

# Instructor's Manual

to accompany  
Krugman & Obstfeld

## International Economics: Theory and Policy Sixth Edition

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# CHAPTER 1

## INTRODUCTION

### *Chapter Organization*

What is International Economics About?

The Gains from Trade

The Pattern of Trade

Protectionism

The Balance of Payments

Exchange-Rate Determination

International Policy Coordination

The International Capital Market

International Economics: Trade and Money

## CHAPTER OVERVIEW

The intent of this chapter is to provide both an overview of the subject matter of international economics and to provide a guide to the organization of the text. It is relatively easy for an instructor to motivate the study of international trade and finance. The front pages of newspapers, the covers of magazines, and the lead reports of television news broadcasts herald the interdependence of the U.S. economy with the rest of the world. This interdependence may also be recognized by students through their purchases of imports of all sorts of goods, their personal observations of the effects of dislocations due to international competition, and their experience through travel abroad.

The study of the theory of international economics generates an understanding of many key events that shape our domestic and international environment. In recent history, these events include the causes and consequences of the large current account deficits of the United States; the dramatic appreciation of the dollar during the first half of the 1980s followed by its rapid depreciation in the second half of the 1980s; the Latin American debt crisis of the 1980s and the Mexico crisis in late 1994; and the increased pressures for industry protection against foreign competition broadly voiced in the late 1980s and more vocally espoused in the first half of the 1990s. Most recently, the financial crisis that began in East Asia in 1997

and spread to many countries around the globe and the Economic and Monetary Union in Europe have highlighted the way in which various national economies are linked and how important it is for us to understand these connections. At the same time, protests at global economic meetings have highlighted opposition to globalization. The text material will enable students to understand the economic context in which such events occur.

Chapter 1 of the text presents data demonstrating the growth in trade and increasing importance of international economics. This chapter also highlights and briefly discusses seven themes which arise throughout the book. These themes include: 1) the gains from trade; 2) the pattern of trade; 3) protectionism; 4), the balance of payments; 5) exchange rate determination; 6) international policy coordination; and 7) the international capital market. Students will recognize that many of the central policy debates occurring today come under the rubric of one of these themes. Indeed, it is often a fruitful heuristic to use current events to illustrate the force of the key themes and arguments which are presented throughout the text.

## ***OVERVIEW OF SECTION I: INTERNATIONAL TRADE THEORY***

Section I of the text is comprised of six chapters:

- Chapter 2 Labor Productivity and Comparative Advantage: The Ricardian Model
- Chapter 3 Specific Factors and Income Distribution
- Chapter 4 Resources and Trade: The Heckscher-Ohlin Model
- Chapter 5 The Standard Trade Model
- Chapter 6 Economies of Scale, Imperfect Competition, and International Trade
- Chapter 7 International Factor Movements

### **SECTION I OVERVIEW**

Section I of the text presents the theory of international trade. The intent of this section is to explore the motives for and implications of patterns of trade between countries. The presentation proceeds by introducing successively more general models of trade, where the generality is provided by increasing the number of factors used in production, by increasing the mobility of factors of production across sectors of the economy, by introducing more general technologies applied to production, and by examining different types of market structure. Throughout Section I, policy concerns and current issues are used to emphasize the relevance of the theory of international trade for interpreting and understanding our economy.

Chapter 2 introduces students to international trade theory through the Ricardian model of trade. This model shows how trade arises when there are two countries, each with one factor of production which can be applied toward producing each of two goods. Key concepts are introduced, such as the production possibilities frontier, comparative advantage versus absolute advantage, gains from trade, relative prices, and relative wages across countries. The Ricardian model is a useful starting point for developing intuition about why countries gain from trading with each other. By using even as simple a framework as the Ricardian model, one can begin to debunk some common misconceptions concerning comparative advantage.

Chapter 3 builds upon the insights from Chapter 2 by developing trade models which allow countries to produce goods when production requires more than one factor of production. One important reason for this addition to the model is that this more general framework highlights the effects of trade on income distribution. The first model presented includes

factors of production which are specific to the production of each of two goods. Then, a more general model is introduced, with this latter model allowing for both mobile and specific factors of production. This extension provides an even richer analysis of the income distribution effects of trade. These models set the stage for an initial discussion of the political economy of trade and for justifying economist's support of the principles of free trade among nations.

Chapter 4 introduces the classic Heckscher-Ohlin model of trade. The chapter proceeds by first presenting a general equilibrium model of an economy with two goods produced by two factors under the assumption of fixed coefficient production functions. Many of the important results of international trade theory are developed. These include: the Rybczynski Theorem, the Stolper-Samuelson Theorem, and the Factor Price Equalization Theorem. Implications of the Heckscher-Ohlin model for the pattern of trade among countries are discussed, as are the failures of empirical evidence to confirm the predictions of the theory.

Chapter 5 presents a general model of international trade which admits the models of the previous chapters as special cases. This "standard trade model" is depicted graphically by a general equilibrium trade model as applied to a small open economy. Relative demand and relative supply curves are used to analyze a variety of policy issues, such as the effects of economic growth, the transfer problem, and the effects of trade tariffs and production subsidies. The appendix to the chapter develops offer curve analysis.

While an extremely useful tool, the standard model of trade fails to account for some important aspects of international trade. Specifically, while the factor proportions Heckscher-Ohlin theories explain some trade flows between countries, recent research in international economics has placed an increasing emphasis on economies of scale in production and imperfect competition among firms.

Chapter 6 presents models of international trade that reflect these developments. The chapter begins by reviewing the concept of monopolistic competition among firms, and then showing the gains from trade which arise in such imperfectly competitive markets. Next, internal and external economies of scale in production and comparative advantage are discussed. The chapter continues with a discussion of the importance of intra-industry trade, dumping, and external economies of production. The subject matter of this chapter is important since it shows how gains from trade arise in ways that are not suggested by the standard, more

traditional models of international trade. The subject matter also is enlightening given the increased emphasis on intra-industry trade in industrialized countries.

Chapter 7 focuses on international factor mobility. This departs from previous chapters which assumed that the factors of production available for production within a country could not leave a country's borders. Reasons for and the effects of international factor mobility are discussed in the context of a one-factor (labor) production and trade model. The analysis of the international mobility of labor motivates a further discussion of international mobility of capital. The international mobility of capital takes the form of international borrowing and lending. This facilitates the discussion of inter-temporal production choices and foreign direct investment behavior.

## CHAPTER 2

# LABOR PRODUCTIVITY AND COMPARATIVE ADVANTAGE: THE RICARDIAN MODEL

### *Chapter Organization*

The Concept of Comparative Advantage

A One-Factor Economy

Production Possibilities

Relative Prices and Supply

Trade in a One-Factor World

Box: Comparative Advantage in Practice: The Case of Babe Ruth

Determining the Relative Price After Trade

The Gains from Trade

A Numerical Example

Box: The Losses from Non-Trade

Relative Wages

Misconceptions About Comparative Advantage

Productivity and Competitiveness

The Pauper Labor Argument

Exploitation

Box: Do Wages Reflect Productivity?

Comparative Advantage with Many Goods

Setting Up the Model

Relative Wages and Specialization

Determining the Relative Wage with a Multigood Model

Adding Transport Costs and Non-Traded Goods

Empirical Evidence on the Ricardian Model

Summary

## CHAPTER OVERVIEW

The Ricardian model provides an introduction to international trade theory. This most basic model of trade involves two countries, two goods, and one factor of production, labor. Differences in relative labor productivity across countries give rise to international trade. This Ricardian model, simple as it is, generates important insights concerning comparative advantage and the gains from trade. These insights are necessary foundations for the more complex models presented in later chapters.

The text exposition begins with the examination of the production possibility frontier and the relative prices of goods for one country. The production possibility frontier is linear because of the assumption of constant returns to scale for labor, the sole factor of production. The opportunity cost of one good in terms of the other equals the price ratio since prices equal costs, costs equal unit labor requirements times wages, and wages are equal in each industry.

After defining these concepts for a single country, a second country is introduced which has different relative unit labor requirements. General equilibrium relative supply and demand curves are developed. This analysis demonstrates that at least one country will specialize in production. The gains from trade are then demonstrated with a graph and a numerical example. The intuition of indirect production, that is "producing" a good by producing the good for which a country enjoys a comparative advantage and then trading for the other good, is an appealing concept to emphasize when presenting the gains from trade argument. Students are able to apply the Ricardian theory of comparative advantage to analyze three misconceptions about the advantages of free trade. Each of the three "myths" represents a common argument against free trade and the flaws of each can be demonstrated in the context of examples already developed in the chapter.

While the initial intuitions are developed in the context of a two good model, it is straightforward to extend the model to describe trade patterns when there are  $N$  goods. This analysis can be used to explain why a small country specializes in the production of a few goods while a large country specializes in the production of many goods. The chapter ends by discussing the role that transport costs play in making some goods non-traded.

The appendix presents a Ricardian model with a continuum of goods. The effect of productivity growth in a foreign country on home country welfare can be investigated with

this model. The common argument that foreign productivity advances worsen the welfare of the domestic economy is shown to be fallacious in the context of this model.

### **ANSWERS TO TEXTBOOK PROBLEMS**

1.
  - a. The production possibility curve is a straight line that intercepts the apple axis at 400 ( $1200/3$ ) and the banana axis at 600 ( $1200/2$ ).
  - b. The opportunity cost of apples in terms of bananas is  $3/2$ . It takes three units of labor to harvest an apple but only two units of labor to harvest a banana. If one foregoes harvesting an apple, this frees up three units of labor. These 3 units of labor could then be used to harvest 1.5 bananas.
  - c. Labor mobility ensures a common wage in each sector and competition ensures the price of goods equals their cost of production. Thus, the relative price equals the relative costs, which equals the wage times the unit labor requirement for apples divided by the wage times the unit labor requirement for bananas. Since wages are equal across sectors, the price ratio equals the ratio of the unit labor requirement, which is 3 apples per 2 bananas.
  
2.
  - a. The production possibility curve is linear, with the intercept on the apple axis equal to 160 ( $800/5$ ) and the intercept on the banana axis equal to 800 ( $800/1$ ).
  - b. The world relative supply curve is constructed by determining the supply of apples relative to the supply of bananas at each relative price. The lowest relative price at which apples are harvested is 3 apples per 2 bananas. The relative supply curve is flat at this price. The maximum number of apples supplied at the price of  $3/2$  is 400 supplied by Home while, at this price, Foreign harvests 800 bananas and no apples, giving a maximum relative supply at this price of  $1/2$ . This relative supply holds for any price between  $3/2$  and 5. At the price of 5, both countries would harvest apples. The relative supply curve is again flat at 5. Thus, the relative supply curve is step shaped, flat at the price  $3/2$  from the relative supply of 0 to  $1/2$ , vertical at the relative quantity  $1/2$  rising from  $3/2$  to 5, and then flat again from  $1/2$  to infinity.
  
3.
  - a. The relative demand curve includes the points  $(1/5, 5)$ ,  $(1/2, 2)$ ,  $(1,1)$ ,  $(2,1/2)$ .
  - b. The equilibrium relative price of apples is found at the intersection of the relative demand and relative supply curves. This is the point  $(1/2, 2)$ , where the relative demand curve intersects the vertical section of the relative supply curve. Thus the equilibrium relative price is 2.

- c. Home produces only apples, Foreign produces only bananas, and each country trades some of its product for the product of the other country.
- d. In the absence of trade, Home could gain three bananas by foregoing two apples, and Foreign could gain by one apple foregoing five bananas. Trade allows each country to trade two bananas for one apple. Home could then gain four bananas by foregoing two apples while Foreign could gain one apple by foregoing only two bananas. Each country is better off with trade.
4. The increase in the number of workers at Home shifts out the relative supply schedule such that the corner points are at  $(1, 3/2)$  and  $(1, 5)$  instead of  $(1/2, 3/2)$  and  $(1/2, 5)$ . The intersection of the relative demand and relative supply curves is now in the lower horizontal section, at the point  $(2/3, 3/2)$ . In this case, Foreign still gains from trade but the opportunity cost of bananas in terms of apples for Home is the same whether or not there is trade, so Home neither gains nor loses from trade.
5. This answer is identical to that in 3. The amount of "effective labor" has not changed since the doubling of the labor force is accompanied by a halving of the productivity of labor.
6. This statement is just an example of the pauper labor argument discussed in the chapter. The point is that relative wage rates do not come out of thin air; they are determined by comparative productivity and the relative demand for goods. The box in the chapter provides data which shows the strong connection between wages and productivity. Korea's low wage presumably reflects the fact that Korea is less productive than the United States in most industries. As the test example illustrated, a highly productive country that trades with a less productive, low-wage country will raise, not lower, its standard of living.
7. The problem with this argument is that it does not use all the information needed for determining comparative advantage in production: this calculation involves the four unit labor requirements (for both the industry and service sectors, not just the two for the service sector). It is not enough to compare only service's unit labor requirements. If  $a_{ls} < a_{ls}^*$ , Home labor is more efficient than foreign labor in services. While this demonstrates that the United States has an absolute advantage in services, this is neither a necessary nor a sufficient condition for determining comparative advantage. For this determination, the industry ratios are also required. The competitive advantage of any

industry depends on both the relative productivities of the industries and the relative wages across industries.

8. While Japanese workers may earn the equivalent wages of U.S. workers, the purchasing power of their income is one-third less. This implies that although  $w=w^*$  (more or less),  $p < p^*$  (since  $3p=p^*$ ). Since the United States is considerably more productive in services, service prices are relatively low. This benefits and enhances U.S. purchasing power. However, many of these services cannot be transported and hence, are not traded. This implies that the Japanese may not benefit from the lower U.S. services costs, and do not face an international price which is lower than their domestic price. Likewise, the price of services in United States does not increase with the opening of trade since these services are non-traded. Consequently, U.S. purchasing power is higher than that of Japan due to its lower prices on non-traded goods.
9. Gains from trade still exist in the presence of nontraded goods. The gains from trade decline as the share of nontraded goods increases. In other words, the higher the portion of goods which do not enter international marketplace, the lower the potential gains from trade. If transport costs were high enough so that no goods were traded then, obviously, there would be no gains from trade.
10. The world relative supply curve in this case consists of a step function, with as many "steps" (horizontal portions) as there are countries with different unit labor requirement ratios. Any countries to the left of the intersection of the relative demand and relative supply curves export the good in which they have a comparative advantage relative to any country to the right of the intersection. If the intersection occurs in a horizontal portion then the country with that price ratio produces both goods.

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## **CHAPTER 3**

### **SPECIFIC FACTORS AND INCOME DISTRIBUTION**

#### *Chapter Organization*

##### The Specific Factors Model

- Assumptions of the Model

- Box: What is a Specific Factor?

- Production Possibilities

- Prices, Wages, and Labor Allocation

- Relative Prices and the Distribution of Income

##### International Trade in the Specific Factors Model

- Resources and Relative Supply

- Trade and Relative Prices

- The Pattern of Trade

##### Income Distribution and the Gains From Trade

##### The Political Economy of Trade: A Preliminary View

- Optimal Trade Policy

- Box: Specific Factors and the Beginnings of Trade Theory

- Income Distribution and Trade Politics

##### Summary

##### Appendix: Further Details on Specific Factors

- Marginal and Total Product

- Relative Prices and the Distribution of Income

## **CHAPTER OVERVIEW**

The analysis presented in the previous chapter, demonstrating unambiguous gains from trade, may leave students wondering why free trade is such a politically charged issue and why protectionism is so heatedly discussed in the press. The reason for this is that the debates concerning free trade focus on its distributional rather than its efficiency effects. A formal examination of these effects requires a model which has factors of production linked to producing certain goods. Two models of this nature are presented in this chapter.

The first model includes factors of production which are inexorably tied to producing one and only one good. The particular example presented in the text involves winemakers and cheesemakers. The immobility of labor prevents equalization of wages. The production possibility frontier of this economy is a rectangle and the relative supply curve is a vertical line. An equilibrium relative price can be determined when the relative demand curve is specified.

Consider the effect of introducing another country which can produce the same bundle of goods. The second economy shares the same production technology, but has different relative amounts of each type of labor. Trade between these two economies benefits each in the aggregate since the possible consumption set of each country expands. However, distributional issues arise when trade is permitted since workers in particular sectors may not gain from trade. There will be no gain for the labor in each economy which was relatively scarce prior to trade as compared to after trade. The type of labor relatively abundant in a country will gain from trade. The source of this effect is the movement in relative prices which favors the good which was relatively abundant in each country before trade. The general outcome is that trade benefits workers in the export sector of each country and hurts workers in the import-competing sector.

Next, a more general model is presented to investigate the distributional effects of trade. This specific factors model allows an examination of the distributional effects of trade on factors inexorably tied to the production of a specific good as well as on a factor that can be used to produce either good. The three factors in this model include two specific factors, land and capital, as well as one inter-sectorally mobile factor, labor. The fixed amount of each specific factor results in diminishing returns to labor. The mobility of labor ensures an equal wage in the production of either good, and perfect competition ensures that the wage equals the value marginal product of labor in the production of each good.

A graphical analysis demonstrates the distribution of labor between sectors as well as the return to labor. International trade alters the relative prices of goods and thus the amount of labor used in each sector, the real wage to labor and the returns to capital and land. The results of this model are similar to that of the immobile factors model in that owners of factors specific to export sectors gain from trade while owners of factors specific to import sectors lose from trade. This model also shows that trade has an ambiguous effect on mobile factors. To reinforce the importance of these concepts, the instructor may present data on

who lobbies for protection and in which industries. Newspapers and magazines are often useful and timely sources of relevant information.

The models presented in this chapter provide a framework for a preliminary discussion of the political economy of trade. The general support for free trade among economists despite its income distributional effects is justified. One reason for this support is that the benefits of free trade are widely dispersed while its costs are concentrated. Economists may better serve the country as advocates for the general welfare since there is no shortage of advocates for particular groups injured by trade. The issue of the political economy of trade reappears throughout the book. An appendix provides further details on the specific factors model.

### **ANSWERS TO TEXTBOOK PROBLEMS**

1. Texas and Louisiana are states with large oil-producing sectors. The real wage of oil-producing factors of production in terms of other goods falls when the price of oil falls relative to the price of other goods. This was the source of economic decline in these states in 1986.
2. To analyze the economy's production possibility frontier, consider how the output mix changes as labor is shifted between the two sectors.
  - a. The production functions for goods 1 and 2 are standard plots with quantities on the vertical axis, labor on the horizontal axis, and  $Q_1 = Q_1(K_1, L_1)$  with slope equal to the  $MPL_1$ , and on another graph,  $Q_2 = Q_2(K_2, L_2)$  with slope equal to the  $MPL_2$ .

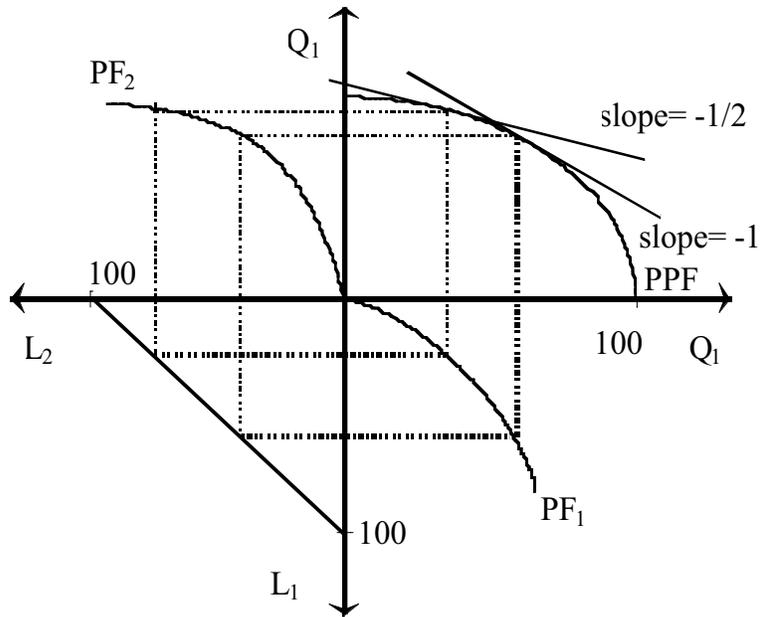


Figure 3-1

- b. To graph the production possibilities frontier, combine the production function diagrams with the economy's allocation of labor in a four quadrant diagram. The economy's PPF is in the upper right hand corner, as is illustrated in the four quadrant diagram above. The PPF is curved due to declining marginal product of labor in each good.
3. a. To solve this problem, one can graph the demand curve for labor in sector 1, represented by  $(w=MPL_1=\text{demand for } L_1)$  and the demand curve for labor in sector 2, represented by  $(w=MPL_2=\text{demand for } L_2)$ . Since the total supply of labor is given by the horizontal axis, the labor allocation between the sectors is approximately  $L_1=27$  and  $L_2=73$ . The wage rate is approximately \$0.98.

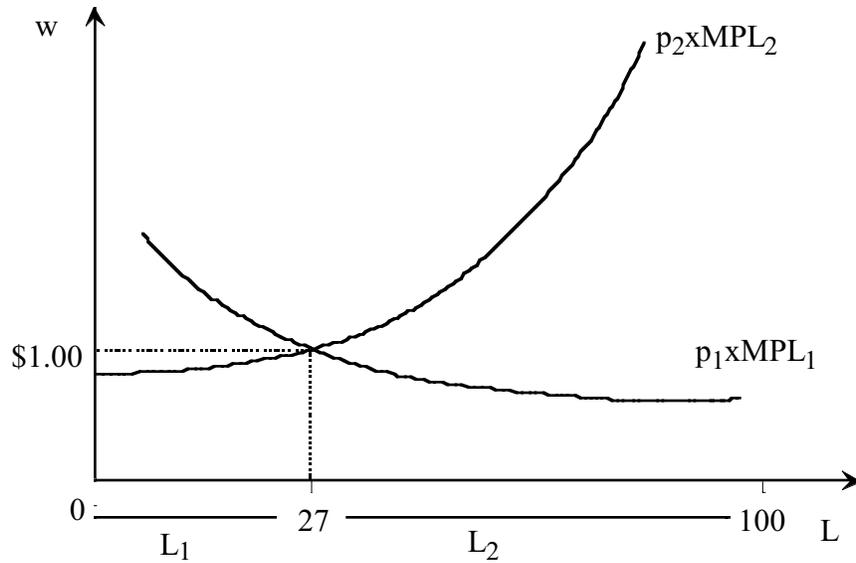


Figure 3-2

- b. Use the same type of graph as in problem 2b to show that sectoral output is  $Q_1=44$  and  $Q_2=90$ . (This involves combining the production function diagrams with the economy's allocation of labor in a four quadrant diagram. The economy's PPF is in the upper right hand corner, as illustrated in the text.)
  - c. Use a graph of labor demands, as in part a, to show that the intersection of the demand curves for labor occurs at a wage rate approximately equal to \$0.74. The relative decline in the price of good 2 caused labor to be reallocated: labor is drawn out of production of good 2 and enters production of good 1 ( $L_1=62$ ,  $L_2=38$ ). This also leads to an output adjustment, whereby production of good 2 falls to 68 units and production of good 1 rises to 76 units.
  - d. With the relative price change from  $p_2/p_1=2$  to  $p_2/p_1=1$ , the price of good 2 has fallen by 50 percent, while the price of good 1 has stayed the same. Wages have fallen, but by less than the fall in  $p_2$  (wages fell approximately 25 percent). Thus, the real wage relative to  $p_2$  actually rises while to real wage relative to  $p_1$  falls. Hence, to determine the welfare consequences for workers, information is needed about their consumption shares of good 1 and good 2.
4. The box diagram presented below is a useful tool for showing the effects of increasing the supply of the mobile factor of production, labor.
    - a. For an economy producing two goods, X and Y, with labor demands reflected by their marginal revenue product curves, there is an initial wage of  $w_1$  and an initial labor

allocation of  $L_x=O_xA$  and  $L_y=O_yA$ . When the supply of labor increases, the right boundary of this diagram is pushed out to  $O_{y'}$ . The demand for labor in sector Y is pulled rightward with the boundary. The new intersection of the labor demand curves shows that labor expands in both sectors, and therefore output of both X and Y also expand. The relative expansion of output is ambiguous. Wages paid to workers fall.

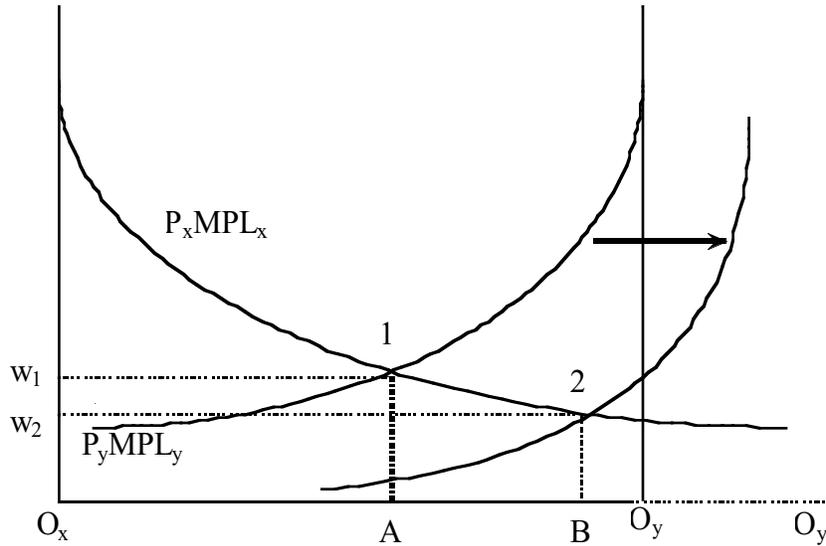


Figure 3-3

- b. From the shape of the MPL curves, it is clear that labor will continue to exhibit diminishing returns. Using a four quadrant diagram, you can demonstrate that the new production possibility frontier is more concave and steeper (flatter) at the ends. Using the numerical example,  $L_1$  increases to 90 from 62 and  $L_2$  increases to 50 from 38. Wages decline from \$0.74 to \$0.60. This new allocation of labor yields a new output mix of approximately  $Q_1=85$  and  $Q_2=77$ .

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## **CHAPTER 4**

### **RESOURCES AND TRADE: THE HECKSCHER-OHLIN MODEL**

#### *Chapter Organization*

##### A Model of a Two-Factor Economy

- Assumptions of the Model

- Factor Prices and Goods Prices

- Resources and Output

##### Effects of International Trade Between Two-Factor Economies

- Relative Prices and the Pattern of Trade

- Trade and the Distribution of Income

- Factor Price Equalization

- Case Study: North-South Trade and Income Inequality

##### Empirical Evidence on the Heckscher-Ohlin Model

- Testing the Heckscher-Ohlin Model

- Implications of the Tests

##### Summary

##### Appendix: Factor Prices, Goods Prices and Input Choices

- Choice of Technique

- Goods Prices and Factor Prices

## **CHAPTER OVERVIEW**

In Chapter 2, trade between nations was motivated by differences internationally in the relative productivity of workers when producing a range of products. In Chapter 3, labor was no longer the only factor used in production. Specific though immobile factors of production were introduced and some distributional effects of alterations in sector specific factors and prices were discussed. In Chapter 4, this analysis goes a step further by introducing the Heckscher-Ohlin theory.

In Chapter 4, the Heckscher-Ohlin theory considers the pattern of production and trade which will arise when countries have different endowments of factors of production, such as labor,

capital, and land. The basic point is that countries tend to export goods that are intensive in the factors with which they are abundantly supplied. Trade has strong effects on the relative earnings of resources, and tends to lead to equalization across countries of prices of the factors of production. These theoretical results and related empirical findings are presented in this chapter.

The chapter begins by developing a general equilibrium model of an economy with two goods which are each produced using two factors according to fixed coefficient production functions. The assumption of fixed coefficient production functions provides an unambiguous ranking of goods in terms of factor intensities. (The appendix develops the model when the production functions have variable coefficients.) Two important results are derived using this model. The first is known as the *Rybczynski effect*. Increasing the relative supply of one factor, holding relative goods prices constant, leads to a biased expansion of production possibilities favoring the relative supply of the good which uses that factor intensively.

The second key result is known as the *Stolper-Samuelson effect*. Increasing the relative price of a good, holding factor supplies constant, increases the return to the factor used intensively in the production of that good by more than the price increase, while lowering the return to the other factor. This result has important income distribution implications.

It can be quite instructive to think of the effects of demographic/ labor force changes on the supply of different products. For example, how might the pattern of production during the productive years of the "Baby Boom" generation differ from the pattern of production for post Baby Boom generations. What does this imply for returns to factors and relative price behavior?

The central message concerning trade patterns of the Heckscher-Ohlin theory is that countries tend to export goods whose production is intensive in factors with which they are relatively abundantly endowed. This is demonstrated by showing that, using the relative supply and relative demand analysis introduced in Chapter 2, the country relatively abundantly endowed with a certain factor will produce that factor more cheaply than the other country. International trade leads to a convergence of goods prices. Thus, the results from the *Stolper-Samuelson Theory* demonstrate that owners of a country's abundant factors gain from trade but owners of a country's scarce factors lose. The extension of this result is the important *Factor Price Equalization Theorem*, which states that trade in (and thus price

equalization of) goods leads to an equalization in the rewards to factors across countries. The political implications of factor price equalization should be interesting to students.

Empirical results concerning the Heckscher-Ohlin theory, beginning with the Leontief paradox and extending to current research, do not support its predictions concerning resource endowments explaining patterns of trade. This observation has motivated many economists to consider motives for trade between nations that are not exclusively based on differences across countries. These concepts will be explored in later chapters. Despite these shortcomings, important and relevant results concerning income distribution are obtained from the Heckscher-Ohlin theory.

## ANSWERS TO TEXTBOOK PROBLEMS

1. The definition of cattle growing as land intensive depends on the ratio of land to labor used in production, not on the ratio of land or labor to output. The ratio of land to labor in cattle exceeds the ratio in wheat in the United States, implying cattle is land intensive in the United States. Cattle is land intensive in other countries too if the ratio of land to labor in cattle production exceeds the ratio in wheat production in that country. Comparisons between another country and the United States is less relevant for this purpose.
  
2. a. The box diagram has 600 as the length of two sides (representing labor) and 60 as the length of the other two sides (representing land). There will be a ray from each of the two corners representing the origins. To find the slopes of these rays we use the information from the question concerning the ratios of the production coefficients. The question states that  $a_{LC} / a_{TC} = 20$  and  $a_{LF} / a_{TF} = 5$ .  
Since  $a_{LC} / a_{TC} = (L_C / Q_C) / (T_C / Q_C) = L_C / T_C$  we have  $L_C = 20T_C$ . Using the same reasoning,  $a_{LF} / a_{TF} = (L_F / Q_F) / (T_F / Q_F) = L_F / T_F$  and since this ratio equals 5, we have  $L_F = 5T_F$ . We can solve this algebraically since  $L = L_C + L_F = 600$  and  $T = T_C + T_F = 60$ . The solution is  $L_C = 400$ ,  $T_C = 20$ ,  $L_F = 200$  and  $T_F = 40$ .
  
- b. The dimensions of the box change with each increase in available labor but the slopes of the rays from the origins remain the same. The solutions in the different cases are as follows.  
 $L = 800$ :  $T_C = 33.33$ ,  $L_C = 666.67$ ,  $T_F = 26.67$ ,  $L_F = 133.33$

$L=1000: T_C=46.67, L_C=933.33, T_F=13.33, L_F=66.67$

$L=1200: T_C=60, L_C=1200, T_F=0, L_F=0$ . (complete specialization).

- c. At constant factor prices, some labor would be unused, so factor prices would have to change, or there would be unemployment.
3. This question is similar to an issue discussed in Chapter 2. What matters is not the absolute abundance of factors, but their relative abundance. Poor countries have an abundance of labor relative to capital when compared to more developed countries.
  4. In the Ricardian model, labor gains from trade through an increase in its purchasing power. This result does not support labor union demands for limits on imports from less affluent countries. Labor may gain or lose from trade in the context of the Immobile Factors model. Purchasing power in terms of one good will rise, but in terms of the other good it will decline. The Heckscher-Ohlin model directly addresses distribution by considering the effects of trade on the owners of factors of production. In the context of this model, unskilled U.S. labor loses from trade since this group represents the relatively scarce factors in this country. The results from the Heckscher-Ohlin model support labor union demands for import limits.
  5. Conditions necessary for factor price equalization include both countries (or regions) produce both goods, both countries have the same technology of production, and the absence of barriers to trade. The difference between wages different regions of the United States may reflect all of these reasons; however, the barriers to trade are purely "natural" barriers due to transportation costs. U.S. trade with Mexico, by contrast, is also subject to legal limits; together with cultural differences that inhibit the flow of technology, this may explain why the difference in wage rates is so much larger.
  6. The factor proportions theory states that countries export those goods whose production is intensive in factors with which they are abundantly endowed. One would expect the United States, which has a high capital/labor ratio relative to the rest of the world, to export capital-intensive goods if the Heckscher-Ohlin theory holds. Leontief found that the United States exported labor-intensive goods. Bowen, Leamer and Sveikauskas found for the world as a whole the correlation between factor endowment and trade patterns to be tenuous. The data do not support the predictions of the theory that countries' exports and imports reflect the relative endowments of factors.

7. If the efficiency of the factors of production differ internationally, the lessons of the Heckscher-Ohlin theory would be applied to “effective factors” which adjust for the differences in technology or worker skills or land quality (for example). The adjusted model has been found to be more successful than the unadjusted model at explaining the pattern of trade between countries. Factor-price equalization concepts would apply to the effective factors. A worker with more skills or in a country with better technology could be considered to be equal to two workers in another country. Thus, the single person would be two effective units of labor. Thus, the one high-skilled worker could earn twice what lower skilled workers do and the price of one effective unit of labor would still be equalized.

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## CHAPTER 5

### THE STANDARD TRADE MODEL

#### *Chapter Organization*

##### A Standard Model of a Trading Economy

- Production Possibilities and Relative Supply

- Relative Prices and Demand

- The Welfare Effect of Changes in the Terms of Trade

- Determining Relative Prices

##### Economic Growth: A Shift of the *RS* Curve

- Growth and the Production Possibility Frontier

- Relative Supply and the Terms of Trade

- International Effects of Growth

- Case Study: Has the Growth of Newly Industrializing Countries Hurt Advanced Nations?

##### International Transfers of Income: Shifting the *RD* Curve

- The Transfer Problem

- Effects of a Transfer on the Terms of Trade

- Presumptions about the Terms of Trade Effects of Transfers

- Case Study: The Transfer Problem and the Asian Crisis

##### Tariffs and Export Subsidies: Simultaneous Shifts in *RS* and *RD*

- Relative Demand and Supply Effects of a Tariff

- Effects of an Export Subsidy

- Implications of Terms of Trade Effects: Who Gains and Who Loses?

##### Summary

##### Appendix: Representing International Equilibrium With Offer Curves

- Deriving a Country's Offer Curve

- International Equilibrium

## CHAPTER OVERVIEW

Previous chapters have highlighted specific sources of comparative advantage which give rise to international trade. This chapter presents a general model which admits previous models as special cases. This "standard trade model" is the workhorse of international trade theory and can be used to address a wide range of issues. Some of these issues, such as the welfare and distributional effects of economic growth, transfers between nations, and tariffs and subsidies on traded goods are considered in this chapter.

The standard trade model is based upon four relationships. *First*, an economy will produce at the point where the production possibilities curve is tangent to the relative price line (called the isovalue line). *Second*, indifference curves describe the tastes of an economy and the consumption point for that economy is found at the tangency of the budget line and the highest indifference curve. These two relationships yield the familiar general equilibrium trade diagram for a small economy (one which takes as given the terms of trade) where the consumption point and production point are the tangencies of the isovalue line with the highest indifference curve and the production possibilities frontier, respectively.

You may want to work with this standard diagram to demonstrate a number of basic points. *First*, an autarkic economy must produce what it consumes, which determines the equilibrium price ratio; and *second*, opening an economy to trade shifts the price ratio line and unambiguously increases welfare. *Third*, an improvement in the terms of trade increases welfare in the economy. *Fourth*, it is straightforward to move from a small country analysis to a two country analysis by introducing a structure of world relative demand and supply curves which determine relative prices.

These relationships can be used in conjunction with the Rybczynski and the Stolper-Samuelson Theorems from the previous chapter to address a range of issues. For example, you can consider whether the dramatic economic growth of countries like Japan and Korea has helped or hurt the United States as a whole, and also identify the classes of individuals within the United States who have been hurt by the particular growth biases of these countries. In teaching these points, it might be interesting and useful to relate them to current events. For example, you can lead a class discussion of the implications for the United States of the provision of forms of technical and economic assistance to the emerging economies around the world or the ways in which a world recession can lead to a fall in demand for U.S. export goods.

The example provided in the text considers the popular arguments in the media that growth in Japan or Korea hurts the United States. The analysis presented in this chapter demonstrates that the bias of growth is important in determining welfare effects rather than the country in which growth occurs. The existence of biased growth, and the possibility of immiserizing growth is discussed. The Relative Supply (*RS*) and Relative Demand (*RD*) curves illustrate the effect of biased growth on the terms of trade. The new terms of trade line can be used with the general equilibrium analysis to find the welfare effects of growth. A general principle which emerges is that a country which experiences export-biased growth will have a deterioration in its terms of trade while a country which experiences import-biased growth has an improvement in its terms of trade. A case study points out that growth in the rest of the world has made other countries more like the United States. This import-biased growth has worsened the terms of trade for the United States.

The second issue addressed in the context of the standard trade model is the effects of international transfers. The salient point here is the direction, if any, in which the relative demand curve shifts in response to the redistribution of income from a transfer. A transfer worsens the donor's terms of trade if it has a higher marginal propensity to consume its export good than the recipient. The presence of non-traded goods tends to reinforce the deterioration of terms of trade for the donor country. The case study attendant to this issue involves the deterioration of many Asian countries' terms of trade due to the large capital withdrawals at the end of the 1990s.

The third area to which the standard trade model is applied are the effects of tariffs and export subsidies on welfare and terms of trade. The analysis proceeds by recognizing that tariffs or subsidies shift both the relative supply and relative demand curves. A tariff on imports improves the terms of trade, expressed in external prices, while a subsidy on exports worsens terms of trade. The size of the effect depends upon the size of the country in the world. Tariffs and subsidies also impose distortionary costs upon the economy. Thus, if a country is large enough, there may be an optimum, non-zero tariff. Export subsidies, however, only impose costs upon an economy. Intrationally, tariffs aid import-competing sectors and hurt export sectors while subsidies have the opposite effect. An appendix presents offer curve diagrams and explains this mode of analysis.

## ANSWERS TO TEXTBOOK PROBLEMS

1. An increase in the terms of trade increases welfare when the PPF is right-angled. The production point is the corner of the PPF. The consumption point is the tangency of the relative price line and the highest indifference curve. An improvement in the terms of trade rotates the relative price line about its intercept with the PPF rectangle (since there is no substitution of immobile factors, the production point stays fixed). The economy can then reach a higher indifference curve. Intuitively, although there is no supply response, the economy receives more for the exports it supplies and pays less for the imports it purchases.
2. The difference from the standard diagram is that the indifference curves are right angles rather than smooth curves. Here, a terms of trade increase enables an economy to move to a higher indifference curve. The income expansion path for this economy is a ray from the origin. A terms of trade improvement moves the consumption point further out along the ray.
3. The terms of trade of Japan, a manufactures (M) exporter and a raw materials (R) importer, is the world relative price of manufactures in terms of raw materials ( $p_M/p_R$ ). The terms of trade change can be determined by the shifts in the world relative supply and demand (manufactures relative to raw materials) curves. Note that in the following answers, world relative supply (RS) and relative demand (RD) are always M relative to R. We consider all countries to be large, such that changes affect the world relative price.
  - a. Oil supply disruption from the Middle East decreases the supply of raw materials, which increases the world relative supply. The world relative supply curve shifts out, decreasing the world relative price of manufactured goods and deteriorating Japan's terms of trade.
  - b. Korea's increased automobile production increases the supply of manufactures, which increases the world RS. The world relative supply curve shifts out, decreasing the world relative price of manufactured goods and deteriorating Japan's terms of trade.
  - c. U.S. development of a substitute for fossil fuel decreases the demand for raw materials. This increases world RD and the world relative demand curve shifts out, increasing the world relative price of manufactured goods and improving Japan's terms of trade. This occurs even if no fusion reactors are installed in Japan since world demand for raw materials falls.

- d. A harvest failure in Russia decreases the supply of raw materials, which increases the world RS. The world relative supply curve shifts out. Also, Russia's demand for manufactures decreases, which reduces world demand so that the world relative demand curve shifts in. These forces decrease the world relative price of manufactured goods and deteriorate Japan's terms of trade.
  - e. A reduction in Japan's tariff on raw materials will raise its internal relative price of manufactures. This price change will increase Japan's RS and decrease Japan's RD, which increases the world RS and decreases the world RD (i.e., world RS shifts out and world RD shifts in). The world relative price of manufactures declines and Japan's terms of trade deteriorate.
4. These results acknowledge the biased growth which occurs when there is an increase in one factor of production. An increase in the capital stock of either country favors production of good X while an increase in the labor supply favors production of good Y. Also, recognize the Heckscher-Ohlin result that an economy will export that good which uses intensively the factor which that economy has in relative abundance. Country A exports good X to country B and imports good Y from country B. The possibility of immiserizing growth makes the welfare effects of a terms of trade improvement due to export-biased growth ambiguous. Import-biased growth unambiguously improves welfare for the growing country.
- a. A's terms of trade worsen, A's welfare may increase or, less likely, decrease, and B's welfare increases.
  - b. A's terms of trade improve, A's welfare increases and B's welfare decreases.
  - c. B's terms of trade improve, B's welfare increases and A's welfare decreases.
  - d. B's terms of trade worsen, B's welfare may increase or, less likely, decrease, and A's welfare increases.
5. Immiserizing growth occurs when the welfare deteriorating effects of a worsening in an economy's terms of trade swamp the welfare improving effects of growth. For this to occur, an economy must undergo very biased growth and the economy must be a large enough actor in the world economy such that its actions spill over to adversely alter the terms of trade to a large degree. This combination of events is unlikely to occur in practice.
6. Aid which must be spent on exports increases the demand for those export goods and raises their price relative to other goods. There will be a terms of trade deterioration

for the recipient country. This can be viewed as a polar case of the effect of a transfer on the terms of trade. Here, the marginal propensity to consume the export good by the recipient country is 1. The donor benefits from a terms of trade improvement. As with immiserizing growth, it is theoretically possible that a transfer actually worsens the welfare of the recipient.

7. Given the difference in technological development between most Eastern European countries and the United States and Japan, the effects on Western European prices will depend, in the short run, on transfer problem issues and, in the long run, on the likely biases in Eastern Europe's growth. The transfer problem point is concerned with the consumption demands of countries which receive available international credit supplies. If loans to developing countries shift from availability to Latin American countries, which have a relatively high propensity to consume U.S. goods, to availability to Eastern European countries, which have a lower propensity to consume U.S. goods and a higher propensity to consume German goods, the price of German exports will rise relative to the price of U.S. exports. This would lead to an improvement in the terms of trade of Germany and a worsening of the terms of trade of the United States. Note, however, that in the long term, the analysis of terms of trade effects should also consider whether the biases in economic growth in Eastern Europe will be in sectors of the economy more closely aligned with the export industries of Germany or of the United States. The greater the similarity of the export-oriented industrial push in Eastern European with the existing industries in Germany, the greater the supply side reversal of the favorable German terms of trade movement which had arisen from the demand side forces of the transfer problem.
8. When a country subsidizes its exports, the world relative supply and relative demand schedules shift such that the terms of trade for the country worsen. A countervailing import tariff in a second country exacerbates this effect, moving the terms of trade even further against the first country. The first country is worse off both because of the deterioration of the terms of trade and the distortions introduced by the new internal relative prices. The second country definitely gains from the first country's export subsidy, and may gain further from its own tariff. If the second country retaliated with an export subsidy then this would offset the initial improvement in the terms of trade; the "retaliatory" export subsidy definitely helps the first country and hurts the second.

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## **CHAPTER 6**

# **ECONOMIES OF SCALE, IMPERFECT COMPETITION, AND INTERNATIONAL TRADE**

### *Chapter Organization*

Economies of Scale and International Trade: An Overview

Economies of Scale and Market Structure

The Theory of Imperfect Competition

    Monopoly: A Brief Review

    Monopolistic Competition

    Limitations of the Monopolistic Competition Model

Monopolistic Competition and Trade

    The Effects of Increased Market Size

    Gains from an Integrated Market: A Numerical Example

    Economies of Scale and Comparative Advantage

    The Significance of Intraindustry Trade

    Why Intraindustry Trade Matters

    Case Study: Intraindustry Trade in Action: The North American Auto Pact

Dumping

    The Economics of Dumping

    Case Study: AntiDumping as Protection

    Reciprocal Dumping

The Theory of External Economies

    Specialized Suppliers

    Labor Market Pooling

    Knowledge Spillovers

    External Economies and Increasing Returns

External Economies and International Trade

    External Economies and the Pattern of Trade

    Trade and Welfare with External Economies

    Box: Tinseltown Economics

    Dynamic Increasing Returns

Summary

## CHAPTER OVERVIEW

In previous chapters, trade between nations was motivated by their differences in factor productivity or relative factor endowments. The type of trade which occurred, for example of food for manufactures, is based on comparative advantage and is called *interindustry trade*. This chapter introduces trade based on economies of scale in production. Such trade in similar productions is called *intraindustry trade*, and describes, for example, the trading of one type of manufactured good for another type of manufactured good. It is shown that trade can occur when there are no technological or endowment differences, but when there are economies of scale or increasing returns in production.

Economies of scale can either take the form of 1) *external economies* whereby the cost per unit depends on the size of the industry but not necessarily on the size of the firm; or as 2) *internal economies*, whereby the production cost per unit of output depends on the size of the individual firm but not necessarily on the size of the industry. Internal economies of scale give rise to imperfectly competitive markets, unlike the perfectly competitive market structures that were assumed to exist in earlier chapters. This motivates the review of models of imperfect competition, including monopoly and monopolistic competition. The instructor should spend some time making certain that students understand the equilibrium concepts of these models since they are important for the justification of intraindustry trade.

In markets described by monopolistic competition, there are a number of firms in an industry, each of which produces a differentiated product. Demand for its good depends on the number of other similar products available and their prices. This type of model is useful for illustrating that trade improves the trade-off between scale and variety available to a country. In an industry described by monopolistic competition, a larger market -- such as that which arises through international trade -- lowers average price (by increasing production and lowering average costs) and makes available for consumption a greater range of goods. While an integrated markets also supports the existence of a larger number of firms in an industry, the model presented in the text does not make predictions about where these industries will be located.

It is also interesting to compare the distributional effects of trade when motivated by comparative advantage with those when trade is motivated by increasing returns to scale in

production. When countries are similar in their factor endowments, and when scale economies and product differentiation are important, the income distributional effects of trade will be small. You should make clear to the students the sharp contrast between the predictions of the models of monopolistic competition and the specific factors and Heckscher-Ohlin theories of international trade. Without clarification, some students may find the contrasting predictions of these models confusing.

Another important issue related to imperfectly competitive markets is the practice of price discrimination, namely charging different customers different prices. One particularly controversial form of price discrimination is dumping, whereby a firm charges lower prices for exported goods than for goods sold domestically. This can occur only when domestic and foreign markets are segmented. While there is no good economic justification for the view that dumping is harmful, it is often viewed as an unfair trade practice.

The other type of economies of scale, external economies, has very different economic implications than internal economies. Since external economies of scale occur at the industry level rather than the firm level, it is possible for there to be many small competitors in an industry, in contrast to the structure which develops under internal economies of scale. Under external economies, trade may not be beneficial to all countries and there may be some justification for protectionism. Dynamic scale economies, which arise when unit production costs fall with cumulative production over time, rather than with current levels of production, also provide a potential justification for protectionism.

## **ANSWERS TO TEXTBOOK PROBLEMS**

1. Cases *a* and *d* reflect external economies of scale since concentration of the production of an industry in a few locations reduces the industry's costs even when the scale of operation of individual firms remains small. External economies need not lead to imperfect competition. The benefits of geographical concentration may include a greater variety of specialized services to support industry operations and larger labor markets or thicker input markets. Cases *b* and *c* reflect internal economies of scale and occur at the level of the individual firm. The larger the output of a product by a particular firm, the lower its average costs. This leads to imperfect competition as in petrochemicals, aircraft, and autos.

2. The profit maximizing output level of a monopolist occurs where marginal revenue equals marginal cost. Unlike the case of perfectly competitive markets, under monopoly marginal revenue is not equal to price. Marginal revenue is always less than price under imperfectly competitive markets because to sell an extra unit of output the firm must lower the price of all units, not just the marginal one.
  
3. By concentrating the production of each good with economies of scale in one country rather than spreading the production over several countries, the world economy will use the same amount of labor to produce more output. In the monopolistic competition model, such a concentration of labor benefits the host country, which can also capture some monopoly rents, while it may hurt the rest of the world which could then face higher prices on its consumption goods. In the external economies case, such monopolistic pricing behavior is less likely since imperfectly competitive markets are less likely.
  
4. Although this problem is a bit tricky and the numbers don't work out nicely, a solution does exist. The first step in finding the solution is to determine the equilibrium number of firms in the industry. The equilibrium number of firms is that number,  $n$ , at which price equals average cost. We know that  $AC = F/X + c$ , where  $F$  represents fixed costs of production,  $X$  represents the level of sales by each firm, and  $c$  represents marginal costs. We also know that  $P = c + (1/bn)$ , where  $P$  and  $b$  represent price and the demand parameter. Also, if all firms follow the same pricing rule, then  $X = S/n$  where  $S$  equals total industry sales. So, set price equal to average cost, cancel out the  $c$ 's and replace  $X$  by  $S/n$ . Rearranging what is left yields the formula  $n^2 = S/Fb$ . Substitute in  $S = 900,000 + 1,600,000 + 3,750,000 = 6,250,000$ ,  $F = 750,000,000$  and  $b = 1/30,000$ . The numerical answer is that  $n = 15.8$  firms. However, since you will never see .8 firms, there will be 15 firms that enter the market, not 16 firms since the last firm knows that it can not make positive profits. The rest of the solution is straight-forward. Using  $X = S/n$ , output per firm is 41,666 units. Using the price equation, and the fact that  $c = 5,000$ , yields an equilibrium price of \$7,000.
  
5. a. The relatively few locations for production suggest external economies of scale in production. If these operations are large, there may also be large internal economies of scale in production.

- b. Since economies of scale are significant in airplane production, it tends to be done by a small number of (imperfectly competitive) firms at a limited number of locations. One such location is Seattle, where Boeing produces.
  - c. Since external economies of scale are significant in semiconductor production, semiconductor industries tend to be concentrated in certain geographic locations. If, for some historical reason, a semiconductor is established in a specific location, the export of semiconductors by that country is due to economies of scale and not comparative advantage.
  - d. "True" scotch whiskey can only come from Scotland. The production of scotch whiskey requires a technique known to skilled distillers who are concentrated in the region. Also, soil and climactic conditions are favorable for grains used in local scotch production. This reflects comparative advantage.
  - e. France has a particular blend of climactic conditions and land that is difficult to reproduce elsewhere. This generates a comparative advantage in wine production.
6. The Japanese producers are price discriminating across United States and Japanese markets, so that the goods sold in the United States are much cheaper than those sold in Japan. It may be profitable for other Japanese to purchase these goods in the United States, incur any tariffs and transportation costs, and resell the goods in Japan. Clearly, the price differential across markets must be non-trivial for this to be profitable.
7. a. Suppose two countries that can produce a good are subject to forward-falling supply curves and are identical countries with identical curves. If one country starts out as a producer of a good, i.e. it has a head start even as a matter of historical accident, then all production will occur in that particular country and it will export to the rest of the world.
- b. Consumers in both countries will pay a lower price for this good when external economies are maximized through trade and all production is located in a single market. In the present example, no single country has a natural cost advantage or is worse off than it would be under autarky.
8. External economies are important for firms as technology changes rapidly and as the "cutting edge" moves quickly with frequent innovations. As this process slows, manufacturing becomes more routine and there is less advantage conferred by external economies. Instead, firms look for low cost production locations. Since external

economies are no longer important, firms find little advantage in being clustered and it is likely that locations other than the high-wage original locations are chosen.

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## **CHAPTER 7**

### **INTERNATIONAL FACTOR MOVEMENTS**

#### ***Chapter Organization***

##### International Labor Mobility

- A One-Good Model without Factor Mobility

- International Labor Movement

- Extending the Analysis

- Case Study: Wage Convergence in the Age of Mass Migration

- Case Study: Immigration and the U.S. Economy

##### International Borrowing and Lending

- Intertemporal Production Possibilities and Trade

- The Real Interest Rate

- Intertemporal Comparative Advantage

- Box: Does Capital Movement to Developing Countries Hurt Workers in High-Wage Countries?

##### Direct Foreign Investment and Multinational Firms

- The Theory of Multinational Enterprise

- Multinational Firms in Practice

- Case Study: Foreign Direct Investment in the United States

- Box: Taken for a Ride?

##### Summary

##### Appendix: More on Intertemporal Trade

### **CHAPTER OVERVIEW**

This chapter introduces an additional aspect of economic integration, international factor movements. Most notably, this refers to labor and financial capital mobility across countries. An important point emphasized in Chapter 7 is that many of the same forces which trigger international trade in goods between countries will, if permitted, trigger international flows of labor and finances. Students may find this analysis especially interesting in that it sheds light on issues which may involve them personally, such as motives for the 19<sup>th</sup> and early 20<sup>th</sup> century waves of emigration to land-abundant but labor-scarce America from land-scarce and

labor-abundant Europe and China. Other, more current examples of international factor mobility include the international capital flows associated with the debt crisis of the 1980s, and intertemporal substitution motives behind United States borrowing and foreign direct investment inflows and outflows in the 1980s and 1990s.

The chapter proceeds in three main sections. First, a simple model of international labor mobility is presented. Next, intertemporal production and consumption decisions are analyzed in the context of international borrowing and lending. Finally, the role of multinational corporations is discussed.

To demonstrate the forces behind international labor mobility, the chapter begins with a model which is quite similar to that presented in Chapter 3. In each country of the world, the real return to labor equals its marginal product in perfectly competitive markets in each of two countries which produce one good using two factors of production. Labor relocates until the marginal products are equal across countries. While the redistribution of labor increases world output and provides overall gains, it also has important income distribution effects. Workers in the originally high wage country are made worse off since wages fall with the inflow of additional workers, and workers in the originally low wage country are made better off. One case study in the text helps illustrate the effects on both source and destination countries and another focuses on the American experience with immigration. It would be interesting for an instructor to discuss the resistance of groups within the United States to migrant farm workers from Mexico and immigration from other low wage countries such as Haiti.

An analysis of international capital movements involves the consideration of intertemporal trade. The important point here is that the real rate of interest differs across countries and international factor movements provide gains to both borrowers and lenders. The analysis presented here is analogous to that in Chapter 5; instead of choosing between consumption of goods at any point in time, the analysis focuses on a one good world where the choice at a point in time is between future and present consumption. An intertemporal production possibilities frontier replaces the PPF and the intertemporal price line replaces the relative price line. Analysis of the gains from intertemporal trade, the size of borrowing and lending, and the effects of taxes on capital transfers follow. The appendix presents this model in greater detail.

The final issue addressed in this chapter concerns direct foreign investment and multinational firms. Direct foreign investment differs from other capital transfers in that it involves the acquisition of control of a company. The theory of multinational firms is not well developed. Important points of existing theory are that decisions concerning multinationals are based upon concerns involving location and internalization. Location decisions are based upon barriers to trade and transportation costs. Internalization decisions focus on vertical integration and technology transfers. Multinationals facilitate shifts such that factor prices move in the direction which free trade would cause. The income distribution effects of direct foreign investment are politically charged and in other chapters are discussed in further detail.

The political dimension of international factor movements differs from that of international trade. Class discussion on these distinctions could focus on who wins and who loses from each and, more specifically, issues such as the role of multinationals or the responsibility of host countries to guest workers. For example, one interesting topic for discussion is the effects of labor mobility as a component of integration within the European Union. (This topic is developed further in Chapter 20.)

### **ANSWERS TO TEXTBOOK PROBLEMS**

1. The marginal product of labor in Home is 10 and in Foreign is 18. Wages are higher in Foreign, so workers migrate there to the point where the marginal product in both Home and Foreign is equated. This occurs when there are 7 workers in each country, and the marginal product of labor in each country is 14.
2. There is no incentive to migrate when there is factor price equalization. This occurs when both countries produce both goods and when there are no barriers to trade (the problem assumes technology is the same in the two countries). A tariff by country A increases the relative price of the protected good in that country and lowers its relative price in the country B. If the protected good uses labor relatively intensively, the demand for labor in country A rises, as does the return to labor, and the return to labor in the country B falls. These results follow from the Stolper-Samuelson theory, which states that an increase in the price of a good raises the return to the factor used intensively in the production of that good by more than the price increase. These international wage differentials induce migration from country B to country A.

3. The analysis of intertemporal trade follows directly the analysis of trade of two goods. Substitute "future consumption" and "present consumption" for "cloth" and "food." The relevant relative price is the cost of future consumption compared to present consumption, which is the inverse of the real interest rate. Countries in which present consumption is relatively cheap (which have low real interest rates) will "export" present consumption (i.e. lend) to countries in which present consumption is relatively dear (which have high real interest rates). The equilibrium real interest rate after borrowing and lending occur lies between that found in each country before borrowing and lending take place. Gains from borrowing and lending are analogous to gains from trade--there is greater efficiency in the production of goods intertemporally.
  
4. Foregoing current consumption allows one to obtain future consumption. There will be a bias towards future consumption if the amount of future consumption which can be obtained by foregoing current consumption is high. In terms of the analysis presented in this chapter, there is a bias towards future consumption if the real interest rate in the economy is higher in the absence of international borrowing or lending than the world real interest rate.
  - a. The large inflows of immigrants means that the marginal product of capital will rise as more workers enter the country. The real interest rate will be high, and there will be a bias towards future consumption.
  - b. The marginal product of capital is low and thus there is a bias towards current consumption.
  - c. The direction of the bias depends upon the comparison of the increase in the price of oil and the world real interest rate. Leaving the oil in the ground provides a return of the increase in the price of oil whereas the world real interest rate may be higher or lower than this increase.
  - d. Foregoing current consumption allows exploitation of resources, and higher future consumption. Thus, there is a bias towards future consumption.
  - e. The return to capital is higher than in the rest of the world (since the country's rate of growth exceeds that of the rest of the world), and there is a bias toward future consumption.
  
5. a. \$10 million is not a controlling interest in IBM, so this does not qualify as direct foreign investment. It is international portfolio diversification.
  - b. This is direct foreign investment if one considers the apartment building a business which pays returns in terms of rents.

- c. Unless particular U.S. shareholders will not have control over the new French company, this will not be direct foreign investment.
  - d. This is not direct foreign investment since the Italian company is an "employee," but not the ones which ultimately control, the company.
6. In terms of location, the Karma company has avoided Brazilian import restrictions. In terms of internalization, the firm has retained its control over the technology by not divulging its patents.

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## ***OVERVIEW OF SECTION II: INTERNATIONAL TRADE POLICY***

Section II of the text is comprised of four chapters:

- Chapter 8      The Instruments of Trade Policy
- Chapter 9      The Political Economy of Trade Policy
- Chapter 10     Trade Policy in Developing Countries
- Chapter 11     Strategic Trade Policies in Advanced Countries

### **SECTION II OVERVIEW**

Trade policy issues figure prominently in current political debates and public policy discussions. The first two chapters of this section of the text are concerned with the instruments of trade policy and the arguments for free trade and managed trade. The second two chapters consider these concepts in the context of specific sets of countries that face common problems. Throughout, the use of case studies provides the student with real world examples that clearly illustrate the theoretical arguments.

Chapter 8 discusses various instruments of trade policy including tariffs, quotas, voluntary export restraints, and local content requirements. The effects of these policies on prices and trade volumes are determined in the context of a partial equilibrium framework. The chapter reviews the analytical tools of consumer and producer surplus, and uses these tools to consider the welfare effects of various protectionist measures. The specific incidents of trade restrictions presented as case studies include import quotas on sugar entering United States markets, voluntary export restraints on Japanese autos, and oil import quotas.

Chapter 9 presents the set of ideas known as the political economy of trade theory. These ideas enable you to understand why certain trade restrictions exist, despite the force of general economic arguments which suggest that they reduce aggregate welfare. Possible motivations for trade restrictions are identified as those which increase national welfare, such as the optimum tariff, and those which foster either income redistribution or the preservation of status quo. While sometimes politically popular, these motivations for trade restrictions ignore the possibility of retaliation and usually fail tests based upon basic welfare analysis. Trade agreements of the 1990s are discussed, including the Uruguay Round, and distinctions

are made between Free Trade Areas and Customs Unions as well as between trade creation and trade diversion.

Chapter 10 considers the possible uses of trade policies to promote the growth of developing economies. The chapter reviews the relative successes of different development strategies. It examines arguments for and the results of import-substituting industrialization. The phenomenon of economic dualism, referring to the coexistence of capital intensive industrial sectors and low-wage traditional sectors, and of uneven development are considered. The chapter concludes with a discussion of export led growth and the experience of the high performing Asian economies.

Chapter 11 considers recent controversies in trade policy. The first part of the chapter considers the notion of strategic trade policy, which first arose in the 1990s. Strategic trade policy refers to the use of trade (and other) tools for channeling resources to sectors targeted for growth by industrial country governments. The chapter presents some commonly voiced arguments for intervention in particular sectors of the economy, and then shows how these arguments are critically flawed. The second part of the chapter introduces more sophisticated arguments for strategic trade policy. The most persuasive of these is the existence of some form of market failure. The second part of the chapter considers the impact of rising trade on workers in developing countries, and more broadly, the debate over globalization. This debate has been argued in academia and policy circles, but also on the streets of Seattle, Genoa, and other cities hosting global economic summits.

## CHAPTER 8

### THE INSTRUMENTS OF TRADE POLICY

#### *Chapter Organization*

##### Basic Tariff Analysis

- Supply, Demand, and Trade in a Single Industry

- Effects of a Tariff

- Measuring the Amount of Protection

##### Costs and Benefits of a Tariff

- Consumer and Producer Surplus

- Measuring the Costs and Benefits

##### Other Instruments of Trade Policy

- Export Subsidies: Theory

- Case Study: Europe's Common Agricultural Policy

- Import Quotas: Theory

- Case Study: An Import Quota in Practice: U.S. Sugar

- Voluntary Export Restraints

- Case Study: A Voluntary Export Restraint in Practice: Japanese Autos

- Local Content Requirements

- Box: American Buses, Made in Hungary

- Other Trade Policy Instruments

- The Effects of Trade Policy: A Summary

##### Summary

##### Appendix I: Tariff Analysis in General Equilibrium

- A Tariff in a Small Country

- A Tariff in a Large Country

##### Appendix II: Tariffs and Import Quotas in the Presence of Monopoly

- The Model with Free Trade

- The Model with a Tariff

- The Model with an Import Quota

- Comparing a Tariff with a Quota

## CHAPTER OVERVIEW

This chapter and the next three focus on international trade policy. Students will have heard various arguments for and against restrictive trade practices in the media. Some of these arguments are sound and some are clearly not grounded in fact. This chapter provides a framework for analyzing the economic effects of trade policies by describing the tools of trade policy and analyzing their effects on consumers and producers in domestic and foreign countries. Case studies discuss actual episodes of restrictive trade practices. An instructor might try to underscore the relevance of these issues by having students scan newspapers and magazines for other timely examples of protectionism at work.

The analysis presented here takes a partial equilibrium view, focusing on demand and supply in one market, rather than the general equilibrium approach followed in previous chapters. Import demand and export supply curves are derived from domestic and foreign demand and supply curves. There are a number of trade policy instruments analyzed in this chapter using these tools. Some of the important instruments of trade policy include *specific tariffs*, defined as taxes levied as a fixed charge for each unit of a good imported; *ad valorem tariffs*, levied as a fraction of the value of the imported good; *export subsidies*, which are payments given to a firm or industry that ships a good abroad; *import quotas*, which are direct restrictions on the quantity of some good that may be imported; *voluntary export restraints*, which are quotas on trading that are imposed by the exporting country instead of the importing country; and, *local content requirements* which are regulations that require that some specified fraction of a good is produced domestically.

The import supply and export demand analysis demonstrates that the imposition of a tariff drives a wedge between prices in domestic and foreign markets, and increases prices in the country imposing the tariff and lowers the price in the other country by less than the amount of the tariff. This contrasts with most textbook presentations which make the small country assumption that the domestic internal price equals the world price times one plus the tariff rate. The actual protection provided by a tariff will not equal the tariff rate if imported intermediate goods are used in the production of the protected good. The proper measurement, *the effective rate of protection*, is described in the text and calculated for a sample problem.

The analysis of the costs and benefits of trade restrictions require tools of welfare analysis. The text explains the essential tools of consumer and producer surplus. Consumer surplus on

each unit sold is defined as the difference between the actual price and the amount that consumers would have been willing to pay for the product. Geometrically, consumer surplus is equal to the area under the demand curve and above the price of the good. Producer surplus is the difference between the minimum amount for which a producer is willing to sell his product and the price which he actually receives. Geometrically, producer surplus is equal to the area above the supply curve and below the price line. These tools are fundamental to the student's understanding of the implications of trade policies and should be developed carefully.

The costs of a tariff include distortionary efficiency losses in both consumption and production. A tariff provides gains from terms of trade improvement when and if it lowers the foreign export price. Summing the areas in a diagram of internal demand and supply provides a method for analyzing the net loss or gain from a tariff.

Other instruments of trade policy can be analyzed with this method. An export subsidy operates in exactly the reverse fashion of an import tariff. An import quota has similar effects as an import tariff upon prices and quantities but revenues, in the form of quota rents, accrue to foreign producers of the protected good. Voluntary export restraints are a form of quotas in which import licenses are held by foreign governments. Local content requirements raise the price of imports and domestic goods and do not result in either government revenue or quota rents.

Throughout the chapter the analysis of different trade restrictions are illustrated by drawing upon specific episodes. Europe's common agricultural policy provides an example of export subsidies in action. The case study corresponding to quotas describes trade restrictions on U.S. sugar imports. Voluntary export restraints are discussed in the context of Japanese auto sales to the United States. The oil import quota in the United States in the 1960's provides an example of a local content scheme.

There are two appendices to this chapter. Appendix I uses a general equilibrium framework to analyze the impact of a tariff, departing from the partial equilibrium approach taken in the chapter. When a small country imposes a tariff, it shifts production away from its exported good and toward the imported good. Consumption shifts toward the domestically produced goods. Both the volume of trade and welfare of the country declines. A large country imposing a tariff can improve its terms of trade by an amount potentially large enough to

offset the production and consumption distortions. For a large country, a tariff may be welfare improving.

Appendix II discusses tariffs and import quotas in the presence of a domestic monopoly. Free trade eliminates the monopoly power of a domestic producer and the monopolist mimics the actions of a firm in a perfectly competitive market, setting output such that marginal cost equals world price. A tariff raises domestic price. The monopolist, still facing a perfectly elastic demand curve, sets output such that marginal cost equals internal price. A monopolist faces a downward sloping demand curve under a quota. A quota is not equivalent to a tariff in this case. Domestic production is lower and internal price higher when a particular level of imports is obtained through the imposition of a quota rather than a tariff.

### ANSWERS TO TEXTBOOK PROBLEMS

1. The import demand equation,  $MD$ , is found by subtracting the home supply equation from the home demand equation. This results in  $MD = 80 - 40 \times P$ . Without trade, domestic prices and quantities adjust such that import demand is zero. Thus, the price in the absence of trade is 2.
2. a. Foreign's export supply curve,  $XS$ , is  $XS = -40 + 40 \times P$ . In the absence of trade, the price is 1.  
b. When trade occurs export supply is equal to import demand,  $XS = MD$ . Thus, using the equations from problems 1 and 2a,  $P = 1.50$ , and the volume of trade is 20.
3. a. The new  $MD$  curve is  $80 - 40 \times (P+t)$  where  $t$  is the specific tariff rate, equal to 0.5. (Note: in solving these problems you should be careful about whether a specific tariff or ad valorem tariff is imposed. With an ad valorem tariff, the  $MD$  equation would be expressed as  $MD=80-40 \times (1+t)P$ ). The equation for the export supply curve by the foreign country is unchanged. Solving, we find that the world price is \$1.25, and thus the internal price at home is \$1.75. The volume of trade has been reduced to 10, and the total demand for wheat at home has fallen to 65 (from the free trade level of 70). The total demand for wheat in Foreign has gone up from 50 to 55.  
b. and c. The welfare of the home country is best studied using the combined numerical and graphical solutions presented below in Figure 8-1.

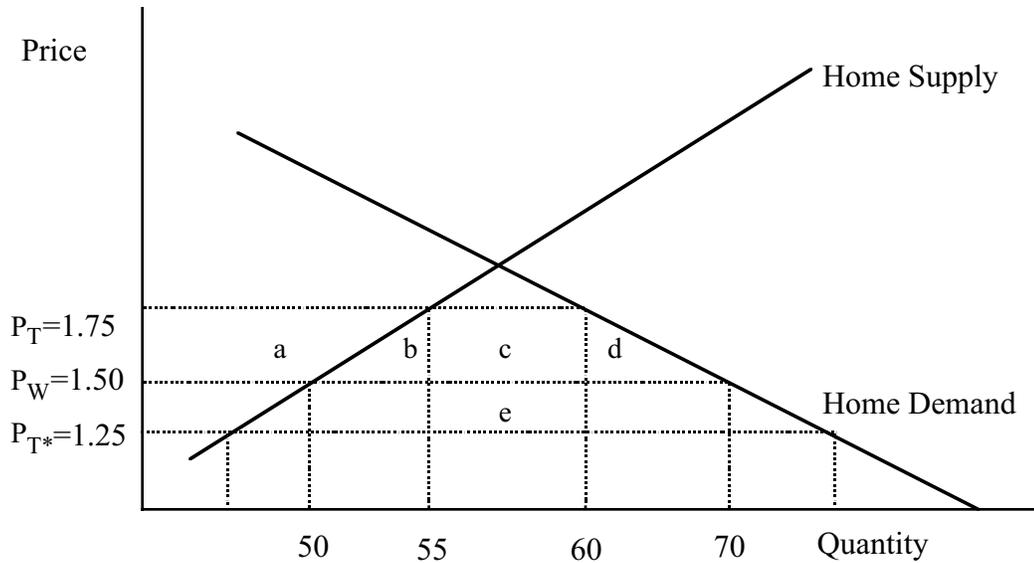


Figure 8-1

where the areas in the figure are:

$$a: 55(1.75-1.50) - .5(55-50)(1.75-1.50)=13.125$$

$$b: .5(55-50)(1.75-1.50)=0.625$$

$$c: (65-55)(1.75-1.50)=2.50$$

$$d: .5(70-65)(1.75-1.50)=0.625$$

$$e: (65-55)(1.50-1.25)=2.50$$

Consumer surplus change:  $-(a+b+c+d)=-16.875$ . Producer surplus change:  $a=13.125$ . Government revenue change:  $c+e=5$ . Efficiency losses  $b+d$  are exceeded by terms of trade gain  $e$ . [Note: in the calculations for the  $a$ ,  $b$ , and  $d$  areas a figure of  $.5$  shows up. This is because we are measuring the area of a triangle, which is one-half of the area of the rectangle defined by the product of the horizontal and vertical sides.]

4. Using the same solution methodology as in problem 3, when the home country is very small relative to the foreign country, its effects on the terms of trade are expected to be much less. The small country is much more likely to be hurt by its imposition of a tariff. Indeed, this intuition is shown in this problem. The free trade equilibrium is now at the price \$1.09 and the trade volume is now \$36.40.

With the imposition of a tariff of 0.5 by Home, the new world price is \$1.045, the internal home price is \$1.545, home demand is 69.10 units, home supply is 50.90 and the volume of trade is 18.20. When Home is relatively small, the effect of a tariff on

world price is smaller than when Home is relatively large. When Foreign and Home were closer in size, a tariff of .5 by home lowered world price by 25 percent, whereas in this case the same tariff lowers world price by about 5 percent. The internal Home price is now closer to the free trade price plus  $t$  than when Home was relatively large. In this case, the government revenues from the tariff equal 9.10, the consumer surplus loss is 33.51, and the producer surplus gain is 21.089. The distortionary losses associated with the tariff (areas  $b+d$ ) sum to 4.14 and the terms of trade gain ( $e$ ) is 0.819. Clearly, in this small country example the distortionary losses from the tariff swamp the terms of trade gains. The general lesson is the smaller the economy, the larger the losses from a tariff since the terms of trade gains are smaller.

5. The effective rate of protection takes into consideration the costs of imported intermediate goods. In this example, half of the cost of an aircraft represents components purchased from other countries. Without the subsidy the aircraft would cost \$60 million. The European value added to the aircraft is \$30 million. The subsidy cuts the cost of the value added to purchasers of the airplane to \$20 million. Thus, the effective rate of protection is  $(30 - 20)/20 = 50\%$ .
  
6. We first use the foreign export supply and domestic import demand curves to determine the new world price. The foreign supply of exports curve, with a foreign subsidy of 50 percent per unit, becomes  $XS = -40 + 40(1+0.5) \times P$ . The equilibrium world price is 1.2 and the internal foreign price is 1.8. The volume of trade is 32. The foreign demand and supply curves are used to determine the costs and benefits of the subsidy. Construct a diagram similar to that in the text and calculate the area of the various polygons. The government must provide  $(1.8 - 1.2) \times 32 = 19.2$  units of output to support the subsidy. Foreign producers surplus rises due to the subsidy by the amount of 15.3 units of output. Foreign consumers surplus falls due to the higher price by 7.5 units of the good. Thus, the net loss to Foreign due to the subsidy is  $7.5 + 19.2 - 15.3 = 11.4$  units of output. Home consumers and producers face an internal price of 1.2 as a result of the subsidy. Home consumers surplus rises by  $70 \times .3 + .5(6 \times .3) = 21.9$  while Home producers surplus falls by  $44 \times .3 + .5(6 \times .3) = 14.1$ , for a net gain of 7.8 units of output.

7. At a price of \$10 per bag of peanuts, Acirema imports 200 bags of peanuts. A quota limiting the import of peanuts to 50 bags has the following effects:
- a. The price of peanuts rises to \$20 per bag.
  - b. The quota rents are  $(\$20 - \$10) \times 50 = \$500$ .
  - c. The consumption distortion loss is  $.5 \times 100 \text{ bags} \times \$10 \text{ per bag} = \$500$ .
  - d. The production distortion loss is  $.5 \times 50 \text{ bags} \times \$10 \text{ per bag} = \$250$ .

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## CHAPTER 9

### THE POLITICAL ECONOMY OF TRADE POLICY

#### *Chapter Organization*

##### The Case for Free Trade

- Free Trade and Efficiency

- Additional Gains from Free Trade

- Political Arguments for Free Trade

##### National Welfare Arguments against Free Trade

##### Case Study: The Gain from “1992”

- The Terms of Trade Argument for a Tariff

- The Domestic Market Failure Argument against Free Trade

- How Convincing is the Market Failure Argument?

- Box: Market Failures Cut Both Ways: The Case of California

##### Income Distribution and Trade Policy

- Electoral Competition

- Collective Action

- Modeling the Political Process

- Who Gets Protected?

- Box: Politicians for Sale: Evidence from the 1990s

##### International Negotiations and Trade Policy

- The Advantages of Negotiation

- International Trading Agreements: A Brief History

- The Uruguay Round

- Trade Liberalization

- From the GATT to the WTO

- Box: Settling a Dispute, and Creating One

- Benefits and Costs

- Preferential Trading Agreements

- Box: Free Trade Versus Customs Unions

- Box: Do Trade Preferences Have Appeal?

- Case Study: Trade Diversion in South America

##### Summary

## Appendix: Proving the Optimum Tariff is Positive

Demand and Supply

The Tariff and Prices

The Tariff and Domestic Welfare

### **CHAPTER OVERVIEW**

The models presented up to this point generally suggest that free trade maximizes national welfare, although it clearly is associated with income distributional effects. Most governments, however, maintain some form of restrictive trade practices. This chapter investigates reasons for this. One set of reasons concerns circumstances under which restrictive trade practices increase national welfare. Another set of reasons concerns the manner in which the interests of different groups are weighed by governments. The chapter concludes with a discussion of the motives for international trade negotiations and a brief history of international trade agreements.

One recurring theme in the arguments in favor of free trade is the emphasis on related efficiency gains. As illustrated by the consumer/producer surplus analysis presented in the text, non-distortionary production and consumption choices which occur under free trade provide one set of gains from eliminating protectionism. Another level of efficiency gains arise because of economies of scale in production.

Two additional arguments for free trade are introduced in this chapter. Free trade, as opposed to "managed trade", provides a wider range of opportunities and thus a wider scope for innovation. The use of tariffs and subsidies to increase national welfare (such as a large country's use of an optimum tariff), even where theoretically desirable, in practice may only advance the causes of special interests at the expense of the general public.

Next, consider some of the arguments voiced in favor of restrictive trade practices. These arguments that protectionism increases overall national welfare have their own caveats. The success of an optimum tariff or an optimum (negative) subsidy by a large country to influence its terms of trade depends upon the absence of retaliation by foreign countries. Another set of arguments rests upon the existence of market failure. The distributional effects of trade policies will differ substantially if, for example, labor cannot be easily reallocated across sectors of the economy as suggested by movements along the production possibility frontier.

Other proponents of protectionist policies argue that the key tools of welfare analysis, which apply demand and supply measures to capture social as well as private costs and benefits, are inadequate. They argue that tariffs may improve welfare when social and private costs or benefits diverge. In general, however, it is better to design policies which address these issues directly rather than using a tariff which has other effects as well. Students may find this point transparent by pointing out that a tariff is like a combined tax and subsidy. A well-targeted subsidy or tax leads to a confluence of social and private cost or benefit. A policy which combines both a subsidy and a tax has other effects which mitigate social welfare gains.

Actual trade policy often cannot be reconciled with the prescriptions of basic welfare analysis. One reason for this is that the social accounting framework of policy makers does not match that implied by cost-benefit analysis. For example, policy makers may apply a "weighted social welfare analysis" which weighs gains or losses differently depending upon which groups are affected. Of course, in this instance there is the issue of who sets the weights and on the basis of what criteria. Also, trade policy may end up being used as a tool of income redistribution. Inefficient existing industries may be protected to preserve the status quo. Indeed, tariffs theoretically can be set at levels high enough to restrict trade in a product.

Divergence between optimal theoretical and actual trade policy may also arise because of the manner in which policy is made. The benefits of a tariff are concentrated while its costs are diffused. Well-organized groups whose individuals each stand to gain a lot by trade restrictions have a better opportunity to influence trade policy than larger, less well-organized groups which have more to lose in the aggregate but whose members individually have little to lose.

Drawing upon these arguments, one would expect that you could generalize that countries with strong comparative advantage in manufacturing would tend to protect agriculture while countries with comparative advantage in agriculture would tend to protect manufacturing. For the United States however, this argument is not validated by the pattern of protection. It is concentrated in four disparate industries: autos, steel, sugar and textiles.

International negotiations have led to mutual tariff reductions from the mid 1930s through the present. Negotiations which link mutually reduced protection have the political advantage of playing off well-organized groups against each other rather than against poorly organized

consumers. Trade negotiations also help avoid trade wars. This is illustrated by an example of the Prisoner's dilemma as it relates to trade. The pursuit of self interest may not lead to the best social outcome when each agent takes into account the other agent's decision. Indeed, in the example in the text, uncoordinated policy leads to the worst outcome since protectionism is the best policy for each country to undertake unilaterally. Negotiations result in the coordinated policy of free trade and the best outcome for each country.

The chapter concludes with a brief history of international trade agreements. The rules governing GATT are discussed, as are the real threats to its future performance as an active and effective instrument for moving toward freer trade. Also, the developments of the Uruguay round are reviewed, including the creation of the WTO and the economic impact of the round.

There is also a discussion of preferential trading agreements. Free Trade Areas and Customs Unions are compared, and trade diverting and trade creating effects of customs unions are demonstrated in an example. Finally, a case study discusses recent evidence on trade diversion in South America. There are numerous examples of groups of countries moving toward regional economic integration; any of which can be used as an example to illustrate the ideas of this section. An appendix proves that there is always an optimal positive tariff if a country's protectionist actions affect world prices.

## **ANSWERS TO TEXTBOOK PROBLEMS**

1. The arguments for free trade in this quote include:
  - Free trade allows consumers and producers to make decisions based upon the marginal cost and benefits associated with a good when costs and prices are undistorted by government policy.
  - The Philippines is "small," so it will have little scope for influencing world prices and capturing welfare gains through an improvement of its terms of trade.
  - "Escaping the confines of a narrow domestic market" allows possible gains through economies of scale in production.
  - Free trade "opens new horizons for entrepreneurship."
  - Special interests may dictate trade policy for their own ends rather than for the general welfare. Free trade policies may aid in halting corruption where these special interests exert undue or disproportionate influence on public policy.

2.
  - a. This is potentially a valid argument for a tariff, since it is based on an assumed ability of the United States to affect world prices -- that is, it is a version of the optimal tariff argument. If the United States is concerned about higher world prices in the future, it could use policies which encourage the accumulation of oil inventories and minimize the potential for future adverse shocks.
  - b. Sharply falling prices benefit U.S. consumers, and since these are off-season grapes and do not compete with the supplies from U.S. producers, the domestic producers are not hurt. There is no reason to keep a luxury good expensive.
  - c. The higher income of farmers due to export subsidies and the potentially higher income to those who sell goods and services to the farmers comes at the expense of consumers and taxpayers. Unless there is some domestic market failure, an export subsidy always produces more costs than benefits. Indeed, if the goal of policy is to stimulate the demand for the associated goods and services, policies should be targeted directly at these goals.
  - d. There may be external economies associated with the domestic production of semiconductors. This is a potentially a valid argument. But the gains to producers of protecting the semiconductor industry must as always be weighed against the higher costs to consumers and other industries which pervasively use the chips. A well-targeted policy instrument would be a production subsidy. This has the advantage of directly dealing with the externalities associated with domestic chip production.
  - e. Thousands of homebuyers as consumers (as well as workers who build the homes for which the timber was bought) have benefited from the cheaper imported timber. If the goal of policy is to soften the blow to timber workers, a more efficient policy would be direct payments to timber workers in order to aid their relocation.
  
3. Without tariffs, the country produces 100 units and consumes 300 units, thus importing 200 units.
  - a. A tariff of 5 per unit leads to production of 125 units and consumption of 250 units. The increase in welfare is the increase due to higher production of  $25 \times 10$  minus the losses to consumer and producer surplus of  $(25 \times 5)/2$  and  $(50 \times 5)/2$ , respectively, leading to a net gain of 62.5.
  - b. A production subsidy of 5 leads to a new supply curve of  $S = 50 + 5 \times (P+5)$ . Consumption stays at 300, production rises to 125, and the increase in welfare equals the benefits from greater production minus the production distortion costs,  $25 \times 10 - (25 \times 5)/2 = 187.5$ .

- c. The production subsidy is a better targeted policy than the import tariff since it directly affects the decisions which reflect a divergence between social and private costs while leaving other decisions unaffected. The tariff has a double-edged function as both a production subsidy and a consumption tax.
  - d. The best policy is to have producers fully internalize the externality by providing a subsidy of 10 per unit. The new supply curve will then be  $S = 50 + 5x(P+10)$ , production will be 150 units, and the welfare gain from this policy will be  $50 \times 10 - (10 \times 50)/2 = 250$ .
4. The government's objective is to maximize consumers surplus plus its own revenue plus twice the amount of producers surplus. A tariff of 5 per unit improves producers surplus by 562.5, worsens consumers surplus by 1375, and leads to government revenue of 625. The tariff results in an increase in the government's objective function of 375.
5. The United States has a legitimate interest in the trade policies of other countries, just as other countries have a legitimate interest in U.S. activities. The reason is that uncoordinated trade policies are likely to be inferior to those based on negotiations. By negotiating with each other, governments are better able both to resist pressure from domestic interest groups and to avoid trade wars of the kind illustrated by the Prisoners' Dilemma example in the text.
6. a. While tariffs are legal, the United States is obliged to offer compensation for any unilateral tariff increase by reducing other tariffs to compensate the affected exporting country.
- b. Export subsidies on agricultural products are legal under GATT.
  - c. This is not legal under GATT because the United States is not offering compensating reductions in other tariffs on Canadian goods. Interestingly, in the late 1980s, U.S. efforts to protect the shakes and shingles industry were met with an outcry and Canadian threats of a trade war. These protectionist efforts by the United States were rescinded.
  - d. This is legal under GATT since the action is taken by Canada on its own exports.
  - e. This is legal under GATT since it does not involve any direct export subsidies.
  - f. This is legal under GATT and, in fact, may help increase the benefits from trade.

7. The potential economic costs associated with the entrance of Poland and Hungary into an expanded EU depend largely on whether their membership results in trade creation or trade diversion. In particular, Poland and Hungary will gain if they engage in new trade with Western Europe although they might lose if trade within the European Union simply replaces trade which had been occurring with Eastern bloc countries. Furthermore, both of these nations will face at least higher structural unemployment during the transition period. Some of the negative effects on workers might be lessened if labor mobility is permitted across borders.

The Western nations should also be concerned on the trade creation versus trade diversion aspects of the entry of Poland and Hungary. For distributional and political reasons, they may be concerned about whether the prices of their own products will be driven down by competition or whether the entrants will simply bring to the Western markets an expanded variety of products and scope for additional scale economies of production. Workers in Western markets may be concerned that inflows of foreign labor drive down wages, although, as we have observed in previous chapters, the nominal wage shifts should be considered in light of changes in the prices of consumption goods. Countries outside of the EU, such as the United States and Japan, would express concern if the supplies of products to the EU by Poland and Hungary substitute for goods previously supplied by the United States and Japan. The large outsiders, however, could reap substantial positive gains from having expanded access to the consumers of Poland and Hungary.

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## **CHAPTER 10**

### **TRADE POLICY IN DEVELOPING COUNTRIES**

#### *Chapter Organization*

##### Import-Substituting Industrialization

- The Infant Industry Argument

- Promoting Manufacturing Through Protectionism

- Case Study: The End of Import Substitution in Chile

- Results of Favoring Manufacturing: Problems of Import-Substituting Industrialization

##### Problems of the Dual Economy

- The Symptoms of Dualism

- Case Study: Economic Dualism in India

- Dual Labor Markets and Trade Policy

- Trade Policy as a Cause of Economic Dualism

##### Export-Oriented Industrialization: The East Asian Miracle

- The Facts of Asian Growth

- Trade Policy in the HPAEs

- Industrial Policy in the HPAEs

- Box: China's Boom

- Other Factors in Growth

##### Summary

## **CHAPTER OVERVIEW**

The final two chapters on international trade, Chapters 10 and 11, discuss trade policy considerations in the context of specific issues. Chapter 10 focuses on the use of trade policy in developing countries and Chapter 11 focuses on new controversies in trade policy.

While there is great diversity among the developing countries, they share some common policy concerns. These include the development of domestic manufacturing industries, the uneven degree of development within the country, and the desire to foster economic growth and improve living standards. This chapter discusses both the successful and unsuccessful

trade policy strategies which have been applied by developing countries in attempts to address these concerns.

Many developing countries pose the creation of a significant manufacturing sector as a key goal of economic development. One commonly voiced argument for protecting manufacturing industries is the *infant industry argument*, which states that developing countries have a potential comparative advantage in manufacturing and can realize that potential through an initial period of protection. This argument assumes *market failure* in the form of imperfect capital markets or the existence of externalities in production: such a market failure makes the social return to production higher than the private return. This implies that a firm will not be able to recapture rents or profits that are in line with the contribution to welfare made by the product or industry establishment of the firm. Without some government support, the argument goes, the amount of investment which will occur in this industry will be less than socially optimal levels.

Given these arguments, many nations have attempted import substitution led industrialization. In the 1950s and 1960s the strategy was quite popular and did lead to a dramatic reduction in imports in some countries. The overall result, though, was not a success. The infant industry argument did not always hold, as protection could let young industries survive, but could not make them efficient. By the late 1980s, most countries had shifted away from the strategy, and the chapter includes a case study of Chile's change from import substitution to a more open strategy.

Development often proceeds unevenly and results in a dual economy consisting of a modern sector and a traditional sector. The modern sector typically differs from the traditional sector in that it has a higher value of output per worker, higher wages, higher capital intensity, lower returns to capital, and persistent unemployment. For example, in India less than one percent of the population is employed in the manufacturing sector but this sector produces 15 percent of GNP. Wages in Indian manufacturing are six times those in agriculture.

Some argue that the existence of wage differentials in a dual economy demonstrate the failure of labor markets to work well. Society would benefit if workers moved from agriculture to manufacturing. A first best policy addresses the wage differential directly. Protectionism may be a second best solution, but one with the undesirable consequences of inducing both capital and labor into manufacturing. This raises the already too high capital intensity in the manufacturing sector. Further, an increase in the number of urban

manufacturing jobs may exacerbate the problems of urban unemployment through migration from the countryside to the cities. This is a key theme of the Harris-Todaro model. Thus, it is possible that the medicine of trade policies worsens the illness of dualism.

The East Asian “miracle” of the high-performing Asian economies (HPAEs) provides a striking and controversial example of export-oriented industrialization. While these countries encountered difficulties in the late 1990s (see Chapter 22), this chapter focuses on their spectacular growth from the 1960s to 1990s. It is acknowledged that the growth was extremely impressive; the controversy is over the source of the success in these countries. Some observers argue that although these countries do not practice free trade, they have lower rates of protection (and more outward orientation) than other developing countries. Other observers argue that the interventionist industrial policies pursued by the HPAEs have been the reason for success, and outward orientation is just a by-product of active rather than passive government involvement in industry. Still others argue that high rates of domestic savings and rapid improvements in education are behind the stunning growth performance.

#### **ANSWERS TO TEXTBOOK PROBLEMS**

1. The Japanese example gives pause to those who believe that protectionism is always disastrous. However, the fact of Japanese success does not demonstrate that protectionist trade policy was responsible for that success. Japan was an exceptional society that had emerged into the ranks of advanced nations before World War II, and was recovering from wartime devastation. It is arguable that economic success would have come anyway, so that the apparent success of protection represents a "pseudo-infant-industry" case of the kind discussed in the text.
2. a. The initial high costs of production would justify infant industry protection if the costs to the society during the period of protection were less than the future stream of benefits from a mature, low cost industry.  
b. An individual firm does not have an incentive to bear development costs itself for an entire industry when these benefits will accrue to other firms. There is a stronger case for infant industry protection in this instance because of the existence of market failure in the form of the appropriability of technology.

3. There are larger markets in larger countries like Brazil and industries which benefit from import substituting policies could realize economy of scale advantages there which would not be available to industries producing solely for the market of Ghana.
  
4. The value of the marginal product of labor in the production of food is  $9 \times \$10 = \$90$ .
  - a. The wage will be equated in each sector when there are no distortions. This occurs when there are 8 workers in manufacturing and 12 in food production. The wage of all workers will be \$90. The output of each sector can be found by calculating the area under the marginal product of labor curves. This curve is a horizontal line for food, so output in this sector is  $12 \times 9 = 108$ . Summing the area under the MPL curve for manufacturing up to 8 workers results in output of 110.
  - b. Manufacturing output shrinks to 3 workers, and there are 17 workers in the food sector. Food output now equals 153 while manufacturing output equals 54. The cost of the distortion equals the value of output lost, which is \$110.
  - c. The probability of being employed is  $1 - (n+3/n) = 3/n$  where  $n$  is the number of city workers. Workers will migrate to the city until the wage times the probability of being employed equals the wage offered in the rural area with certainty. There will be 5 workers in manufacturing, 15 workers in agriculture, and 2 unemployed workers. The output of the manufacturing sector is 54 and for food is 135.
  
5. Under these circumstances, workers are both "pulled" into the urban, "modern" sector by the lure of high wages and "pushed" from the rural areas due to stagnant conditions in the agricultural sector. To correct this problem of the bias toward the urban-manufacturing sector, explicit attention should be paid to making the agricultural sector more rewarding, In order to retain labor, the agricultural sector might be provided with wage subsidies so that the rural-urban wage gap is reduced. Policies can also be targeted at promoting light rural enterprise and agricultural investment which would increase wages through increasing worker productivity. In addition, development of the rural infrastructure and social services might increase the relative attractiveness of the countryside.
  
6. Import quotas on capital-intensive goods and subsidies for the import of capital equipment foster the development of a capital intensive sector, and thus of a dual economy. If the capital-intensive sector pays high wages relative to the traditional sector, the result may be rural-urban migration and the emergence of persistent urban unemployment.

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## **CHAPTER 11**

### **CONTROVERSIES IN TRADE POLICY**

#### ***Chapter Organization***

Sophisticated Arguments for Activist Trade Policy

    Technology and Externalities

    Imperfect Competition and Strategic Trade Policy

    Case Study: When the Chips Were Up

Globalization and Low-Wage Labor

    The Anti-Globalization Movement

    Trade and Wages Revisited

    Labor Standards and Trade Negotiations

    Environmental and Cultural Issues

    The WTO and National Independence

    Case Study: The Shipbreakers of Alang

Summary

#### **CHAPTER OVERVIEW**

While the text has shown why, in general, free trade is a good policy, this chapter considers two controversies in trade policy that challenge free trade. The first regards strategic trade policy. Proponents of such activist government trade intervention argue that certain industries are desirable and may be under funded by markets or dominated by imperfect competition and warrant some government intervention. The second controversy regards the recent debate over the effects of globalization on workers, the environment, and sovereignty. While the anti-globalization arguments often lack sound structure, their visceral nature demonstrates that the spread of trade is extremely troubling to some groups.

As seen in the previous chapters, activist trade policy may be justified if there are market failures. One important type of market failure involves externalities present in high-technology industries due to their knowledge creation. Existence of externalities associated with research and development and high technology make the private return to investing in these activities less than their social return. This means that the private sector will tend to

invest less in high technology sectors than is socially optimal. While there may be some case for intervention, the difficulties in targeting the correct industry and understanding the quantitative size of the externality make effective intervention complicated. To address this market failure of insufficient knowledge creation, the first best policy may be to directly support research and development in all industries. Still, while it is a judgment call, the technology spillover case for industrial policy probably has better footing in solid economics than any other argument.

Another set of market failures arises when imperfect competition exists. Strategic trade policy by a government can work to deter investment and production by foreign firms and raise the profits of domestic firms. An example is provided in the text which illustrates the case where the increase in profits following the imposition of a subsidy can actually exceed the cost of a subsidy to an imperfectly competitive industry. While this is a valid theoretical argument for strategic policy, it is nonetheless open to criticism in choosing the industries which should be subsidized and the levels of subsidies to these industries. These criticisms are associated with the practical aspects of insufficient information and the threat of foreign retaliation. The case study on the attempts to promote the semiconductor chips industry shows that neither excess returns nor knowledge spillovers necessarily materialize even in industries that seem perfect for activist trade policy.

The second section of the chapter examines the anti-globalization movement. In particular, it examines the concerns over low wages in poor countries. Standard analysis suggests trade should help poor countries, and, in particular, help the abundant factor (labor) in those countries. Protests in Seattle, which shut down WTO negotiations, and subsequent demonstrations at other meetings showed, though, that protestors either did not understand or did not agree with this analysis.

The concern over low wages in poor countries is a revision of arguments in chapter 2. Analysis in the current chapter shows again that trade should help the purchasing power of all workers and that if anyone is hurt, it is the workers in labor scarce countries. The low wages in export sectors of poor countries are higher than they would be without the export-oriented manufacturing and while the situation of these workers may be more visible than before, that does not make it worse. Practically, the policy issue is whether or not labor standards should be part of trade pacts. While such standards may act in ways similar to a domestic minimum wage, developing countries fear they would be used as a protectionist tool.

Anti-globalization protestors were by no means united in their cause. There were also strong concerns that export manufacturing in developing countries was bad for the environment. Again, the issue is whether these concerns should be addressed by tying environmental standards into trade negotiations, and the open question is whether this can be done without destroying the export industries in developing countries.

Finally, globalization raises questions of cultural independence and national sovereignty. Specifically, many are disturbed by the WTO's ability to overturn laws which on their face do not seem to be trade restrictions, but which have trade impacts. This highlights the difficulty of advancing trade liberalization when clear impediments to trade - tariffs or quotas - have been removed, and national policies regarding industry promotion or labor and environmental standards are next on the list.

### **ANSWERS TO TEXTBOOK PROBLEMS**

1. If everyone knows that an industry will grow rapidly, private markets will funnel resources into the industry even without government support. There is need for special government action only if there is some market failure; the prospect of growth by itself isn't enough.
2. A valid reason for supporting high-technology industries would be that they generate technologies which benefit the whole economy. The value to the whole economy of this aspect of the high-technology firms' existence exceeds the benefits to the firms themselves, and there will be too little expansion of these firms from a social point of view. Other stated benefits are not valid reasons for industrial policy since the market provides incentives for the realization of these benefits. The protection from foreign competition is also a spurious argument since, as has been shown in previous chapters, the economy as a whole benefits from cheap foreign high-technology goods. The exception being if the industry provides monopoly rents and the foreign government is trying to capture these rents for its home economy.
3. The results of basic research may be appropriated by a wider range of firms and industries than the results of research applied to specific industrial applications. The benefits to the United States of Japanese basic research would exceed the benefits from Japanese research targeted to specific problems in Japanese industries. A specific application may benefit just one firm in Japan, perhaps simply subsidizing an activity

that the market is capable of funding. General research will provide benefits that spill across borders to many firms and may be countering a market failure, externalities present in the advancement of general knowledge.

4. A subsidy is effective when the firm in the other country does not produce when the domestic firm enters the market. As the text tables show, a subsidy may present a credible threat of entry and deters production by the other firm: a subsidy encourages Airbus to produce and Boeing not to produce. However, Boeing may still produce even if Airbus receives a subsidy. Airbus' return is less than the subsidy if Boeing enters the market.
5. Because the economy has limited resources, a trade policy that conveys a strategic advantage on one industry necessarily puts other industries at some strategic disadvantage. It is not possible to achieve a strategic advantage in all industries. This point should be clear from the emphasis on movements along production possibility frontiers as illustrated in previous chapters. Korea's across-the-board subsidy probably has little net effect on the strategic position of the industries because while it provides each industry with a direct subsidy, it indirectly raises all industries' costs.
6. The potential gains for the high technology industries depend on the extent to which a great deal of government sponsored research and development is filtered through the military budget. This is especially relevant when military expenditures on research and development have spillover effects and produce a marginal social gains of knowledge which benefit other firms in U.S. industry. However, there are several caveats to this argument. To the extent that military industry is particularly concentrated and oligopolistic, there may be a serious market failure. More importantly, there remains the issue of how relevant and applicable will be any knowledge spillovers from military research and development to the high technology sectors. Moreover, the military fields may be siphoning off many highly talented researchers from civilian high-technology industries. Much of it may not be well-suited. In this case, the goal of developing a broad application to high technology through military research would not be a well-targeted program.
7. A primary argument must be that there is some sort of market failure that voids the standard logic of free trade. One might argue that Microsoft's' monopoly position allows it to capture excessive profits, and that its market power dissuades entry. A

state-sponsored firm might be able to over-come these entry costs. Furthermore, the software industry may have numerous knowledge spillovers with other industries and high-tech applications that make it desirable to have some local presence even if the local industry loses money. On the other hand, Microsoft may be a natural monopoly. It is much easier for the world to have one computer standard. Furthermore, state direction of an industry where innovation is so important is unlikely to be successful. Finally, in software, physical location may be of minor importance as ancillary industries could develop anywhere and use modern telecommunications technology to interact with U.S. based software firms.

8. The French may be following an active nationalist cultural policy as an economic or strategic trade policy to the extent that cultural activities, such as art, music, fashion, and cuisine, are linked to other French major industries. Indeed, the fashion industry is tied to the huge textile industry, as well as to the retail sector and advertising services. One could argue that the promotion of fashion, art, and music will benefit both tourism, and these large strategic trade sectors of the French economy. However, the existence of market failures is not clearly documented in the cultural sector except to the extent that there are other less tangible externalities. Furthermore, the cultural promotions are not, in economic terms, the first best approach to supporting larger industries.

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## ***OVERVIEW OF SECTION III: EXCHANGE RATES AND OPEN ECONOMY MACROECONOMICS***

Section III of the textbook is comprised of six chapters:

- Chapter 12 National Income Accounting and the Balance of Payments
- Chapter 13 Exchange Rates and the Foreign Exchange Market: An Asset Approach
- Chapter 14 Money, Interest Rates, and Exchange Rates
- Chapter 15 Price Levels and the Exchange Rate in the Long Run
- Chapter 16 Output and the Exchange Rate in the Short Run
- Chapter 17 Fixed Exchange Rates and Foreign Exchange Intervention

### **SECTION III OVERVIEW**

The presentation of international finance theory proceeds by building up an integrated model of exchange rate and output determination. Successive chapters in Part III construct this model step by step so students acquire a firm understanding of each component as well as the manner in which these components fit together. The resulting model presents a single unifying framework admitting the entire range of exchange rate regimes from pure float to managed float to fixed rates. The model may be used to analyze both comparative static and dynamic time path results arising from temporary or permanent policy or exogenous shocks in an open economy.

The primacy given to asset markets in the model is reflected in the discussion of national income and balance of payments accounting in the first chapter of this section. Chapter 12 begins with a discussion of the focus of international finance. The discussion then proceeds to national income accounting in an open economy. The chapter points out, in the discussion on the balance of payments account, that current account transactions must be financed by financial account flows from either central bank or noncentral bank transactions. A case study uses national income accounting identities to consider the link between government budget deficits and the current account.

Observed behavior of the exchange rate favors modeling it as an asset price rather than as a goods price. Thus, the core relationship for short-run exchange-rate determination in the model developed in Part III is uncovered interest parity. Chapter 13 presents a model in

which the exchange rate adjusts to equate expected returns on interest-bearing assets denominated in different currencies given expectations about exchange rates, and the domestic and foreign interest rate. This first building block of the model lays the foundation for subsequent chapters that explore the determination of domestic interest rates and output, the basis for expectations of future exchange rates and richer specifications of the foreign-exchange market that include risk. An appendix to this chapter explains the determination of forward exchange rates.

Chapter 14 introduces the domestic money market, linking monetary factors to short-run exchange-rate determination through the domestic interest rate. The chapter begins with a discussion of the determination of the domestic interest rate. Interest parity links the domestic interest rate to the exchange rate, a relationship captured in a two-quadrant diagram. Comparative statics employing this diagram demonstrate the effects of monetary expansion and contraction on the exchange rate in the short run. Dynamic considerations are introduced through an appeal to the long run neutrality of money that identifies a long-run steady-state value toward which the exchange rate evolves. The dynamic time path of the model exhibits overshooting of the exchange-rate in response to monetary changes.

Chapter 15 develops a model of the long run exchange rate. The long-run exchange rate plays a role in a complete short-run macroeconomic model since one variable in that model is the expected future exchange rate. The chapter begins with a discussion of the law of one price and purchasing power parity. A model of the exchange rate in the long-run based upon purchasing power parity is developed. A review of the empirical evidence, however, casts doubt on this model. The chapter then goes on to develop a general model of exchange rates in the long run in which the neutrality of monetary shocks emerges as a special case. In contrast, shocks to the output market or changes in fiscal policy alter the long run real exchange rate. This chapter also discusses the real interest parity relationship that links the real interest rate differential to the expected change in the real exchange rate. An appendix examines the relationship of the interest rate and exchange rate under a flexible-price monetary approach.

Chapter 16 presents a macroeconomic model of output and exchange-rate determination in the short run. The chapter introduces aggregate demand in a setting of short-run price stickiness to construct a model of the goods market. The exchange-rate analysis presented in previous chapters provides a model of the asset market. The resulting model is, in spirit, very close to the classic Mundell-Fleming model. This model is used to examine the effects of a

variety of policies. The analysis allows a distinction to be drawn between permanent and temporary policy shifts through the pedagogic device that permanent policy shifts alter long-run expectations while temporary policy shifts do not. This distinction highlights the importance of exchange-rate expectations on macroeconomic outcomes. A case study of U.S. fiscal and monetary policy between 1979 and 1983 utilizes the model to explain notable historical events. The chapter concludes with a discussion of the links between exchange rate and import price movements which focuses on the J-curve and exchange-rate pass-through. An appendix to the chapter compares the IS-LM model to the model developed in this chapter. A second appendix considers intertemporal trade and consumption demand. A third appendix discusses the Marshall-Lerner condition and estimates of trade elasticities.

The final chapter of this section discusses intervention by the central bank and the relationship of this policy to the money supply. This analysis is blended with the previous chapter's short-run macroeconomic model to analyze policy under fixed rates. The balance sheet of the central bank is used to keep track of the effects of foreign exchange intervention on the money supply. The model developed in previous chapters is extended by relaxing the interest parity condition and allowing exchange-rate risk to influence agents' decisions. This allows a discussion of sterilized intervention. Another topic discussed in this chapter is capital flight and balance of payments crises with an introduction to different models of how a balance of payments or currency crisis can occur. The analysis also is extended to a two-country framework to discuss alternative systems for fixing the exchange-rate as a prelude to Part IV. An appendix to Chapter 17 develops a model of the foreign-exchange market in which risk factors make domestic-currency and foreign-currency assets imperfect substitutes. A second appendix explores the monetary approach to the balance of payments. The third appendix discusses the timing of a balance of payments crisis.

## **CHAPTER 12**

# **NATIONAL INCOME ACCOUNTING AND THE BALANCE OF PAYMENTS**

### *Chapter Organization*

#### The National Income Accounts

- National Product and National Income

- Capital Depreciation, International Transfers, and Indirect Business Taxes

- Gross Domestic Product

#### National Income Accounting in a Closed Economy

- Consumption

- Investment

- Government Purchases

- The National Income Identity for an Open Economy

- An Imaginary Open Economy

- The Current Account and Foreign Indebtedness

- Saving and the Current Account

- Private and Government Savings

- Case Study: Government Budget Deficit Reduction May Not Increase the Current Account Surplus

#### The Balance of Payments Accounts

- Examples of Paired Transactions

- The Fundamental Balance of Payments Identity

- The Current Account, Once Again

- The Financial Account

- The Capital Account

- The Statistical Discrepancy

- Official Reserve Transactions

- Box: The Mystery of the Missing Surplus

- Case Study: Is the United States the World's Biggest Debtor?

#### Summary

## CHAPTER OVERVIEW

This chapter introduces the international macroeconomics section of the text. The chapter begins with a brief discussion of the focus of international macroeconomics. You may want to contrast the type of topics studied in international trade, such as the determinants of the patterns of trade and the gains from trade, with the issues studied in international finance, which include unemployment, savings, trade imbalances, and money and the price level. You can then "preview" the manner in which the theory taught in this section of the course will enable students to better understand important and timely issues such as the U.S. trade deficit, the experience with international economic coordination, European Economic and Monetary Union, and the financial crises in Asia and other developing countries.

The core of this chapter is a presentation of national income accounting theory and balance of payments accounting theory. A solid understanding of these topics proves useful in other parts of this course when students need to understand concepts such as the intertemporal nature of the current account or the way in which net export earnings are required to finance external debt. Students will have had some exposure to closed economy national income accounting theory in previous economics courses. You may want to stress that GNP can be considered the sum of expenditures on final goods and services or, alternatively, the sum of payments to domestic factors of production. You may also want to explain that separating GNP into different types of expenditures allows us to focus on the different determinants of consumption, investment, government spending, and net exports.

The relationship between the current account, savings, investment, and the government budget deficit should be emphasized. It may be useful to draw an analogy between the net savings of an individual and the net savings of a country to reinforce the concept of the current account as the net savings of an economy. Extending this analogy, you may compare the net dissavings of many students when they are in college, acquiring human capital, and the net dissavings of a country that runs a current account deficit to build up its capital stock. You may also want to contrast a current account deficit that reflects a lot of investment with a current account deficit that reflects a lot of consumption to make the point that all current account deficits are not the same, nor do they all warrant the same amount of concern. The chapter includes a case study on the current account imbalances of the United States and Japan in the 1980s that allows students to frame a policy debate in the context of the accounting relationships presented in the chapter.

Balance of payments accounting will be new to students. The text stresses the double-entry bookkeeping aspect of balance of payments accounting. The 1997 U.S. balance of payments accounts provide a concrete example of these accounts. Large statistical discrepancy between the current and capital accounts are discussed in a box on the apparent global current account deficit. These statistical discrepancies illustrate some real-world difficulties in measuring international payments.

Note that the book uses the new current / financial / capital account definitions. The old capital account is now the financial account. The current account is the same except that unilateral asset transfers [debt forgiveness or immigrants moving wealth with them] are now in the new capital account. Credits and debits are marked in the same manner; if money comes into a country, it is a credit. A description of the changes along with revised estimates for 1982-98 can be found in the article by Christopher Bach (see references). These changes were made in conjunction with the IMF's new standards. A description of these new standards can be found in the *Survey of Current Business* Article listed at the end of the references.

The chapter concludes with a discussion of official reserve transactions. You may want to stress that, from the standpoint of financing the current account, these official capital flows play the same role as other capital flows. You may also briefly mention that there are additional macroeconomic implications of central-bank foreign asset transactions. A detailed discussion of these effects will be presented in Chapter 17.

## **ANSWERS TO TEXTBOOK PROBLEMS**

1. The reason for including only the value of final goods and services in GNP, as stated in the question, is to avoid the problem of double counting. Double counting will not occur if intermediate imports are subtracted and intermediate exported goods are added to GNP accounts. Consider the sale of U.S. steel to Toyota and to General Motors. The steel sold to General Motors should not be included in GNP since the value of that steel is subsumed in the cars produced in the United States. The value of the steel sold to Toyota will not enter the national income accounts in a more finished state since the value of the Toyota goes towards Japanese GNP. The value of the steel should be subtracted from GNP in Japan since U.S. factors of production receive payment for it.

2. Equation 2 can be written as  $CA = (S_p - I) + (T - G)$ . Higher U.S. barriers to imports may have little or no impact upon private savings, investment, and the budget deficit. If there were no effect on these variables then the current account would not improve with the imposition of tariffs or quotas. It is possible to tell stories in which the effect on the current account goes either way. For example, investment could rise in industries protected by the tariff, worsening the current account. (Indeed, tariffs are sometimes justified by the alleged need to give ailing industries a chance to modernize their plant and equipment.) On the other hand, investment might fall in industries that face a higher cost of imported intermediate goods as a result of the tariff. In general, permanent and temporary tariffs have different effects. The point of the question is that a prediction of the manner in which policies affect the current account requires a general-equilibrium, macroeconomic analysis.
3. a. The purchase of the German stock is a debit in the U.S. financial account. There is a corresponding credit in the U.S. financial account when the American pays with a check on his Swiss bank account because his claims on Switzerland fall by the amount of the check. This is a case in which an American trades one foreign asset for another.
- b. Again, there is a U.S. financial account debit as a result of the purchase of a German stock by an American. The corresponding credit in this case occurs when the German seller deposits the U.S. check in its German bank and that bank lends the money to a German importer (in which case the credit will be in the U.S. current account) or to an individual or corporation that purchases a U.S. asset (in which case the credit will be in the U.S. financial account). Ultimately, there will be some action taken by the bank which results in a credit in the U.S. balance of payments.
- c. The foreign exchange intervention by the French government involves the sale of a U.S. asset, the dollars it holds in the United States, and thus represents a debit item in the U.S. financial account. The French citizens who buy the dollars may use them to buy American goods, which would be an American current account credit, or an American asset, which would be an American financial account credit.
- d. Suppose the company issuing the traveler's check uses a checking account in France to make payments. When this company pays the French restaurateur for the meal, its payment represents a debit in the U.S. current account. The company issuing the traveler's check must sell assets (deplete its checking account in France) to make this payment. This reduction in the French assets owned by that company represents a credit in the American financial account.

- e. There is no credit or debit in either the financial or the current account since there has been no market transaction.
  - f. There is no recording in the U.S. Balance of Payments of this offshore transaction.
4. The purchase of the answering machine is a current account debit for New York, and a current account credit for New Jersey. When the New Jersey company deposits the money in its New York bank there is a financial account credit for New York and a corresponding debit for New Jersey. If the transaction is in cash then the corresponding debit for New Jersey and credit for New York also show up in their financial accounts. New Jersey acquires dollar bills (an import of assets from New York, and therefore a debit item in its financial account); New York loses the dollars (an export of dollar bills, and thus a financial account credit). Notice that this last adjustment is analogous to what would occur under a gold standard (see Chapter 19).
5. a. Since non-central bank capital inflows fell short of the current-account deficit by \$500 million, the balance of payments of Pecunia (official settlements balance) was -\$500 million. The country as a whole somehow had to finance its \$1 billion current-account deficit, so Pecunia's net foreign assets fell by \$1 billion.
- b. By dipping into its foreign reserves, the central bank of Pecunia financed the portion of the country's current-account deficit not covered by private financial inflows. Only if foreign central banks had acquired Pecunian assets could the Pecunian central bank have avoided using \$500 million in reserves to complete the financing of the current account. Thus, Pecunia's central bank lost \$500 million in reserves, which would appear as an official financial inflow (of the same magnitude) in the country's balance of payments accounts.
- c. If foreign official capital inflows to Pecunia were \$600 million, the country had a balance of payments surplus of \$100 million. Put another way, the country needed only \$1 billion to cover its current-account deficit, but \$1.1 billion flowed into the country. The Pecunian central bank must, therefore, have used the extra \$100 million in foreign borrowing to increase its reserves. Purchases of Pecunian assets by foreign central banks enter their countries' balance of payments accounts as outflows, which are debit items. The rationale is that the transactions result in foreign payments to the Pecunians who sell the assets.
- d. Along with non-central bank transactions, the accounts would show an increase in foreign official reserve assets held in Pecunia of \$600 million (a financial account credit, or inflow) and an increase Pecunian official reserve assets held abroad of \$100

billion (a financial account debit, or outflow). Of course, total net financial inflows of \$1 billion just cover the current-account deficit.

6. A current account deficit or surplus is a situation which may be unsustainable in the long run. There are instances in which a deficit may be warranted, for example to borrow today to improve productive capacity in order to have a higher national income tomorrow. But for any period of current account deficit there must be a corresponding period in which spending falls short of income (i.e. a current account surplus) in order to pay the debts incurred to foreigners. In the absence of unusual investment opportunities, the best path for an economy may be one in which consumption, relative to income, is smoothed out over time.

The reserves of foreign currency held by a country's central bank change with nonzero values of its official settlements balance. Central banks use their foreign currency reserves to influence exchange rates. A depletion of foreign reserves may limit the central bank's ability to influence or peg the exchange rate. For some countries (particularly developing countries), central-bank reserves may be important as a way of allowing the economy to maintain consumption or investment when foreign borrowing is difficult. A high level of reserves may also perform a signaling role by convincing potential foreign lenders that the country is credit-worthy. The balance of payments of a reserve-currency center (such as the United States under the Bretton Woods system) raises special issues best postponed until Chapter 18.

7. The official settlements balance, also called the balance of payments, shows the net change in international reserves held by U.S. government agencies, such as the Federal Reserve and the Treasury, relative to the change in dollar reserves held by foreign government agencies. This account provides a partial picture of the extent of intervention in the foreign exchange market. For example, suppose the Bundesbank purchases dollars and deposits them in its Eurodollar account in a London bank. Although this transaction is a form of intervention, it would not appear in the official settlements balance of the United States. Instead, when the London bank credits this deposit in its account in the United States, this transaction will appear as a private financial flow.
8. A country could have a current account deficit and a balance of payments surplus at the same time if the financial and capital account surpluses exceeded the current account deficit. Recall that the balance of payments surplus equals the current account

surplus plus the financial account surplus plus the capital account surplus. If, for example, there is a current account deficit of \$100 million, but there are large capital inflows and the capital account surplus is \$102 million, then there will be a \$2 million balance of payments surplus.

This problem can be used as an introduction to intervention (or lack thereof) in the foreign exchange market, a topic taken up in more detail in Chapter 17. The government of the United States did not intervene in any appreciable manner in the foreign exchange markets in the first half of the 1980s. The “textbook” consequence of this is a balance of payments of zero, while the actual figures showed a slight balance of payments surplus between 1982 and 1985. These years were also marked by large current account deficits. Thus, the financial inflows into the United States between 1982 and 1985 exceeded the current account deficits in those years.

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## CHAPTER 13

# EXCHANGE RATES AND THE FOREIGN EXCHANGE MARKET: AN ASSET APPROACH

### *Chapter Organization*

#### Exchange Rates and International Transactions

Domestic and Foreign Prices

Exchange Rates and Relative Prices

Box: A Tale of Two Dollars

#### The Foreign Exchange Market

The Actors

Characteristics of the Market

Spot Rates and Forward Rates

Foreign Exchange Swaps

Futures and Options

#### The Demand for Foreign Currency Assets

Assets and Asset Returns

Risk and Liquidity

Interest Rates

Exchange Rates and Asset Returns

A Simple Rule

Return, Risk, and Liquidity in the Foreign Exchange Market

#### Equilibrium in the Foreign Exchange Market

Interest Parity: The Basic Equilibrium Condition

How Changes in the Current Exchange Rate Affect Expected Returns

The Equilibrium Exchange Rate

#### Interest Rates, Expectations, and Equilibrium

The Effect of Changing Interest Rates on the Current Exchange Rate

The Effect of Changing Expectations on the Current Exchange Rate

Box: The Perils of Forecasting Exchange Rates

#### Summary

#### Appendix: Forward Exchange Rates and Covered Interest Parity

## CHAPTER OVERVIEW

The purpose of this chapter is to show the importance of the exchange rate in translating foreign prices into domestic values as well as to begin the presentation of exchange-rate determination. Central to the treatment of exchange-rate determination is the insight that exchange rates are determined in the same way as other asset prices. The chapter begins by describing how the relative prices of different countries' goods are affected by exchange rate changes. This discussion illustrates the central importance of exchange rates for cross-border economic linkages. The determination of the level of the exchange rate is modeled in the context of the exchange rate's role as the relative price of foreign and domestic currencies, using the uncovered interest parity relationship.

The euro is used often in examples. Some students may not be familiar with the currency or aware of which countries use it; a brief discussion may be warranted. A full treatment of EMU and the theories surrounding currency unification appears in Chapter 20.

The description of the foreign-exchange market stresses the involvement of large organizations (commercial banks, corporations, nonbank financial institutions, and central banks) and the highly integrated nature of the market. The nature of the foreign-exchange market ensures that arbitrage occurs quickly, so that common rates are offered worldwide. Forward foreign-exchange trading, foreign-exchange futures contracts and foreign-exchange options play an important part in currency market activity. The use of these financial instruments to eliminate short-run exchange-rate risk is described.

The explanation of exchange-rate determination in this chapter emphasizes the modern view that exchange rates move to equilibrate asset markets. The foreign-exchange demand and supply curves that introduce exchange-rate determination in most undergraduate texts are not found here. Instead, there is a discussion of asset pricing and the determination of expected rates of return on assets denominated in different currencies.

Students may already be familiar with the distinction between real and nominal returns. The text demonstrates that nominal returns are sufficient for comparing the attractiveness of different assets. There is a brief description of the role played by risk and liquidity in asset demand, but these considerations are not pursued in this chapter. (The role of risk is taken up again in Chapter 17.)

Substantial space is devoted to the topic of comparing expected returns on assets denominated in domestic and foreign currency. The text identifies two parts of the expected return on a foreign-currency asset (measured in domestic-currency terms): the interest payment and the change in the value of the foreign currency relative to the domestic currency over the period in which the asset is held. The expected return on a foreign asset is calculated as a function of the current exchange rate for given expected values of the future exchange rate and the foreign interest rate.

The absence of risk and liquidity considerations implies that the expected returns on all assets traded in the foreign-exchange market must be equal. It is thus a short step from calculations of expected returns on foreign assets to the interest parity condition. The foreign-exchange market is shown to be in equilibrium only when the interest parity condition holds. Thus, for given interest rates and given expectations about future exchange rates, interest parity determines the current equilibrium exchange rate. The interest parity diagram introduced here is instrumental in later chapters in which a more general model is presented. Since a command of this interest parity diagram is an important building block for future work, we recommend drills that employ this diagram.

The result that a dollar appreciation makes foreign currency assets more attractive may appear counterintuitive to students -- why does a stronger dollar reduce the expected return on dollar assets? The key to explaining this point is that, under the static expectations and constant interest rates assumptions, a dollar appreciation today implies a greater future dollar depreciation; so, an American investor can expect to gain not only the foreign interest payment but also the extra return due to the dollar's additional future depreciation. The following diagram illustrates this point. In this diagram, the exchange rate at time  $t+1$  is expected to be equal to  $E$ . If the exchange rate at time  $t$  is also  $E$  then expected depreciation is 0. If, however, the exchange rate depreciates at time  $t$  to  $E'$  then it must appreciate to reach  $E$  at time  $t+1$ . If the exchange rate appreciates today to  $E''$  then it must depreciate to reach  $E$  at time  $t+1$ . Thus, under static expectations, a depreciation today implies an expected appreciation and conversely.

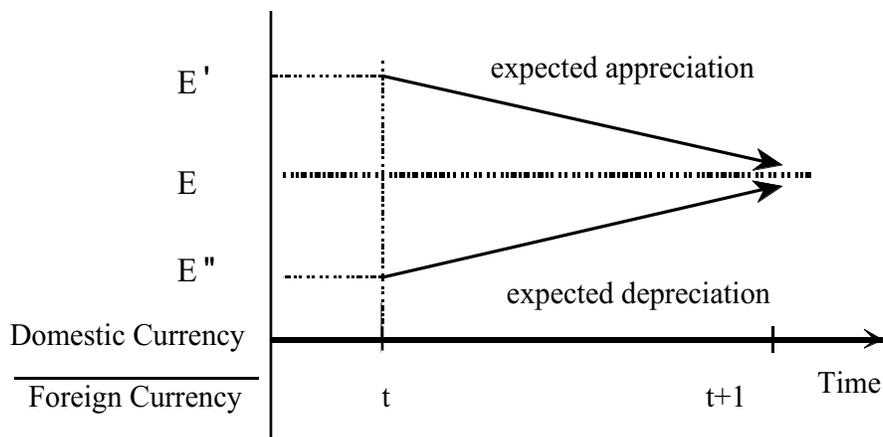


Figure 13-1

This pedagogic tool can be employed to provide some further intuition behind the interest parity relationship. Suppose that the domestic and foreign interest rates are equal. Interest parity then requires that expected depreciation is equal to zero and that the exchange rate today and next period is equal to  $E$ . If the domestic interest rate rises, people will want to hold more domestic-currency deposits. The resulting increased demand for domestic currency drives up the price of domestic currency, causing the exchange rate to appreciate. How long will this continue? The answer is that the appreciation of the domestic currency continues until the expected depreciation that is a consequence of the domestic currency's appreciation today just offsets the interest differential.

The text presents exercises on the effects of changes in interest rates and of changes in expectations of the future exchange rate. These exercises can help develop students' intuition. For example, the initial result of a rise in U.S. interest rates is a higher demand for dollar-denominated assets and thus an increase in the price of the dollar. This dollar appreciation is large enough that the subsequent expected dollar depreciation just equalizes the expected return on foreign-currency assets (measured in dollar terms) and the higher dollar interest rate.

The appendix describes the covered interest parity relationship and applies it to explain the determination of forward rates under risk neutrality as well as the high correlation between movements in spot and forward rates.

## ANSWERS TO TEXTBOOK PROBLEMS

1. At an exchange rate of \$1.50 per euro, the price of a bratwurst in terms of hot dogs is 3 hot dogs per bratwurst. After a dollar appreciation to \$1.25 per euro, the relative price of a bratwurst falls to 2.5 hot dogs per bratwurst.
2. The Norwegian krone/Swiss franc cross rate must be 6 Norwegian krone per Swiss franc.
3. The dollar rates of return are as follows:
  - a.  $(\$250,000 - \$200,000)/\$200,000 = 0.25$ .
  - b.  $(\$216 - \$180)/\$180 = 0.20$ .
  - c. There are two parts of this return. One is the loss involved due to the appreciation of the dollar; the dollar appreciation is  $(\$1.38 - \$1.50)/\$1.50 = -0.08$ . The other part of the return is the interest paid by the London bank on the deposit, 10 percent. (The size of the deposit is immaterial to the calculation of the rate of return.) In terms of dollars, the realized return on the London deposit is thus 2 percent per year.
4. Note here that the ordering of the returns of the three assets is the same whether we calculate real or nominal returns.
  - a. The real return on the house would be  $25\% - 10\% = 15\%$ . This return could also be calculated by first finding the portion of the \$50,000 nominal increase in the house's price due to inflation (\$20,000), then finding the portion of the nominal increase due to real appreciation (\$30,000), and finally finding the appropriate real rate of return  $(\$30,000/\$200,000 = 0.15)$ .
  - b. Again, subtracting the inflation rate from the nominal return we get  $20\% - 10\% = 10\%$ .
  - c.  $2\% - 10\% = -8\%$ .
5. The current equilibrium exchange rate must equal its expected future level since, with equality of nominal interest rates, there can be no expected increase or decrease in the dollar/pound exchange rate in equilibrium. If the expected exchange rate remains at \$1.52 per pound and the pound interest rate rises to 10 percent, then interest parity is satisfied only if the current exchange rate changes such that there is an expected

appreciation of the dollar equal to 5 percent. This will occur when the exchange rate rises to \$1.60 per pound (a depreciation of the dollar against the pound).

6. If market traders learn that the dollar interest rate will soon fall, they also revise upward their expectation of the dollar's future depreciation in the foreign-exchange market. Given the current exchange rate and interest rates, there is thus a rise in the expected dollar return on euro deposits. The downward-sloping curve in the diagram below shifts to the right and there is an immediate dollar depreciation, as shown in the figure below where a shift in the interest-parity curve from II to II' leads to a depreciation of the dollar from  $E_0$  to  $E_1$ .

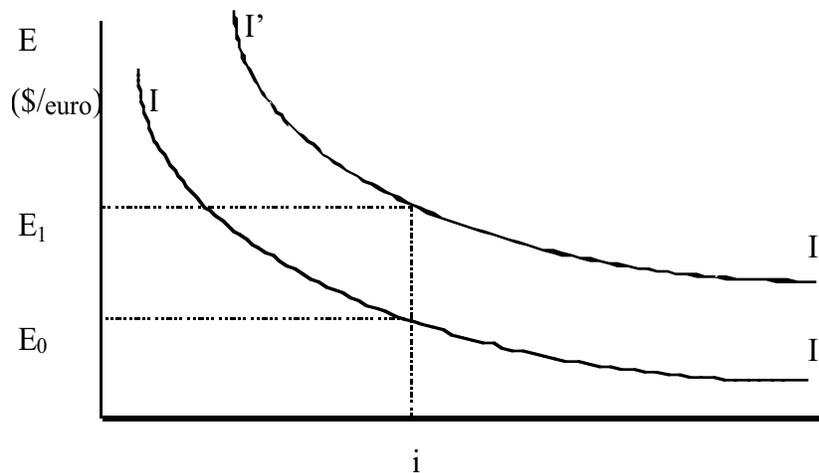


Figure 13-2

7. The analysis will be parallel to that in the text. As shown in the accompanying diagrams, a movement down the vertical axis in the new graph, however, is interpreted as a euro appreciation and dollar depreciation rather than the reverse. Also, the horizontal axis now measures the euro interest rate. Figure 13-3 demonstrates that, given the expected future exchange rate, a rise in the euro interest rate from  $R_0$  to  $R_1$  will lead to a euro appreciation from  $E_0$  to  $E_1$ .

Figure 13-4 shows that, given the euro interest rate of  $i$ , the expectation of a stronger euro in the future leads to a leftward shift of the downward-sloping curve from II to II' and a euro appreciation (dollar depreciation) from  $E$  to  $E'$ . A rise in the dollar interest rate causes the same curve to shift rightward, so the euro depreciates against the dollar. This simply reverses the movement in figure 13-4, with a shift from II' to II, and a depreciation of the euro from  $E'$  to  $E$ . All of these results are the same as in the text when using the diagram for the dollar rather than the euro.

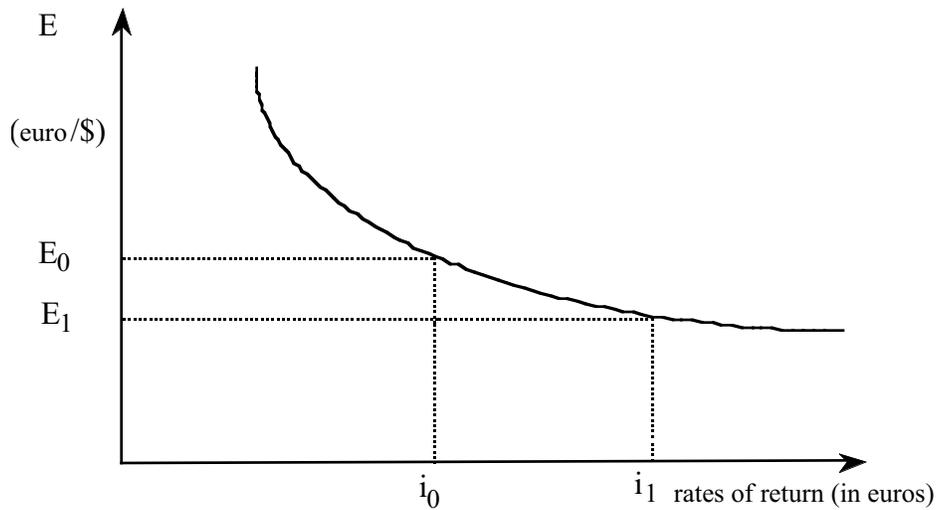


Figure 13-3

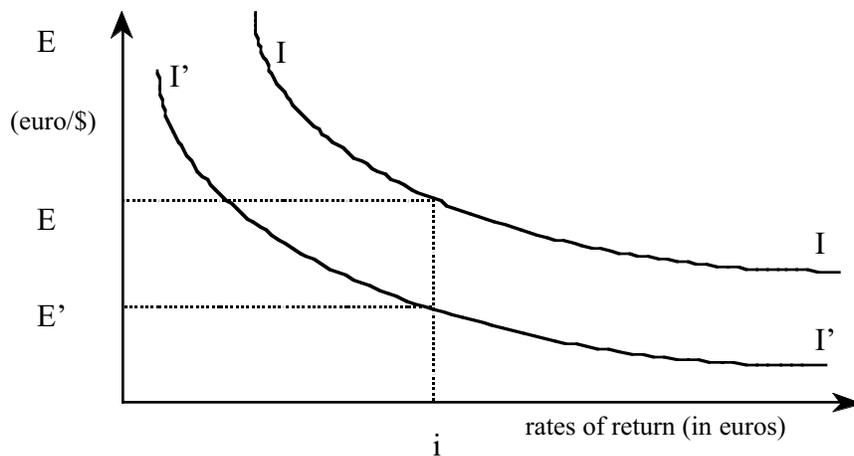


Figure 13-4

8. a. If the Federal Reserve pushed interest rates down, with an unchanged expected future exchange rate, the dollar would depreciate (note that the article uses the term "downward pressure" to mean pressure for the dollar to depreciate). In terms of the analysis developed in this chapter, a move by the Federal Reserve to lower interest rates would be reflected in a movement from R to R' in figure 13.5, and a depreciation of the exchange rate from E to E'.

If there is a "soft landing", and the Federal Reserve does not lower interest rates, then this dollar depreciation will not occur. Even if the Federal Reserve does lower interest

rates a little, say from  $R$  to  $R''$ , this may be a smaller decrease than what people initially believed would occur. In this case, the expected future value of the exchange rate will be more appreciated than before, causing the interest-parity curve to shift in from  $I$  to  $I'$  (as shown in figure 13.6). The shift in the curve reflects the "optimism sparked by the expectation of a soft landing" and this change in expectations means that, with a fall in interest rates from  $R$  to  $R''$ , the exchange rate depreciates from  $E$  to  $E''$ , rather than from  $E$  to  $E^*$ , which would occur in the absence of a change in expectations.

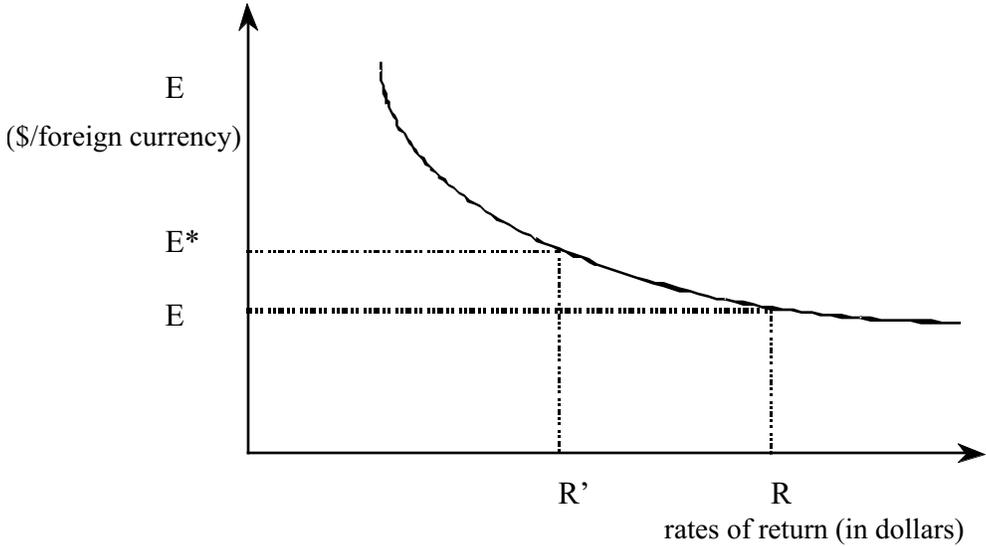


Figure 13-5

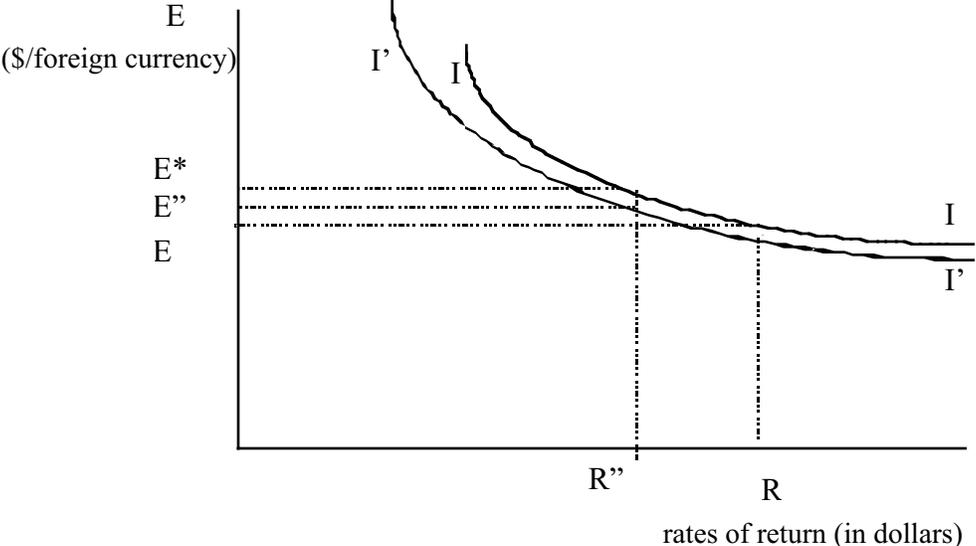


Figure 13-6

- b. The "disruptive" effects of a recession make dollar holdings more risky. Risky assets must offer some extra compensation such that people willingly hold them as opposed to other, less risky assets. This extra compensation may be in the form of a bigger expected appreciation of the currency in which the asset is held. Given the expected future value of the exchange rate, a bigger expected appreciation is obtained by a more depreciated exchange rate today. Thus, a recession that is disruptive and makes dollar assets more risky will cause a depreciation of the dollar.
9. The euro is less risky for you. When the rest of your wealth falls, the euro tends to appreciate, cushioning your losses by giving you a relatively high payoff in terms of dollars. Losses on your euro assets, on the other hand, tend to occur when they are least painful, that is, when the rest of your wealth is unexpectedly high. Holding the euro therefore reduces the variability of your total wealth.
10. The chapter states that most foreign-exchange transactions between banks (which accounts for the vast majority of foreign-exchange transactions) involve exchanges of foreign currencies for U.S. dollars, even when the ultimate transaction involves the sale of one nondollar currency for another nondollar currency. This central role of the dollar makes it a vehicle currency in international transactions. The reason the dollar serves as a vehicle currency is that it is the most liquid of currencies since it is easy to find people willing to trade foreign currencies for dollars. The greater liquidity of the dollar as compared to, say, the Mexican peso, means that people are more willing to hold the dollar than the peso, and thus, dollar deposits can offer a lower interest rate, for any expected rate of depreciation against a third currency, than peso deposits for the same rate of depreciation against that third currency. As the world capital market becomes increasingly integrated, the liquidity advantages of holding dollar deposits as opposed to yen deposits will probably diminish. The euro represents an economy as large as the United States, so it is possible that it will assume some of that vehicle role of the dollar, reducing the liquidity advantages to as far as zero. Since the euro has no history as a currency, though, some investors may be leary of holding it until it has established a track record. Thus, the advantage may fade slowly.
11. Greater fluctuations in the dollar interest rate lead directly to greater fluctuations in the exchange rate using the model described here. The movements in the interest rate can be investigated by shifting the vertical interest rate curve. As shown in figure 13.7,

these movements lead directly to movements in the exchange rate. For example, an increase in the interest rate from  $i$  to  $i'$  leads to a dollar appreciation from  $E$  to  $E'$ . A decrease in the interest rate from  $i$  to  $i''$  leads to a dollar depreciation from  $E$  to  $E''$ . This diagram demonstrates the direct link between interest rate volatility and exchange rate volatility, given that the expected future exchange rate does not change.

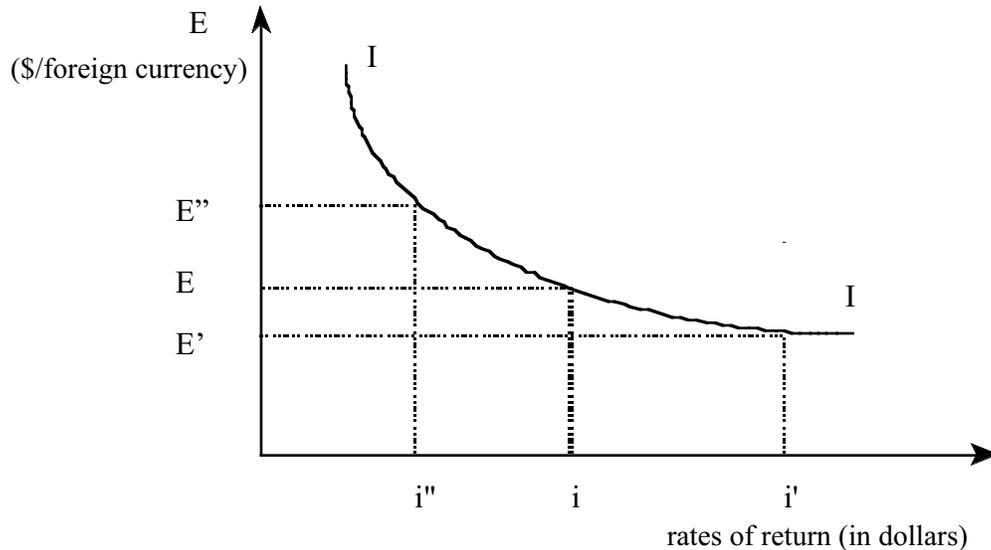


Figure 13-7

12. A tax on interest earnings and capital gains leaves the interest parity condition the same, since all its components are multiplied by one less the tax rate to obtain after-tax returns. If capital gains are untaxed, the expected depreciation term in the interest parity condition must be divided by 1 less the tax rate. The component of the foreign return due to capital gains is now valued more highly than interest payments because it is untaxed.
  
13. The forward premium can be calculated as described in the appendix. In this case, we find the forward premium on euro to be  $(1.26 - 1.20)/1.20 = 0.05$ . The interest-rate difference between one-year dollar deposits and one-year euro deposits will be 5 percent because the interest difference must equal the forward premium on euro against dollars when covered interest parity holds.

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## CHAPTER 14

### MONEY, INTEREST RATES, AND EXCHANGE RATES

#### *Chapter Organization*

##### Money Defined: A Brief Review

- Money as a Medium of Exchange

- Money as a Unit of Account

- Money as a Store of Value

- What is Money?

- How the Money Supply is Determined

##### The Demand for Money by Individuals

- Expected Return

- Risk

- Liquidity

##### Aggregate Money Demand

##### The Equilibrium Interest Rate: The Interaction of Money Supply and Demand

- Equilibrium in the Money Market

- Interest Rates and the Money Supply

- Output and the Interest Rate

##### The Money Supply and the Exchange Rate in the Short Run

- Linking Money, the Interest Rate, and the Exchange Rate

- U.S. Money Supply and the Dollar/Euro Exchange Rate

- Europe's Money Supply and the Dollar/Euro Exchange Rate

##### Money, the Price Level, and the Exchange Rate in the Long Run

- Money and Money Prices

- The Long-Run Effects of Money Supply Changes

- Empirical Evidence on Money Supplies and Price Levels

- Box: Inflation and Money Supply Growth in Latin America

- Money and the Exchange Rate in the Long Run

##### Inflation and Exchange Rate Dynamics

- Short-Run Price Rigidity versus Long-Run Price Flexibility

- Box: Money Supply Growth and Hyperinflation in Bolivia

- Permanent Money Supply Changes and the Exchange Rate

## Exchange Rate Overshooting

### Summary

#### **CHAPTER OVERVIEW**

This chapter combines the foreign-exchange market model of the previous chapter with an analysis of the demand for and supply of money to provide a more complete analysis of exchange rate determination in the short run. The chapter also introduces the concept of the long-run neutrality of money which allows an examination of exchange rate dynamics. These elements are brought together at the end of the chapter in a model of exchange rate overshooting.

The chapter begins by reviewing the roles played by money. Money supply is determined by the central bank; for a given price level, the central bank's choice of a nominal money supply determines the real money supply. An aggregate demand function for real money balances is motivated and presented. Money-market equilibrium--the equality of real money demand and the supply of real money balances--determines the equilibrium interest rate.

A familiar diagram portraying money-market equilibrium is combined with the interest rate parity diagram presented in the previous chapter to give a simple model of monetary influences on exchange rate determination. The domestic interest rate, determined in the domestic money market, affects the exchange rate through the interest parity mechanism. Thus, an increase in domestic money supply leads to a fall in the domestic interest rate. The home currency depreciates until its expected future appreciation is large enough to equate expected returns on interest-bearing assets denominated in domestic currency and in foreign currency. A contraction in the money supply leads to an exchange rate appreciation through a similar argument. Throughout this part of the chapter the expected future exchange rate is still regarded as fixed.

The analysis is then extended to incorporate the dynamics of long-run adjustment to monetary changes. The long run is defined as the equilibrium that would be maintained after all wages and prices fully adjusted to their market-clearing levels. Thus the long-run analysis is based on the long-run neutrality of money: All else equal, a permanent increase in the money supply affects only the general price level--and not interest rates, relative prices, or real output--in the long run. Money prices, including, importantly, the money prices of foreign currencies, move in the long run in proportion to any change in the money supply's

level. Thus, an increase in the money supply, for example, ultimately results in a proportional exchange rate depreciation.

The combination of these long-run effects with the short-run static model allows consideration of exchange rate dynamics. In particular, the long-run results are suggestive of how long-run exchange rate expectations change after permanent money-supply changes. One dynamic result which emerges from this model is exchange rate overshooting in response to a change in the money supply. For example, a permanent money-supply expansion leads to expectations of a proportional long-run currency depreciation. Foreign-exchange market equilibrium requires an initial depreciation of the currency large enough to equate expected returns on foreign and domestic bonds. But because the domestic interest rate falls in the short run, the currency must actually depreciate beyond (and thus overshoot) its new expected long-run level in the short run to maintain interest parity. As domestic prices rise and  $M/P$  falls, the interest rate returns to its previous level and the exchange rate falls (appreciates) back to its long-run level, higher than the starting point, but not as high as the initial reaction.

## ANSWERS TO TEXTBOOK PROBLEMS

1. A reduction in real money demand has the same effects as an increase in the nominal money supply. In figure 14.1, the reduction in money demand is depicted as a backward shift in the money demand schedule from  $L_1$  to  $L_2$ . The immediate effect of this is a depreciation of the exchange rate from  $E_1$  to  $E_2$ , if the reduction in money demand is temporary, or a depreciation to  $E_3$  if the reduction is permanent. The larger impact effect of a permanent reduction in money demand arises because this change also affects the future exchange rate expected in the foreign exchange market. In the long run, the price level rises to bring the real money supply into line with real money demand, leaving all relative prices, output, and the nominal interest rate the same and depreciating the domestic currency in proportion to the fall in real money demand. The long-run level of real balances is  $(M/P)_2$ , a level where the interest rate in the long-run equals its initial value. The dynamics of adjustment to a permanent reduction in money demand are from the initial point 1 in the diagram, where the exchange rate is  $E_1$ , immediately to point 2, where the exchange rate is  $E_3$  and then, as the price level falls over time, to the new long-run position at point 3, with an exchange rate of  $E_4$ .

2. A fall in a country's population would reduce money demand, all else equal, since a smaller population would undertake fewer transactions and thus demand less money. This effect would probably be more pronounced if the fall in the population were due to a fall in the number of households rather than a fall in the average size of a household since a fall in the average size of households implies a population decline due to fewer children who have a relatively small transactions demand for money compared to adults. The effect on the aggregate money demand function depends upon no change in income commensurate with the change in population -- else, the change in income would serve as a proxy for the change in population with no effect on the aggregate money demand function.

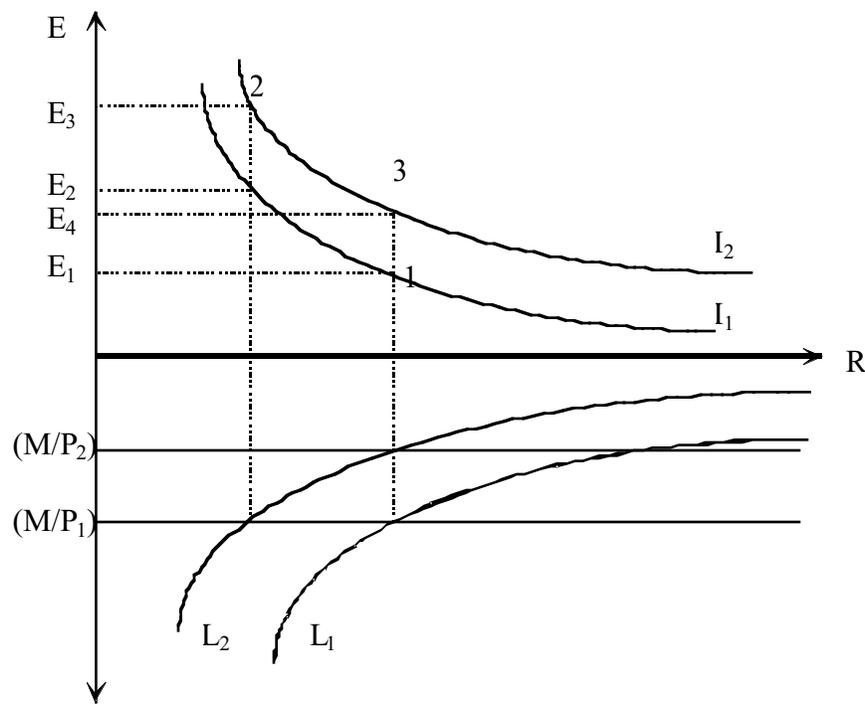


Figure 14-1

3. Equation 14-4 is  $M^s/P = L(R, Y)$ . The velocity of money,  $V = Y/(M/P)$ . Thus, when there is equilibrium in the money market such that money demand equals money supply,  $V = Y/L(R, Y)$ . When  $R$  increases,  $L(R, Y)$  falls and thus velocity rises. When  $Y$  increases,  $L(R, Y)$  rises by a smaller amount (since the elasticity of aggregate money demand with respect to real output is less than one) and the fraction  $Y/L(R, Y)$  rises. Thus, velocity rises with either an increase in the interest rate or an increase in income. Since an increase in interest rates as well as an increase in income cause the exchange

rate to appreciate, an increase in velocity is associated with an appreciation of the exchange rate.

4. An increase in domestic real GNP increases the demand for money at any nominal interest rate. This is reflected in figure 14-2 as an outward shift in the money demand function from  $L_1$  to  $L_2$ . The effect of this is to raise domestic interest rates from  $R_1$  to  $R_2$  and to cause an appreciation of the domestic currency from  $E_1$  to  $E_2$ .
5. Just as money simplifies economic calculations within a country, use of a vehicle currency for international transactions reduces calculation costs. More importantly, the more currencies used in trade, the closer the trade becomes to barter, since someone who receives payment in a currency she does not need must then sell it for a currency she needs. This process is much less costly when there is a ready market in which any nonvehicle currency can be traded against the vehicle currency, which then fulfills the role of a generally accepted medium of exchange.

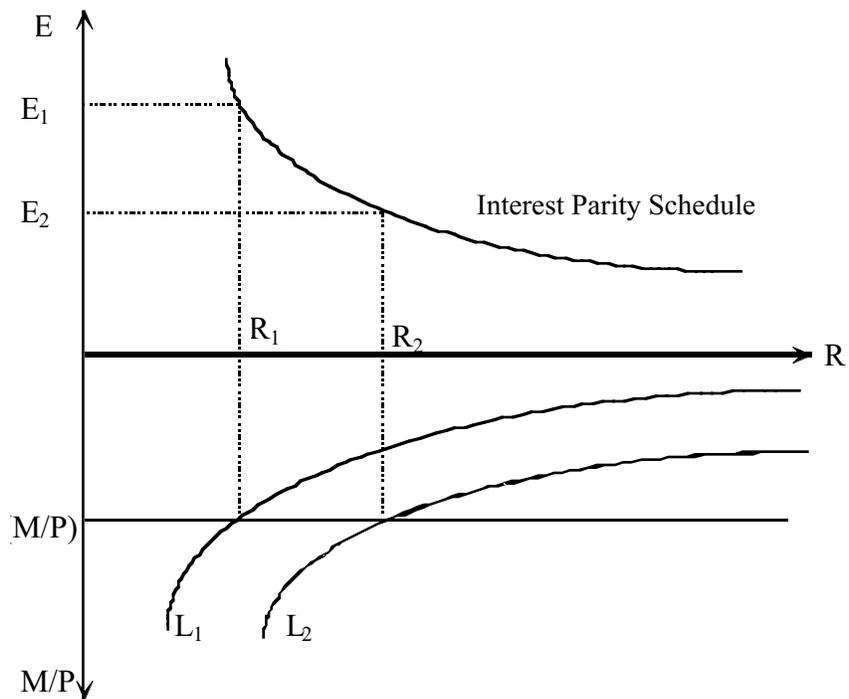


Figure 14-2

6. Currency reforms are often instituted in conjunction with other policies which attempt to bring down the rate of inflation. There may be a psychological effect of introducing a new currency at the moment of an economic policy regime change, an effect that

allows governments to begin with a "clean slate" and makes people reconsider their expectations concerning inflation. Experience shows, however, that such psychological effects cannot make a stabilization plan succeed if it is not backed up by concrete policies to reduce monetary growth.

7. The interest rate at the beginning and at the end of this experiment are equal. The ratio of money to prices (the level of real balances) must be higher when full employment is restored than in the initial state where there is unemployment: the money-market equilibrium condition can be satisfied only with a higher level of real balances if GNP is higher. Thus, the price level rises, but by less than twice its original level. If the interest rate were initially below its long-run level, the final result will be one with higher GNP and higher interest rates. Here, the final level of real balances may be higher or lower than the initial level, and we cannot unambiguously state whether the price level has more than doubled, less than doubled, or exactly doubled.
8. The 1984 - 1985 money supply growth rate was 12.4 percent in the United States ( $100\% \cdot (641.0 - 570.3) / 570.3$ ) and 334.8 percent in Brazil ( $100\% \cdot (106.1 - 24.4) / 24.4$ ). The inflation rate in the United States during this period was 3.5 percent and in Brazil the inflation rate was 222.6 percent. The change in real money balances in the United States was approximately  $12.4\% - 3.5\% = 8.9\%$ , while the change in real money balances in Brazil was approximately  $334.8\% - 222.6\% = 112.2\%$ . The small change in the U.S. price level relative to the change in its money supply as compared to Brazil may be due to greater short-run price stickiness in the United States; the change in the price level in the United States represents 28 percent of the change in the money supply ( $(3.5/12.4) \cdot 100\%$ ) while in Brazil this figure is 66 percent ( $(222.6/334.8) \cdot 100\%$ ). There are, however, large differences between the money supply growth and the growth of the price level in both countries, which casts doubt on the hypothesis of money neutrality in the short run for both countries.
9. Velocity is defined as real income divided by real balances or, equivalently, nominal income divided by nominal money balances ( $V = P \cdot Y / M$ ). Velocity in Brazil in 1985 was 13.4 ( $1418 / 106.1$ ) while velocity in the United States was 6.3 ( $4010 / 641$ ). These differences in velocity reflected the different costs of holding cruzados compared to holding dollars. These different costs were due to the high inflation rate in Brazil which quickly eroded the value of idle cruzados, while the relatively low inflation rate in the United States had a much less deleterious effect on the value of dollars.

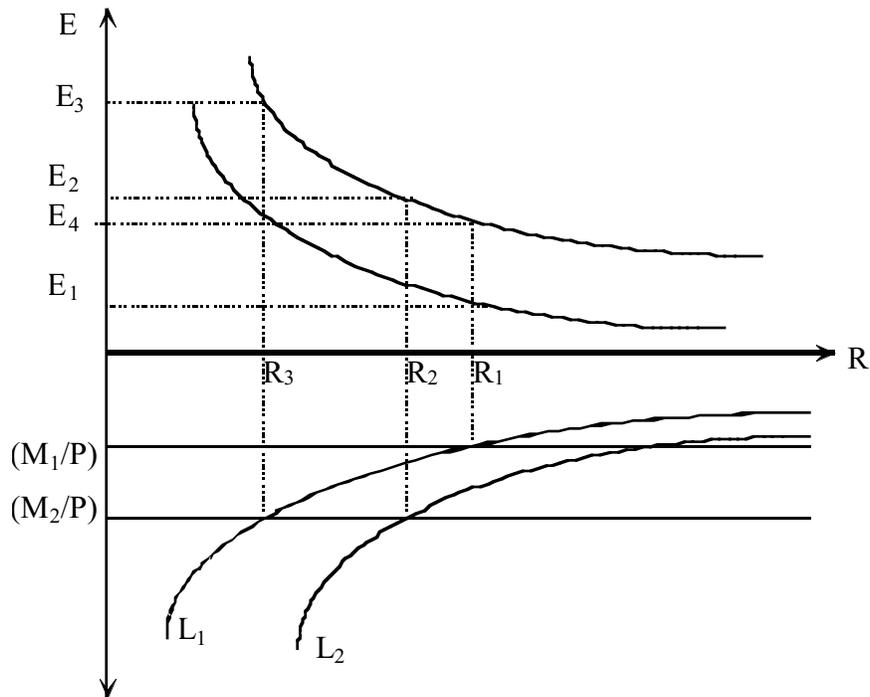


Figure 14-3

10. If an increase in the money supply raises real output in the short run, then the fall in the interest rate will be reduced by an outward shift of the money demand curve caused by the temporarily higher transactions demand for money. In figure 14-3, the increase in the money supply line from  $(M_1/P)$  to  $(M_2/P)$  is coupled with a shift out in the money demand schedule from  $L_1$  to  $L_2$ . The interest rate falls from its initial value of  $R_1$  to  $R_2$ , rather than to the lower level  $R_3$ , because of the increase in output and the resulting outward shift in the money demand schedule. Because the interest rate does not fall as much when output rises, the exchange rate depreciates by less: from its initial value of  $E_1$  to  $E_2$ , rather than to  $E_3$ , in the diagram. In both cases we see the exchange rate appreciate back some to  $E_4$  in the long run. The difference is the overshoot is much smaller if there is a temporary increase in  $Y$ . Note, the fact that the increase in  $Y$  is temporary means that we still move to the same IP curve, as LR prices will still shift the same amount when  $Y$  returns to normal and we still have the same size  $M$  increase in both cases. A permanent increase in  $Y$  would involve a smaller expected price increase and a smaller shift in the IP curve.

Undershooting occurs if the new short-run exchange rate is initially below its new long-run level. This happens only if the interest rate rises when the money supply rises

– that is if GDP goes up so much that R does not fall, but increases. This is unlikely because the reason we tend to think that an increase in M may boost output is because of the effect of lowering interest rates, so we generally don't think that the Y response can be so great as to increase R.

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## CHAPTER 15

### PRICE LEVELS AND THE EXCHANGE RATE IN THE LONG RUN

#### *Chapter Organization*

The Law of One Price

Purchasing Power Parity

    The Relationship Between PPP and the Law of One Price

    Absolute PPP and Relative PPP

A Long-Run Exchange-Rate Model Based on PPP

    The Fundamental Equation of the Monetary Approach

    Ongoing Inflation, Interest Parity, and PPP

    The Fisher Effect

Empirical Evidence on PPP and the Law of One Price

    Box: Some Meaty Evidence on the Law of One Price

Explaining the Problems with PPP

    Trade Barriers and Nontradables

    Departures from Free Competition

    Box: Hong Kong's Surprisingly High Inflation

    International Differences in Price Level Measurement

    PPP in the Short Run and in the Long Run

    Box: Sticky Prices and the Law of One Price: Evidence From Scandinavian Duty-free Shops

    Case Study: Why Price Levels are Lower in Poorer Countries

Beyond Purchasing Power Parity: A General Model of Long-Run Exchange Rates

    The Real Exchange Rate

    Demand, Supply, and the Long-Run Real Exchange Rate

    Nominal and Real Exchange Rates in Long-Run Equilibrium

    Case Study: Why Has the Yen Keep Rising?

International Interest Rate Differences and the Real Exchange Rate

Real Interest Parity

Summary

Appendix: The Fisher Effect, the Interest Rate, and the Exchange Rate under the Flexible-Price Monetary Approach

## CHAPTER OVERVIEW

The time frame of the analysis of exchange rate determination shifts to the long run in this chapter. An analysis of the determination of the long-run exchange rate is required for the completion of the short-run exchange rate model since, as demonstrated in the previous two chapters, the long-run expected exchange rate affects the current spot rate. Issues addressed here include both monetary and real-side determinants of the long-run real exchange rate. The development of the model of the long-run exchange rate touches on a number of issues, including the effect of ongoing inflation on the exchange rate, the Fisher effect, and the role of tradables and nontradables. Empirical issues, such as the breakdown of purchasing power parity in the 1970s and the correlation between price levels and per capita income, are addressed within this framework.

The law of one price, which holds that the prices of goods are the same in all countries in the absence of transport costs or trade restrictions, presents an intuitively appealing introduction to long-run exchange rate determination. An extension of this law to sets of goods motivates the proposition of absolute purchasing power parity. Relative purchasing power parity, a less restrictive proposition, relates changes in exchange rates to changes in relative price levels and may be valid even when absolute PPP is not. Purchasing power parity provides a cornerstone of the monetary approach to the exchange rate, which serves as the first model of the long-run exchange rate developed in this chapter. This first model also demonstrates how ongoing inflation affects the long-run exchange rate.

The monetary approach to the exchange rate uses PPP to model the exchange rate as the price level in the home country relative to the price level in the foreign country. The money market equilibrium relationship is used to substitute money supply divided by money demand for the price level. The Fisher relationship allows us to substitute expected inflation for the nominal interest rate. The resulting relationship models the long-run exchange rate as a function of relative money supplies, the inflation differential and relative output in the two countries;

$$E = (M/M^*) \cdot l(p^e - p^{*e}, (Y^*/Y))$$

The  $l$  function represents the ratio of foreign to domestic money demand; thus, both the difference in expected inflation rates and the output ratio enter the function with a positive sign. An increase in inflation at home means higher home interest rates (through the Fisher

equation) and lower home money demand. An increase in foreign output raises foreign money demand.

One result from this model that students may find initially confusing concerns the relationship between the long-run exchange rate and the nominal interest rate. The model in this chapter provides an example of an increase in the interest rate associated with exchange rate depreciation. In contrast, the short-run analysis in the previous chapter provides an example of an increase in the domestic interest rate associated with an appreciation of the currency. These different relationships between the exchange rate and the interest rate reflect different causes for the rise in the interest rate as well as different assumptions concerning price rigidity. In the analysis of the previous chapter, the interest rate rises due to a contraction in the level of the nominal money supply. With fixed prices, this contraction of nominal balances is matched by a contraction in real balances. Excess money demand is resolved through a rise in interest rates which is associated with an appreciation of the currency to satisfy interest parity. In this chapter, the discussion of the Fisher effect demonstrates that the interest rate will rise in response to an anticipated increase in expected inflation due to an anticipated increase in the rate of growth of the money supply. There is incipient excess money supply with this rise in the interest rate. With perfectly flexible prices, the money market clears through an erosion of real balances due to an increase in the price level. This price level increase implies, through PPP, a depreciation of the exchange rate. Thus, with perfectly flexible prices (and its corollary PPP), an increase in the interest rate due to an increase in expected inflation is associated with a depreciation of the currency.

Empirical evidence presented in the chapter suggests that both absolute and relative PPP perform poorly for the period since 1971. Even the law of one price fails to hold across disaggregated commodity groups. The rejection of these theories is related to trade impediments (which help give rise to nontraded goods and services), to shifts in relative output prices and to imperfectly competitive markets. Since PPP serves as a cornerstone for the monetary approach, its rejection suggests that a convincing explanation of the long-run behavior of exchange rates must go beyond the doctrine of purchasing power parity. The Fisher effect is discussed in more detail and accompanied by a diagrammatic exposition in an appendix to the chapter.

A more general model of the long-run behavior of exchange rates in which real-side effects are assigned a role concludes the chapter. The material in this section drops the assumption of a constant real exchange rate, an assumption that you may want to demonstrate to students

is necessarily associated with the assumption of PPP. Motivating this more general approach is easily done by presenting students with a time series graph of the recent behavior of the real exchange rate of the dollar which will demonstrate large swings in its value. The real exchange rate,  $q$ , is the ratio of the foreign price index, expressed in domestic currency, to the domestic price index, or, equivalently,  $E = q \cdot (P/P^*)$ . The chapter includes an informal discussion of the manner in which the long run real exchange rate,  $q$ , is affected by permanent changes in the supply or demand for a country's products.

### ANSWERS TO TEXTBOOK PROBLEMS

1. Relative PPP predicts that inflation differentials are matched by changes in the exchange rate. Under relative PPP, the franc/ruble exchange rate would fall by 95 percent with inflation rates of 100 percent in Russia and 5 percent in Switzerland.
2. A real currency appreciation may result from an increase in the demand for nontraded goods relative to tradables which would cause an appreciation of the exchange rate since the increase in the demand for nontradables raises their price, raising the domestic price level and causing the currency to appreciate. In this case exporters are indeed hurt, as one can see by adapting the analysis in Chapter 3. Real currency appreciation may occur for different reasons, however, with different implications for exporters' incomes. A shift in foreign demand in favor of domestic exports will both appreciate the domestic currency in real terms and benefit exporters. Similarly, productivity growth in exports is likely to benefit exporters while causing a real currency appreciation. If we consider a ceteris paribus increase in the real exchange rate, this is typically bad for exporters as their exports are now more expensive to foreigners which may reduce foreign export demand. In general, though, we need to know why the real exchange rate changed to interpret the impact of the change.
3. a. A tilt of spending towards nontraded products causes the real exchange rate to appreciate as the price of nontraded goods relative to traded goods rises (the real exchange rate can be expressed as the price of tradables to the price of nontradables).  
b. A shift in foreign demand towards domestic exports causes an excess demand for the domestic country's goods which causes the relative price of these goods to rise; that is, it causes the real exchange rate of the domestic country to appreciate.

4. Relative PPP implies that the pound/dollar exchange rate should be adjusted to offset the inflation difference between the United States and Britain during the war. Thus, a central banker might compare the consumer price indices in the United States and the U.K. before and after the war. If America's price level had risen by 10 percent while that in Britain had risen by 20 percent, relative PPP would call for a pound/dollar exchange rate 10 percent higher than before the war--a 10 percent depreciation of the pound against the dollar.

A comparison based only on PPP would fall short of the task at hand, however, if it ignored possible changes in productivity, productive capacity or in relative demands for goods produced in different countries in wake of the war. In general, one would expect large structural upheavals as a consequence of the war. For example, Britain's productivity might have fallen dramatically as a result of converting factories to wartime uses (and as a result of bombing). This would call for a real depreciation of the pound, that is, a postwar pound/dollar exchange rate more than 10% higher than the prewar rate.

5. The real effective exchange rate series for Britain shows an appreciation of the pound from 1977 to 1981, followed by a period of depreciation. Note that the appreciation is sharpest after the increase in oil prices starts in early 1979; the subsequent depreciation is steepest after oil prices soften in 1982. An increase in oil prices increases the incomes received by British oil exporters, raising their demand for goods. The supply response of labor moving into the oil sector is comparable to an increase in productivity which also causes the real exchange rate to appreciate. Of course, a fall in the price of oil has opposite effects. (Oil is not the only factor behind the behavior of the pound's real exchange rate. Instructors may wish to mention the influence of Prime Minister Margaret Thatcher's stringent monetary policies.)
6. The announcement puzzle is that interest rates rise when the market learns money supply growth has been higher than expected (and fall in the opposite case), in contrast to what a simple money-market equilibrium analysis might seem to suggest. Were this phenomenon due to higher expected inflation, we would expect to see the dollar depreciate against foreign currencies, since the expectation of future currency depreciation is one result of higher expected inflation. As demonstrated in the previous chapter, a depreciation of the expected future exchange rate causes the spot rate today to depreciate. If, however, nominal rates are higher because the market expects the Fed to adjust for excessive money growth by tightening, then the higher nominal interest

rates reflect a decrease in money supply as banks adjust for expected lower high-powered money in the future. In this case, we would expect to see an appreciation of the currency. Thus, the foreign exchange market can help us distinguish between the two competing explanations for the phenomenon. In fact, Engel and Frankel found that in the early 1980s, the dollar tended to appreciate after unexpectedly high monetary growth was announced and depreciate in the opposite case. This implies expectations regarding Fed action are the likely cause of the increase in nominal interest rates.

7. A permanent shift in the real money demand function will alter the long-run equilibrium nominal exchange rate, but not the long-run equilibrium real exchange rate. Since the real exchange rate does not change, we can use the monetary approach equation,  $E = (M/M^*) \cdot \{L(R^*, Y^*)/L(R, Y)\}$ . A permanent increase in money demand at any nominal interest rate leads to a proportional appreciation of the long-run nominal exchange rate. Intuitively, the level of prices for any level of nominal balances must be lower in the long run for money market equilibrium. The reverse holds for a permanent decrease in money demand. The real exchange rate, however, depends upon relative prices and productivity terms which are not affected by general price-level changes.
8. The mechanism would work through expenditure effects with a permanent transfer from Poland to The Czech Republic appreciating the zloty (Czech currency) in real terms against the koruna (Polish currency) if (as is reasonable to assume) the Czechs spent a higher proportion of their income on Czech goods relative to Polish goods than did the Poles.
9. As discussed in the answer to question 8, the zloty appreciates against the koruna in real terms with the transfer from Poland to The Czech Republic if the Czechs spend a higher proportion of their income on Czech goods relative to Polish goods than did the Poles. The real appreciation would lead to a nominal appreciation as well.
10. Since the tariff shifts demand away from foreign exports and toward domestic goods, there is a long-run real appreciation of the home currency. Absent changes in monetary conditions, there is a long-run nominal appreciation as well.

11. The balanced expansion in domestic spending will increase the amount of imports consumed in the country that has a tariff in place, but imports cannot rise in the country that has a quota in place. Thus, in the country with the quota, there would be an excess demand for imports if the real exchange rate appreciated by the same amount as in the country with tariffs. Therefore, the real exchange rate in the country with a quota must appreciate by less than in the country with the tariff.
12. A permanent increase in the expected rate of real depreciation of the dollar against the euro leads to a permanent increase in the expected rate of depreciation of the nominal dollar/euro exchange rate, given the differential in expected inflation rates across the US and Europe. This increase in the expected depreciation of the dollar causes the spot rate today to depreciate.
13. Suppose there is a temporary fall in the real exchange rate in an economy, that is the exchange rate appreciates today and then will depreciate back to its original level in the future. The expected depreciation of the real exchange rate, by real interest parity, causes the real interest rate to rise. If there is no change in the expected inflation rate then the nominal interest rate rises with the rise in the real exchange rate. This event may also cause the nominal exchange rate to appreciate if the effect of a current appreciation of the real exchange rate dominates the effect of the expected depreciation of the real exchange rate.
14. International differences in expected real interest rates reflect expected changes in real exchange rates. If the expected real interest rate in the United States is 9 percent and the expected real interest rate in Europe is 3 percent then there is an expectation that the real dollar/euro exchange rate will depreciate by 6 percent (assuming that interest parity holds).
15. The initial effect of a reduction in the money supply in a model with sticky prices is an increase in the nominal interest rate and an appreciation of the nominal exchange rate. The real interest rate, which equals the nominal interest rate minus expected inflation, rises by more than the nominal interest rate since the reduction in the money supply causes the nominal interest rate to rise and deflation occurs during the transition to the new equilibrium. The real exchange rate depreciates during the transition to the new equilibrium (where its value is the same as in the original state). This satisfies the real interest parity relationship which states that the difference between the domestic and

the foreign real interest rate equals the expected depreciation of the domestic real exchange rate -- in this case, the initial effect is an increase in the real interest rate in the domestic economy coupled with an expected depreciation of the domestic real exchange rate. In any event, the real interest parity relationship must be satisfied since it is simply a restatement of the Fisher equation, which defines the real interest rate, combined with the interest parity relationship, which is a cornerstone of the sticky-price model of the determination of the exchange rate.

16. One answer to this question involves the comparison of a sticky-price with a flexible-price model. In a model with sticky prices, a reduction in the money supply causes the nominal interest rate to rise and, by the interest parity relationship, the nominal exchange rate to appreciate. The real interest rate, which equals the nominal interest rate minus expected inflation, increases both because of the increase in the nominal interest rate and because there is expected deflation. In a model with perfectly flexible prices, an increase in expected inflation causes the nominal interest rate to increase (while the real interest rate remains unchanged) and the currency to depreciate since excess money supply is resolved through an increase in the price level and thus, by PPP, a depreciation of the currency.

An alternative approach is to consider a model with perfectly flexible prices. As discussed in the preceding paragraph, an increase in expected inflation causes the nominal interest rate to increase and the currency to depreciate, leaving the expected real interest rate unchanged. If there is an increase in the expected real interest rate, however, this implies an expected depreciation of the real exchange rate. If this expected depreciation is due to a current, temporary appreciation, then the nominal exchange rate may appreciate if the effect of the current appreciation (which rotates the exchange rate schedule downward) dominates the effect due to the expected depreciation (which rotates the exchange rate schedule in the upwards).

17. Combining the Fisher relationship with the interest parity condition we find that expected depreciation of the dollar/Swiss franc exchange rate equals the difference between U.S. and Swiss inflation rates less the difference between U.S. and Swiss real interest rates. The question states that the ex post difference between U.S. and Swiss real interest rates was positive between 1976 and 1980. Inspecting the data presented in figure 16-1 in the text demonstrates that U.S. inflation was consistently higher than Swiss inflation over this period. We, thus, expect that this period saw a consistent expected and actual depreciation of the dollar relative to the Swiss franc. Between

1981 and 1982 this pattern reverses with very high real U.S. interest rates, and comparable U.S. and Swiss inflation rates. This corresponds to the beginning of the dramatic appreciation of the dollar in 1981. The actual data are as follows; the average Swiss franc/dollar exchange rate in 1978 was 1.79, for 1979 1.66, for 1980 1.68, for 1981 1.96 and for 1982 2.03. Thus we see an appreciation of the Swiss franc between 1978 and 1980 followed by a dramatic depreciation of the Swiss franc from 1981 to 1982.

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## CHAPTER 16

### OUTPUT AND THE EXCHANGE RATE IN THE SHORT RUN

#### *Chapter Organization*

Determinants of Aggregate Demand in an Open Economy

    Determinants of Consumption Demand

    Determinants of the Current Account

    How Real Exchange Rate Changes Affect the Current Account

    How Disposable Income Changes Affect the Current Account

The Equation of Aggregate Demand

    The Real Exchange Rate and Aggregate Demand

    Real Income and Aggregate Demand

How Output is Determined in the Short Run

Output Market Equilibrium in the Short Run: The DD Schedule

    Output, the Exchange Rate, and Output Market Equilibrium

    Deriving the DD Schedule

    Factors that Shift the DD Schedule

Asset Market Equilibrium in the Short Run: The AA Schedule

    Output, the Exchange Rate, and Asset Market Equilibrium

    Deriving the AA Schedule

    Factors that Shift the AA Schedule

Short-Run Equilibrium for the Economy: Putting the DD and AA Schedules Together

Temporary Changes in Monetary and Fiscal Policy

    Monetary Policy

    Fiscal Policy

    Policies to Maintain Full Employment

Inflation Bias and Other Problems of Policy Formulation

Permanent Shifts in Monetary and Fiscal Policy

    A Permanent Increase in the Money Supply

    Adjustment to a Permanent Increase in the Money Supply

    A Permanent Fiscal Expansion

    Box: The Dollar Exchange Rate and the U.S. Economic Slowdown of 2000-1

Macroeconomic Policies and the Current Account

Gradual Trade Adjustment and Current Account Dynamics

## The J-Curve

### Exchange-Rate Pass-Through and Inflation

#### Summary

Appendix I: The IS-LM and the DD-AA Model

Appendix II: Intertemporal Trade and Consumption Demand

Appendix III: The Marshall-Lerner Condition and Empirical Estimates of Trade Elasticities

## **CHAPTER OVERVIEW**

This chapter integrates the previous analysis of exchange rate determination with a model of short-run output determination in an open economy. The model presented is similar in spirit to the classic Mundell-Fleming model, but the discussion goes beyond the standard presentation in its contrast of the effects of temporary versus permanent policies. The distinction between temporary and permanent policies allows for an analysis of dynamic paths of adjustment rather than just comparative statics. This dynamic analysis brings in the possibility of a J-curve response of the current account to currency depreciation. The chapter concludes with a discussion of exchange-rate pass-through, that is, the response of import prices to exchange rate movements.

The chapter begins with the development of an open-economy fixed-price model (Appendix I discuss the relationship between the IS-LM model and the analysis in this chapter). An aggregate demand function is derived using a Keynesian-cross diagram in which the real exchange rate serves as a shift parameter. A nominal currency depreciation increases output by stimulating exports and reducing imports, given foreign and domestic prices, fiscal policy, and investment levels. This yields a positively sloped output-market equilibrium (DD) schedule in exchange rate-output space. A negatively sloped asset-market equilibrium (AA) schedule completes the model. The derivation of this schedule follows from the analysis of previous chapters. For students who have already taken intermediate macroeconomics, you may want to point out that the intuition behind the slope of the AA curve is identical to that of the LM curve, with the additional relationship of interest parity providing the link between the closed-economy LM curve and the open-economy AA curve. As with the LM curve, higher income increases money demand and raises the home-currency interest rate (given real balances). In an open economy, higher interest rates require currency appreciation to satisfy interest parity (for a given future expected exchange rate).

The effects of temporary policies as well as the short-run and long-run effects of permanent policies can be studied in the context of the DD-AA model if we identify the expected future exchange rate with the long-run exchange rate examined in Chapters 14 and 15. In line with this interpretation, temporary policies are defined to be those which leave the expected exchange rate unchanged, while permanent policies are those which move the expected exchange rate to its new long-run level. As in the analysis in earlier chapters, in the long-run prices change to clear markets (if necessary). While the assumptions concerning the expectational effects of temporary and permanent policies are unrealistic as an exact description of an economy, they are pedagogically useful because they allow students to grasp how differing market expectations about the duration of policies can alter their qualitative effects. Students may find the distinction between temporary and permanent, on the one hand, and between short run and long run, on the other, a bit confusing at first. It is probably worthwhile to spend a few minutes discussing this topic.

Both temporary and permanent increases in money supply expand output in the short run through exchange rate depreciation. The long-run analysis of a permanent monetary change once again shows how the well-known Dornbusch overshooting result can occur. Temporary expansionary fiscal policy raises output in the short run and causes the exchange rate to appreciate. Permanent fiscal expansion, however, has no effect on output even in the short run. The reason for this is that, given the assumptions of the model, the currency appreciation in response to permanent fiscal expansion completely "crowds out" exports. This is a consequence of the effect of a permanent fiscal expansion on the expected long-run exchange rate which shifts inward the asset-market equilibrium curve. This model can be used to explain the consequences of U.S. fiscal and monetary policy between 1979 and 1984. The model explains the recession of 1982 and the appreciation of the dollar as a result of tight monetary and loose fiscal policy.

The chapter concludes with some discussion of real-world modifications of the basic model. Recent experience casts doubt on a tight, unvarying relationship between movements in the nominal exchange rate and shifts in competitiveness and thus between nominal exchange rate movements and movements in the trade balance as depicted in the DD-AA model. Exchange-rate pass-through is less than complete and thus nominal exchange rate movements are not translated one-for-one into changes in the real exchange rate. Also, the current account may worsen immediately after currency depreciation. This J-curve effect occurs because of time lags in deliveries and because of low elasticities of demand in the short run as compared to the long run. The chapter contains a discussion of the way in which the analysis of the model

would be affected by the inclusion of incomplete exchange-rate pass-through and time-varying elasticities. Appendix III provides further information on trade elasticities with a presentation of the Marshall-Lerner conditions and a reporting of estimates of the impact, short-run and long-run elasticities of demand for international trade in manufactured goods for a number of countries.

### ANSWERS TO TEXTBOOK PROBLEMS

1. A decline in investment demand decreases the level of aggregate demand for any level of the exchange rate. Thus, a decline in investment demand causes the DD curve to shift to the left.
  
2. A tariff is a tax on the consumption of imports. The demand for domestic goods, and thus the level of aggregate demand, will be higher for any level of the exchange rate. This is depicted in figure 16-1 as a rightward shift in the output market schedule from DD to D'D'. If the tariff is temporary, this is the only effect and output will rise even though the exchange rate appreciates as the economy moves from point 0 to point 1. If the tariff is permanent, however, the long-run expected exchange rate appreciates, so the asset market schedule shifts to A'A'. The appreciation of the currency is sharper in this case. If output is initially at full employment then there is no change in output due to a permanent tariff.

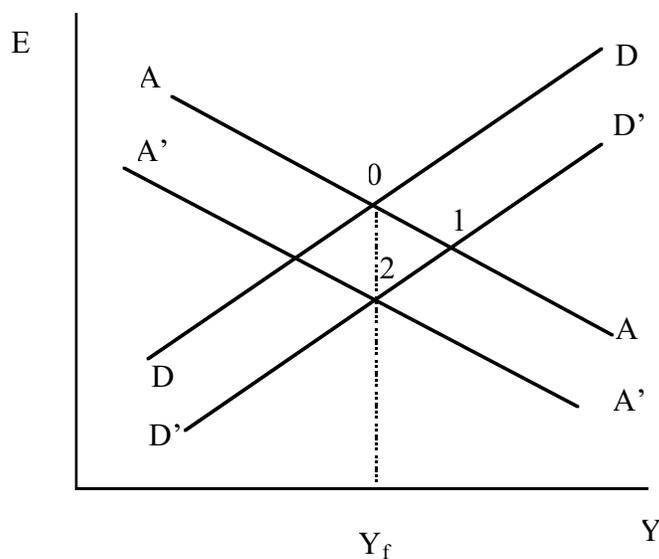


Figure 16-1

3. A temporary fiscal policy shift affects employment and output, even if the government maintains a balanced budget. An intuitive explanation for this relies upon the different propensities to consume of the government and of taxpayers. If the government spends \$1 more and finances this spending by taxing the public \$1 more, aggregate demand will have risen because the government spends the entire \$1 while the public reduces its spending by less than \$1 (choosing to reduce its saving as well as its consumption). The ultimate effect on aggregate demand is even larger than this first round difference between government and public spending propensities, since the first round generates subsequent spending (Of course, currency appreciation still prevents permanent fiscal shifts from affecting output in our model.)
  
4. A permanent fall in private aggregate demand causes the DD curve to shift inward and to the left and, because the expected future exchange rate depreciates, the AA curve shifts outward and to the right. These two shifts result in no effect on output, however, for the same reason that a permanent fiscal expansion has no effect on output. The net effect is a depreciation in the nominal exchange rate and, because prices will not change, a corresponding real exchange rate depreciation. A macroeconomic policy response to this event would not be warranted.

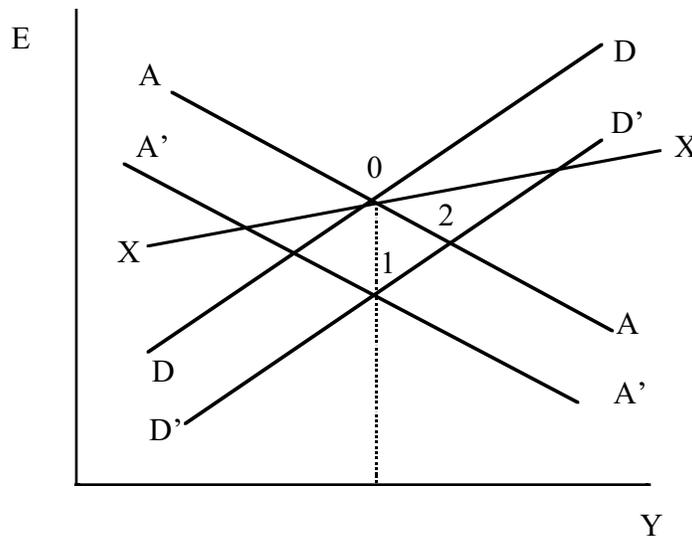


Figure 16-2

5. Figure 16-2 can be used to show that any permanent fiscal expansion worsens the current account. In this diagram, the schedule XX represents combinations of the exchange rate and income for which the current account is in balance. Points above

and to the left of  $XX$  represent current account surplus and points below and to the right represent current account deficit. A permanent fiscal expansion shifts the  $DD$  curve to  $D'D'$  and, because of the effect on the long run exchange rate, the  $AA$  curve shifts to  $A'A'$ . The equilibrium point moves from 0, where the current account is in balance, to 1, where there is a current account deficit. If, instead, there was a temporary fiscal expansion of the same size, the  $AA$  curve would not shift and the new equilibrium would be at point 2 where there is a current account deficit, although it is smaller than the current account deficit at point 1.

6. A temporary tax cut shifts the  $DD$  curve to the right and, in the absence of monetization, has no effect on the  $AA$  curve. In figure 16-3, this is depicted as a shift in the  $DD$  curve to  $D'D'$ , with the equilibrium moving from point 0 to point 1. If the deficit is financed by future monetization, the resulting expected long-run nominal depreciation of the currency causes the  $AA$  curve to shift to the right to  $A'A'$  which gives us the equilibrium point 2. The net effect on the exchange rate is ambiguous, but output certainly increases more than in the case of a pure fiscal shift.

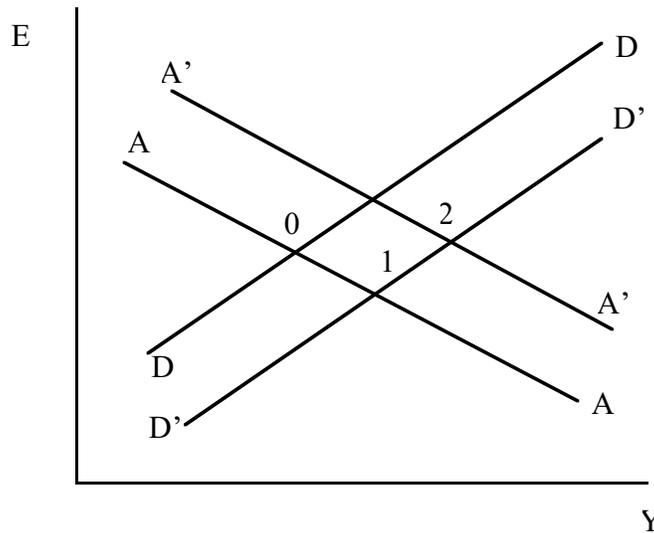


Figure 16-3

7. A currency depreciation accompanied by a deterioration in the current account balance could be caused by factors other than a J-curve. For example, a fall in foreign demand for domestic products worsens the current account and also lowers aggregate demand, depreciating the currency. In terms of figure 16-4,  $DD$  and  $XX$  undergo equal vertical shifts, to  $D'D'$  and  $X'X'$ , respectively, resulting in a current account deficit as the

equilibrium moves from point 0 to point 1. To detect a J-curve, one might check whether the prices of imports in terms of domestic goods rise when the currency is depreciating, offsetting a decline in import volume and a rise in export volume.

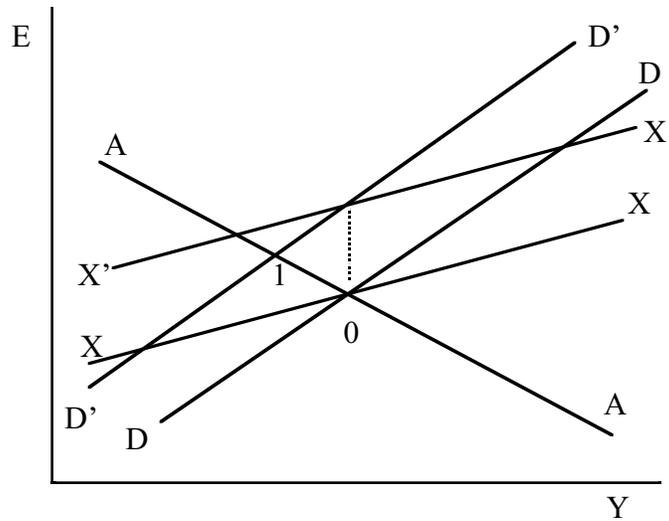


Figure 16-4

8. The expansionary money supply announcement causes a depreciation in the expected long-run exchange rate and shifts the AA curve to the right. This leads to an immediate increase in output and a currency depreciation. The effects of the anticipated policy action thus precede the policy's actual implementation.

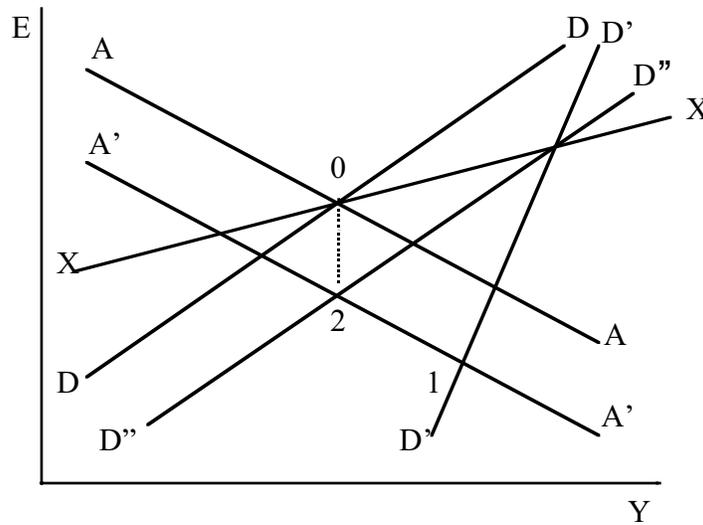


Figure 16-5

9. If exchange rate pass-through is incomplete in the short-run then the DD curve becomes steeper; a given appreciation of the exchange rate crowds out less imports because the foreign currency price of these imports falls concurrent with the appreciation of the currency. In this case, a permanent fiscal expansion both shifts out the DD curve and, because of pricing behavior by foreign exporters, makes it steeper. This results in an increase in output along with a current account deficit, as depicted in figure 16-5 by a shift from DD to D'D' which shifts the equilibrium point from 0 to 1. Over time, as the foreign currency price of imports rise, the slope of the DD returns to its original value, which reduces output and offsets, to some extent, the current account deficit. In the diagram, this is depicted as a movement from point 1 to point 2 with a flattening of the output market curve from D'D' to D''D''. Thus, low government and private savings caused the current account deficit, but incomplete pass-through exacerbated the initial effect on the current account.
10. The DD curve might be negatively sloped in the very short run if there is a J-curve, though the absolute value of its slope would probably exceed that of AA. This is depicted in figure 16-6. The effects of a temporary fiscal expansion, depicted as a shift in the output market curve to D'D', would not be altered since it would still expand output and appreciate the currency in this case (the equilibrium point moves from 0 to 1).

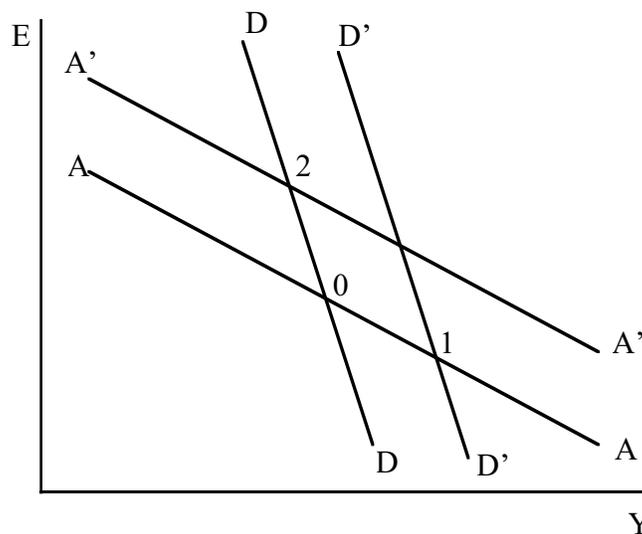


Figure 16-6

Monetary expansion, however, while depreciating the currency, would reduce output in the very short run. This is shown by a shift in the AA curve to A'A' and a movement in the equilibrium point from 0 to 2. Only after some time would the expansionary effect of monetary policy take hold (assuming the domestic price level did not react too quickly).

11. The derivation of the Marshall-Lerner condition uses the assumption of a balanced current account to substitute EX for  $(q \times EX^*)$ . We cannot make this substitution when the current account is not initially zero. Instead, we define the variable  $z = (q \times EX^*)/EX$ . This variable is the ratio of imports to exports, denominated in common units. When there is a current account surplus,  $z$  will be less than 1 and when there is a current account deficit  $z$  will exceed 1. It is possible to take total derivatives of each side of the equation  $CA = EX - q EX^*$  and derive a general Marshall-Lerner condition as  $n + z n^* > z$ , where  $n$  and  $n^*$  are as defined in the appendix. The balanced current account ( $z=1$ ) Marshall-Lerner condition is a special case of this general condition. A depreciation is less likely to improve the current account the larger its initial deficit when  $n^*$  is less than 1. Conversely, a depreciation is more likely to cause an improvement in the current account the larger its initial surplus, again for values of  $n^*$  less than 1.

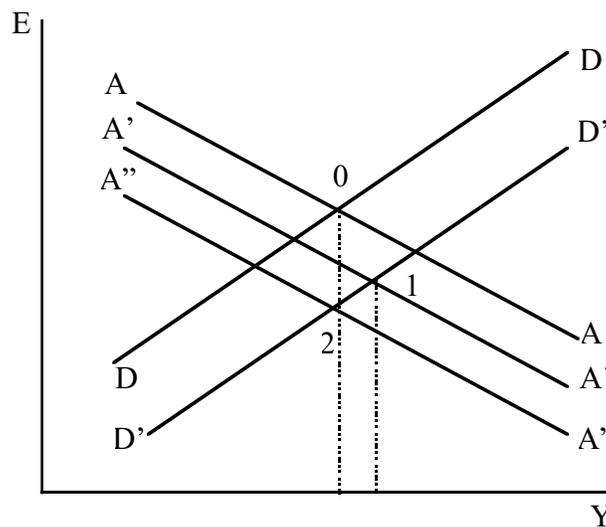


Figure 16-7

12. If imports constitute part of the CPI then a fall in import prices due to an appreciation of the currency will cause the overall price level to decline. The fall in the price level

raises real balances. As shown in diagram 16-7, the shift in the output market curve from DD to D'D' is matched by an inward shift of the asset market equilibrium curve. If import prices are not in the CPI and the currency appreciation does not affect the price level, the asset market curve shifts to A''A'' and there is no effect on output, even in the short run. If, however, the overall price level falls due to the appreciation, the shift in the asset market curve is smaller, to A'A', and the initial equilibrium point, point 1, has higher output than the original equilibrium at point 0. Over time, prices rise when output exceeds its long-run level, causing a shift in the asset market equilibrium curve from A'A' to A''A'', which returns output to its long-run level.

13. An increase in the risk premium shifts the asset market curve out and to the right, all else equal. A permanent increase in government spending shifts the asset market curve in and to the right since it causes the expected future exchange rate to appreciate. A permanent rise in government spending also causes the goods market curve to shift down and to the right since it raises aggregate demand. In the case where there is no risk premium, the new intersection of the DD and AA curve after a permanent increase in government spending is at the full-employment level of output since this is the only level consistent with no change in the long-run price level. In the case discussed in this question, however, the nominal interest rate rises with the increase in the risk premium. Therefore, output must also be higher than the original level of full-employment output; as compared to the case in the text, the AA curve does not shift by as much so output rises.
  
14. Suppose output is initially at full employment. A permanent change in fiscal policy will cause both the AA and DD curves to shift such that there is no effect on output. Now consider the case where the economy is not initially at full employment. A permanent change in fiscal policy shifts the AA curve because of its effect on the long-run exchange rate and shifts the DD curve because of its effect on expenditures. There is no reason, however, for output to remain constant in this case since its initial value is not equal to its long-run level, and thus an argument like the one in the text that shows the neutrality of permanent fiscal policy on output does not carry through. In fact, we might expect that an economy that begins in a recession (below  $Y_f$ ) would be stimulated back towards  $Y_f$  by a positive permanent fiscal shock. If  $Y$  does rise permanently, we would expect a permanent drop in the price level (since  $M$  is constant). This fall in  $P$  in the long run would move AA and DD both out. We could also consider the fact that in the case where we begin at full employment and there is

no impact on  $Y$ ,  $AA$  was shifting back due to the real appreciation necessitated by the increase in demand for home products (as a result of the increase in  $G$ ). If there is a permanent increase in  $Y$ , there has also been a relative supply increase which can offset the relative demand increase and weaken the need for a real appreciation. Because of this,  $AA$  would shift back by less. We do not know the exact effect without knowing how far the lines originally move (the size of the shock), but we do know that without the restriction that  $Y$  is unchanged in the long run, the argument in the text collapses and we can have both short run and long run effects on  $Y$ .

15. The text shows output cannot rise following a permanent fiscal expansion if output is initially at its long-run level. Using a similar argument, we can show that output cannot fall from its initial long-run level following a permanent fiscal expansion. A permanent fiscal expansion cannot have an effect on the long-run price level since there is no effect on the money supply or the long-run values of the domestic interest rate and output. When output is initially at its long-run level,  $R$  equals  $R^*$ ,  $Y$  equals  $Y^f$  and real balances are unchanged in the short run. If output did fall, there would be excess money supply and the domestic interest rate would have to fall, but this would imply an expected appreciation of the currency since the interest differential ( $R - R^*$ ) would then be negative. This, however, could only occur if the currency appreciates in real terms as output rises and the economy returns to long-run equilibrium. This appreciation, however, would cause further unemployment and output would not rise and return back to  $Y^f$ . As with the example in the text, this contradiction is only resolved if output remains at  $Y^f$ .

## **FURTHER READINGS**

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## CHAPTER 17

# FIXED EXCHANGE RATES AND FOREIGN EXCHANGE INTERVENTION

### *Chapter Organization*

Why Study Fixed Exchange Rates?

Central Bank Intervention and the Money Supply

The Central Bank Balance Sheet and the Money Supply

Foreign Exchange Intervention and the Money Supply

Sterilization

The Balance of Payments and the Money Supply

How the Central Bank Fixes the Exchange Rate

Foreign Exchange Market Equilibrium Under a Fixed Exchange Rate

Money Market Equilibrium Under a Fixed Exchange Rate

A Diagrammatic Analysis

Stabilization Policies With a Fixed Exchange Rate

Monetary Policy

Fiscal Policy

Changes in the Exchange Rate

Adjustment to Fiscal Policy and Exchange Rate Changes

Case Study: Fixing the Exchange Rate to Escape From a Liquidity Trap

Balance of Payments Crises and Capital Flight

Box: Mexico's 1994 Balance of Payments Crisis

Managed Floating and Sterilized Intervention

Perfect Asset Substitutability and the Ineffectiveness of Sterilized Intervention

Foreign Exchange Market Equilibrium Under Imperfect Asset Substitutability

The Effects of Sterilized Intervention with Imperfect Asset Substitutability

Evidence on the Effects of Sterilized Intervention

The Signaling Effect of Intervention

Reserve Currencies in the World Monetary System

The Mechanics of a Reserve Currency Standard

The Asymmetric Position of the Reserve Center

The Gold Standard

- The Mechanics of a Gold Standard
- Symmetric Monetary Adjustment Under a Gold Standard
- Benefits and Drawbacks of the Gold Standard
- Bimetallic Standard
- The Gold-Exchange Standard
- Appendix I: Equilibrium in the Foreign-Exchange Market with Imperfect Asset Substitutability
- Appendix II: The Monetary Approach to the Balance of Payments
- Appendix III: The Timing of Balance of Payments Crises

## **CHAPTER OVERVIEW**

Open-economy macroeconomic analysis under fixed exchange rates is dual to the analysis of flexible exchange rates. Under fixed exchange rates, attention is focused on the effects of policies on the balance of payments (and the domestic money supply), taking the exchange rate as given. Conversely, under flexible exchange rates with no official foreign-exchange intervention, the balance of payments equals zero, the money supply is a policy variable, and analysis focuses on exchange rate determination. In the intermediate case of managed floating, both the money supply and the exchange rate become, to an extent which is determined by central-bank policies, endogenous.

This chapter analyzes various types of monetary policy regimes under which the degree of exchange-rate flexibility is limited. The reasons for devoting a chapter to this topic, almost thirty years after the breakdown of the Bretton Woods system, include the prevalence of managed floating among industrialized countries, the common use of fixed exchange rate regimes among developing countries, the existence of regional currency arrangements such as the Exchange Rate Mechanism through which some European nations peg to the euro, the recurrent calls for a new international monetary regime based upon more aggressive exchange-rate management, and the irrevocably fixed rates among countries which use the euro (a topic addressed in depth in Chapter 20).

The chapter begins with an analysis of a stylized central bank balance sheet to show the link between the balance of payments, official foreign-exchange intervention, and the domestic money supply. Also described is sterilized intervention in foreign exchange, which changes the composition of interest-bearing assets held by the public but not the money supply. This analysis is then combined with the exchange-rate determination analysis of Chapter 14 to

demonstrate the manner in which central banks alter the money supply to peg the nominal exchange rate. The endogeneity of the money supply under fixed exchange rates emerges as a key lesson of this discussion.

The tools developed in Chapter 16 are employed to demonstrate the impotence of monetary policy and the effectiveness of fiscal policy under a fixed exchange rate regime. The short-run and long-run effects of devaluation and revaluation are examined. The setup already developed suggests a natural description of balance of payments crises as episodes in which the public comes to expect a future currency devaluation. Such an expectation causes private capital flight and, as its counterpart, sharp official reserve losses. Different explanations of currency crises are explored, both those that argue that crises result from inconsistent policies and those that maintain crises are not necessarily inevitable but instead result from self-fulfilling expectations. (See Appendix III to this chapter for a more detailed analysis.)

Equipped with an understanding of the polar cases of fixed and floating rates, the student is in a position to appreciate the more realistic intermediate case of managed floating. The discussion of managed floating focuses on the role of sterilized foreign-exchange intervention and the theory of imperfect asset substitutability. The inclusion of a risk premium in the model enriches the analysis by allowing governments some scope to run independent exchange rate and monetary policies in the short run. The chapter reviews the results of attempts to demonstrate empirically the effectiveness of sterilized foreign-exchange operations which, however, are generally negative. Also discussed is the role of central-bank intervention as a "signal" of future policy actions and the credibility problems entailed by such a strategy.

At this point, the discussion abandons the small-country framework in favor of a systemic perspective to discuss the properties of two different fixed exchange rate systems: the reserve-currency systems and the gold standards. A key distinction between these systems is the asymmetry between the reserve center and the rest of the world compared to the symmetric adjustment among all countries under the gold standard. It is shown that this asymmetry gives the reserve center exclusive control over world monetary conditions (at least when interest parity links countries' money markets).

The chapter ends with a discussion of the pros and cons of the gold standard and the gold-exchange standard. Appendix I presents a more detailed model of exchange-rate determination with imperfect asset substitutability. Appendix II describes the monetary

approach to the balance of payments and its usefulness as a tool of policy analysis. Appendix III provides an analysis of the timing of balance of payments crises.

### **ANSWERS TO TEXTBOOK PROBLEMS**

1. An expansion of the central bank's domestic assets leads to an equal fall in its foreign assets, with no change in the bank's liabilities (or the money supply). The effect on the balance-of-payments accounts is most easily understood by recalling how the fall in foreign reserves comes about. After the central bank buys domestic assets with money there is initially an excess supply of money. The central bank must intervene in the foreign exchange market to hold the exchange rate fixed in the face of this excess supply: the bank sells foreign assets and buys money until the excess supply of money has been eliminated. Since private residents acquire the reserves the central bank loses, there is a non-central bank capital outflow (a capital-account debit) equal to the increase in foreign assets held by the private sector. The offsetting credit is the reduction in central bank holdings of foreign assets, an official capital inflow.
2. An increase in government spending raises income and also money demand. The central bank prevents the initial excess money demand from appreciating the domestic currency by purchasing foreign assets from the domestic public. Central bank foreign assets rise, as do the central bank's liabilities and with them, the money supply. The central bank's additional reserve holdings show up as an official capital outflow, a capital-account debit. Offsetting this debit is the capital inflow (a credit) associated with the public's equal reduction in its own foreign assets.
3. A one-time unexpected devaluation initially increases output; the output increase, in turn, raises money demand. The central bank must accommodate the higher money demand by buying foreign assets with domestic currency, a step that raises the central bank's liabilities (and the home money supply) at the same time as it increases the bank's foreign assets. The increase in official foreign reserves is an official capital outflow; it is matched in the balance of payments accounts by the equal capital outflow associated with the public's own reduction in net foreign asset holdings. (The public must exchange foreign assets for the money it buys from the central bank, either by selling foreign assets or by borrowing foreign currency abroad. Either course of action is a capital inflow.)

A more subtle issue is the following: when the price of foreign currency is raised, the value of the initial stock of foreign reserves rises when measured in terms of domestic currency. This capital gain in itself raises central-bank foreign assets (which were measured in domestic currency units in our analysis)--so where is the corresponding increase in liabilities? Does the central bank inject more currency or bank-system reserves into the economy to balance its balance sheet? The answer is that central banks generally create fictional accounting liabilities to offset the effect of exchange-rate fluctuations on the home-currency value of international reserves. These capital gains and losses do not automatically lead to changes in the monetary base.

4. As shown in figure 17-1, a devaluation causes the AA curve to shift to A'A' which reflects an expansion in both output and the money supply in the economy. Diagram 17-1 also contains an XX curve along which the current account is in balance. The initial equilibrium, at point 0, was on the XX curve, reflecting the fact that the current account was in balance there. After the devaluation, the new equilibrium point is above and to the left of the XX curve, in the region where the current account is in surplus. With fixed prices, a devaluation improves an economy's competitiveness, increasing its exports, decreasing its imports and raising the level of output.

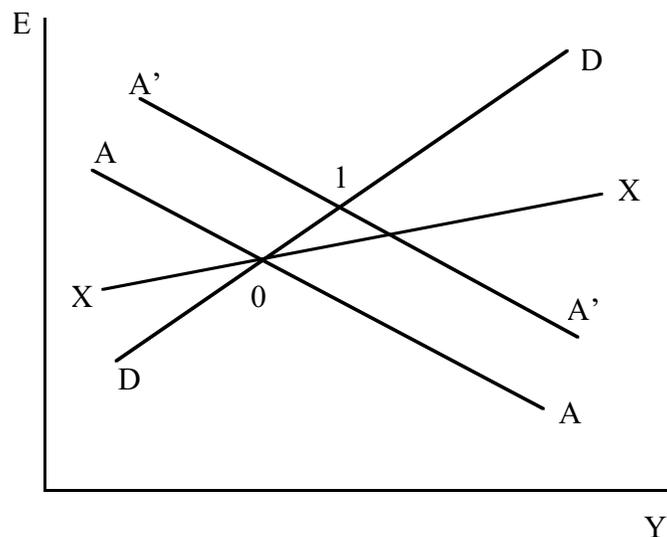


Figure 17-1

5. a. Germany clearly had the ability to change the dollar/DM exchange simply by altering its money supply. The fact that "billions of dollars worth of currencies are traded each day" is irrelevant because exchange rates equilibrate markets for stocks of assets, and the trade volumes mentioned are flows.

- b. One must distinguish between sterilized and nonsterilized intervention. The evidence regarding sterilized intervention suggests that its effects are limited to the signaling aspect. This aspect may well be most important when markets are "unusually erratic," and the signals communicated may be most credible when the central bank is not attempting to resist clear-cut market trends (which depend on the complete range of government macroeconomic policies, among other factors). Nonsterilized intervention, however, is a powerful instrument in affecting exchange rates.
- c. The "psychological effect" of a "stated intention" to intervene may be more precisely stated as an effect on the expected future level of the exchange rate.

- d. A rewrite might go as follows:

To keep the dollar from falling against the West German mark, the European central banks would have to sell marks and buy dollars, a procedure known as intervention.

Because the available stocks of dollar and mark bonds are so large, it is unlikely that sterilized intervention in the dollar/mark market, even if carried out by the two most economically influential members of the European Community--Britain and West Germany--would have much effect. The reason is that sterilized intervention changes only relative bond supplies and leaves national money supplies unchanged. Intervention by the United States and Germany that was not sterilized, however, would affect those countries' money supplies and have a significant impact on the dollar/mark rate.

Economists believe that the direct influence of sterilized intervention on exchange rates is small compared with that of nonsterilized intervention. Even sterilized intervention can affect exchange rates, however, through its indirect influence on market expectations about future policies. Such psychological effects, which can result from just the stated intention of the Community's central banks to intervene, can disrupt the market by confusing traders about official plans. The signaling effect of intervention is most likely to benefit the authorities when their other macroeconomic policies are already being adjusted to push the exchange rate in the desired direction.

- 6. The problems caused by exchange-rate variability are discussed at length in Chapter 19; some monetary policy autonomy might willingly be sacrificed to reduce these problems. Policy-makers might also sacrifice autonomy to enter into cooperative arrangements with foreign policy-makers that reduce the risk of "beggar-thy-neighbor" policy actions (see the appendix to Chapter 19).

7. By raising output, fiscal expansion raises imports and thus worsens the current-account balance. The immediate fall in the current account is smaller than under floating, however, because the currency does not appreciate and crowd out net exports.
8. The reason that the effects of temporary and permanent fiscal expansions differ under floating exchange rates is that a temporary policy has no effect on the expected exchange rate while a permanent policy does. The AA curve shifts with a change in the expected exchange rate. In terms of the diagram, a permanent fiscal expansion causes the AA curve to shift down and to the left which, combined with the outward shift in the DD curve, results in no change in output. With fixed exchange rates, however, there is no change in the expected exchange rate with either policy since the exchange rate is, by definition, fixed. In response to both temporary and permanent fiscal expansions, the central bank must expand the money supply (shift AA out) to prevent the currency from appreciating (due to the shift out in the DD curve). Thus,  $Y$  goes up and  $E$  does not change after a permanent or temporary fiscal expansion when exchange rates are fixed.
9. By expanding output, a devaluation automatically raises private saving, since part of any increase in output is saved. Government tax receipts rise with output, so the budget deficit is likely to decline, implying an increase in public saving. We have assumed investment to be constant in the main text. If investment instead depends negatively on the real interest rate (as in the IS-LM model), investment rises because devaluation raises inflationary expectations and thus lowers the real interest rate. (The nominal interest rate remains unchanged at the world level.) The interest-sensitive components of consumption spending also rise, and if these interest-rate effects are strong enough, a current-account deficit could result.
10. An import tariff raises the price of imports to domestic consumers and shifts consumption from imports to domestically produced goods. This causes an outward shift in the DD curve, increasing output and appreciating the currency. Since the central bank cannot allow exchange rates to change, it must increase the money supply, an action depicted in the diagram as an outward shift in the AA schedule. Corresponding to this monetary expansion is a balance of payments surplus and an equal increase in official foreign reserves.

The fall in imports for one country implies a fall in exports for another country, and a corresponding inward shift of that country's DD curve necessitating a monetary

contraction by the central bank to preserve its fixed exchange rate. If all countries impose import tariffs, then no country succeeds in turning world demand in its favor or in gaining reserves through an improvement in its balance of payments. Trade volumes shrink, however, and all countries lose some of the gains from trade.

11. If the market expects the devaluation to "stick," the home nominal interest rate falls to the world level afterward, money demand rises, and the central bank buys foreign assets with domestic money to prevent excess money demand from appreciating the currency. The central bank thus gains official reserves, according to our model. Even if another devaluation was to occur in the near future, reserves might be gained if the first devaluation lowered the depreciation expected for the future and, with it, the home nominal interest rate. An inadequate initial devaluation could, however, increase the devaluation expected for the future, with opposite effects on the balance of payments.
12. If the Bank of Japan holds U.S. dollars instead of Treasury bills, the adjustment process is symmetric. Any purchase of dollars by the Bank of Japan leads to a fall in the U.S. money supply as the dollar bills go out of circulation and into the Bank of Japan's vaults. A Japanese balance of payments surplus increases the Bank of Japan's money supply (if there is no sterilization) and reduces the U.S. money supply at the same time.
13. A central bank that is maintaining a fixed exchange rate will require an adequate buffer stock of foreign assets on hand during periods of persistent balance of payments deficits. If a central bank depletes its stock of foreign reserves, it is no longer able to keep its exchange rate from depreciating in response to pressures arising from a balance of payments deficit. Simply put, a central bank can either choose the exchange rate and allow its reserve holdings to change or choose the amount of foreign reserves it holds and allow the exchange rate to float. If it loses the ability to control the amount of reserves because the private demand for them exceeds its supply, it can no longer control the exchange rate. Thus, a central bank maintaining a fixed exchange rate is not indifferent about using domestic or foreign assets to implement monetary policy.
14. An ESF intervention to support the yen involves an exchange of dollar-denominated assets initially owned by the ESF for yen-denominated assets initially owned by the private sector. Since this is an exchange of one type of bond for another there is no

change in the money supply and thus this transaction is automatically sterilized. This transaction increases the outstanding stock of dollar-denominated assets held by the private sector, which increases the risk premium on dollar-denominated assets.

15. The monetary authorities can combine a change in the money supply with a purchase or sale of its foreign assets to keep the exchange rate fixed while altering the domestic interest rate. For example, the monetary authorities lower domestic interest rates by increasing the money supply. To maintain a fixed value of the exchange rate, the monetary authority would also sell foreign assets and purchase domestic assets. In the figure below, the increase in the money supply lowers the interest rate from  $R_0$  to  $R'$ . The purchase of domestic assets and sale of foreign assets, while having no further effect on the money supply, lowers the risk premium, shifts the interest parity schedule from  $II$  to  $II'$  and maintains the exchange rate at  $E_0$ .

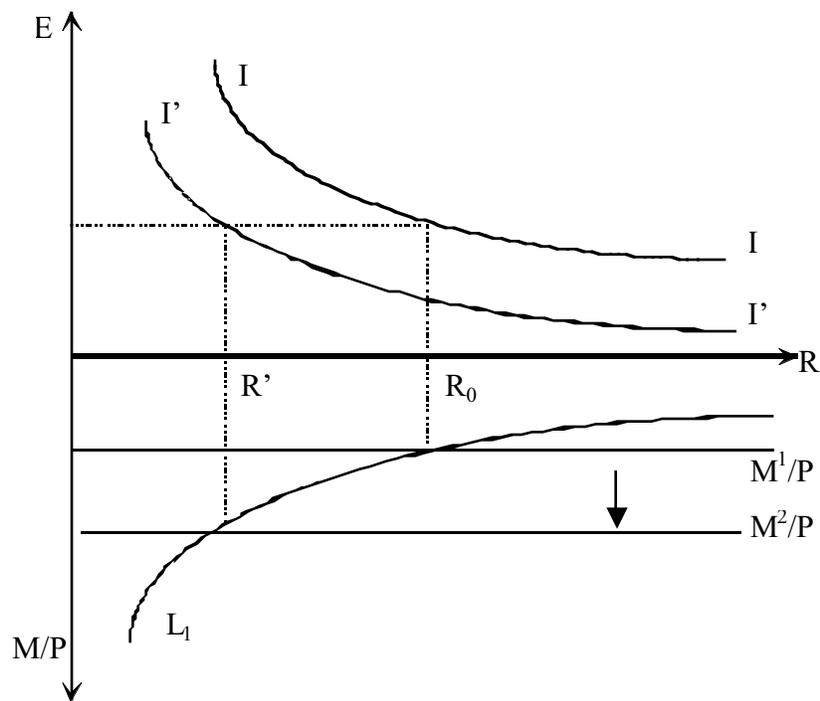


Figure 17-2

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## ***OVERVIEW OF SECTION IV: INTERNATIONAL MACROECONOMIC POLICY***

Part IV of the text is comprised of five chapters:

- Chapter 18 The International Monetary System, 1870-1973
- Chapter 19 Macroeconomic Policy and Coordination Under Floating Exchange Rates
- Chapter 20 Optimum Currency Areas and The European Experience
- Chapter 21 The Global Capital Market: Performance and Policy Problems
- Chapter 22 Developing Countries: Growth, Crisis, and Reform

### **SECTION OVERVIEW**

This final section of the book, which discusses international macroeconomic policy, provides historical and institutional background to complement the theoretical presentation of the previous section. These chapters also provide an opportunity for students to hone their analytic skills and intuition by applying and extending the models learned in Part III to a range of current and historical issues.

The first two chapters of this section discuss various international monetary arrangements. These chapters describe the workings of different exchange rate systems through the central theme of internal and external balance. The model developed in the previous section provides a general framework for analysis of gold standard, reserve currency, managed floating, and floating exchange-rate systems.

Chapter 18 chronicles the evolution of the international monetary system from the gold standard of 1870 - 1914, through the interwar years, and up to and including the post-war Bretton Woods period. The chapter discusses the price-specie-flow mechanism of adjustment in the context of the discussion of the gold standard. Conditions for internal and external balance are presented through diagrammatic analysis based upon the short-run macroeconomic model of Chapter 16. This analysis illustrates the strengths and weaknesses of alternative fixed exchange rate arrangements. The chapter also draws upon earlier discussion of balance of payments crises to make clear the interplay between "fundamental disequilibrium" and speculative attacks. There is a detailed analysis of the Bretton Woods

system that includes a case study of the experience during its decline beginning in the mid-1960s and culminating with its collapse in 1973.

Chapter 19 focuses on recent experience under floating exchange rates. The discussion is couched in terms of current debate concerning the advantages of floating versus fixed exchange rate systems. The theoretical arguments for and against floating exchange rates frame two case studies, the first on the experience between the two oil shocks in the 1970s and the second on the experience since 1980. The transmission of monetary and fiscal shocks from one country to another is also considered. Discussion of the experience in the 1980s points out the shift in policy toward greater coordination in the second half of the decade. Discussion of the 1990s focuses on the strong U.S. economy from 1992 on and the extended economic difficulties in Japan. Finally, the chapter considers what has been learned about floating rates since 1973. The appendix illustrates losses arising from uncoordinated international monetary policy using a game theory setup.

Europe's switch to a single currency, the euro, is the subject of Chapter 20, and provides a particular example of a single currency system. The chapter discusses the history of the European Monetary System and its precursors. The early years of the E.M.S. were marked by capital controls and frequent realignments. By the end of the 1980s, however, there was marked inflation convergence among E.M.S. members, few realignments and the removal of capital controls. Despite a speculative crisis in 1992-3, leaders pressed on with plans for the establishment of a single European currency as outlined in the Maastricht Treaty which created Economic and Monetary Union (EMU). The single currency was viewed as an important part of the EC 1992 initiative which called for the free flow within Europe of labor, capital, goods and services. The single currency, the euro, was launched on January 1, 1999 with eleven original participants. These countries have ceded monetary authority to a supranational central bank and constrained their fiscal policy with agreements on convergence criteria and the stability and growth pact. A single currency imposes costs as well as confers benefits. The theory of optimum currency areas suggests conditions which affect the relative benefits of a single currency. The chapter provides a way to frame this analysis using the GG-LL diagram which compares the gains and losses from a single currency. Finally, the chapter examines the prospects of the EU as an optimal currency area compared to the United States and considers the future challenges EMU will face.

The international capital market is the subject of Chapter 21. This chapter draws an analogy between the gains from trade arising from international portfolio diversification and

international goods trade. There is discussion of institutional structures that have arisen to exploit these gains. The chapter discusses the Eurocurrency market, the regulation of offshore banking, and the role of international financial supervisory cooperation. The chapter examines policy issues of financial markets, the policy trilemma of the incompatibility of fixed rates, independent monetary policy, and capital mobility as well as the tension between supporting financial stability and creating a moral hazard when a government intervenes in financial markets. The chapter also considers evidence of how well the international capital market has performed by focusing on issues such as the efficiency of the foreign exchange market and the existence of excess volatility of exchange rates.

Chapter 22 discusses issues facing developing countries. The chapter begins by identifying characteristics of the economies of developing countries, characteristics that include undeveloped financial markets, pervasive government involvement, and a dependence on commodity exports. The macroeconomic analysis of previous chapters again provides a framework for analyzing relevant issues, such as inflation in or capital flows to developing countries. Borrowing by developing countries is discussed as an attempt to exploit gains from intertemporal trade and is put in historical perspective. Latin American countries' problems with inflation and subsequent attempts at reform are detailed. Finally, the East Asian economic miracle is revisited (it is discussed in Chapter 10), and the East Asian financial crisis is examined. This final topic provides an opportunity to discuss possible reforms of the world's financial architecture.

## CHAPTER 18

### THE INTERNATIONAL MONETARY SYSTEM, 1870-1973

#### *Chapter Organization*

Macroeconomic Policy Goals in an Open Economy

Internal Balance: Full Employment and Price-Level Stability

External Balance: The Optimal Level of the Current Account

International Macroeconomic Policy Under the Gold Standard, 1870-1914

Origins of the Gold Standard

External Balance Under the Gold Standard

The Price-Specie-Flow Mechanism

The Gold Standard "Rules of the Game": Myth and Reality

Box: Hume v. the Mercantilists

Internal Balance Under the Gold Standard

Case Study: The Political Economy of Exchange Rate Regimes: Conflict Over America's Monetary Standard During the 1890s

The Interwar Years, 1918-1939

The German Hyperinflation

The Fleeting Return to Gold

International Economic Disintegration

Case Study: The International Gold Standard and the Great Depression

The Bretton Woods System and the International Monetary Fund

Goals and Structure of the IMF

Convertibility

Internal and External Balance Under the Bretton Woods System

The Changing Meaning of External Balance

Speculative Capital Flows and Crises

Analyzing Policy Options Under the Bretton Woods System

Maintaining Internal Balance

Maintaining External Balance

Expenditure-Changing and Expenditure-Switching Policies

The External-Balance Problem of the United States

Case Study: The Decline and Fall of the Bretton Woods System

## Worldwide Inflation and the Transition to Floating Rates

### Summary

#### **CHAPTER OVERVIEW**

This is the first of five international monetary policy chapters. These chapters complement the preceding theory chapters in several ways. They provide the historical and institutional background students require to place their theoretical knowledge in a useful context. The chapters also allow students, through study of historical and current events, to sharpen their grasp of the theoretical models and to develop the intuition those models can provide. (Application of the theory to events of current interest will hopefully motivate students to return to earlier chapters and master points that may have been missed on the first pass.)

Chapter 18 chronicles the evolution of the international monetary system from the gold standard of 1870-1914, through the interwar years, and up to and including the post-World War II Bretton Woods regime that ended in March 1973. The central focus of the chapter is the manner in which each system addressed, or failed to address, the requirements of internal and external balance for its participants. A country is in internal balance when its resources are fully employed and there is price level stability. External balance implies an optimal time path of the current account subject to its being balanced over the long run. Other factors have been important in the definition of external balance at various times, and these are discussed in the text. The basic definition of external balance as an appropriate current-account level, however, seems to capture a goal that most policy-makers share regardless of the particular circumstances.

The price-specie-flow mechanism described by David Hume shows how the gold standard could ensure convergence to external balance. You may want to present the following model of the price-specie-flow mechanism. This model is based upon three equations:

1. The balance sheet of the central bank. At the most simple level, this is just gold holdings equals the money supply:  $G = M$ .
2. The quantity theory. With velocity and output assumed constant and both normalized to 1, this yields the simple equation  $M = P$ .
3. A balance of payments equation where the current account is a function of the real exchange rate and there are no private capital flows:  $CA = f(E \cdot P^*/P)$

These equations can be combined in a figure like the one below. The 45° line represents the quantity theory and the vertical line is the price level where the real exchange rate results in a balanced current account. The economy moves along the 45° line back towards the equilibrium point 0 whenever it is out of equilibrium. For example, the loss of four-fifths of a country's gold would put that country at point a with lower prices and a lower money supply. The resulting real exchange rate depreciation causes a current account surplus which restores money balances as the country proceeds up the 45° line from a to 0.

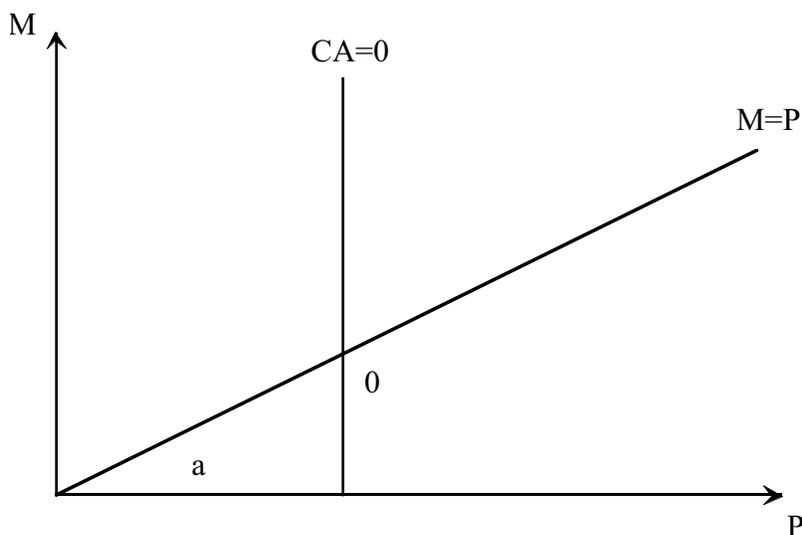


Figure 18-1

The automatic adjustment process described by the price-specie-flow mechanism is expedited by following "rules of the game" under which governments contract the domestic source components of their monetary bases when gold reserves are falling (corresponding to a current-account deficit) and expand when gold reserves are rising (the surplus case).

In practice, there was little incentive for countries with expanding gold reserves to follow the "rules of the game". This increased the contractionary burden shouldered by countries with persistent current account deficits. The gold standard also subjugated internal balance to the demands of external balance. Research suggests price-level stability and high employment were attained less consistently under the gold standard than in the post-1945 period.

The interwar years were marked by severe economic instability. The monetization of war debt and of reparation payments led to episodes of hyperinflation in Europe. An ill-fated attempt to return to the pre-war gold parity for the pound led to stagnation in Britain.

Competitive devaluations and protectionism were pursued in a futile effort to stimulate domestic economic growth during the Great Depression. These beggar-thy-neighbor policies provoked foreign retaliation and led to the disintegration of the world economy. As one of the case studies shows, strict adherence to the Gold Standard appears to have hurt many countries during the Great Depression.

Determined to avoid repeating the mistakes of the interwar years, Allied economic policy makers met at Bretton Woods in 1944 to forge a new international monetary system for the postwar world. The exchange-rate regime that emerged from this conference had at its center the U.S. dollar. All other currencies had fixed exchange rates against the dollar, which itself had a fixed value in terms of gold. An International Monetary Fund was set up to oversee the system and facilitate its functioning by lending to countries with temporary balance of payments problems.

A formal discussion of internal and external balance introduces the concepts of expenditure-switching and expenditure changing-policies. The Bretton Woods system, with its emphasis on infrequent adjustment of fixed parities, restricted the use of expenditure-switching policies. Increases in U.S. monetary growth to finance fiscal expenditures after the mid-1960s led to a loss of confidence in the dollar and the termination of the dollar's convertibility into gold. The analysis presented in the text demonstrates how the Bretton Woods system forced countries to "import" inflation from the United States and shows that the breakdown of the system occurred when countries were no longer willing to accept this burden.

## **ANSWERS TO TEXTBOOK PROBLEMS**

1. a. Since it takes considerable investment to develop uranium mines, you would want a larger current account deficit to allow your country to finance some of the investment with foreign savings.
- b. A permanent increase in the world price of copper would cause a short term current account deficit if the price rise leads you to invest more in copper mining. If there are no investment effects, you would not change your external balance target because it would be optimal simply to spend your additional income.
- c. A temporary increase in the world price of copper would cause a current account surplus. You would want to smooth out your country's consumption by saving some of its temporarily higher income.

- d. A temporary rise in the world price of oil would cause a current account deficit if you were an importer of oil, but a surplus if you were an exporter of oil.
2. Because the marginal propensity to consume out of income is less than 1, a transfer of income from B to A increases savings in A and decreases savings in B. Therefore, A has a current account surplus and B has a corresponding deficit. This corresponds to a balance of payments disequilibrium in Hume's world, which must be financed by gold flows from B to A. These gold flows increase A's money supply and decrease B's money supply, pushing up prices in A and depressing prices in B. These price changes cease once balance of payments equilibrium has been restored.
3. Changes in parities reflected both initial misalignments and balance of payments crises. Attempts to return to the parities of the prewar period after the war ignored the changes in underlying economic fundamentals that the war caused. This made some exchange rates less than fully credible and encouraged balance of payments crises. Central bank commitments to the gold parities were also less than credible after the wartime suspension of the gold standard, and as a result of the increasing concern of governments with internal economic conditions.
4. A monetary contraction, under the gold standard, will lead to an increase in the gold holdings of the contracting country's central bank if other countries do not pursue a similar policy. All countries cannot succeed in doing this simultaneously since the total stock of gold reserves is fixed in the short run. Under a reserve currency system, however, a monetary contraction causes an incipient rise in the domestic interest rate, which attracts foreign capital. The central bank must accommodate the inflow of foreign capital to preserve the exchange rate parity. There is thus an increase in the central bank's holdings of foreign reserves equal to the fall in its holdings of domestic assets. There is no obstacle to a simultaneous increase in reserves by all central banks because central banks acquire more claims on the reserve currency country while their citizens end up with correspondingly greater liabilities.
5. The increase in domestic prices makes home exports less attractive and causes a current account deficit. This diminishes the money supply and causes contractionary pressures in the economy which serve to mitigate and ultimately reverse wage demands and price increases.

6. A "demand determined" increase in dollar reserve holdings would not affect the world supply of money as central banks merely attempt to trade their holdings of domestic assets for dollar reserves. A "supply determined" increase in reserve holdings, however, would result from expansionary monetary policy in the United States (the reserve center). At least at the end of the Bretton Woods era the increase in world dollar reserves arose in part because of an expansionary monetary policy in the United States rather than a desire by other central banks to increase their holdings of dollar assets. Only the "supply determined" increase in dollar reserves is relevant for analyzing the relationship between world holdings of dollar reserves by central banks and inflation.
7. An increase in the world interest rate leads to a fall in a central bank's holdings of foreign reserves as domestic residents trade in their cash for foreign bonds. This leads to a decline in the home country's money supply. The central bank of a "small" country cannot offset these effects since it cannot alter the world interest rate. An attempt to sterilize the reserve loss through open market purchases would fail unless bonds are imperfect substitutes.
8. Capital account restrictions insulate the domestic interest rate from the world interest rate. Monetary policy, as well as fiscal policy, can be used to achieve internal balance. Because there are no offsetting capital flows, monetary policy, as well as fiscal policy, can be used to achieve internal balance. The costs of capital controls include the inefficiency which is introduced when the domestic interest rate differs from the world rate and the high costs of enforcing the controls.

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## CHAPTER 19

# MACROECONOMIC POLICY AND COORDINATION UNDER FLOATING EXCHANGE RATES

### *Chapter Organization*

#### The Case For Floating Exchange Rates

- Monetary Policy Autonomy

- Symmetry

- Exchange Rates as Automatic Stabilizers

#### The Case Against Floating Exchange Rates

- Discipline

- Destabilizing Speculation and Money Market Disturbances

- Injury to International Trade and Investment

- Uncoordinated Economic Policies

- The Illusion of Greater Autonomy

- Case Study: Exchange Rate Experience Between the Oil Shocks, 1973 - 1980

- The First Oil Shock and Its Effects, 1973 - 1975

- Revising the IMF's Charter, 1975 - 1976

- The Weak Dollar, 1976 - 1979

- The Second Oil Shock, 1979 - 1980

#### Macroeconomic Interdependence Under a Floating Rate

- Case Study: Disinflation, Growth, Crisis, and Recession 1980 - 2001

- Disinflation and the 1981 - 1983 Recession

- Fiscal Policies, the Current Account, and the Resurgence of Protectionism

- From the Plaza to the Louvre and Beyond: Trying to Manage Exchange Rates

- Global Slump Once Again, Recovery, Crisis, and Slowdown

#### What Has Been Learned Since 1973?

- Monetary Policy Autonomy

- Symmetry

- The Exchange Rate as an Automatic Stabilizer

- Discipline

- Destabilizing Speculation

- International Trade and Investment

## Policy Coordination

### Are Fixed Exchange Rates Even an Option for Most Countries ?

Directions for Reform

Summary

Appendix: International Policy-Coordination Failures

## CHAPTER OVERVIEW

The floating exchange rate system in place since 1973 was not, in contrast with the Bretton Woods system, well planned before its inception. Instead, it has developed as an *ad hoc* system, muddling through the various shocks with which the world economy has had to contend. Disillusion with economic performance since 1973 has often fueled demands for alternative international monetary arrangements. This chapter sets forth the case for and against floating exchange rates and considers the evidence concerning the performance of the international exchange-rate system since 1973.

A set of theoretical arguments for and against floating exchange rates frame the discussion of this chapter. Proponents of a floating exchange rate regime cite as its advantages the autonomy it gives to monetary policy, the symmetry of adjustment under floating, and the automatic stabilization which floating rates provide when aggregate-demand shocks occur. Critics fault floating rates on the grounds that they do not impose enough discipline on governments or promote economic policy coordination, because of alleged detrimental effects on international trade and investment, and because floating exchange rates may be susceptible to harmful destabilizing speculation. The DD-AA model first presented in Chapter 16 is used to demonstrate that money-market shocks are less disruptive under a fixed exchange-rate regime than under a floating regime while output-market shocks are less disruptive under a floating exchange rate regime.

This result is important in considering the relative attractiveness of floating exchange rates in face of the first oil shock in 1973. This shock led to "stagflation," simultaneous recession and inflation. It is unlikely that a fixed-exchange-rate system would have survived without widespread realignments and speculative attacks. Industrial countries chose expansionary macro policies and recovery from the recession of 1974 was underway in most of these countries by the first half of 1975. The success with which the floating-exchange-rate regime allowed countries to adjust to the first oil shock prompted a call by the leaders of the main industrial countries for the IMF to formally recognize the new arrangement. The IMF

directors heeded this by amending the Fund's Articles of Agreement to recognize the new reality of floating rates.

Floating exchange rates enabled countries to pursue divergent expansionary policies after the first oil shock. This advantage of floating exchange rates proved to be a disadvantage as the recovery of 1974-1975 turned into the slowdown of 1976. American policies more expansionary than those pursued by Germany and Japan weakened the dollar, pushed the U.S. current account into deficit, and contributed to a resurgence of inflation in the United States. The second oil shock promoted fears of higher inflation, leading to restrictive monetary policies that plunged the world economy, in 1981, into the deepest recession since the Great Depression.

This chapter also discusses the way in which two large countries' economies affect one another, examining the global effects of fiscal and monetary policy in the 1980s and 1990s. This discussion incorporates feedback effects from policy in one economy to economic performance in the other. A fiscal expansion in either country increases output in both countries. A monetary expansion in the domestic country, however, raises domestic output but, by making the foreign currency more expensive, lowers foreign output. In the text, the ideas are used to analyze the effects of U.S. monetary and fiscal policy after 1980, particularly the Volcker disinflation and the Reagan fiscal expansion. The impact of the resulting dollar appreciation on world current accounts and on protectionist sentiment in the United States are also discussed.

In the face of growing protectionist pressure in the United States, economic officials of the Group of Five (G-5) countries met at the Plaza Hotel in New York in September 1985 where they agreed to intervene jointly in the foreign-exchange market to bring about a dollar depreciation. This marked a reversal from the United States' *laissez-faire* approach to dollar management in the first half of the 1980s. The dollar depreciated throughout 1986. In February 1987, at a meeting at the Louvre, finance ministers and central bankers from the G-5 countries plus Canada set up (unpublished) target zones to stabilize exchange rates around their then-current level. Currencies stabilized for several months thereafter, but this period of quiescence ended with the October 1987 stock market crash which began a period of further dollar depreciation. Despite a brief theoretical maintenance of zones, by the early 1990s, zones had been abandoned. After a period of slow growth in many nations around 1990, the United States has experienced a long expansion. Alternatively, by 1999, Japan had not fully

recovered from the end of its asset bubble in the early 1990s. This has affected the other Asian countries, a topic returned to in Chapter 22.

Conclusions concerning the advantages of floating exchange rates are not unambiguous. The insulation of economies from inflation, while important in the long run, may not hold in the short run. The exchange rate's role as a macroeconomic target also reduces the autonomy central banks actually enjoy under floating rates. Evidence does not support the "vicious circle" theory that, in the absence of accommodating monetary policy, currency depreciation leads to inflation, leading to further depreciation, and so on. Nor is there convincing evidence that floating rates have hindered international trade and investment. Lack of policy coordination has been a particularly disappointing feature of the system, but this problem is not unique to floating rates. The chapter also considers the emerging view that durable fixed exchange rates may not be possible, even if they were more desirable than floating rates, unless a single currency is created. These arguments rest on theories of speculative attacks, the problems of the policy trilemma, and the recent experiences in developing countries.

A lesson that emerges from this chapter is that no exchange rate system works well when countries act on the basis of narrowly-perceived self interest. The chapter appendix illustrates this point, using a simple game-theoretic example to show how the beggar-thy-neighbor effects of monetary restriction can lead to uncoordinated macroeconomic policies that make two countries worse off than they would be if they cooperated.

## **ANSWERS TO TEXTBOOK PROBLEMS**

1. A rise in the foreign price level leads to a real domestic currency depreciation for a given domestic price level and nominal exchange rate; thus, as shown in the following diagram, the output market curve shifts from DD to D'D' moving the equilibrium from point 0 to point 1. This shift causes an appreciation of the home currency and a rise in home output. If the expected future exchange rate falls in proportion to the rise in  $P^*$ , then the asset market curve shifts down as well, from AA to A'A' with the equilibrium at point 2.

Notice that the economy remains in equilibrium in this case, at the initial output level, if the current exchange rate also falls in proportion to the rise in  $P^*$ . Why? The goods market is in equilibrium because the real exchange rate has not changed; the foreign-exchange market is in equilibrium if the domestic interest rate does not change (there has been no change in the expected rate of future currency depreciation); and with

output and the interest rate the same, the money market is still in equilibrium. The economy thus remains in internal and external balance if these conditions held initially.

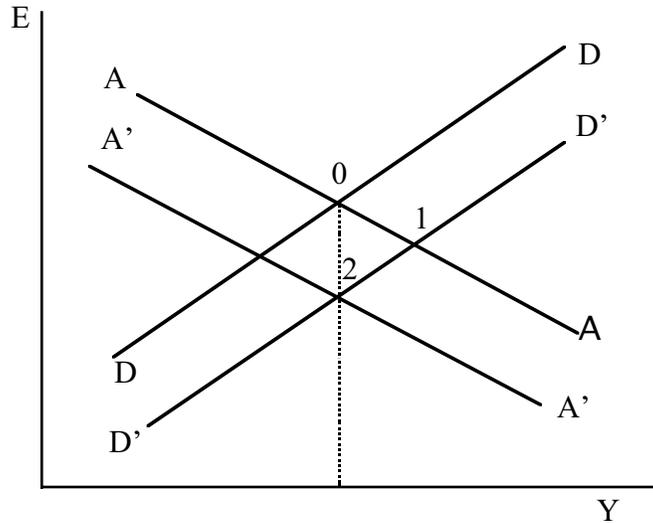


Figure 19-1

2. A transitory increase in the foreign interest rate shifts the asset market curve up and to the right from AA to A'A', as shown in the figure 19-2 (there is no change in the expected exchange rate since this is a temporary rise). Under a floating exchange rate there is thus a depreciation of the home currency and an increase in output. (The effect could differ in the IS-LM model, where the real interest rate influences aggregate demand directly; the DD curve would shift up and to the right as well.) Under a fixed exchange rate, however, the monetary authority must intervene to prevent the depreciation, so it contracts the home money supply by selling foreign exchange and drives the home interest rate to the new higher world level. This causes AA to return to its original position, leaving output unaffected. (Once again, the result would differ in the IS-LM model since foreign interest-rate shocks are not pure money-market disturbances in that model.)
  
3. The effect of a permanent rise in the foreign nominal interest rate depends upon whether that rise is due to an increase in inflationary expectations abroad or a rise in the foreign real interest rate. If the foreign real interest rate rises because of monetary contraction abroad, there is a long-run depreciation of the domestic currency which reinforces the depreciation that occurs in problem 2. The expansionary effect on home

output is thus greater than in the transitory case. If the foreign nominal interest rate rises only because foreign inflationary expectations rise, however, the expectations effect goes the other way and the long-run expected price of foreign currency falls, shifting AA to the left. Domestic output need not rise in this case. Under a fixed exchange rate there is still no short run effect on the economy in the DD-AA model, but as  $P^*$  starts to rise the home country will have to import foreign inflation. Under a floating rate the home economy can be completely insulated from the subsequent foreign inflation.

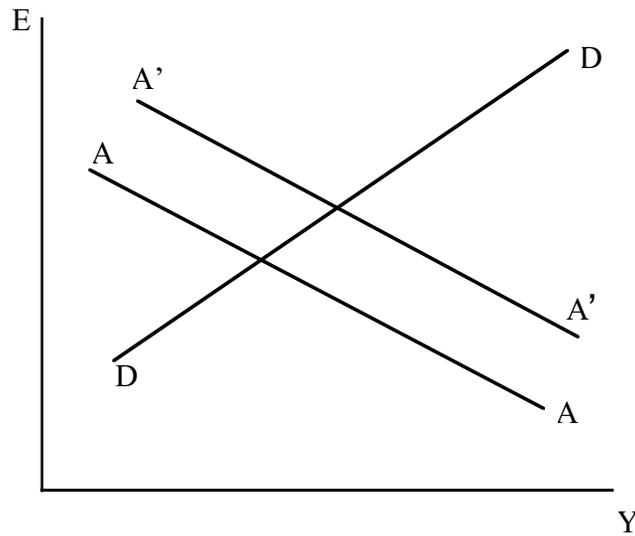


Figure 19-2

4. A rise in foreign inflation could arise from a permanent increase in foreign monetary growth. This causes the home currency to appreciate against the foreign currency, implying also a real appreciation (since  $P$  and  $P^*$  are fixed in the short run). Domestic output therefore falls as foreign output rises. In the long run, relative PPP implies that the rate of domestic currency appreciation rises to offset the higher foreign inflation. The foreign nominal interest rate rises by the increase in expected inflation (the Fisher effect); the domestic nominal interest rate is the same as its initial long-run value; and by relative PPP, interest parity continues to hold. Notice that in this case, the expected future exchange rate moves over time to reflect the trend inflation differential.
5. We can include the aspect of imperfect asset substitutability in the DD-AA model by recognizing that the AA schedule now must equate  $M/P=L(R^*+ \text{expected depreciation} + \text{risk premium}, Y)$ . An increase in the risk premium shifts out the AA curve, leading

to a currency depreciation and an increase in output. Output will not change under a fixed-exchange-rate regime: since the exchange rate parity must be preserved, there will be no depreciation and no effect on output.

6. In Chapter 18 there is an analysis of internal and external balance for fixed exchange rates. It is possible to construct a corresponding diagram for floating exchange rates. In figure 19-4, the vertical axis measures expansion of the money supply and the horizontal axis measures fiscal ease. The internal balance curve II has a negative slope since monetary restraint must be met by greater fiscal expansion to preserve internal balance. The external balance curve XX has a positive slope since monetary expansion, which depreciates the exchange rate and improves the current account, must be matched by fiscal expansion to preserve external balance. The "four zones of economic discomfort" are :

- Zone 1 -- overemployment and excessive current account surplus;
- Zone 2 -- overemployment and current account deficit;
- Zone 3 -- underemployment and current account deficit;
- Zone 4 -- underemployment and current account surplus.

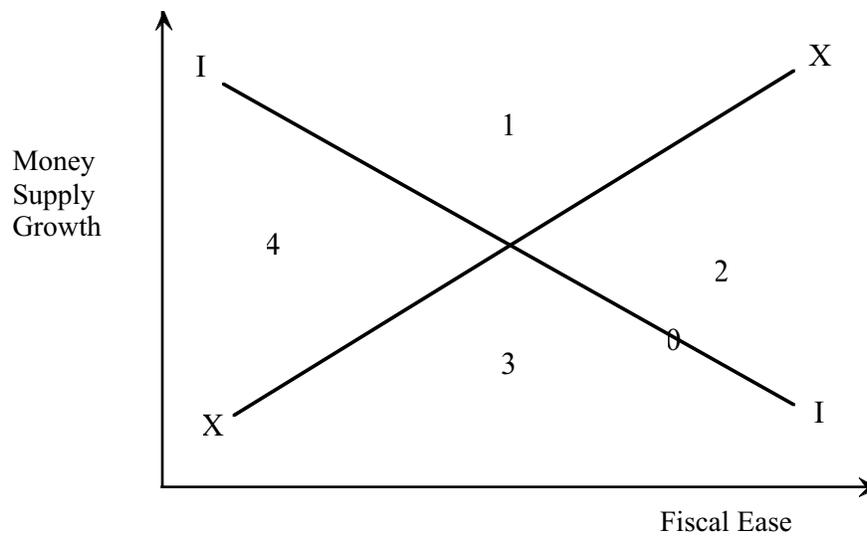


Figure 19-4

7. The diagram described in the answer to question 6 can be used to answer this question. The United States begins at point 0 after 1985, where it is in internal balance but there is a large current account deficit. In the short run, monetary expansion (an upward shift in the point) moves the economy toward the goal of a greater current account surplus,

but also moves the economy out of internal balance toward overemployment. The expenditure-reducing policy of reducing the budget deficit (represented by a leftward shift in the point), used in tandem with an expenditure-switching monetary expansion, can restore external balance while maintaining internal balance. Moving the economy into a zone of overemployment puts pressure on the price level which ultimately reverses the short-run effect of monetary expansion on the real exchange rate.

8. Fiscal expansion in Germany and Japan would have appreciated the currencies of those countries and diminished the bilateral U.S. trade deficits with them, as desired by American officials. On the other hand, monetary expansion in these countries would have worsened the U.S. current account since the dollar would have appreciated relative to the deutschemark and the yen. Our two-country models suggests that U.S. output would have fallen as a result. These effects would differ, of course, if the United States altered its policies in response to policy changes in Germany or Japan. For example, if the United States expanded its money supply with the expansion in either Germany or Japan there would be no bilateral effects. If the United States contracted fiscal policy as Germany or Japan expanded fiscal policy there would less of an effect on output in each country.
  
9. Sterilized intervention has no effect on the supply of high-powered money. A way to check whether the intervention in connection with the Louvre accord in February 1987 was sterilized is to see if there are unusual movements in German or Japanese stocks of high-powered money around that time. The *International Financial Statistics*, published by the IMF, includes measures of reserve money (line 14). These data, for Germany (in billions of DM at end of month) and Japan (in billions of yen at end of month), are as follows:

<u>Month/Yr.</u>	10/86	11/86	12/86	1/87	2/87	3/87	4/87	5/87
<u>Japan</u>	26,318	27,772	32,119	27,844	29,016	30,146	29,998	29,379
<u>Germany</u>	169.6	179.3	182.9	169.8	178.3	193.3	180.5	192.8

These data for Japan reflect a more-or-less steady trend in high-powered money. The largest deviations from this trend do not occur around February 1987. The high-powered money series for Germany appears less stable. There is a substantial increase between the end of January 1987 and the end of March 1987, an increase that was somewhat reversed by the end of April, but rose again by the end of May 1987.

10. One can construct a matrix analogous to figure 19A-1 in the text to show the change in inflation and the change in exports for each country in response to monetary policy choices by that country and by the other country. Export growth in a country will be greater, but inflation will be higher, if that country undertakes a more expansionary monetary policy, given the other country's policy choice. There is, however, a beggar-thy-neighbor effect because one country's greater export growth implies lower export growth for the other. Without policy coordination, the two countries will adopt over-expansionary monetary policies to improve their competitive positions, but these policies will offset each other and result simply in higher inflation everywhere. With coordination, the countries will realize that they can both enjoy lower inflation if they agree not to engage in competitive currency depreciation.

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## CHAPTER 20

### OPTIMUM CURRENCY AREAS AND THE EUROPEAN EXPERIENCE

#### *Chapter Organization*

##### How the European Single Currency Evolved

- European Currency Reform Initiatives, 1969-1978

- The European Monetary System: 1979 to 1998

- Germany Monetary Dominance and the Credibility Theory of the EMS

- The EU 1992 Initiative

- European Economic and Monetary Union

##### The Euro and Economic Policy in the Euro Zone

- The Maastricht Convergence Criteria and the Stability and Growth Pact

- Box: Designing and Naming a New Currency

- The European System of Central Banks

- The Revised Exchange Rate Mechanism

##### The Theory of Optimum Currency Areas

- Economic Integration and the Benefits of a Fixed Exchange Rate Area: The GG Schedule

- Economic Integration and the Costs of a Fixed Exchange Rate Area: The LL Schedule

- The Decision to Join a Currency Area: Putting the GG and LL Schedules Together

- What is an Optimum Currency Area?

##### Case Study: Is Europe an Optimum Currency Area?

- The Extent of Intra-European Trade

- Box: How Much Trade Do Currency Unions Create?

- How Mobile is Europe's Labor Force?

- Other Considerations

- Summing Up

##### The Future of EMU

##### Summary

## CHAPTER OVERVIEW

The establishment of a common European currency and the debate over its possible benefits and costs was one of the key economic topics of the 1990s. Students should be familiar with the euro, but probably not with its technical aspects or its history. This chapter provides them with the historical and institutional background needed to understand this issue. It also introduces the idea of an optimum currency area and presents an analytical framework for understanding this concept.

The discussion in this chapter points out that European monetary integration has been an ongoing process. Fixed exchange rates in Europe were a by-product of the Bretton Woods system. When strains began to appear in the Bretton Woods system, concerns arose about the effects of widely-fluctuating exchange rates between European countries. The 1971 Werner report called for the eventual goal of fixed exchange rates in Europe. Reasons for this included enhancing Europe's role in the world monetary system and turning the EU into a truly unified market. Also, many Europeans hoped economic unification would encourage political unification and prevent a repeat of Europe's war torn history.

The first attempt at a post-Bretton Woods fixed exchange rate system in Europe was the "Snake." This effort was limited in its membership. The European Monetary System (E.M.S.), established in 1979, was more successful. The original member countries of the E.M.S. included Germany, France, Italy, Belgium, Denmark, Luxembourg, the Netherlands, and Ireland. In later years, the roll of membership grew to include Spain, Great Britain, and Portugal. The E.M.S. fixed exchange rates around a central parity. Most currencies were allowed to fluctuate above or below their central rate by 2.25 percent although the original band for the Italian lira and the bands for the Spanish peseta and the Portuguese escudo allow for fluctuations of 6 percent in either direction from the central parity.

After attacks and realignments in its early years, the EMS grew to become more sturdy than its predecessors. The presence of small bands instead of pure fixed rates helped, as did the guarantee of credit from strong to weak currency countries. The presence of capital controls was quite important, but these were slowly dismantled. The EMS was, in some sense, simply a peg to the DM. Many felt that the dominant position of the DM had allowed other countries to import Germany's inflation fighting credibility and that this was another advantage of fixed rates in Europe.

Years of quiet ended, though, in 1992-1993. German reunification had led to higher interest rates in Germany (to fight inflationary pressures), but other countries were not in a position to follow the rate hikes. Fierce attacks followed and some countries (the UK and Italy) left the EMS in 1992 and the bands were widened to 15 percent in August 1993.

In 1986, the EU launched a more aggressive integration package known as “1992” that was intended to complete the internal market by 1992. To further that goal, a plan of European Economic and Monetary Union, which involved a single currency and was embodied in the Maastricht treaty, was begun, and by 1993 had been accepted by all EU countries. Reasons for pursuing a single currency included: furthering market integration, broadening the viewpoint of monetary policy by moving decision making from the Bundesbank to a European Central Bank, the difficulties in maintaining fixed rates with free capital movements, and finally, to support political unification.

A crucial aspect of EMU has been the goal of economic convergence embodied in the Maastricht convergence criteria and the Stability and Growth Pact (SGP). These agreements stipulate low deficits and debt to GDP ratios and are an attempt by low inflation countries to prevent free-spending counterparts from turning the euro into a weak currency. Eleven nations participated in the launch of the euro in 1999 with the UK and Denmark choosing not to join, Sweden failing the exchange rate stability criteria, and Greece failing all criteria (Greece joined two years later). The nations in the euro area have ceded monetary control to the European System of Central Banks (ESCB). The national central banks are now part of an overarching structure headed by the governing council of the ECB. The ESCB is a very independent central bank with no political control and little accountability. Additionally, a new exchange rate mechanism has begun in which non-euro EU members peg to the euro.

There are both advantages and drawbacks to this decision to form a common currency union. The theory of optimum currency areas provides a way to frame an analysis of the benefits and costs of a single currency. The benefits of a common currency are the monetary efficiency gains realized when trade and payments are not subject to devaluation risk. These benefits rise with an increase in the amount of trade or factor flows, that is with the extent of economic integration. A common currency also forces countries to give up their independence with regards to monetary policy (at least those countries which are not at the "center" of the system). This may lead to greater macroeconomic instability, although the instability is reduced the more integrated the country is with the other members of the

common currency area. The analyses of the benefits and costs of membership in a common currency area are presented in the text chapter as the GG and LL schedules, respectively.

The GG-LL framework is applied to the question of whether Europe is an optimum currency area. An illuminating way to frame the question is to compare the United States to Europe. The evidence that Europe is an optimum currency area is much weaker than the evidence supporting the notion that the United States is an optimum currency area. Trade among regions in the United States is much higher than trade among European countries. Labor is much more mobile within the United States than within Europe. Federal transfers and changes in federal tax payments provide a much bigger cushion region-specific shocks in the United States than do analogous EC revenues and expenditures.

The chapter concludes by considering the future of EMU. The facts that the EU is probably not an optimum currency area, that economic union is so far in front of political union, that EU labor markets are very rigid, and that the SGP constrains fiscal policies will all present challenges to Europe's economy and to its policymakers in the years ahead. Instructors may wish to call upon current events and news stories that illuminate how these challenges are being met.

## **ANSWERS TO TEXTBOOK PROBLEMS**

1. The stability of the EMS depended upon the ability of member countries' central banks to defend their currencies. The level of foreign currency reserves to which a central bank has access affects its ability to defend its currency; the larger the stock of reserves, the better positioned a central bank to defend its currency. Credits from the central bank of a strong-currency country can help a weak-currency central bank defend its currency by putting at its disposal more reserves when its currency is threatened. Participants in the foreign exchange market may be less apt to speculate against a weak currency if they know there are ample reserves in place to defend it.
2. The maximum change in the lira/DM exchange rate was 4.5 percent (if, for example, the lira starts out at the top of its band and then moves to the bottom of its band). If there was no risk of realignment, the maximum difference between a one-year DM and a one-year lira deposit would have reflected the possibility that the lira/DM exchange rate could have moved by 4.5 percent over the year; thus, by interest parity, the interest differential would have been 4.5 percent. The maximum possible difference between a

six-month DM and a six-month lira deposit would have been about 9 percent. This reflects the possibility that the lira/DM exchange rate could have moved by 4.5 percent over six months, which is an annualized rate of change of about 9 percent ( $1.045 \times 1.045 = 1.092$ ). The difference on three month deposits could have been as high as 19.25 percent ( $1.045^4$ ). The intuitive explanation for these differences is that we are not holding constant the time over which the 4.5 percent change in the exchange rate occurs but we are expressing all interest rates on an annualized basis.

3. A three percent difference on the annual rate of a five-year bond implied a difference over five years of  $1.03^5 = 1.159$  (that is 15.9 percent). This means that the predicted change in the lira/DM exchange rate over 5 years was far above the amount that would be consistent with the maintenance of the EMS bands. Thus, there was little long-term credibility for the maintenance of the EMS band with these interest differentials on five-year bonds.
4. The answers to the previous two questions are based upon the relationship between interest rates and exchange rates implied by interest parity since this condition links the returns on assets denominated in different currencies. A risk premium would introduce another factor into this relationship such that the interest differentials would not equal the expected change in the exchange rate.
5. A favorable shift in demand for a country's goods appreciates that country's real exchange rate. A favorable shift in the world demand for non-Norwegian EMU exports appreciates the euro (and hence the Norwegian krone) against non-euro currencies. This adversely affects Norwegian output. The adverse output effect for Norway is smaller the greater the proportion of trade between Norway and other euro-zone countries (and therefore the smaller the proportion of trade between Norway and non-euro-zone countries).
6. Compare two countries which are identical except that one has larger and more frequent unexpected shifts in its money-demand function. In the DD-AA diagrams for each country, the one with the more unstable money demand has larger and more frequent shifts in its AA schedule resulting in bigger shifts in its output. The country with the more unstable money demand would benefit more from a policy rule under which authorities offset shifts in money demand; one such rule would be a fixed exchange rate. Therefore, the economic stability loss from pegging the exchange rate

would be lower for a country with a more unstable money demand; its LL schedule would be below and to the left of the LL schedule of a country with a stable money demand. The GG-LL analysis suggests that a country with relatively unstable money demand would find it advantageous to join a currency union at a lower level of monetary integration than would a country with relatively stable money demand.

7. a. While in the ERM, British monetary authorities were obliged to maintain nominal interest rates at a level commensurate with keeping the pound in the currency band. If this obligation were removed, British monetary authorities could run an expansionary policy to stimulate the economy. This would cause the pound to depreciate vis-a-vis the DM and other currencies.
  - b. Writers at the *Economist* believe that expected future inflation will rise in Britain if it leaves the EMS which will cause nominal interest rates to rise through the Fisher effect.
  - c. British policymakers may have gained credibility as being strongly committed to fight inflation and to maintain the pound's value through Britain's membership in the ERM since they were willing to allow the British economy to go through a protracted slump without resorting to a monetary expansion which would have jeopardized their membership in the ERM.
  - d. A high level of British interest rates relative to German interest rates would suggest high future inflation in Britain relative to that in Germany by the Fisher relationship. Higher British interest rates may also result from a relatively higher money demand in Britain (perhaps due to relatively higher British output) or relatively lower money supply growth in Britain than in Germany.
  - e. British interest rates may have been higher than German interest rates if British output were relatively higher. The smaller gap at the time of the writing of the article cited may reflect relatively poor British output growth over the past two years. Also, German real interest rates may have risen because of the increased demand for capital for investing in eastern Germany after re-unification.
8. Each central bank would have benefited from issuing currency because it would have gained seignorage revenues when it printed money; that is, it could have traded money for goods and services. Money creation leads to inflation, which central banks dislike. With a system of central banks, however, each country's central bank would have received the full benefit of the seigniorage revenues from money creation but would only partially bear the cost of higher inflation since this effect would have been

somewhat dissipated across the entire EMS. This situation, where the central bank does not bear the full cost of its actions, is an example of an externality. It leads to more money creation than would otherwise occur if central bank actions were coordinated.

9. A single labor market would facilitate the response of member countries to country-specific shocks. Suppose there is a fall in the demand for French goods which results in higher unemployment in France. If French workers could easily migrate to other countries where opportunities for employment were better, the effect of the reduction in demand is mitigated. If workers could not move, however, there is a greater incentive to devalue the franc to make workers more competitive with respect to workers in other countries. EMU's success, in many respects, depends on the ability of labor markets to make the adjustments that can no longer be made by the exchange rate. The absence of a unified labor market would mean all adjustments would have to come through internal wage adjustments, a difficult prospect.

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## CHAPTER 21

# THE GLOBAL CAPITAL MARKET: PERFORMANCE AND POLICY PROBLEMS

### *Chapter Organization*

The International Capital Market and the Gains from Trade

Three Types of Gains from Trade

Risk Aversion

Portfolio Diversification as a Motive for International Asset Trade

The Menu of International Assets: Debt vs. Equity

International Banking and the International Capital Market

The Structure of the International Capital Market

The Growth of the International Capital Market

Offshore Banking and Offshore Currency Trading

The Growth of Eurocurrency Trading

Regulating International Banking

The Problem of Bank Failures

Difficulties in Regulating International Banking

International Regulatory Cooperation

Box: The Banco Ambrosiano Collapse

International Regulatory Cooperation

Case Study: The Day the World Almost Ended

How Well has the International Capital Market Performed?

The Extent of International Portfolio Diversification

The Extent of Intertemporal Trade

Onshore-Offshore Interest Differentials

The Efficiency of the Foreign Exchange Market

Summary

## CHAPTER OVERVIEW

The international capital market, involving Eurocurrencies, offshore bond and equity trading, and International Banking Facilities, initially may strike students as one of the more arcane areas covered in this course. Much of the apparent mystery is dispelled in this chapter. The chapter demonstrates that issues in this area are directly related to other issues already discussed in the course including macroeconomic stability, the role of government intervention, and the gains from trade.

Using the same logic that we applied to show the gains from trade in goods or the gains from intertemporal trade, we can see how the international exchanges of assets with different risk characteristics can make both parties to a transaction better off. International portfolio diversification allows people to reduce the variability of their wealth. When people are risk-averse, this diversification improves welfare. An important function of the international capital market is to facilitate such welfare-enhancing exchanges of both debt instruments, such as bonds, and equity instruments, such as stocks.

In discussing the growth of the international capital market, the chapter introduces an important concept, the policy trilemma. This is the notion that governments can not maintain more than two of the following three policy stances: fixed exchange rates, domestically oriented monetary policy, and international capital mobility. This is an important theme hinted at in many parts of the book. The capital market has grown in part because countries have sacrificed either fixed rates or monetary sovereignty to allow more capital mobility.

Offshore banking activity is at the center of the international capital market. Central to offshore banking are Eurocurrencies (not to be confused with euros), which are bank deposits in one country that are denominated in terms of another country's currency. Relatively lax regulation of Eurocurrency deposits compared with onshore deposits allows banks to pay relatively high returns on Eurocurrency deposits. This has fostered the rapid growth of offshore banking. Growth has also been spurred, however, by political factors, such as the reluctance of Arab OPEC members to place surplus funds in American banks after the first oil shock.

The text also introduces issues of regulating capital markets. Central to this task is the notion of how banks fail, and what can be done to prevent bank failures. Deposit insurance, regulations, and lenders of last resort can all help prevent the lack of confidence in a banking

system that can generate a run on the banking assets. International banking presents additional challenges as rules are not uniform, responsibility can be unclear and enforcement is difficult.

Industrialized countries are involved in an effort to coordinate their bank supervision practices to enhance the stability of the global financial system. Common supervisory standards set by the Basel Committee are to be phased in by 1992. Potential problems remain, however, especially regarding the clarification of the division of lender-of-last-resort responsibilities among countries and the increasingly large role of nonbank financial firms which makes it harder for regulators to oversee global financial flows. The text highlights these regulatory difficulties using a case study of the near collapse of the hedge fund LTCM. This case study is also used to illustrate the difficult balance regulators face between creating moral hazard and maintaining financial stability.

The evidence on the functioning of the international capital market is mixed. International portfolio diversification appears to be limited in reality. Studies in the mid-1980s cited the lack of intertemporal trade, as evidenced by small current account imbalances, as evidence of the failure of the international capital market. The large external imbalances since then, however, have cast doubt on the initial conclusions. Studies of the relationship between onshore and offshore interest rates on the same currency also tend to support the view of well-integrated international capital markets. The developing country debt crisis represents a dramatic failure of the world capital market to funnel world savings to potentially productive uses, a topic taken up again in the next chapter.

The recent performance of one component of the international capital market, the foreign exchange market, has been the focus of public debate. Government intervention might be uncalled for if exchange-rate volatility reflects market fundamentals, but may be justified if the international capital market is an inefficient, speculative market drifting without the anchor of underlying fundamentals. The performance of the foreign exchange markets has been studied through tests of interest parity, tests based on forecast errors, attempts to model risk premiums, and tests for excess volatility. Research in this area presents mixed results that are difficult to interpret, and there is still much to be done.

A mathematical postscript to this chapter develops a model of international portfolio diversification by a representative risk-averse investor. This model shows how the optimal

portfolio share between two assets (called the home asset and the foreign asset) depends upon the return paid by each under different states of nature as well as initial wealth. An extension of this model to a two-country case involves the use of an Edgeworth box diagram that students will have seen in Chapter 4. In this analysis each country has an endowment that depends upon which of the two states of nature occurs. The endowment for the home agent in state 1 is  $E_h^1$ , and in state 2 is  $E_h^2$ , while the endowments for the foreign agent are  $E_f^1$  in state 1 and  $E_f^2$  in state 2. In Figure 21-1, this endowment point is labeled E. Preferences in each economy are shown by indifference curves. The two agents will trade to achieve the point labeled C, where consumption by the home agent in state 1 is  $C_h^1$ , and in state 2 is  $C_h^2$ , and consumption by the foreign agent is  $C_f^1$  in state 1 and  $C_f^2$  in state 2. The price of state-contingent contracts can be determined by the slope of the line between point E and point C. Trade that allows agents to move from their initial endowment E to point C makes both agents better off.

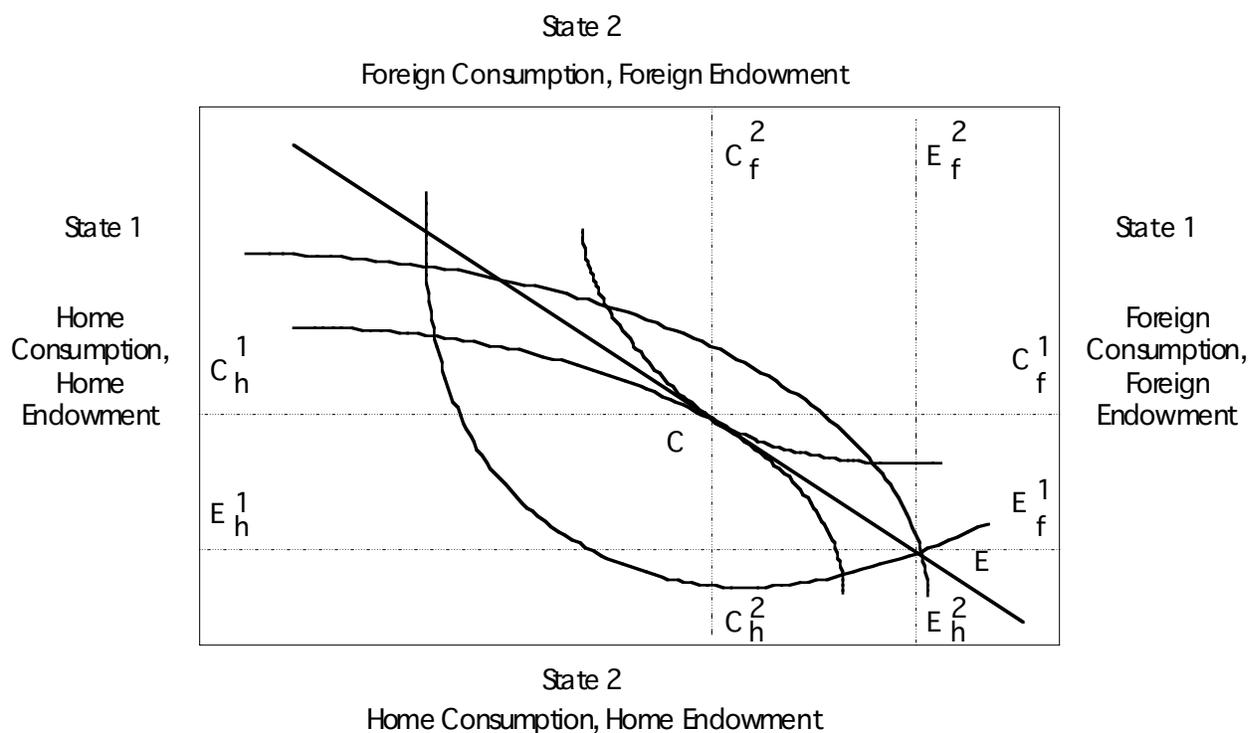


Figure 21-1

### ANSWERS TO TEXTBOOK PROBLEMS

1. The better diversified portfolio is the one that contains stock in the dental company and the dairy company. Good years for the candy company may be correlated with good

years for the dental company, and conversely. The return from a portfolio consisting of these stocks would be more volatile than the return from a portfolio consisting of the dental and dairy company stocks.

2. Our two-country model (Chapter 19) showed that under a floating exchange rate, monetary expansion at home causes home output to rise but foreign output to fall. Thus, national outputs (and earnings of companies in the two countries) will tend to be negatively correlated under a floating rate if all shocks are monetary in nature. Chapter 18 suggests, however, that the correlation will be positive under a fixed rate if all shocks are monetary. The gains from international asset exchange are therefore likely to be greater under floating under the conditions assumed.
3. The main reason is political risk--as discussed in the appendix to Chapter 13.
4. Reserve requirements are important for bank solvency. Maintaining adequate reserves enables a bank to remain solvent, even in periods in which it faces a relatively high amount of withdrawals relative to deposits. The higher the reserve requirements faced by a bank, however, the lower the bank's profitability. To create a "level playing field" for U.S. banks with foreign branches as compared to U.S. banks without foreign branches, it is important to ensure that banks with foreign branches cannot shift around their assets in a manner that reduces their reserve requirements, an option not open to U.S. banks without foreign branches.
5. This is again an open-ended question. The main criticism of Swoboda's thesis is that foreign central banks held dollars in interest-bearing form, so the United States extracted seigniorage from issuing reserves only to the extent that the interest it paid was less than the rate it would have paid were the dollar not a reserve currency. The high liquidity of the dollar make this plausible, but it is impossible to say whether the amount of seigniorage the U.S. extracted was economically significant.
6. Tighter regulation of U.S. banks increased their costs of operation and made them less competitive relative to banks which were not as tightly regulated. This made it harder for U.S. banks to compete with foreign banks, and led to a decline in U.S. banking in those markets where there was direct, unregulated foreign competition.

7. Banks are more highly regulated and have more stringent reporting requirements than other financial institutions. Securitization increases the role played by nonbank financial institutions over which regulators have less control. Regulators also do less monitoring of nonbank financial institutions. As the role of nonbank financial institutions increases with securitization, the proportion of the financial market that bank regulators oversee declines as does the ability of these regulators to keep track of risks to the financial system.

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## CHAPTER 22

### DEVELOPING COUNTRIES: GROWTH, CRISIS, AND REFORM

#### *Chapter Organization*

Income and Wealth in the World Economy

    The Gap Between Rich and Poor

    Has the World Income Gap Narrowed?

Structural Features of Developing Countries

Developing Country Borrowing and Debt

    The Economics of Capital Inflows to Developing Countries

    The Problem of Default

    Alternative Forms of Capital Inflow

Latin America: From Crisis to Uneven Reform

    Inflation and the 1980s Debt Crisis in Latin America

    Box: The Simple Algebra of Moral Hazard

    Case Study: Argentina's Economic Stagnation and Recovery

    Reforms, Capital Inflows, and the Return of Crisis

East Asia: Success and Crisis

    The East Asian Economic Miracle

    Box: What Did Asia Do Right?

    Asian Weaknesses

    The Asian Financial Crisis

    Crises In Other Developing Regions

    Case Study: Can Currency Boards Make Fixed Exchange Rates Credible?

Lessons of Developing Country Crises

Reforming the World's Financial Architecture

    Capital Mobility and the Trilemma of the Exchange Rate Regime

    Prophylactic Measures

    Coping With Crisis

    A Confused Future

Summary

## CHAPTER OVERVIEW

This chapter provides the theoretical and historical background students need to understand the macroeconomic characteristics of developing countries, the problems these countries face, and some proposed solutions to these problems. Students should be aware of the general events of the East Asian financial crisis. The chapter covers the East Asian growth miracle and subsequent financial crisis in depth. First, though, it introduces general characteristics of developing countries and the economics of their extensive borrowing on world markets, as well as the inflation experiences, debt crisis, and subsequent reform in Latin America.

The chapter begins by discussing how the economies of developing countries differ from industrial economies. The wide differences in per capita income and life expectancy across different classes of countries is striking. Some economic theories predict growth convergence, and there is evidence of such a pattern among industrialized nations, but no clear pattern emerges among developing countries. Some have grown rapidly while others have struggled.

There are important structural differences between developing economies and industrial economies. Governments in developing countries have a pervasive role in the economy, setting many prices and limiting transactions in a wide variety of markets; this can contribute to higher levels of corruption. These governments often finance their budget deficits through seigniorage, leading to high and persistent inflation. The economies of developing countries are typically not well diversified, with a small number of commodities providing the bulk of exports. These commodities, which may be natural resources or agricultural products, have extremely variable prices. Finally, economies of developing countries typically lack developed financial markets and often rely on fixed exchange rates and capital controls.

There is a discussion of the use of seigniorage in developing countries in the text. You may want to use the discussion of seigniorage in the text as a springboard for a more in-depth discussion of this topic. In particular, you could present a model of where seigniorage revenue is a function of the inflation rate chosen. The function is concave, at first increasing but eventually decreasing as high inflation leads people to hold less money. It is much like the Laffer curve for taxation. This helps explain how similar seigniorage revenues may come from widely different inflation levels.

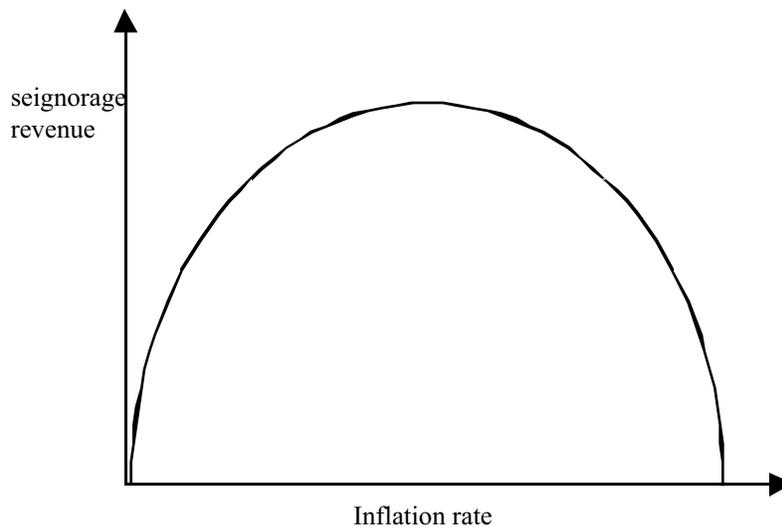


Figure 22-1

In principle, developing countries (and the banks lending to them) should enjoy large gains from intertemporal trade. Developing countries, with their rich investment opportunities relative to domestic saving, can build up their capital stocks through borrowing. They can then repay interest and principal out of the future output the capital generates. Developing-country borrowing can take the form of equity finance, direct foreign investment, or debt finance, including bond finance, bank loans, and official lending. These gains from intertemporal trade are threatened by the possibility of default by developing countries. Developing countries have defaulted in many situations over time, from nineteenth century American states to most developing countries in the Depression to the debt crisis in the 1980s. If lenders lose confidence, they may refuse further lending, forcing developing countries to bring their current account into balance. These crises are driven by similar self-fulfilling mechanisms as exchange rate crises or bank runs and the discussion of debt default provides an opportunity to revisit the ideas of currency crises and bank runs before a full-fledged discussion of the East Asian crisis.

The next section of the chapter focuses on the experiences of Latin America. In the 1970s, inflation became a widespread problem in Latin America, and many countries tried using a tablita, or crawling peg. The strategy, though, did not stop inflation and large real appreciations were the result. Government guaranteed loans were widespread leading to moral hazard (discussed in a box on Chile). By the early 1980s, collapsing commodity prices,

a rising dollar, and high U.S. interest rates precipitated default in Mexico followed by other developing countries. After the debt crisis stretched through most of the decade and slowed developing country growth in many regions, debt renegotiations finally loosened burdens on many countries by the early 1990s.

After the debt crisis appeared to be ending, capital began to flow back into many developing countries. These countries were finally undertaking serious economic reform to stabilize their economy. The chapter details these efforts in Argentina, Brazil, Chile, and Mexico, and also discusses how crisis unfortunately returned to some of these countries.

Next, the chapter covers the success and subsequent crisis in Asia (Chapter 10 also touches on this subject). The causes of success, such as high savings, strong education, stable macroeconomics, and high levels of trade are considered. Some aspects of the economies that remained weak, such as low productivity growth and weak financial regulation are also discussed. The crisis, beginning in August 1997, is explained in detail along with its spread to other developing countries. The lessons of these years of growth and crisis are summarized as: choosing the right exchange rate regime, the importance of banking, proper sequencing of reforms, and the importance of contagion. A box then considers whether currency boards can make fixed exchange rates more sustainable.

These experiences have emphasized the policy trilemma discussed in Chapter 21 and led to calls for reform of the world's financial architecture. The chapter concludes by considering some of these, from preventative measures to reduce the risk of crises, to measures that improve the way crises are handled (such as reforming the IMF).

## **ANSWERS TO TEXTBOOK PROBLEMS**

1. The amount of seigniorage governments collect does not grow monotonically with the rate of monetary expansion. The real revenue from seigniorage equals the money growth rate times the real balances held by the public. But higher monetary growth leads to higher expected future inflation and (through the Fisher effect) to higher nominal interest rates. To the extent that higher monetary growth raises the nominal interest rate and reduces the real balances people are willing to hold, it leads to a fall in real seigniorage. Across long-run equilibriums in which the nominal interest equals a

constant real interest rate plus the monetary growth rate, a rise in the latter raises real seigniorage revenue only if the elasticity of real money demand with respect to the expected inflation rate is greater than -1. Economists believe that at very high inflation rates this elasticity becomes very negative (quite large in absolute value).

2. As discussed in the answer to problem 1, the real revenue from seigniorage equals the money growth rate times the real balances held by the public. Higher monetary growth leads to higher expected future inflation, higher nominal interest rates, and a reduction in the real balances people are willing to hold. In a year in which inflation is 100 percent and rising, the amount of real balances people are willing to hold is less than in a year in which inflation is 100 percent and falling; thus seigniorage revenues will be higher in 1980, when inflation is falling, than in 1990, when inflation is rising.
3. Although Brazil's inflation rate averaged 147 percent between 1980 and 1985, its seigniorage revenues, as a percentage of output, were less than half the seigniorage revenues of Sierra Leone, which had an average inflation rate of 43 percent. Since seigniorage is the product of inflation and real balances held by the public, the difference in seigniorage revenues reflects lower holdings of real balances in Brazil than in Sierra Leone. In the face of higher inflation, Brazilians find it more advantageous than residents of Sierra Leone to economize on their money holdings. This may be reflected in a financial structure in which money need not be held for very long to make transactions due to innovations such as automatic teller machines.
4. Under interest parity, the nominal interest rate of the country with the crawling peg will exceed the foreign interest rate by 10 percent since expected currency depreciation (equal to 10 percent) must equal the interest differential. If the crawling peg is not fully credible, the interest differential will be higher as the possibility of a large devaluation makes the expected depreciation larger than the announced 10 percent.
5. Capital flight exacerbates debt problems because the government is left holding a greater external debt itself but may be unable to identify and tax the people who bought the central-bank reserves that are the counterpart of the debt, and now hold the money in foreign bank accounts. To service its higher debt, therefore, the government must tax those who did not benefit from the opportunity to move funds out of the country. There is thus a change in the domestic income distribution in favor of people

who are likely to be quite well-off already. Such a regressive change may trigger political problems.

6. There may have been less lending available to private firms than to state-owned firms if lenders felt that state guarantees ensured repayment by state-owned firms. (In some cases, such as that of Chile, however, the government was pressured *ex post* into taking over the debts even of private borrowers.) Private firms may also have faced more discipline from the market -- their operating losses are unlikely to be covered with public revenues. Private firms would therefore have had to restrict borrowing to investment projects of high quality.
7. By making the economy more open to trade and to trade disruption, liberalization is likely to enhance an developing country's ability to borrow abroad. In effect, the penalty for default is increased. In addition, of course, a higher export level reassures prospective lenders about the country's ability to service its debts in the future. Finally, by choosing policies which international lenders consider sound, such as open markets, countries improve lenders assessment of their credit-worthiness.
8. Cutting investment today will lead to a loss of output tomorrow, so this may be a very short-sighted strategy. Political expediency, however, makes it easier to cut investment than consumption.
9. Peter Kenen first proposed the IDDC plan in 1983, before there was a secondary market for debt. Even with a secondary market, there is scope for the IDDC to help debtor countries since it would alter the terms of their loans and provide some debt relief. There are some potential problems with the IDDC. First, the debt that banks would be willing to sell to the IDDC is that which is least likely to be repaid. Kenen argues that this problem could be avoided by forcing banks to sell baskets of debt, offering some or all of their claims on all participating debtor countries. There is also the so-called moral hazard problem; a debt relief scheme would invite debtors to pursue policies that would increase rather than reduce the size of their debt. Another obstacle is the free-rider problem; if one bank believes that other banks or the IDDC will grant debt relief, which improves the debtor's ability to repay, there is an incentive for that bank to demand a higher price from the IDDC, or to refuse to participate in the IDDC scheme.

10. If Argentina dollarizes its economy, it will buy dollars from the United States with goods, services, and assets. This is, in essence, giving the US Federal Reserve assets for green paper to use as domestic currency. Since Argentina already operates a currency board holding U.S. bonds as its assets, dollarization would not be as radical as it would be for a country whose central banks hold domestic assets. Argentina can trade the U.S. bonds it holds for dollars to use as currency. When money demand increases, the currency board cannot simply print pesos and exchange them for goods and services, it must sell pesos and buy U.S. government bonds. So in switching to dollarization, the government has not surrendered its power to tax its own people through seignorage, it already does not have that power.

Still, though, through dollarization, Argentina loses interest by holding non-interest bearing dollar bills instead of interest bearing U.S. treasury bonds. Thus, the size of the seignorage given to the United States each year would be the lost interest (the U.S. nominal interest rate times the money stock of Argentina). This comes on top of the fact that any expansion of the money supply requires sending real goods, services, or assets to the United States for dollars (just as they do with bonds under the currency board). This is not a long-run loss because Argentina could cash in those dollars (just as it could the bonds) for goods and services from the United States whenever it wants. So, what they lose is the interest they should be getting every year they hold the dollars.

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## MATHEMATICAL POSTSCRIPT

These postscripts set out formal mathematical treatments of models presented in earlier chapters. The level of mathematical sophistication is a step above that used in the text; calculus and maximization principles are employed. A prior knowledge of these tools, however, is not necessary for students to work through these postscripts since there is an intuitive explanation of derivatives and maximization.

The postscript to Chapter 3 uses the "hat algebra" technique to present the specific factors model. Factor price determination and the effects of a change in relative prices are derived formally. The postscript to Chapter 4 presents a formal treatment of the factor proportions model, again using "hat algebra", to derive the relationship between goods prices and factor prices and to demonstrate the relationship between factor supplies and output. The postscript to Chapter 5 develops a formal presentation of the standard trade model. This presentation, which introduces a utility function, derives the world trading equilibrium, demonstrates its stability, and investigates the effects of economic growth, the transfer problem, and the effects of a tariff using comparative statics analysis.

The postscript to Chapter 21 develops a model of international portfolio diversification by a risk-averse investor. Both an analytic and a diagrammatic derivation of the investor's choice of the optimal portfolio is presented. The diagram which is developed is employed to consider the effects of changing rates of return on the investor's choice.

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