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An Overview of the Book

Globalization – the extension of the division of labor and specialization beyond national borders – is patently a key to understanding much of our recent economic history. (Alan Greenspan)

The international economic system has undergone a profound transformation over the past several decades. At the beginning of the 21st century many of the most important economies around the world – and many smaller economies as well – are trading goods and services, financial assets, and even the services of factors of production such as labor and capital much more intensively with each other than they had been doing over most of the 20th century. This ongoing process, colloquially known as **globalization**, has meant that markets for many commodities and for a wide range of financial assets are becoming increasingly international in scope, rather than being restricted to the confines of a single country. It is hard to believe that such a process would not fundamentally change the economies that have been engaged in it, and indeed the quote above from Alan Greenspan, the former Chairman of the Board of Governors of the US Federal Reserve System, suggests that it may not be possible to understand macroeconomic developments even in as large an economy as that of the United States without taking into account this continually intensifying process of international economic integration.

This book is about how international economic integration affects domestic macroeconomic performance. It is therefore motivated by one fundamental question: How does the intensification of trade across international boundaries in both goods and services as well as in financial assets affect the way the economy works? As we will see, the answer to this question is the same as that to many other interesting questions in economics: it depends. Factors such as the size of the economy, the degree to which it is integrated with the world economy in different markets, the policies that it adopts toward the value of its currency in terms of the currencies of other countries, and how it conducts its monetary and fiscal

policies all influence how the process of globalization affects macroeconomic performance. The objective of this book is to provide you with a set of analytical tools that will help you think in an orderly way about how all of these factors interact to affect an open economy's macroeconomic performance, and thus prepare you to better understand how the process of globalization will continue to affect the way not only that your own economy works, but also the diverse economies of the many countries that you will eventually have reason to care about in our increasingly integrated global environment.

In this first chapter we will go over some fundamental concepts to help establish a framework for the rest of the book. We will also consider some of the topics that we will be investigating together. Finally, we will take a brief tour of the book's contents to give you an overview of its structure and a sense of how the topics to be examined in it fit together.

1.1 What Is International Macroeconomics?

Short-run Macroeconomics

Macroeconomics is the study of an economy's aggregate performance. Macroeconomists typically concern themselves with two sets of issues, which fall into the general categories of **long-run macroeconomics** (or *growth theory*) and **short-run macroeconomics**. In long-run macroeconomics we study the evolution of an economy's productive capacity over time, while in short-run macroeconomics the focus is instead on the factors that determine how fully the economy *uses* its productive capacity at any moment in time, as well as on the behavior of other macroeconomic variables that are affected by the rate of capacity utilization, such as changes in the rate of inflation.

The reason that macroeconomists worry about these things is not just to learn how the world works, but also to understand how to design policies that will enhance the economy's ability to do what it is supposed to do: provide the goods and services that satisfy our society's material needs. To attain that goal, we want to make sure that our economy achieves an optimal rate of growth of productive capacity over time while fully utilizing the productive capacity that it possesses at each moment in time.

In short-run macroeconomics, which is the subject of this book, our main concern is with **stabilization**, which means keeping the economy's actual level of production as close as possible to its productive capacity. The trick involved in doing so is that the economy is continually subjected to a variety of unpredictable changes, either in the economic environment or in the behavior of economic agents, that tend to drive the actual level of production, measured by real gross domestic product (GDP), away from the level of productive capacity, as measured by potential, or full-employment real GDP.[1] Macroeconomists refer to such unpredictable changes as **shocks** to the economy. These shocks tend to generate booms and busts in the level of economic activity, which may destabilize the average price level or create prolonged periods of underutilization of productive capacity. Since shocks are unavoidable, the policy issue that is the focus of short-run macroeconomics is how the economy can be stabilized in the face of such shocks, either by adopting institutional arrangements that make it less vulnerable to shocks or by taking countervailing

[1] Full employment GDP is sometimes also referred to as the *natural* level of real GDP.

policy measures in response to shocks when they arrive, usually in the form of fiscal and/or monetary policies.

This all sounds pretty straightforward, but in practice this problem can get fairly complicated. The effects of shocks on the economy may be quite complex, depending not just on their magnitudes, but also on their origin (that is, the specific macroeconomic market in which their effect is initially felt), their expected duration, and the extent to which they were anticipated or not before they happened. Moreover, different macroeconomic institutional arrangements may be more effective in countering the effects of some shocks than others, and some arrangements may ameliorate the effects of some shocks while magnifying those of others.[2] Finally, far from serving just to stabilize the economy in the face of shocks, policies may themselves be the sources of shocks in many cases, and even when they are conducted with an eye to the achievement of macroeconomic stabilization, their effectiveness in doing so may depend on various characteristics of the economy, including its institutional environment.

The bottom line, then, is that life in short-run macroeconomics is complicated. The point of studying short-run macroeconomics is to sort out these complications by mastering an analytical framework (a ''model'') that allows us to identify what is important and to clear away irrelevant detail, so that we can think about all of these issues in an orderly and systematic way.

Closed versus Open Economies

Unfortunately, the frameworks that most students learn for this purpose in intermediate macroeconomics tend to be deficient in one important respect. Intermediate-level macroeconomics textbooks are usually dominated by **closed-economy macroeconomic models**. This is an analytical framework in which residents of the domestic economy are assumed to trade goods and services, financial assets, and factor services only with each other. As suggested above, that assumption has been rendered increasingly irrelevant by the forces of globalization that have gathered strength in recent years. The phenomenon of globalization requires that macroeconomic issues be analyzed in a setting that takes into account the fact that domestic and foreign residents trade often and sometimes very extensively with each other. The study of macroeconomic issues in an open-economy setting in which such links are taken into account is sometimes referred to as **international monetary economics**, **open-economy macroeconomics**, or **international macroeconomics**. These terms are used interchangeably throughout this book.

What kind of trade does the term macroeconomic openness take into account? Closed-economy macroeconomics typically considers trade in four types of commodities: goods and services, money, interest-bearing financial assets (bonds), and labor. A short-run macroeconomic equilibrium is one in which the markets for all of these commodities are simultaneously in equilibrium, and the purpose of a short-run macroeconomic model is to

[2] For example, a central bank policy of keeping the money supply constant in the face of shocks to the demand for domestic output would tend to make real GDP more stable than a policy of keeping the interest rate constant. But keeping the money supply constant would actually make real GDP *less* stable than keeping the interest rate constant if the shocks affecting the economy primarily involve changes in the demand for money.

explain how this **general equilibrium** determines the values of real GDP, the interest rate, the price level, and the level of employment, among other variables of interest. In the real world, all of these commodities are actively traded across national boundaries, in the sense that people who live in one country consume goods and services produced in other countries, hold money and other types of financial assets issued in other countries, and sometimes work in other countries or hire foreign workers. All of these transactions create economic links across countries that, as we will see in this book, may substantially change the ways that economies behave. Thus, a theory that adequately describes the behavior of any real economy that is ''open'' in any of these ways must take transactions of these types into account. This book will consider how doing so changes our understanding of short-run macroeconomics.

The Issues of Concern

In this context, the questions that we are going to be interested in are in part the standard ones asked in closed-economy macroeconomics. In closed-economy macroeconomics the key endogenous variables are the level of real economic activity (real GDP) and the price level.[3] We care about these things because we believe that they are related to the country's level of economic well-being. We want to explain their behavior, in the sense that we seek to understand how they are affected by changes in exogenous variables (the macroeconomic shocks that we discussed previously), as well as by policy variables that can be controlled by governments.

When we open the economy up to external commerce, the analysis of how these key endogenous variables are determined has to be modified. In particular, the following questions arise:

1 How are the effects of domestic exogenous shocks on the macroeconomic variables that we care about affected by macroeconomic openness?

For example, we know that the US economy is subject to occasional fluctuations in real GDP that are often triggered by changes in domestic variables, such as the expectations of consumers or firms. These are usually referred to as **business cycles**. How is the behavior of US business cycles likely to be affected in the future by the increased openness of the US economy? To take a specific example, if the residents of a country become more optimistic about their future economic prospects and consequently decide to spend more, how do the effects of those spending decisions on the level of domestic economic activity depend on how much the economy trades with the rest of the world? How do they depend on whether domestic residents can borrow from the rest of the world to finance their additional spending, or on the policies that the domestic central bank has adopted toward the value of the domestic currency?

[3] It may be worth briefly recalling the distinction between **exogenous** and **endogenous** variables in economics. The relationship between them is that of cause and effect. Exogenous variables play the role of independent causes in economic theories: they affect other variables, but are not themselves affected by those variables. Thus, their behavior is not explained by the theory. Endogenous variables, by contrast, are those whose behavior is explained by a theory.

2 Are there new exogenous shocks that may influence these variables in the open-economy environment?

For example, it is sometimes said that when the United States sneezes, Latin America catches pneumonia. A tightening of monetary policy in the United States in the early 1980s was indeed associated with the outbreak of a debt crisis that resulted in a ''lost decade'' of economic growth in Latin America during the 1980s. Why did this happen? Are such effects the unavoidable consequence of macroeconomic openness, or did their emergence depend on the policies that were being pursued by the affected countries? As additional examples, should firms in Argentina care if the US dollar becomes more expensive in terms of European euros or Japanese yen? Should residents of Thailand be happy, sad, or indifferent if the Japanese central bank decides to lower interest rates to stimulate the Japanese economy? Should the European Central Bank change interest rates in Europe when interest rates fall in the United States? Under what conditions should other Asian countries care if the Chinese central bank chooses to buy large amounts of US Treasury bills? In short, how do macroeconomic events in other countries affect open economies, and how is the transmission of these effects affected by the policies followed in the home economy?

3 How is the effectiveness of policies affected by macroeconomic openness?

Much of intermediate macroeconomics is taken up by the study of fiscal and monetary policies. How do the impacts of these policies depend on how open the country is to trade in financial assets with the rest of the world? How do they depend on the institutional arrangements that govern the central bank's behavior in the foreign exchange market? Are they affected by the size of the domestic economy relative to that of its trading partners? As examples, can Bulgaria use monetary policy to stimulate its economy if world demand for its exports contracts? Does expansionary fiscal policy in Switzerland lose its ability to affect the economy because any additional demand created by the fiscal expansion is simply channeled to the purchase of foreign goods?

4 Are there new policy options in an open macroeconomic environment?

Domestic monetary policy involves the buying or selling of domestic government securities by the central bank (open market operations). But in an open economy, the central bank can also buy or sell *foreign* securities. Do these transactions have the same effect on the economy as open market operations? Why have the central banks of many countries been buying large amounts of US Treasury bills in recent years? Similarly, countries may have a choice about how open they are to trade with the rest of the world through the regulations and taxes that they implement on such trades. What are the macroeconomic effects of such measures?

The questions just posed suggest that we may have to rethink our interpretation of the way the economy works from a macroeconomic perspective when we take openness into account. As economies around the world have become increasingly open, macroeconomists have had to confront this possibility when thinking about a broad range of macroeconomic issues. As an illustration, Empirical Study 1.1 at the end of this chapter describes one such case: the impact of openness on the behavior of the inflation rate.

In addition to potentially altering the ways that familiar macro variables like the inflation rate may behave, macroeconomic openness also complicates matters by generating new endogenous variables that will typically be of concern to policymakers – in particular, the

foreign exchange value of the domestic currency and a variety of balance of payments concepts. As in the closed-economy case, we will want to know:

1 How do these variables affect the country's economic well-being?

For example, when a new currency, the euro, was introduced by ten members of the European Union in 1999, that currency initially lost a substantial amount of value against the US dollar, and subsequently reversed that performance and actually gained value against the US dollar, right up until the time of writing (early 2008). How did such fluctuations in the value of the euro affect the economic well-being of residents of the European Union? As a second example, the United States currently spends much more on goods and services produced by the rest of the world than the rest of the world spends on goods and services produced in the United States (to the tune of nearly 6 percent of US GDP in 2007, a very high figure by historical standards). How does a deficit of this size in this category of international transactions affect the well-being of US residents?

2 What determines the behavior of these variables?

Just why did the euro decrease and then increase in value the way it did? As we will see, such swings in the value of individual currencies have not been unusual, and sometimes they are much more dramatic. For example, in 1997 the value of the currency of Thailand (the *baht*) fell by more than 30 percent in less than a month, and such dramatic **currency crises** (sudden changes in currency values) have not been unusual. Why do they happen?

3 How can policymakers affect their behavior if they desire to do so?

If all of these international variables indeed matter for the well-being of the residents of a country, is there anything that policymakers can do to influence them? How do the conventional fiscal and monetary policy tools affect them? Are there other, new policy tools that can be brought to bear on these international variables? If policymakers can indeed influence these variables, what effects – if any – do their actions have on the more familiar domestic macroeconomic variables?

As all these issues make clear, both because it alters the way that familiar macroeconomic endogenous variables behave, and because it produces new issues of concern to policymakers, macroeconomic openness requires us to modify the toolkit used in the study of closed economies.

International Macroeconomics and International Finance

At this point, you may be wondering how international macroeconomics differs from something else you may have heard about: international finance. International finance is essentially the analysis of the process of arbitrage among financial assets issued in different political jurisdictions, and usually denominated in different currencies. By contrast, as we have seen, international macroeconomics is the analysis of macroeconomic issues in the context of an economy that is open to various types of trade with the rest of the world. What is the relationship between them?

A financial asset issued by a resident of country A, say, gives the person who buys it – say a resident of country B – a legal claim on the income of the person who issues it.

The size of that claim (i.e., the contractual rate of return on the asset) and the likelihood that it will be satisfied when it is due (the riskiness of the asset) both depend on the macroeconomic conditions in country A. Thus, macroeconomic conditions affect asset prices. You cannot know how much you should pay for an asset issued by a resident of country A unless you understand the conditions that determine the return that the asset is likely to yield.

At the same time, however, the terms on which an individual in country A can borrow abroad will affect the terms on which borrowing and lending take place at home, in country A, because dealing with residents of other countries represents an alternative source of funds for domestic borrowers and lenders. In turn, this affects whether domestic households choose to consume more or domestic firms choose to buy more physical capital, which will in turn affect their country's macroeconomic performance. Thus, international asset prices affect domestic macroeconomic conditions.

The bottom line is that the prices at which assets trade are both affected by and themselves affect domestic macroeconomic conditions. In other words, asset markets interact with the other markets that make up a general macroeconomic equilibrium. What this means is that *international finance is a part of international macroeconomics*. It follows that, since the underlying macroeconomic performance of the economy is what ultimately determines the prices of financial assets that are traded internationally, even if your primary interest is international finance, you have no choice but to care about international macroeconomics. In short, the tools that we will develop in this book will help deepen your understanding of international finance.

1.2 The International Macroeconomics Toolkit

These tools will consist of a set of open-economy macroeconomic models that will be applicable in different circumstances. Thus, we will spend a lot of our time building analytical macroeconomic models. Why should we do so? *The reason is that the answers to the questions posed previously tend to depend not only on a variety of characteristics of the domestic economy, but also on the specific ways that that economy is linked to the rest of the world*. For example, in closed-economy macroeconomics, an important characteristic of the domestic economy in determining how it responds to shocks and policy changes is the extent of wage-price flexibility, which determines the slope of the economy's aggregate supply curve. While this may be a purely domestic phenomenon, it is just as important in affecting macroeconomic behavior in the context of an open economy. But in addition, the economy's behavior is also affected by several new considerations of an international nature, including:

1 The rules that govern the behavior of the domestic central bank, not only in the domestic securities market (the **monetary policy regime**), but also in the foreign exchange market (the **exchange rate regime**).
2 The degree of integration of the domestic economy with world markets for goods and services.
3 The degree of integration of the domestic economy with world financial markets (typically referred to as the degree of **capital mobility**).

It turns out that all of these characteristics have significant effects on how open economies ''work'' from a macroeconomic perspective. What is particularly important for our purposes, however, is that these characteristics have tended to differ not only across countries, but also for the same country at different points in time. For example, some countries (such as United Arab Emirates as of early 2008) keep the value of their currencies rigidly tied to that of the US dollar, while others (such as New Zealand) allow the values of their currencies to be fully determined by the market (in the case of New Zealand, since 1985). In some large developing countries, such as Brazil and India, international trade represents a relatively small fraction of GDP, while in others, such as Singapore and Malaysia, the volume of trade is actually larger than the economy's GDP. Some developing countries (referred to as **emerging-market economies**, or (**emerging economies** for short) are highly integrated with world financial markets, while others have remained relatively isolated financially from the rest of the world. These differences mean that, in analyzing the macroeconomic behavior of open economies, we need to consider several cases, depending on which of these characteristics holds. That is what creates the need to analyze several different models.

1.3 The Contents of this Book

However, it would be tedious and not very illuminating to take a purely taxonomic approach, considering alternative combinations of characteristics one at a time and seeing how the economy works under each particular combination. Instead, we will proceed by developing a general framework from which specific models can be derived as special cases, and the specific special cases that we will study will be ones that reflect the characteristics of important groups of countries around the world.

Structure

In keeping with this approach, the book will be divided into six main parts:

Part 1. Foundations

In the first part of the book, we will introduce and interpret many of the international macroeconomic concepts that will be used throughout the book. Specifically, we will examine the balance of payments accounts and their links to the national income accounts, we will explore arbitrage conditions that have been applied to trade in goods and services as well as in financial assets, and we will develop the general analytical framework described above.

Part 2. Fixed exchange rates

To develop our modeling tools gradually, we will begin the analytical portion of the book with what is arguably the simplest model to understand: one in which a country is highly integrated financially with the rest of the world, its central bank is committed to maintaining a fixed value of its currency in terms of some foreign currency, and in which there are institutional mechanisms in place to limit the central bank's discretion in buying and selling domestic securities. The last two of these conditions are the components of what is sometimes referred to as a **''hard'' exchange rate peg**. While there are several

contemporary versions of hard exchange rate pegs, the most important historical application of this type of exchange rate regime was during the time of the classical gold standard (1880–1914), and we will begin our study of international macroeconomic models in Chapters 5 and 6 by analyzing how the gold standard worked.

The gold standard was eventually succeeded after World War II by a world monetary system designed at an international conference held in Bretton Woods, New Hampshire in 1944. This system, known as the Bretton Woods system, remained in place from 1946 to 1973. In Chapters 6 and 7 we will examine macroeconomics under the Bretton Woods system. Like the gold standard, this system featured fixed exchange rates. However, unlike the gold standard, the fixed exchange rates that prevailed under the Bretton Woods system are best described as **''soft'' exchange rate pegs**. A soft peg is an exchange rate regime in which the central bank maintains a fixed, officially announced exchange rate, but retains substantial discretion over the value of the official exchange rate as well as over monetary policy. Another major difference from the conditions that prevailed under the gold standard was that during the Bretton Woods period links among national capital markets were very imperfect. Thus the analytical focus of Chapters 6 and 7 is on the macroeconomic behavior of an economy that is characterized by imperfect integration with world financial markets and operates a soft fixed exchange rate. As you will see, this is a subject that is not just of historical interest, because these characteristics describe rather well the conditions that prevail among most developing countries today.

However, as previously mentioned, the process of globalization has resulted in increasing integration among national financial markets, making capital much more mobile internationally for both industrial as well as for many middle-income developing countries. Consequently, in Chapter 8 we conclude our examination of fixed exchange rates by turning to the analysis of fixed exchange rates under high capital mobility. As we will see there, many international macroeconomists have come to question the sustainability of soft exchange rate pegs as countries become increasingly integrated financially with the rest of the world, because many countries that have gone through this process have been led to abandon such pegs in recent years, often under crisis circumstances. These economists have argued that if such countries want to retain a fixed exchange rate, they will have to adopt a modern version of a hard exchange rate peg. Chapter 8 will thus conclude our examination of macroeconomics under fixed exchange rates by describing the modern versions of hard pegs and exploring the considerations that may influence the choice between soft and hard pegs in a financially integrated world.

Part 3. Floating exchange rates

Most readers of this book, however, will probably be living under a different set of macroeconomic circumstances, one that tends to prevail among the major industrial countries and the largest emerging-market economies. Such economies are characterized by very high capital mobility, no central bank commitment to defend any particular value of the exchange rate by intervening in foreign exchange markets (floating exchange rates), and a substantial degree of discretion on the part of the central bank in its conduct of monetary policy. The analysis of macroeconomic behavior under such circumstances will receive the most attention in this book. It is the subject of Part 3.

As we will see, an important complicating factor that arises when exchange rates are perceived as free to move in the future is that the expected *future* value of the exchange rate will affect today's macroeconomic outcomes. Since long-lasting shocks to the

economy will tend to affect the exchange rate that prevails in the future, the effects of shocks will thus depend on how long they are expected to last. Accordingly, in this part of the book we will separately analyze the cases of transitory, intermediate, and permanent shocks to the economy, and will also consider how macroeconomic responses to permanent shocks are affected when the economy's asset markets adjust much more quickly than the markets for goods and services, as is indeed likely to be the case in the real world. Chapter 10 will examine the effects of transitory shocks in a floating-rate model, while Chapter 11 will consider longer-lived shocks. Chapter 12 examines the implications of asymmetries in the speed of adjustment in the markets for goods and services and those for financial assets.

Those chapters will be based on a sticky-price ''Keynesian'' framework of the type that is usually employed for the analysis of short-run stabilization issues in macroeconomics. In this framework, the aggregate price level is perceived as adjusting slowly, so to a first approximation it is constant in the short run – that is, it does not immediately adjust in response to shocks. Over a long enough time horizon, however, the aggregate price level becomes an endogenous variable. Thus, to round out our analysis of macroeconomics under floating exchange rates, Chapter 13 will examine how the economy responds to shocks over a horizon that is long enough for all price-level adjustments to be completed. However, not all international macroeconomists subscribe to this Keynesian perspective on the speed of price level adjustment. Consequently, this part of the book concludes with a separate examination in Chapter 14 of how floating exchange rates work under a more ''classical'' perspective that allows for full short-run wage and price flexibility.

Having separately considered how open economies behave under fixed and floating exchange rates, it is natural to ask which exchange rate regime countries *should* adopt. In Chapter 15 we will consider what criteria can be used in evaluating exchange rate regimes. We will then apply these criteria together with the analyses of the first two parts of the book to consider what factors should influence the type of exchange rate regime that it may be optimal for a specific country to adopt.

Part 4. International monetary cooperation

For most of the book, we will conduct our analysis from the perspective of a single country. That is, we will analyze how an *individual* economy behaves under a variety of circumstances. The nation-state is, after all, the context in which macroeconomic policy decisions are typically made. But sometimes countries may choose to enter into international agreements that have the effect of constraining the policy decisions that they can make. In Chapters 16–18, we will explore why they may find it desirable to do so.

We will consider a variety of arrangements for international monetary coordination that place differing degrees of constraint on domestic policy decisions in the participating countries. Chapter 16 considers the least constraining type of coordination, consisting of the establishment of certain ''rules of the game'' to govern both international capital flows as well as the behavior of international financial institutions. Proposals affecting these issues feature prominently in contemporary debates over how to redesign the international financial system to create a new international ''financial architecture.''

In Chapter 17, we will consider the types of cooperation that may be called for when macroeconomic developments in a single country have important effects on partner countries. The analysis of this situation, which currently prevails among the G-3 ''countries'' (the United States, the European countries constituting the Eurozone, and Japan) will

require modifying earlier models to handle the case of a country that is sufficiently large so that its actions are capable of influencing the international environment in which it operates. The policy spillovers generated in these circumstances create a case for international cooperation beyond the mere agreeing on ''rules of the game'': countries will want to induce other countries to take into account – at least in a loose way – these spillover effects when they formulate their domestic macroeconomic policies.

Finally, the most ambitious form of cooperation, in the sense that it seeks to impose the strongest international constraints on domestic macroeconomic policies, involves the coordination of exchange rate policies, particularly in the extreme form of **monetary unification**, the adoption of a common currency. We will explore this type of coordination in Chapter 18, with a specific focus on the evolution of a single European currency, the euro.

Part 5. The new international macroeconomics

Finally, in the book's last chapter, we will explore the implications of incorporating into our basic analytical framework more sophisticated assumptions about the way that macroeconomic agents behave, based on explicit microeconomic foundations. This alternative description of the way economic agents behave highlights the role of intertemporal issues – decisions about the allocation of spending and production across different points in time – in international macroeconomics. It has formed the basis of a ''new international macroeconomics'' that has guided academic research in the field during recent years.

Techniques

Because most of our work will consist of building and analyzing models, it is worth saying a word or two about the analytical techniques that will be used throughout the book. As is invariably the case in modern macroeconomics (and particularly in most intermediate macroeconomics textbooks), the models that we will study will be developed and summarized in equation form. But, again as in intermediate macroeconomics, we will generally analyze these models using graphical tools, which you will likely find very familiar. The exception will be in Chapter 14, in which we analyze flexible-price versions of floating exchange rate models. In that context, the analysis will rely on simple algebra applied to log-linear versions of the models.[4] You may want to brush up on the basic properties of natural logarithms before reading those chapters especially, though natural logs will also be used (sparingly) in various other places in the book. While calculus is not used explicitly, those of you who are familiar with it will occasionally recognize reasoning that is derived from basic concepts of calculus.

Empirical Study 1.1 Globalization and Inflation

As we will discover in this book, there are many ways that increased openness can affect macroeconomic performance, but the links are sometimes subtle, and they depend both on the type of openness that a country experiences, as well as on the

(Continued)

[4] A log-linear model is one whose equations are linear functions of the logarithms of the variables in the model.

Empirical Study 1.1 *(Continued)*

Figure 1.1 World inflation rate, 1980–2007 (in percent)
Source: International Monetary Fund, *International Financial Statistics*.

macroeconomic policies that it pursues. Understanding how such factors interact in affecting a country's macroeconomic performance is a key objective of this book.

As an illustration, consider an issue that has been debated by economists in recent years: the effect of globalization on inflation. Of particular interest is the role that globalization may have played in bringing about the ''great disinflation'' – the dramatic decrease in inflation rates that many countries experienced in the period since the early 1990s. Figure 1.1 displays the average annual world inflation rate over the period 1980–2007, based on consumer price indexes. As shown in the chart, the average rate of inflation in the world remained relatively high until the mid-1990s. After that time, it has fallen rather dramatically. Why might this have happened?

There are many possible explanations. Some economists emphasize the role of institutional changes in the ways that monetary and fiscal policies are conducted in many countries around the world. Improved productivity performance may also have contributed. But several observers have pointed to a potential effect of globalization.

There are several ways that globalization may affect a country's ''normal'' rate of inflation. For example, consider the effects of increased ''real'' openness, in the form of increased integration of markets for goods and services. Such integration increases the intensity of competition faced by domestic producers. This much is clear. But how does this increased competition affect the sensitivity of domestic prices to domestic demand? One argument is that when domestic demand is high, foreign competition prevents domestic producers from raising prices as much as they otherwise would, because consumers would simply buy foreign goods; similarly, when domestic

demand is low, domestic producers would not need to lower prices as much as they otherwise would, because they can sell some of their output abroad. This argument implies that domestic inflation would be less responsive to domestic demand in open economies, and it has been cited to explain why US inflation may have stayed low during recent periods of rapid growth, such as the late 1990s.

One problem with this story, though, is that it assumes that the behavior of the prices of foreign goods (measured in domestic currency) does not change when domestic inflation does. If the prices of foreign goods moved in tandem with that of domestic goods whenever domestic demand changed, the story would not hold. But is there any reason why we should expect that to happen? One such reason is that the domestic currency may lose value relative to foreign currencies when domestic inflation rises, making foreign goods become more expensive when their prices are measured in domestic currency. Similarly, the domestic currency may gain value relative to foreign currencies when domestic inflation falls, making foreign goods less expensive in domestic currency terms. Is this what normally happens? To answer this question, and therefore to understand how globalization may affect the behavior of inflation, we need to understand what determines the relative values of world currencies, one of the central issues that we will consider in this book.

Increased financial openness may have had a role to play as well. Money growth is often the result of excessively expansionary fiscal policies, since governments that need to finance large fiscal deficits generally pressure central banks to print money with which to purchase government debt. Under increased financial openness, governments that run large fiscal deficits are likely to face high interest rates on their debt, because the higher risks faced by their creditors would cause them to shift their lending overseas unless they are compensated by the government for bearing the increased risk by being paid higher interest rates. The higher interest rates that the government has to pay would tend to discourage excessively expansionary fiscal policies, thus reducing pressures on central banks to expand the money supply.

There is substantial empirical evidence on the relationship between openness and inflation. The key reference is Romer (1993), who found that more open economies (measured in terms of commercial openness) have tended to experience lower inflation. More recently, Wynne and Kersting (2007) have documented the effects of commercial openness on the behavior of inflation in the United States. Specifically, they have shown that changes in the rate of inflation in the United States are positively correlated with high levels of economic activity in the country's main trading partners. This implies that, in a globalized context, changes in the US inflation rate are affected not just by domestic economic conditions, but also by economic conditions in US trading partners.

1.4 Summary

As the phenomenon of globalization has intensified during recent years, it has become increasingly important for the analysis of macroeconomic issues to be conducted in an open-economy context. Openness affects the ways that variables of concern to policymakers

respond to exogenous changes in the economic environment, influences the effectiveness of familiar macroeconomic policies, and introduces new objectives of policy as well as new policy instruments. The objective of this book is to develop an analytical framework to help us understand exactly how openness affects macroeconomic performance.

We begin that task in the next part of the book by defining some open-economy macroeconomic concepts, exploring the foreign exchange market in more detail, and developing the general analytical framework that will provide the foundation on which the analysis of the rest of the book will be built.

Further Reading and References

On the openness of the US economy

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