Spending

Source: Authors.

[31] There is a notable absence of diagrams in the *General Theory*. Keynes produces only one, relating to the relationship between investment and interest rates, and even that was suggested by Harrod rather than constructed by him.

As explained in detail in the introductory chapter, after the publication of the *General Theory*, Keynes's followers divided into two camps: the 'hydraulic Keynesians' (who favoured policy models such as the Keynesian cross analysis); and the 'fundamentalist Keynesians' like Joan Robinson who saw unstable expectations and uncertainty as forming the core of Keynes's contribution (later disequilibrium and new Keynesian groups were added to the Keynesian camp). The fundamentalists viewed the hydraulic interpretation as a 'bastardisation' of Keynes's thought. Modern-day fundamentalists are called Post-Keynesians.[32]

Questions of legitimacy aside, the simple model of income determination does provide a framework for illustrating how an economy can come to rest at a position of less than full employment. It is a one-sector model because it only models the real sector of the economy, otherwise known as the goods market. This focus on the goods market is pertinent as it highlights the reaction of producers to changes in demand—a central Keynesian dynamic. However, to do greater justice to Keynes's ideas, it is necessary to include the financial sector in the analysis. This requires developing a model with two sectors, namely a goods market and a money market. This is done in Chapter 6, which introduces the *IS–LM* model.

New Keynesian Microfoundations

In discussion of the Keynesian output adjustment argument, you may have been wondering why firms do not simply lower their prices, rather than cut output. In other words, why are they assumed not to behave like firms in neoclassical models? Why do Keynesians argue that the laws of supply and demand acting through the price mechanism no longer apply, or at least do not apply very well? This is a very good question which neoclassical thinkers love asking Keynesians, as it raises doubts about Keynesian microfoundations. It seems to suggest that there is something wrong with the economic logic of the Keynesian argument.

The following 'Keynesian' story could be constructed in support of why firms may choose to cut output rather than prices. If the 'near-rational' entrepreneur chose to cut his or her prices, this would erode revenue, unless demand was very price-elastic. A 'near-rational' entrepreneur may indeed choose to hold out a little longer at the higher price. But even assuming a price-elastic demand curve, the entrepreneur still faces the problem of producing and remaining profitable at a lower price. To do so, he or she will have to cut costs—and this is not nearly as easy as it sounds. It requires dealing with disappointment and anger on the part of workers and suppliers, potentially undermining important relations of trust and reciprocity. In particular, cutting wages could cause strike action at worst—and a demoralised and unproductive workforce at best. When faced with the prospect of such a trying time, as well as uncertainty about the responsiveness of

[32] See Snowdon, B., H. Vane and P. Wynarczyk. 1994. *A Modern Guide to Macroeconomics: An Introduction to Competing Schools of Thought*. Chapter 8. Aldershot: Edward Elgar.

demand to price cuts, the entrepreneur may rather choose to keep selling the inventories at the original price, and instead slowly start cutting back on production and allow the workforce to decline through retrenchment packages or natural attrition.

New Keynesian attempts to build more acceptable microfoundations concentrate on different aspects of disequilibrium stories, such as the above. One strand of New Keynesian research concentrates on the labour market, and specifically on why wages tend to be above market-clearing levels as a result of turnover costs and efficiency wages (i.e., higher than market-clearing wages being paid in order to generate higher productivity).[33] The other strand concentrates on explaining why prices are 'sticky' and adjust slowly to changes in demand.

Let us consider first some of the New Keynesian arguments as to why wages are 'sticky' and persist at higher than market-clearing levels, thus resulting in unemployment. Possible reasons for such stickiness include efficiency wages, and insider–outsider theories of wage determination.[34]

Efficiency wage theories argue that it does not pay firms to reduce wages, as this is likely to have an adverse effect on morale and labour productivity. However, if workers are paid above market-clearing levels, then they will have less incentive to shirk. They are also likely to be more co-operative.

Lowering real wages during recessions is likely to harm relations on the shopfloor, and undermine future attempts on part of the employers to gain the co-operation of the workforce. Furthermore, some workers may choose to leave as a result of the wage cut, and if firms have to replace them, then they will have to carry out the associated hiring and training costs.

Insider–outsider theories start with the existence of turnover costs, and then add the proposition that trained 'insiders' are not perfect substitutes for untrained 'outsiders'. This implies that employed insiders can, to some extent, protect their wages against undercutting by unemployed outsiders. Furthermore, given that employed insiders often have to be relied upon to train newly employed workers, employers have an incentive to keep on the good side of the already-employed workforce. Employing new workers at lower wages could lead to harassment of new recruits by insiders, or to future demands by such recruits for higher wages.

As regards New Keynesian arguments about sticky prices, or 'nominal rigidities' in their jargon, the basic contention is that firms are reluctant to change prices regularly, and that small nominal rigidities at firm level add up to large macroeconomic effects. This was first proposed in the 'menu costs' literature which focuses on the technological costs of changing nominal prices (literally, the costs of changing menus and price lists).[35]

[33] Lindbeck, A. and D. Snower. 1988. 'Co-operation, Harassment and Involuntary Unemployment: An Insider Outsider Approach.' *American Economic Review* 78 (1): 167–88.

[34] This discussion is drawn from Greenwald, B. and J. Stiglitz. 1993. 'New and Old Keynesians.' *Journal of Economic Perspectives* 7 (1): 33–34.

[35] See Mankiw, N. G. 1985. 'Small Menu Costs and Large Business Cycles: A Macroeconomic Model of Monopoly.' *Quarterly Journal of Economics* 100: 529–37.

Where firms are imperfectly competitive and face small barriers to price flexibility (such as menu costs), then it can be shown that even small barriers can have large macroeconomic effects.[36]

Menu costs, however, tend to be small and there is little empirical evidence that they are a significant source of even small nominal rigidities. Greenwald and Stiglitz have provided a more convincing argument by adding the role of risk to the analysis of pricing decisions.

When a firm considers the various ways it might react, it perceives greater uncertainty about the consequences of price and wage adjustments—because those consequences depend on the uncertain responses of rival firms, customers and workers—than about the consequences of output adjustments. In fact, for those goods which can be put into inventory, the only risk associated with producing too little is the risk associated with higher production costs in the next period, when any inventory deficiency must be made up.[37]

The issue of nominal rigidities is still an open question. As Romer reminds us, 'economists do not have a good understanding of the price-adjustment policies of firms, or even of the considerations that underlie their choices of policies.'[38] The task of providing adequate 'microfoundations' to Keynesian macroeconomics has a long way to go.

Not everyone thinks this is a good research programme, however. There remains a body of Keynesian and Post-Keynesian thinking which rejects the project of providing a rationale (to neoclassical economists) for the alleged rigidity of money wages and prices. According to James Tobin (America's most prominent Keynesian), showing how nominal shocks can have real consequences was not Keynes's idea:

> I don't find it extremely convincing—and I'm sure Keynes would have not—that the whole effective demand problem is that there are real costs of changing nominal prices on the menu at the restaurant. I think Keynes would have laughed at the idea that menu costs are a big enough resource-using problem to cause the Great Depression or any other substantial losses of economic activity. It's not credible. If I had a copyright on who could use the term 'Keynesian'; I wouldn't allow them to use it.[39]

The Relevance of Keynesian Economics Today

Keynesian economics revolutionised economic thinking and policy making. Throughout the long post-war boom of the 1950s, governments acted on the assumption that the state could regulate aggregate demand and ensure full employment. But the rise of inflation in the late 1960s, and stagflation in the 1970s, undermined the Keynesian

[36] See Romer, D. 1993. 'The New Keynesian Synthesis.' *Journal of Economic Perspectives* 7 (1): 5–22.
[37] Greenwald, B. and J. Stiglitz. 1993. 'New and Old Keynesians.' *Journal of Economic Perspectives* 7 (1): 37.
[38] Romer, 'The New Keynesian Synthesis,' p. 19.
[39] Tobin, quoted in Snowdon et al., *A Modern Guide to Macroeconomics*, p. 132.

hegemony and most governments shifted towards more restrictive economic policies which reduced the role of government.

However, the pendulum started swinging back during the 1990s. Slow growth in many countries lead governments (and economists) to reconsider Keynesian principles of demand management. In Japan, growth stagnated from 1992 onwards and was dealt a particularly severe blow during the Asian crisis of 1997–98. In text book Keynesian fashion, the Japanese government embarked on an expansionary fiscal policy to try and boost spending. The government even went as far as to issue monetary coupons to poor households (Keynes would have been impressed!). Paul Krugman, one of the leading American economists, even wrote a book after the Asia crisis of 1998 called *The Return of Depression Economics*.[40]

Krugman, however, was ahead of his time. The long boom of the 2000s rekindled faith in the invisible hands of the market. It was only after the 2008 crisis that people realised that the long consumption-fuelled boom rested on toxic assets (American sub-prime mortgage bonds packaged into complex instruments which disguised their risky nature) and that the regulatory authorities had failed to notice, anticipate or even imagine that such a problem existed. The academic silver lining of this economic cloud is that Keynesian insights have re-entered the mainstream. This new-found tolerance for Keynesianism and suspicion of economic models based on perfect competition and rational expectations has made macroeconomics a more open and exciting discipline today.

Even some Marxists, who typically are suspicious of Keynes, given his role in articulating a theory which helps policy makers save capitalism, have surprising praises for Keynes these days. For example, Samir Amin writes:

> Keynes' vision of the future of humanity was optimistic. He saw that the level of development of the productive forces that had been acquired enabled humanity to emancipate itself from the economic question (in his beautiful speeches to our great grandchildren). A society that was freed from the chains of obligatory work was therefore possible: a society that passed its time cultivating human relationships, a society that was truly emancipated and cultivated. This objective, in its way, is none other than that of Marx's communism. It is the reason why capitalism is a system that is now obsolescent, whose time is now over. The thinking of Keynes constitutes, I believe, one of the examples that prove the rightness of Marx's vision: humanity aspires to communism. Not only its popular classes (whom Keynes distrusted), but even its greatest thinkers. Keynes was certainly not the first one to have conceived this radiant future. Before him, the utopians had done so. ... However the equally necessary reading of Keynes the economist is, in my view, disappointing. Of course Keynes was far above the conventional vulgar economists of his day (and their descendants, the pure economists of today). And his proposals constitute an approach to reality infinitely more powerful than those of our miserable liberals.[41]

[40] Krugman, P. 1999. *The Return of Depression Economics*. New York: Norton.

[41] Amin, S. 2011. *Ending the Crisis of Capitalism or Ending Capitalism?* p. 190. Bangalore: Books for Change.

Review Questions and Answers

Assume a closed economy one-sector Keynesian model with the following characteristics: a marginal propensity to consume of 30 per cent, autonomous consumption spending of $15 billion, investment spending of $20 billion and government spending of $35 billion.

a) What is the equilibrium level of output?

C = \$15 billion + 0.3y
I = \$20 billion
G = \$35 billion
$E = C + I + G$
$E = y$
y = \$15 billion + 0.3y + \$20 billion + \$35 billion
y – 0.3y = \$70 billion
y = \$100 billion

b) What happens to the equilibrium level of output if I rises to $55 billion?

y = \$15 billion + 0.3y + \$55 billion + \$35 billion
0.7y = \$105 billion
y = \$150 billion
(Alternatively, you can multiply the increase in I (i.e., \$35 billion) by the multiplier (1/(1 – 0.3) which is 1/0.7) to get \$35 billion/0.7 = \$50 billion. The new output level is that \$100 billion plus the increase (\$50 billion) which is \$150 billion.)

c) Outline the economic dynamics behind the increase:

The increase in investment causes an increase in aggregate demand (E). Assuming the economy was in equilibrium before the exogenous shock, this implies an excess of aggregate demand. Stocks start to fall in response to the greater than expected level of E. This sends a signal to producers to increase output, and they do.

The Keynesian model usually assumes investment spending to be exogenous. What would the multiplier look like if investment was instead made endogenous through the following functional form: $I = xy$ where $0<x>1$? Will the multiplier effect be larger or smaller than the conventional model?

$C = a + by$
$I = xy$
$E = y$
$y = a + by + xy + G$
$y(1 - b - x) = a + G$
$y = (a + G)\ (1/(1 - b - x)$
In other words, the multiplier effect will be larger.

CHAPTER 5

Investment and Interest Rates

This chapter discusses the relationship between investment and interest rate as preparation for our subsequent discussion of the *IS–LM* model. The *IS–LM* model is a two-sector model in that it includes both real (goods market) and financial (money market) sectors. It is a simple, but useful, model because it allows us to explore the ways in which financial variables affect real output, and *vice versa*.

The key connection between the goods market and the money market is the relationship between the interest rate (a financial variable) and investment spending (which, being a component of aggregate demand, helps determine goods market equilibrium). This chapter explores this relationship, pointing to the assumptions made about it in the *IS–LM* model. It should thus be regarded as background information to be absorbed before moving on to the *IS–LM* model discussed in Chapters 6 and 7.

Interest Rates and Investment

The interest rate is the price of borrowing money, normally expressed as an annual percentage of the nominal amount of money borrowed. Because money represents purchasing power and can be invested in ways which generate more money, lenders need to be compensated by borrowers for the opportunity cost of parting with it over a specified period. The interest rate, in other words, is the rental price of money.

Interest rates play an important allocative function in the economy. They help channel funds from households and firms with funds to spare (i.e., savers) to those needing to borrow money. This is usually done directly through the issuing of bonds (marketable debt) by borrowers, or indirectly through financial intermediaries such as banks and other financial institutions. In the *IS–LM* model, there are no banks or other financial intermediaries. The flow of finance from savers to borrowers is conceptualised as being only via marketable loan contracts—that is, bonds.

Large institutions (usually governments, government bodies or large corporations) are in a position to borrow money by issuing bonds on the primary market. By 'selling' bonds, they are exchanging a marketable loan contract for cash. The loan contract, or bond, states the value of the loan (i.e., the face value), the period of the loan and the rate of interest payable on the face value (i.e., the coupon rate). Some bonds are issued with fixed coupon rates, and others, like the floating rate bonds first issued by the Indian

government in 1995, do not have fixed coupon rates and the coupon rate is adjusted at regular intervals (e.g., 6 months), typically according to yields on Treasury bills.[1] For the purposes of theoretical discussion in this book, we confine our attention to fixed coupon rate bonds. During the life of a loan contract, the borrower makes regular fixed interest payments to whoever holds the bond. At the end of the loan period, the principal (i.e., face value) is repaid to the bond-holder. A bond with no retirement date is known as perpetuity. It only has a coupon rate and a face value, and the issuer is under no obligation to pay back the face value. The bond is thus a financial asset that pays a fixed amount to the bond-holder indefinitely.

Bonds can be envisaged as tradeable I owe you (IOUs). The original bond purchaser (i.e., lender) is free to sell the financial asset on the secondary bond market where prices are set by forces of supply and demand. The price of such 'second-hand' bonds could rise above or fall below their issue price (i.e., the face value). When that happens, the effective interest rate—or yield—for today's buyer diverges from the coupon rate of interest.

Financial Theory of Investment

Financial approaches to investment distinguish between internal funds (retained profit and depreciation) and external funds (borrowing and the sale of equity). The cost of internal funds is the yield forgone by not investing these funds in interest-bearing assets. The cost of external funds is the cost of borrowing (interest rate). Firms opt for internal or external funding of investment depending on their relative costs.

Source: Authors.

The fact that bonds can be traded in this way renders them risky investments as prices can go up or down. For this reason, a range of 'derivative' financial instruments have been created. For example, collateralised debt obligations (CDOs), which pooled together US mortgage bonds from different places and with different risk profiles, were created supposedly to reduce the exposure of buyers to particular mortgage bonds. Unfortunately, the CDOs (and the rating agencies which approved them) did not take into account the systemic risk that was building up, and which affected the entire mortgage market, thereby eliminating the advantage of the CDO. The 2000s also saw the rise of credit default swaps (CDS) which effectively allowed people to buy insurance on mortgage bonds and CDOs. The models discussed in this text book do not take into account such

[1] For more information on bonds in India, see the Reserve Bank of India's Government Securities Market in India—A Primer. http://www.rbi.org.in/scripts/FAQView.aspx?Id=79

complex derivatives. While this is a limitation, the advantage is that it allows us to focus on the key underlying dynamics which derivatives like CDOs and CDSs potentially render less risky in periods of economic calm, but amplify during times of crisis.

Bond Prices and Yields: Some Basics

It is important to draw a clear conceptual distinction between the coupon interest rate (which is written on the bond) and the yield (which is determined by market forces). Yield is the effective interest rate obtained from the bond and depends on the relationship between the fixed coupon payments and the price of the bond in the secondary bond market. At the time of issue, the coupon rate and the yield are identical. Yields and coupon rates differ once the bond price differs from the face value.

For example, say a bond of ₹1,000 with no retirement date (i.e., perpetuity) was issued with a coupon rate of 10 per cent. The coupon payment per year would be ₹100, and hence the effective interest rate (i.e., yield) would be 10 per cent, that is, equal to the coupon rate. Now assume the bond-holder decides to trade it in the secondary market. If the demand for bonds is low, then the bond-holder may have to accept a lower price for it, that is, offer the buyer an asset with a higher yield than it had when initially offered in the primary market. If the bond was sold for ₹800, then the buyer would be buying an asset with a yield of ₹100/800, that is, 12.5 per cent. Conversely, if the demand for bonds was strong in the secondary market, then the bond-holder may be able to sell the asset for ₹1,200. The buyer would thus purchase an asset with a yield lower than the original coupon rate. In this example, the yield would be ₹100/1,200 = 8.3 per cent. *In short, when the price of a bond falls below the face value, the yield will rise above the coupon rate, and vice versa*.

If the bond had not been a perpetuity (i.e., a bond that was promised to pay the bearer the face value at a certain point), then the capital gain or loss implied by the price change would also have to be factored into the equation.[2] Whatever the exact calculation, the relationship between the price of the bond and the yield would still be negative.

For short-term bonds, the price of the bond will not differ much from the issue price (face value) because the principal is soon to be repaid. This is why short-term bonds are relatively risk-free. Long-term bonds, by contrast, can experience significant differences between their face value and market price.

Note that yields ruling in the secondary market will affect yields offered in the primary market. In the above example, if one could purchase a perpetuity in the secondary market with a yield of 12.5 per cent, then no one would be able to find a buyer for a similar debt issue in the primary market with a coupon value of 10 per cent. Similarly, if yields in the primary market were higher than those on similar bonds for sale in the secondary market, then bond prices would fall in the secondary market until the yields

[2] The yield would thus be equal to the coupon payment/bond price plus the change in the price of bonds.

were the same. In fact, the rate of return on all financial assets would rise. Bond yields and other interest rates and rates of return thus tend to move in the same direction.

In the *IS–LM* model, the only interest-bearing asset is a bond, and the only financial market is the secondary bond market. There are no banks or stock exchanges and no internal sources of funding for firms. The only interest rate is the ruling bond yield. Even so, the model still has explanatory power because financial rates of return tend to move together.

The Relationship between Investment and the Interest Rate

The relationship between investment demand/spending and the interest rate is usually modelled as a negative function (as in Figure 5.1). Note that investment refers to investment spending on productive assets—and not to 'investment' in financial assets (which is rather an act of saving). Furthermore, investment spending refers to planned investment and does not include inventory accumulation.[3]

Investment spending is a negative function of interest rate because as rate of return on savings rises—along with the cost of borrowing—the opportunity cost of investment spending rises. At high interest rates, people with spare cash would be tempted into the bond market (rather than into fixed investment projects) and those who needed to borrow to finance their investment plans, may scrap many of their proposed projects (as they cease to be viable at high interest rates). Only the very profitable investment projects would thus be undertaken at high interest rates. As interest rates fall, however, the pool of viable investment projects rises. The investment schedule thus slopes downwards against the interest rate (*i*).

Imagine as a potential investor, that you are faced with the following decision: should you invest ₹100,000 of your surplus cash in additional plant and machinery, or should

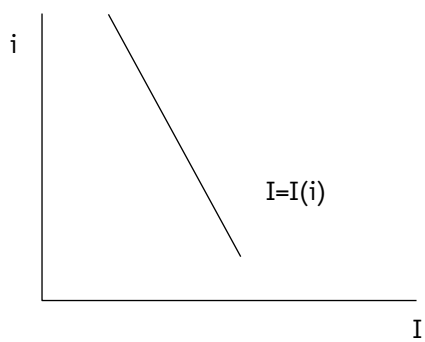


Figure 5.1 The Investment Schedule

Source: Authors.

[3] In other words, the investment function is drawn for *ex ante* investment, and not for *ex post* investment, which includes unplanned inventory investment.

The *IS–LM* Model is Consistent with the Neoclassical Theory of Investment

The neoclassical approach to investment was developed primarily by Dale Jorgenson in the early 1960s. He showed that the user cost of capital could be derived from neoclassical microeconomic theory about profit maximising decisions by firms. Jorgenson also described the connection between a firm's investment decision and the effects of government tax policy on the incentives to invest. This theory states that an extra unit of capital will not be purchased unless the expected marginal product of capital (MPK) is almost equal to the real cost of capital (u): MPK $\geq u$.

The cost to the business firm of using a piece of capital equipment for a period of time, expressed as a fraction of the machine's purchase price is the user cost of capital. For example, the user cost may be 10 per cent, consisting perhaps of a 2 per cent annual real interest rate and an 8 per cent depreciation rate.

The user cost of capital can be cut using monetary and fiscal policies. This will induce firms to adopt more capital-intensive methods of production. An increase in the user cost of capital will prompt firms to substitute away from machines towards more labour-intensive techniques. We discuss these dynamics further in Chapters 6 and 7. The point here is to demonstrate that neoclassical approaches to investment are consistent with a downward-sloping investment curve and with the *IS–LM* model itself.

Source: Authors.

you save it and earn interest? If there was a stock market, and shares in your firm were publicly traded, you might consider Tobin's q, that is, the ratio of the market value of your firm to the replacement cost of capital: if it was high, you might decide to expand your business by purchasing more plant and equipment (i.e., investing). If it was low, you might decide to purchase some shares (i.e., increase your stake in the company—an act of saving). The *IS–LM* model, however, does not have a stock market. It assumes that the only way you can save is to purchase bonds in the bond market.

After investigating the bond market, you discover that your best bet is to buy a perpetuity with a face value of ₹100,000 and a coupon rate of 10 per cent. This means that you will earn ₹10,000 a year from the bond. Under these circumstances, you would be most unlikely to invest ₹100,000 in plant and machinery unless you expect to earn a rate of return of 10 per cent or more. In short, investment in capital goods will only be undertaken if the expected rate of return on that investment is equal to or greater than the yield on bonds. If a very high return can be obtained from the bond market, then only very profitable investment projects will be undertaken in the face of it. This implies that at high rates of interest, investment will be low. Conversely, when returns are low, more investment projects become viable, and hence investment spending will be high.

Obviously, the decision is much more complicated than this. When considering whether to purchase a bond, you will also be worrying about its future market value. Forming expectations about future prices is always a risky and fraught business. Similarly, when trying to work out the rate of return on a proposed investment project (by calculating the net present value [*NPV*]—see box below), you will probably end up making all sorts of guesses about future demand for the product, trends in cost prices, potential competition, etc. You will also have to make a fairly long-term projection about the path of costs and revenues over the life of the project.

Present Value

According to neoclassical theory, firms consider both the expected marginal product of capital (discounted over time) and the real cost of capital, which is affected both by interest rate and depreciation. The present value (*PV*) of a capital asset that yields a stream of revenue (*Y*) over *t* years is:

$$PV = Y/(1 + i)^1 + Y/(1 + i)^2 + \ldots + Y(1 + i)^t$$

where i = interest rate

The *PV* of an asset paying ₹5,000 per year for the next 3 years is (assuming an interest rate of 10 per cent):

$PV = 5{,}000/(1 + 0.1)^1 + 5{,}000/(1 + 0.1)^2 + 5{,}000/(1 + 0.1)^3 =$ ₹4545.45 + ₹4123.23 + ₹3759.40 = ₹12428.08.

Net Present Value

Rational firms use the *NPV* criterion when deciding whether to buy capital equipment or not. *NPV* is calculated by subtracting the supply price of capital (S_k), that is, the price the firm must pay to acquire the machine, from the *PV* of the capital asset:

$$NPV = PV - S_k = Y/(1 + i)^1 + Y/(1 + i)^2 + \ldots + Y/(1 + i)^t - S_k.$$

The implication is that more capital investment will take place at lower interest rates than at high interest rates. The problem is that there is no way of knowing for sure what the future returns or future interest rates are going to be. As Keynes pointed out many years ago, 'animal spirits' and guesswork are important determinants of investment—even when the investment decision is made on a purely rational basis.

Source: Authors.

Keynes believed that uncertainty and irrational fears and desires played a central role in driving investment and accounted for its disruptive volatility. Such factors are clearly exogenous to the relationship between interest rate and investment, and hence act to

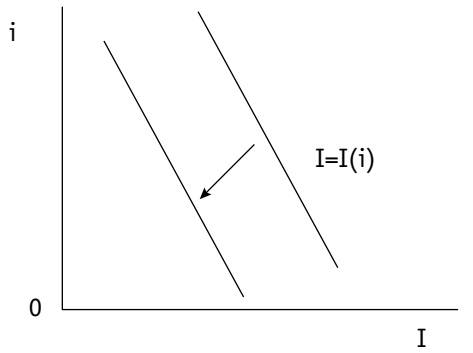


Figure 5.2 An Inward Shift of the Investment Schedule

Source: Authors.

shift to position of the investment demand schedule as depicted in Figure 5.2. When entrepreneurs are uncertain about future profits, they will discount their future earnings at a high rate, thus reducing the expected return on all investments. This means that less will be invested at all rates of interest, and the investment schedule will move closer to the origin (as shown in Figure 5.2). If investors suddenly fear that disaster will strike and hence cut back on their investment demand, this will have a similar impact on the position of the investment schedule. Of course, if expectations about the future economic environment improve, then the rate at which entrepreneurs discount future earnings will fall. This means that more investment will be undertaken at all rates of interest. The investment schedule would thus shift out. The same occurs if investor's confidence increases for less rational reasons.

The accelerator theory of investment (see box below) tries to capture some of these dynamics by explicitly modelling investment as a function of expected output. Such dynamics can only be represented in the *IS–LM* model as an exogenous shift of the investment schedule in response to changed expectations about output.

The Accelerator Theory

The accelerator theory states that the level of net investments depends on expected change in output. Net investment (I^n) is the change in the capital stock that occurs between two periods (t and $t - 1$).

$$I^n = K_t - K_{t-1}.$$

Let us assume that the firm always manages to acquire new capital quickly enough to keep its actual capital stock equal to its desired capital stock in each period:

(Box Continued)

(Box Continued)

$$I^n = v^* \left(Q^e_t - Q^e_{t-1}\right)$$

Q^e is the estimate of expected sales and 'v^*' is a multiple of the expected sales by assuming that the stock of capital, that is, the plant and the equipment that a firm desires (K^*) is a multiple of its expected sales:

$$K^* = v^* Q^e.$$

Thus, the accelerator hypothesis says that the level of net investment (I^n) depends on the change in expected output.

The flexible accelerator theory is a variant of the accelerator theory. It states that the desired ratio of capital to expected output may be affected by the user cost of capital. As per this theory, net investment does not always close the gap between desired capital and the capital stock in the preceding period, but by only a fraction of it.

Source: Authors.

Inflation and Interest Rates

The discussion so far assumes that the price level remains constant (which is a typical assumption in simple Keynesian models). This means that the nominal interest rate (i) in Figure 5.2 is also the real interest rate. However, if we drop this assumption for a moment, then nominal and real returns diverge, introducing further economic adjustments.

When the general price level rises, it affects both the cost to borrowers and the real rate of return to lenders. If prices rise over the life of a loan contract, then the purchasing power of money, and hence of the principal declines. This means that the borrower will end up paying the lender a principal that is worth less in terms of purchasing power than it was when the loan was made. In this way, unexpected inflation benefits borrowers and harms lenders. Conversely, if prices fall over the life of a loan, the lender will be paid back a principal that has greater purchasing power than it had at the time the loan was made. Unexpected deflation thus harms borrowers and benefits lenders.

For each unit of currency (say ₹1) an individual saves, he or she will get back at the end of the period an amount equal to 1 + the interest rate. If there was inflation over the period, then the purchasing power of that amount is: (1 + the interest rate)/(1 + the inflation rate), an expression that is approximately equal to the interest rate minus the inflation rate. The real interest rate is thus defined (approximately) as follows:

$$i_r = i - \Delta P_a \qquad (5.1)$$

real interest rate = nominal interest rate − actual inflation

Thus, if the nominal interest rate was 3 per cent and inflation was 2 per cent, then the real interest rate would be approximately 1 per cent. Given this potential for inflation to reduce the real rate of return to savers, we would expect savers to insist on higher nominal interest rates to compensate them for expected inflation over the life of a loan. The nominal (i.e., market) rate of interest can thus be conceptualised as approximately the sum of the desired real rate of interest and expected inflation:

$$\begin{array}{lcll} i & = & i_d & + \quad \Delta P_e \\ \text{nominal} & = & \text{desired real} & + \text{ expected} \\ \text{interest rate} & & \text{interest rate} & \text{inflation} \end{array} \tag{5.2}$$

The premium for expected inflation (ΔP_e) is commonly referred to as the Fisher effect (named after the economist Irving Fisher who identified it). The nominal rate of interest (i.e., that rate of interest ruling in the market) is thus modelled as consisting of the market's consensus about the rental value of money (i.e., the desired real rate) plus a premium determined by expected changes in the price level. The higher the expected rate of inflation, the higher the nominal rate of interest.

In terms of the bond market, this means that expected inflation will result in a fall in bond prices, and hence in a rise in (nominal) yields—so as to ensure that the (inflation-adjusted) desired rate of return is obtained.

Of course, lenders can only protect themselves adequately from inflation if they correctly anticipate price changes. When actual inflation exceeds expected inflation, then borrowers benefit at the cost of lenders (and *vice versa*). This occurred in the mid- and late-1970s when unexpected oil price increases boosted inflation above expected levels and real interest rates turned negative in most countries. By contrast, real rates of return were unexpectedly high in the early 1980s and the late 1990s because of unanticipated recessionary conditions.

In the neoclassical version of the *IS–LM* model, prices of all goods are assumed to adjust quickly and instantaneously to fluctuations in demand and supply to restore equilibrium in all markets. The assumption of perfect competition means that actual and expected price increases blur into the same thing. You will see in Chapter 7 (which introduces the neoclassical version of the *IS–LM* model) that as the general price level rises, bond prices fall and the nominal interest rate (i) rises.

The Structure of Interest Rates

The *IS–LM* model makes the simplifying assumption that the only interest-bearing asset is a bond, and that all bonds are identical. The yield on bonds is thus the ruling and the only interest rate in the model. In the real-world, however, there are many different bonds available, offering different yields. In general, five factors are responsible for the difference in yields on offer in the bond market: term to maturity, default risk, tax treatment, marketability and special features like call and put options.

The Term Structure of Interest Rates

The 'term to maturity' of a financial claim is the length of time until the principal amount becomes payable. The relationship between yield and term to maturity on bonds that differ only in terms of length of time until the principal is paid is called the term structure of interest rates. By plotting terms to maturity on the horizontal axis and yields on the vertical axis, a *yield curve* can be created. Note that the yield curve is drawn for bonds which differ only in term to maturity—that is, the securities have the same tax treatment, marketability, risk profile, etc.

Three differently shaped yield curves are common:

- ascending yield curves when interest rates are lowest on short-term issues (this is the most common shaped curve);
- flat yield curves, which are unusual and
- descending yield curves, which occur periodically, usually at or near the beginning of a recession.

There are two competing theories of the term structure of interest rates: the market segmentation theory (which suggests that bonds of different maturities appeal to different types of investors) and the expectations theory.

The Expectations Theory of the Yield Curve

The expectations theory (which was originally developed by Irving Fisher and further developed by John Hicks) holds that the shape of the yield curve is determined by expectations of future interest-rate movements. To obtain this result, the theory assumes that investors are profit maximisers who are indifferent between holding long-term or short-term bonds.

To illustrate how expectations alter the shape of the yield curve, let us suppose that investors have to choose between two types of bond: a short-term maturity bond (of 1 year) and a longer-term maturity bond of 2 years. Assuming that both bonds yield 6 per cent, the yield curve will be flat, as shown in Figure 5.3. Now, assume that investors obtain economic information which they believe indicates that interest rates are going to rise in the next year. They may, for example, have obtained the latest economic statistics showing strong economic growth and could have reasoned on this basis that prices (and hence yields) were going to rise. Assume that they expect interest rates to rise to 12 per cent. Note that the 12 per cent interest rate is a *forward rate* in that, it is expected to exist (1 year) in the future.

Assuming rational profit-maximising behaviour, investors will sell 2-year bonds because they will not want to be locked into the prevailing interest rate of 6 per cent when interest rates are expected to rise in the future. Most investors would prefer to buy

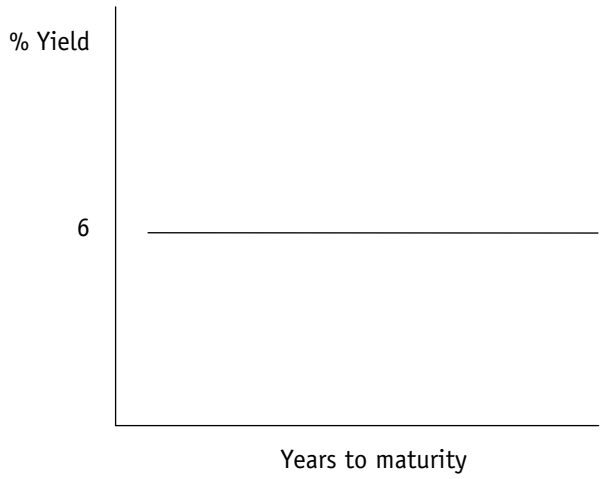


Figure 5.3 A Flat Yield Curve

Source: Authors.

short-term (i.e., 1-year) bonds, wait for interest rates to rise, and then buy long-term (i.e., 2-year) bonds and lock into the higher interest rate. In other words, instead of holding a 2-year bond for 2 years and obtaining 6 per cent a year, investors would prefer to purchase two 1-year bonds: the first at the prevailing interest rate of 6 per cent; and the second at the beginning of the following year when interest rates are expected to rise to 12 per cent. The average yield over the 2-year period would thus be $((1.06)(1.12))^{1/2} = 9$ per cent (see the term structure formula outlined in the text box).

Investors will thus start selling any 2-year bonds they own, and buying 1-year bonds. This will drive the price of 1-year bonds up (and hence the yield down), and the price of 2-year bonds down (and hence the yield up). The net effect of this portfolio adjustment is to shift the prevailing yield curve from flat to ascending.

The process of buying and selling bonds continues until any differential in expected returns over the 2-year investment period is eliminated. That condition could occur, for example, when the 1-year forward rate is 12 per cent, and the yield on 1-year bonds equals 4 per cent and 2-year bonds yield 8 per cent. With this 'term structure', investors will be indifferent between holding one 2-year bond yielding 8 per cent, or holding two 1-year bonds yielding 4 per cent and then investing the proceeds the following year in bonds with an expected 12 per cent yield. Such portfolio adjustment will result in the yield curve shifting from a flat curve to one that is upward sloping (as shown in Figure 5.4).

This expectations-driven relationship between short- and long-term interest rates determines the shape of the yield curve. If, for example, interest rates are expected to increase, then the yield curve will be upward sloping; if they are expected to decrease, it will be downward sloping; and if no change in interest rates is expected, the yield curve will be flat.

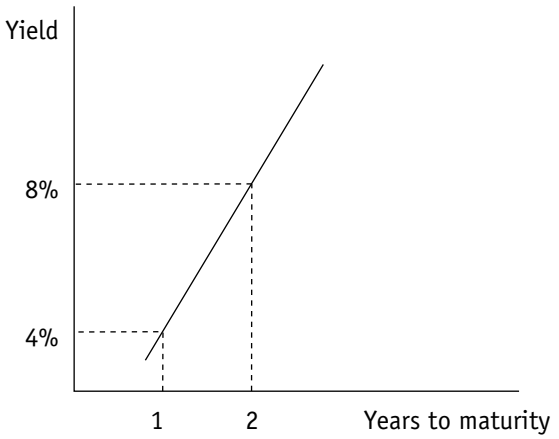


Figure 5.4 An Upward-sloping Yield Curve

Source: Authors.

The expectations theory of the yield curve assumes that investors are indifferent between long- and short-term securities. However, given that short-term securities tend to be more liquid (i.e., the secondary market for them is more active) than longer-term securities (which also display greater fluctuations in price), this assumption is usually not true. Because of the problems associated with the liquidity of long bonds, borrowers seeking to fund capital projects with long-term bonds usually have to pay lenders a 'liquidity premium' in order to tempt them to purchase long-term bonds rather than the more liquid short-term bonds. This liquidity premium implies that an upward-sloping yield curve will be steeper than that predicted by the expectations theory.

If one assumes that the expectations theory has some validity, the yield curve provides information about market expectations and future interest rates. It is thus observed with great interest by many economic analysts.

If the yield curve is upward sloping, then one could (in terms of this theory) surmise that the consensus in the market is that interest rates will rise in the future. Since interest rates tend to be procyclical (i.e., rise and fall with the business cycle), one might conclude further that market participants expect an economic upswing in the future. By the same logic, if the yield curve is downward sloping, then one could conclude that 'the market' expects interest rates to fall (which may imply that an economic downswing is expected). The fact that descending yield curves are common near the final phase of a period of economic expansion lends some credence to this theory.

Information can also be obtained by monitoring the spread between long-term and short-term interest rates (such as the difference between the yield on a 9-year bond and a 3-month bond). As the spread narrows (i.e., the yields move closer together), one could surmise that the 'market consensus' is that the rate of economic expansion will slow down, and/or that future inflation is not expected to be so high. Alternatively, if the

spread widens (i.e., the yield curve becomes steeper), then this may indicate that inflation is expected to be higher in the future, and thus higher yields on longer-term bonds are demanded.

When market analysts talk about the yield curve, they are often, in fact, referring to the spread between short-term and long-term interest rates. For example, in some countries, a rough yield curve can be calculated as a spread between the average long and short bond rates. When plotted over time, this gives a 'yield curve' of sorts. Normally, the yield curve rises ahead of booms and falls ahead of recessions.

Figure 5.5 plots the Indian yield curve for three periods: March 2001–02, March 2006–07 and March 2011–12. It shows that yields have risen over time (no doubt to keep

The Term Structure Formula

If the expectations theory of the yield curve holds, then the long-term interest rate will be a geometric average of the current short-term interest rate and a series of expected short-term forward rates:

$$(1 + {}_tR_n) = [(1 + {}_tR_1)(1 + {}_{t+1}f_1)(1 + {}_{t+2}f_1) \ldots (1 + {}_{t+n-1}f_1)]^{1/n} \qquad (5.3)$$

where R = actual interest rate; f = forward interest rate; t = time period for which the rate is applicable; n = maturity of the bond. The postscript identifies the maturity (n) of the bond, and the prescript represents the time period in which the bond originates (t). Thus, ${}_tR_1$ is the actual market rate of interest on a 1-year bond today (i.e., time t); similarly, ${}_tR_{10}$ is the current market rate of interest for a 10-year bond. For the forward rates, the prescript identifies future rates. Thus ${}_{t+2}f_1$ refers to a 1-year interest rate, 2 years from now.

Suppose that the current 1-year rate is 6 per cent and that the market expects the 1-year rate 1 year from now to be 8 per cent, and 2 years from now to be 10 per cent. Using the above notational form, this can be represented as follows: ${}_tR_1 = 6\%$; ${}_{t+1}f_1 = 8\%$; ${}_{t+2}f_1 = 10\%$. Given such market expectations, we can calculate the current 3-year rate of interest by applying the formula.

$$(1 + {}_tR_3) = [(1.06)(1.08)(1.10)]^{1/3}$$

$${}_tR_3 = (1.259)^{1/3} - 1 = 8\%.$$

This tells us that an investor with a 3-year time horizon will be indifferent between buying a 3-year security yielding 8 per cent, or buying three successive 1-year bonds that will also yield, on average, 8 per cent.

Source: Authors.

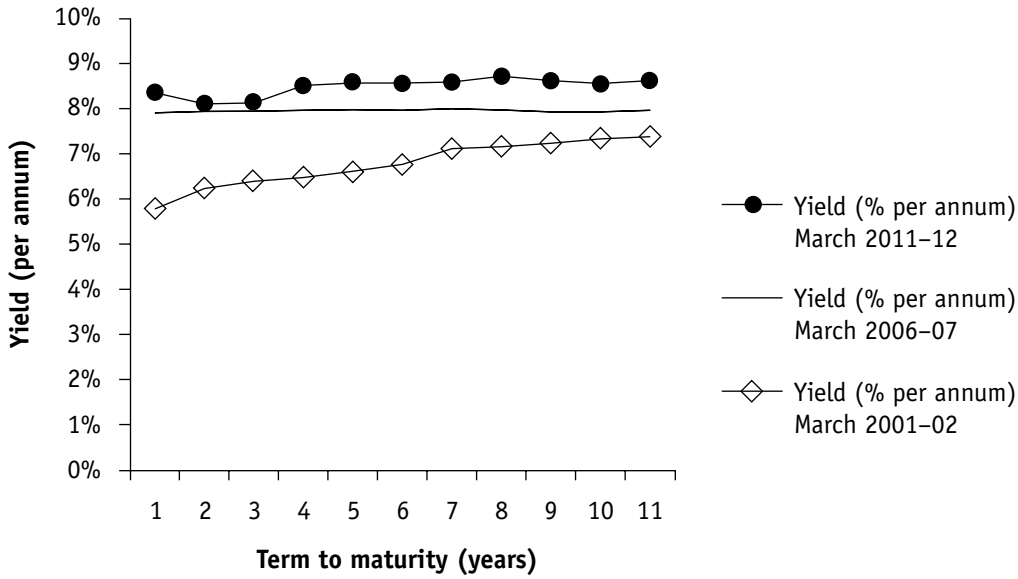


Figure 5.5 The Indian Yield Curve Over Time

Source: Reserve Bank of India. Yield of SGL transactions in government dated securities for various maturities. http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics (downloaded 30 March 2013).

abreast of inflation) but that the slope of the yield curve has changed too. In 2001–02, it was clearly upward sloping, implying that bond-buyers expected inflation to rise over time, and hence would only accept higher yields on long dated bonds. In March 2006–07, however, the yield curve was flat, suggesting that bond-buyers did not expect inflation to rise. As of March 2011–12, the yield curve remained flat, although the negative slope over the first few years suggests that inflationary expectations were negative over the fairly short term, but were flat over the longer term.

Inflation-indexed Bonds in India

The Indian financial sector has broadened and matured over the past two decades, largely as a consequence of financial liberalisation and rapid growth. It now has a growing variety of debt instruments on offer.

Inflation-indexed bonds (IIBs) are popular in developed debt markets, such as in the United Kingdom and the USA. In addition to widening the government securities market and serving as an avenue for raising funds for government, inflation-indexed bonds offer investors a hedge against inflation and enhance the credibility of government's anti-inflation policies.

India has begun experimenting with IIBs.[4] In 1997, the Reserve Bank of India (RBI) issued a 6 per cent 'Capital-indexed Bond 2002', but the market response was poor because only the principal repayment at the time of redemption was indexed to inflation. A new version was designed in 2004 which linked both the principal repayments and coupon payments to the wholesale price index (WPI). However this also was unsuccessful, perhaps because this benchmark was unconvincing and because of the lack of depth in the bond market.[5] When the Finance Minister P. Chidambaram announced in his 2013 budget speech that he would, in consultation with the RBI, be introducing IIBs or securities, the news was unsurprisingly greeted with both excitement and scepticism. By early 2013, it was clear that there was a need for inflation-indexed instruments which would grow the principal in line with inflation (and calculate coupon payments on this rising principal) to counterbalance the strong demand for gold import. Negative real interest rates were discouraging people from buying bonds and so gold imports were ballooning and undermining the balance of payments position.[6] The challenge was to come up with an instrument that would appeal more to savers than gold.

Review Questions and Answers

If a bond is issued with a face value of ₹100,000 and a coupon rate of 15 per cent pays an income of ₹15,000 a year, what is the yield if the bond only sells for ₹75,000?

A bond with a face value of ₹100,000 and a coupon rate of 15 *per cent* pays an income of ₹15,000 a year. If the bond is sold for ₹75,000, then the yield on the bond rises to ₹15,000/₹75,000 = 20 *per cent*.

If a person wishes to make a ₹1,000 loan and earn a real interest rate of 4 per cent, what nominal interest rate will be charged if prices are expected to rise by 10 per cent?

$i_n = i_d + \Delta P_e + (i_d \,.\, \Delta P_e) = 4\% + 10\% + 0.4\% = 14.4\%$.

If prices in fact rise by 6 per cent what is the realised real rate?

$i_r = i_d + \Delta P_a + (i_n \,.\, \Delta P_a) = 14.4\% - 6\% - 0.24\% = 8.16\%$,

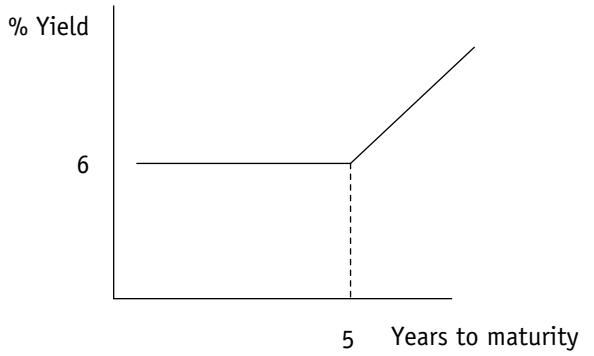
where ΔP_a = actual price rise; i_r = realised real rate.

[4] See 'A technical paper on Inflation Indexed Bonds.' http://rbi.org.in/scripts/PublicationReportDetails.aspx?ID=598. Accessed on 9 December 2010.

[5] Ranu, A. 2013. 'Inflation Indexed Bonds, please'. *The Hindu Business Line*. http://www.thehindubusinessline.com/features/investment-world/inflation-indexed-bonds-please/article2744860.ece

[6] Adhikari, A. 2013. 'Will Inflation-indexed Bonds Check Rising Gold Demand?' *Business Today*. http://businesstoday.intoday.in/story/union-budget-2013-14-inflation-indexed-bond-gold-import/1/192935.html. Accessed on 28 February 2013.

What does the following yield curve suggest?



According to the expectations theory of the yield curve, this suggests that market participants expect yields to stay the same for 5 years and then rise. A liquidity premium could be flattening the curve which might otherwise be slightly downward sloping for bonds with maturities of less than 5 years.

CHAPTER 6

The *IS–LM* Model

We now turn to a standard rite of passage for economics students: the *IS–LM* model. This model has two sectors, namely the goods market and the money market. It shows how dynamics in the financial sector affect the level of real economic activity.

As noted in Chapter 4, the *IS–LM* framework was actually developed by Hicks in 1937[1] as an interpretation of Keynes in an article published several months after the *General Theory*. Although many economists who considered themselves 'Keynesians' were uncomfortable with it, Keynes himself wrote and told Hicks that he had 'next to nothing to say by the way of criticism'.[2] Modern-day new Keynesians and post Keynesians consider Keynes's judgement to have been rather rash in this instance. They argue that the *IS–LM* model served to obscure and trivialise many of Keynes's revolutionary ideas and that Keynes was too quick to welcome the *IS–LM* model because it had Keynesian policy implications.

Skidelsky on the *IS–LM* Framework

'The *IS–LM* diagram, first drawn by John Hicks in 1936 is the *General Theory* as it has been taught to economics students ever since: 384 pages of argument whittled down to four equations and two curves. Hicks, Harrod, Meade and Hansen in America, the leading constructors of "*IS–LM*" Keynesianism, had a clear motive: to reconcile Keynesians and non-Keynesians so that the ground for policy could be quickly cleared. These early theoretical models incorporated features which were not at all evident in the magnum opus, but which conformed more closely to orthodox theory. The constructors of the model also thought they were improving the original building. Joan Robinson, no slouch with insults, would later label the result "bastard Keynesianism" but Keynes was the bastard's father.'[3]

Source: Authors.

[1] See, Hicks, J. 1937. 'Mr Keynes and the Classics.' *Econometrica* (5) 2: 147–59.
Hicks, J. 1981. 'IS–LM: An Explanation.' *Journal of Post-Keynesian Economics* 3 (2): 139–54.

[2] Quoted in Hillier, B. 1991. *The Macroeconomic Debate. Models of the Closed and Open Economy*. p. 42. Oxford: Blackwell.

[3] Skidelsky, R. 1992. *John Maynard Keynes: The Economist as Saviour*, *1920–1937*. p. 538. London: Macmillan.

Nevertheless, the *IS–LM* model is widely interpreted as being Keynesian in character, particularly as regards the way in which consumption, savings, investment and the demand for money are modelled.

The Value of the *IS–LM* Model

James Tobin: 'If you're faced with a problem of interpretation of the economy—policy or events—probably the most useful first thing you can do is to try to see how to look at it in these (*IS–LM*) terms. ... I don't say it's enough. I doubt if Keynes or Hicks would have thought it enough. But it's a start and lots of times it's exactly right.'[4]

Stanley Fischer: 'It [the *IS–LM* model] is useful for two reasons. One as a historical device and two it's still the basic model that people use—in fact I use it—in understanding the economy. We teach our incoming graduate students the *IS–LM* model and I don't think that there is a better model for getting the intuition of the short-run adjustment of the economy right.'[5]

Source: Authors.

The Role of Investment

The link between the financial sector (the money market) and the real economy (the goods market) is provided in the *IS–LM* model through a relationship between planned (i.e., *ex ante*) investment and the interest rate. Remember that such investment refers to investment in productive assets. As you will recall from Chapter 4, investment is an exogenous variable in the simple Keynesian model of income determination. Here, investment is modelled as a function of the interest rate and hence is endogenously determined within the model. Investment is conventionally modelled as an inverse function of the nominal rate of interest (i) (see Chapter 5), and it is usually presented as an investment schedule depicted in Figure 6.1.

The investment schedule is drawn up for a given (constant) state of expectations and for a given price level of capital goods. When these change, the rate at which investment projects are discounted will change, and hence, a new investment schedule will have to be derived. Thus, changes in expected profits result in a shift of the investment schedule.

As investment is a negative function of the interest rate, a linear investment function can be written as follows:

$$I = j - di, \tag{6.1}$$

[4] James Tobin, interviewed in Snowdon, B., H. Vane and P. Wynarczyk. 1994. *A Modern Guide to Macroeconomics: An Introduction to Competing Schools of Thought*. p. 129. Aldershot: Edward Elgar.

[5] Stanley Fischer quoted in *ibid.*, p. 35.

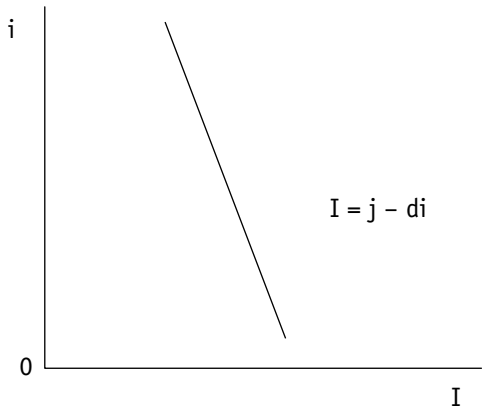


Figure 6.1 The Investment Schedule

Source: Authors.

where j = autonomous investment; d = interest sensitivity of investment (the slope of the investment schedule).

Note that the investment function in Equation 6.1 should really be drawn with investment on the vertical axis and the interest rate on the horizontal axis. It is a matter of convention in economics that investment schedule is drawn the other way round (as in Figure 6.1).[6] This implies that as the interest sensitivity of investment (d) rises, the investment schedule becomes flatter.

The *IS* Curve with No Government Sector

This section derives the most basic *IS* curve by assuming a closed economy (i.e., no imports or exports) and no government sector. We start off with an examination of the goods market equations, such as the simple Keynesian cross framework attempt to model the real sector of the economy. Prices are assumed as constant, and output adjusts when aggregate demand differs from supply.

Equilibrium in the goods market: The IS *curve*

The goods market equations start off with two definitional equations and an equilibrium condition:

$$E = C + I, \tag{6.2}$$
$$y = C + S, \tag{6.3}$$
$$y = E, \tag{6.4}$$

[6] In this regard, the investment schedule is like the demand curve that depicts the dependent variable (quantity) on the horizontal axis and the independent variable (price) on the vertical axis. This is one of the many oddities in the discipline of economics.

where E = aggregate demand (i.e., expenditure); C = consumption; I = investment; S = savings and y = real income.

Equation 6.2 sets aggregate demand equal to consumption and investment spending. Equation 6.3 shows that the national income or output can be allocated in one of the following two ways: either households dispose off their income through consumption or they save it. Equation 6.4 is the equilibrium condition which states that for there to be no pressure on output change (i.e., for the economy to be in equilibrium) it must be the case that aggregate demand (spending) is exactly equal to output.

As we observed in Chapter 4, such a state of equilibrium implies that aggregate demand (i.e., actual expenditure) equals expected demand. Moreover, firms will experience unplanned changes in inventories until aggregate demand comes in line with expected demand, which in turn cause them to adjust their output decisions till aggregate demand equals expected demand. At this point, aggregate demand will equal output.

By substituting Equations 6.2 and 6.3 into Equation 6.4, we get the following equation:

$$\begin{aligned} C + S &= C + I, \\ S &= I. \end{aligned} \tag{6.5}$$

Equation 6.5 shows that the economy will be in equilibrium when savings equals planned investment. Note that the equation deals with investment *ex ante,* that is, planned investment, and also, it is not to confuse with the national income accounting identity, which measures investment *ex post* (i.e., includes unplanned inventory investment). The national accounting savings equals *ex post* investment identity, which is not an indicator of equilibrium. Unplanned changes in inventories spark off changes in expectations about demand and hence changes in output will be realised. The economy will thus only come to rest, when planned (*ex ante*) investment and savings are brought into line. This is how Equation 6.5 should be understood.

Planned investment and savings

A central Keynesian proposition is that there is no necessary reason why savings of households should conveniently be equal to planned investment at any one time. Investment and savings decisions can be made by different people for different reasons, and there is no inherent reason in the Keynesian framework why the amount investors choose to invest (given their expectations about future demand) should always exactly equal the amount that people choose to save. In the neoclassical model, S and C are determined at the same time by the interest rate (following Irving Fisher's theory that people allocate their income to current consumption or future consumption—achieved through savings—depending on the interest rate). In the Keynesian model (where S and C are functions of income), planned investment and savings are brought into line by subsequent changes in output.

For example, if savers decide to keep some of their surplus cash rather than lend it to firms to finance their planned investment, this implies that aggregate demand will be insufficient to absorb available output. This can be represented as follows:

$$S > I,$$
$$C + S > I + C,$$
$$y > E.$$

This is clearly a disequilibrium position. If aggregate demand (i.e., spending) is too low to absorb available output, then stocks will start to accumulate on shop shelves. In other words, firms will experience unplanned additions to their inventories. This indicates that producers expectations towards demand were too high. As was the case in the simple model of income determination, this sends a signal to producers to reduce their expectations and cut back on output and employment. Output (and hence real income) will thus fall, bringing down C and S in the process, until it is brought into line with aggregate demand. At that point, savings will have fallen to a point where $S = I$.

If, however, $S < I$, then aggregate demand will be greater than the supply of available output. Stocks will start falling at an unexpectedly rapid rate. This indicates to producers that their expectations about demand were too low. They adjust their expectations accordingly and increase employment and output. As output (and income) rises, so too will consumption and savings until $S = I$. At that point, the economy will come to rest, that is, be in equilibrium.

Note once again the important role of expectations in the analysis. The economy moves to a position of equilibrium through a process of output adjustment which is driven by firms adjusting their expectations, and subsequently also their output decisions, in the light of unexpected changes in inventories.

Deriving the IS *curve*

So far, we have ascertained that for the goods market to be in equilibrium, the case must be that planned investment equals savings. This is stated in Equation 6.5.

$$S = I. \tag{6.5}$$

Investment is no longer seen as exogenous (as in the simple Keynesian model of income determination) but is rather modelled as a negative linear function of the interest rate:

$$I = j - di. \tag{6.1}$$

As regards the savings function, this can be derived from the familiar Keynesian consumption function through a process of substitution and re-organisation of terms.

$$
\begin{aligned}
C &= a + by, \\
y &= C + S, \\
y &= a + by + S, \\
S &= -a + (1 - b)y.
\end{aligned} \tag{6.6}
$$

Equation 6.6, the savings function, shows that savings is a positive function of income. The slope of the savings function, that is, the marginal propensity to save, is equal to 1 minus the marginal propensity to consume. For example, if the marginal propensity to consume was 80 per cent, then the marginal propensity to save would be 20 per cent. The intercept of savings function is simply the negative of autonomous consumption. In other words, if an economy consumes amount '*a*' while experiencing zero income, then it must be the case that the economy has run down on savings to do this. The intercept of the savings function is thus *–a*. The relationship between savings and consumption function is depicted in Figure 6.2. If the marginal propensity to consume (*b*) rises, then the slope of the consumption function will become steeper, whereas the slope of the savings function will become flatter.

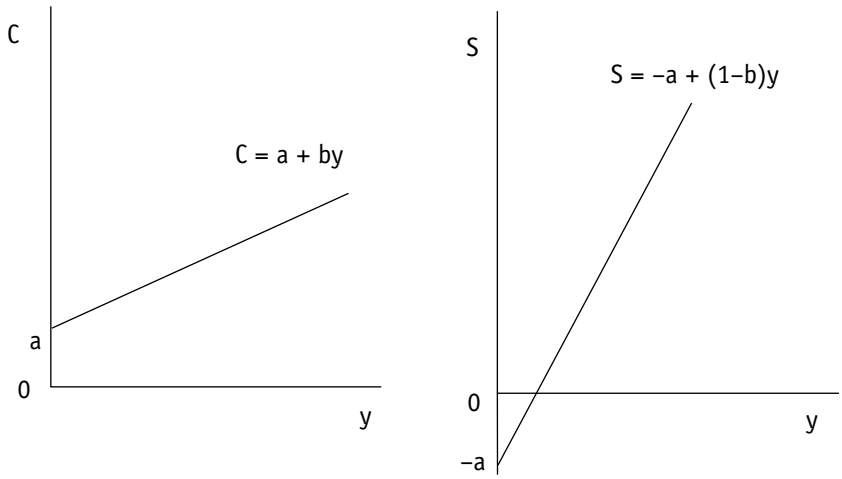


Figure 6.2 The Consumption and Savings Functions

Source: Authors.

Self-test

- What happens to the slope of the consumption function and the slope of the savings function when the marginal propensity to consume increases?
- Assume autonomous consumption spending increases. Draw the new consumption and savings functions.

Source: Authors.

The Keynesian idea that savings and consumption are positive functions of income (rather than functions of the interest rate) is a radical departure from neoclassical economics. It turns the classical argument for 'thrift' (i.e., economies need to save before they can grow) on its head. In Keynes's vision, it is consumption, not savings, which drives output. Consumption boosts output, which in turn boosts savings. In terms of this argument, cutting consumption in order to finance growth is wrong-headed, as consumption is the mainspring of growth. As Keynes puts it:

> It has been usual to think of the accumulated wealth of the world as having been painfully built-up out of the voluntary abstinence of individuals from the immediate enjoyment of consumption which we call thrift. But it should be obvious that mere abstinence is not enough by itself to build cities or drain fens. ... It is enterprise which builds and improves the world's possessions. ... If enterprise is afoot, wealth accumulates whatever may be happening to thrift; and if enterprise is asleep, wealth decays whatever thrift may be doing.[7]

Substituting Equations 6.1 and 6.6 into Equation 6.5, we get the following equation:

$$S = I$$

$$-a + (1 - b)y = j - di$$

Solving for y gives us

$$y = (a + j - di)/1 - b. \tag{6.7}$$

This can be rewritten as follows:

$$y = (a + j - di)\ (1/1 - b).$$

Note the presence of the familiar Keynesian multiplier $(1/1 - b)$. Thus, a change in $a + j - di$ will have a multiplied impact on y.

Solving for i gives us

$$i = (j + a - (1 - b)y)/d. \tag{6.8}$$

Equations 6.7 and 6.8 are equations for the *IS* curve, that is, investment equals the savings curve. The *IS* curve provides us with various combinations of y and i which will make investment and savings equal and hence will ensure that the goods market is in equilibrium. Given that investment is a negative function of the interest rate, whereas savings is a positive function of output, we would expect y and i to have a negative relationship in equilibrium. If interest rates were low, and hence investment was high, the *IS* curve tells us that y would have to be high so as to generate sufficient savings to match the high levels of investment. If, on the other hand, interest rates were high (and hence investment was low), y would have to be low so as to ensure equilibrium between low

[7] Quoted in Skidelsky, *John Maynard Keynes*, p. 318.

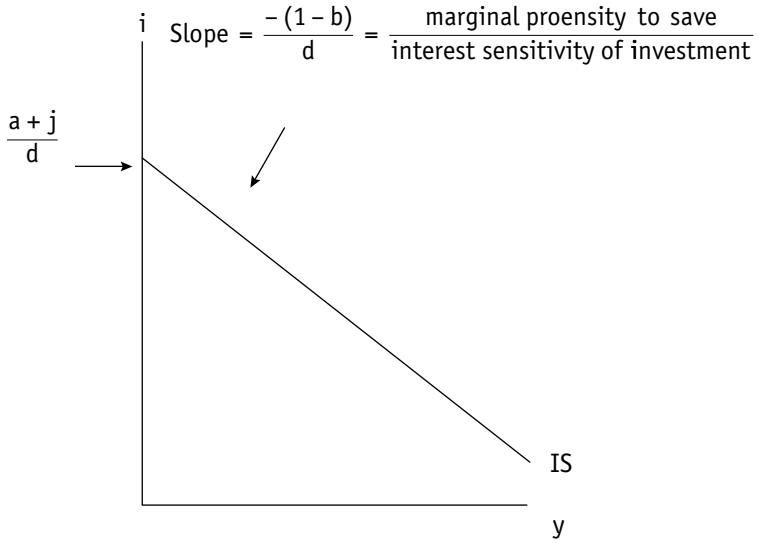


Figure 6.3 The *IS* Curve

Source: Authors.

savings and low investment. This can be seen more easily in the diagrammatic derivation of the *IS* curve.

Equation 6.8 can be rewritten as:

$$i = (a + j)/d - ((1 - b)y)/d.$$

The *IS* curve has an intercept of $(a + j)/d$ and a slope of $-(1 - b)/d$ as shown in Figure 6.3. The term for the slope tells us that the *IS* curve will be more elastic; the smaller the marginal propensity to save $(1 - b)$, the larger the interest sensitivity of investment (d). In other words, the flatter the slopes of the investment schedule[8] and the savings function, the more elastic will be the *IS* curve.

Deriving the simple IS *curve geometrically*

The equilibrium condition $I = S$ is represented by a 45° line between the I and S axis in the north-west quadrant of Figure 6.4.

The savings function, $S = -a + (1 - b)y$ (Equation 6.6), is depicted in the north-east quadrant. The investment schedule occupies the south-west quadrant.

[8] The slope of the investment function $I = j - di$ is d. As d rises, investment becomes more sensitive to the interest rate, and hence the slope of the function becomes steeper. Note that it is the investment schedule: $i = j/d - 1/d$. I that appears in the geometric derivation of the *IS* curve. Thus, as d rises, and hence, investment becomes more sensitive to changes in the interest rate, the investment schedule becomes flatter.

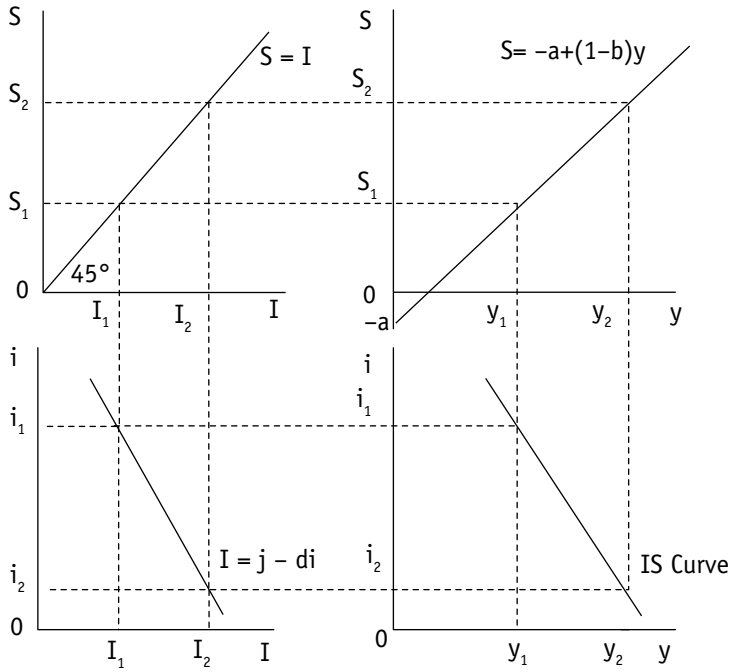


Figure 6.4 Deriving the *IS* Curve

Source: Authors.

In order to derive the *IS* curve, we need to ascertain two points along it.[9] Given that the *IS* curve represents combinations of i and y for which the goods market is in equilibrium, we need to generate two combinations of i and y for which $I = S$ (remember that the equilibrium condition for the goods market is such that $I = S$).

Start off by picking a low level of savings, S_1. To see what level of output would generate S_1, trace the corresponding value of y from the savings function. This tells us that for S_1 to be possible, it must be the case that y is y_1. Given that we are searching for the combinations of i and y for which the goods market is in equilibrium, it is now necessary to ascertain the corresponding equilibrium investment level for S_1. The equilibrium condition in the north-west quadrant shows that this will be I_1. To find out what rate of interest is associated with I_1, turn to the investment schedule which indicates that the interest rate would have to be i_1 in order to produce an investment level of I_1. This provides the first point on the *IS* curve, namely y_1,i_1.

To get a second point on the *IS* curve, pick a higher level of savings, S_2. The savings function indicates that the associated level of output is y_2. To ascertain the corresponding

[9] Note that we only need to find two points because we have assumed that the investment function is, like the savings function, linear in character.

equilibrium investment level for S_2, read this off from the equilibrium condition which gives I_2. The corresponding rate of interest (read off from the investment schedule) is i_2. This provides the second point on the *IS* curve, namely y_2,i_2.

What we have done here diagrammatically is the equivalent of substituting the investment function and the savings function into the equilibrium condition in order to derive the *IS* curve in the south-east quadrant.

The *IS* curve shifts (i.e., a new *IS* curve will be derived) when constants and exogenous variables change in the model. In the simple *IS* curve (i.e., excluding government), these are $-a$ (the negative of autonomous consumption); autonomous investment (j) the marginal propensity to consume (b); the sensitivity of investment to the interest rate (d) and finally, exogenous factors such as business confidence and expectations (which affect the position of the investment schedule).

Shifts of the simple IS *curve*

For example, if producers suddenly became more confident about earning future profits, this would result in an outward shift of the investment schedule.

As shown in Figure 6.5, this results in a similar outward shift of *IS* from IS_1 to IS_2. The exogenous increase in investment implies that for the goods market to be in equilibrium, more output is required (at all rates of interest) to bring *S* in line with *I*. The outward

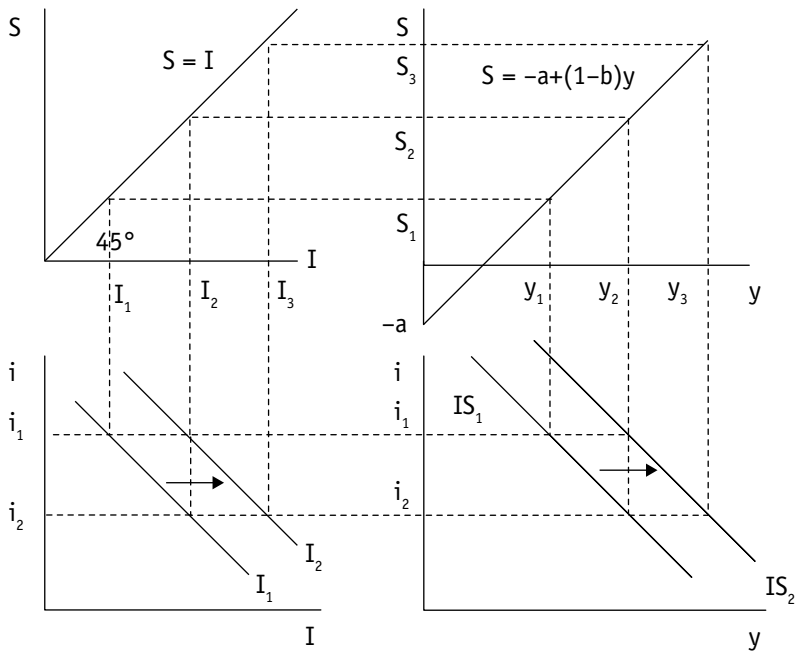


Figure 6.5 An Outward Shift in Investment and the *IS* Curve

Source: Authors.

shift of the investment schedule indicates that more investment will be forthcoming at all rates of interest. Interest rate i_1, which was associated with a level of investment I_1, is now associated with I_2. For there to be sufficient savings to match that level of investment, output must be y_2 in order to generate S_2 of savings. The first point on the new *IS* curve is thus y_2,i_1. Interest rate i_2 is now associated with a higher level of investment, I_3. For there to be goods market equilibrium, output must be y_3 and savings S_3. The second point on the IS_2 curve is thus y_3,i_2.

With the aid of Figure 6.6, consider what happens to the *IS* curve if the marginal propensity to save increases. The effect of an increase in the marginal propensity to save will be manifested in an increase in the slope of the savings function. This indicates that more is saved at every level of output. Note that as autonomous consumption has not changed, the intercept ($-a$) stays the same. The function simply swings up to the left.

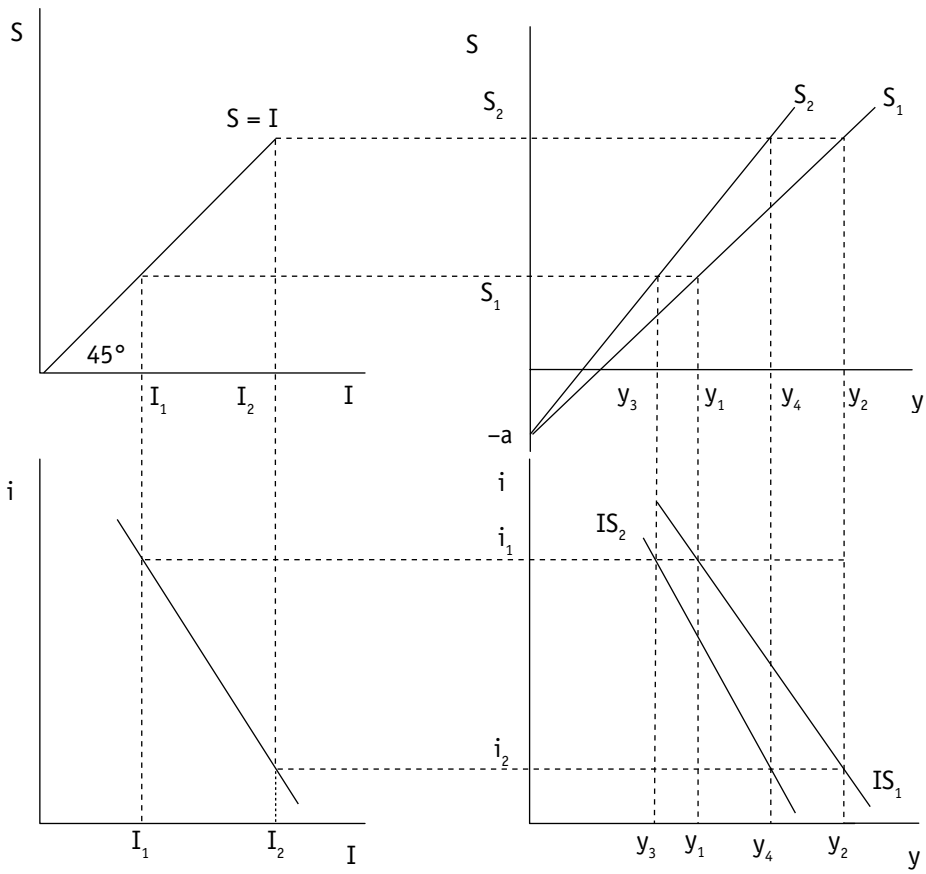


Figure 6.6 The Effect of an Increase in the Marginal Propensity to Save

Source: Authors.

Thus, for S_1 of savings to be generated in order to equate I_1, only y_3 of output is now required rather than y_1. The first point on the new *IS* curve is y_3,i_1. Likewise, only y_4 of output is now required to ensure sufficient savings to equate with I_2. The second point on the new *IS* curve is thus y_4,i_2. As can be seen from the diagram, the *IS* curve has shifted to the left. It has also, like the savings function, become less elastic (i.e., steeper).

Self-test. Show by means of a four-quadrant diagram what happens to the *IS* curve when:

- the marginal propensity to consume rises;
- autonomous consumption spending falls;
- investment becomes more sensitive to the interest rate (i.e., *d* rises).

Source: Authors.

The IS *curve including government*

In order to use the *IS–LM* model as a means of analysing fiscal and monetary policies, it is necessary to derive the *IS* curve for a model that includes a government sector.

Aggregate demand becomes

$$E = C + I + G, \tag{6.9}$$

where G = government spending (assumed to be exogenous).

A model that brings in government spending, usually also brings in taxation. We bring in taxation here by modelling consumption and saving as functions of disposable income, that is, income after tax has been deducted.

$$y_d = y - T, \tag{6.10}$$
$$y = y_d + T, \tag{6.11}$$
$$T = ty, \tag{6.12}$$

where y_d = disposable income; T = tax revenues; t = the (proportional) tax rate, $1 > t > 0$.

Disposable income is now divided up between C and S:

$$y_d = y - T = C + S. \tag{6.13}$$

Therefore,

$$y = C + S + T. \tag{6.14}$$

Goods market equilibrium still requires that aggregate demand equals output:

$$y = E. \tag{6.4}$$

Substituting Equations 6.9 and 6.14 into Equation 6.4, and removing C from both sides of the equation gives us

$$S + T = I + G. \tag{6.15}$$

Note that because S and C are now functions of disposable income, the savings function is slightly different from the earlier version (Equation 6.6).

$$S = -a + (1 - b)y_d. \tag{6.16}$$

Substituting Equations 6.10 and 6.12 into Equation 6.16, we get

$$\begin{aligned} S &= -a + (1 - b)(y - ty), \\ S &= -a + (1 - b)(1 - t)y. \end{aligned} \tag{6.17}$$

The savings plus tax function is thus

$$\begin{aligned} S + T &= -a + (1 - b)(1 - t)y + ty, \\ S + T &= -a + y - ty - by + bty + ty, \\ S + T &= -a + (1 - b + bt)y. \end{aligned} \tag{6.18}$$

Substituting Equations 6.18 (the savings plus tax function) and 6.1 (the investment function) into Equation 6.15 (the equilibrium condition), we arrive at the following equations:

$$\begin{aligned} -a + (1 - b + bt)y &= j - di + G, \\ y(1 - b + bt) &= j - di + G + a. \end{aligned}$$

Solving for i

$$\begin{aligned} di &= j + G + a - y(1 - b + bt), \\ i &= (j + G + a)/d - ((1 - b + bt)y)/d. \end{aligned} \tag{6.19}$$

This tells us that the *IS* curve will be steeper: the smaller the interest sensitivity of investment to the interest rate (d), the higher the tax rate (t), the smaller the marginal propensity to consume (b), and the higher the marginal propensity to save ($1 - b$).

Solving for y

$$y = (j - di + G + a)/(1 - b + bt). \tag{6.20}$$

The new multiplier is

$$1/(1 - b + bt).$$

Equations 6.19 and 6.20 are the new equations for the *IS* curve when the government sector is included. Note that the multiplier with taxes is smaller than the multiplier derived from the model excluding a government sector.

For example, if $b = 0.2$ and $t = 0.3$, then the multiplier in the model excluding government is

$$1/(1 - b) = 1/(1 - 0.2) = 1/0.8,$$

whereas the multiplier in the model including government is

$$1/(1 - b + bt) = 1/(0{,}8 + (0.2)(0.3)) = 1/0.86.$$

The Balanced Budget Multiplier

As noted previously, taxes lower the multiplier. However, even where government spending is matched exactly by an increase in taxation, output will still rise as a result of the government spending. The multiplier effect of a balanced budget is small but still positive. This can be illustrated by means of the following example:

Let $y = 100$, $t = 0.1$; $b = 0.2$; $G = 10$; $a = 6$ and $I = 66$
$y = (I + G + a)/(1 - b + bt) = (66 + 10 + 6)/(0.8 + 0.02) = 82/0.82 = 100.$

Now assume that G rises to 20, and the tax rate rises to 20 per cent in order to finance this expenditure:

$$y = (66 + 20 + 6)/(0.8 + 0.04) = 92/0.84 = 109.5.$$

In other words, y rises by 9.5.

If, however, the increase in government spending had been bond-financed rather than tax-financed, the increase in output would have been greater:

$$y = (66 + 20 + 6)/0.82 = 92/0.82 = 112.2.$$

There are those, however, who believe that this distinction between tax-financed and bond-financed government expenditure is not as useful from a policy point of view as this simple analysis indicates. According to the Ricardian debt equivalence theorem,[10] the burden of government expenditure on the private sector is equivalent whether it is loan-financed or tax-financed because taxes will have to be raised in the future in order to pay back loans raised now. In terms of this argument, the private sector will react rationally to bond-financed government spending by increasing savings so as to be able to pay the increased taxes which are expected to follow later. This will cut into the multiplier effect of the loan-financed government expenditure, even to the point of rendering it the same as the balanced budget multiplier—or even reducing it to zero.

This claim, however, hinges on people worrying about future tax payments, even when these are to be paid back by a different generation. The extreme argument assumes

[10] See, Buchanan, J. 1976. 'Barro on the Ricardian Equivalence Theorem.' *Journal of Political Economy* 84 (2): 337–42.

that parents react to bond-financed expansion by saving now in order to help their (born and unborn) children pay future tax increases. While one should not underestimate parental love, this assumption probably pushes parental responsibility a little too far.[11]

Deriving the *IS* Curve (Including Government) Geometrically

To derive the *IS* curve (including government) geometrically, it is necessary to go through the same diagrammatic procedure as we used in the simple *IS* curve derivation. However, there are more variables at this time. As can be seen in Figure 6.7, the north-west

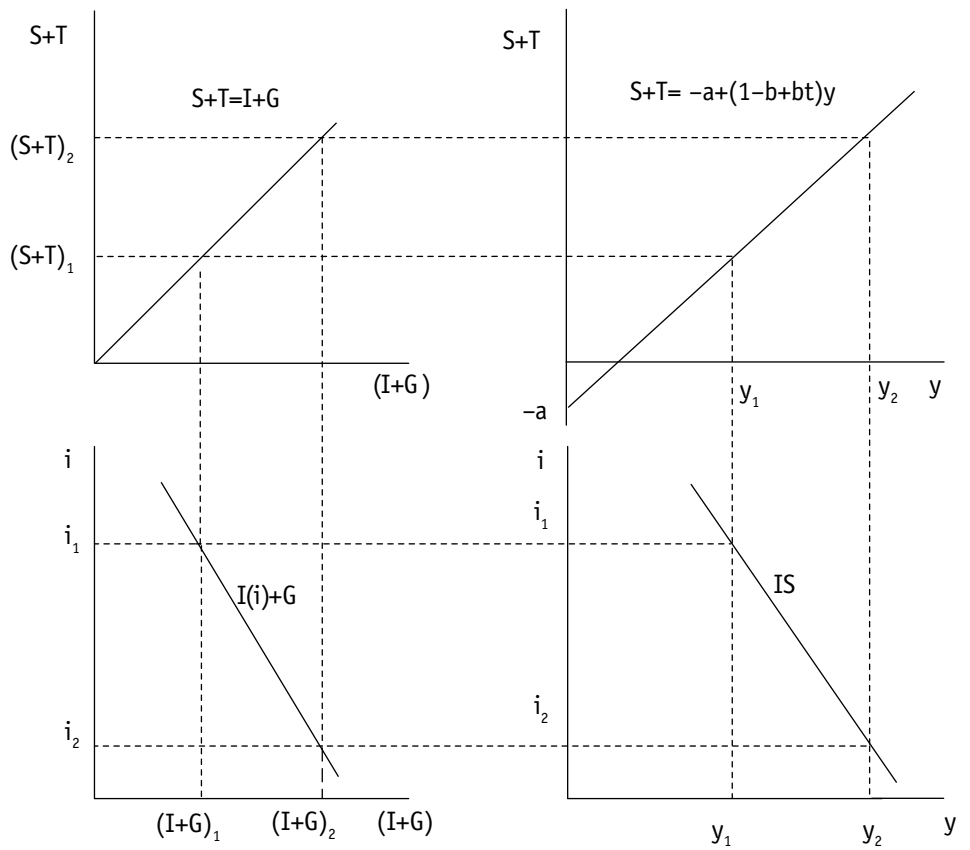


Figure 6.7 Deriving the *IS* Curve with a Government Sector

Source: Authors.

[11] See, Feldstein, M. 1982. 'Government Deficits and Aggregate Demand.' *Journal of Monetary Economics* 9 (1): 1–20.

Barro, R. 1989. 'The Ricardian Approach to Budget Deficits.' *Journal of Economic Perspectives* 3 (2): 37–54.

quadrant, that is, the equilibrium condition, now has $S + T$ and $I + G$ as the ordinate and abscissa, respectively. This reflects the new equilibrium condition of $S + T = I + G$ for the goods market in a model including the government sector.

The north-east quadrant consists of new savings plus tax function. Note that the intercept remains at $-a$ (i.e., the negative of the intercept of the consumption function). The slope of the $S + T$ line is determined by the marginal propensity to save $(1 - b)$ and the tax rate (t) multiplied by the marginal propensity to consume (b). The slope of the $S + T$ function will be steeper than the original S function by the tax rate times the marginal propensity to consume. A rise in the tax rate will thus cause the $S + T$ function to swing up to the left. Figure 6.8 shows how the $S + T$ function swings up from the intercept as a result of the tax rate rising from t_1 to t_2.

The south-west quadrant consists of the $I + G$ schedule (reproduced in Figure 6.9). Given that G is exogenous, that is, determined outside the model, the downward slope of the $I + G$ function is determined entirely by the negative relationship between investment and the interest rate. The amount of government spending is simply added to investment.

As shown in Figure 6.9, when government spending rises, this will be manifested in an outward (parallel) shift of the $I + G$ function (the other factor which would cause an outward shift in the $I + G$ function is of course a positive change in expectations and business confidence).

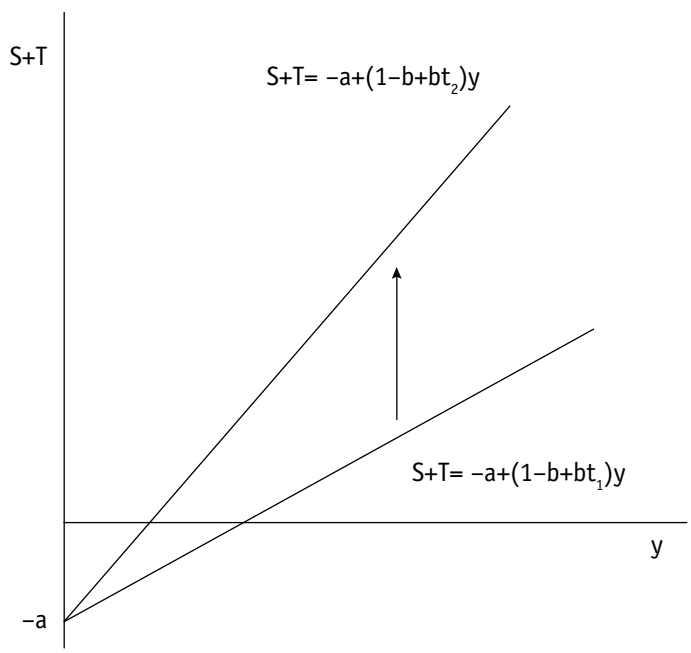


Figure 6.8 A Rise in the Tax Rate

Source: Authors.

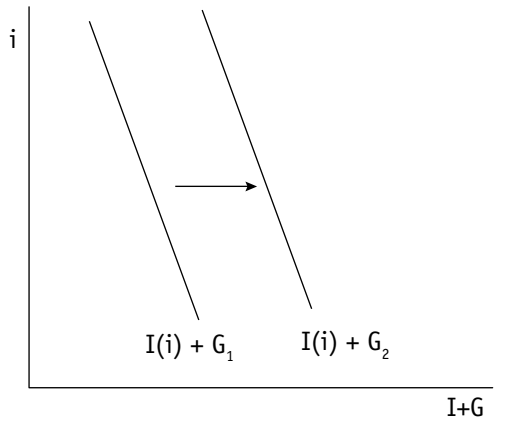


Figure 6.9 An Increase in Government Spending

Source: Authors.

Shifts in the IS *curve*

Shifts in the *IS* curve will be caused by changes in constants and exogenous variables. These are as follows: $-a$ (the counterpart in the savings function of autonomous consumption); autonomous investment (j); the marginal propensity to consume (b); government spending (G); the tax rate (t); the interest sensitivity of investment (d) and exogenous factors (such as changes in investor confidence).

Self-test

Make sure you can shift the *IS* curve in response to any positive or negative change in the above-mentioned constants and exogenous variables.

Source: Authors.

Positions on and off the IS *curve*

By definition, all points along the *IS* curve are combinations of i and y for which the goods market is in equilibrium. In order to grasp this point completely, it is useful to consider points on and off the *IS* curve.

Consider point X in the south-east quadrant of Figure 6.10. Point X consists of coordinates (y_2, i_1). This is not a point of equilibrium for the goods market because the relatively high output level of y_2 will produce a relatively high level of savings plus tax, i.e., $(S + T)_2$, whereas the relatively high interest rate of i_1 will induce only $(I + G)_1$ of investment plus government spending. In other words, the components of aggregate demand

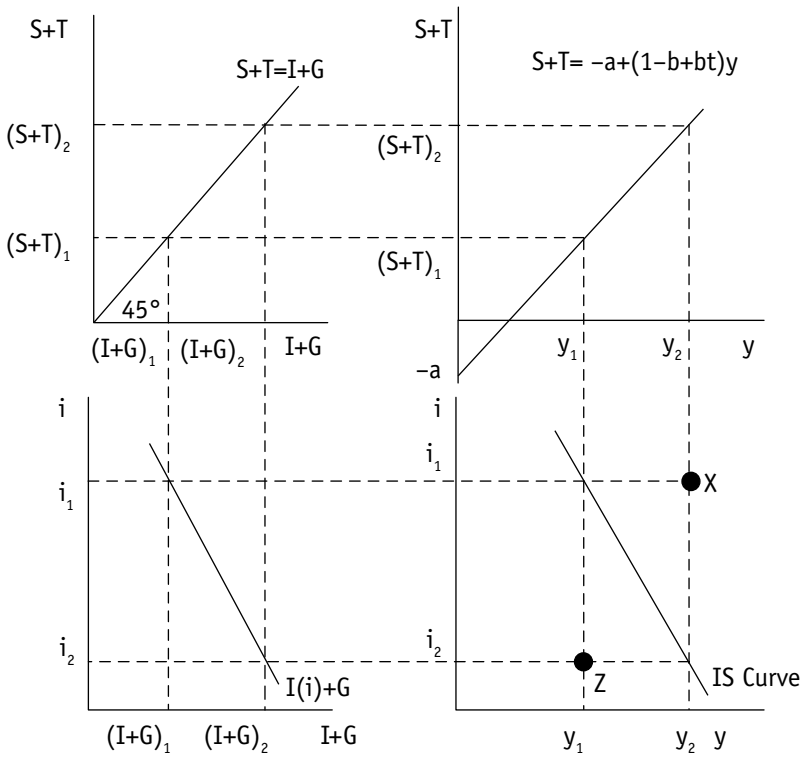


Figure 6.10 Positions On and Off the *IS* Curve

Source: Authors.

(i.e., government spending plus planned investment spending) will be less than available savings plus taxation. Put differently, injections of demand will be less than withdrawals.

This implies that aggregate demand will be insufficient to absorb the amount of output produced (y_2). The goods market is thus characterised by a state of *excess supply*. Unsold stocks will start accumulating. This, in turn, will send a signal to producers to cut back on output. Assuming that the interest rate remains unchanged at i_1, output will have to fall to y_1 before equilibrium is established at (y_1,i_1), which is a point on the *IS* curve. *All points to the right of the* IS *curve are points of excess supply*.

Now consider point *Z,* which consists of co-ordinates (y_1,i_2). This is not a point of equilibrium for the goods market because a relatively low output level of y_1 will produce a low savings plus tax level of $(S + T)_1$, whereas a relatively low interest rate like i_2 will induce a relatively high level $(I + G)_2$ of planned investment and government spending. In other words, injections into the system will be greater than withdrawals.

This indicates that producers underestimated the demand for their products and produced too little. The goods market is characterised by a state of *excess demand*. As stocks start to run down in response to the stronger than expected aggregate demand, producers react by generating more output. Assuming that interest rates remain unchanged, output

will rise to y_2, at which point equilibrium will be established at (y_2,i_2). *All points to the left of the* IS *curve are positions of excess demand.*

Movements along the IS *curve*

The *IS* curve slopes downwards because as interest rates rise (e.g., from i_2 to i_1 in Figure 6.10), investment will fall. The fall in investment reduces demand. As demand falls, stocks start to rise, and this sends a signal to producers to cut output. Output will fall until goods market equilibrium is restored at y_1, i_1.

The Financial Sector (The *LM* Curve)

As noted earlier in the chapter, the link between the financial sector and the real sector is given by the relationship between investment and interest rate: changes in the interest rate affect investment, which in turn affects demand in the economy. The *LM* curve provides a model of how equilibrium interest rates are determined in the financial sector.

A central assumption in this model is that *bonds are the only interest-bearing asset*. If a person wants to save and obtain a rate of return on a financial asset, he or she is forced to buy a bond. The yield on the bond is thus the only interest rate available in the economy. There is no stock market in this model, and there are no interest-bearing bank accounts.

Thus, assuming that bonds are the only financial asset, then if the bonds had a face value of ₹100 and a coupon rate of 10 per cent, the rate of interest ruling in the market would be the yield on those bonds, that is, 10 per cent. If the demand for bonds fell, and hence the bonds with a face value of ₹100 could only be sold for ₹80, then the yield will rise to ₹10/80 = 12.5 per cent. This implies that if the price of bonds falls, then the interest rate (which in this model is the same thing as the yield on bonds) rises.

Unlike bonds, money has a zero rate of return in this model. Bank accounts only provide cheque facilities and pay no interest on deposits. Money is simply a commodity which is generally accepted as a medium of exchange and store of value. It consists of notes and coin in circulation plus non-interest-bearing bank deposits that are transferable by cheque.

The advantage of holding money is that it is a perfectly liquid asset. It can be exchanged for some nominal amount without incurring transaction costs. Bonds, by contrast, are less liquid. It takes time to sell them, transaction costs are usually involved, and, because the price could fall, there is risk involved in selling (i.e., liquidating) bonds.

These observations form the basis of Keynes's *liquidity preference theory*. This theory is rooted in the notion that there are three distinct motivations for holding money (rather than investing in bonds):

- transactions demand (to finance purchases);
- speculative demand (which will be high if people expect bond prices to fall, and hence they would rather hold cash now and buy bonds later) and
- precautionary demand (to finance unexpected needs).

Money demanded for transaction purposes is held in the form of 'active balances'. Money kept for speculative or precautionary motives is said to sit in 'idle balances'.

The focus on liquidity is central to Keynes's thinking. Because much of the motivation for holding idle balances has to do with uncertainty and imperfect information, Keynes's liquidity preference theory of money brings these aspects into the heart of his theory of employment and income determination. The very fact that people hold idle balances implies that resources are not being fully utilised (and implies that Say's law does not hold). This means that the economy is operating at a less than full-employment level of output.

A pure neoclassical model would, of course, reject such a theory. Given the assumptions about perfect information, there would be no need for any precautionary or speculative cash balances, and no reason for output to stagnate at a less than full-employment level. The fact that the *IS–LM* model is strongly influenced by Keynes's liquidity preference theory, reflects its essentially Keynesian character.

'Keynes's vision, which one can trace back to his youth, has to do with the logic of choice, not under scarcity, but under uncertainty; with its daring corollary that the desire for goods is more easily satisfied than the desire for money, or liquidity.'[12]

Demand for money in the IS–LM *model*

According to the *IS–LM* model, individuals allocate their financial portfolios between bonds and money (held for transactions, precautionary and speculative purposes).

The demand for active real balances (to satisfy the transactions demand for money) is modelled as a positive function of real income as shown in Figure 6.11. If we assume a constant velocity of circulation of money (v), then the total amount of money needed for transactions purposes will equal the total income (y) divided by the number of times that cash changes (v). The slope of the L^1 function is thus $1/v$.

$$L^1 = \text{active balances},$$
$$L^1 = y/v \tag{6.21}$$

where v = velocity of circulation.

The demand for idle balances (i.e., to satisfy the speculative and precautionary demand for money) is modelled as a negative function of the interest rate (i.e., the yield on bonds). Like the investment schedule, the demand for idle balances is conventionally

[12] Skidelsky, *John Maynard Keynes*, p. 539.

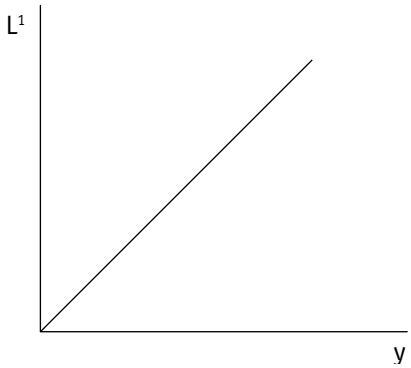


Figure 6.11 The Demand for Active Real Balances

Source: Authors.

depicted as having the dependent variable (L^2) on the horizontal axis and the independent variable (i) on the vertical axis.

We model the demand for idle balances as a negative linear function of the interest rate:

$$L^2 = f - hi, \tag{6.22}$$

where L^2 = idle balances; f = precautionary holdings of cash (unrelated to the interest rate); h = interest elasticity.

Idle balances comprise precautionary holdings of cash, which are not related to changes in the interest rate, and speculative holdings that are sensitive to the interest rate. The speculative demand for money is a negative function of the interest rate (as shown in Figure 6.12) because at high rates of interest, the opportunity cost of holding

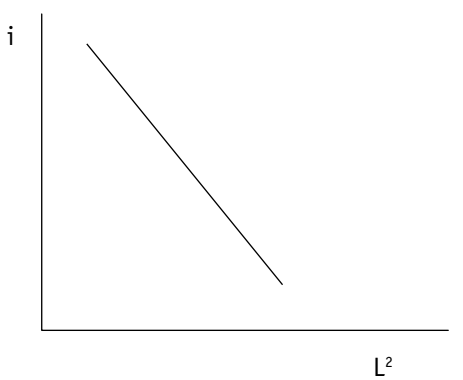


Figure 6.12 The Demand for Idle Balances

Source: Authors.

cash (i.e., the yield) is high. People would be better off holding bonds. At high interest rates, bond prices are low, and there is thus a good chance that bond prices may rise (and thus afford an opportunity for capital gain). Conversely, at low interest rates, the opportunity cost of keeping money in idle balances is low. When people expect interest rates to rise (i.e., the price of bonds to fall), it makes better sense (from a speculative point of view) to maintain a high level of liquidity and purchase bonds later when the prices fall.

One could hypothesise that at a certain low interest rate, people will move all their assets into cash; that is, the demand for idle balances will be perfectly elastic at that interest rate (as shown in Figure 6.13). People expect the price of bonds to fall (and the interest rate to rise) and hence will not wish to enter the bond market at all. If such a 'liquidity trap' prevailed, then the L^2 curve would become perfectly elastic at some low interest rate. A liquidity trap occurs when the nominal interest obtainable on short-term assets other than money is close to zero, and people are indifferent as to whether they hold money or short-term assets. As we will see later, this renders monetary policy ineffective because the reserve bank becomes powerless to reduce interest rates further. Economists have argued that this was the case in Japan when short-term interest rates averaged 0.5 per cent between 1996 and 1999.[13] A similar situation arose in the USA and Europe after 2008 after interest rates fell close to zero.

Total money demand is the sum of desired (or planned) active balances and desired (or planned) idle balances.

$$L = L^1 + L^2,$$
$$L = ky + f - hi. \tag{6.23}$$

(In case, *y*ou were wondering why the letter L is being used to denote money demand, it denotes 'liquidity preference'.)

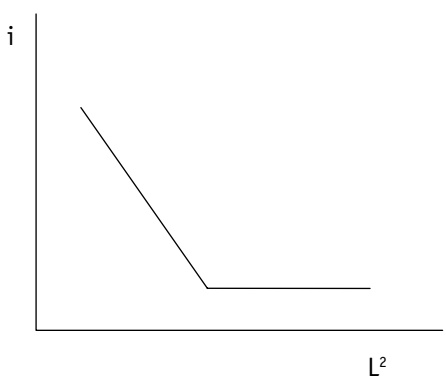


Figure 6.13 The Liquidity Trap

Source: Authors.

[13] Krugman, P., K. Dominquez and K. Rogoff. 1998. 'Its Baaack: Japan's Slump and the Return of the Liquidity Trap.' *Brookings Papers on Economic Activity* (2): 137–205.

Money market equilibrium

The money supply (M), which is given exogenously in this model, is absorbed either in the form of active or idle balances. The money supply has a planned (desired) and an unplanned component. It consists of active balances (to satisfy the transactions demand for money) and planned and unplanned idle balances.

$M = L$ + unplanned (and hence undesired) money balances.

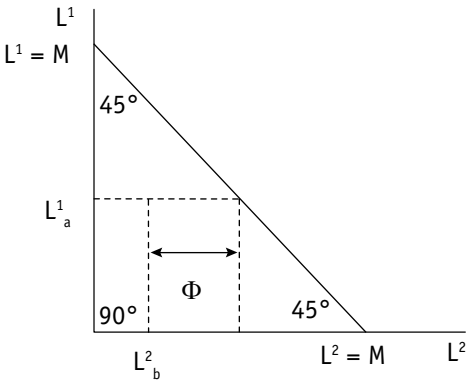


Figure 6.14 The Money Supply

Source: Authors.

As can be seen in Figure 6.14, the money supply (M) can be absorbed entirely in idle balances—in which case it will be represented by position $L^2 = M$ on the horizontal axis—or absorbed entirely in active balances, in which case it will be represented by position $L^1 = M$ on the vertical axis. Alternatively, the money supply can be absorbed in various combinations of active and idle balances, as represented by all points along the 'budget line'. At all points along the line, different combinations of L^1 and L^2 will equal M. Given that the distance from the origin to M on each axis is the same (because the money supply will be the same in each case), the 'budget line' will form a 45° angle with each axis.

Assume that the economy has L^1_a of active balances and L^2_b of planned idle balances. The money supply thus consists of $L^1_a + L^2_b + \Phi$ amount of (unplanned and undesired) idle balances.

The money market is in equilibrium only when money demand (i.e., desired active and idle balances) equals the money supply (i.e., actual active and idle balances).

Deriving the LM *curve*

Just as the *IS* curve provides combinations of y and i for which the goods market is in equilibrium, the *LM* curve plots combinations of y and i for which the money market is in equilibrium. The money market is in equilibrium when the supply and demand for money are equal, that is, $L = M$.

$$L = M. \tag{6.24}$$

Substituting Equation 6.23 into 6.24:

$$y/v + f - hi = M.$$

Solving for y

$$y = v(M - f + hi). \tag{6.25}$$

Solving for i

$$i = (y/v + f - M)/h,$$
$$i = (f - M)/h + (y/v)/h. \tag{6.26}$$

Equations 6.25 and 6.26 are the equations for the *LM* curve. They tell us that there are various combinations of i and y for which the money market is in equilibrium. The slope of the *LM* curve in Equation 6.26 depends on the velocity of circulation (vk) and the interest elasticity (h) of the demand for money. In case of a liquidity trap, the *LM* curve will be perfectly elastic at the same interest rate at which the demand for idle balances becomes perfectly elastic.

Deriving the LM *curve geometrically*

The *LM* curve is derived in the south-west quadrant of the four-quadrant diagram shown in Figure 6.15. The north-west quadrant shows the demand for active balances (L^1). The south-east quadrant shows the demand for idle balances (L^2). The north-east quadrant provides the equilibrium condition for money market equilibrium. Any combination of $L^1 + L^2$ which falls on the 'budget line' will be equal to the money supply (M). Any combination of $L^1 + L^2$ which does not occur on this line is a position of money market disequilibrium.

The *LM* curve consists of combinations of i and y for which the money market is in equilibrium. Consider a low level of output, y_1. This level of output will generate a demand for active balances of L^1_1. For the demand for active and idle balances to equal the money supply, the north-east quadrant shows that the demand for idle balances must equal L^2_1. For L^2_1 to come into being, interest rates would have to be i_1. This provides a point on the *LM* curve. It tells us that the combination of y_1,i_1 is such that the money market will be in equilibrium.

To get another point on the *LM* curve, consider a higher level of output y_2. This level of output will generate a correspondingly higher demand for active balances of L^1_2. For the demand for active and idle balances to equal the money supply, the north-east quadrant shows that the demand for idle balances must equal L^2_2. For L^2_2 to come into being, interest rates would have to be i_2. This provides another point on the *LM* curve. It tells us that the combination of y_2,i_2 is such that the money market will be in equilibrium.

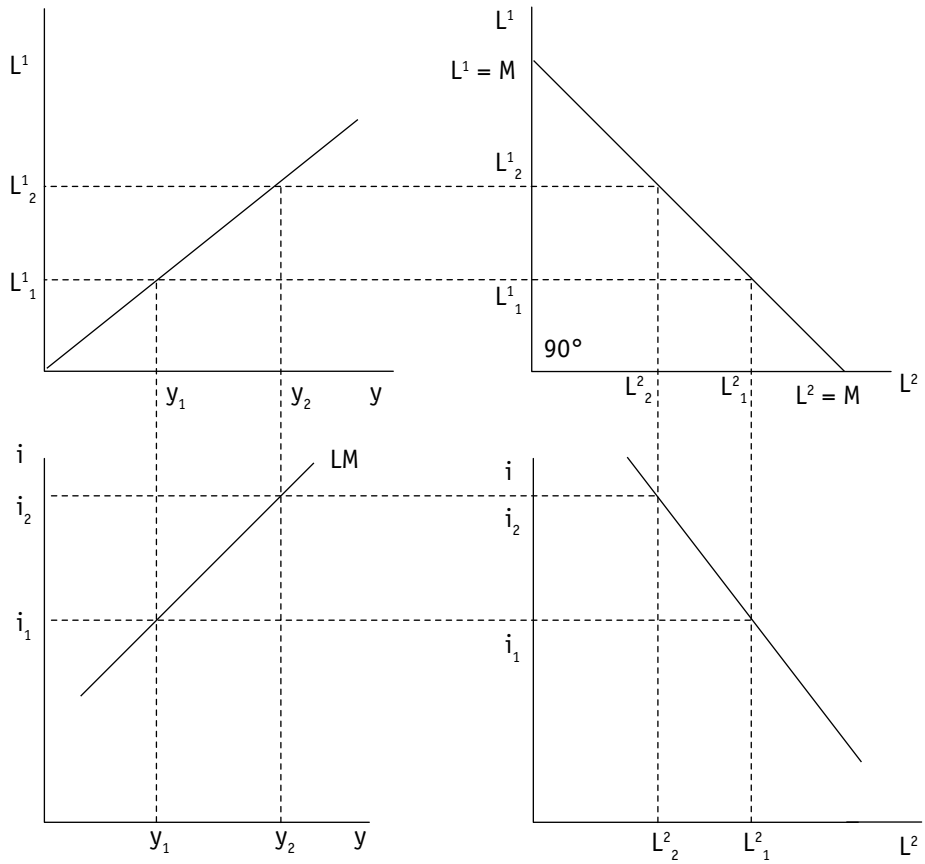


Figure 6.15 Deriving the *LM* Curve

Source: Authors.

Points on and off the LM *curve*

In order to illustrate the economic forces at work moving the money market towards equilibrium, consider point X (i.e., y_1,i_2) in Figure 6.16. At point X, L^1_1 of active balances are demanded in order to finance the transactions demand associated with y_1. For the money market to be in equilibrium, L^2_1 worth of idle balances would have to be demanded. However, as can be seen in the diagram, the interest rate i_2 associated with point X is too high to generate demand for idle balances equal to L^2_1. Instead, only L^2_2 worth of idle balances are demanded. This is because at high interest rate of i_2, people would prefer to hold more bonds than idle balances.

Under these conditions, people find themselves with excess idle balances equal to $L^2_1 - L^2_2$ (in case you ask yourself why these are excess money balances, remember that

the money supply is fixed and must be absorbed either in the form of active or idle balances. Given that active balances are determined by income, any discrepancy between money demand and money supply will be accounted for in [unplanned] idle balances).

Given that people only want to hold L^2_2 worth of idle balances when the interest rate is i_2, they will respond by altering their portfolios by purchasing more bonds. This will drive the price of bonds up and the yield (i.e., the interest rate) down. Point *X* is thus an unstable position. Bond prices will rise and interest rates will fall until they reach the level i_1, at which point the money market will be in equilibrium at point y_1,i_1 (which is on the *LM* curve). All points to the left of *LM* indicate an excess supply of money (ESM).

Now consider point *Z* in Figure 6.16. Point *Z* is associated with level of output y_2. This means that L^1_2 worth of active balances will be demanded in order to finance transactions associated with output level y_2. For the money market to be in equilibrium, the north-east quadrant shows that L^2_2 worth of idle balances would have to be

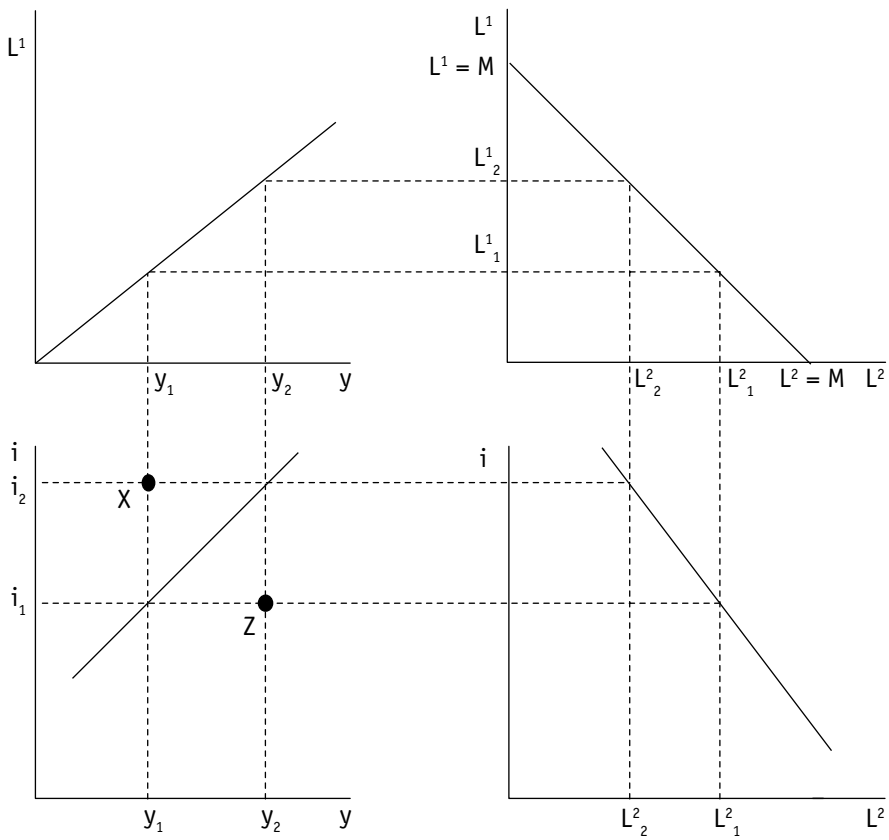


Figure 6.16 Positions On and Off the *LM* Curve

Source: Authors.

demanded. But for people to want to hold only L^2_2 idle balances, the interest rate must be i_2 rather than i_1.

In case of point *Z*, the interest rate is not high enough to reduce the desired holdings of idle balances to the level required for equilibrium to exist in the money market. Given the low ruling interest rate of i_1, a higher level of idle balances (L^2_1) than is consistent with money market equilibrium will be demanded. Under these conditions, people find themselves with excess holdings of bonds (or, put differently, insufficient idle balances). They thus start selling bonds. This drives the price of bonds down and the interest rate (or yield) up. The money market will eventually come to rest at point y_2,i_2 (which of course is on the *LM* curve). All points to the right of the *LM* curve are positions indicating excess demand for money (EDM).

In sum, *all combinations of interest rate and output which lie above the* LM *curve are characterised by excess idle balances (or excess money supply)*. People will thus start adjusting their portfolios by buying bonds, thus driving the price of bonds up and the interest rate down until the *LM* curve is reached. *All combinations of interest rate and output that lie below the* LM *curve are characterised by EDM*. People will start adjusting their portfolios by selling bonds, thus driving the price of bonds down and the interest rate up until the *LM* curve is reached.

So far, the bond market dynamics that drive the changes in the interest rate (i.e., the bond yield) have been hidden from view in the *LM* geometric derivation. Figure 6.17 brings them in explicitly. The diagram shows that if the economy was at y_1,i_1, then people would have enough transaction balances to cover the transactions associated with

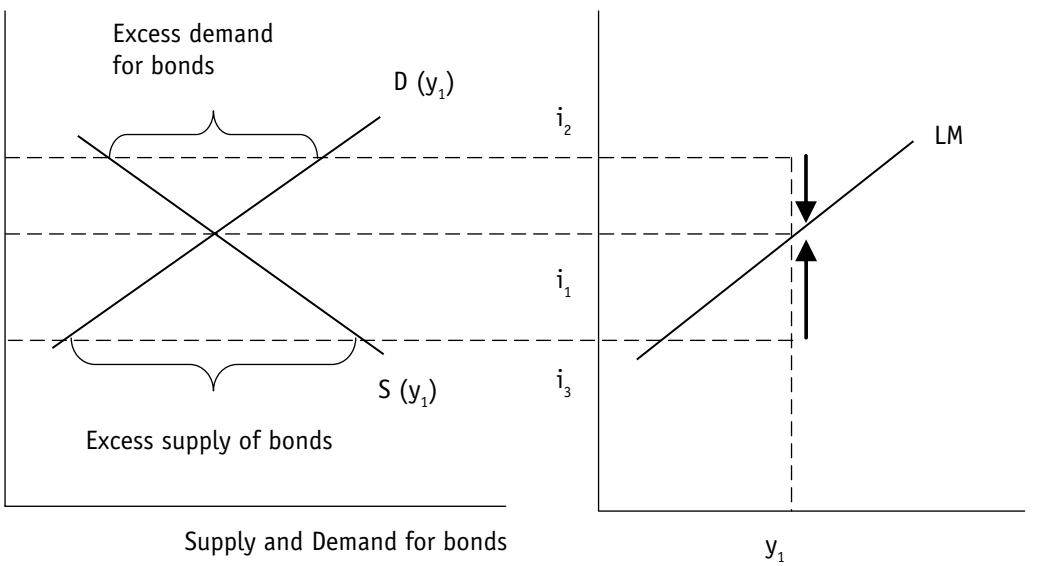


Figure 6.17 The Relationship between the Bond Market and *LM*

Source: Authors.

income level y_1, and they would be comfortable with their holdings of idle balances, given the interest rate of i_1. If the economy was, however, at y_1,i_2, then there would be an ESM (and hence an excess demand for bonds in the bond market). Bond prices would rise as people demand more bonds (to reduce their stock of idle balances). Yields will fall until equilibrium is restored at y_1,i_1.

If the economy was at y_1,i_3, then there would be an EDM, and hence also an excess supply of bonds (as people adjust their portfolios so that they comprise a higher proportion of cash balances). Bond prices would fall (and yields would rise) until equilibrium is restored at y_1,i_1.

Movements along the LM *curve*

The *LM* curve slopes upwards because, as real income rises, the demand for active balances increases, and (assuming an unchanged money supply) people will have to adjust their portfolios and sell bonds, thus driving the interest rate upwards. Referring to Figure 6.16, the rise in income from y_1 to y_2 results in a movement along the L^1 curve from L^1_1 to L^1_2. As the interest rate rises, the demand for idle balances falls. This can be seen as a movement back along the L^2 curve from L^2_1 to L^2_2. Both these movements are represented as a movement along the *LM* curve from y_1,i_1 to y_2,i_2.

Shifts of the LM *curve*

Now consider what happens to the *LM* curve if the money supply rises. This will happen if the reserve bank prints money and gives it to the treasury to spend on goods and services, or if the reserve bank engages in open market operations and buys government bonds from the public. If the government 'monetises the debt' by issuing government bonds and 'selling' them to the reserve bank, then the money supply will rise as government expenditure takes place.[14] Such financing strategy amounts to printing money to finance government expenditure.

Taking the output level y_1 in Figure 6.18, let us trace through the effect of increase in money supply. Output level y_1 still generates the same transactions demand and hence the same demand (L^1_1) for active balances. However, with an increase in money supply, the north-east quadrant shows that excess idle balances now exist at the prevailing level of output and interest rate. People adjust their portfolios by buying bonds, thus driving the price of bonds up and the interest rate down. As the interest rate falls, the demand for idle balances rises (i.e., there is a shift down along the L^2 curve) until money market equilibrium is restored at i_3.

Figure 6.19 tells the same story, but this time includes the bond market in picture. As people find themselves with excess holdings of money (as a result of increased money

[14] Note that this expenditure also pushes out the *IS* curve (as demand and output rises in response). Here, we are only considering the monetary impact of the expenditure when it is financed in this way.

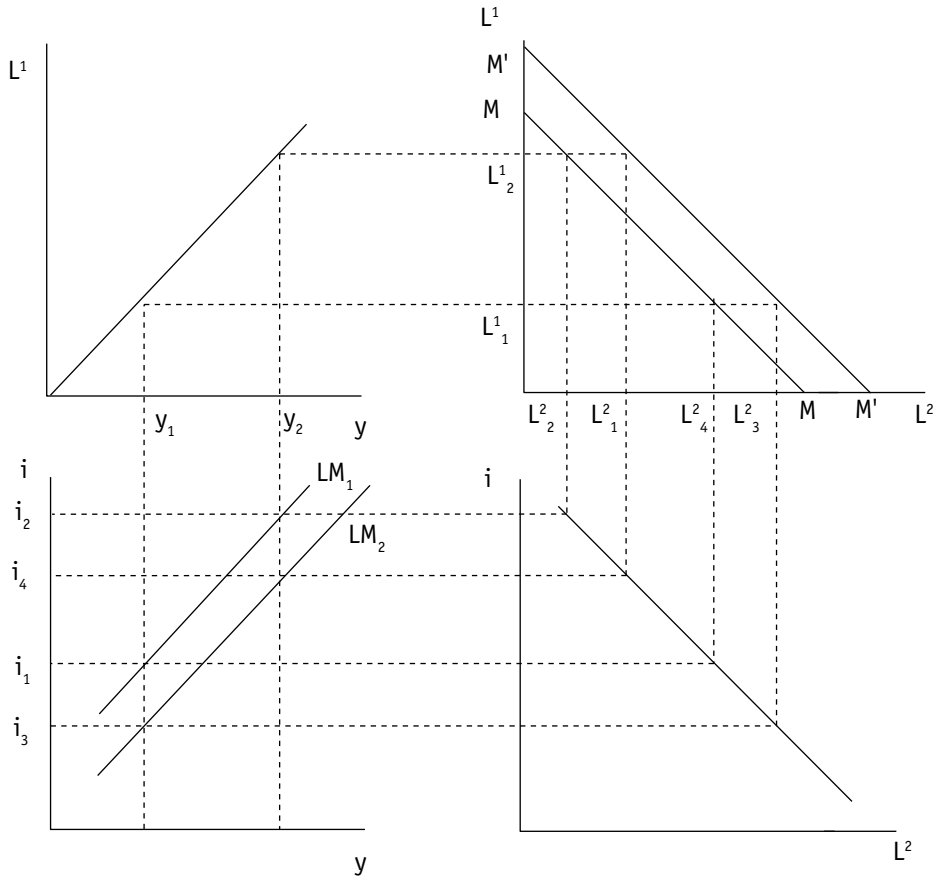


Figure 6.18 An Increase in the Money Supply

Source: Authors.

supply), they demand more bonds, and hence the demand for bonds shifts out, thus driving down the yield. The *LM* curve shifts out.

Now consider the impact of an increase in money supply caused by the reserve bank engaging in open market operations and buying bonds from public. This time, the impact of monetary policy is initially in the bond market, as the reserve bank increases the demand for bonds through its open market operations. The demand for bonds function shifts out, and yields fall. However, as people sell bonds to the reserve bank, the money supply rises (as people end up with more cash, and the reserve bank ends up with more bonds).

Finally, let us see what happens to the *LM* curve if (for whatever exogenous reason) people decide to hold more idle balances, that is, to increase their preference for liquidity at all interest rates. This could be caused by a general lack of confidence. As people demand more idle balances at all interest rates (i.e., L^2 shifts out), they

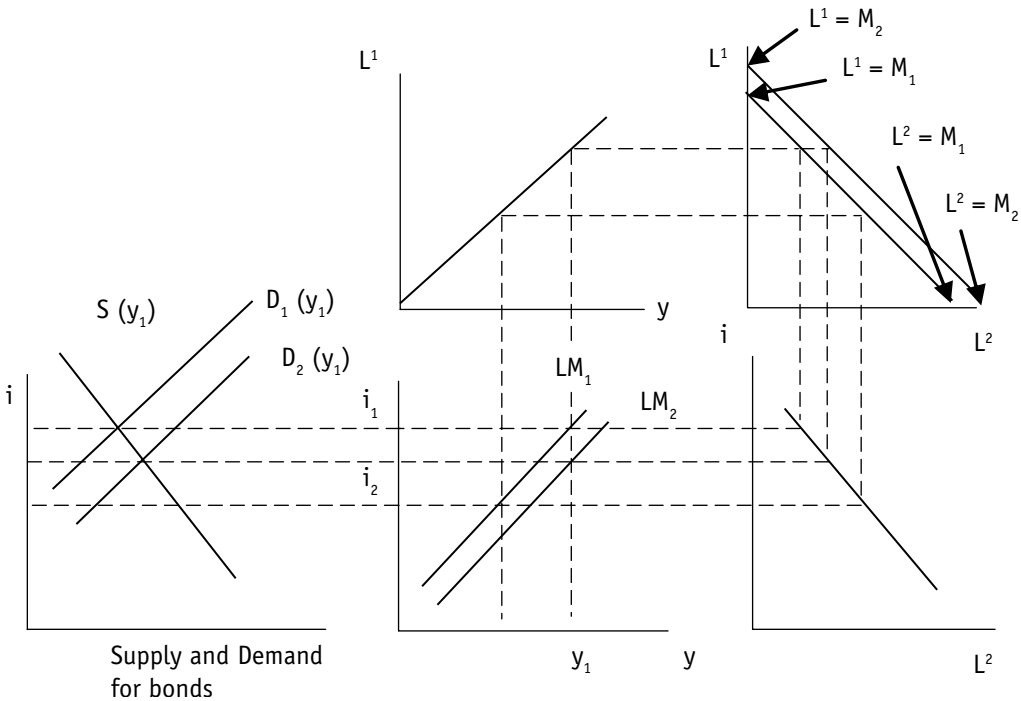


Figure 6.19 An Increase in the Money Supply (Showing the Bond Market)

Source: Authors.

sell bonds, thus pushing out the supply curve of bonds (Figure 6.20). The *LM* curve shifts backwards from LM^1 to LM^2 (if this decline in confidence is also reflected in an exogenous decline in investment demand, then the *IS* curve will also shift back, thus exacerbating the recession).

Equilibrium in the Goods and Money Market

Equilibrium in the *IS*–*LM* model occurs at the intersection of the *IS* and *LM* curves. Only at that point, both the goods and money markets will be in equilibrium. Equilibrium combination of i and y can be obtained by setting the equation for the *IS* curve equal to that of the *LM* curve, (both derived in terms of i) solving for y, and then substituting y into either the *IS* or the *LM* equation to find the equilibrium value for i.

$$\begin{gathered} IS = LM, \\ (j + G + a)/d - ((1 - b + bt)y)/d = (f - M)/h + (y/v)/h = i, \\ y = [h(j + G + a) - d(f - M)]/[h(1 - b + bt) + d/v] \end{gathered} \tag{6.27}$$

This is the equation for the equilibrium value of y.

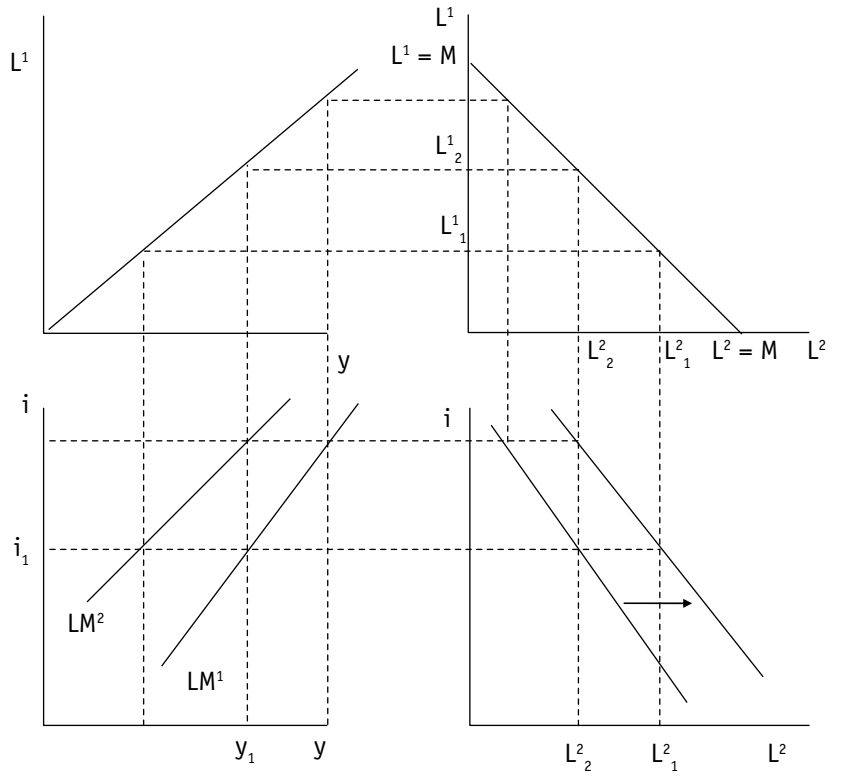


Figure 6.20 An Exogenous Increase in the Demand for Money

Source: Authors.

Figure 6.21 summarises the goods and money market conditions in the *IS–LM* framework. Any point which falls to the right of the *IS* curve will be characterised by excess supply in the goods (ESG) market. Stocks will accumulate and output will start to fall until goods market equilibrium is restored. Any point to the left of the *IS* curve is characterised by excess demand in the goods (EDG) market. Stocks will start falling,

Example

Let $j = 600$; $d = 100$; $G = 450$; $a = 60$; $b = 0.5$; $t = 0.1$; $f = 10$; $h = 20$; $M = 408$ and $v = 5$.

What are the equilibrium values for i and y?

Answer: $i = 0.1$ and $y = 2{,}000$.

Source: Authors.

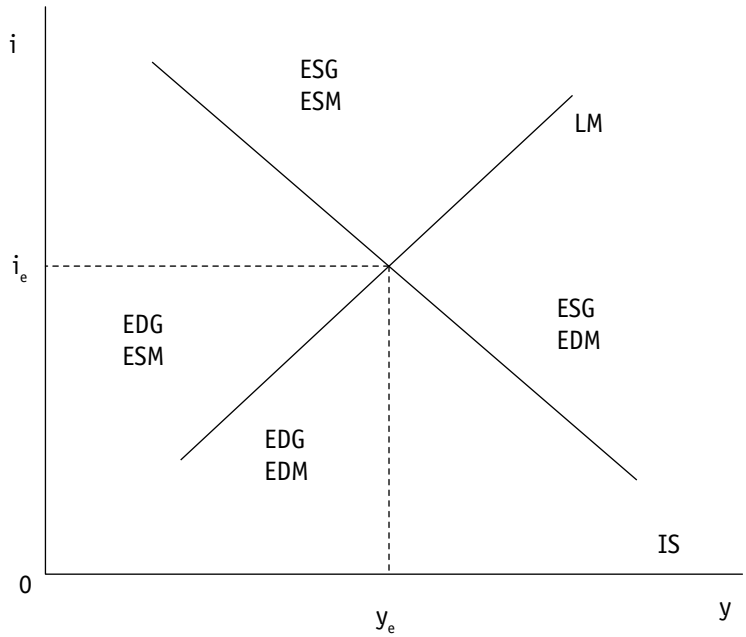


Figure 6.21 Summary of Market Conditions

Source: Authors.

this will send a signal to producers to increase output, and hence, output will rise until goods market equilibrium is restored.

Any point to the right of (i.e., below) the *LM* curve represents EDM. As people sell off bonds (so as to satisfy their demand for money), the price of bonds will fall and interest rates will rise until money market equilibrium is restored. Any point to the left of (i.e., above) the *LM* curve represents a point of ESM. People will thus demand more bonds, the price of bonds will rise, and the interest rate will fall, until equilibrium is restored in the money market.

Consider point *Z* in Figure 6.22. Point $Z\ (y_1,i_1)$ happens to be a point of equilibrium in the money market (it is on the *LM* curve), but not a point of equilibrium in the goods market (it is off the *IS* curve). Under these circumstances, the goods market is characterised by excess demand. Stocks start falling, and hence output starts to rise. Assuming no rise in interest rates, output would rise until goods market equilibrium is restored at y_2,i_1.

However, in the *IS*–*LM* model, which brings together the goods and money markets, the rise in output will have an effect on the money market, which in turn will affect the eventual level of output. As soon as output rises, this has an effect on the money market. As output rises, so does the transactions demand for money. People respond by selling bonds (in order to satisfy their increased demand for money). Bond prices start to fall, and interest rates start to rise. As interest rates rise, this dampens down the demand for investment, hence also the total demand in the economy.

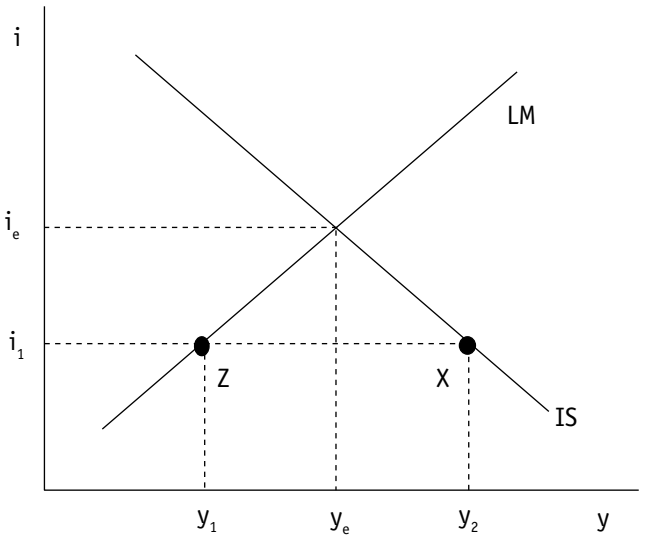


Figure 6.22 Points On and Off *IS–LM*

Source: Authors.

In the *IS–LM* model, the dampening effect of interest rates on investment, and hence also on output, is captured in the negative slope of the *IS* curve. In other words, if output jumped from y_1 to y_2, then the interest rate rises, which occuring shortly thereafter, would result in a movement back along the *IS* curve from y_2 to y_e. In practice, of course, the economy would probably not overshoot as far as y_2 because interest rates would start rising soon after output started to rise. In any event, economic dynamics in both the goods and money markets will eventually come to rest when y_e,i_e is obtained.

Self-test

Explain the goods and money market dynamics which will move the economy from point *X* to y_e,i_e.

Source: Authors.

Comparing the Keynesian Cross and the *IS–LM* Models

As shown in the previous section, the interaction between the goods and the money markets has significant implications for the eventual level of output. In the Keynesian cross model of income determination, an increase in demand results in a corresponding

increase in output. Interest rates do not enter the model, and investment is regarded as exogenous.

In the *IS–LM* model, however, the picture is rather different. If demand increases, output will rise (as in the simple model of income determination). However, as output rises, so too will the interest rate. Higher interest rates imply lower investment. Lower investment will lead to lower demand and hence a smaller eventual increase in output.

In other words, by building a more sophisticated model in order to take into account dynamics in both the goods and the money market, we observe that an increase in output following an increase in demand is moderated by a consequent rise in interest rate and decrease in demand for investment.

Figure 6.23 compares the two Keynesian models. The top diagram depicts the Keynesian cross framework, which captures only trends in the goods market. If aggregate demand rises (e.g., as a result of an increase in government spending from G_1 to G_2), then E rises from E_1 to E_2. Stocks fall and output rises from y_1 to y_2.

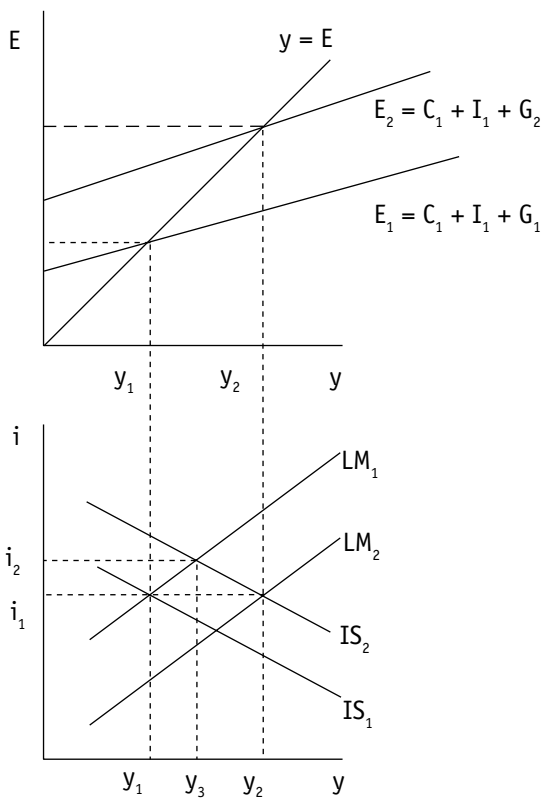


Figure 6.23 Comparing the Keynesian Cross and the *IS–LM* Models

Source: Authors.

The *IS–LM* model is depicted below the Keynesian cross in Figure 6.23. If expenditure rises (e.g., as a result of an increase in government spending from G_1 to G_2), then the *IS* curve shifts out from IS_1 to IS_2. Equilibrium output rises from y_1 to y_3. Note that y_3 is less than the simple model's equilibrium output level of y_2. This is because of the negative relationship between interest rates and investment (as captured in the slope of the *IS* curve) and the positive relationship between interest rates and output (as captured in the *LM* curve). The net result of dynamics in the goods and money markets shows that an increase in output (resulting from an increase in expenditure) is less in the *IS–LM* model than in the Keynesian cross framework. In other words, the multiplier effect with respect to an increase in demand on output is less in the former than in the latter.

For an increase in output in the *IS–LM* model to be as high as that in the Keynesian cross model, the dampening effect (on investment and hence also on output) of the interest rate rise must be addressed. If the interest rate could be made to stay the same (at i_1), then the rise in output would be the same in the two models.

This could be brought about by an increase in money supply. If money supply grew in line with income, then people would have sufficient cash balances. They would thus not have to sell bonds in order to finance a higher level of transaction. The *LM* curve would shift out to LM_2 and the increase in output would then be the same in the Keynesian cross model as in the *IS–LM* model.

According to the *IS–LM* model, this would happen if government financed the increased expenditure by having the reserve bank print money—thus expanding the money supply in line with the increased expenditure. If, however, the government financed the increased spending by borrowing money from the public, then the money supply (and hence the *LM* curve) would remain unchanged.

This analysis suggests that governments are best off printing money to finance expenditure if their goal is to have the maximum impact in terms of stimulating output. The obvious problem with this policy prescription is the danger of inflation. The Keynesian version of the *IS–LM* model discussed so far assumes that prices are constant. Hence, inflation never rears its ugly head.

However, in the neoclassical version of the model, price adjustment comes back into play, and the danger of inflation is very real indeed. Chapter 7 discusses monetary and fiscal policies in more depth using both Keynesian and neoclassical versions of the *IS–LM* framework.

Review Questions and Answers

Keynesians believe

a) Supply creates its own demand
b) The transaction demand for money is inversely related to income
c) An expansionary fiscal policy leads to some crowding out of private investment

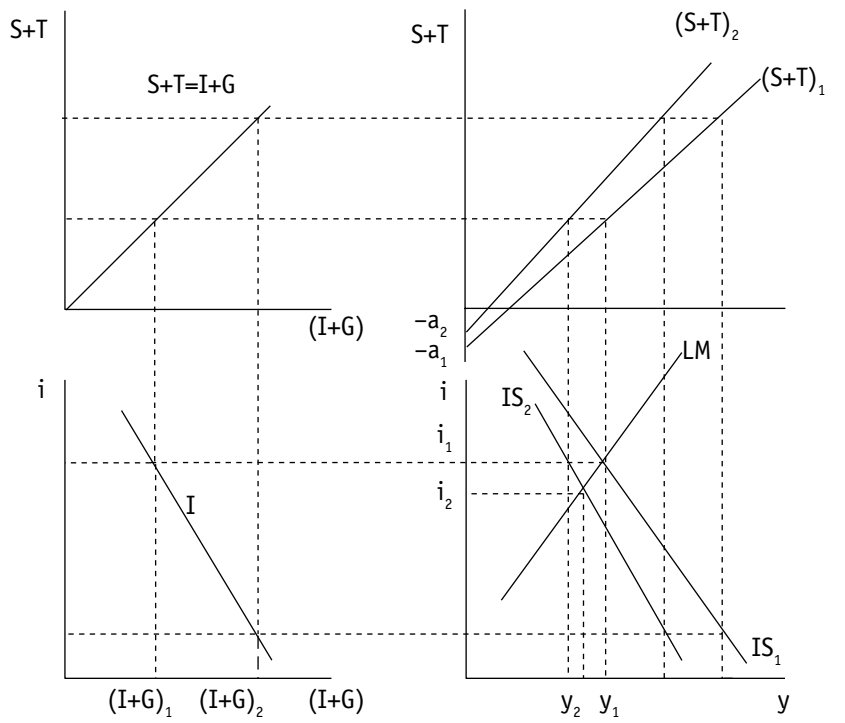
d) All the above
e) None of the above
Answer: c

The interest rate in the IS–LM *model*
a) Is the profit a bank makes from lending money
b) Is a reflection of expectations of future profitability of investment projects
c) Is determined by the supply and demand for loanable funds
d) Will be reflected in the coupon rate of new bonds issued
e) All the above
Answer: d

Assume a simple closed-economy Keynesian model without a government sector where: $b = 0.2$, $a = 6$ and $c = 18$.
What are the values for y and S?
$C = a + by$
$18 = 6 + 0.2y$
$y = 12/0.2 = 60$
$y = C + S$
$60 = 18 + S$
$S = 42$

Write the equation for the savings function
$S = -a + (1 - b)y$
$42 = -6 + (0.8)60$
Assume that the investment function has the following form:
$I = 142 - 1000(i)$
What rate of interest will bring savings and investment into equilibrium?
$42 = 142 - 1000(i)$
$i = 10$ per cent
Write the equation for the IS *curve*
$y = (a + I(i)) \cdot 1/(1 - b)$
$y = (6 + 42) \cdot 1/(0.8) = 60$

In a closed-economy IS *model excluding government, what happens to the position of the IS curve when there is a general decline in investor confidence?*
A decline in investor confidence will result in less being invested at all rates of interest. The investment demand curve thus shifts to the left. Lower levels of savings are now required to bring investment in line with savings, hence the *IS* curve also shifts to the left. The economic dynamics are as follows: the decline in investment results in a fall in demand. Inventories rise. This sends a signal to producers to cut their production, which they do, hence output falls. This is the Keynesian quantity adjustment mechanism.



Using a closed-economy four-quadrant Keynesian IS–LM model, show the impact on equilibrium output and the interest rate of a simultaneous decrease in autonomous consumption and an increase in the tax rate. Show both effects in the same diagram. Discuss the dynamics underpinning the shift in equilibrium position.

An increase in the tax rate will result in the slope of the $S + T$ curve becoming steeper, and a decrease in autonomous consumption will shift the curve upwards (as the intercept rises from $-a_1$ to $-a_2$). The joint impact of this on the *IS* curve is to shift it inwards and make it less elastic.

In moving from y_1,i_1 to y_2,i_2, the economy experiences the following dynamics. Firstly, the backward shift in IS indicates that the point y_1,i_1 is now a disequilibrium position: the reduction in demand as a consequence of the decline in autonomous consumption and increase in taxation results in ESG market. Inventories start to rise, sending signals to producers to cut output and employment. This is accompanied by a decline in the transactions demand for money—leaving the money market in disequilibrium. People adjust to the decline in transactions demand by adjusting their portfolios and buying bonds. This drives the price of bonds up and hence the interest rate goes down. This, in turn, boosts investment, which dampens the overall contraction in demand and hence output. Eventually, the economy comes to rest at y_2,i_2 which represents the new goods and money market equilibrium.

What is the difference between ex post and ex ante investment?

Ex ante investment is planned investment. *Ex post* investment consists of planned investment and unplanned investment. Unplanned investment is unforeseen (and thus undesired) investment in inventories. In the national accounts, investment is always measured *ex post*. This implies that investment will always equal savings in the national accounts. Remember that there is no necessary reason why *ex ante* investment and savings will be equal.

The IS curve will shift to the right when:

a) The marginal propensity to consume decreases
b) Autonomous consumption falls
c) The tax rate increases
d) Government spending declines
e) None of the above

Answer: e

The LM *curve:*

a) Will be inelastic if the demand for money is inelastic
b) Shows combinations of output and the interest rate for which the money market is in equilibrium
c) Has a positive slope because at higher levels of income, transactions demand for money is greater, and hence, higher rates of interest are required if the money market is to clear
d) Is consistent with all of the above
e) Is consistent with none of the above

Answer: d

Points to the left of the LM *cure represent:*

a) The interest rate is too high to generate a sufficiently high demand for active balances
b) A situation where people will sell bonds to increase active balances
c) A level of output that is too high
d) People holding unplanned idle balances
e) A desire by people to hold less idle balances

Answer: e

A point to the right of the IS *curve represents:*

a) An exceess supply of savings
b) An excess demand for savings
c) An EDG
d) An excess supply of goods
e) Aggregate demand which is too high

Answer: d

If the money supply is 800 and the demand for money is 500 – 400i + 0.5y, which if the following represents a point on the LM *curve?*

a) $y = 660$, $i = 10\%$
b) $y = 640$, $i = 10\%$
c) $y = 680$, $i = 10\%$
d) $y = 650$, $i = 10\%$
e) None of the above
Answer: c

If the IS *curve is y = 1000 – 5000i and the* LM *curve is y = 200 + 3000i, then the equilibrium combination of y and i is:*

a) $y = 1250$, $i = 5\%$
b) $y = 1000$, $i = 10\%$
c) $y = 1000$, $i = 20\%$
d) $y = 500$, $i = 10\%$
e) $y = 250$, $i = 15\%$
Answer: d

CHAPTER 7

Fiscal and Monetary Policies in the *IS–LM* Model

This chapter explores the economic effects of fiscal and monetary policies within an *IS–LM* framework. The first section builds on the basic Keynesian interpretation developed in Chapter 6. The second section shows how the *IS–LM* model behaves when neoclassical assumptions are adopted.

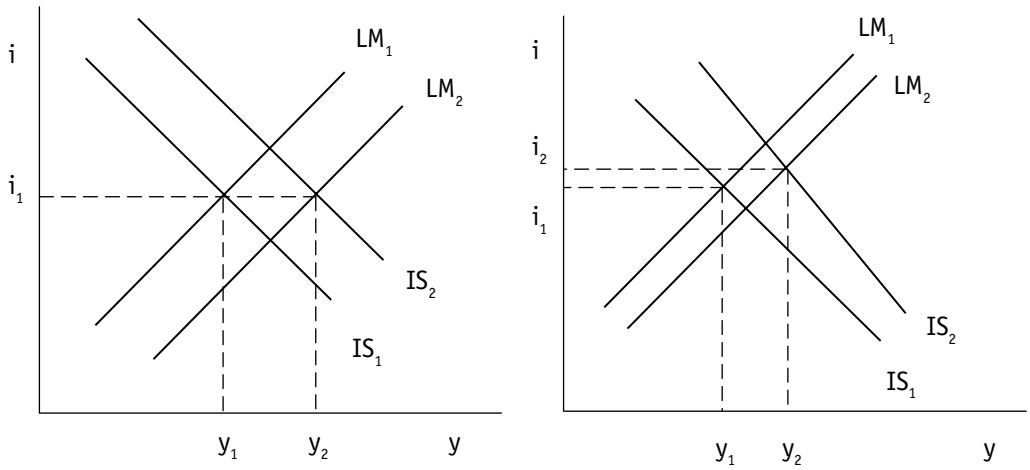
Monetary policy in the *IS–LM* model refers to the alteration of the (nominal) money supply by the reserve bank. The money supply is regarded as exogenous and hence as directly controllable by the monetary authorities. Although the discussion of monetary policy is limited in the *IS–LM* framework, it nevertheless allows some basic exploration of the economic impact of an expanding or contracting money supply.

Fiscal policy is the management of government's budget (which consists of inflows of tax revenue and outflows of expenditure) in order to affect the level and composition of aggregate demand in the economy.

When expenditure exceeds tax revenues, the government runs a primary deficit.[1] Such a deficit can be financed by the sale of government bonds to the public, or by monetising the deficit, that is, when the government issues bonds and the reserve bank buys them. Selling government debt to public in order to finance expenditure has no net monetary impact (as the money spent by the government has been obtained from public via bond sales). Monetising the deficit, however, expands the money supply as it basically amounts to the reserve bank printing money and giving it to the government to spend. The money supply thus expands in line with government spending, resulting in an equal outward shift in *IS* and *LM* (see panel A in Figure 7.1). The stimulus packages after 2008 in the USA involved such an approach (sometimes called Obamanomics), with the expansionary monetary stance referred somewhat euphemistically as 'quantitative easing'.

When the government runs a primary budget surplus (tax revenues exceed expenditure), the monetary impact depends on what the government does with the surplus. If it buys back government bonds from the public, then the net monetary impact is

[1] The conventional deficit/surplus includes interest payments on the government debt as part of expenditure. The primary deficit/surplus excludes interest payments to the holders of government debt.



A: An increase in government spending financed by selling bonds to the reserve bank (i.e., printing money)

B: An increase in government spending financed by a mix of taxation and printing money

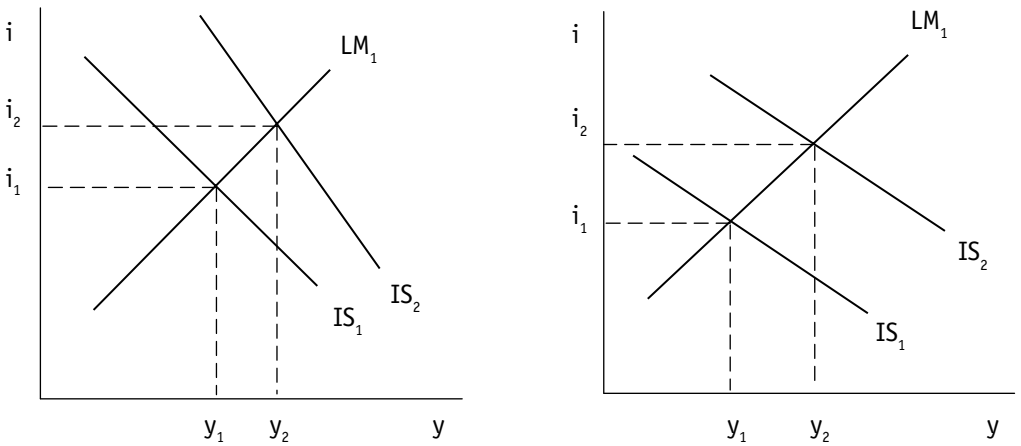
Figure 7.1 Expansionary Fiscal Policy with a Monetary Impact

Source: Authors.

zero (as the excess of taxation over spending is returned to the public through such redeeming of the debt). If it buys back government bonds from the reserve bank, then the money supply will contract (as the excess of taxation over spending ends up in the reserve bank's vaults).

In other words, the impact of fiscal policy on money supply depends on the way that fiscal policy is financed. 'Pure fiscal policy' is defined as a government budgetary change that leaves the money supply unaltered. This occurs when government spending is tax-financed (as in panel A of Figure 7.2) or financed by selling bonds to (i.e., borrowing from) the public (as in panel B of Figure 7.2), or when the government uses a primary surplus to redeem government debt to the public. Note that the multiplier effect is larger in the bond-financed expansion than in the tax-financed expansion. This is because the increase in taxation reduces disposable income (and makes *IS* steeper) and hence reduces consumption spending. Because of the balanced budget multiplier, the overall impact on demand of an equal increase in taxation and government spending is still positive—but not as large as in the bond-financed expansion.

In practice, governments rarely follow pure fiscal policies. They may, for example, finance the increase in government spending in part through selling bonds to the reserve bank (i.e., printing money), and in part by raising taxation. This is illustrated in panel B of Figure 7.1.



A: A tax-financed increase in government spending

B: Government spending financed by selling bonds to the public

Figure 7.2 Expansionary Pure Fiscal Policy in a Keynesian Model

Source: Authors.

Fiscal and Monetary Policies in a Keynesian Framework

In discussing fiscal policy in a Keynesian framework, we shall assume that the economy is operating at less than full capacity (i.e., it is in recession). Given this assumption about recessionary conditions, an increase in demand will induce an increase in output without a corresponding increase in prices. The economy can be moved towards full employment through increases in output (i.e., quantity adjustment) rather than through price adjustment.

Fiscal policy

When the economy is stuck in a deep recession, Keynesians typically argue that it is the duty of government to increase spending. The extreme version of this is captured most graphically, perhaps the most notorious passage in Keynes's *General Theory*:

> If the [British] Treasury were to fill old bottles with bank notes, bury them in suitable depths in disused coal mines which are then filled up to the surface with town rubbish, and leave it to private enterprise on well tried principles of laissez-faire to dig up the notes again ... there would be no more unemployment.[2]

[2] Keynes, J. M. 1936. (Reprinted in 1964). *The General Theory of Employment, Interest and Money.* p. 129. London: Macmillan.

Although Keynes was no doubt exaggerating for effect, this passage highlights an important early Keynesian belief, namely that the very act of injecting demand is more important than the nature of that spending. Even if government spending was unproductive in and of itself, it could still have a beneficial effect through the multiplier process. Note that in the case of burying bank notes, this would result in an outward shift in *IS* (as a result of the government employing people to do the burying) and in an increase in the money supply (once people had dug up the bottles and started spending the notes) and hence in an outward shift in *LM*.

As discussed earlier, the monetary impact of fiscal policy depends on how government spending is financed. Assuming an expansionary pure fiscal policy, the impact of government spending is merely to shift out the *IS* curve, leaving the money supply unaltered (as in Figure7.2). Output rises (in response to increased demand) from y_1 to y_2 as the *IS* curve shifts out. Interest rates rise as people sell bonds to finance the increased transactions demand associated with the expansion in output and income. This is represented as a movement along the *LM* curve from i_1 to i_2.

Fiscal policy will be most effective where the *LM* curve is relatively elastic, and the *IS* curve relatively inelastic. Under these conditions, an increase in demand will result in a relatively limited increase in interest rates; and, given the relative insensitivity of investment to interest rates, this will have only a minor dampening impact on the level of output.

This story gets told in reverse when it comes to a restrictive fiscal policy. Assume that the economy is initially in equilibrium at the intersection of IS_2 and LM_1 (at y_2,i_2) in Figure 7.2. If the government pursues a (pure) restrictive fiscal policy, then the $I + G$ curve will shift backwards, as will the *IS* curve (from IS_2 to IS_1). Output will fall to y_1 as a result of the decrease in demand, and interest rates will fall to i_1 as people demand lower transaction balances and therefore buy bonds, thus increasing the price of bonds and lowering the yield.

Because output falls in response to the decrease in demand, the Keynesian model implies that the economy can get trapped in a low-level equilibrium. There are no forces other than an increase in demand to pull the economy out of this low-level equilibrium. The policy implication is that governments can cause recessions if they implement restrictive fiscal policies.

Monetary policy

Monetary policy in an *IS–LM* framework entails the reserve bank affecting the money supply through open market operations—that is, the sale and purchase of bonds to and from the public. If the reserve bank buys bonds from the public, then the money supply increases. If it sells bonds to the public, then the money supply decreases.

An increase in the money supply results in an outward shift in the *LM* curve. This was discussed in detail in Chapter 6 with reference to Figures 6.18 and 6.19. As the money supply increases, the demand for bonds increases, bond prices rise and the yield falls (from i_1 to i_2 in Figure 7.3). This decline in the interest rate impacts the real sector (the

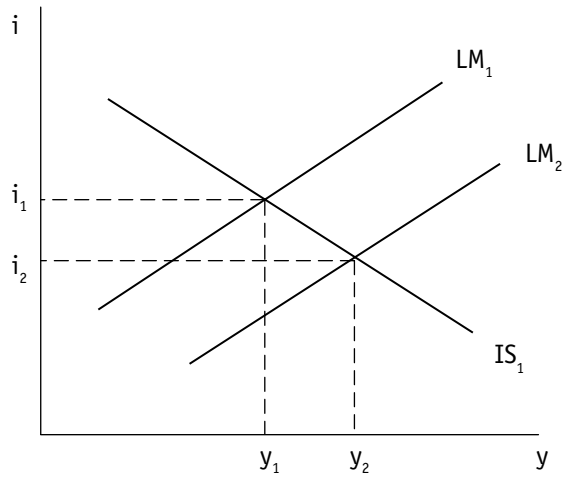


Figure 7.3 An Expansionary Monetary Policy in a Keynesian Model

Source: Authors.

goods market) via a negative relationship between investment and interest rate. As the interest rate falls, investment demand increases and hence demand increases. Output then increases in line with the increased demand from y_1 to y_2. This is represented as a movement along the *IS* curve in Figure 7.3.

The increase in output as a result of an increase in money supply is particularly a Keynesian story. The Keynesian transmission mechanism can be explained as follows: the rise in money supply leads to a fall in the interest rate, which leads to an increase in investment and hence an increase in demand and eventually output. Neoclassical economists, by contrast, believe that a rise in money supply has no lasting impact on output.

Although the Keynesian transmission mechanism indicates that monetary policy can have a positive impact on output, the outcome depends on the elasticities of key functions. If investment is relatively insensitive to changes in the interest rate, and if the demand for idle balances is very elastic, monetary policy will be less effective.

Dynamic adjustment and economic policy

The simple Keynesian *IS–LM* model is a comparative static model where one equilibrium point is simply compared with another. The dynamic path that the economy traces in getting from one equilibrium to another is not modelled explicitly. As real-world economies are rarely 'in equilibrium', policy responses are never as clear as suggested by the *IS–LM* framework.

For example, assume the economy is on an adjustment path described in Figure 7.4.[3] At stage 1, the economy is experiencing falling output and interest rates. This corresponds

[3] This analysis and diagram were provided by Michael Power.

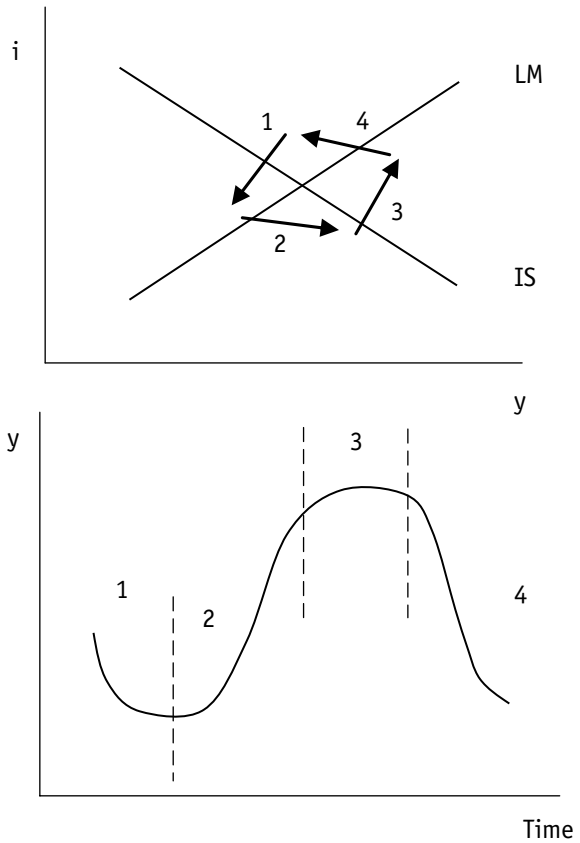


Figure 7.4 Possible Adjustment Paths and the *IS–LM* Framework

Source: Authors.

to the downward phase of the business cycle sketched below the *IS–LM* diagram. At some point, the impact of lower interest rates acts to stimulate demand, and hence output rises, thus halting the downward movement in interest rates (stage 2). This corresponds with the early stage of the economic upswing. As output continues to increase, interest rates rise, thus causing the economy to cool off at the top of the upswing (stage 3). The economy then dips back towards recession as output falls (stage 4). Such an adjustment path is characterised by real-world tendencies for the goods market and the money market to 'overshoot' their optimal positions (as predicted by *IS* and *LM*) with the result that the economy is characterised by a never-ending cycle of over-shooting—correction—over-shooting—correction.

What is an appropriate policy response in such scenario? Should the government pursue expansionary fiscal and monetary policies in stage 1, or should it wait for the economy to correct itself? If the government decides to intervene (perhaps on the basis that self-correction will take too long and will entail too much of a loss in terms of

output), then at what point does it halt such policies? Clearly, expansionary economic policies are ill-advised at stage 3, but at what point, exactly, does stage 2 turn into stage 3? And what indicators can the governments use to make an informed guess about the optimal point for policy changes?

During the 1950s and 1960s, when Keynesian demand-management was widely accepted and practised, most governments were prepared to 'prime the pump' of demand. However, as advanced capitalist economies moved towards full employment in the mid- to late-1960s, inflation began to characterise stages 2 and 3. Boosting demand under such conditions was thus costly in terms of macroeconomic stability. This experience resulted in a conservative backlash against expansionary economic policies in most of the advanced capitalist countries.

A similar policy trajectory has become evident in the period from 2008. The global financial crisis of 2007–08 resulted in major economic stimulus packages in advanced capitalist countries, especially the USA and the United Kingdom. When the US economy started slowing in 2008, President Bush approved a $268 billion stimulus. But as the economy worsened, the new President Obama obtained a $787 billion from Congress in January 2009. This was widely believed to have staved off a major depression. Even so, the cost was high in terms of rising government debt—especially in the USA, where federal debt rose from about 30 per cent of GDP in 2000 to over 100 per cent of GDP today. Commentators like John Taylor, whose 'Taylor rule' advises governments to adopt neutral monetary and fiscal policies, now argues that excessively low interest rates in the 2000s were a major cause of the financial crisis and that expansionary fiscal policies subsequent to the crash were unhelpful and should be rolled back.[4] More Keynesian commentators like Paul Krugman, however, argue that fiscal cut-backs are premature—and will extend the recession (as they did in the 1930s in the USA, and in Japan in the late 1990s).[5] He argues that austerity programmes for heavily indebted countries like Greece are counterproductive as they will depress demand further, thereby raising rather than reducing debt to GDP ratios.

In Krugman's view, the root of the economic policy errors leading up to the 2008 economic crisis was that 'economists, as a group, mistook beauty, clad in impressive looking mathematics, for truth' and that as memories of the Great Depression faded, they fell back in love with the 'idealized vision of the economy in which rational individuals interact in perfect markets'.[6] He argues that the 'freshwater economists' in Chicago who argued against the US fiscal stimulus are 'neoclassical purists' and that they had forgotten the lessons of Keynes—if they ever knew them. Keynes' biographer, Robert Skidelsky

[4] See, Taylor, J. 2010. 'Getting Back on Track: Macroeconomic Policy Lessons of the Financial Crisis.' *Federal Reserve Bank of St Louis Review*, May 92 (3): 165–76.

[5] Krugman, P. 2010. 'British Fashion Victims.' *New York Times*, 22 October.

[6] Krugman, P. 2009. *How Did Economists get it so Wrong?* http://www.ie.ufrj.br/hpp/intranet/pdfs/krugman_september_6_2009_howdideconomistsdidsowrong.pdf. Accessed on 31 March.

agrees. He published a book in 2009 with the provocative title: *The Return of the Master: Why Sixty Years after His Death, John Maynard Keynes is the Most Important Economic Thinker for America* (New York: Basic Books).

The debate between Keynesian and Neoclassical economic models is thus alive and well today.[7] We now turn to an analysis of fiscal and monetary policy in the neoclassical version of the *IS–LM* model.

Fiscal and Monetary Policies in a Neoclassical Framework

So far, the *IS–LM* model has been discussed entirely within a Keynesian framework. In other words, we have assumed that the economy is operating at less than full employment, and that adjustment takes place through changes in output. Rather than resulting in an increase in prices, an increase in demand simply brings forth an increase in output. A nominal rise in income thus translates into a real increase.

If, however, we were to adopt a neoclassical approach, these assumptions would have to change dramatically. As you will recall from Chapter 3, the key characteristic of a neoclassical model is the assumption that markets function perfectly and instantaneously. Price adjustment ensures that the economy comes to rest at a full-employment equilibrium. The typical Keynesian view, that is, a less than full-employment equilibrium is possible and that a stimulus in demand generating an increase in output cannot be tolerated within a neoclassical model.

Given that price (rather than quantity) adjustment is the hallmark of the neoclassical model, we need to represent the *IS–LM* model slightly differently in order to illustrate how it works under neoclassical assumptions. Most obviously, we need to bring prices into picture. To do so, it is necessary to represent the money market more explicitly in real terms. (The goods market is already represented in real terms in the *IS–LM* model.)

In Figure 7.5, the money supply is represented in real terms, that is, as nominal money supply divided by the (index of the) price level (M/P). By modelling the money supply in real terms, as M/P, we are able to indicate how price changes may affect monetary values.[8]

Consider the effect of an exogenous increase in prices. Assuming a constant (nominal) money supply, an increase in price level will erode the real value of the money supply. In other words, each unit of the currency will be worth less in terms

[7] See, Hodgson, G. 2009. 'The Great Crash of 2008 and the Reform of Economics.' *Cambridge Journal of Economics* 33: 1205–21.

[8] We could, of course, have represented the money supply in similar explicitly real terms in the Keynesian model. However, given that prices were assumed to be unchanged, the nominal and real money supply were equivalent, and hence, it made no difference whether we modelled the money supply as M, or as M/P where $P = 1$.

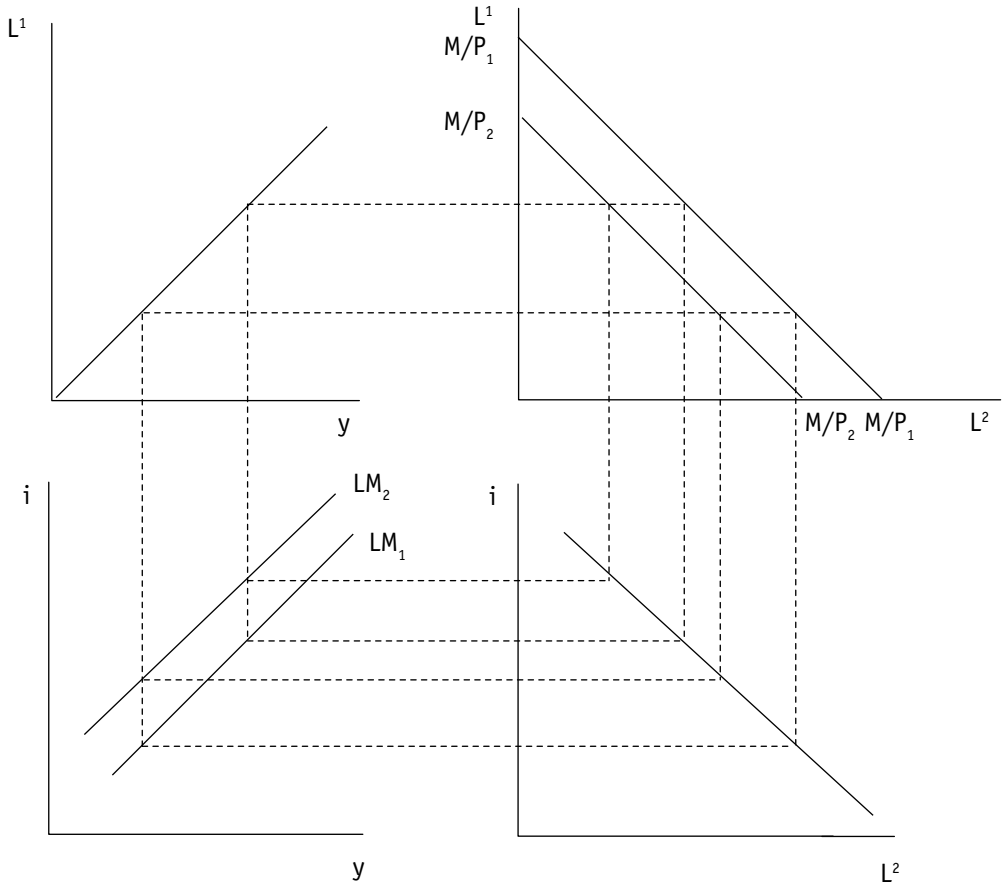


Figure 7.5 A Decrease in the Real Money Supply

Source: Authors.

of purchasing power. As shown in the north-east quadrant, an increase in the price level from P_1 to P_2 will result in a fall in the real money supply from M/P_1 to M/P_2. This inward shift in the real money supply will result in an inward shift in the *LM* curve from LM_1 to LM_2.

Self-test

Illustrate how a fall in the price level will result in an outward shift in the *LM* curve.

Source: Authors.

Having shown how price changes can enter the *IS–LM* model, let us now consider the economic effects of expansionary fiscal and monetary policies when a neoclassical world is assumed.

Fiscal policy

Assume the economy is in equilibrium at y_f, i_1 in Figure 7.6. Note that as this is a neoclassical world, the equilibrium level of output is assumed to be at full employment (hence y_f). As explained in Chapter 3, the neoclassical model assumes that all markets function perfectly and hence that supply and demand will be brought into line in all markets by changes in price. This means that the economy will come to rest at the full-employment level of output.

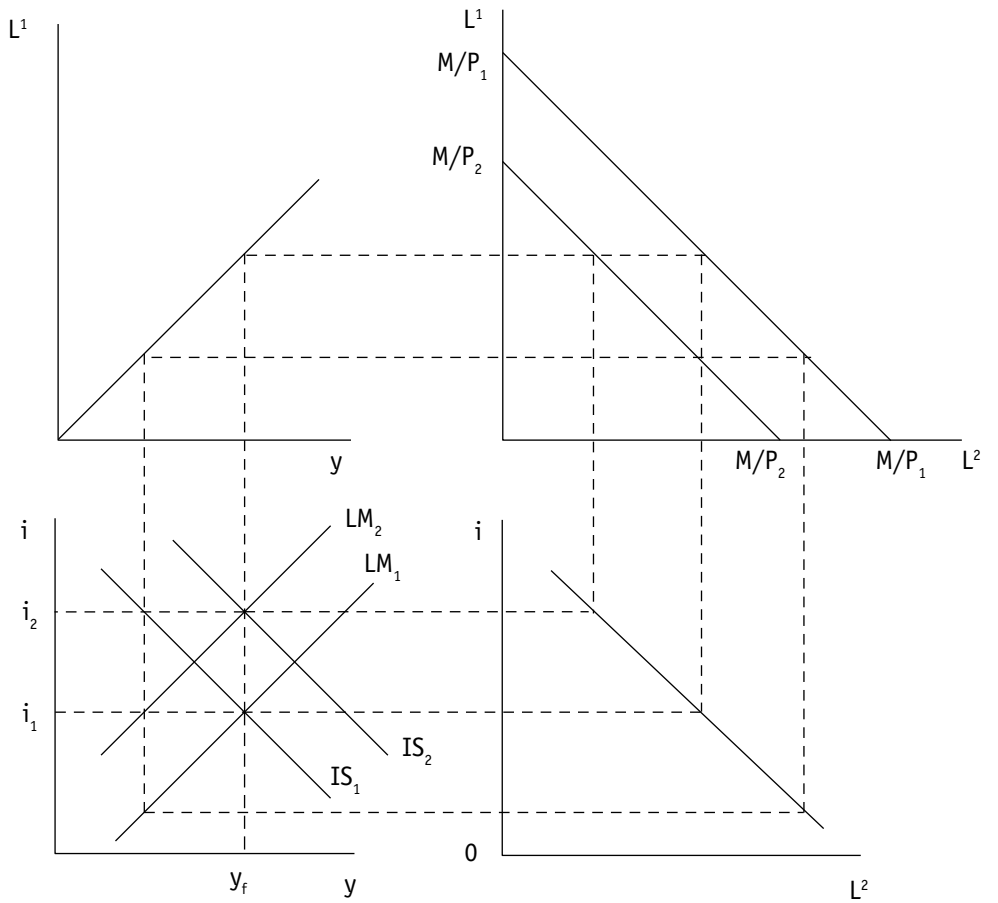


Figure 7.6 Expansionary Fiscal Policy in a Neoclassical Framework

Source: Authors.

Now let us assume that the government attempts to boost the level of output by pursuing an expansionary pure fiscal policy. The *IS* curve shifts from IS_1 to IS_2 as a result. This increase in demand will, as in the Keynesian model, result in the running down of stocks. However, unlike in the Keynesian model, this will generate an increase in the price level rather than an increase in output because the economy is already operating at full capacity. Instead of responding by increasing output, neoclassical entrepreneurs simply raise prices in the face of increased demand.

The rise in price level from P_1 to P_2 is shown in the north-east quadrant by an inward shift in the real money supply from M/P_1 to M/P_2. This contraction in the real money supply results in a backward shift in the *LM* curve from LM_1 to LM_2. (People find themselves with insufficient holdings of real balances to finance transactions, so they sell bonds, bond prices fall and yields rise.) Prices rise (and hence the *LM* curve will shift backwards) until the full-employment equilibrium (y_f) is restored. In the diagram, this point is y_f,i_2 (as determined by the intersection of LM_2 and IS_2).

In other words, there is no increase in output in the final result of an expansionary fiscal policy. All that has happened is a rise in the interest rate and in the price level. Government spending has increased, yet total demand in the economy is the same as before the increase took place.

Can you work out why this is the case? The answer has to do with the rise in interest rates: higher interest rates mean lower levels of investment. The rise in government spending thus simply *crowds out* an equivalent amount of investment through negative effect on investment of the higher interest rate. 'Full crowding out' is said to have taken place.

In order to demonstrate further the processes at work in the neoclassical model, let us examine the effect on output and the interest rate of a restrictive fiscal policy.

As shown in Figure 7.7, the economy is initially at full-employment equilibrium (y_f,i_1). When the government pursues a restrictive fiscal policy, the *IS* curve will shift inwards from IS_1 to IS_2. This decreases demand in the economy below the full-employment level of output. If output were to fall (as in the Keynesian model) in response to the drop in demand, then the economy would come to rest at y_1,i_2.

However, as this is a neoclassical model, the economic forces at work are rather different. Instead of output falling in response to lower level of demand, price adjustment will take place. As demand falls, the goods market will be characterised by excess supply. This impacts directly on prices. Prices will fall in order to re-equate supply and demand in the goods market.

As prices fall (from P_1 to P_2), the real money supply will rise from M_1/P_1 to M_1/P_2, thus shifting the *LM* curve outwards in the process, until the full-employment equilibrium level of output is restored once again. The economy will thus come to rest at the intersection of IS_2 and LM_2. The full-employment level of output will be restored but at a lower level of interest rate (i_3). The net result of a restrictive fiscal policy is that full employment is restored, but this time as a result of greater investment demand (in response to the lower interest rate) and less government spending.

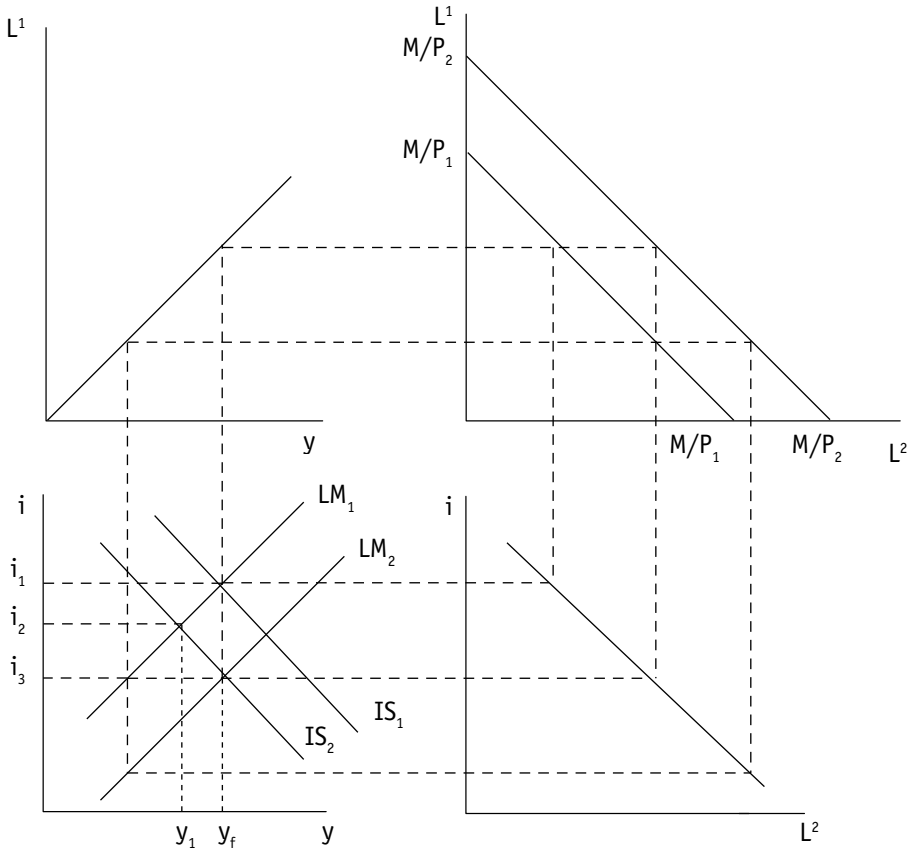


Figure 7.7 Restrictive Fiscal Policy in a Neoclassical Framework

Source: Authors.

Self-test

Using a four-quadrant diagram, show what happens to the equilibrium level of output and the interest rate when government lowers taxation. Assume a neoclassical model.

Source: Authors.

Monetary Policy

In a neoclassical model, any attempt on part of the authorities to increase the level of output through an expansionary monetary policy is ultimately self-defeating. As was the

case with expansionary fiscal policy, this result is a function of the neoclassical assumption that the economy is already at a full-employment level of output. Any attempt to boost demand above this level simply results in a rise in the price level.

When the reserve bank pursues an expansionary monetary policy, the real money supply initially increases as a result of the increase in the nominal money supply. This is shown in Figure 7.8 by the outward shift in M/P from M_1/P_1 to M_2/P_1. The LM curve shifts out from LM_1 to LM_2 accordingly (as people get rid of excess idle balances by purchasing bonds).

For the new level of demand to be satisfied, output would have to rise to y_1. However, given that there is no spare capacity in the economy (because the neoclassical model assumes all factors of production are fully employed), it is not possible for the increase in demand to be satisfied by an increase in output. All that happens is due to rise in prices.

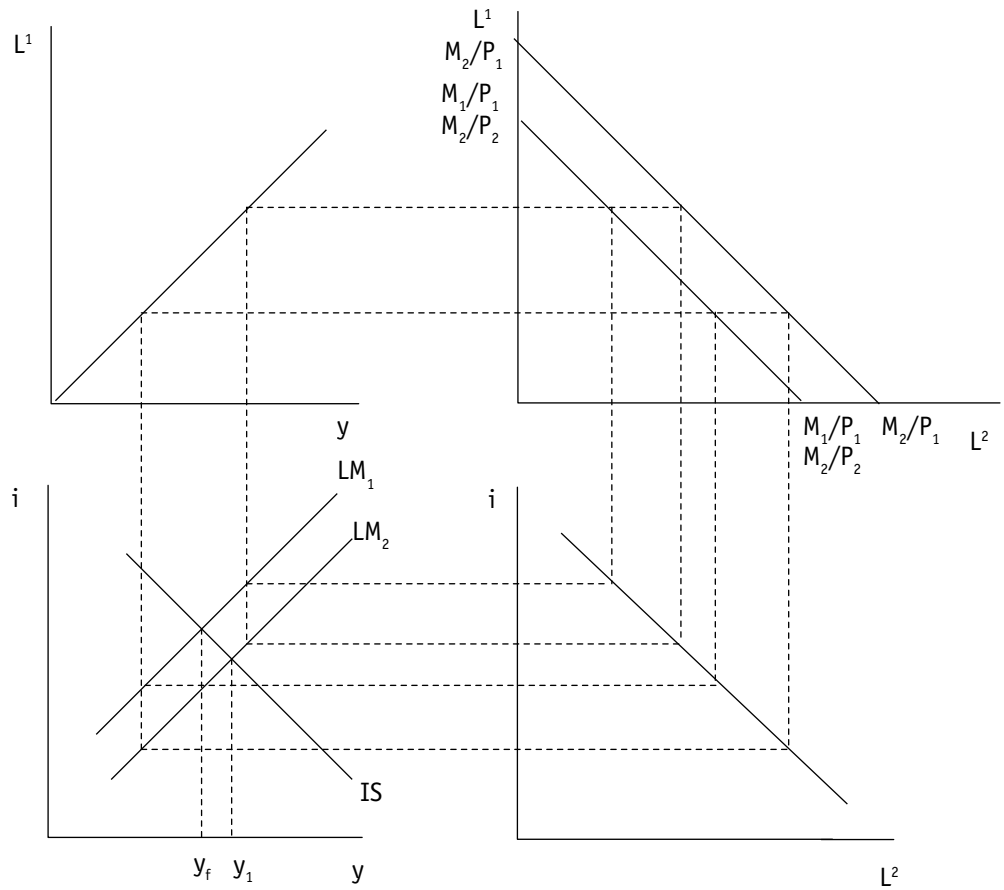


Figure 7.8 Expansionary Monetary Policy in a Neoclassical Framework

Source: Authors.

As prices rise, the real money supply contracts, thus pulling the *LM* curve back towards the left (as people sell bonds in order to restore their real transactions balances). This process will continue until the full-employment level of output is once again restored. This will occur when the original value of the real money supply is restored, that is, when $M_2/P_2 = M_1/P_1$. At this point, the *LM* curve will have returned to its original position, LM_1.

In short, an expansionary monetary policy has no impact on the real level of output. A rise in the money supply simply generates a rise in the price level. This result should be familiar to you: it is simply the quantity theory of money coming through in the guise of an *IS–LM* framework.

Self-test

Using a four-quadrant diagram, show what happens when government pursues a restrictive monetary policy. Assume a neoclassical model.

Source: Authors.

A Pragmatic Approach to *IS–LM*

A pragmatic approach to the *IS–LM* framework might be to use a neoclassical version to model an economy at full employment (or close to full employment), and to use a Keynesian version to model an economy in a depression (or as it heads into a recession).

For example, in modelling the performance of the Japanese economy from the 1960s to the 1980s, it would probably be appropriate to use a model with strong neoclassical features as the economy was close to full employment over much of the period. However, since the stock market and real estate bubbles burst in the early 1990s, Japan has been suffering from a recession. Interest rates dropped from 7 per cent to nearly 0 per cent in 1995 and have remained at this level. Some economists argue that Japan—and since the 2008 crash now also the advanced capitalist countries—is firmly caught in a liquidity trap and hence that monetary policy has been rendered powerless to stimulate demand.[9] If this is indeed the case, then the appropriate model for thinking about the economic challenge today may now be a Keynesian model with a very elastic *LM* curve. This in turn implies that an expansionary fiscal policy is the correct policy response.

[9] See e.g., Krugman, P., K. Dominquez and K. Rogoff. 1998. 'Its Baaack: Japan's Slump and the Return of the Liquidity Trap.' *Brookings Papers on Economic Activity* 2:137–205.

Krugman, P. 1999. *The Return of Depression Economics*. New York: Norton and Company.

Alternatively, one could argue that the appropriate policy response is rather to improve the institutional workings of the financial system (e.g., reforming banks and lending practices) and make the labour market more flexible. The more neoclassically-minded economists tend to opt for such measures rather than go along with Keynesian prescriptions (and we pick up this theme again in Chapter 8).

Which model is appropriate for India in the post-2008 crisis world? As shown in Table 2.3, India's economic growth rate dipped in 2008–09, picked up over the next 2 years but then slowed once more. In contrast to the rest of the world, Indian growth was not constrained by inadequate aggregate demand. Rather inflation and capacity constraints appear to be more pressing problems, with some commentators worrying also about relatively poor employment growth. There are also growing concerns about India's 'neoliberal' approach to economic growth and development, with some calling for greater government involvement in the economy.[10]

Rather than choosing between Keynesian and neoclassical models to suit different economic environments, one could construct a hybrid model allowing for an increase both in output and in prices when demand increases. In such a model, the expansionary impact of an increase in demand would be dampened (but not eliminated) by an increase in prices. This is illustrated in Figure 7.9 which shows an increase in output and

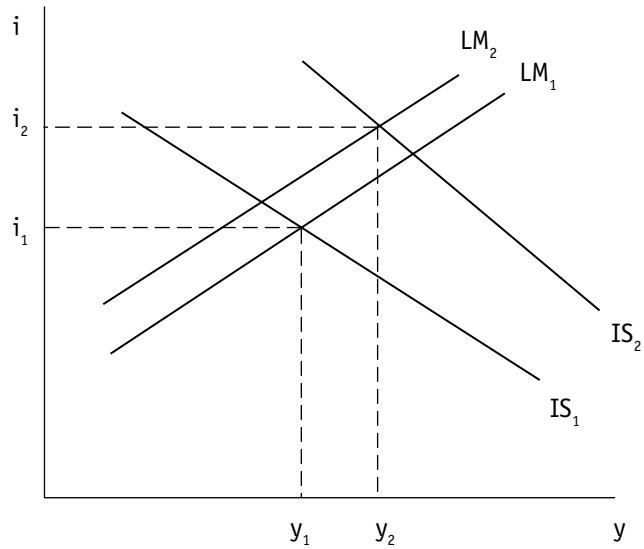


Figure 7.9 Expansionary (Pure) Fiscal Policy in a Hybrid Model Resulting in an Increase in Price and Output

Source: Authors.

[10] A.S.G. India. 2012. *Alternative Economic Survey, India 2007–08: Decline of the Developmental State.* Delhi: Daanish Books.

prices following an expansionary (pure) fiscal policy. The boost in demand pushes *IS* outwards, and the rise in price level pulls *LM* slightly backwards.

According to Tobin, this kind of pragmatic flexibility about output and price adjustment is central to Keynesianism. When asked 'What are the fundamental propositions which Keynesians adhere to?,' he replied:

> One way to put it is to say that there is a two-regime model of the economy. Sometimes the economy is in a classical situation where markets are clearing (demand equals supply) and the economy's ability to produce output is supply-constrained. … At other times the economy is in a Keynesian situation in which the constraint on actual output is *demand*—aggregate spending. That I think is the distinction. Whereas for the real business cycle theorists (like Ed Prescott) and new classical guys (like Robert Barro) you are always supply-constrained. There is just one regime, and the observed cyclical fluctuations are fluctuations in the voluntary willingness to be employed.[11]

Keynes himself would of course have agreed that 'Keynesian' prescriptions become increasingly unsuitable as the economy moved towards full employment. He was deeply aware of the dangers of inflation and was fond of quoting Lenin's dictum that 'there is no subtler, surer means of overturning [capitalism] than to debauch the currency'. In 1937, when unemployment was still at 12 per cent, Keynes worried that the British economy was in danger of over-heating. He wrote that 'we are in more need today of a rightly distributed demand than of a greater aggregate demand'.[12]

Distribution and Demand

But what did Keynes mean by this? What impact could a 'rightly distributed demand' have on the level of output and employment?

According to the basic Keynesian vision, the main culprits responsible for an economy sliding into a less than full-employment equilibrium are fluctuations in investment and changes in the demand for idle balances. If either investment contracts or the demand for idle balances increases (both of which could happen in times of uncertainty), then there will be a shortfall in demand, and hence an eventual cut in output and employment.

Consumption, by contrast, is regarded as a stable and relatively predictable part of expenditure. An implication of this is that channelling income from those who have discretionary income to place in idle balances, to those who consume all their income, will have a stabilising impact on the economy. Thus, if the poorer members of society (e.g., the working class) consume all their income, whereas wealthier members (e.g., highly

[11] Quoted in Snowdon, B., H. Vane and P. Wynarczyk. 1994. *A Modern Guide to Macroeconomics: An Introduction to Competing Schools of Thought*. pp. 126–67. Aldershot: Edward Elgar.

[12] Quoted by Skidelsky in the *Guardian Weekly*, 13/11/92.

paid professionals and capitalists) store some of it in idle balances (and thus cause leakages in demand), then it follows that redistributing income to workers will be good in terms of promoting full employment.

Three policy options thus face governments when attempting to boost economies out of a less than full-employment equilibrium: increase government spending and/or reduce taxation; expand the money supply or redistribute income in favour of those classes with the highest propensity to consume.

According to Skidelsky, this is the hidden radicalism in Keynes's theory of the consumption function:

> For what Keynes has implicitly done is to make *workers* (those who normally save only a tiny fraction of their incomes) the saviours of the capitalist system, businessmen its wreckers. While capitalists are febrile creatures, whose nerves can cause economies to go wild, the workers go on stolidly consuming according to slowly changing habit, their "demand" giving output such stability as it has. They lack the margin, perhaps the imagination, to be nervous; the deadly thought is that the capitalist system will become more unstable as workers get richer and start to behave more like capitalists.[13]

As Skidelsky notes, warming to his theme, the *General Theory* can be interpreted as a morality play in which the social landscape:

> [E]xhibits a life-denying *rentier* class which practises non-consumption in order to postpone the day of enjoyment; a business class driven by fantasies of triumph and disaster; a working class victimised not by calculated oppression but by the unsteady commitments of their controllers; and, on the other side of the divide, a radiant vision of cities beautified and marshes drained, and the good life brought within reach of all under the benevolent guidance of a Platonic state.[14]

Keynes believed that the solution to the crisis of capitalism (as manifested by the Great Depression) was the wise economic management by an elite of dedicated and skilled civil servants. (This lead his biographer to observe drily that senior economists of the time 'clung to the notion of the self-adjusting market because they mistrusted Keynes's theory of the self-adjusting politician'.)[15]

The question of state efficiency is very important. If governments were indeed comprised of skilled and efficient civil servants who were able to implement wise policies that encouraged rather than undermined private investment, then the nature of the debate over fiscal policy would be very different. It would be far more focused on questions like the optimal allocation of spending between education and infrastructure—rather than on large ideological battles over the optimal level of the deficit.

[13] Skidelsky, *John Maynard Keynes*, pp. 498–99.
[14] *Ibid.*, p. 543.
[15] *Ibid.*, p. 593.

Keynes and Communism

Keynes was an incorrigible elitist. Despite the redistributional implications embedded in the Keynesian consumption function, Keynes was no Marxist revolutionary. He believed in redistribution, but under the direct control of the bourgeoisie, and in the (indirect) interests of the bourgeoisie. Although some scholars have attempted to draw connections between Marxism and Keynesianism, Keynes was particularly hostile to communism in Russia:

> How can I accept a doctrine which sets up as its bible, above and beyond criticism, an obsolete economic textbook which I know to be not only scientifically erroneous but without interest or application for the modern world? How can I adopt a creed which, preferring the mud to the fish, exalts the boorish proletariat above the bourgeois and intelligentsia who, with whatever faults, are the quality of life and surely carry the seeds of human advancement? Even if we need a religion, how can we find it in the turgid rubbish of the Red bookshops? It is hard for an educated, decent, intelligent son of western Europe to find his ideals here, unless he has first suffered some strange and horrid process of conversion which has changed all his values.[16]

In turn, one Russian reviewer regarded him as a 'cynical intriguer, the worst enemy of the working class and the toiling masses, and the trusted servant of contemporary imperialism'.[17] Perhaps he was. It is quite possible that Keynesian demand management policies provided a solution to the capitalist crisis which in fact saved the system from more widespread revolutionary transformation.

Source: Authors.

Investment and Economic Policy

Private investment is notoriously hard to model because so much depends on 'expectations' or as Keynes preferred to put it, on fears, flights of fancy or simply the 'animal spirits' of investors. The attitude of investors to the government's budget deficit is widely regarded as a determinant of investment, although it is not clear how investors are likely to respond to it.

For example, consider a situation in which investment responds positively to demand—that is, as demand and output rises, the investment schedule shifts out. This

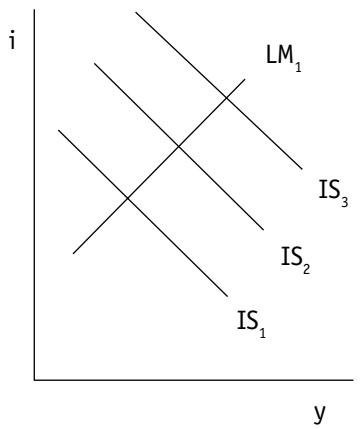
[16] *Ibid.*, p. 235.

[17] Blyumin, quoted in *ibid.*, p. 582.

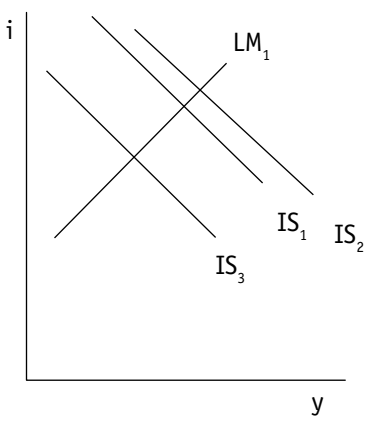
would be represented in the *IS–LM* model as an exogenous increase in investment. This appears to be the case in reality, as most studies of investment show it responding positively to demand.[18] Models that include demand as a driver of investment thus incorporate an 'accelerator' term: as demand rises, investment rises, thus pushing up demand and output further. Under these conditions, a debt-financed increase in government spending will push the *IS* curve out, and then as investment rises in response to the increased demand, the curve will shift out again) as in Panel A of Figure 7.10. (The model in Figure 7.11 assumes no change in prices. If prices rose too, then the *LM* curve would shift backwards in response.)

However, if investors respond with alarm to government plans to embark on debt-financed expenditure—perhaps because they fear the future inflationary implications or even a soverign debt default—then a totally different process will emerge. As shown in panel B of Figure 7.10, an outward shift in the *IS* curve because of government spending could backfire by panicking investors thereby shifting the curve backwards.

During the 1990s and 2000s, it became fashionable for policy makers in developing countries to assume that a restrictive fiscal policy would induce private investment spending because it would 'send a signal' that the government was pursuing 'sound'



A: An increase in debt-financed government spending boosts private investment (as investment responds positively to demand)



B: An increase in debt-financed government spending reduces private investment (as investment reacts negatively to the rise in government debt)

Figure 7.10 Different (Exogenous) Reactions on the Part of Private Investors to a Debt-financed Expansion in Government Spending

Source: Authors.

[18] See, Chirinko, R. 1993. 'Business Fixed Investment Spending: Modelling Strategies, Empirical Results and Policy Implications.' *Journal of Economic Literature* 4 (31): 1883.

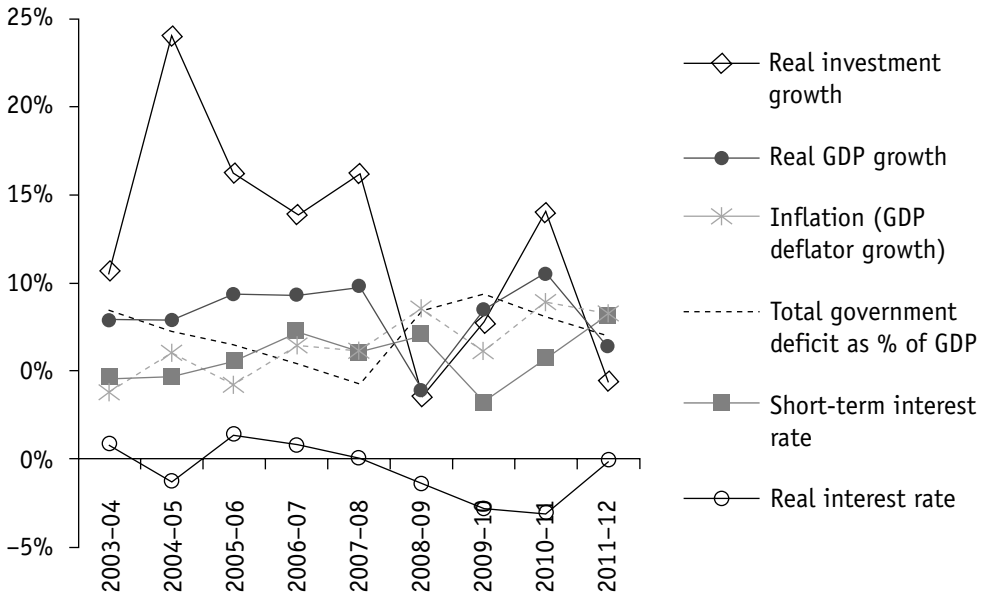


Figure 7.11 Trends in Real Interest, Investment and the Deficit in India 2003–04 to 2011–12

Source: Reserve Bank of India: http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics (downloaded 30 March 2013).

(i.e., balanced) fiscal policies. In 2010, India's government pledged to shrink its budget deficit by more than one percentage point of GDP in order to send the right 'signal' to investors about the government's seriousness to cut debt.[19]

This idea—that contractionary fiscal policies may have expansionary effects—assumed the status of a conventional wisdom worldwide during the 2000s, despite limited evidence for it and its dubious theoretical underpinnings.[20] However, with the 2008 crisis, most countries changed tack in practice and reverted to Keynesian strategies of employing fiscal stimulus to keep their economies afloat.

India, which weathered the global financial storm relatively easily, continued to act on the assumption that prudent monetary policy was necessary for attracting investment (and the authorities were probably justified in doing so given the jittery financial markets and inflationary pressures). In terms of the Fiscal Responsibility and Budget Management Act—which constrains the fiscal deficit within defined targets[21]—there is relatively little

[19] 'Mukherjee Pledges to Narrow India's Budget Deficit as Economy Accelerates.' *Industry News*, 26 February 2010.

[20] See, Blinder, A. 1997. 'A Core of Economic Beliefs?' *Challenge* 40 (4) July/August: 41–43.

[21] See, Centre for Budget and Governance Accountability, *FRBM-A Review, 2007,* New Delhi for a discussion of the act and related economic policies.

room for manoeuvre on the fiscal policy side. However, in the post-2008 period, India has allowed the deficit to exceed these targets, a kind of 'accidental Keynesianism' which some commentators believe might threaten fiscal stability in the future.[22] Indeed, by early 2013, the influential *Economist* magazine was describing Indian public finances as a 'walk on the wild side' and worrying about the level of public debt.[23]

Whether one worries more about the deficit and its impact on interest rates and hence on private investment, or about the possibility that cutting government spending (to reduce the deficit) will have an even worse effect on growth and investment, is a matter of judgement and theoretical presuppositions. Figure 7.11 shows that real investment in India grew strongly between 2003–04 and 2004–05 as real interest rates fell and economic growth picked up pace. This suggests that both the cost of borrowing and the accelerator effect of growth on investment may have been important. But even though real interest rates declined between 2007–08 and 2008–09, investment plummeted sharply as growth slowed. This suggests that growth was an important driver of investment. According to estimates by the International Monetary Fund (IMF), changes in real interest rates between 2006 and 2012 explained about a quarter of the change in investment and that supply bottlenecks and slowing growth were also important.[24]

Note that the government deficit started rising sharply as 'Keynesian' expansionary fiscal policy characterised post-2008 crisis policy. To some neoclassically- minded economists, this might suggest that the government deficit crowded out private investment to some extent (although the cost of borrowing was negative in real terms during this period so this is unlikely). For more Keynesian- minded economists, the rise in the deficit was necessary to prevent an even greater collapse in growth and investment.

But the rise in short-term interest rates and in inflation from 2009 to 2010, however, were probably signalling that such expansionary policies were not sustainable. By February 2013, the IMF was emphasising the need for decisive 'fiscal consolidation', notably for a reduction in untargeted subsidies (like fuel subsidies) and for an increase in tax revenues, including a general sales tax and greater efficiency in revenue collection. The IMF argued that a restructuring of government expenditure towards greater reliance on cash transfers to the poor and better targeted investment expenditure on infrastructure would help limit the impact of a lower budget deficit on demand and hence growth—and would assist in unlocking the supply-side constraints that were slowing investment and growth.[25]

[22] Chhibber, A. and T. Palanivel. 2009. *India Manages Global Crisis but Still Needs Serious Reforms for Sustained Inclusive Growth*. Stanford Center for International Development Annual conference on Indian Economic Policy Reform.

[23] 'A Walk on the Wild Side.' *The Economist*, 23 February 2013. p. 42.

[24] IMF Country Report No. 13/37. India: 2013 Article IV Consultation, February 2013. http://www.imf.org/external/pubs/ft/scr/2013/cr1337.pdf, p. 21.

[25] See, IMF Country Report No. 13/37. India: 2013 Article IV Consultation, February 2013: http://www.imf.org/external/pubs/ft/scr/2013/cr1337.pdf

Review Questions and Answers

An increase in taxation in a Keynesian model will, for any given level of income

a) Reduce consumption by an equivalent amount
b) Reduce savings by more than the tax increase
c) Reduce the marginal propensity to consume
d) Result in all of the above
e) Result in none of the above

Answer: e

Which if the following is true in the neoclassical IS–LM *model?*

a) Monetary policy and fiscal policy only have a lasting impact on the interest rate
b) The share of government is always the lowest component of aggregate demand
c) Increased demand will result in higher prices and the interest rate
d) There is no difference in the macroeconomic dynamics associated with fiscal and monetary policy
e) All of the above

Answer: c

In a closed-economy Keynesian IS–LM *model, under which set of assumptions will fiscal policy be more effective at increasing the level of output if the economy is in recession?*

a) An elastic *IS* curve and an elastic *LM* curve
b) An elastic *IS* curve and an inelastic *LM* curve
c) An inelastic *IS* curve and an elastic *LM* curve
d) An inelastic *IS* curve and an inelastic *LM* curve
e) We need more information to make a decision

Answer: c

Describe what happens in a Keynesian closed-economy IS–LM *model when the government pursues a restrictive fiscal policy by decreasing spending.*

A decrease in government spending shifts the $I + G$ function to the left. The fall in G feeds into a decline in aggregate demand which results in firms experiencing unplanned accumulation of inventories. Producers cut back on production (and the *IS* curve shifts to the left). As output and incomes fall, the transactions demand for money declines. People alter their portfolios and buy more bonds. The price of bonds rises and interest rates fall. The fall in interest rate dampens the fall in output because the lower interest rate boosts investment demand (which of course is why the *IS* curve has a negative slope).

CHAPTER 8

The Aggregate Supply and Demand Model

A closed-economy three-sector aggregate supply (*AS*) aggregate demand (*AD*) model can be generated by adding the labour market to the *IS–LM* model (which is summarised in the *AD* curve). It is a synthesis model in that it incorporates both price and output adjustment processes. Like the *IS–LM* model, it comes in Keynesian and neoclassical versions.

The Keynesian less than full-employment equilibrium is modelled in the *AS–AD* framework in terms of labour market failure. Keynesian economics is boiled down in this model to the 'special case' scenario associated with the failure of wages to adjust to market-clearing levels. This three-sector treatment of Keynesianism has come to be known as the 'neoclassical synthesis' in part because it explains Keynesian outcomes primarily in terms of the neoclassical narrative of imperfectly functioning labour markets.

The Neoclassical Synthesis

The term 'neoclassical synthesis' was coined by Samuelson in his famous text book Economics[1] to describe the consensus view of macroeconomics that had emerged in the USA by the 1950s. This view held that full employment was unlikely to be achieved under policies of laissez-faire but that it could be achieved through judicious use of fiscal and monetary policies. The neoclassical synthesis has also been associated with the view that in the short-run Keynesian situations prevail, but that in the long run the economy will tend towards full employment. Early contributors to the neoclassical synthesis were John Hicks (as discussed in Chapter 6), Franco Modigliani,[2] Lawrence Klein,[3] Paul Samuelson and Don Patinkin.[4]

Source: Authors.

[1] Samuelson, P. 1955. *Economics,* 3rd ed. p. 212. New York: McGraw-Hill.

[2] Modigliani, F. 1944. 'Liquidity Preference and the Theory of Interest and Money.' *Econometrica* 12 (1): 45–88.

[3] Klein, L. 1952. *The Keynesian Revolution*. London: Macmillan and Co.

[4] Patinkin, D. 1956. *Money, Interest and Prices*. Evanston: Peterson and Company.

The three-sector *AS–AD* model shows that incorporating the labour market and shifting from quantity adjustment to a combination of quantity and price adjustment results in a different understanding of economic processes—and in different policy prescriptions. It also allows us to discuss the relationship between unemployment and inflation.

The *AS* Curve

As shown in Chapter 3, the neoclassical *AS* curve depicts the relationship between output and price level as determined by the labour market and the production function.

The neoclassical AS *curve*

In a neoclassical model, nominal wages are assumed to adjust quickly and efficiently to ensure that a market-clearing real wage always prevails (see Chapter 3). Under these conditions, full employment always exists and the *AS* curve is thus vertical at the full-employment level of output. This is shown in Figure 8.1.

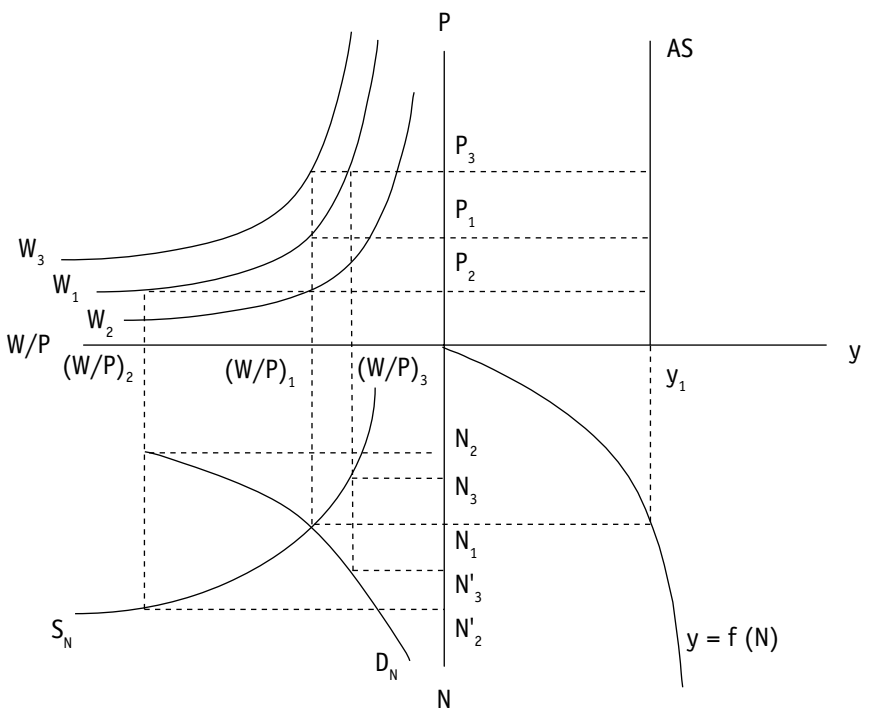


Figure 8.1 The Neoclassical Supply Curve

Source: Authors.

Deriving the AS *curve with money wages rigid downwards: The 'Keynesian' version*

Rather than assuming that money wages will decline during times of excess supply in the labour market, the 'Keynesian' version of the model assumes that money wages are inflexible (or 'sticky') in a downward direction. This idea reflects Keynes's insight that workers will resist attempts to reduce their money wages but are less likely to protest declines in real wages because it affects everyone equally:

> Every trade union will put up some resistance to a cut in money-wages, however small. But since no trade union would dream of striking on every occasion of a rise in the cost of living, they do not raise the obstacle to any increase in aggregate employment which is attributed to them by the classical school.[5]

Let us now derive this 'Keynesian' *AS* curve, that is, assuming that money wages are rigid downwards. Consider Figure 8.2. The combination of price level P_1 and W_1 gives an equilibrium real wage that clears the labour market. The economy is thus operating at the full-employment level of output, y_1.

Now, consider what happens if the aggregate price level drops from P_1 to P_2. The lower price level in combination with the same money wage (W_1) results in a higher real wage $(W/P)_2$. At this higher real wage, only N_2 amount of labour will be demanded. And, as indicated by the production function, N_2 of labour will produce only y_2 of output. The

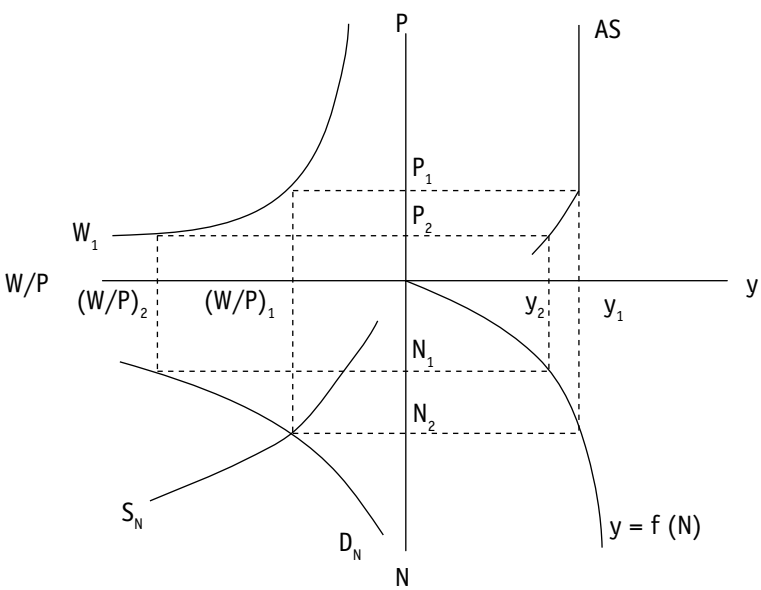


Figure 8.2 The Keynesian *AS* Curve

Source: Authors.

[5] Keynes, J. M. 1936. *The General Theory of Employment, Interest and Money* (Reprinted in 1964). p. 15. London: Macmillan.

new point on the *AS* curve is P_2,y_2. The Keynesian *AS* curve thus slopes upwards to the point of full employment.

Unemployment in this model is thus assumed to be the result of failure of wages to adjust downwards. It implies that the problem lies with wage-setting institutions and labour laws that enable workers to protect their (nominal) wage settlements at the cost of employment.

At the point of full employment, Keynesian dynamics give way to neoclassical dynamics, and the economics of full employment (rather than recession) applies. As Keynes puts it: 'When a point has been reached at which the whole of the labour and capital equipment of the community are employed, further increases in effective demand would have no effect whatever except to raise prices without limit.'[6] In other words, as soon as the economy reaches full employment, then the neoclassical model applies.

So, if the price level rises above P_1 in Figure 8.2, then workers will immediately resist any fall in real wages by bidding up the money wage. As in the neoclassical *AS* curve derivation, the money wage will rise to restore the full-employment equilibrium wage $(W/P)_1$.

Consider what happens to the *AS* curve in a Keynesian model if the money wage rises exogenously from W_1 to W_2. As can be seen in Figure 8.3, AS_1 is derived assuming a money wage of W_1. If money wages rise from W_1 to W_2, then every level of output up until the point of full employment will be associated with a higher price level. The proportion of the *AS* curve below full employment thus shifts upwards from AS_1 to AS_2.

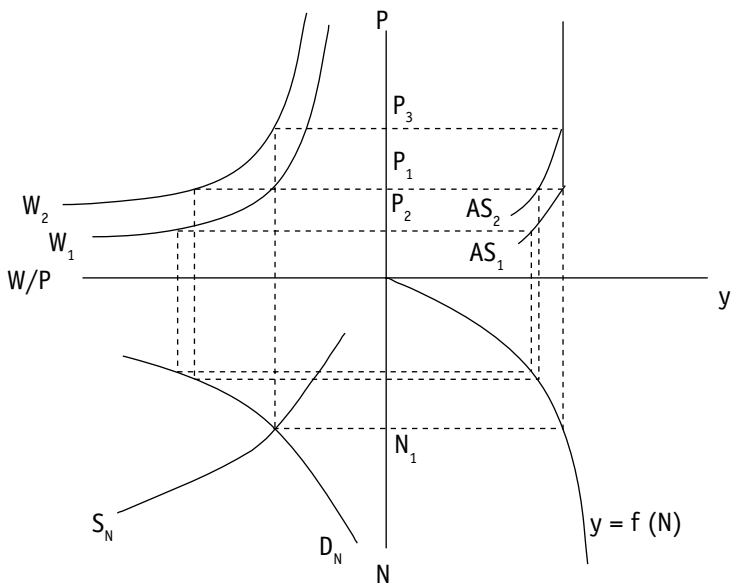


Figure 8.3 An Upward Shift in Nominal Wages and in the *AS* Curve

Source: Authors.

[6] Quoted in Skidelsky, R. 1992. *John Maynard Keynes: The Economist as Saviour, 1920–1937*. p. 507. London: Macmillan.

Do Labour Laws Undermine Employment in India?

There is a debate in India over whether the labour laws undermine employment growth—especially with regard to the Industrial Disputes Act (IDA) which requires that firms employing 100 or more workers obtain government permission for any retrenchments. Fallon and Lucas argue that extension of the IDA's coverage over time (it initially applied only to the organised sector, and then to all firms employing 300 or more workers, and finally to firms employing 100 or more) was associated with a drop in the demand for labour.[7] Building on this, Basu argues that this has harmed the very workers it sought to protect.[8] Such conclusions, however, have been criticised as not adequately supported by the data.[9]

Besley and Burgess explore differences in the implementation and character of the IDA at state level, arguing that employment was slowest in the pro-labour states.[10] But this study, too, has been criticised, including its classification system.[11]

In a recent review of the evidence, D'Souza concludes that 'the empirical evidence suggests that job security legislation in India has, on balance, not had the negative effects its critics make a case out for.'[12] He points out that firms have used voluntary retirement packages and (increasingly) contract labour to obtain the flexibility they need—and that the licensing system and capacity constraints are the main obstacles to employment growth in manufacturing. Whatever the impact of labour legislation, commentators agree that it has created a two-tier labour market of protected insiders versus those in more precarious, short-term and informal employment.

Source: Authors.

[7] Fallon, P. and R. Lucas. 1993. 'Job Security Regulations and the Dynamic Demand for Industrial Labour in India and Zimbabwe.' *Journal of Development Economics* 40 (2): 241–75.

[8] Basu, K. 2006. 'Labour Laws and Labour Welfare in the Context of the Indian Experience', *Poverty, Inequality and Development: Essays in Honor of Erik Thorbecke,* eds. Janvry, A. and R. Kanbur. pp. 183–204. New York: Springer.

[9] Bhalotra, S. 1998. 'The Puzzle of Jobless Growth in Indian Manufacturing.' *Oxford Bulletin of Economics and Statistics* 60 (1): 5–32.

[10] Besley, T. and R. Burgess. 2004. 'Can Labour Regulation Hinder Economic Performance? Evidence from India.' *Quarterly Journal of Economics* 119 (1): 91–134.

[11] Jha, P. and S. Golder. 2008. 'Labour Market Regulation and Economic Performance: A Critical Review of Arguments and Some Plausible Lessons for India'. Geneva: Employment Analysis and Research Unit, ILO.

D'Souza, E. 2010. 'The Employment Effects of Labour Legislation in India: A Critical Essay.' *Industrial Relations Journal* 41 (2): 122–35.

[12] *Ibid.*, p. 132.

The Aggregate Demand (*AD*) Curve

Now let us build the *AD* side into the model. The *AD* curve relates output and price level with reference to equilibrium in the goods and money markets. The *AD* curve can be derived from the *IS–LM* model.

Figure 8.4 depicts equilibrium in the goods and money markets in terms of the *IS–LM* analysis. The diagram immediately beneath the *IS–LM* model associates the various equilibrium positions in relation to the price level. For example, equilibrium output y_1 is associated with price level P_1. If the price level falls to P_2, then the real value of the money supply rises, and the *LM* curve shifts out to LM_2. Interest rates fall to i_2. Investment (and hence demand and output) rises and a new equilibrium level of output is reached at y_2. This transmission mechanism from prices to output is known as the 'Keynes effect'. If, on the other hand, the price level rises to P_3, then the real value of money supply falls, and the *LM* curve shifts backwards to LM_3. Interest rates rise to i_3 (investment demand declines in response) and output falls to y_3. The *AD* curve is derived by conceptually varying the price level in this manner.

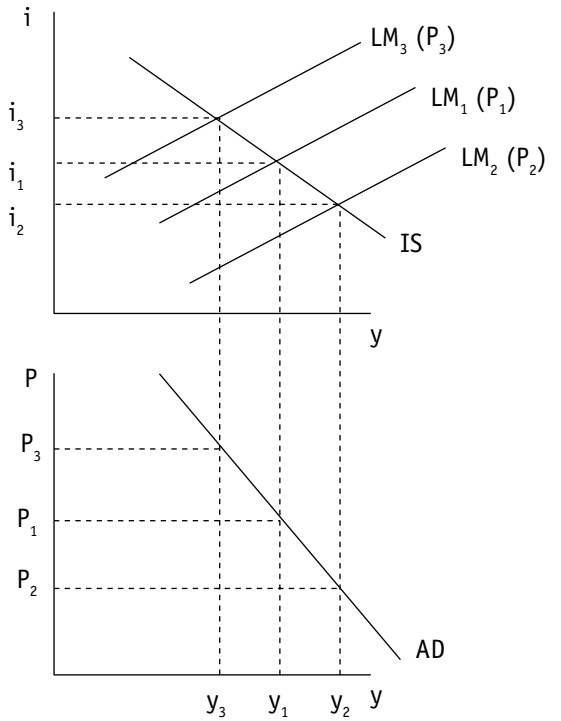


Figure 8.4 Deriving the *AD* Curve

Source: Authors.

Note that the *AD* curve consists of combinations of output and price level for which the goods and money markets are in equilibrium. It thus serves as a summary curve of dynamics in the goods and money market. All points to the left of the *AD* curve represent positions below *IS* and all points to the right of *AD* represent positions above *IS*.

Keynes, Pigou and the Real Balance Effect

Arthur Pigou argued that Keynes neglected another important effect of price changes on the economy. He suggested that if prices fall, then real (money) balances increase, thereby stimulating consumption.[13] This 'Pigou effect' would of course push out the *IS* curve, thereby providing an automatic correcting mechanism for an economy experiencing deflation and recession. The argument that falling prices would stimulate the economy through the Keynes effect (lower interest rates and higher investment) and the Pigou effect (higher real balances and greater consumption) came to be known as the 'real balance effect'. According to Patinkin, this effect eliminates the classical dichotomy by acting as an equilibrating mechanism, the result being that money is neutral.[14]

Source: Authors.

Shifting the AD *curve*

It is important to distinguish between a movement along the *AD* curve and a shift of the curve. The above derivation of the *AD* curve involved movements along the curve: as the price level was altered, a corresponding level of output was determined. In contrast, shifts of the curve occur when exogenous variables change. Shifts of the *IS* or *LM* curves, when caused by anything other than a change in the price level, will result in a shift in *AD*.

Consider an expansionary monetary policy. An outward shift in the (real) money supply will cause the *LM* curve to shift out from LM_1 to LM_2 (Figure 8.5). Output rises from y_1 to y_2 as a result. As the price level has not changed, the new combination of output and price level becomes P_1,y_2. The *AD* curve thus shifts to the right. If an expansionary fiscal policy is pursued, then both the *IS* and *AD* curves will shift out (Figure 8.6).

Self-test

- Show the effects on the *AD* curve of an increase in the rate of taxation.
- Show the effects of a restrictive monetary policy on *LM* and *AD*.

Source: Authors.

[13] Pigou, A. 1943. 'The Classical Stationary State.' *Economic Journal* 53 (212): 343–51.
[14] Patinkin, D. 1956. *Money, Interest and Prices*. Evanston: Row, Peterson and Company.

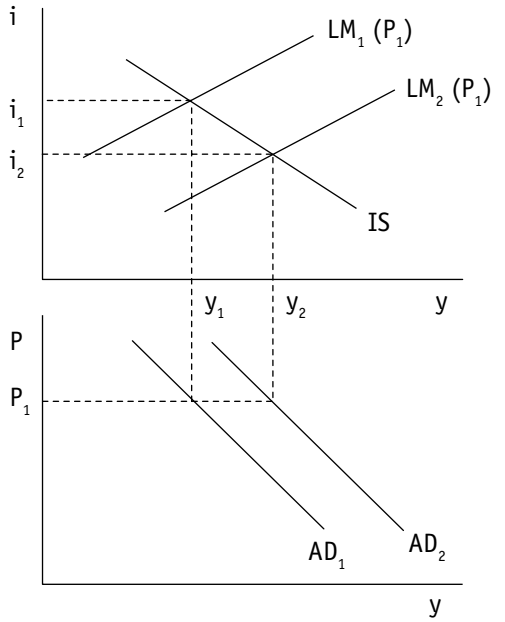


Figure 8.5 An Outward Shift in *LM* Causing an Outward Shift in *AD*

Source: Authors.

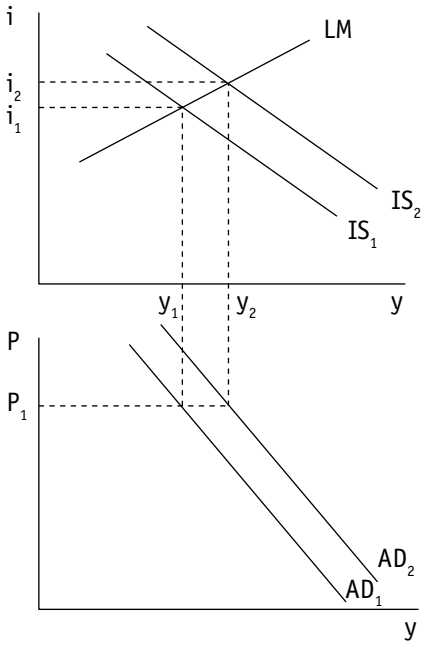


Figure 8.6 An Outward Shift in *IS* Causing an Outward Shift in *AD*

Source: Authors.

Equilibrium in the Keynesian *AS–AD* Model

Equilibrium in the three-sector Keynesian *AS–AD* model is determined by intersection of the *AS* and *AD* curves. Figure 8.7 shows that for there to be equilibrium in the goods, money and labour markets, the combination of price and output must be P_2,y_2. In this respect, the labour market plays a dominating role in determining the equilibrium output level.

The *AD* curve provides combinations of price and output for which the money and goods markets are in equilibrium. However, this set of possible output levels is determined within a two-sector framework only. Once the labour market is introduced (via the *AS* curve), then equilibrium output is set in the labour market. Remember, the *AS* curve is determined by conditions in the labour market. The price level affects the real wage, which affects the amount of employment demanded, which—via the production function—determines the amount of output produced.

Consider point (P_1,y_3) on the *AD* curve. Being on the *AD* curve, this point indicates that the goods and money markets are both in equilibrium. However, as indicated by the fact that (P_1,y_3) is not on the *AS* curve, this is not an equilibrium position once the third sector (the labour market) is included. Given the conditions prevailing in the labour market, price level P_1 is associated with an output level of y_1, not y_3. The amount actually

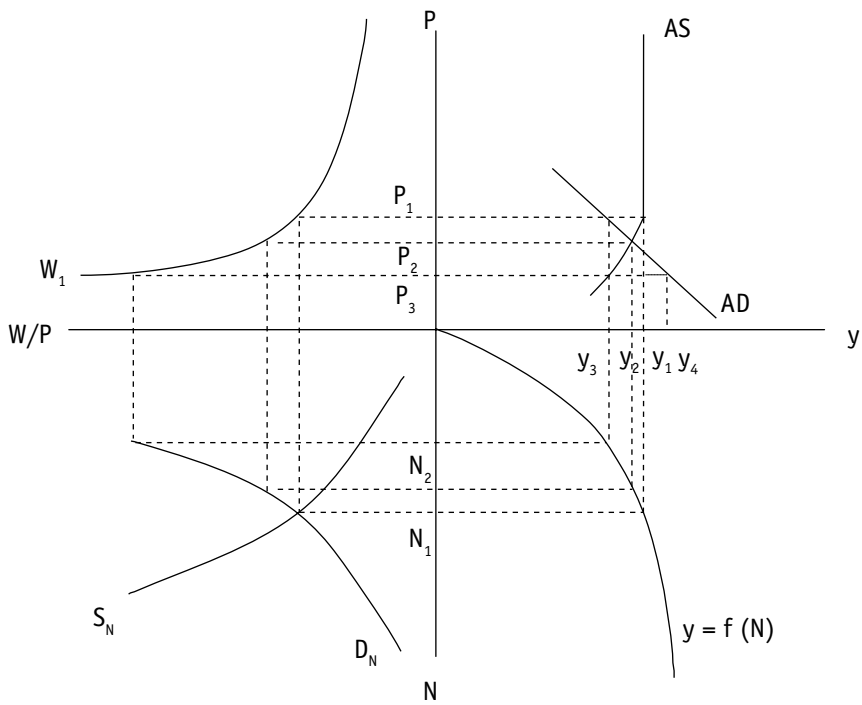


Figure 8.7 Equilibrium in the Keynesian Three-sector *AS–AD* Model

Source: Authors.

supplied (y_1) is thus inconsistent with equilibrium in the goods and money markets at that price level. Given that y_1 is greater than y_3, this situation can be characterised as one of *excess supply*.

In the two-sector Keynesian *IS–LM* model, excess supply results in a build- up of stocks which sends a signal to producers to cut back on output. In the three-sector Keynesian *AS–AD* model, excess supply also causes prices to fall from P_1 to P_2, thus raising real wages. This results in a fall in employment and output until equilibrium is restored at P_2,y_2.

Consider another point on the *AD* curve, P_3,y_4. At that low price level, real wages will be relatively high, and hence, employment and output will be low. From the *AS* curve, it was observed that the output will only be y_3, when prices are at level P_3. In other words, we have a situation of *excess demand*. Prices will thus be bid up. As prices rise, real wages fall. Employment and output will rise until equilibrium is restored.

The dampening effect of prices on the multiplier

At this point, it is worth comparing the effect on output of an increase in demand in the two-sector and three-sector Keynesian models. Let us assume that the government pursues an expansionary fiscal policy. In terms of the *IS–LM* framework, this shifts the *IS* curve to the right (from IS_1 to IS_2) and equilibrium output from y_1 to y_2 in Figure 8.8.

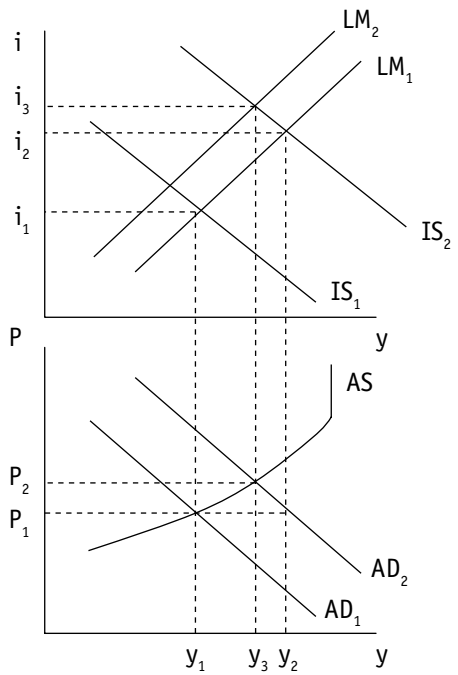


Figure 8.8 Comparing the Two-sector and Three-sector Keynesian Models

Source: Authors.

In terms of the *AS–AD* framework, the expansionary fiscal policy will shift the *AD* curve from AD_1 to AD_2. This will result in a price rise (from P_1 to P_2), and the economy will come to rest at y_3,P_2. If the effect of the price rise was tracked back into the *IS–LM* model, this would be expressed in terms of a decrease in the real money supply and hence in a backward shift in the *LM* curve from LM_1 to LM_2.

In other words, the three-sector model, by building in the effect on prices of an increase in demand, shows that an increase in demand has a smaller impact on output than the *IS–LM* model. The multiplier is thus smaller in the three-sector Keynesian model than in the two-sector model.

Interpreting the Keynesian less than full-employment equilibrium

In this three-sector neoclassical synthesis version of Keynesianism, the less than full-employment equilibrium is explained in terms of labour market failure.

Consider an economy at the full-employment equilibrium position of P_1, y_1 in Figure 8.9. Now let us assume that for some exogenous reason (e.g., an inexplicable loss of business confidence), the *AD* curve shifts to the left from AD_1 to AD_2. The economy plunges into a recession, bringing down prices from P_1 to P_2. The lower price level causes real wages to rise from $(W/P)_1$ to $(W/P)_2$. This causes employment to fall from N_1 to N_2, thus resulting in a drop in output from y_1 to y_2. What allows the economy to stagnate at y_2 is simply the fact that workers refuse to allow their money wage (W_1) to fall. In other words, their real wages are too high to clear the labour market. The rise in real wages

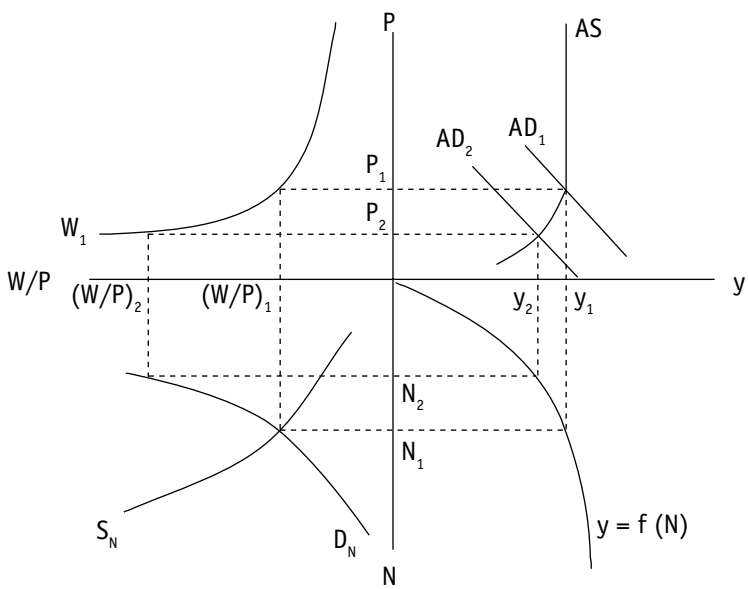


Figure 8.9 Changes in Demand in a Keynesian Model

Source: Authors.

(as a result of the fall in the price level) is thus responsible for the fall-off in employment and the decline in output.

When the 'Keynesian' less than full-employment equilibrium is explained in these terms, the way in which expansionary demand policies impact the economy alters accordingly. As you will recall from the two-sector *IS–LM* model, an expansion in demand leads to a decrease in inventories, which serves as a signal to producers to increase output. In this three-sector model, the increase in demand also results in an increase in output, but this time mediated also through the price mechanism and its impact on real wages.

In this model, the less than full-employment equilibrium is the result of the price level sinking (due to the impact of recessionary forces) and, in doing so, raising real wages above market-clearing level. In Keynes's view, the solution to the problem was for the government to pursue expansionary fiscal and monetary policies in order to boost the level of demand back from AD_2 to its original full-employment level of AD_1 in Figure 8.9.

Keynes was, in fact, willing to try any means of raising demand. In a radio broadcast in January 1931, he made the following impassioned appeal:

> The best guess I can make is that whenever you save five shillings, you put a man out of work for a day. ... On the other hand, whenever you buy goods you increase employment—though they must be British, home-produced goods if you are to increase employment in this country. ... Therefore, O patriotic housewives, sally out tomorrow early into the streets and go to the wonderful sales which are everywhere advertised. You will do yourselves good—for never were things so cheap, cheap beyond your dreams. Lay in a stock of household linen, of sheets and blankets to satisfy all your needs. And have the added joy that you are increasing employment, adding to the wealth of the country because you are setting on foot useful activities, bringing a chance and a hope to Lancaster, Yorkshire and Belfast. ... For what we need now is not to button up our waistcoats tight, but to be in a mood of expansion, of activity—to do things, to buy things, to make things.[15]

Whatever the cause of increased demand, the effect is the same: prices rise and inventories fall and producers get a clear signal to increase output. But note that the rise in price is more than a mere signal, as it facilitates a drop in real wages, which in turn allows firms to increase employment and output from y_2 to y_1.

For Keynes, bringing about such an adjustment to real wages by increasing the price level was far more sensible a policy than attempting to drive down nominal wages:

> The business of forcing down certain levels of wages, and so forth, into equilibrium is almost hopeless, or it will take a long time. The continuance of unemployment is to an important extent due to the fact that we have got the level of wages ... out of gear with everything else. The only way in which they will get into gear will be by an increase in the level of prices.[16]

[15] Quoted in Skidelsky, *John Maynard Keynes*, pp. 383–84.
[16] *Ibid.*, p. 133.

Those thinkers who are more neoclassically minded, however, prefer to act directly on nominal wages (typically by eroding the power of labour to drive up nominal wages) in order to bring about an adjustment to real wages. Indeed, breaking trade-union power was an explicit and important aspect of 'Thatcherist economics' in Britain under Prime Minister Margaret Thatcher. Thatcher also promoted the privatisation of state assets and lower taxation on the rich.

Equilibrium in the Neoclassical *AS–AD* Model

In a neoclassical word, the Keynesian less than full-employment equilibrium is impossible as the economy always comes to rest at full employment. As argued earlier, this implies that the neoclassical *AS* curve will be vertical at the full-employment level of output.

Assume the economy is at P_1,y_1 in Figure 8.10. Now let us suppose that *AD* falls for exogenous reasons from AD_1 to AD_2. Prices fall from P_1 to P_2 and real wages rise from $(W/P)_1$ to $(W/P)_2$. If real wages were to remain at this level, then unemployment would result. However, this being a neoclassical world, workers compete for jobs and, in so doing, allow their money wages to fall from W_1 to W_2. In this way, the full-employment real wage is restored. The economy thus returns to the full-employment level of output, but this time at a lower price level (P_2).

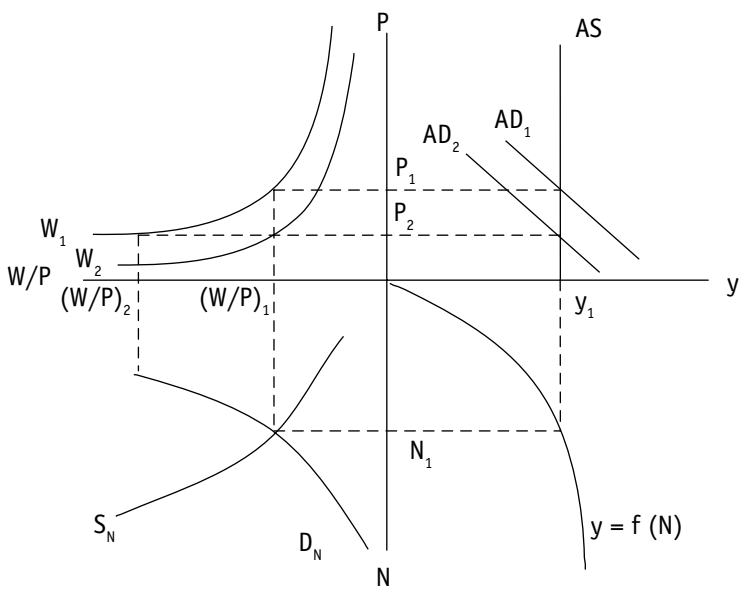


Figure 8.10 Changes in Demand in a Neoclassical Model

Source: Authors.

The three-sector *AS–AD* 'neoclassical synthesis' model suggests the following:

- When markets function perfectly, money wages will always adjust to restore labour market equilibrium.
- When an economy stagnates at a less than full employment (the Keynesian version of the model), the problem lies in the labour market—real wages are too high to ensure full employment.

The policy implications boil down to a choice between:

- making the labour market more 'flexible', that is, ensuring that wages are able to 'adjust' upwards and downwards so as to clear the labour market (the option favoured by the neoclassically minded) and
- raising the level of demand—and hence prices—and, in so doing, lowering real wages and hence enabling the economy to move out of recession (the option favoured by Keynes).

Comparing the One-sector, Two-sector and Three-sector Keynesian Models

So far, we have built three different Keynesian models at an increasing level of complexity. The one-sector (Keynesian cross) model describes the goods market; the two-sector (*IS–LM*) model adds the money market and the three-sector (*AS–AD*) model incorporates the labour market.

With each additional degree of complexity, the multiplier effect of an increase in demand becomes smaller. This is shown in Figure 8.11. By including the relationship between investment and interest rate, the *IS–LM* model shows that the positive effect of an increase in demand on output will be dampened by the negative effect of a rise in interest rate on investment. By including the effect of an increase in demand on the level of prices, the *AS–AD* model indicates that the multiplier effect is dampened even further by the negative effect on output of a decline in the real money supply.

The top diagram in Figure 8.11 depicts the simple one-sector Keynesian cross. An increase in government spending (from G_1 to G_2) generates an increase in output from y_1 to y_2. When that same increase in government spending is depicted in terms of a two-sector *IS–LM* model, the rise in output is dampened further by a rise in interest rate (from i_1 to i_2) and consequent fall in investment. Output thus rises only from y_1 to y_3.

The bottom diagram models an increase in government spending in terms of an outward shift in *AD* from AD_1 to AD_2. The rise in price (from P_1 to P_2) has an additional dampening effect and output only rises from y_1 to y_4.

The models show that as one builds a more complicated picture of the economy, the impact of policy on output becomes more complex (and in case of these three models,

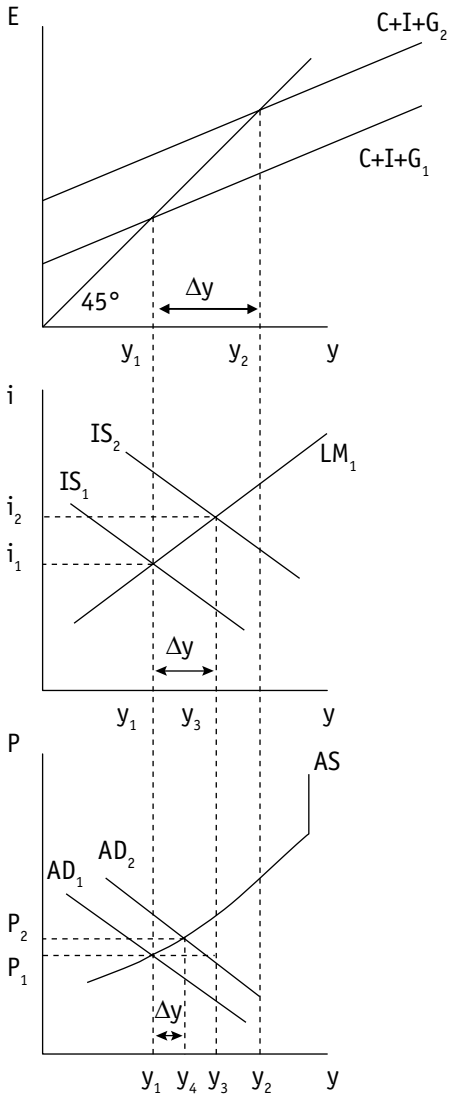


Figure 8.11 The Effect of an Expansionary Fiscal Policy in the One-sector, Two-sector and Three-sector Keynesian Models

Source: Authors.

more muted). However, the danger with using more complex models is that if one set of relationships is wrong, the entire modelling exercise can be thrown off course. And the more complex the model, the greater the need for reliable and accurate data. When the data are poor and when relationships are unclear, simple models are sometimes more appropriate.

Short-term and Long-term Growth

When thinking about these dynamics, it is important to bear in mind the distinction between short-run economic models (which model an increase in output for a given capital stock and technology) and long-run growth models (which allow capital stock and technology to change). The *IS–LM* and *AS–AD* models are of a short-run nature and by definition assume a fixed production capacity. Where spare capacity exists, an increase in demand will result in an increased output (i.e., economic growth will take place) until full capacity is reached. The short-run nature of the models is formalised explicitly in the three-sector *AS–AD* model by the inclusion of a production function drawn for a given capital stock and technology.

There is a substantial literature on economic growth theory exploring various economic relationships such as that between savings, investment, the capital stock, labour inputs, technology and output. Neoclassical models tend to model economic growth as being dependent on capital accumulation, which in turn is modelled as being dependent on the growth of savings. A rise in savings translates automatically into an increase in investment and in the capital stock. This increase in capital (i.e., productive capacity) shifts the production function upwards. Technological change, which is exogenous, also shifts the production function upwards.

Modern 'endogenous' growth theory moves away from the assumption of diminishing marginal returns to the factors of production by modelling knowledge as an important input into the production function. The acquisition of knowledge allows the productivity of labour and capital to rise over time. In this view, competitiveness is driven by investment in human capital (skills, training, learning-by-doing, etc.).

This is not the place for a detailed discussion of economic growth theory.[17] Simply bear in mind that economic policies can stimulate a rise in output in two ways: policies that boost demand will increase output in the short term; and policies that promote the growth of human and physical capital will lay the basis for sustainable growth in the longer term. An increase in demand increases output by pushing an economy up the *AS* curve, whereas an outward shift in the production function moves the *AS* curve itself.

Policies that increase output by moving up the *AS* curve are sometimes known as 'demand-side' policies, whereas those which work on the production function (and hence shift the *AS* curve) are sometimes known as 'supply-side' policies. Supply-side interventions include policies to promote investment (such as tax incentives), expenditure on training and skills enhancement (which make workers more productive for any given input of capital), and policies designed to improve the environment for growth (through improving infrastructure, economic services, law enforcement, etc.). Supply-side interventions affect the production function via two channels: by increasing the amount of capital, and by improving the productivity of either labour or capital by other means. Both result in an outward shift of the production function.

[17] For an accessible discussion of economic growth theory see, Gylfason, T. 1999. *Principles of Economic Growth*. Oxford: Oxford University Press.

The challenge facing policy makers is to balance short-run supply-side and demand-side policies in a way that does not undermine sustainable growth. If demand rises in excess of existing surplus capacity, then the danger of inflation arises. This outcome has to be avoided by increasing productive capacity (by the public or private sectors) at the same time.

Note that investment works on the demand side (as modelled in earlier chapters) by increasing spending on capital goods. But if one takes a longer term perspective, it also works on the supply-side by increasing the capital stock—thereby shifting out the production function in long-run growth models. For this reason, policy makers keep a careful eye on trends in fixed capital formation and try to find ways to boost private investment by carefully-targeted public investment, for example in economic infrastructure such as roads and ports.

The Phillips Curve and Unemployment

The three-sector *AS–AD* neoclassical synthesis turned out to be a very powerful and resilient policy tool. The model provided a framework for understanding recessions and, with minor adaptations, the relationship between inflation and unemployment. From the late 1960s onwards, economic growth (and, later, the OPEC oil shocks) created inflationary pressures in the advanced capitalist countries. Macroeconomic models had to be capable of explaining this phenomenon if they were to remain credible. By incorporating the Phillips curve into the three-sector model, the neoclassical synthesis provided an (wage-led) explanation of inflation and a few guidelines for policy makers. The central notion was the existence of a tradeoff between unemployment and inflation.

The Phillips curve

In 1958, A. W. Phillips published an empirical paper showing a negative correlation between the percentage change in wages and the level of unemployment in the United Kingdom.[18] The curve suggested that wage growth was slower when the unemployed portion of labour force was relatively large and faster when it was relatively small.

Although this was not the first time that such a correlation had been observed, Phillips was lucky enough to be publishing his work in the right place at the right time. The 'Phillips curve' was seized upon as a means of incorporating an explanation of inflation into the neoclassical synthesis.

The Phillips curve was merely an empirical correlation, but the negative relationship between the growth of (money) wages and the unemployment rate was subsequently introduced into macroeconomic models as a means of explaining inflation. This can be done by assuming (1) the ability of workers to drive up wages will be greater during

[18] Phillips, A. W. 1958. 'The Relationship between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1881–1957.' *Economica* (25): 283–99.

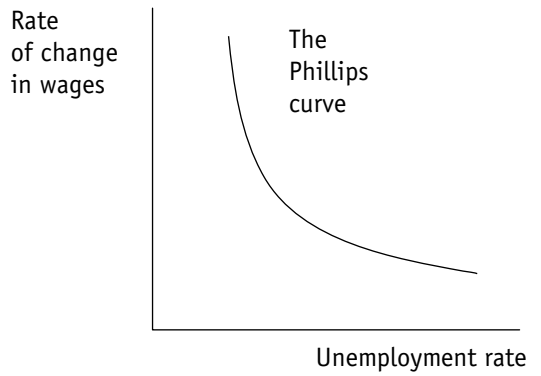


Figure 8.12 The Phillips Curve (Wage Increases and Unemployment)

Source: Authors.

periods of low unemployment and (2) if prices are determined in part as a mark-up on costs, wage inflation translates into price inflation.

The Relationship between Wage Growth and the Rate of Unemployment in a Closed Economy

The first assumption behind a Phillips curve-type explanation of inflation is that the rate of growth of wages is in part a function of the bargaining power of workers. When there is very little unemployment, workers are in a strong bargaining position; there is little wage competition from unemployed work-seekers, and employers are more likely to accede to high wage demands in order to keep production going. The fact that union strike funds are larger during booms (as unions have more members) adds to this bargaining position. Conversely, when unemployment is high, employed workers will be in a weaker position and hence will not be able to obtain rapid or large wage increases.

The second assumption is that firms set their prices in part as a mark-up on costs—and hence that as wages rise, so too do prices. If firms did not do this, their profit margins would be eroded and the profit share (of value-added) would fall. In other words, inflation results from distributional conflict between labour and capital. In terms of this scenario, prices rise when the bargaining power of workers is strong. This is consistent with a negative relationship between the rate of growth in the price level (i.e., the rate of inflation) and the rate of unemployment.

Note that this is only possible in a relatively closed economy. In an open economy, price increases are constrained by international competition as consumers may respond by importing foreign-produced substitutes rather than paying the higher domestic prices.

In accordance with this understanding of price determination (which is an important departure from the story of prices being determined solely by the interaction of supply

and demand in perfectly competitive markets), the Phillips curve can be drawn as a relationship between prices and unemployment rather than as a relationship between wages and unemployment. The price–unemployment version appears in the Keynesian dynamic model discussed below.

But let us pause for a moment and consider the difference between the above 'Keynesian' theory of inflation and the standard neoclassical explanation. As shown most baldly in the Quantity Theory of Money, a fundamental tenet of neoclassical thinking is that the money supply determines the price level. This result derives from the assumption that the economy is at (or gravitating rapidly towards) full employment. The argument is taken slightly further in the *IS–LM* neoclassical model, which suggests that any expansionary government policies (be it monetary or fiscal) will ultimately generate only inflation. The bottom line of this theoretical approach is thus that governments cause inflation through their ham-handed attempts to fine-tune the economy. According to neoclassical theory, governments should facilitate the smooth operation of market forces, and not attempt to regulate the level of employment by influencing the level of demand.

By constructing an explanation of inflation in terms of the Phillips curve, Keynesians were able to justify continued government intervention. In this model, prices rise as the economy moves towards full employment. In other words, inflation becomes the necessary price for obtaining the social goal of minimal unemployment.

In short, the Phillips curve relationship suggests that there is a *tradeoff between the rate of unemployment and the rate of inflation*. Policy makers must simply make a judgement as to what combination is the most desirable and then design policies accordingly.

In his influential presidential address to the American Economic Society,[19] Milton Friedman argued that the Phillips curve was mis-specified because it was related to the rate of change of money wages rather than real wages. He pointed out that workers are interested in real wages, not money wages, and that they bargain wages in terms of some expectation about inflation. He therefore 'augmented' the Phillips curve with the anticipated rate of inflation as an additional variable determining the rate of change of money wages. It is to a discussion of the role of expectations formation in bargaining that we now turn.

A Dynamic Keynesian Model Assuming Naive Expectations

Using the above Phillips curve-type explanation of inflation, we can now show how the three-sector model can be extended into a more dynamic framework incorporating the rate of change in unemployment and prices. The model is more dynamic because it traces an economic process over time.

[19] See Friedman, M. 1968. 'The Role of Monetary Policy.' *American Economic Review* 153 (1): 1–17.

Assuming naive expectations on the part of workers, the model can show the possibility of a constant tradeoff between the rate of unemployment and the rate of inflation. As will become clearer later on, it is only under the assumption of naive expectations that such a tradeoff is stable over time.

In order to show a stable relationship between the rate of inflation and the rate of unemployment, it is necessary to trace the bargaining and price-setting process over time. The model below traces such a path over three distinct time periods (in this case, years). For the sake of simplicity, we will assume that workers and employers bargain over money wages at the end of each year. They sign a contract that remains in force until the end of the following year, at which point it is renegotiated and enforced over the next year.

Because a rise in the price level erodes the real value of money wages, workers have to make a judgement about the likely change in prices over the contract period and take this into account when bargaining over their money wages. The kind of information which workers use in forming these judgements, and the way in which such information is processed into expectations about the future, are captured in economic models through an *expectations function*.

The most simple model of expectations formation is the 'naive' expectations function, which assumes that prices ruling in the current period will continue to rule in the following period. The naive expectations function can be expressed as follows:

$$E_t(P_{t+1}) = P_t, \tag{8.1}$$

where t = current period; $t + 1$ = following period.

Equation 8.1 says that current expectations (E_t) about the price level in the following period (P_{t+1}) are given by the price level ruling in the current period (P_t). In other words, workers are exhibiting 'naive' expectations by assuming that the current price level will continue unchanged into the future. Of course, if inflation is negligible and if workers expect the government to pursue anti-inflationary policies, then holding such expectations is not as silly as it may first appear. However, as shown below, naive expectations in the presence of inflationary forces will result in a fall in real wages.

Assume that the economy is initially at P_1,y_1 in Figure 8.13. Assume also that workers wish to obtain a real wage of W_1/P_1 (i.e., $(W/P)_1$). On the assumption that the existing price level (P_1) will hold in the future, they bargain a money wage of W_1, which binds them into a contract for the following period (the next year).

Now let us assume that the government wishes to boost employment and output. Expansionary fiscal (and/or monetary) policies are pursued which push the *AD* curve out from AD_1 to AD_2. This results in a rise in the price level to P_2, a fall in the real wage (to $(W/P)_2$), an increase in employment and hence an increase in output to y_2.

Because workers are bound into a money wage contract, they cannot defend this erosion of their real wage. However, at the end of the year, they attempt to restore their real wage by bargaining up the money wage. What money wage will they bargain? Assuming

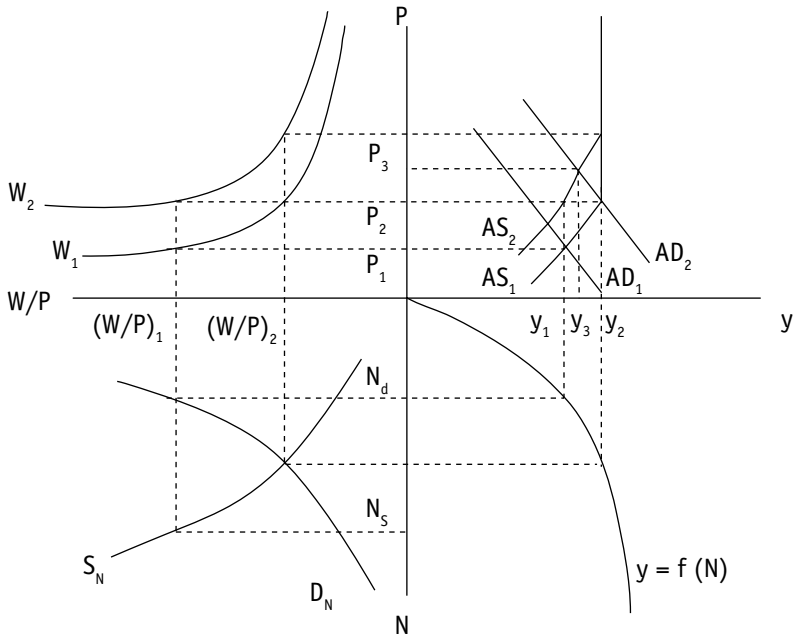


Figure 8.13 A Keynesian Model Assuming Naive Expectations

Source: Authors.

naive expectations on the part of workers, the model assumes that workers will act on the expectation that the current price level (P_2) will continue into the next period. They thus attempt to restore their original real wage, $(W/P)_1$, by bargaining a money wage of W_2. This results in an increase in the real wage and in an upward shift in AS from AS_1 to AS_2. The new equilibrium is at P_3,y_3.

The unexpected increase in the price level (from P_2 to P_3) erodes the real wage of workers. Consequently, at the end of the year, they will bargain an increase in the money wage on the assumption that P_3 will continue into the next year. However, for the same reasons outlined for the previous period, the resulting upward shift in the AS curve ensures that the price level will rise further than expected, and hence that the bargained real wage is eroded once again.

The message of the story is that the attempt to maintain a rate of unemployment lower than that associated with the desired real wage of workers, results in a constant rate of inflation. The story is consistent with the Phillips curve, and implies that government can trade off inflation and unemployment. Figure 8.14 draws the Phillips curve associated with the model in Figure 8.13.

$$\text{The rate of inflation over two periods} = (P_3 - P_1)/P_1 = P^* \quad (8.2)$$

$$\text{The rate of unemployment} = (N_s - N_d)/N_s = U^* \quad (8.3)$$

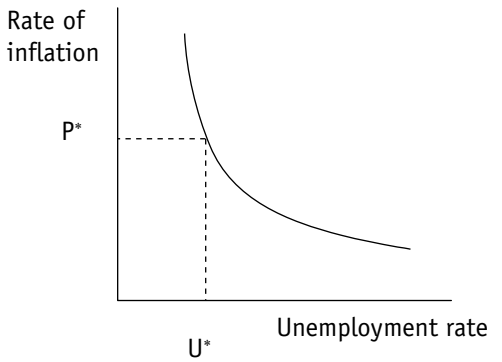


Figure 8.14 The Phillips Curve (Price Increases and Unemployment)

Source: Authors.

Adaptive Expectations and the Long-run Vertical Phillips Curve

The above result rests on the assumption that workers always believe that the current price level will remain the same in the following period. In other words, workers are assumed never to learn from their mistakes. Rather than noting that the price level is always higher than expected, they continue to act on the basis of naive expectations, that is, they assume that what rules today, will rule tomorrow.

What happens to the model if we adopt a more realistic approach and assume that workers learn from past experience? As shown below, if we assume *adaptive* rather than naive expectations, then the notion of a steady tradeoff between the rate of unemployment and inflation comes unstuck.

A simple adaptive expectations model can be constructed as follows:

$$E_t(P_{t+1}) = P_t(1 + P_t - P_{t-1})/P_{t-1}. \tag{8.4}$$

NB: $(P_t - P_{t-1})/P_{t-1}$= the rate of inflation in the current period.

In other words, workers expect that the price level in the next period will equal the current price level plus the current price level multiplied by the rate of inflation. They thus adjust their wage bargaining on the assumption that prices will not stay the same but will *rise at the same rate* as they did in the previous period. Under these conditions, the nominal wage will be bargained upwards to a greater extent than it was in the previous period. However, because the intersection of the new *AS* curve and the *AD* curve ensures a higher than expected price level, real wages will continue to be eroded. This results in an accelerating wage price spiral.

This is bad news for the stable Phillips curve relationship. It suggests that over time, any attempt to maintain a stable rate of unemployment (say U^*) below a certain ('natural') level will result in an ever-accelerating rate of inflation. For example, in year 1, the

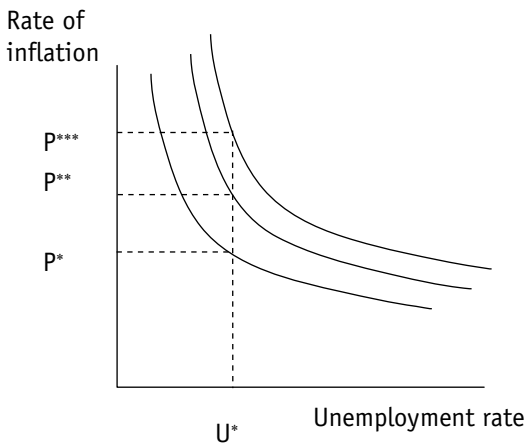


Figure 8.15 Upward Shifts in the Phillips Curve

Source: Authors.

inflation rate might be P^*; however, in year 2, it is likely to be P^{**}; and similarly, in year 3, it could be P^{***}. This is shown in Figure 8.15. In other words, the Phillips curve could shift upwards over time. The tradeoff between the unemployment rate and that of inflation thus becomes a short-run phenomenon only, with the long-run Philips curve being vertical. 'Monetarists', such as Milton Friedman, used this kind of argument to attack Keynesian economics during the 1970s.

Rational Expectations

Some economists, however, believe that even the idea of a short-run tradeoff between inflation and unemployment is mistaken. By adopting a rational expectations framework, they argue that economic agents are much better informed and wiser than suggested by the adaptive expectations framework. They assume that people understand economic theory and practice so well that they can accurately predict the path of inflation in the future. The inflation forecast equation thus becomes

$$E_t(P_{t+1}) = P_{t+1}. \tag{8.5}$$

Assuming such perfect information and also flexible wages and prices, the rational expectations model removes even the possibility of a short-run tradeoff between unemployment and inflation.

Many fancy mathematical economic models have been constructed on the basis of rational expectations. The real business cycle models referred to in Chapter 3 fall under this category. The problem, however, is the extreme implausibility of the assumption.

Information and understanding are costly to acquire. And, considering that the predictions of sophisticated economic forecasting models are regularly proved wrong, what is the point of assuming that economic agents can do any better, even if they had all the available information and understanding?

Nevertheless, the rational expectations school correctly places the spotlight on the ways in which expectations, on part of economic agents, can potentially undermine government policies. Rational expectations enthusiasts may have been carried away with the beauty of their models, but they have nevertheless shown how inappropriate it is to assume naive expectations on part of economic agents.

The NAIRU

The possibility of a relationship between unemployment and *accelerating* inflation poses problems for policies designed to reduce unemployment. The bouts of inflation that beset the advanced capitalist countries from the late 1960s have generally made policy makers more cautious about stimulating demand. Some economists warn that attempts to lower unemployment below the 'natural' rate of unemployment (or the non-accelerating inflation rate of unemployment, the NAIRU), could be counterproductive. In terms of Figure 8.13, the NAIRU would be that level of unemployment associated with the real wage that workers insist on defending $(W/P)_1$. Any level of unemployment below that is assumed to generate accelerating inflation through wage–price spirals.

Does a Philips Curve or a NAIRU Exist in India?

If a Philips curve exists in India, then policy makers can use Keynesian policies to boost employment, albeit at the cost of higher, stable inflation. If a NAIRU exists, then there is no room for expansionary policies to reduce unemployment below the NAIRU.

According to Biru Paul, a Phillips curve-type relationship is evident in the Indian industrial sector (once supply shocks and policy shocks are taken into account)—suggesting the existence of a short-run tradeoff between inflation and industrial output.[20] Patra and Ray[21] estimate a Phillips curve taking into account various shocks and monetary and fiscal policies. Their work points to

(Box Continued)

[20] Paul, Biru Paksha. 2009. 'In Search of the Phillips Curve for India.' *Journal of Asian Economics* 20 (4): 479–88.

[21] Patra, M. and P. Ray. 2010. 'Inflationary Expectations and Monetary Policy in India: An Empirical Exploration.' *IMF Working Paper*, WP/10/84.

(Box Continued)

the existence of adaptive expectations. Dholakia and Sapre take this work forward and find that there is a regular tradeoff between inflation and output (or unemployment) with inflationary expectations based on the experience of the past 3–4 years.[22]

Source: Authors.

One of the problems with the concept of a NAIRU is that it is very difficult estimating the unemployment levels associated with it. Some economists believe that the idea is so abstract (even incoherent) that it is of little practical significance. A further problem is that the NAIRU hypothesis seems to fit the real-world experience less and less well as time goes by. The notion of an equilibrium rate of unemployment which will result in a stable inflation rate has been severely challenged by the experience of the 1980s in the most advanced capitalist countries, when unemployment persisted despite a significant reduction of inflation. Deviation from the NAIRU occurred almost as if the NAIRU increased with unemployment itself. In any event, the serious rise in unemployment globally as growth faltered after the 2008 economic crisis has refocused policy makers' attention on boosting growth and employment rather than worrying about abstract notions with little contemporary relevance such as the NAIRU. In India, for example, employment rates were lower in 2011 than in 2007.[23] This has serious implications for inequality and growth.

The 'Low Road/High Road' Counter Narrative

The *AS–AD* model presented above implies that labour market distortions (perhaps caused by labour legislation) are at the root of less than full-employment outcomes. This neoclassical synthesis, or neoliberal narrative, dominates the global economics profession. But there are strong counter narratives to it both within academia and in policy circles.

For example, the 'varieties of capitalism' approach to politics/economy highlights how different forms of capitalism entail different approaches to labour market and related welfare and economic policies. Notably, labour markets are more fluid, and welfare regimes more limited in the 'liberal market economies' such as the USA, whereas

[22] Dholakia, R. and A. Sapre. 2011. 'Speed of Adjustment and Inflation—Unemployment Tradeoff in Developing Countries—Case of India.' Indian Institute of Management, Working Paper. no. 2011-07-01.

[23] These are estimates by the International Labour Organisation (ILO). The ILO estimates that informal employment remained constant while formal employment rates fell (even as the incidence of non-standard employment rose slightly). ILO. 2012. *World of Work Report 2012*. pp. 3, 8 and 11. ILO: Geneva.

labour market policy is more active, and welfare protection stronger in the 'co-ordinated market economies' of Germany and Scandinavia.[24] The key idea is that firms in the more co-ordinated market economies accept higher labour costs (and taxation)—so long as the system delivers the supply of skills, active industrial policies and long-term finance they need to operate profitably.

This analysis implies that different paths to growth are possible—and that under certain conditions, employment protection is consistent with rapid productivity and income growth. A similar argument is made by those who distinguish between a 'low road' to growth in which firms have no incentive to get out of a 'low-wage, low-productivity' equilibrium, and a 'high road' which uses employment protection (which raises the cost of labour for business) to force firms to become more competitive. For example, with regard to India, Sharma argues that: 'Only when the path to competition on the basis of low wages and bad working conditions is barred by providing a floor of labour standards'[25] are firms likely to innovate.

D'Souza argues that India's approach to labour-market regulation rests on such theoretical foundations

> Job security regulation in a state-led economic growth regime was treated more as a sunk cost that was required to induce investment in skills and as a form of social insurance. It was a means of spurring the acquisition of skills which makes labour more efficient in the production process.[26]

In other words, what this argument suggests is that Indian policy makers assumed that when faced with higher labour costs (caused by employment protection), firms would improve productivity and innovate rather than simply move down the labour demand curve and shed labour. We could represent this assumed positive effect of employment protection (and other government policies which raise the cost of labour) in the *AS–AD* framework as a simultaneous outward shift in the nominal wage function and in the labour demand curve. In the most optimistic version of this growth narrative, both the *AS* and the *AD* curves shift outwards as income and productive capacity increases.

This high road to growth is possible—and indeed is a vision promoted by the International Labour Organisation (ILO). The ILO recommends that governments take active steps to promote the growth of 'decent jobs' (i.e., higher wage, higher productivity jobs)

[24] Hall, P. and D. Soskice. 2001. 'An Introduction to Varieties of Capitalism.' *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, pp. 1–68, eds. Hall, P. and D. Soskice. Oxford: Oxford University Press.

Hall, P. and D. Gingerich. 2009. 'Varieties of Capitalism and Institutional Complementarities in the Political Economy: An Empirical Analysis.' *British Journal of Political Science* 39 (3): 449–82.

[25] Sharma, A. 2006. 'Flexibility, Employment and Labour Market Reforms in India.' *Economic and Political Weekly*, May.

[26] D'Souza, 'The Employment Effects of Labour Legislation', p. 130. See also, D'Souza, E. 2005. 'Are Retrenchment Laws Inefficient?' *The Indian Journal of Labour Economics* 48 (4).

and to accompany this with expansionary macroeconomic policies.[27] However, increasing the cost of labour can undermine employment growth as some firms relocate all or parts of their production processes to lower wage countries. And, in places where informal employment is tolerated, one might expect more firms to escape labour-market regulation by moving into the informal sector. The challenge for government is to assist in the creation of decent jobs whilst ensuring that its industrial policies provide support to firms where necessary—and that the welfare system can provide for those unlucky enough to remain unemployed. In this respect, India's employment guarantee schemes are of utmost importance in ensuring that growth is genuinely inclusive. Tolerating, even supporting low-wage, labour-intensive sectors is also necessary where welfare budgets are stretched and unemployment is high.

Review Questions and Answers

The AD *curve*

a) Slopes downwards because as prices fall, the real money supply expands thus causing the interest rate to fall which in turn stimulates investment and hence output
b) Slopes downwards because of the Keynes effect
c) Consists combinations of output and the general price level for which the goods and money markets are in equilibrium
d) Is consistent with all of the above statements
e) Is consistent with none of the above statements

Answer: d

The 'Keynesian' version of the AS *curve differs from the Neoclassical AS curve up to the point of full employment because*

a) Keynes assumed sticky wages to be the main cause of a vertical *AS* curve
b) The *AS* curve is vertical because money wages are rigid downwards
c) The *AS* curve is upward sloping because money wages are rigid downwards
d) The *AS* curve is not affected by a change in the money wage
e) None of the above

Answer: c

When the AS *curve is positively sloped, continuous increases in the money supply will result in*

a) No change in the price level and proportional increases in real output
b) No change in real output and proportional increases in the price level
c) An increase in the price level and real output

[27] See for example, ILO. 2013. *Global Employment Trends 2013: Recovering from a Second Jobs Dip*. ILO: Geneva, and ILO. 2012. *World of Work: 2012*. ILO: Geneva.

d) An increase in the price level and a decrease in real output
e) None of the above
Answer: c

The Philips curve shows
a) An inverse relationship between the real and nominal wage
b) An inverse relationship between the rate of inflation and the rate of unemployment
c) A positive relationship between the nominal wage and the rate of unemployment
d) A positive relationship between the rate of inflation and the nominal wage
e) None of the above
Answer: b

In the neoclassical synthesis model (AS–AD), disinflationary demand management policies
a) Achieve a lower rate of inflation without causing a decrease in output
b) Reduce output but have no initial effect on the inflation rate
c) Require an increase in government spending
d) Require an increase in the growth rate of the nominal money supply
e) None of the above
Answer: e

CHAPTER 9

Introducing the Open Economy

So far, our theoretical discussion has been confined to a closed economy. This chapter extends the Keynesian *IS–LM* framework to include the international sector and concludes with a discussion of the role of prices.

Exchange Rate Determination and Balance of Payments Concepts

The balance of payments (BOP) reflects a country's international transactions. It is the systematic record of all economic transactions between residents of a country and the residents of rest of the world. Table 9.1 describes the key components of India's BOP in 2011–12.

The current account (also known as the trade account) measures trade flows in goods and services (factor and non-factor services) as well as any net transfers. The

Table 9.1 India's BOP (₹ in Billion) in 2011–12

1a. Merchandise exports (f.o.b.)	14,825
1b. Merchandise imports (c.i.f.)	23,946
1. Current account (trade balance) (1a – 1b)	–9,121
2. Invisibles, net	5,362
3. Current account (1 + 2)	–3,760
4. Capital account (A to F)	3,074
A. Foreign investment	2,418
B. External assistance, net	120
C. Commercial borrowings, net	421
D. Rupee debt service	–4
E. NRI deposits, net	582
F. Other capital	–465
5. Overall balance (3 + 4)	–685
6. Decrease in reserves	685

Source: *Reserve Bank of India:* Key components of India's balance of payments. http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics, downloaded 1 April 2013.

capital account reflects international financial transactions with the rest of the world, and in effect shows how current account deficits are 'financed'. The items in this account include net foreign direct investment (i.e., investment by foreigners in undertakings in India minus investments by Indians in undertakings abroad) and portfolio and other investments.[1] In the current account, invisibles include services (travel, transport, insurance, miscellaneous items like software, business, financial and communication services), transfers (official and private) and income (investment income and compensation of employees). The total current account is the sum of merchandise and services.

The capital account includes foreign investment (foreign direct investment and portfolio investment in India and abroad), loans and external assistance to and from India, rupee debt service and other capital. The overall balance is the sum of the current account and the capital account. When this is negative (as was the case in 2011–12), there will be a decline in reserves. Loans from the IMF can help to reduce the pressure on reserves, but no such loans were obtained in 2011–12.

Table 9.1 shows that the Indian economy in 2011–12 was running a trade deficit of ₹9,121 billion. Capital inflows of ₹3,074 billion were insufficient to finance this deficit so the overall balance was negative and Indian reserves fell by the difference (₹685 billion). The last time this state of affairs existed was in 2008–09 (Figure 9.1). Figure 9.1 shows

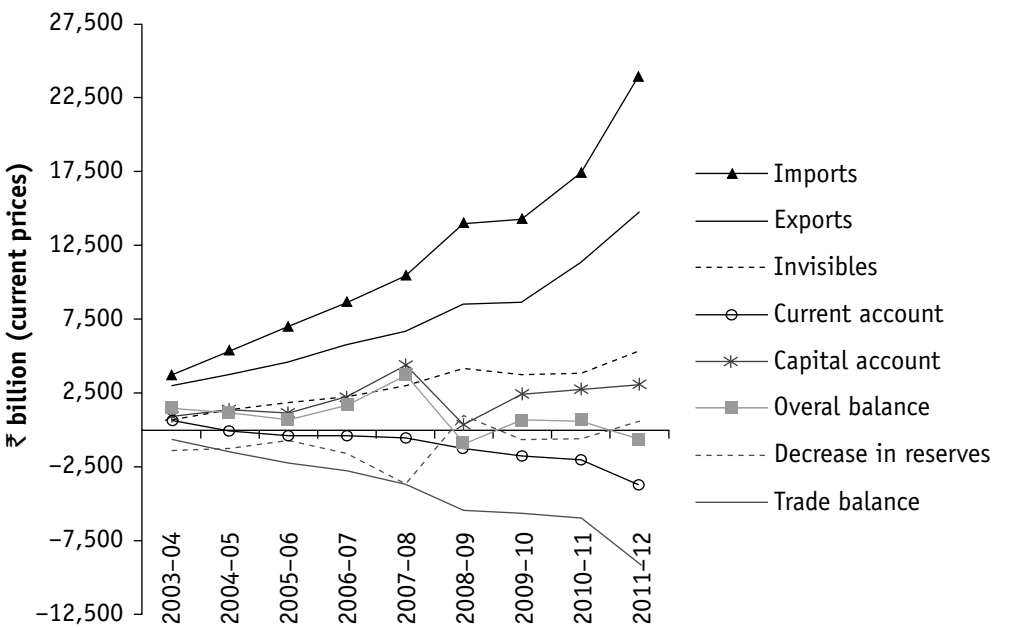


Figure 9.1 Trends in the Indian BOP

Source: *Reserve Bank of India:* Key components of India's balance of payments. http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics, downloaded 1 April 2013.

[1] Investment tends to be long-term. Portfolio investment tends to be short term.

that the main driver of the Indian BOP deficit from 2003–04 to 2011–12 was the steadily widening current account deficit as import growth outstripped export growth.

Nominal Exchange Rate Determination

The nominal exchange rate is defined as the domestic currency price of a unit of foreign exchange (denoted by *e*). In India's case, it would be the number of rupees it costs to buy one unit of foreign exchange, say one US dollar. If the rupee loses value (i.e., gets 'weaker'), it means that more rupees are needed to buy one dollar. Thus, the rupee depreciates as *e* rises. If *e* falls, it means that fewer rupees are needed to buy dollars; that is, the rupee has appreciated.

In a perfectly competitive market for foreign exchange, the nominal exchange rate is determined by an intersection of supply and demand for foreign exchange (*SS* and *DD* in Figure 9.2). Exports of goods and services, and capital inflows (foreign investment, foreign loans, etc.) contribute to the supply of foreign exchange, and imports of goods and services and capital outflows contribute to demand. In a flexible exchange rate system, where the exchange rate is determined by market forces, the supply of foreign exchange will always equal demand, and therefore, by definition, there will be no net change in foreign-exchange reserves. For example, if there is a change in tastes towards Indian products, the *SS* curve will shift to the right as foreigners demand more Indian exports at

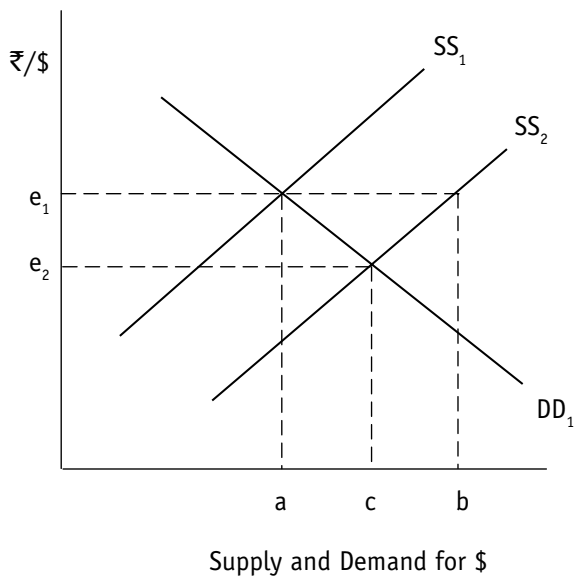


Figure 9.2 Flexible Exchange Rate Determination

Source: Authors.

all exchange rates (Figure 9.2). There will be an excess supply of foreign exchange equal to *ab*, and foreign-exchange reserves will rise by that amount if the reserve bank supplies the increased demand for rupees.

If there is no reserve bank intervention, the excess supply will result in a fall in the price of foreign exchange from e_1 to e_2, that is, the rupee will appreciate. In the absence of compensating price changes, this will dampen export demand (and hence reduce the supply of dollars to the foreign-exchange market) and boost import demand (thus increasing the demand for dollars) until BOP equilibrium is restored.

This process of adjustment may also have implications for capital flows, and hence, movements in the capital account will also affect the market for foreign exchange. If, for example, interest rates decline along with aggregate demand, then capital will probably leave the country, thus increasing the supply of rupees and further encouraging depreciation.

According to economic theory, under a system of perfectly flexible exchange rates, the nominal exchange rate adjusts instantaneously to equilibrate *SS* and *DD*, changes in reserves are zero, and the BOP is therefore always in equilibrium. In practice, however, most central banks (that is, reserve banks) intervene occasionally in the foreign-exchange market. Some attempt to contain the exchange rate within a specified target range. Where a central bank stands ready to buy or sell foreign exchange at a fixed rate, a fixed exchange rate regime is said to be in operation.

Fixed exchange rates

Between 1945 and 1973, most major economies operated fixed exchange rate regimes. Prior to the Second World War, exchange rates were fixed by the gold standard. After the war, the Bretton Woods agreement created the gold exchange standard whereby the dollar was tied to gold, and all other currencies were fixed in terms of dollar. The IMF was established to provide support for countries experiencing temporary BOP difficulties. Thus, if a country found its foreign-exchange reserves were running too low to allow the central bank to continue intervening in support of the fixed exchange rate, then it could go to the IMF for a loan. If economic conditions were serious enough to warrant a more fundamental adjustment, deficit countries were expected to devalue their currencies.

The system worked well until the 1960s when the German and Japanese economies started becoming very competitive. As the demand for American goods fell, so too did the demand for dollars. At the same time, the need to finance the politically unpopular Vietnam War resulted in a rapid expansion of the US money supply, high BOP deficits and increased world inflation. Tying the dollar to gold was clearly no longer sustainable. In 1971, US President Nixon broke away from the Bretton Woods agreement and by 1973 the dollar was floating. Other countries rapidly followed suit.

Since the collapse of the Bretton Woods system, most of the world's currencies have floated against one another, but not freely. Some countries tie their currencies to that of their major trading partner. Argentina, for example, maintained a fixed exchange rate with the US dollar between 1991 and 2002, and Senegal maintained a fixed exchange rate

with the French franc (and now the euro). Other countries tie their currencies loosely to the dollar (or some other major currency), or attempt to keep their currencies in line with some target range. Because depreciation has inflationary consequences and appreciation can cause harm to export industries, most countries adopt a system of managed exchange rates in order to maintain some exchange rate stability.

During the 1990s, most European countries joined a common monetary system in which the various central banks agreed to maintain their respective exchange rates within a narrow band. This culminated in the European Monetary Union in 1999. Since then, participating countries have fixed their currencies to the new European currency (the euro), which is now controlled by the European Bank. This has made independent monetary policy by member countries impossible.

Consider how a central bank may intervene in the foreign-exchange market in order to maintain a fixed exchange rate. Assume the central bank wishes to maintain the exchange rate at e_1 in Figure 9.3 but is suddenly faced with an increased demand for foreign exchange—perhaps the result of lower interest rates that boost spending (including on imports) and encourage capital flight. The demand for foreign currency shifts out to DD_2 as a consequence. There is now an excess demand for foreign exchange equal to *ab*. In the absence of central bank intervention, the domestic currency would depreciate (rise to e_2). If the central bank wished to maintain the current rate, it would have to 'accommodate' this excess demand by supplying the quantity of dollars *ab* to the market out of its stock of foreign exchange reserves. In effect, it would be shifting the supply curve to the right to intersect DD_2 at point *b*.

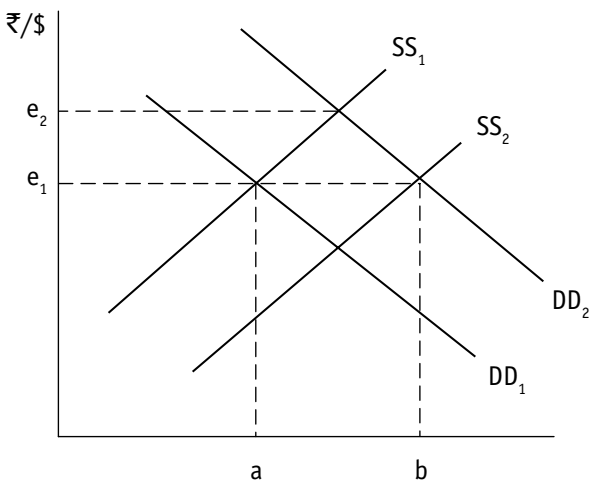


Figure 9.3 Central Bank Intervention (Fixed Exchange Rate Regime)

Source: Authors.

Note that the central bank cannot sell foreign exchange reserves indefinitely because sooner or later it will run out of reserves.

If, conversely, the supply of foreign currency exceeded the demand for it, then the domestic currency would appreciate (*e* would fall). If the central bank wished to maintain the exchange rate, it would have to buy up all the excess foreign exchange in the market. This excess (equal to the BOP surplus) would then be added to the central bank's stock of foreign exchange reserves.

An alternative or complementary way to maintain a fixed rate is for the government to implement economic policies that shift the demand or supply curves for foreign exchange. For example, when faced with a BOP deficit, the government could embark on 'expenditure switching' and 'expenditure reducing' policies as part of a programme of structural adjustment. Expenditure switching policies (such as export subsidies and import quotas) discourage imports and encourage exports, and expenditure reducing policies (e.g., restrictive fiscal policy) reduce the level of expenditure, and thereby dampen import demand. Both improve the current account of the BOP.

The exchange rate regime has important implications for money supply—and for the conduct of monetary policy. Under a fixed exchange rate regime, foreign exchange reserves will rise when there is a BOP surplus and fall when there is a deficit. When reserves rise (as the central bank provides domestic currency to meet demand), so does the money supply and *vice versa*. Under flexible exchange rates, by contrast, there are no overall deficits or surpluses. Changes in reserves will always be zero, and there will be no impact on the money supply from the BOP. These dynamics are modelled explicitly in the *IS–LM–BP* framework developed later on in this chapter.

BOP Policy in India

For most of the post-war period, India operated a fixed exchange rate with periodic devaluations in face of BOP crises. This exchange rate regime was supported by high tariffs on imports (which functioned also to protect Indian industry) and export subsidies. After the first oil price hike of 1973, strict exchange controls were applied to protect both the current and capital accounts. After the second oil price hike, India was forced to borrow from the IMF and to sell a large share of its gold reserves. The worst BOP crisis occurred in 1991 when India's credit rating was downgraded, sparking a sustained net outflow of capital. The government was forced to borrow again from the IMF, this time pledging 67 tonnes of gold reserves as collateral and agreeing to introduce substantial economic reforms.

This resulted in the New Economic Policy of liberalisation and privatisation. Since 1993, the Reserve Bank of India has operated a 'managed float' approach to

(Box Continued)

(Box Continued)

the exchange rate, the objective being to minimise volatility.[2] A dual-exchange rate regime was initially introduced (which required that 40 per cent of receipts be converted at the official rate and deposited with the Reserve Bank) but this was soon replaced by a unified exchange rate system.

Source: Authors.

The Open-economy One-sector Keynesian Model

The basic Keynesian (one-sector) model of income determination can be extended to the open economy by adding the current account balance (exports minus imports) to aggregate demand. Recall that prices are assumed constant in this Keynesian model. This means that prices will not alter in the face of any domestic imbalance between supply and demand, and nominal exchange rate changes will be real changes. (We discuss the real exchange rate in more detail towards the end of the chapter.)

$$E = C + I + G + X - Z,$$

where $X - Z$ = balance on current account of the BOP.

Given that exports (X) are a function of foreign demand, the export function is exogenous to the model. Imports (Z), however, tend to rise with income.

$$Z = m + uy, \tag{9.1}$$

where m = autonomous imports and u = marginal propensity to import.

When exports equal imports, the current account of the BOP will equal zero because the foreign exchange earned through exports is exactly sufficient to pay for imports. In Figure 9.4, this occurs at output level y_1. For any output level above y_1, the demand for imports exceeds exports and hence the current account will be in deficit. Conversely, for any output level below y_1, the current account will show a surplus.

Assuming a stable (fixed) exchange rate, a deficit on the current account can be 'financed' by inflows of foreign capital or by changes in foreign exchange reserves. However, this solution is difficult to sustain—particularly in developing countries. In order to generate sufficient foreign exchange to pay for imports, the only sustainable long-term strategy is to develop greater export capacity.

Allowing the currency to depreciate (which makes exports more competitive and imports more expensive) can help—so long as the nominal depreciation is a real

[2] See Shyamal, R. 2010. *Macroeconomic Policy Environment: An Analytical Guide for Managers*. New Delhi: Tata McGraw-Hill Education Private Ltd.

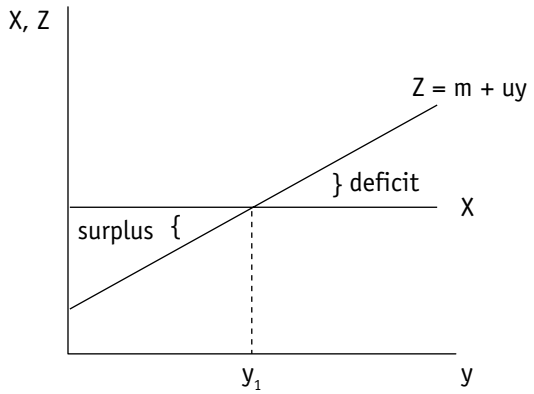


Figure 9.4 The Current Account of the BOP

Source: Authors.

depreciation (which it is by definition in this Keynesian model where prices are assumed constant). Furthermore, the current account will only improve following a depreciation if exports increase enough, and imports decrease enough, to compensate for the increased price of imports.

Consider the simple one-sector Keynesian open-economy model in Figure 9.5. The economy is initially at rest at y_1. The bottom section of the diagram indicates that y_1 is associated with a current account balance equal to zero. Now assume that the government pursues an expansionary fiscal policy. This shifts aggregate expenditure from E_1 to E_2, and output rises from y_1 to y_2. As shown in the bottom diagram, imports rise and the current account moves into deficit. Under a flexible exchange rate regime, this will result in depreciation (as the demand for foreign currency from importers exceeds the supply from exporters). This will boost exports (from X_1 to X_2) and reduce imports (as the marginal propensity to import (u) falls) from Z_1 to Z_2. This adjustment continues until equilibrium is established. Under a more managed exchange rate system, the monetary authorities would have to facilitate a depreciation by increasing the supply of domestic currency onto the foreign-exchange market.

Note that the BOP will improve only if export and import demands respond sufficiently to the change in exchange rate. This requirement is formalised in the Marshall–Lerner condition[3] which states that the current account will improve in response to depreciation if the sum of elasticity of demand for exports and elasticity of demand for imports exceeds unity. In the following discussion, we shall assume that the Marshall–Lerner condition holds (i.e., we adopt an 'elasticities' approach to the BOP).[4]

[3] See Marshall, A. 1923. *Money, Credit and Commerce.* London: Macmillan, and Lerner, A. 1944. *Economics of Control.* New York: Macmillan.

[4] An alternative approach is the 'absorption approach'—see Alexander, S. 1952. *Effects of Devaluation on Trade Balance,* IMF Staff Papers, April.

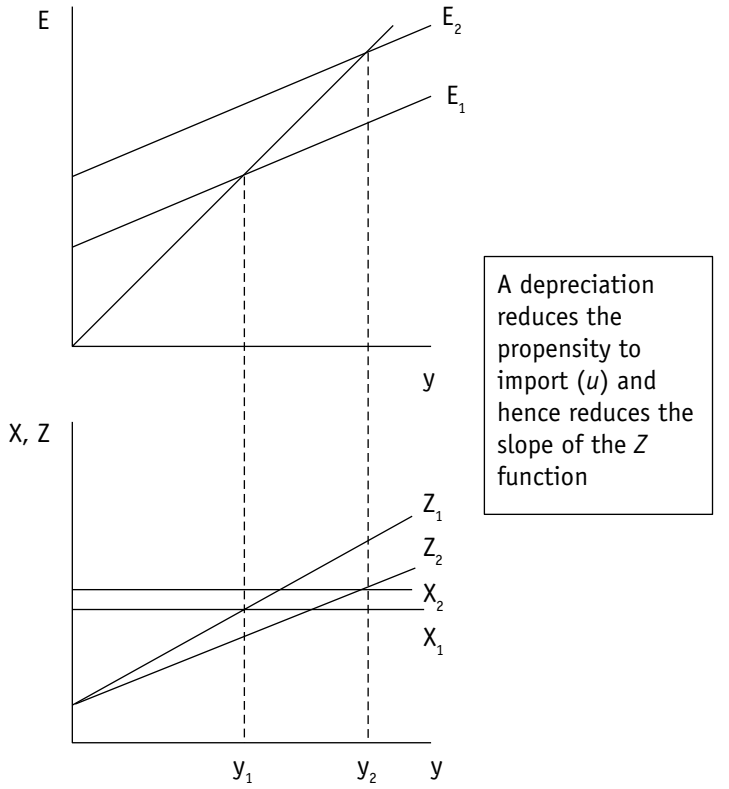


Figure 9.5 The One-sector Open-economy Keynesian Model

Source: Authors.

The Open-economy Keynesian *IS–LM–BP* Model

Unlike the Keynesian cross open-economy model that includes only the current account of the BOP, the open-economy *IS–LM–BP* model includes a discussion of capital account dynamics. A new function, the *BP* line plots combinations of *i* and *y,* that indicates equilibrium in the BOP.

In the version of the model discussed here, capital is assumed to be perfectly mobile across international borders. This means that people in the bond market will take their savings to whichever country offers the highest yield. Market forces will thus ensure that there will be one ruling world rate of interest (i^*). As explained below, this means that capital flows dominate the BOP and the *BP* line will be horizontal at i^*. We assume further that we are dealing with a small open economy, that is, an economy is too small to affect world interest rates. Whereas a large economy like the USA is able to influence world yields when domestic yields rise, a small open economy cannot.

The open economy IS *curve*

Like consumption, government spending and investment, exports represent an injection of demand into the economy. Imports, however, are a withdrawal. In deriving the *IS* curve in an open economy context, the equilibrium condition will thus change from $I + G = S + T$ to

$$I + G + X = S + T + Z. \tag{9.2}$$

Substituting Equations 6.18 and 9.1 into the right-hand side of Equation 9.2:

$$S + T + Z = -a + (1 - b + bt)y + m + uy. \tag{9.3}$$

The $S + T + Z$ function thus has a steeper slope than the $S + T$ function (because imports rise with income) and the intercept rises by the amount m (i.e., autonomous imports). This is shown in Figure 9.6.

The $I + G$ function now becomes the $I + G + X$ function. As exports and government spending are not a function of the interest rate, the $I + G + X$ function obtains its slope from the investment function. Government spending and exports merely affect the position of the curve. The equilibrium condition becomes

$$j - di + G + X = -a + (1 - b + bt)y + m + uy.$$

Open economy *IS* is $y = (j - di + G + X + a - m)/(1 - b + bt + u)$. (9.4)
The multiplier is $1/(1 - b + bt + u)$. (9.5)

Note that the open economy multiplier is smaller than the closed economy multiplier because some of the increased demand is lost to domestic producers as a result of propensity to import (u). In other words, lower the multiplier effect of an expansionary

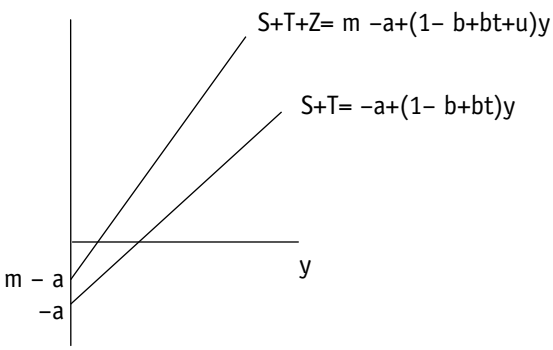


Figure 9.6 ***S + T* and *S + T + Z* Functions**

Source: Authors.

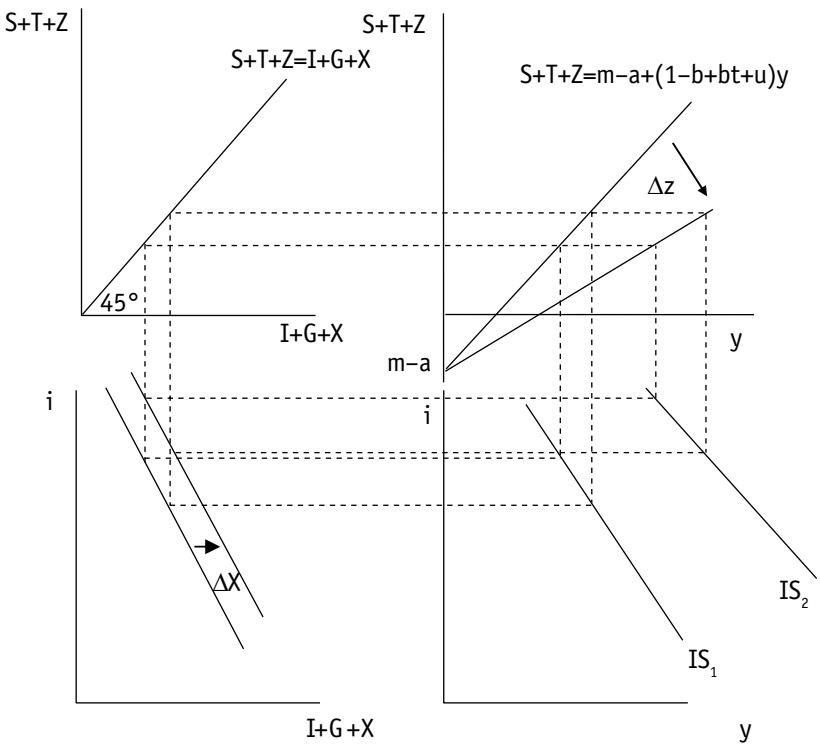


Figure 9.7 The Open Economy *IS* Curve Before and After Depreciation

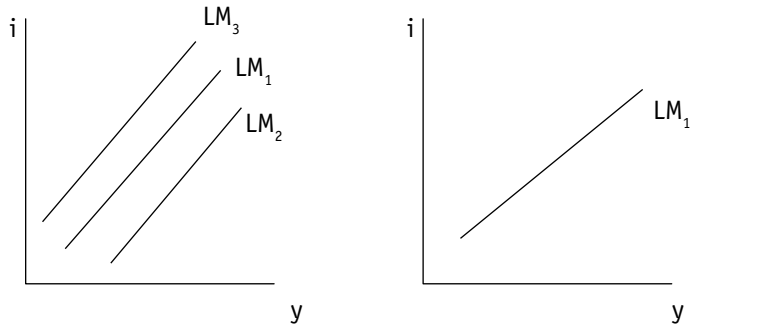
Source: Authors.

fiscal policy (or any increase in demand), the greater the propensity of the economy to import.

Figure 9.7 derives the open economy *IS* curve by means of a diagram. It also shows how depreciation affects the *IS* curve (assuming the Marshall–Lerner condition holds). Depreciation will reduce the marginal propensity to import and hence flatten the slope of the $S + T + Z$ function, and boost exports, thus shifting out the $I + G + X$ function. Taken together, these shifts push the *IS* curve out to IS_2. Note that the new *IS* curve is more elastic than the pre-depreciation curve because of the fall in propensity to import. Remember that this is a Keynesian model and hence prices are assumed constant and the economy can come to rest at a less than full-employment equilibrium.

The open economy LM *curve*

Under a flexible exchange rate regime, the nominal domestic money supply remains unaffected by developments in the foreign-exchange market. The supply and demand for foreign exchange is brought into line by changes in the exchange rate, and hence, there will be no net impact on the nominal money supply. A flexible exchange rate regime



A. The LM Curve under a Fixed Exchange Rate Regime

B. The LM Curve under a Flexible Exchange Rate Regime

Figure 9.8 The *LM* Curve under Different Exchange Rate Regimes

Source: Authors.

ensures that the amount of domestic currency people want to trade for foreign currency is exactly matched by the amount of foreign currency demanded.

In a fixed exchange rate world, however, the central bank is obliged to supply domestic and foreign currency on demand at a fixed rate. If more people offer foreign currency in exchange for domestic currency than *vice versa*, then foreign exchange reserves will rise—as will the nominal money supply. Assuming no change in prices (which is the case in a Keynesian model), the *LM* curve will thus shift out from LM_1 to LM_2 in panel A of Figure 9.8. If the demand for foreign currency exceeds the available supply, then foreign reserves will decline (as will the nominal money supply) and the *LM* curve will shift backwards from LM_1 to LM_3.

The BP *line*

As noted earlier, the open-economy *IS–LM–BP* model includes a third function, the *BP* line, which consists of combinations of *y* and *i* for which the BOP is in equilibrium. Given our assumption of perfect capital mobility, there is effectively one (internationally integrated) bond market, and one ruling world yield or interest rate (i^*) in the model. Perfect capital mobility implies that residents of one country can easily purchase bonds in another country and that foreign and domestic bonds are perfect substitutes. Thus, if yields are higher in country *A* than in country *B*, people will sell bonds in country *B* and buy bonds in country *A* until yields are the same in both countries. Country *A* will thus experience capital inflows, and country *B* will experience capital outflows, until yields are equalised.

Under such conditions, any deviation of domestic yield from the world yield will result in BOP problems. Hence, it follows that capital account equilibrium is only possible at the world interest rate (i^*) and that movements in the capital account completely dominate the current account position. The *BP* line is thus perfectly elastic at i^*.

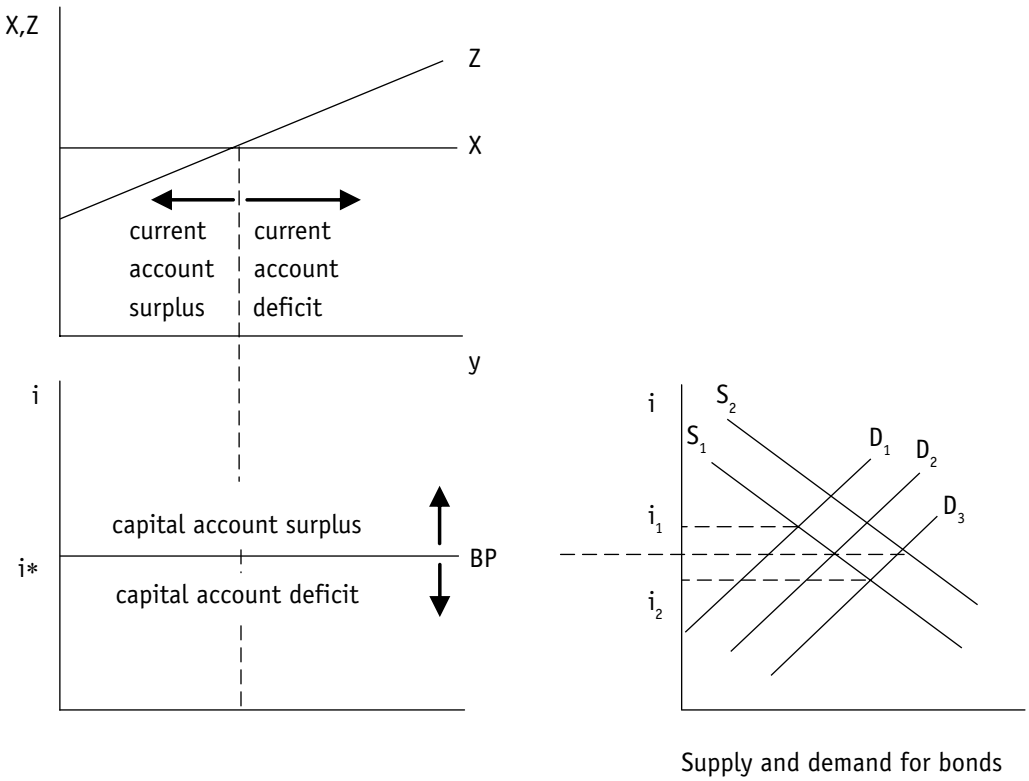


Figure 9.9 Equilibrium on the BOP

Source: Authors.

For example, if the domestic interest rate marginally exceeded i^* (e.g., i_1 in Figure 9.9), then capital from abroad would flow instantly into the country (thus boosting the capital account into surplus) and into the bond market. This will push out the demand for bonds from D_1 to D_2. The overall BOP would thus be in surplus at any yield above i^* irrespective of whether the current account was in deficit or not.

If the domestic interest rate was marginally below i^*, that is, at i_2 in Figure 9.9, then there would be instant capital outflow. People would sell bonds (thus pushing out the supply of bonds to S_2 and driving up yields). The impact of a yield below i^* on the capital account would be so severe and instantaneous as to ensure that the overall BOP would be in deficit irrespective of whether the current account was in surplus (as would be the case at any level of income below y_1) or not. Overall BOP equilibrium is thus dictated by the capital account in this model.

Capital is of course not perfectly mobile between countries nor are foreign and domestic bonds perfect substitutes. However, as globalisation gathered pace, most countries reduced their capital controls and capital markets became increasingly

internationally integrated. Capital account transactions dwarf current account transactions: total foreign exchange transactions in a single day exceed the annual GDP of many industrialised countries and amount to an equivalent of over one-quarter of the annual value of world trade. Assuming perfect capital mobility (and hence that the capital account dominates the current account when it comes to BOP equilibrium) is thus not as unrealistic as it may at first appear.

Note that the *IS–LM–BP* framework can incorporate a change in the risk profile of the economy. Thus, if people decided that holding domestic bonds was risky compared to holding bonds abroad (perhaps because of fears that domestic bond-holders are going to be taxed), then there would be a risk premium on domestic bond yields. The *BP* curve would thus shift upwards by an amount of that risk premium. In other words, i^* (which is the nominal domestic interest rate) becomes the ruling world bond yield plus the risk premium necessary to make bond-buyers indifferent between holding domestic or foreign bonds.

So, for example, if the domestic interest rate was equal to i^*_1 in Figure 9.10, then there would be no tendency for capital to flow in or out of the country. However, if bond buyers subsequently became nervous about the domestic bond market, then the supply of bonds will increase (as people try and reduce their domestic bond holdings) from S_1 to S_2. The demand for bonds may also decline exogenously (from D_1 to D_2). Domestic yields would thus rise until bond-holders are compensated for the increased risk and hence are once again indifferent as to whether they hold domestic or foreign bonds. The *BP* line would thus shift up to i^*_2.

The full *IS–LM–BP* model is shown in Figure 9.11. Equilibrium in the goods and money markets occurs at the intersection of *IS* and *LM*. As long as the equilibrium interest rate is i^*, the BOP will also be in equilibrium. If *IS* and *LM* intersect above i^*, then the

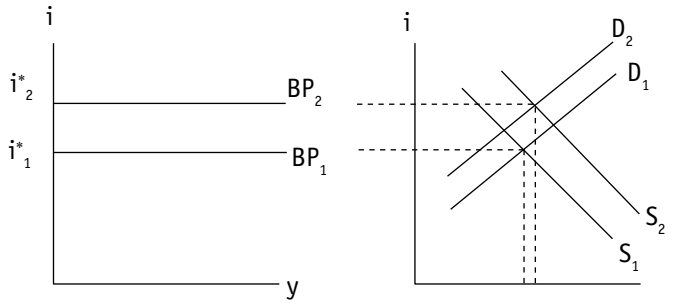


Figure 9.10 An Upward Movement in the *BP* Curve Following an Increase in the Perceived Relative Risk of Domestic Bonds

Source: Authors.

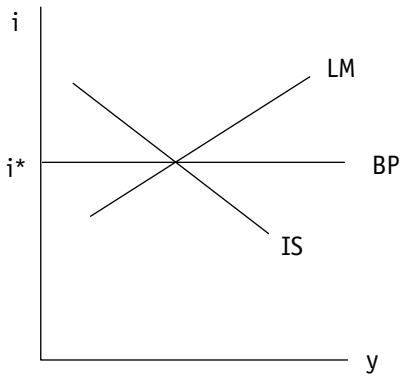


Figure 9.11 The *IS–LM–BP* Model Assuming Perfect Capital Mobility

Source: Authors.

BOP will be in surplus (as capital flows into the domestic bond market from abroad). If they intersect below i^*, the BOP will be in deficit as capital flows out of the domestic bond market and into foreign markets. This will spark off further adjustment—the nature of which varies depending on whether a fixed or flexible exchange rate system is in operation.

Economic Policy under Fixed Exchange Rates

Assume the economy is initially at y_1 in Figure 9.12(A). If the government decides to pursue an expansionary fiscal policy, the *IS* curve will shift out from IS_1 to IS_2. In a closed-economy model, the economic effects stop here. However, in an open-economy model, there is an additional effect: the higher interest rate attracts an inflow of foreign capital and the BOP moves into surplus. Under a fixed exchange rate regime, this will increase the money supply as the central bank increases its reserves of foreign exchange (in exchange for domestic currency). The *LM* curve thus shifts from LM_1 to LM_2 and output increases to y_3. Foreign capital will continue flowing into the domestic bond market, and hence, the money supply will keep rising (and yields will keep falling) until equilibrium is restored at y_3, i^*. In short, the fiscal policy multipliers are larger in an open-economy Keynesian *IS–LM–BP* model assuming fixed exchange rates than they are in a closed-economy model.

In contrast to fiscal policy, monetary policy is ineffective in a Keynesian *IS–LM–BP* model assuming fixed exchange rates. Assume that the economy is initially at y_1 in Figure 9.12(B). An expansionary monetary policy will shift the *LM* curve from LM_1 to LM_2, thus resulting in a fall in interest rates and an increase in output to y_2. In an open-economy model, the fall in interest rate will lead to capital flight (as people take their savings out of the country in order to purchase bonds in other countries where yields

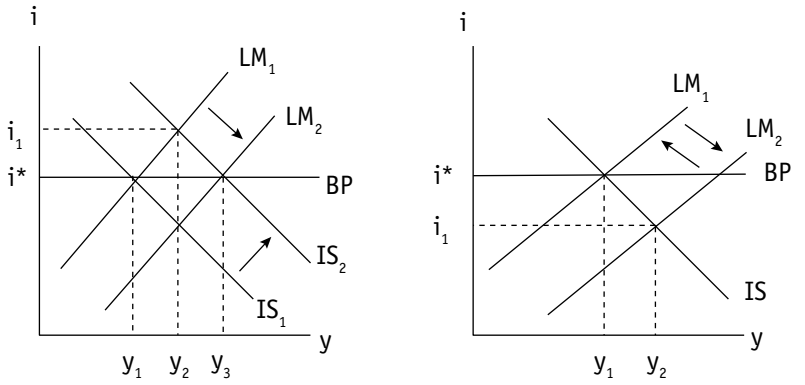


Figure 9.12 Policy under Fixed Exchange Rates

Source: Authors.

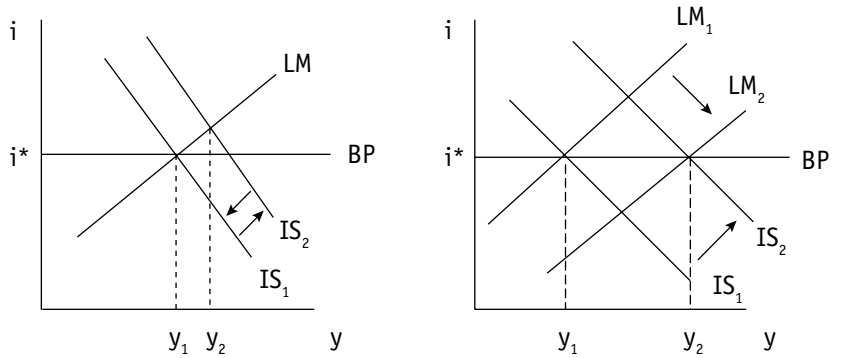
are higher, i.e., at i^*). The BOP thus moves into deficit. The money supply will decrease (as people exchange domestic currency for foreign currency, thus eroding the foreign exchange reserves of the central bank). The *LM* curve thus shifts backwards and hence erodes the intended expansion.

In short, when exchange rates are fixed, monetary policy is ineffective. The central bank could try and counteract the contraction of the money supply (resulting from the decline in reserves) by buying bonds from the public. The central bank's holdings of government bonds and foreign exchange will fall by equal amounts—thus leaving the money supply unaltered. Such 'sterilisation' of the BOP deficit is, however, not sustainable and can last only as long as foreign exchange reserves are positive.

Economic Policy under Flexible Exchange Rates

If one assumes a flexible exchange rate regime in an open-economy Keynesian *IS–LM–BP* model, monetary policy becomes an effective policy tool, whereas fiscal policy is ineffective. Recall that under a flexible exchange rate regime, the supply and demand for foreign currency is brought into line by exchange rate movements—rather than by changes in foreign reserves. So, rather than the money supply being affected (as is the case with fixed exchange rate regimes) the exchange rate moves—and this impacts the economy by affecting the demand for exports and imports.

If the government pursues an expansionary fiscal policy, then the *IS* curve will shift out to IS_2 in Figure 9.13(A). The rise in *i* attracts capital from abroad into the foreign-exchange market (in order to purchase domestic bonds using domestic currency). The demand for local currency increases, thus resulting in an exchange rate appreciation.



A. The Effect of Expansionary Fiscal Policy

B. The Effect of Expansionary Monetary Policy

Figure 9.13 Policy under Flexible Exchange Rates

Source: Authors.

Given that prices are assumed constant, this nominal appreciation is a real appreciation. It thus results in an increased demand for imports (and a drop in exports). The *IS* curve will thus shift backwards. This process will continue until the interest rate is brought back into line with the world interest rate i^* (i.e., at the intersection of LM_1 and IS_1).

Now consider the case of an expansionary monetary policy that shifts the *LM* curve to LM_2 in Figure 9.13(B). This lowers the interest rate and hence encourages capital flight out of the domestic bond market. As the supply of domestic currency increases on the foreign-exchange market (as people demand more foreign exchange in order to buy bonds in other countries where the yield is higher), the exchange rate will depreciate. This will dampen the demand for imports and increase the competitiveness of exports. The *IS* curve thus shifts outwards to IS_2. Thus, both the *IS* and *LM* curves respond to a monetary stimulus and output rises to y_2.

The Real Exchange Rate

Our discussion so far has assumed a Keynesian model in which prices are held constant. We assumed that if the nominal exchange rate (e) falls (i.e., the domestic currency appreciates), then exports will become less competitive on international markets. However, there is only a one-to-one relationship between the nominal exchange rate and competitiveness if domestic prices do not change. Obviously, if the nominal exchange rate appreciated by 10 per cent and domestic prices fell by 10 per cent, then the price of exports in foreign currency would remain unchanged, and hence competitiveness would be unaffected. Clearly, domestic prices (relative to foreign prices) are also important in determining competitiveness.

This brings us to the concept of real exchange rate. The *real exchange rate* (REX) is equal to the average nominal exchange rate between a country and its trading partners, with an adjustment for difference in inflation rates between that country and its trading partners.

$$\text{REX} = e \cdot P^*/P, \tag{9.6}$$

or (approximately)

$$\Delta\text{REX} = \Delta e + \Delta P^* - \Delta P, \tag{9.7}$$

where P^* = world price index (i.e., index of prices of the country's trading partners); P = domestic price index; Δ = change in.

Thus, if world inflation was 5 per cent and domestic inflation was 10 per cent, then a 20 per cent nominal depreciation would approximately result in a 15 per cent real depreciation (20% + 5% – 10%).

The more competitive the foreign trade sector, the closer the relationship is likely to be between nominal exchange rate movements and changes in domestic prices (relative to world prices). In a perfectly competitive world market where consumers have easy access to products produced in other countries, the prices of traded goods should be the same everywhere (after adjustment for customs duties and transport costs). If so, then *purchasing power parity* (PPP) would hold, and nominal exchange rates would adjust quickly in response to changes in relative prices. Under such conditions, real exchange rate changes are impossible.

The Theory of Purchasing Power Parity (PPP)

The theory of PPP is neoclassical in nature as it assumes that domestic prices and the nominal exchange rates adjust quickly in response to changes in supply and demand in world markets. Thus, if the domestic price level dropped, locally produced goods would become cheaper (relative to goods in other countries), and hence, foreign demand for local products would increase. This would increase the supply of foreign exchange, and the nominal exchange rate would appreciate, until the competitive advantage of the lower price level had been eliminated. Similarly, if the domestic price level rose, then domestic consumers would switch demand to imports, thus pushing up e (i.e., the currency would depreciate) until domestic prices were once again in line with foreign prices.

In a more managed exchange rate regime, PPP would hold through price adjustments (rather than changes in e). Thus, if the nominal exchange rate depreciated, then foreign demand for domestic products would rise, pushing up prices. If PPP holds, then prices of goods in different countries will be equalised (when expressed in a common currency) through international arbitrage. In other words, the 'law of one price' would hold

$$P = eP^*, \tag{9.8}$$

or

$$e = P/P^*. \tag{9.9}$$

This implies that all goods will cost the same when expressed in a common currency and that the nominal exchange rate will be equal to the ratio of domestic to international prices.

This theory of absolute PPP underpins *The Economists*' tongue-in-cheek 'Hamburger Standard' evaluation of exchange rates. Using the McDonalds 'Big Mac' as a proxy for an international good sold everywhere, *The Economist* evaluates the dollar exchange rates of various countries to see whether they do indeed equal P/P^* (see box below).

The Economist*'s *Big Mac Index

According to *The Economist*, The average cost in October 2010 of a McDonalds 'Big Mac' in the USA was $3.71. If PPP held, then the cost of the Big Mac in other countries should be $3.71 times the exchange rate of their currencies per dollar. In other words, the exchange rate should be equal to the local price of a Big Mac divided by the American price (i.e., the implied PPP of the $). According to this index, the Chinese yuan was grossly undervalued, costing only $2.18 at market exchange rates. (http://www.economist.com/node/17257797?story_id=17257797)

The Big Mac Index omits India since a major section of the population does not eat beef. But there is an Indian version of the Big Mac called the 'Maharaja Mac' made out of chicken.

Source: Authors.

Relative (rather than absolute) PPP is said to hold when

$$\% \Delta e = \% \Delta P - \% \Delta P^*. \tag{9.10}$$

In other words, relative PPP holds when percentage change in the exchange rate is equal to inflation differential between the domestic and foreign countries. The implication is that countries with relatively high inflation rates will have depreciating exchange rates (and *vice versa*). Because we are dealing with percentage changes rather than levels, this is not as strong an assumption as the absolute version of PPP theory. Note that if absolute PPP holds, then relative PPP will also hold (and relative PPP may hold even when absolute PPP does not). This is because the level of e may not equal P/P^*, but the change in e could still equal the inflation differential. If exchange rates are fixed, then price levels will remain equalised (absolute version) or inflation rates will be equalised (relative version) throughout the world.

A key implication of PPP theory is that real exchange rate movements are impossible—or at least cannot be sustained. Any nominal depreciation will result in increased demand

for domestic goods, and hence domestic prices will rise until the previous equilibrium real exchange rate is restored.

There are various reasons why PPP theory does not hold very well. Price adjustment (as Keynesians would argue) may not be as quick or as efficient as assumed by the theory. Furthermore, measures of inflation tend to include a wide range of goods—not all of which are traded internationally. This is true, for example, with regard to building construction and retail services. Thus, in the case of the Big Mac, the meat, bread and potatoes may be traded goods (and hence subject to international arbitrage), but the retail costs of selling the hamburgers (e.g., rent and labour costs) are likely to differ between countries.

There are, nevertheless, several insights to be drawn from PPP theory. In particular, it predicts that a country that allows its domestic inflation rate to exceed the world rate (i.e., experiences an appreciating real exchange rate) is likely to suffer from a nominal exchange rate depreciation (as the demand for its currency falls). This is not a bad rule of thumb to start with. But bear in mind that it will not always result in a correct prediction because the demand for, and supply of, foreign exchange depends on more factors than merely the ratio of domestic and foreign price indices. For example, the US dollar appreciated in the 1990s because of strong capital inflows (attracted in part by a strong economy and by the invention of new products such as internet software and projects) and not because of changing relative inflation rates.

Policy Implications

In practice, most economies operate somewhere between a fixed and a flexible system, and most experience price adjustments (but not to the extremes suggested by PPP theory). Thus, one is most likely to be using a hybrid *IS–LM–BP* framework when approaching a real-world case.

For example, consider the following possible 'real-world' scenario. An economy is at less than full employment and the monetary authorities pursue an expansionary monetary policy. This leads to a drop in interest rates, and hence some capital leaves the country. The central bank intervenes to cushion the impact on exchange rate, but allows the nominal exchange rate to depreciate to some extent. Assume also that prices rise, but not enough to prevent a real exchange rate depreciation.

This story could be incorporated into an adapted *IS–LM–BP* framework (Figure 9.14) as follows: The expansionary monetary policy pushes LM_1 to LM_2 as the nominal money supply rises from M_1 to M_2. The drop in interest rates sparks some capital flight—and hence boosts demand for foreign currency. The central bank supplies some, but not all, of this increased demand out of its reserves, thus contracting the nominal money supply (to M_3).

Given that the central bank does not provide enough reserves to cover the increased demand, the *LM* curve does not contract all the way back to LM_1 but instead comes to

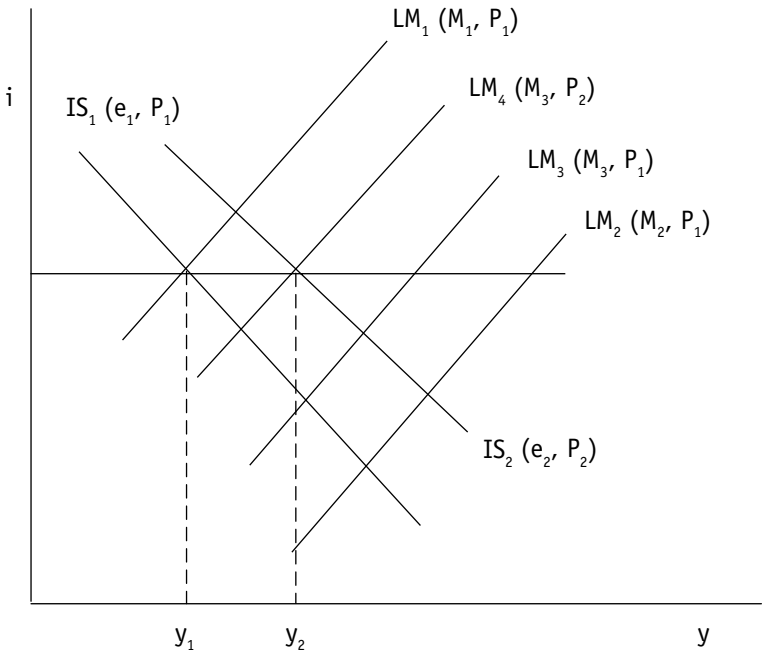


Figure 9.14 A Hybrid *IS–LM–BP* Framework

Source: Authors.

rest at LM_3. Instead, the exchange rate depreciates (from e_1 to e_2). Prices rise (from P_1 to P_2), but not enough to prevent the real exchange rate from depreciating (i.e., $\Delta e > \Delta P$). Exports rise and imports fall, thus resulting in an outward shift in *IS* to IS_2. The increase in price erodes the real money supply, thus pushing the *LM* curve to LM_4. Notice that output rises from y_1 to y_2 which is more than would be predicted using an extreme neoclassical model (assuming full employment and PPP), but less than would be predicted using an extreme Keynesian model (assuming constant prices).

More on Interest Rates and the Exchange Rate

In our discussion of the open-economy Keynesian *IS–LM–BP* model, we assumed that perfect capital mobility would result in one world interest rate (yield)—adjusted for risk if necessary. This resulted in the interest parity condition: $i = i^*$. For this to be the case, however, the *IS–LM–BP* model made an implicit further assumption, namely that the actual exchange rate is the expected exchange rate. It is only when people expect to pay for bonds and obtain yields at the same exchange rate that the domestic interest rate will equal the world interest rate. If, however, people expect that they are going to have to

convert their yield payments at a different exchange rate, then domestic interest rates have to reflect that expectation.

Consider a situation where $e = 1$ and interest rates in country *A* and country *B* are both 10 per cent. If the exchange rate is expected to remain the same, people will be indifferent as to where they buy bonds. But what happens if country *A*'s currency is expected to depreciate by 5 per cent over the period between buying bonds and receiving the yield payments? The yield payments would thus be worth 5 per cent less in terms of foreign currency than they would be if the bond had been purchased in country *B* where the exchange rate was expected to remain constant. Under such conditions, bonds would only be purchased in country *A* if the yield at the time of purchase was sufficiently high to compensate for the expected exchange rate depreciation.

The implication is that nominal domestic interest rates (adjusted if necessary for country-specific risk) should equal (approximately) the sum of the nominal interest rate abroad, i^*, plus the anticipated depreciation of the domestic currency (x).

$$i = i^* + x. \tag{9.11}$$

Equation 9.11 is known as the uncovered interest parity condition. It can be transformed into

$$i - i^* = x. \tag{9.12}$$

Equation 9.12 suggests that the interest rate differential among comparable assets denominated in different currencies can be interpreted as representing anticipated exchange rate movements. One would thus expect countries with depreciating currencies (and high inflation rates) to have comparatively high nominal interest rates (as in Latin America), and *vice versa*.

Expected Inflation and the Exchange Rate

If relative PPP holds, then economic agents would expect exchange rates to change according to the anticipated differential in the rates of domestic and foreign inflation or

$$x = P^e - P^{e*}. \tag{9.13}$$

P^e and P^{e*} are expected domestic and foreign inflation, and x is the expected change in the exchange rate. Relatively higher anticipated domestic inflation thus tends to depreciate the value of the domestic currency. This model also suggests that any news relevant to the formation of expectations regarding future domestic and foreign inflation will immediately be reflected in exchange rate changes. Since such news is sudden and not known beforehand, the changes in exchange rates will also be sudden and

unanticipated, which explains why it is so difficult to predict exchange rate movements accurately.

India and the 2008 Financial Crisis

The global financial crisis of 2008 originated in USA with the ending of the property boom and rising defaults on 'sub-prime' mortgage loans. Many factors were to be blamed including irresponsible lending on part of the banks, the development of complex financial securities for which the assessment of risk was difficult (if not impossible), rapidly rising systemic risk as these instruments spread, and the unwillingness of the regulators to act on (or even recognise) the problem.

But international economic imbalances also played a role. Through the long boom of the 2000s, US consumption had sucked in exports from developing countries and a constant stream of capital inflows. The boom in USA thus fuelled growth elsewhere (through its demand for imports) but also was the epicentre of the asset bubble. Capital inflows contributed to excess liquidity which pushed up house prices and other assets. Policies designed to support low-income earners to enter the housing market contributed further to strong demand for housing (and this process was exacerbated by banking practices which encouraged institutions to provide mortgage finance to risky borrowers and then package these loans into complex securities and then sell them off).

When the stock market collapse in 2008 brought this engine of growth to an abrupt halt, the rest of the world had to deal with the twin shocks of depressed asset prices and reduced export demand. The European sovereign debt crises (notably Ireland and Greece initially, but then later spreading to other European countries including Spain, Italy and France) amplified the problem, rendering portfolio investment and foreign exchange dealings increasingly volatile.

India's prudent banking regulations protected the country from exposure to US sub-prime and other toxic assets of the kind that bankrupted Ireland. Yet this did not protect the economy from consequences of investor panic and falling global demand.[5] Initially, in September 2008, the Indian rupee depreciated significantly (weakening about 25 per cent in a few months) as portfolio investment took flight (Figure 9.15). Although this should have boosted exports, this was overwhelmed by the general crash in global demand. Instead, the depreciation contributed to inflation, causing the Indian monetary authorities to pursue a more anti-inflationary stance after 2010. In the immediate aftermath of the crisis, however, Indian authorities allowed the money supply to expand.

[5] For an excellent discussion of the causes of the 2008 financial crisis and its implications for India, see Reserve Bank of India. 2010. *Report on Currency and Finance 2008–09: Global Financial Crisis and The Indian Economy*.

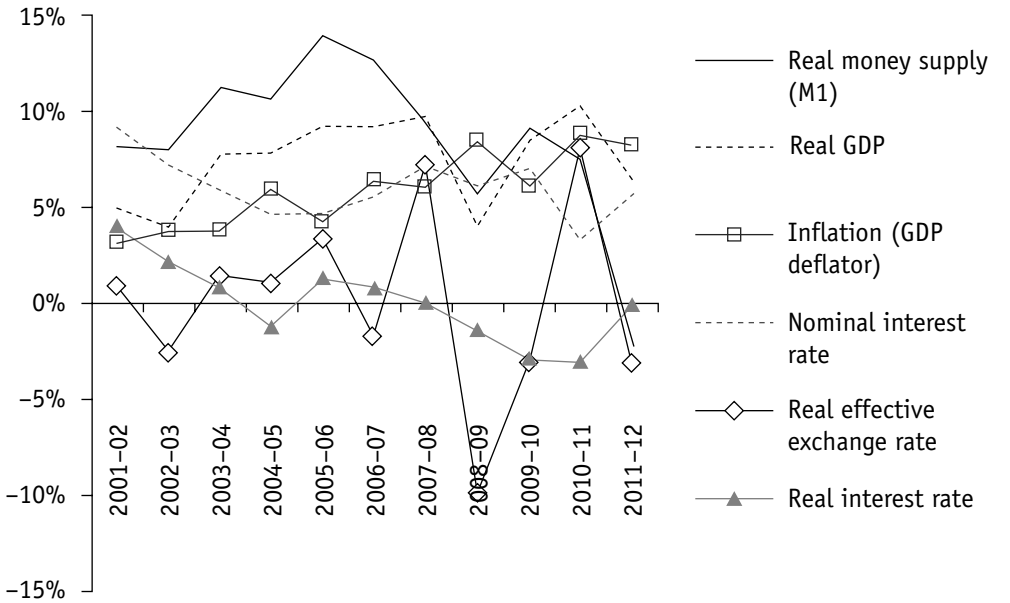


Figure 9.15 Key Trends in the Indian Macroeconomy: 2001–02 to 2011–12

Source: *Reserve Bank of India:* Average Monetary Aggregates and Key components of India's balance of payments. http://dbie.rbi.org.in/DBIE/dbie.rbi?site=statistics, downloaded 1 April 2013.

Joseph Stiglitz on Indian Economic Policy (2012)

2001 Nobel Prize winner, Joseph Stiglitz, delivered a lecture at the Indian Statistical Institute in February 2012 where he praised Indian economic policy for being 'balanced and cautious'.[6] He argued that government 'needed to play an important role in any economy' and that the Great Recession of 2008 disproved the fallacy that free markets were efficient and inherently stable. According to him, countries like India without independent central banks performed better in crisis. Professor Stiglitz blamed the failure of the governments in advanced capitalist economies to control and restrain the markets (that is to restrain their excesses and to enforce good corporate governance) for the recession. He praised governments in East Asia for their role in restraining market excesses.

With regard to dealing with market failures, Stiglitz said it would be optimal to impose some subsidies even if taxes were distortionary. He also dispelled

(Box Continued)

[6] Stiglitz, J. 2012. 'Indian Economy Doing Well: Joseph Stiglitz.' *Indian Express.com*, 14 February 2012. http://www.indianexpress.com/news/indian-eco-doing-well-joseph-stiglitz/898557/2

(Box Continued)

the notion that trade liberalisation often led to increased growth. Research had shown that share of the least developing countries in world trade had actually been declining, he said.

Source: Authors.

We could think about the situation facing India in *IS–LM–BP* terms as follows: the sudden drop in confidence and 'flight to safety' by bondholders (a process exacerbated by the global liquidity crisis that also sparked mass sell-offs of financial assets) resulted in the risk premium for Indian bonds rising (the *BP* curve shifting upwards). The resulting depreciation did not boost exports (though it probably prevented a greater fall).

Indian fiscal policy injected demand into the economy as deficit rose. We can represent this in Figure 9.16 as an outward shift in the *IS* curve. The growth in the money supply shown in Figure 9.15 would also have injected demand into the economy (i.e., the *LM* curve shifted out). However, after 2010, tighter monetary policy resulted in slowing inflation, rising real interest rates and a fall in the real money supply.

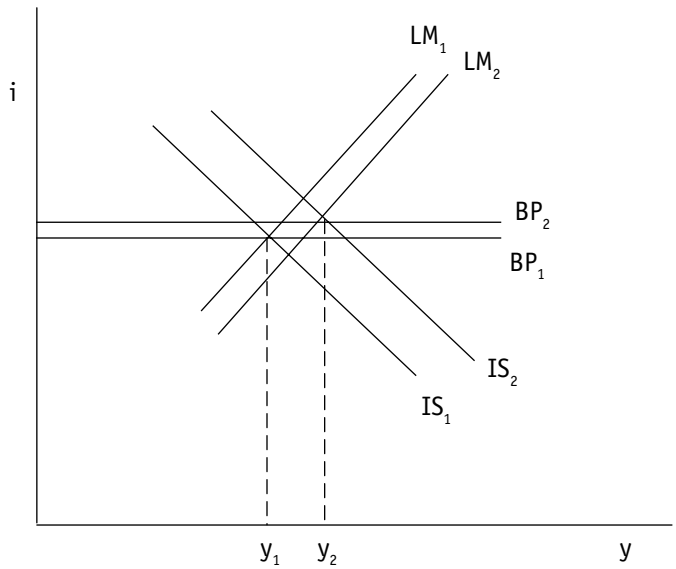


Figure 9.16 Indian Economic Adjustment in the Immediate Aftermath of the 2008 Global Financial Crisis

Source: Authors.

CHAPTER 10

Credit and Crisis: An Epilogue

The 2008 global economic crisis highlighted a key feature of capitalism which mainstream economic theory pays limited attention to: its highly unstable character and proclivity for financial crises. Indeed, the neoclassical approach, which holds that financial markets are efficient (prices on traded assets are assumed to reflect all known information) and that rational expectations prevail (outcomes do not differ significantly from what they are expected to be), is totally ill-equipped to deal with financial crises. This is a serious problem because speculative bubbles and busts are common under capitalism and their effects are harmful. As Keynes warned us long ago:

> Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a whirlpool of speculation. When the capital development of a country becomes the by-product of the activities of a casino, the job is likely to be ill-done.[1]

In their thorough analysis of financial crises over the past eight centuries, Carmen Reinhart and Kenneth Rogoff show that financial crises are a regular occurrence caused by overconfidence, excessive debt accumulation and a lack of appreciation of rising systemic risk.[2] They argue that policy makers and investors ignore the lessons of history, believing erroneously that 'this time is different'. This illusion is costly as financial crises reverberate through the real economy, causing extended recessions. Their central theme is that:

> Excessive debt accumulation, whether it be by the government, banks, corporations, or consumers, often poses greater systemic risks than it seems during a boom. Infusions of cash can make a government look like it is providing greater growth to its economy than it really is. Private sector borrowing binges can inflate housing and stock prices far beyond their long-run sustainable levels and make banks seem more stable and profitable than they really are. Such large-scale debt build-ups pose risks because they make an economy vulnerable to crises of confidence, particularly when debt is short term and needs to be

[1] Keynes, J. M. 2006 [1936]. *The General Theory of Employment, Interest and Money*. p. 142. New Delhi: Atlantic Publishers.

[2] Reinhart, C. and K. Rogoff. 2009. *This Time is Different: Eight Centuries of Financial Folly*. Princeton and Oxford: Princeton University Press.

> constantly refinanced. Debt-fuelled booms all too often provide false affirmation of a government's polies, a financial institution's ability to make outsized profits, or a country's standard of living. Most of these booms end badly.[3]

Reinhart and Rogoff highlighting the role of credit as a source of great instability. This aspect of monetary economy is not accommodated within the standard *IS–LM–BP* and *AS–AD* models (which effectively boil the financial sector down to a bond market). To explore the role of credit and debt as a source of stability internal to capitalism itself, we need to turn to Joseph Schumpeter, who built it into his theory of economic cycles, and his student Hyman Minsky who developed the ideas further through his concept of financial fragility.

Underlying Causes of the 2008 Crisis: A Heterodox View Point

In 2008, Immanuel Wallerstein,[4] an historian of capitalism remarked that the belief that USA was in just another cyclical swing and would soon bounce back hid the fact that three basic costs of capitalist production (wages, inputs and taxation) had risen as a percentage of sales thus squeezing profits and future capital accumulation. He believed that the depression had already started.

Wallerstein argues that the capitalist world has had two major forms of cyclical swings: (a) the 'Kondratieff' cycles of 50–60 years length; and (b) 'hegemonic' cycles linked to the economic dominance of particular regions. In terms of Kondratieff cycles, the world came out of the last B (downturn) phase in 1945, reaching its strongest A (upturn) in 1967–73. This cycle coincided with the strongest period of US hegemony. However, since the mid-1970s, US influence has fallen—a process exacerbated by former president George W. Bush's follies. Falling profitability in the productive sector encouraged capitalists to turn to the financial arena and speculate: 'Productive activities in order not to become too unprofitable tend to move from core zones like Detroit to other parts of the world system like China, India and Brazil, thus trading lower transaction costs for lower personnel costs.'

Source: Authors.

Joseph Schumpeter

Writing in the first half of the 20th century, Schumpeter was critical of the economic mainstream for its lack of attention to profitability and the forces behind the continued

[3] *Ibid.*, p. xxv.

[4] Wallerstein, I. 2008. 'The Depression: A Long-Term View.' *Commentary no.* 243, 15 October 2008. http://www.sendika.org/yazi.php?yazi_no=20228

dynamic expansion of production. He criticised the circular flow of income model—in which no factor of production receives income more than its costs because supply and demand eliminate profits—as being patently unable to account for the process of dynamic accumulation.[5]

Economic growth theory seeks a way out of this problem by attributing dynamic change to exogenous factors such as technological invention. Schumpeter, however, focuses on the people who invent and apply these new technologies—thereby rendering the process endogenous, that is, as an integral aspect of capitalism itself. These were his 'entrepreneurs', the people who revolutionised the economy by restructuring the factors of production to generate new processes, produce new goods and expand new markets.

Entrepreneurs, in Schumpeter's memorable phrase, unleash a storm of 'creative destruction' by driving out old businesses and attracting a 'swarm' of imitators. Investment demand increases rapidly in this expansionary phase—a process Schumpeter highlighted was facilitated by the growth of bank credit.[6] This, he argued, was the second, independent source of dynamism as expanding bank credit stimulated production and demand, thereby stimulating both rising cash balances and greater demand for bank credit. As Ingham observes, 'Schumpeter clearly grasped that the essential capitalist practice was the actual "production" of bank credit money out of nothing more than the promise of repayment.'[7]

The boom produced by new innovations eventually slows down (as imitators set up business and drive down profits through competition) and as firms that cannot stand the assault on their margins go out of business. This, in turn, reduces income, demand and banks suffer defaults. This slows down the expansion of credit (and could even cause a financial crisis). A recession, possibly even a major depression, then results. For Schumpeter, there is a bright side to this as it puts the economic base on a firmer footing to take advantage of the next entrepreneurial driven boom.

Schumpeter was the first to place the financial sector at the heart of capitalist dynamics—but it was his student Hyman Minsky who developed the ideas further.

Hyman Minsky

Minsky believed that 'as long as an economy is capitalist, it will be financially unstable',[8] hence his 'financial instability hypothesis':

> In contrast to the orthodox Quantity Theory of Money, the financial instability hypothesis takes banking seriously as a profit-seeking activity. Banks seek profits by financing activity

[5] Schumpeter, J. 1961 [1911]. *The Theory of Economic Development*. pp. 30–32. Oxford: Oxford University Press.

[6] Schumpeter, J. 1994 [1954]. *A History of Economic Analysis*. London: Routledge.

[7] Ingham, G. 2008. *Capitalism*. p. 39. Malden: Polity Press.

[8] Minsky, H. 1982. 'The Financial Instability Hypothesis'. *Financial Crises*, eds. C. P. Kindleberger and J. P. Lafarge. p. 36. Cambridge: Cambridge University Press.

> and bankers. Like all entrepreneurs in a capitalist economy, bankers are aware that innovation assures profits. Thus bankers (using the term generically for all intermediaries in finance), whether they be brokers or dealers, are merchants of debt who strive to innovate in the assets they acquire and the liabilities they market. This innovative characteristic of banking and finance invalidates the fundamental presupposition of the orthodox Quantity Theory of Money to the effect that there is an unchanging 'money' item whose velocity of circulation is sufficiently close to being constant....[9]

Expanding his idea of banking as a profit-seeking and innovative area of economic activity, Minsky argued that capitalism by the late 20th century had morphed into what he called 'money manager capitalism'[10]—a system where in most business is corporate, where most of their liabilities are held by financial institutions and where there is a new layer of financial intermediation (pension, mutual funds, investment banking). The aim of these fund managers is to maximise the value of investments and where their performance is measured by total return on assets—a combination of dividends and interest received and appreciation in per share value.

In 1999, 3 years after Minsky coined the term 'money manager capitalism' the Glass-Steagall Act, which had separated retail and investment banking, was repealed in the USA, thereby facilitating the expansion of money manager capitalism on a grand scale. It also unleashed the development and spread of innovative financial securities such as collateralised debt obligations (CDOs). These derivatives, many of which were made up of pools of mortgage bonds, supposedly spread financial risk—but in reality rendered the global financial system a far riskier place. Iconic investor, Warren Buffet called them weapons of mass destruction.

Minsky identified three possible sets of relationships between incoming revenue and debt liabilities that describe progressive 'financial fragility':

- hedge finance (anticipated revenues exceed running costs and debt and interest payments);
- speculative finance (can meet their interest payments but can only repay the principal if asset prices rise);
- Ponzi finance (projected earnings cannot possibly meet obligations).[11]

Minsky argued that 'if hedge financing dominates, then the economy may well be an equilibrium seeking and containing system. In contrast, the greater the weight of speculative and Ponzi financing, the greater the likelihood that the economy is a deviation amplifying system.' But he also argued that 'over periods of prolonged prosperity,

[9] Minsky, H. 1992. 'The Financial Instability Hypothesis.' *Working Paper no. 74*, Jerome Levy Economics Institute of Bard College. http://www.levyinstitute.org/pubs/wp74.pdf

[10] Minsky, H. 1996. 'Uncertainty and the Institutional Structure of Capitalist Economies.' *Working paper no. 155*, Jerome Levy Economics Institute of Bard College. http://www.levyinstitute.org/pubs/wp155.pdf

[11] Minsky, The Financial Instability Hypothesis.

the economy transits from financial relations that make for a stable system to financial relations that make for an unstable system.'[12]

Schumpeter and Minsky emphasised that because capitalist enterprise is debt-financed, crises are normal functioning events. The typical cycle begins with the expansion of production and revenues of the prudent hedge finance enterprises. The growing cash balances in their bank accounts enable banks to lend money to enterprises which fall into the 'speculative' and 'Ponzi' categories. As the level of unserviceable debt rises, the probability of a chain reaction of defaults increases (or the monetary authorities might try to curb lending by raising interest rates—which could also trigger defaults). So, assets are sold to realise cash, which sparks a collapse in asset prices, also making a financial crisis likely. This translates directly into the real economy as firms try to cut losses by reducing output and employment, thus collapsing demand.

Minsky saw this as a problem, but not a terminal one in that governments and central banks could (at least hypothetically) become more effective at monitoring and so prevent financial fragility from translating into crisis. Reinhart and Rogoff, echo this view, arguing also for better and more transparent monitoring of the level of national government debt.[13] Central banks can prevent a total crisis by advancing loans to the banking system (to prevent the unravelling of the credit network and payments system). But the obvious danger here is moral hazard as banks feel insured because they are seen as too big to fail. Under such conditions, money managers have every incentive to continue with risky financial innovations.

Capitalism and Society

Schumpeter predicted that capitalism would eventually lose momentum (probably giving way to socialism) as the entrepreneurial function became more muted over time under the weight of bureaucracy, team-work and disinterest on the part of the children of entrepreneurs.[14] He was wrong in this respect, but correct to be concerned about potential social and institutional forces shaping the path of capitalist development.

Economists, and especially neoclassical economists, typically model the economy as if it is wholly separate from society. Yet, as Karl Polanyi argued compellingly in his book *The Great Transformation*[15] economies are always profoundly 'embedded' in social relations and that when people feel that market forces are undermining their welfare, they put pressure on governments to restrain market forces, especially where these apply to land, labour and credit. He thus regards the neoclassical model as an 'impossible utopia', warning that attempts to free up market forces will be counterproductive (indeed, he

[12] *Ibid*.
[13] Reinhart and Rogoff, *This Time is Different*, p. xxxiv.
[14] Schumpeter, J. 1975 [1942]. *Capitalism Socialism and Democracy*. New York: HarperCollins.
[15] Polanyi, K. 1944. *The Great Transformation*. New York: Rinehart.

argued that the rise of fascism in Europe was a response to insufficiently regulated and crisis-ridden economies).

Polanyi's analysis certainly resonates today as citizens around the world put pressure on governments to restrain the activities of money managers (the 'banksters') and to increase taxes on the rich. There is also growing interest in the ways in which governments can intervene more aggressively in economies, both with regard to investment and welfare spending.

Capitalism has come under a great deal of criticism since the 2008 crisis, but it is not about to disappear anytime soon. Rather the challenge facing policy makers is to manage the capitalist economy so that it delivers more benefits, and fewer costs, for ordinary people. The old tension between neoclassical and Keynesian ways of thinking will continue—but this is a creative tension and can help us as we think through what policies make sense in particular contexts.

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