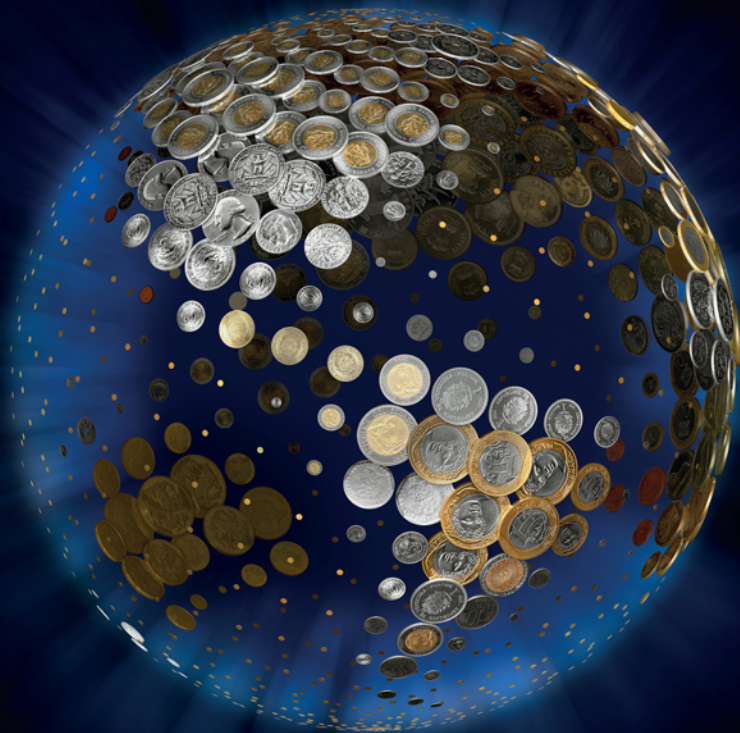


# MACROECONOMICS

# MANFRED GÄRTNER

Fifth Edition



# Macroeconomics

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# Macroeconomics

FIFTH EDITION

Manfred Gärtner

University of St Gallen, Switzerland

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**For**

**Juliana**

**the most amazing little girl I know**

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### Lecturer Resources

For password-protected online resources tailored to support the use of this textbook in teaching, please visit [www.pearsoned.co.uk/gartner](http://www.pearsoned.co.uk/gartner)

# GUIDED TOUR OF THE BOOK

## What to expect

Bullet points at the start of each chapter show what the reader can expect to learn, and highlight the core coverage.

### What to expect

After working through this chapter, you will understand:

- 1 In more detail the meaning of **potential income** or output.
- 2 How wages and employment are determined in the **labour market**.
- 3 How regulations, trade unions, and other labour market characteristics, or demographic features, may give rise to **involuntary unemployment** which persists in the long run.
- 4 Why **aggregate output** produced by firms may temporarily exceed or fall short of the level of potential output produced in equilibrium (or the long run).
- 5 How **unemployment** may be decomposed into a temporary and a persistent component by means of the **Beveridge curve**.

## Margin notes

Helpful tips and guidance appear in the margins, giving maths reminders, examples, rules, empirical notes and reality checks.

**Maths note.** The two-period budget constraint states that since today's income is either consumed or saved,  $Y_1 = C_1 + S_1$ , and consumption next period is limited by the sum of period-2 income and period-1 saving plus interest,  $C_2 = Y_2 + (1 + r)S_1$ , the present value of consumption must equal the present value of income:  $C_1 + \frac{C_2}{1+r} = Y_1 + \frac{Y_2}{1+r}$ . This is rewritten  $C_2 = (1+r)Y_1 + Y_2 - (1+r)C_1$ , which defines a straight line with slope  $(1+r)$ . The concept of present values makes payments comparable that accrue at different points in time. For example, when the interest rate is 4% annually, €100,000 becomes €104,000 in a year. Then we may say that at an interest

To obtain an unobserved that each can be taken

**The consumption** analyzed in a diagram  $t$  and future consumption have already decided comes that are thus immediately, in the point in the interestment point. In a lot of money has been thrown from future income. In Figure 17.3 the Thus the endowment indicate the household produces nothing but to be consumed rigid in which it was

## Key terms

Key terms and concepts in each chapter are highlighted in colour, with definitions in the margin.

sum of goods and services currently produced.

The **aggregate supply curve** shows the total quantity of goods and services supplied by all firms in the economy at different price levels.

The **extreme Keynesian aggregate supply curve** is horizontal, stating that, at the current price, firms are ready to produce any output that is demanded. A refined Keynesian aggregate supply

level of output was when we discussed money in the circular flow model in Chapter 1. There we considered two extreme cases of the **aggregate supply (AS) curve**, the line that indicates how much output firms produce at different price levels. For easy reference, Figure 6.1 replicates these two versions. The **horizontal aggregate supply curve** shown in panel (a) is the one we employed in Chapters 2–5 in the context of the Keynesian cross, the **IS-LM model** and the **Mundell-Fleming model**. It is usually referred to as the **extreme Keynesian aggregate supply curve**. It assumes there is slack and the presence of one or more production factors in abundance. Then how much firms produce depends only on demand. At the given price level, firms supply any level of output that is demanded. But then the price level never changes! How does this correspond with the real world where continuous price changes in the form of inflation are the rule rather than an exception? Quite obviously, a horizontal aggregate supply curve cannot be the whole story.

## Boxes

Boxes in each chapter present useful guidance to the reader and illustrate the concepts.

## Case studies

Every chapter contains one or more case study that applies core concepts to recent experiences in Europe and in other parts of the world.

### BOX 17.1 A pocket guide to the history of macroeconomic thought

Many bright minds have contributed to what macroeconomics is today. This box does not even try to do justice to the richness of ideas found in their writings. Instead, it settles for the modest goal of projecting the major schools of macroeconomic thought onto the AD-AS diagram and highlighting selected key contributions.

#### Classical economics

Long before the term macroeconomics had even been invented, classical economists (like Adam Smith, David Ricardo, David Hume and John Stuart Mill) believed that the flexibility of wages and prices ensured that markets very much cleared all the time. In the view of classical macroeconomics income remained so close to potential output that no policy intervention was warranted. Translated into the AD-AS diagram (which also had not been devised yet), the AS curve is vertical, and it moves slowly and smoothly as the labour force grows, the capital stock increases and technology improves. Shifts in the AD curve cannot affect income. When nominal variables, such as the money supply, change, this affects only the price level but none of the real variables. This phenomenon is called the **classical dichotomy**. We actually have two separate, independent parts of the economy: one where real variables like the capital stock or productivity determine other real variables like income, employment or the real wage, and the other where nominal variables like the money supply or

foreign prices determine other nominal variables like prices or the exchange rate.

#### Keynesianism

After a long reign well into the 20th century, the experience of the Great Depression (1929–32) left the classical view in shambles. There was no way to rationalize a drop in industrial production of 47% within little more than three years, as had happened in the United States, or of 42%, as experienced in Germany, as a movement in potential income. British economist John Maynard Keynes came up with a new way to look at the economy. He argued that when there were high levels of unemployment, even at unchanged prices, firms would produce any volume of output that was demanded. Under such circumstances AS is flat and the classical dichotomy breaks down. If an increase in government spending shifts AD to the right, this has real consequences in the form of a rise in income. While Keynes did not contest the possibility of a return of income to potential income in the long run, this was not the focus of his analysis. In fact, he shrugged it off with the famous remark: 'In the long run we are all dead.' With market forces considered too slow, Keynesians believed that during periods of lack of demand the government had to step in by means of fiscal and monetary policy.

In the orthodox Keynesian scenario prices remain fairly constant, as postulated in our IS-LM and Mundell-Fleming models. Later, faced by the

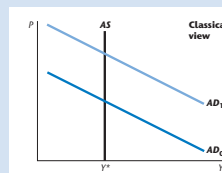


Figure 17.14 Demand fluctuations do not affect income. Potential income evolves slowly. Classical dichotomy holds at all times.

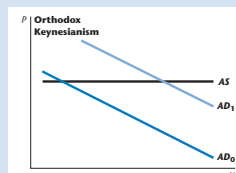


Figure 17.15a Demand fluctuations affect income only. Classical dichotomy does not hold.

### CASE STUDY 2.2 How to pay for the war: Great Britain in 1940

Many of the tools we encounter in this and subsequent chapters are due to British economist John Maynard Keynes (1883–1946), who gave his name to such terms as Keynesian cross and Keynesianism (for an entire school).

In 1940 Keynes published *How to Pay for the War*. One of the questions raised in this treatise is how Great Britain could meet the economic efforts required by the Second World War without generating inflation. In essence (after streamlining it in some inessential aspects), Keynes's argument runs as follows:

- 1 Income in 1938 (the latest available data) ran at £5,520 million. Potential income was estimated at £6,345 million. So income (output) could increase by  $\Delta Y = 6,345 - 5,520 = 825$  million without risking inflation. (If demand were driven beyond potential income, he assumed, firms would start to raise prices.)
- 2 How far can government spending be raised without pushing income beyond potential income? The answer is certainly not £825 million! The permitted change of income and therefore the permitted change of government spending are related by the multiplier. We may take the one given in equation (2.14). Letting  $m = 0$

(private, income-sensitive imports would be controlled and low during the war), we obtain

$$\Delta Y = \frac{1}{1 - c(1 - t)} \Delta G$$

Knowing that  $\Delta Y = 825$ , all we need to know to calculate  $\Delta G$  is  $c$  and  $t$ .

3 **Assumptions.** Proceeding from the 1938 data  $Y = 5,520$ ,  $C = 4,380$  and  $T = 770$ , a reasonable guess is to assume that marginal and average consumption and tax rates are the same, that is  $c = CY = 4,380/5,520$  and  $t = TY = 770/5,520$ .

4 **Result.** Substituting the obtained rates  $c = 0.79$  and  $t = 0.14$  into the multiplier expression gives a multiplier of 3.15. Letting  $\Delta Y = 825$  and solving the multiplier equation for  $\Delta G$  finally yields  $\Delta G = 262$ . Therefore, government spending can be geared up by £262 million (in 1938 prices) without triggering inflation. If that doesn't provide sufficient funds, tax rates may have to be raised (if politically feasible), which in turn reduces the multiplier and drives equilibrium income down.

Keynes's assumptions, line of argument and results may also be presented graphically in the context of the Keynesian-cross diagram (see Figure 2.13).

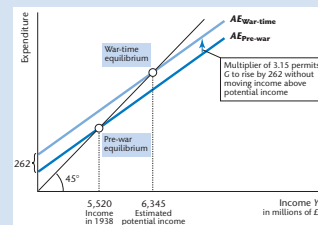


Figure 2.13



**CHAPTER SUMMARY**

- A country's income at a given point in time is determined by the steady-state level of income, the deviation of potential income from steady-state income, and the deviation of income from potential income. The latter is called the business cycle.
- In the circular flow model there exists one equilibrium level of income at which actual spending is exactly as planned. What sets this level of income apart from all other feasible income levels is that firms will try to set production to this very level to avoid having to invest or disinvest involuntarily.

**Chapter summary**

Each chapter ends with a bullet-point summary which highlights the material covered in the chapter and can be used as a quick reminder of the main issues.

**Key terms and concepts**

- |                                    |                                   |
|------------------------------------|-----------------------------------|
| actual expenditure 42              | Keynesian cross 47                |
| aggregate (planned) expenditure 42 | marginal income tax rate 51       |
| average income tax rate 51         | marginal propensity to consume 46 |
| boom 37                            | multiplier 50                     |
| business cycle 37                  | net taxes 44                      |
| capital costs 58                   | permanent income 60               |
| consumption function 51            | potential income 37               |
| demand-side equilibrium 43         | production function 39            |

**Key terms and concepts**

A list at the end of each chapter of all the key terms and concepts, for quick reference.

**Recommended reading**

The bible on issues of central bank independence is Alex Cukierman (1995) *Central Bank Strategy, Credibility, and Independence: Theory and Evidence*, Cambridge, MA and London: MIT Press.

The empirical evidence is gauged on a non-technical level in Alberto Alesina and Lawrence H. Summers (1992) 'Central bank independence and macroeconomic performance', *Journal of Money, Credit and Banking* 25: 153–62.

A survey of theoretical progress in political macroeconomics achieved in the 1990s is provided by Manfred Gaertner (2000) 'Political macroeconomics: a survey of recent developments', *Journal of Economic Surveys* 14: 527–61.

Sacrifice ratios are studied in Lawrence Ball (1994) 'What determines the sacrifice ratio?', in N. Gregory

Mankiw (ed.) *Monetary Policy*, Chicago and London: University of Chicago Press.

A provoking view on inflation, central bank independence and monetary policy is offered in Paul Krugman (1996) 'Stable prices and fast growth: Just say no', *The Economist*, 31 August, pp. 17–20.

Several authors have forwarded proposals of how to integrate the kind of endogenous monetary policy discussed in this chapter into an IS-LM framework:

- David Romer (2000) 'Keynesian macroeconomics without the LM curve', *Journal of Economic Perspectives* 14:149–69.
- Carl Walsh (2002) 'Teaching inflation targeting: An analysis for intermediate macro', *Journal of Economic Education* 33: 333–46.

**Recommended reading**

Each chapter is supported by an annotated recommended reading section, directing the reader to additional printed and electronic sources in order to gain an alternative perspective, or to pursue a topic in more depth.

**Exercises**

Exercises at the end of each chapter are geared towards the chapter's central ideas and consolidate the acquired knowledge.

**Applied problems**

These optional problems show students how intermediate statistical skills may be applied to the study of macro-economics, and encourage them to try for themselves.

**EXERCISES**

- 2.1 Consider French real output between 1900 and 2015 as given in Figure 2.19. Add your guess of the paths of steady-state income and potential income to the graph.

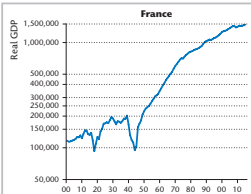


Figure 2.19

- 2.2 Figure 2.20 displays the evolution of real GDP between 1978 and 2002 for the United States and France.
- Try to identify business cycles, marking peaks and troughs on the graphs.
  - Identify the US position in 1991 in a diagram with prices on the vertical axis and income on the horizontal axis. Mark potential income, steady-state income and actual income.

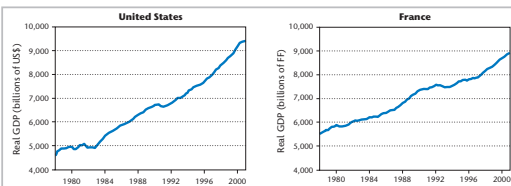


Figure 2.20

Two US economists, Arthur F. Burns and Wesley C. Mitchell, claimed half a century ago that the typical business cycle lasts between six and thirty-two quarters.

(d) Does this agree with your findings?

- 2.3 Consider an economy with the following data (note that  $I$  is planned investment, which may not coincide with actual investment):
- $$C = 750 \quad I = 500 \quad T = 0 \quad G = 250$$
- $$NX = 250 \quad Y = 1,000$$
- Is this economy's circular flow in equilibrium in the sense that firms do not have to change inventories involuntarily?
  - Translate the above data into a diagram with demand on the vertical axis and income on the horizontal axis. Add the assumption  $C = 0.75Y$ .
  - Draw the aggregate-expenditure and the actual-expenditure lines. Identify demand-determined income in equilibrium in your graph and analytically.
  - What happens to equilibrium income if government expenditure increases by 500 units? Show your result in a graph and verify that it is supported by the multiplier formula of equation (2.9).
  - Using a graph, show what happens if net exports fall from 250 to 100.

**APPLIED PROBLEMS**

**EMPIRICAL RESEARCH**

**What explains sacrifice ratios?**

Lawrence Ball ('What determines the sacrifice ratio?', in N. G. Mankiw (ed.) (1994) *Monetary Policy*, Chicago and London: University of Chicago Press) computes a sample of sacrifice ratios for different disinflation episodes in different countries. One question that he analyses is whether the obtained sacrifice ratios depend on the SIZE of the disinflation (by how many percentage points is inflation reduced from the beginning to the end of the episode?) and by the LENGTH (how many quarters did the disinflation last?). The obtained estimation equation for twenty-eight episodes is (standard errors in parentheses):

$$\text{Sacrifice ratio} = 1.045 - 0.198 \text{ SIZE} + 0.120 \text{ LENGTH}$$

$$(0.325) (0.061) \quad (0.034)$$

$$R_{adj}^2 = 0.30$$

Larger disinflations come at lower disinflation costs: the coefficient for SIZE is negative and significant ( $t$ -statistic =  $0.198/0.061 = 3.25$ ). On the other hand, spreading the disinflation over a longer time appears to make it more costly: the coefficient for LENGTH is positive, with a  $t$ -statistic of  $0.120/0.034 = 3.53$ . The coefficient of determination is only 0.30, however, meaning that only 30% of

the differences of sacrifice ratios between disinflation episodes may be traced back to the size and the length of the disinflation.

**WORKED PROBLEM**

**Does central bank independence ease disinflation pains?**

Inflation can be reduced by moving down along the SAS curve. Then the slope of SAS determines the incurred sacrifices. Or the SAS curve may be shifted down by reducing inflation expectations. If this is accomplished, inflation may be reduced at no or at low cost. According to what we learned in this chapter, an independent central bank (which desires lower inflation than a dependent one) should be expected to be more successful in reducing inflation expectations. Hence, more CBI should come hand in hand with lower sacrifice ratios. Table 13.3 gives average sacrifice ratios for nine countries and CBI data.

To see whether there is a relationship we run a regression to obtain (standard errors in parentheses):

$$\text{Sacrifice ratio} = -0.441 + 0.206 \text{ CBI} \quad R_{adj}^2 = 0.59$$

$$(0.553) (0.058)$$

**Online resources**

Online material supporting each chapter includes interactive applets and self quizzes. QR codes provide easy access to material prepared for use on smart phones.

**Online resources**

Interactive Keynesian cross applet [www.eurmacro.eu/tutor/keynesiancross.html](http://www.eurmacro.eu/tutor/keynesiancross.html)  
X-curse on paradox of thrift [www.eurmacro.eu/exercises/paradoxofthrift.html](http://www.eurmacro.eu/exercises/paradoxofthrift.html)

Self quiz  
[www.eurmacro.eu/SelfQuizAq-ch02.html](http://www.eurmacro.eu/SelfQuizAq-ch02.html)



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# PREFACE

## What makes this book unique?

This text reverses the usual priorities in undergraduate macroeconomics instruction. The emphasis is not on teaching macroeconomic theories, models and concepts, with real-world applications thrown in for motivation and excitement; rather, students work through this book towards an understanding of the macroeconomic issues and challenges facing the global economy and individual countries. Macroeconomic concepts and models are taught only as they serve this end.

## Content

The global financial crisis that morphed into a European sovereign debt crisis gave macroeconomics a rude awakening from a slumber of complacency. This poses challenges for research as well as teaching on all levels. Interestingly, though, many of the issues that dominated policy debates, and concepts that proved useful during the crisis, were taken from the undergraduate curriculum, not from cutting-edge research. Undergraduate teaching is, therefore, less rattled by recent events than are graduate curriculums and research agendas. But the startling speed at which demand and employment receded, and the sheer magnitude at which incomes dropped, the stubbornness with which they resisted recovery, has tarnished belief in the self-healing powers of markets and the uniqueness of macroeconomic equilibria. This calls for a revitalized interest in what can go wrong in financial and goods markets, and when and how central banks and governments should step in to augment private demand.

Acknowledging this, the text's business cycle chapters use the events of 2008–2015 very much as a running theme that features in Case Studies and Boxes. And the book places new emphasis on financial markets, on the possibility of instabilities and on multiple equilibria.

Chapters 1–9 are fairly conventional in content, amounting to a streamlined, no-frills introduction to the macroeconomic concepts that are useful for discussion of today's macroeconomic issues. Essential concepts are introduced in the context of the circular-flow-of-income model. Students are then led via the Keynesian cross, the *IS-LM* model, the Mundell–Fleming model and the aggregate demand–aggregate supply model to a fully dynamic aggregate demand–aggregate supply framework for analysing short- and medium-term macroeconomic issues. Chapters on the supply-side topics of unemployment and growth complete this predictable set of tools.

Chapters 10 and 11 extend the toolbox into areas that most intermediate macroeconomics textbooks barely mention in passing. The first one refines and extends the Solow growth model (introduced in Chapter 9) with discussions

of human capital and poverty traps, and concludes with a first glimpse at endogenous growth. Under the heading ‘Endogenous economic policy’, Chapter 11 shows that politicians may be tempted to steer economies along paths not considered desirable from society’s point of view, and discusses how institutions should be structured to reduce this risk.

Chapters 12–15 explore issues at the heart of European and global economic integration. Chapters 12 and 13 look at monetary integration, with a focus on the challenges posed by and benefits offered by a single currency shared by many countries. Chapter 14 explores debt dynamics and takes a closer look at the market for government bonds. In Chapter 15 economic crises take centre stage. Standard models are expanded and refined to shed light on the consequences of oil price explosions, on the real estate and financial crisis, and on the sovereign debt crisis. Relevant new concepts introduced in this and earlier chapters are bubbles and self-fulfilling prophecy, market psychology and risk premiums, multiple equilibria and liquidity traps, and multiple interest rates.

Chapters 16 and 17 offer a sneak preview of what macroeconomics courses at the Masters level have in store. They also make a serious effort to motivate students and explain why research had moved beyond the workhorse models of intermediate macroeconomics to study macroeconomic models with explicit microfoundations – of the real-business-cycle mould, or with sticky prices and information. To this end, students learn about the co-movement of macroeconomic variables, and why sticky prices or sticky information may perform better than sticky wages in explaining empirically observed patterns. They also grasp the intuition behind real-business-cycle dynamics, without the elaborate formal apparatus that usually comes with it.

## Learning features

The book has a user-friendly design, featuring margin notes and definitions that emphasize important concepts. Exercises geared towards each chapter’s central ideas consolidate the acquired knowledge. An extensive and innovative use of graphs facilitates access and enhances learning success. Every chapter contains one or more Case Studies that apply core concepts to recent or historic experiences in Europe and in other parts of the world. And all chapters feature links to elaborate online material that includes interactive graphical versions of the book’s key models, guided exercises, an interactive road map, self-grading online tests, macroeconomic data, and much more. Suitable parts of the online material have been adapted for use on smart phones, with easy access provided by QR codes.

## What courses does the book accommodate?

The organization of the book gives instructors various options:

- Primarily, the text is designed for courses in *undergraduate* or *intermediate macroeconomics* that on the one hand insist on providing a sound theoretical foundation, but on the other also want to make a point of emphasizing *applications* in the form of Case Studies or even, if so desired, elementary statistical work.

- The book's first half can also be used for a self-contained *short course in macroeconomics* whenever time does not permit working through a full macroeconomics text.
- Also, the book readily accommodates courses in *Economic policy* and *Applied macroeconomics*. Such courses may be organized around an appropriate selection from the several dozen Case Studies and empirical applications. As deemed necessary, students can be referred to the required theory tools in the same textbook.
- Finally, the book accommodates *European studies* courses that can be organized around the applied topics discussed in Chapters 12–15. Here also, should it be necessary to freshen up or expand previously acquired theoretical knowledge, such material is readily available in the same textbook.

## Prerequisites

Ideally, students should approach this book with a *Principles of economics* course under their belt. The mathematical requirements are mild: anything close to the most basic mathematics training in high school should do. Most of the formal manipulations are optional and either shown in margin notes or in separate sections that supplement graphical arguments.

I am confident, though, that the book can also be used successfully if a principles course is missing and algebraic manipulations are avoided altogether. Dozens of Case Studies, some brief, some elaborate, provide ample ammunition for keeping up motivation, and the big payoff waits in the later chapters of the book.

Finally, and though it may sound frivolous: I believe that the book is even suited for self-study. The acquired knowledge will definitely be more fragile and lack depth compared with what can be achieved under the guidance of an experienced instructor. But it should provide an up-to-date first foundation for informed discussion of today's national and global macroeconomic issues.

## Acknowledgements

This brings me to the people I want to thank for their contributions to whatever merits this text may have. In the very first place, these are my students, who amaze me time and again. Most of all, teaching teaches the teacher. Students' questions and curiosity constantly force me to refine explanations, and in the process very often end up with a deeper understanding myself.

It has been a joy to work with the professionals at Pearson Education, to whom I owe a big 'thank you'. They helped and guided me, with unmatched skill and great patience, in preparing this thoroughly updated fifth edition, and brought the book into its final shape: Caitlin Lisle (editor), Linda Mellor (copy editor), Jennifer Sargunar (senior project editor), and (Prathiba Naveenkumar) (proofreader).

I have also benefitted from the reviews commissioned by Pearson Education. Both those that offered applause and encouragement, and those that were more reserved, helped shape the book into a better teaching tool.

The mere writing of a textbook may mostly happen at the desk. But the enthusiasm, the creativity and the discipline that are essential for such a project come from beyond office doors. In this respect I owe much more to my family than they can possibly know.

## PUBLISHER'S ACKNOWLEDGEMENTS

*We are grateful to the following for permission to reproduce copyright material:*

### **Figures**

Figures 9.6a, 9.6b from *Economics*, Prentice Hall Europe (K. Case, R. Fair, M. Gärtner and K. Heather, 1999); Figure 12.1 from *Economics*, Prentice Hall Europe (K. Case, R. Fair, M. Gärtner and K. Heather, 1999).

### **Tables**

Table 9.1 from S.A. Englander and A. Gurney (1994) 'Medium-term determinants of OECD productivity growth', *OECD Economic Studies*, 22, Reproduced with permission of the OECD.

### **Text**

Case Study 6.1 from "Did Henry Ford Pay Efficiency Wages?", *Journal of Labor Economics*, Vol. 5, No. 4, Pt 2, pp. S57–S86 (Daniel M. G. Raff and Lawrence H. Summers, 1987) University of Chicago Press; Case Study 11.2 and 14.2, 'Who wants the euro – and why?' Economic explanation of public attitudes towards a single European currency, *Public Choice*, 93, pp. 487–510 (Manfred Gärtner, 1997), © 1997 Kluwer Academic Publishers, with permission of Springer.

# CHAPTER 1

## Macroeconomic essentials

### What to expect

After working through this warm-up chapter, you will know:

- 1 What **macroeconomics** is all about, and how it relates to microeconomics.
- 2 All you need to know about **national income accounting**, including government budgets and the balance of payments.
- 3 What the **circular flow model** is, how to use it and what its limitations are.
- 4 How **money** fits into the macroeconomy.
- 5 Why economists need to use **models**, and why these simplified pictures of the real world are useful.
- 6 How to work with **graphs**.

### 1.1 The issues of macroeconomics

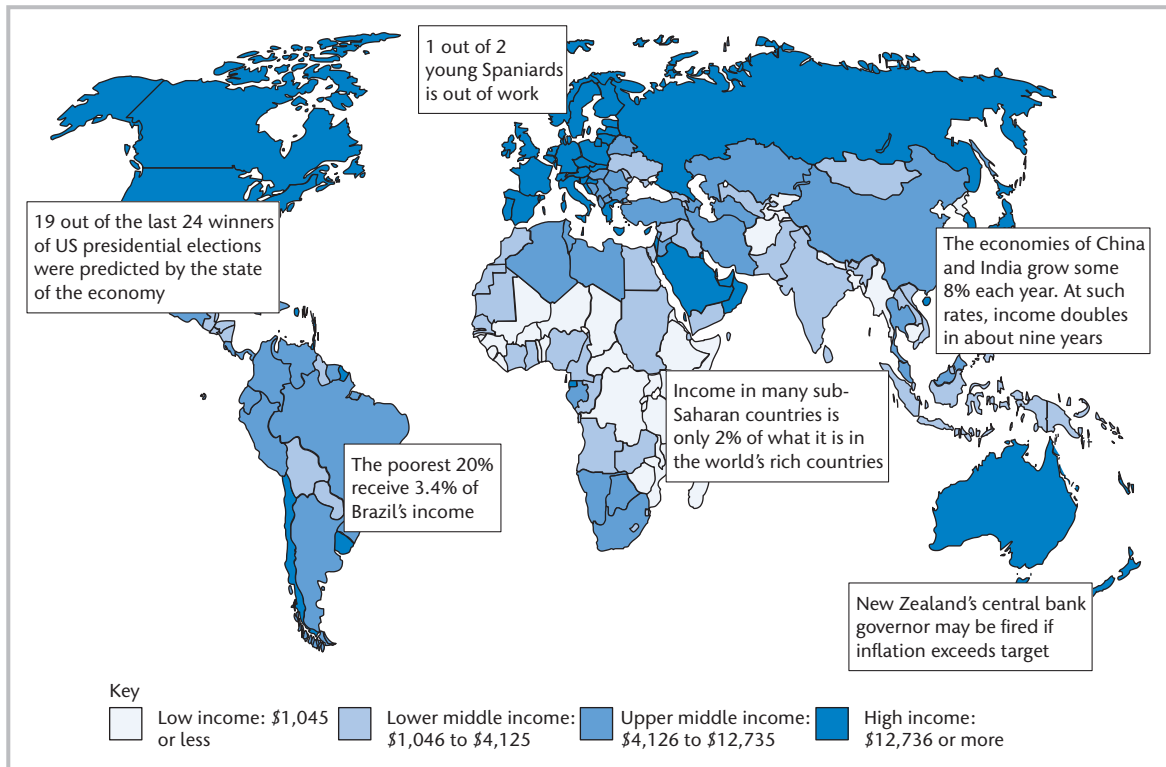
**Economics** is about how people use time and tools to produce what other people want to buy – and about the sometimes intricate choices that must be made and the things that can go wrong.

The two major subdisciplines of economics are microeconomics and macroeconomics. **Microeconomics** looks in great detail at how individuals make choices – as consumers, as employees, as entrepreneurs, as investors, or even as politicians. **Macroeconomics** looks at the big picture, at the way things are and how they develop after we add everything up, in the whole economy or in large segments or sectors of the economy. Of course, microeconomics and macroeconomics cannot lead separate lives. What happens in the macroeconomy must be the result of all the individual decisions analysed and explained in microeconomics. This is why the search for the *microfoundations of macroeconomics* ranks high on today's research agenda. However, to model all the choices of millions of different people and show how they interact to generate specific macroeconomic outcomes is simply not feasible. It probably never will be. Inevitably, at some point we have to resort to simplifications or abstractions: either by assuming, say, that all individuals are alike, which is what so-called *representative agents models* of the macroeconomy do; or by postulating relationships between macroeconomic variables which are *ad hoc* in the sense that they only *proxy* the outcomes of individual choices, but nevertheless seem to work well in many real-world situations.

**Microeconomics** studies individual entities such as consumers or firms.

**Macroeconomics** studies the whole economy from a bird's-eye perspective.





**Figure 1.1** The map shows the huge differences that exist in the per capita incomes of the world's nations in 2015. Other important macroeconomic variables and issues are reported in boxes: economic growth, unemployment, inflation, the distribution of income and the close link between the economy and politics.

Source: World Bank Key Statistics Online.

**Income** is revenue derived from work and assets, such as wages, interest, dividends and profits.

**Rule of 72.** As a rule of thumb, divide 72 by the annual income growth rate (in per cent) to learn in how many years income doubles. Example:  $72/9 = 8$ .

The foremost single measure of how an economy performs is the aggregate level of **income**. Presenting the world at a glance, Figure 1.1 gives an overview of this variable by classifying countries according to income per capita, which is total income divided by population. Huge differences in per capita incomes exist. At the high end are the industrialized countries with annual incomes per head of \$20,000 to \$60,000. Lowest are a number of countries in sub-Saharan Africa with average annual per capita incomes of barely \$1,000. To make matters worse, many of the world's poorest countries do not seem to be growing very much – if at all. In stark contrast, the Asian 'tigers' – Hong Kong, Singapore, South Korea and Taiwan – have been growing at or near double-digit percentage rates throughout the 1980s and much of the 1990s. Other Asian nations, China and India most notably, by far the world's most populous nations, have been copying this miracle. At such growth rates, incomes double in less than ten years.

Per capita incomes reported in Figure 1.1 are *nominal incomes*. They were initially recorded in a country's currency – say Euros, Pounds, Francs or Kronas – and then converted into a common currency (here US Dollars) in order to make them comparable, using the current exchange rate.

Nominal incomes are not the best data to look at if you want to compare the material well-being of different countries, or see how it evolves over time in a single country. The reason is that one dollar might not buy the same amount of rice (or potatoes, or cod, or . . .) in Ireland as it does in Bulgaria. In technical terms: it may not have the same *purchasing power* in different countries. Also, it may not buy the same amount in 2016 that it bought in 2010 because prices have changed.

Measuring income growth over time in a single country is the simpler problem. Note that nominal income is prices  $P$  times real income  $Y$ , that is  $P \times Y$ . Now consider that US nominal income per capita grew by 26.5% from  $P_{2006} \times Y_{2006} = \$46,352$  in 2006 to  $P_{2016} \times Y_{2016} = \$58,625$  in 2016. This does not necessarily mean that US citizens could buy 26.5% more goods and services in 2016 than they could in 2006. Possibly, the increase in nominal income might have been entirely due to a 26.5% rise in prices, with no real improvements in the purchasing power of US incomes at all. Of course, this has not really been the case. In fact, US prices rose by 19.3% from an index value of, say, 1 in 2006 to 1.193 in 2016. To obtain 2016 real income (expressed in 2006 prices), we need to divide 2016 nominal income by the 2016 price level and multiply by 2006 prices:  $Y_{2016} = (P_{2016} \times Y_{2016})/P_{2016} \times P_{2006} = \$58,625/1.193 \times 1 = \$49,140.8$ . So while nominal income rose by 26.5%, real income grew by only 6%.

Similar issues, with one added complication, arise when comparing incomes between countries. Noting that per capita income in 2016 was \$58,625 in the United States but \$84,377 in Switzerland would only permit a meaningful comparison of purchasing power if one dollar bought the same in Switzerland as in the United States. Although \$14.37 buys three Big Macs at \$4.79 each in the United States, you need \$22.62 to buy the same (at \$7.54 each) in Switzerland. This price difference may have two causes: at 6.50 Swiss francs Big Macs may simply be expensive in local currency; or the dollar may be undervalued, meaning it takes too many dollars to buy a Swiss franc. Our current knowledge does not put us in a position to sort this out. All we know is that a dollar buys fewer Big Macs in Switzerland than in the United States, and that we need to take this into account when comparing Swiss income to US income.

Table 1.1 generalizes our Big Mac example. Column 2 shows that in 2016 nominal income per capita in Switzerland was almost 44% higher than in the United States. In Poland it was less than a sixth of Switzerland's. Taking into

**Table 1.1 Nominal and real income in 2016.** The second column shows *nominal income*. Because prices differ substantially between countries (third column), *real income*, the amount of goods that income can buy, turns out quite differently, as shown in the fourth column

	Nominal income (per capita, in \$) $PY$	Price level (relative to US price level) $P$	Real income (in US purchasing power) $Y$
Poland	13,598	0.49	27,530
Switzerland	84,377	1.41	59,976
United States	58,625	1	58,625

Source: IMF.

**Empirical note.** World-wide the richest countries, with 17% of the population, make 71% of world income. The poorest countries, with 47% of the population, make 7% of world income.

account the level of prices relative to the United States, the picture changes substantially. In Switzerland, \$84,377 buys what only \$59,976 buys in the United States. So Switzerland's *real income* per capita is almost the same as America's. Prices in Poland are half as high as in the United States, and about a third of what they are in Switzerland. Therefore, in terms of real income, Poland performs much better than it seems to perform in terms of nominal income.

A statistical *average*, which is what income per capita is, is one thing. The actual *distribution of income* may be quite another story. In Brazil, to give one example, the richest 20% of the population earn 57.2% of the nation's aggregate income. The poorest 20% earn as little as 3.4%. In Europe, high average incomes conceal that almost one in ten of those who want to work do not find a job. Good unemployment insurance and social security have so far prevented high *unemployment* from showing up more pronouncedly in a widening distribution of income. But welfare states are struggling and are quickly scaling down the role of the government. This trend has been reinforced by Europe's sovereign debt crisis, which put a number of countries on the brink of default.

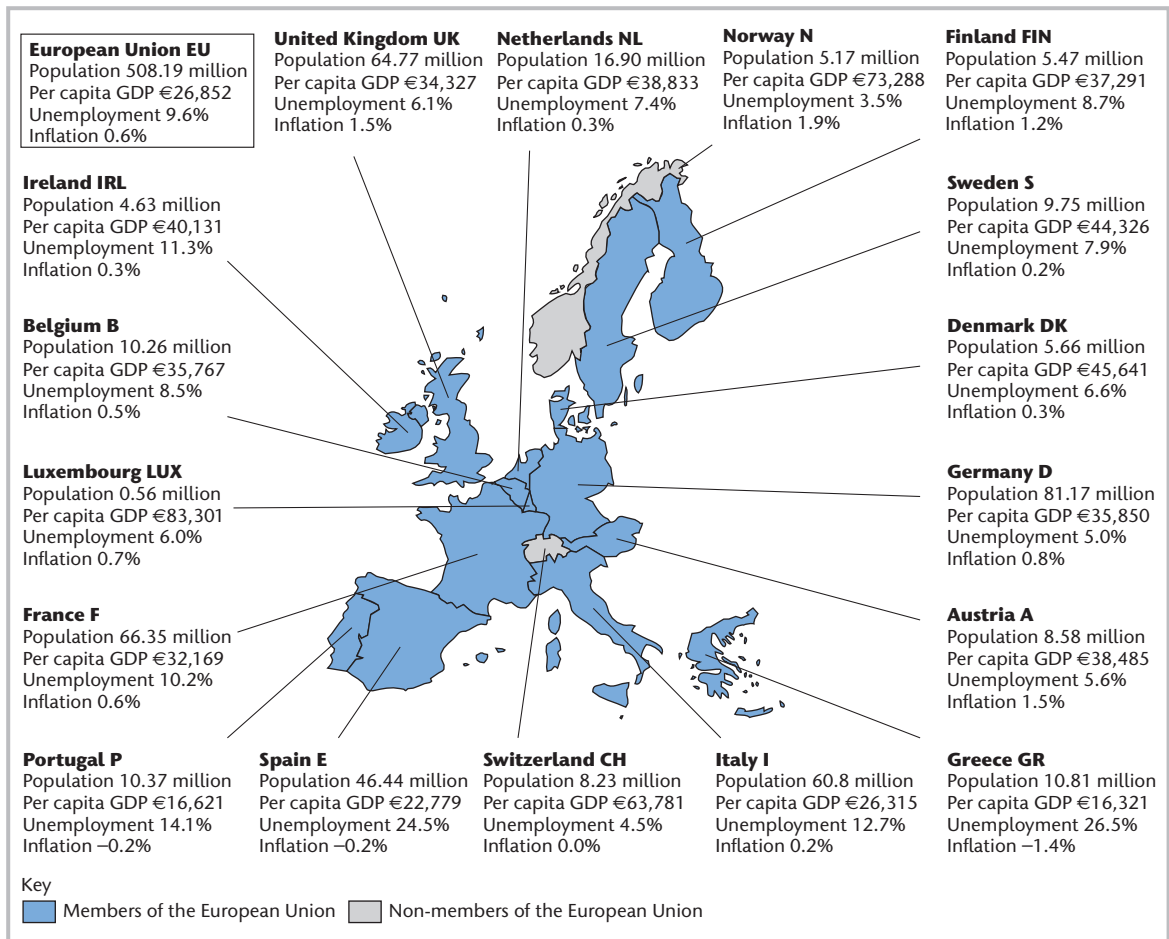
In the United States the results of nineteen out of the twenty-four presidential elections could have been predicted simply by looking at how the economy was doing, as measured by key indicators such as income growth and inflation. This implies a close link between macroeconomic performance and all the other (and, you may argue, more important) things in life, not only because all these other things typically cost money, but because a precondition for being in power – and thus being able to realize one's dream, ideology or vision, in whatever field – is a satisfactory economic performance.

New Zealand's government made the headlines back in the 1990s by putting a clause in the employment contract of its central bank governor that threatened him or her with the sack if inflation exceeded 2% annually. This reflects a serious concern for *inflation*, the rate at which prices grow. Many other nations share this concern, which points to inflation as a third important variable in the macroeconomic context.

The world abounds with economic challenges and puzzles. These differ from one part of the world to another, and they must be viewed in the context of different institutions, cultures and historical backgrounds. Despite this, a set of macroeconomic principles and concepts exists which can, applied wisely, be brought to bear on a variety of different issues. This book sets out to assemble such a basic macroeconomic tool kit. While it focuses on and emphasizes what is needed to understand and discuss the experiences and prospects in one part of the world, the European Union and its neighbours, the perspective is global, as indicated by the range of issues, case studies and data.

The *European Union* (EU) grew out of economic and political integration efforts that started more than half a century ago. Today, it comprises the 28 member states shown in blue in Figure 1.3. Figures 1.2 and 1.3 also provide some basic information on the member states' economies, the economies of Norway and Switzerland, whose governments had embarked on an integration path before voters rejected that option, plus a selection of other countries from around the globe.

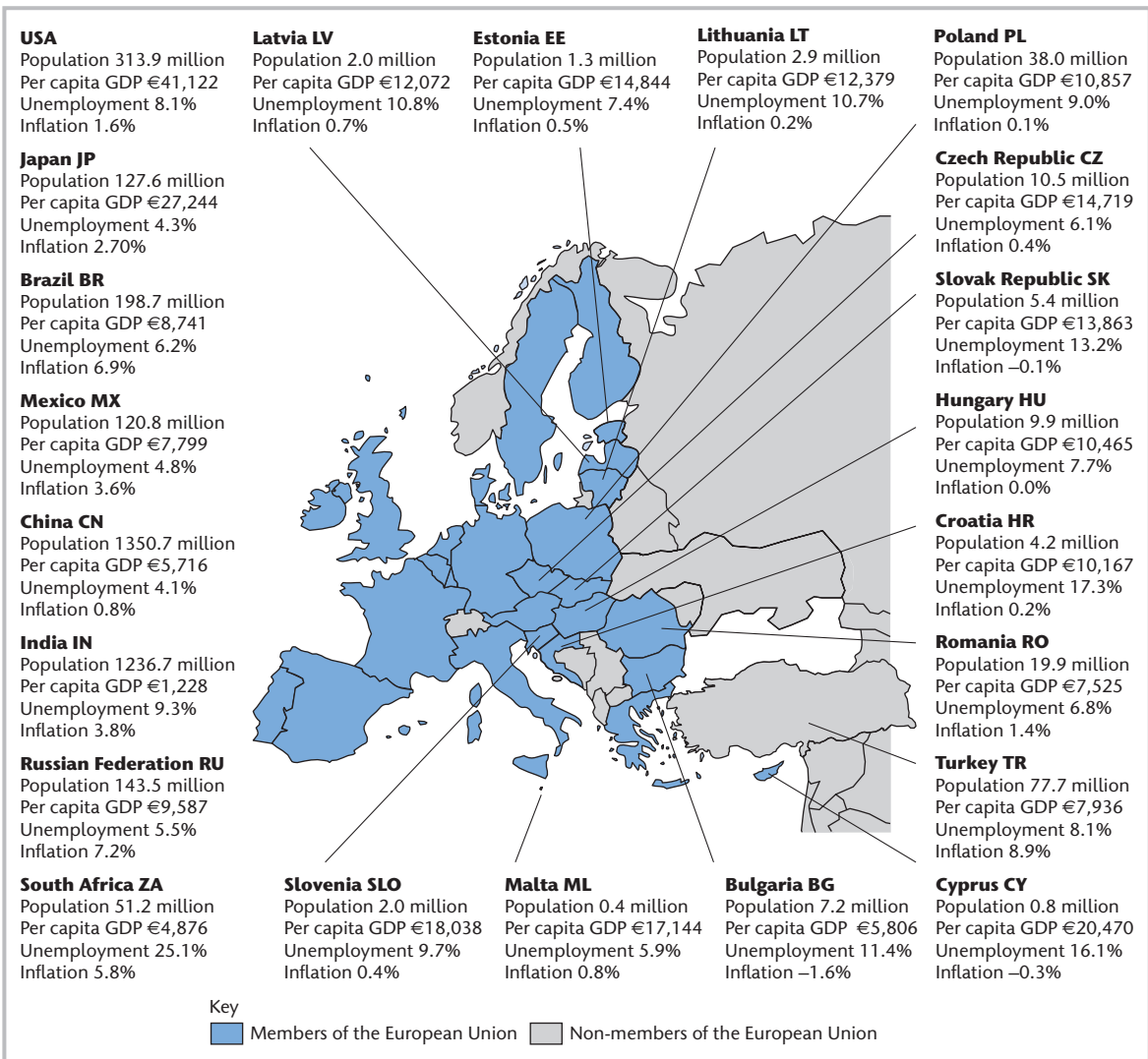
While EU countries appeared reasonably homogeneous in terms of per capita income from the world-wide perspective given in Figure 1.1, the more detailed information included in Figures 1.2 and 1.3 reveals some notable



**Figure 1.2** The map provides 2014 data on the countries of Western Europe that formed the European Union at the turn of the millennium, or that had completed negotiations before choosing not to join. GDP is a measure of a country's total income. Country names are followed by shorthand abbreviations that are used in the text.

Source: Eurostat, World Bank.

differences. These are not only the obvious differences in size and population, but also the differences in the standardized macroeconomic performance data mentioned earlier. Nominal per capita income, as measured by gross domestic product (GDP - see Box 1.1), in Luxembourg, was more than twice as high as in the Netherlands and five times that of Portugal; not to mention late entrants Bulgaria and Romania, where the ratio exceeds one to ten. Unemployment ranged from a (by current standards) tolerable 5% in Germany to an alarming 26.5% in Greece. Inflation is not a current problem in the EU. While still marginally visible in Austria and the UK at 1.5%, it is virtually zero in most other member states. However, the European Central Bank's easier monetary policy in response to the financial crisis of 2007–09, along with its massive purchases of sovereign bonds from Eurozone countries that were hit severely by the debt crisis that had started in 2010, has created some fears that a new inflationary surge could be in the offing.



**Figure 1.3** This map provides basic 2014 data on second-wave EU members and some other countries for reference.

Sources: Eurostat, IMF, World Bank.

## 1.2 Essentials of macroeconomic accounting

**Factors of production** are all resources used in the production of goods and services: labour, capital goods such as machines, and natural resources such as oil.

The focal point of macroeconomics is the level of income. Incomes are paid out to **factors of production** that are employed by firms to produce goods and services. This output is then put on the market for people to buy. The two major things that can go wrong in this process are as follows:

- Firms may not use all available production factors to produce output, thus leaving factors idle in the form of *unemployment* or slack.
- People may not want to buy all that is being produced, that is *demand may fall short of output*.

### BOX 1.1 GDP as a measure of total output or income

How do modern economies measure total income (or output)? Usually it is done by means of a concept called **gross domestic product (GDP)**. Nominal GDP evaluates all final goods and services produced in a country at current market prices. If 100 pizzas and 5 Alfas are produced in a given calendar year at prices of €10 and €30,000, respectively, GDP is  $100 \times 10 + 30,000 \times 5 = €151,000$ . Important things to watch out for are the following:

- **Only count final products.** If Alfa Romeo buys tyres from an external supplier to put on its cars, you would not want to count tyres twice – once when Alfa Romeo buys them and again when consumers buy an Alfa, the price of which, of course, includes the cost of tyres. As indicated, one way to avoid double counting is by including *final products* only. Another way is to count only the *value added* at each stage during the production process.
- **Only count current production.** If the original Alfa owner resells her car next year, this obviously does not represent output and income generated during that period.

GDP increases, first, if more pizzas and/or Alfas are being produced, and second, if prices rise. Table 1.2 illustrates these two possibilities.

In 2016 nominal GDP is €151,000. *Real GDP* does not evaluate output in terms of current prices, but in prices in a given year. In terms of what nominal GDP buys in 2016, real GDP in 2016 of course is also €151,000. In 2017 nominal GDP has risen to €182,000. Since prices are the same as in 2016, real GDP has also risen to €182,000: the buying power of nominal GDP is at what €182,000 would have bought in 2016. Finally, in 2018 nominal GDP is at €244,000. But the increase is only due to price increases. Production quantities are the same as in 2017. This leaves real GDP unchanged at €182,000.

Sometimes total income is also measured as **gross national product (GNP)**. The difference between the two concepts is that GDP refers to incomes generated within the geographical boundaries of a country, no matter by whom. Instead, GNP measures the incomes generated by the inhabitants of a country, no matter in what country. So if a Spaniard living in Barcelona owns Lufthansa stocks, the annual dividends she may receive are included in Germany's GDP, but in Spain's GNP. For most countries the difference between GDP and GNP is small (see case study 1.1). We will usually think of GDP when talking about total income or output.

**Table 1.2** An illustration of nominal and real GDP

Year	Pizzas		Alfas		Nominal GDP (in €)	Real GDP in prices of 2016
	Price	Quantity	Price	Quantity		
2016	10	100	30,000	5	151,000	151,000
2017	10	200	30,000	6	182,000	182,000
2018	20	200	40,000	6	244,000	182,000

Economists have analysed economies very much in terms of these two failures: underutilization of production factors and/or insufficient (or excessive) demand. These will also be major themes in subsequent chapters of this book, as they lie at the heart of most prominent macroeconomic issues such as unemployment and inflation.

Before embarking on our task to assemble a set of macroeconomic tools and concepts for analysing these and other macroeconomic issues, we need to clarify some essential terminology and techniques.

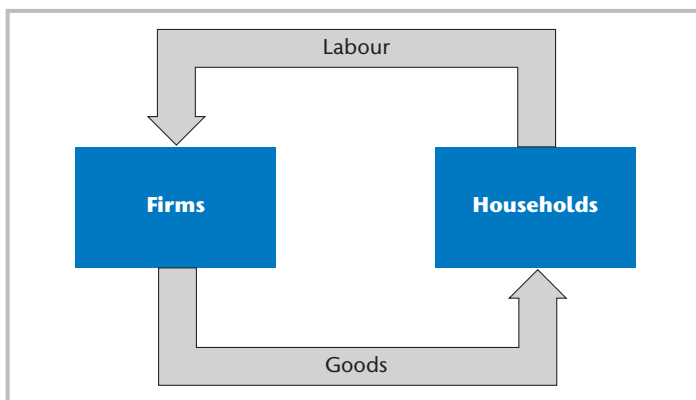
## The circular flow of income and spending

We start by looking at how economists measure income, and at how they divide it into useful components to facilitate subsequent efforts to understand what determines income and what makes it change. For this purpose we employ a preliminary stylized picture (or ‘model’) of the economy: the image of continuous circular flows. This model, which we begin to build in Figure 1.4, identifies the key actors (or sectors) of an economy, and then proceeds to describe and measure the interaction between them.

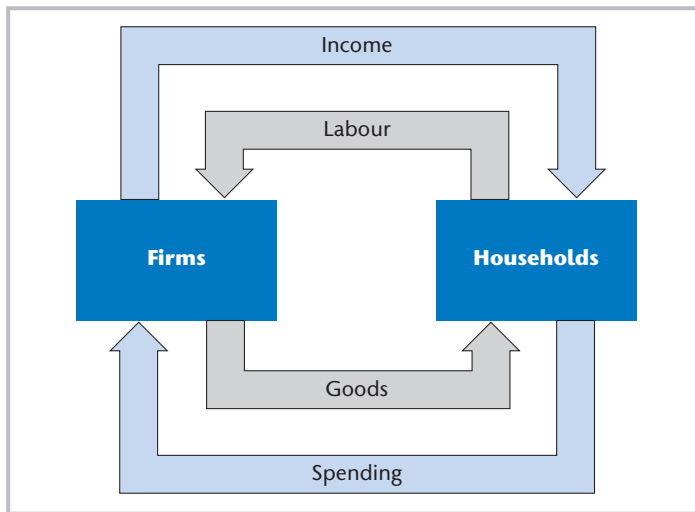
Suppose there are only two actors, *households* and *firms*. In an economy without money – economists call this a *barter economy* – households and firms interact through a continuous flow of real transactions. Households furnish firms with labour (and usually also capital goods like machines and buildings, or land). Firms use these factors of production, or *resources*, as they are also called, to produce goods (and services). These goods flow back to the households, constituting compensation for having supplied the factors of production.

It would not be very efficient if pizzerias were to compensate pizzaiolos with the Margaritas and Calzones they baked, and if Alfa Romeo were to pay employees with a brand new Giulietta every six months. In modern economies, firms pay households with money for using the factors of production. This relieves pizzaiolos of a tedious search for Alfa Romeo workers with just the right craving for pizza. Therefore, in the upper half of Figure 1.5, an appropriate amount of euros, pounds or kronas flows back to the households, completing this transaction. In the lower half, households spend their money incomes on the goods produced and put on the market by the firms. So in the end the counter-clockwise circular flow of real transactions between households and firms remains intact. It is now complemented by an outer circle flowing clockwise which records the payments streams that compensate for the goods received and for the labour provided.

The outer circle has an important advantage over the inner one: it is easier to measure, since all transactions are denominated in the same measuring units. This is not true for the inner circle. Typically, both the factors of production and the goods produced are very heterogeneous and cannot simply be added up. Economists therefore focus on the outer circle of income and spending to measure aggregate economic activity.



**Figure 1.4** The circle shows that households furnish firms with production factors such as labour, and receive goods and services produced by firms in return. (Please excuse us for describing something that flows around four corners as a circle!)



**Figure 1.5** The outer circle shows that the inner real flow of labour and goods is financed by a monetary flow of income payments from firms to households and of households' spending on the firms' goods.

The *expenditure approach* measures **aggregate output** as the sum of all spending. The *income approach* adds up all incomes instead.

An important point to note is that one person's spending – flowing from right to left in the lower part of the outer circle – is another person's income, received after completion of the upper part of the outer circle. So all spending must add up to the same amount to which all incomes add up. Total production or **aggregate output**, the value of all goods and services produced by firms, may therefore be measured either by adding up all incomes, or by adding up all expenditures.

Figure 1.5 provided a very simple first picture, and there are a number of complicating factors. For example, consumers may not, and typically do not, spend all their income. As Figure 1.6 illustrates, if households save €20 out of an income of €100, only €80 arrives at the firms in demand for their goods. The €20 *leak* out of the circular flow system. On the other hand, the firms' products are not only bought by consumers. The pizza place may buy an Alfa and offer home deliveries. Such *investment demand* is typically not paid for out of current income (in fact, firms have no income) but is financed by borrowing money from banks. In this light, investments take the form of *injections* into the income circle.

Figure 1.6, with its focus on bringing savings and investment into the picture, illustrates how the basic circular flow model may be adapted to take into account complications that arise in reality. We now take a big step and introduce all those leakages and injections that will play prominent roles in the remainder of this book. First, income received by households may not arrive at the firms as demand for three main reasons:

- 1 *People save.* We have noted this point already. If people save part of their income, their consumption expenditures fall short of what they have produced and received as income. *Saving* may thus be viewed as a *leakage* of income out of the circular flow system.
- 2 *Governments levy taxes.* The taxes that governments levy on citizens are a part of income which is prevented from turning into demand – another leakage.