

>>Currencies and Crises

CRYING FOR ARGENTINA

IN DECEMBER 2001, ARGENTINA experienced conditions all too reminiscent of the Great Depression. Desperate people waited in endless lines at banks, only to find that they could no longer withdraw their savings. Millions of people who considered themselves middle class suddenly found themselves plunged into poverty as the unemployment rate soared to 23%. In huge demonstrations, outraged citizens banged pots and pans to symbolize the collapse of their families' livelihoods. The president of Argentina resigned in disgrace. The finance minister, the architect of the country's economic policies during the 1990s, was briefly jailed on charges of corruption (which were later dismissed).

In our introduction to macroeconomics we said that the single most important mission of macroeconomics is to prevent anything like the Great Depression from ever happening again. In the United States and other wealthy countries, macroeconomists can claim success: even at their worst, recessions since World War II have been far less severe than the great plunge of 1929–1933.

But in other parts of the world, the success of macroeconomic analysis and policy

has been less clear. In 2001–2002 Argentina experienced a Great Depression–sized slump. And Argentina's experience was not, alas, unique: Mexico in 1994–1995 and Asian countries in 1997–1998 experienced severe economic crises as well. The common denominator in each of these events was a dramatic reversal of international capital flows: countries that had received large inflows of foreign capital suddenly found those inflows turning into large outflows. These reversals of capital flows caused currencies to plunge, leading (in ways we'll explain later) to serious financial problems. And neither economists nor government officials had any easy answers about how to cope with the problem.

In this supplemental chapter, we provide the tools for understanding such crises. We begin by showing how *expected depreciation* or *expected appreciation* of a currency affect international capital flows. Next we describe the factors that can lead investors to expect depreciation or appreciation. We then show why, in some cases, countries face *speculative attacks* as expectations of depreciation lead to capital outflows. Finally, we take a look at the special difficulties posed for macroeconomic policy by currency speculation.

What you will learn in this chapter:

- ▶ How expectations of future appreciation or depreciation of a currency lead to **currency speculation**, and what determines these expectations
- ▶ Why countries with fixed exchange rates sometimes face **speculative attacks**
- ▶ Why a speculative attack can cause a recession, and how this risk affects macroeconomic policy

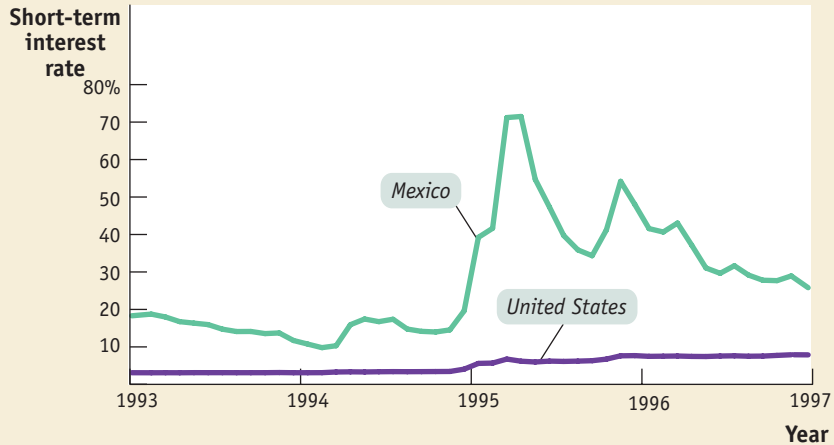
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Figure 1

Short-Term Interest Rates in the United States and Mexico

In the mid-1990s Mexican bonds paid much higher short-term interest rates than U.S. bonds. Yet capital was flowing out of Mexico, not in. The reason was a widespread expectation that the peso would soon depreciate against the dollar.

Source: OECD.



Expectations and International Capital Flows

In 1995 Mexican government bonds yielded a much higher interest rate than comparable U.S. bonds. We're not talking about a small difference. Figure 1 shows short-term interest rates in Mexico and the United States from 1993 through 1996. At its peak, the Mexican short-term interest rate was 71%, compared with a short-term interest rate of less than 7% in the United States. Yet U.S. capital wasn't flooding into Mexico. On the contrary, capital was moving in the other direction, from Mexico to the United States.

Why were private investors moving funds from Mexico to the United States—that is, selling Mexican bonds and buying U.S. bonds—despite the high interest rate of Mexican bonds compared with comparable U.S. bonds? The main reason was that Mexican bonds offered a 71% interest rate *in pesos*, but U.S. bonds offered a 7% rate *in dollars*. That is, the **currency denomination** of Mexican and U.S. bonds—the national currency in which payment is promised—differs. U.S. bonds are denominated in U.S. dollars; Mexican bonds are denominated in Mexican pesos. In 1995 investors believed that the peso was likely to depreciate sharply against the dollar—they believed that a given number of pesos would be worth substantially fewer dollars by the time a Mexican bond was repaid than when they bought that bond. And they believed that this reduction in the number of dollars per peso would more than offset the higher interest rate on peso-denominated bonds. If they were right, peso-denominated bonds would, in the end, offer a lower rate of return than dollar-denominated bonds.

The fact that Mexican bonds were regarded as a poor investment, despite the very high interest rate they offered, illustrates an important point: international capital flows don't depend just on interest rates; they also depend on *expectations about future exchange rates*. To understand why, let's look at a less extreme example: comparisons between dollar bonds and euro bonds.

Appreciation, Depreciation, and Expected Yields

Suppose that the interest rates on a U.S. one-year government bond and on a French one-year government bond are both equal to 3%. Both governments are considered very reliable when it comes to paying their bills, so it's almost certain that both will honor their debts. Does that mean that over the next year an investor who buys a U.S. government bond will earn the same amount as an investor who buys a French government bond?

No. In fact, the return on the investments may be very different. A U.S. bond is denominated in dollars, and a French bond is denominated in euros. (Remember, most

The **currency denomination** of a bond is the national currency in which payment is due.

TABLE 1**Value of \$1 Invested for One Year**

		Euro appreciates, dollar depreciates: €1 = US\$1.10		Euro depreciates, dollar appreciates: €1 = US\$0.90	
If invested in a dollar-denominated bond	Value in dollars	\$1.03		\$1.03	
	Value in euros	\$1.03/1.10 \$ per € = €0.936		\$1.03/0.90 \$ per € = €1.144	
If invested in a euro-denominated bond	Value in dollars	€1.03 × 1.10 \$ per € = \$1.133		€1.03 × 0.90 \$ per € = \$0.927	
	Value in euros	€1.03		€1.03	

European countries have given up their national currencies and adopted the euro, the common European currency.) If the euro appreciates against the dollar, a bond denominated in euros will have been the better investment; if the euro depreciates against the dollar, a bond denominated in dollars will have been the better investment.

Let's consider a specific example, shown in Table 1. We assume that dollar and euro bonds both pay 3% interest and that the current exchange rate is US\$1 = €1. We know that \$1 invested in a dollar bond today will yield \$1.03 in a year. We also know that this \$1 can instead be converted into €1 and used to buy a euro bond today that will yield €1.03 in a year.

But an American deciding whether to buy a dollar-denominated bond or a euro-denominated bond wants to know the yield of a euro-denominated bond *in dollars*. Similarly, a European wants to know the yield of a dollar-denominated bond *in euros*. In both cases, that comparison depends on what happens to the exchange rate over the year. In Table 1 we assume that there are two possibilities: the exchange rate will be either €1 = US\$1.10 in one year (the euro appreciates, rising by 10% against the dollar) or €1 = US\$0.90 in one year (the euro depreciates, falling by 10% against the dollar.) In each case we show the yield from \$1 invested in a U.S. bond will be in terms of both dollars and euros, as well as the yield from \$1 invested in a French bond in terms of both dollars and euros.

In the case where the euro rises to \$1.10, a dollar invested in a euro bond will yield €1.03 × 1.10 dollars per euro = \$1.133 after a year. So an American who buys a euro bond will earn more than 13%, compared with only 3% on a dollar bond. At the same time, a euro invested in a dollar bond will yield only \$1.03/1.10 dollars per euro = €0.936. So a European who buys a dollar bond will lose more than 6%, compared with earning a 3% return on a euro bond. So if the euro rises against the dollar, a euro bond will yield a higher return from everyone's point of view.

But if the euro falls to \$0.90, a dollar invested in a euro bond will be worth €1.03 × 0.90 dollars per euro = \$0.927—a loss of more than 7%. Meanwhile, a euro invested in a dollars bond will be worth \$1.03/0.9 dollars per euro = €1.144, a return of more than 14%. So if the euro falls against the dollar, dollar-denominated bonds will yield a higher return from everyone's point of view.

Table 1 illustrates why changes in exchange rates have a large impact on the yields of bonds denominated in different currencies. But knowing that fact does not, by itself, tell an investor where to invest his or her funds. To make that decision, an investor needs to make a prediction about the future exchange rate. What information should an investor use to make such predictions?

Understanding Currency Speculation

Nobody knows for sure what the dollar-euro exchange rate or the dollar-peso exchange rate will be a year from now. Investors can, however, make educated guesses about future exchange rates. Sometimes the best guess is that future exchange rates will be about the same as today's exchange rate. At other times, however, there are reasons to expect substantial appreciation or depreciation of a

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Investors engage in **currency speculation** when they make decisions about where to invest based on the expectation that exchange rates will change substantially in the future.

currency. When investors make decisions about where to put their funds based on the expectation that exchange rates will change substantially in the future, they are engaging in **currency speculation**.

In some countries, government officials frequently complain about currency speculation. These officials sometimes claim that speculators are coordinating their actions in order to drive down the currency. For Inquiring Minds on page 10 asks whether such conspiracy theories are ever valid. And as we'll see shortly, it's likely that currency speculation played an important role in some economic crises. But despite the official complaints, currency speculation isn't a nefarious practice—it's a normal economic activity. In fact, professional investors—those who manage other people's money, such as the managers of mutual funds—would be neglecting their duties if they didn't try to predict future exchange rates and invest on the basis of those predictions.

In order to engage in currency speculation, investors need some basis for predicting future changes in exchange rates. Among the factors that lead investors to believe that exchange rates will change are differences in inflation rates, deviations from purchasing power parity, large current account imbalances, and pressures on an exchange rate regime.

Differences in Inflation Rates Recall our discussion in an earlier chapter (Open-Economy Macroeconomics) of the exchange rate between the U.S. dollar and the Mexican peso between 1993 and 2003. While Mexico had higher inflation than the United States over that period, the peso depreciated so much that the real exchange rate between the dollar and the peso at the end of that period was about the same as at the beginning. As we explained in that chapter, these events reflected a general economic result: exchange rates tend to move to offset international differences in inflation, because in the long run exchange rates tend to move towards the purchasing power parity level. Consequently, the expectations of investors reflect this normal tendency: they generally expect the currencies of countries with high inflation to depreciate against the currencies of countries with low inflation.

Deviations from Purchasing Power Parity When a country's goods and services look expensive compared with those of other countries, it is often a good bet that this is only temporary and that prices will eventually be brought in line by a depreciation of the country's currency. Similarly, when a country's goods and services look cheap, it's often a good bet that the country's currency will appreciate.

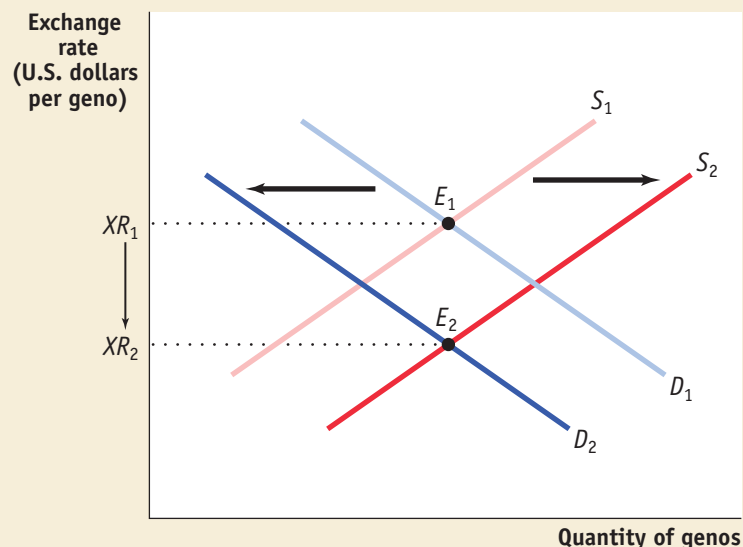
Large Current Account Imbalances A country that is running a large current account deficit is like a family that is borrowing to pay its current expenses. This can continue for a while, but eventually the family must bring its spending and income into balance. The same is true of a country. The usual way a country eliminates a current account deficit, however, is through a depreciation of its currency, which makes its goods and services relatively cheaper. Therefore, investors generally expect the currencies of countries with current account deficits to depreciate and the currencies of countries with current account surpluses to appreciate.

Pressures on an Exchange Rate Regime Finally, one important way to predict future changes in a country's exchange rate is to look for stresses on that country's current exchange rate regime. Consider, for example, a country with a fixed exchange rate that is supported by exchange market intervention. The intervention, though, is depleting its foreign exchange reserves. The running down of its foreign exchange reserves is a sign that it may be on the verge of abandoning the fixed exchange rate and will experience a sharp fall in the value of its currency. Similarly, a country that maintains high interest rates in the face of a recession in order to support its exchange rate and staunch an outflow of capital is also a likely candidate for a depreciation of its currency.

Figure 2

Effects of Expected Depreciation

Initially, investors expect no change in the dollar–geno exchange rate. S_1 represents the supply of genos on the foreign exchange market and D_1 , the demand for genos. Equilibrium is at E_1 , and the equilibrium exchange rate is XR_1 . Now suppose that investors suddenly expect future depreciation of the geno. The supply curve for genos shifts rightward to S_2 , and the demand curve shifts leftward to D_2 , and the equilibrium exchange rate falls to XR_2 . In other words, expectations of a future depreciation in the geno cause depreciation now.

**Effects of Currency Speculation**

Because investors make decisions based on expected yields that include expectations about future appreciation and depreciation, expectations about *future* exchange rates have a strong effect on *current* exchange rates. To see why, consider Figure 2, which shows the market for the geno, the currency of the imaginary country of Genovia. The horizontal axis shows the quantity of genos bought and sold, and the vertical axis shows the exchange rate against the dollar, measured as the number of dollars per geno. For now, let's assume that Genovia has a floating exchange rate, so that the geno is free to appreciate or depreciate in response to changes in supply and demand. We'll also assume, however, that initially investors *don't* expect any future appreciation or depreciation of the geno—they expect the future exchange rate to be the same as the current exchange rate.

As we explained in the chapter Open-Economy Macroeconomics, the supply curve for genos slopes upward and the demand curve slopes downward. S_1 is the initial supply curve and D_1 is the initial demand curve for genos. The initial equilibrium is at E_1 , and the initial equilibrium exchange rate is XR_1 .

Now suppose that for some reason investors' expectations change, and they now expect a future depreciation of the geno. For example, suppose they now believe that a year from now a geno will be worth 10% less in terms of dollars than it is worth today. This expected depreciation will shift both the supply curve and the demand curve. Genovians will now demand more U.S. bonds at every level of the exchange rate, because the expected depreciation of the geno means that U.S. bonds have a higher expected return in terms of genos than they did before. As a result, Genovians will want to buy more dollars and sell more genos, so the supply curve of genos shifts rightward, to S_2 . At the same time, U.S. residents will now demand fewer Genovian bonds at every level of the exchange rate, because the expected depreciation of the geno reduces the expected rate of return on those bonds. As a result, Americans will want to buy fewer genos and sell fewer dollars at every level of the exchange rate, so the demand curve for genos shifts leftward, to D_2 . The new equilibrium is at E_2 , and the equilibrium exchange rate has depreciated from XR_1 to XR_2 . In short, if people expect the geno to depreciate in the future, the equilibrium value of the geno falls right now. (This is similar to the way current stock prices depend on expectations about future stock prices, a phenomenon we discussed in our chapter "Savings, Investment Spending, and the Financial System.")

How would these two pieces of information help you form an expectation about the future exchange rate between Elbonia's currency and the dollar? Would you be sure about the direction in which the exchange rate is likely to move?

Solutions appear at back of book.

Fixed Exchange Rates and Speculative Attacks

Until crisis struck in late 2001, Argentina had a fixed exchange rate. Under a law passed in 1991, the value of the Argentine peso was fixed—supposedly forever—at \$1 per peso. But there was a problem: by the late 1990s, many people didn't believe that the value of the peso would remain fixed. Instead, they began to expect Argentina to abandon its fixed exchange rate regime and allow the Argentine peso to depreciate against the dollar. These expectations were eventually proved correct when the value of the peso plunged to less than \$0.30.

As we just learned, under a *floating* exchange rate, expected future depreciation of a currency leads to depreciation today. In contrast, how do expectations of depreciation or appreciation affect a country with a *fixed* exchange rate regime? The answer is that such expectations often make it much harder to maintain a fixed exchange rate and, in certain cases, can cause the fixed exchange rate regime to collapse.

How Speculation Can Threaten a Fixed Exchange Rate

Fixed exchange rate regimes aren't necessarily permanent. Since World War II, several fixed rate regimes have either been voluntarily or involuntarily abandoned. As a result, investors sometimes come to believe that a fixed exchange rate will soon be abandoned. When investors suddenly sell a currency with a fixed exchange rate because they expect the fixed exchange rate regime to be abandoned and the country's currency to depreciate—that is, when speculation occurs against the currency—we say that the currency faces a **speculative attack**, also known as a **currency crisis**.

To see how a speculative attack affects a fixed exchange rate regime, let's return to our imaginary economy of Genovia. But this time let's assume that it has a fixed exchange rate, with its initial position in the foreign exchange market shown by Figure 3. S_1 is the supply curve and D_1 is the demand curve for genos. Rather than allow the

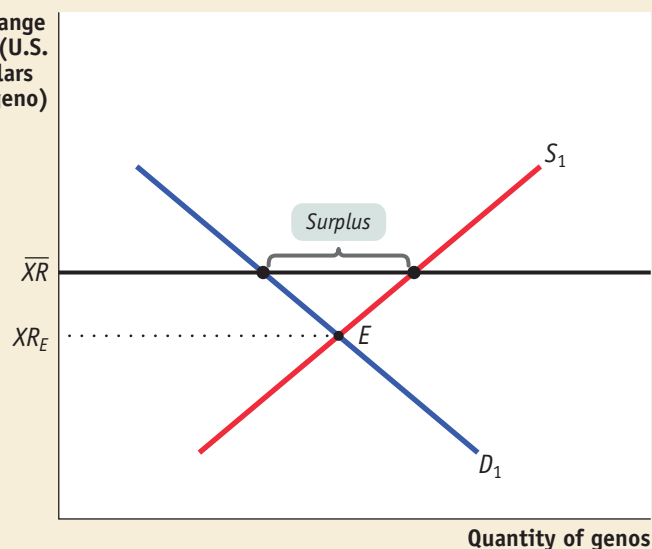
A **speculative attack** on a currency, also known as a **currency crisis**, occurs when expectations that a fixed exchange rate will be abandoned and the currency will depreciate lead investors to sell large quantities of the currency.

Figure 3

A Fixed Exchange Rate

Here, Genovia uses foreign exchange market intervention to keep the exchange rate at \bar{XR} , above the equilibrium exchange rate, XR_E . The government of Genovia must buy up the resulting surplus of genos in the foreign exchange market to maintain \bar{XR} .

Exchange rate (U.S. dollars per geno)



Quantity of genos

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exchange rate to move to its equilibrium level at XR_E , the Genovian government has chosen to keep the exchange rate fixed at the level \overline{XR} , a value is above the equilibrium level. That is, the geno is being maintained at a higher value in terms of dollars than its equilibrium value, leading to a surplus of genos in the market. We assume that the Genovian government accomplishes this with exchange market intervention, using its foreign exchange reserves to buy up the surplus of genos. And it must buy up this surplus every day in the foreign exchange market. (We'll turn later to the possibility that Genovia might use other policies to maintain the fixed exchange rate.)

Now suppose that for some reason investors suddenly expect a future depreciation of the geno, the effects of which are shown in Figure 4. Expectations of geno depreciation lead investors to want to sell more genos at every level of the exchange, and shift the supply curve for genos rightward from S_1 to S_2 . At the same time, the demand curve for genos shifts leftward, from D_1 to D_2 , as investors want to buy fewer genos at every level of the exchange rate. These two shifts increase the surplus of genos at the fixed exchange rate \overline{XR} . As a result, the amount of exchange market intervention by the Genovian government required to keep the exchange rate fixed at \overline{XR} increases. That is, the Genovian government must buy up more genos on the foreign exchange market than before the change in expectations. This means that it must use more of its foreign exchange reserves to support its fixed exchange rate every day. In practice, a speculative attack takes the form of a huge capital outflow from the country—also known as *capital flight*—as investors sell their Genovian assets and move their funds to U.S. dollar assets held in U.S. accounts.

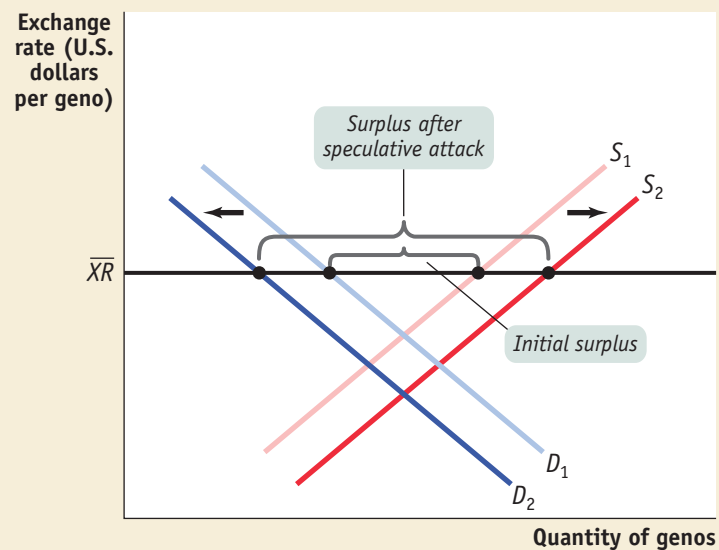
Since Genovia has a finite amount of reserves, even the situation shown in Figure 3 can't be sustained indefinitely because, sooner or later, its foreign exchange reserves will be exhausted. A pessimistic turn in expectations, as shown in Figure 4, brings the day of reckoning closer as the country depletes its foreign exchange reserves at a faster rate. In practice, as we explain in the Economics in Action that follows this section, speculative attacks often lead to *very* rapid losses of reserves, quickly making it very difficult for a country to maintain its fixed exchange rate.

But what causes a speculative attack in the first place?

Figure 4

How Currency Speculation Affects a Fixed Exchange Rate Regime

Assume that investors suddenly expect a future depreciation of the geno. This leads to an increase in the supply of genos, as investors want to sell more genos at every level of the exchange rate, and a fall in the demand for genos, as investors want to buy fewer genos at every level of the exchange rate. So, in order to maintain the fixed exchange rate, the Genovian government must buy up the new, larger surplus of genos, using up more of Genovia's foreign exchange reserves.



The Logic of Speculative Attack

Let's recap what we've just learned by returning to Figure 3, which shows the market for the geno based on the assumption that investors expect the geno's exchange rate to remain at its current level \overline{XR} . Even so, \overline{XR} is above XR_E , the equilibrium exchange rate in the absence of intervention. So maintaining the exchange rate fixed at \overline{XR} requires that the Genovian government enter the foreign exchange market each day, using its *foreign exchange reserves* of dollars to buy up surplus genos.

Over time, however, these reserves will be depleted. If there is no change in the situation, there will come a day when Genovia's foreign exchange reserves are gone. At that point it can no longer support the geno by buying it with dollars in the foreign exchange market. Consequently, the value of the geno will fall to XR_E .

Now comes the crucial point: *investors can see this coming*. If it's obvious that Genovia will eventually run out of foreign exchange reserves, and that when it does the value of the geno will drop, investors will build that prospect into their expectations today. That is, they will come to expect a future depreciation of the geno, even though the exchange rate is currently fixed. In addition, Figure 4 showed us that when investors suddenly expect a future depreciation of the geno, they will begin speculation against it today. And this forces the Genovian government to buy more genos to support \overline{XR} , causing it to run down its foreign exchange reserves more rapidly.

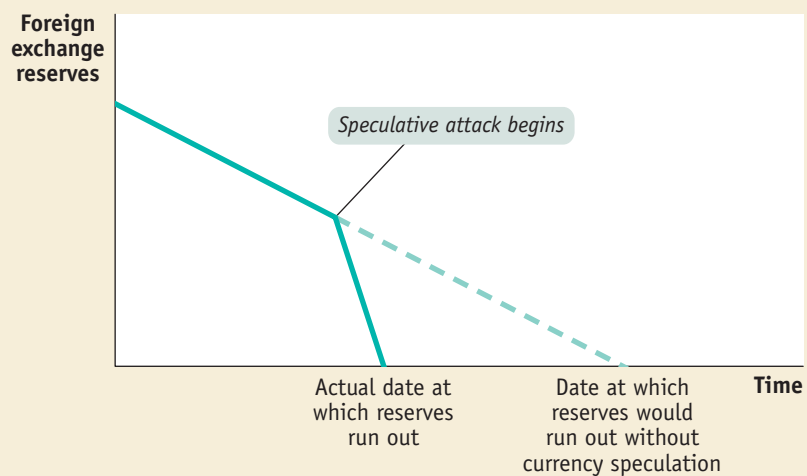
The realization of these events is shown schematically in Figure 5. Time is shown on the horizontal axis; the value of Genovia's foreign exchange reserves is shown on the vertical axis. The solid line shows how the foreign exchange reserves decline over time as Genovia uses them to support its fixed exchange rate. If investors didn't look ahead, reserves would decline gradually until they were exhausted, as illustrated by the dotted line. But if investors are forward-looking, once reserves fall to some threshold level they will start to expect a future depreciation of the geno. This leads to a speculative attack and an accelerated loss of reserves, shown by the sharp downward turn in the solid line. (As the head of a troubled small country's central bank put it, "Once I have only six months' reserves I will have no reserves." That about sums it up.) As the figure shows, the speculative attack greatly hastens the end of the fixed exchange rate regime.

This example may seem to suggest that speculative attacks are always prompted by the prospect that a fixed exchange rate regime will come to an end when a country runs out of foreign exchange reserves. In fact, this is only one possible scenario for a speculative attack, though it is useful for understanding many important cases.

Figure 5

The Logic of Speculative Attack

A country that is gradually depleting its foreign exchange reserves will eventually run out and be forced to let its currency depreciate. Forward-looking investors will see this coming. At some point before reserves are actually exhausted they will engage in a speculative attack. This causes reserves to fall more rapidly and brings the fixed exchange rate to an early end.



In other cases, the forces leading to a speculative attack are more subtle than a loss of reserves. For example, Britain maintained a fixed exchange rate for the British pound from 1990 to 1992 but abandoned that rate after a speculative attack in September 1992. The reason for that speculative attack wasn't so much the fact that Britain was running out of foreign exchange reserves as the fact that the British public was running out of patience. The public had grown increasingly unhappy with the government's tight monetary policy, which resulted in high interest rates, a depressed economy, and high unemployment. But the high interest rate on British bonds supported the fixed exchange rate, inducing investors to hold on to British bonds and British pounds, rather than sell them. But this also made it impossible to stimulate the economy by cutting interest rates. These circumstances led many to believe that Britain would make a political decision to abandon the fixed rate. By causing investors to expect depreciation of the pound, currency speculation against the British pound forced the British government to push interest rates even higher to keep the exchange rate fixed. This provoked political backlash that forced the British government to abandon the fixed rate and fulfilled investors' expectations.

Self-Fulfilling Prophecies?

The logic of speculative attacks sounds a bit circular: a country is forced into allowing its currency to depreciate by currency speculation, and this speculation reflects investors' belief that the country's currency will soon be allowed to depreciate. Some economists, looking at this circular logic, have argued that in some cases speculative attacks can be the result of self-fulfilling prophecies.

Here's how their argument works. Suppose that a country has a fixed exchange rate that causes some difficulties for economic policy but that the country's government also wants to maintain that fixed rate. An example is the case of Sweden in 1992, described in the Economics in Action that follows this section. At the time, the Swedish government would have liked freedom to cut interest rates to fight a recession, but it also wanted to maintain a fixed exchange rate between Sweden's currency and the German mark. Until the fall of 1992, the government's desire to fix the exchange rate outweighed the lure of freeing up monetary policy.

But now suppose that for some reason investors begin to believe that the fixed exchange rate will be abandoned. This change in expectations will lead to higher inter-

FOR INQUIRING MINDS CONSPIRACY THEORIES

Governments facing speculative attack often complain that they are being victimized. A British official in the 1960s famously blamed his government's currency problems on the "gnomes of Zurich"—by which he meant shady characters with Swiss bank accounts. In 1997 the prime minister of Malaysia blamed hedge funds—a type of mutual fund that engages in risky investments—for the currency crises of several Asian economies.

Do conspiracy theories about speculative attack ever make sense? If some speculative attacks are self-fulfilling prophecies, it's possible in principle that investors with large amounts of funds at their disposal

could deliberately foster such attacks, as a way to make a profit. The scheme would work like this: first, quietly borrow funds denominated in the target country's currency, and put them into a safe currency like the U.S. dollar. Then make a big show of pulling funds out of the country, so as to create a crisis that forces the country to let its currency depreciate. This will cut the value of your debts measured in dollars, allowing you to make a profit from the crisis.

Does this ever happen? George Soros, a famous hedge fund manager, borrowed large sums in British pounds before the 1992 crisis, and made about \$1 billion when the

pound fell. But most observers doubt that Soros actually caused the crisis. Hong Kong officials (who are not normally given to conspiracy theories) believe that they were the subject of a complicated plot by several large hedge funds, which involved both speculation against the Hong Kong dollar and speculation against the Hong Kong stock market, in 1998. But the plot failed, perhaps because of an unconventional defense in which Hong Kong's central bank bought up large quantities of Hong Kong stocks.

The bottom line is that conspiracy theories of speculative attack aren't necessarily silly, but they should be treated with caution.

est rates and capital outflows. As a result, it will become harder for the government to maintain the fixed exchange rate! The point is that expectations that a fixed exchange rate will be abandoned can push a country into abandoning the fixed rate: a speculative attack can be a self-fulfilling prophecy.

And what would provoke such a self-fulfilling prophecy? It could be anything—a scandal affecting the government, a piece of bad economic news, a careless statement by a government official.

Economists are divided over how important such self-fulfilling crises are in causing speculative attacks. All experts agree that many, perhaps most, currency crises are the result of fundamental economic problems. They also agree that countries with truly solid economic positions aren't subject to speculative attack. But some countries may fall into a gray area: they are in good enough shape that a speculative attack doesn't have to happen, given the current state, but weak enough that they can be pushed into abandoning a fixed exchange rate by a speculative attack if it should occur and thereby experience a self-fulfilling prophecy.

Some macroeconomists believe that the partially self-fulfilling nature of speculative attacks may explain why these attacks often seem to come in waves, with a speculative attack on one currency quickly followed by an attack on another currency, and so on. The speculative attack on the British pound in 1992 was soon followed by attacks on the Italian lira, the French franc, and the Swedish krona. A speculative attack on the Thai baht in 1997 was followed by a string of attacks around the world, culminating with an attack on Brazil's currency at the beginning of 1999. Economists call this phenomenon, in which a crisis in one country seems to spread to other countries, *contagion*, and suggest that it may happen because the collapse of a fixed exchange rate regime in one country leads investors to worry about the viability of regimes in other countries.

economics in action

The Fall of the Krona

In the early 1990s Sweden had a fixed exchange rate regime: it pegged the value of the krona, its national currency, in terms of German marks. When Britain abandoned its fixed exchange rate, many investors wondered whether Sweden would do the same. Sweden's attempts to maintain the fixed exchange rate are a classic demonstration of just how hard it is to defend against a speculative attack.

The first wave of speculation came in September 1992, after the British pound's fall. Like Britain, Sweden was suffering from a depressed economy, and many people suspected that the country would eventually abandon the fixed exchange rate to give itself the freedom to cut interest rates. But the government insisted that it was committed to the fixed rate. To induce investors to keep their money in Sweden, the central bank temporarily raised the overnight interest rate—the equivalent of the federal funds rate in the United States—to 500%.

To see why the interest rate had to go so high, we need to realize that in September 1992 investors believed that there was a high probability that the krona would depreciate by, say, 10% over the next week or two. To compensate them for that expected depreciation, Sweden's central bank had to offer them an interest rate of several percent *per week*. That's equivalent to an interest rate of several hundred percent at an annual rate.

High interest rates beat back the initial speculative attack on the krona, but only for a few months. In November 1992 speculation against the krona resumed, and the government feared the macroeconomic consequences of another rise in the interest rate. It tried, instead, to offset the outflow of capital with foreign exchange market intervention. But the size of the intervention required to keep the exchange rate fixed was immense. Over the course of a few days, the Swedish government bought about 160 billion krona—equal in value to about \$29 billion—on the foreign exchange market. Sweden has a much smaller economy than the United States, so this intervention

>> QUICK REVIEW

- ▶ *Speculative attacks* against fixed exchange rate regimes, also known as *currency crises*, can make a fixed rate hard to sustain.
- ▶ When a fixed exchange rate is ultimately unsustainable, investors realize this and launch a speculative attack that accelerates the end of the fixed rate.
- ▶ In some cases, speculative attacks can act as self-fulfilling prophecies, bringing down a fixed exchange rate that might have survived in the absence of currency speculation.

was equivalent to a U.S. government intervention of well over \$1 trillion in a brief space of time.

On November 19, 1992, Sweden threw in the towel and allowed the krona to fall against the German mark. It turned out that the Swedish economy did quite well over the years that followed, and the floating exchange rate regime has become popular with the Swedish public. In 2003 a referendum proposal to give up the krona and adopt the euro, which would have meant a permanent switch to a fixed exchange rate, was voted down by a large majority of Swedes. ■

**>> CHECK YOUR UNDERSTANDING 2**

1. In the absence of both currency speculation and foreign exchange market intervention, the geno would settle at an equilibrium exchange rate of 1 geno = US\$0.80. However, the Genovian central bank is supporting the geno at an exchange rate of 1 geno = US\$1. To do this, it must buy up \$50 million worth of genos each day. At present, the central bank has \$15 billion in foreign exchange reserves.
 - a. Draw a diagram showing what would happen to Genovia's foreign exchange reserves over time in the absence of currency speculation.
 - b. What will happen to the geno when the foreign exchange reserves are exhausted?
 - c. Why will the answer to part b affect the rate at which reserves are lost assuming that investors are forward-looking?
 - d. The head of Genovia's central bank tells you, "Once I have six months of reserves, I will have no reserves." Using the diagram you drew for part a, together with the effects of currency speculation, explain what she means.

Solutions appear at back of book.

Speculative Attacks and Macroeconomic Policy

We have now seen how currency speculation affects foreign exchange markets and how, under certain circumstances, countries find themselves facing speculative attacks as investors come to believe that their currencies will depreciate. Our final task in this chapter is to look at how currency speculation affects macroeconomic policy.

Macroeconomic Effects of Speculative Attacks

Suppose that a country with a fixed exchange rate experiences a speculative attack and ends up abandoning the fixed rate. What are the consequences for the economy? The effects vary widely across countries. In some cases, such as Britain in 1992, nothing very bad happens. In other cases, however, such as Argentina in 2002, the aftermath of a speculative attack is a severe recession. Why do the results of speculative attack vary so much, and how do the risks of crisis affect macroeconomic policy?

When we discussed macroeconomic policy in the chapter on open economies, we saw that a country with a fixed exchange rate often loses the ability to use monetary policy to stabilize the economy. This seems to imply that if a country abandons a fixed exchange rate, it should have a greater ability to stabilize the economy. While there may be costs to abandoning the exchange rate regime, these might be outweighed by the benefits accruing from greater flexibility in macroeconomic policy. For example, a country with high unemployment and a fixed exchange rate should be better able to bring unemployment down after giving up its exchange rate target.

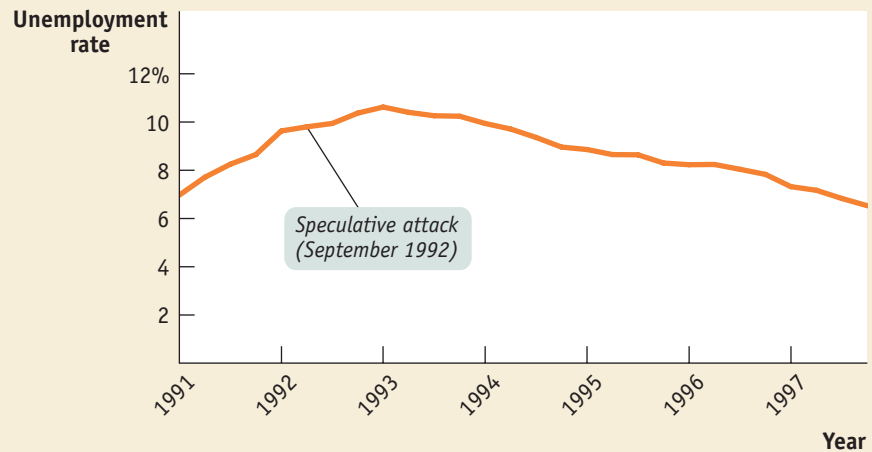
In fact, this favorable turn of events is what happens after some, but not all, speculative attacks. Figure 6 shows the most famous example of the favorable case. The figure shows the unemployment rate in Britain before and after "Black Wednesday"—September 16, 1992—the day when a speculative attack forced the government to give up its fixed exchange rate. After abandoning the fixed rate, the Bank of England was free to cut interest rates, and a bit later unemployment came down too.

Figure 6

Speculative Attack: Britain's Happy Story

The speculative attack that forced Britain to abandon its fixed exchange rate in 1992 did not have serious adverse economic effects. In fact, the government's new freedom to cut interest rates helped generate a fall in unemployment.

Source: OECD.



In other instances, the story has been much less favorable. Figure 7 shows the unemployment rate in Argentina before and after a policy that fixed the value of an Argentine peso at US\$1 dollar was abandoned in December 2001. Unemployment, which was already 17% on the eve of the crisis, shot up to Depression-era levels afterward. And Argentina's suffering wasn't unique. Mexico experienced a severe fall in output and employment after a speculative attack in late 1994. Thailand, Malaysia, South Korea, and, especially, Indonesia suffered sharp declines in output and employment after a wave of speculative attacks in 1997 and 1998.

This list of countries may convey the impression that wealthy countries have "good" outcomes after speculative attacks that force them to abandon a fixed exchange rate but poorer countries have "bad" outcomes. This isn't always true, however. A speculative attack on Brazil's currency led to the end of a fixed exchange rate in January 1999, but—to the great relief of Brazilians and many economists—the aftermath wasn't nearly as bad as feared.

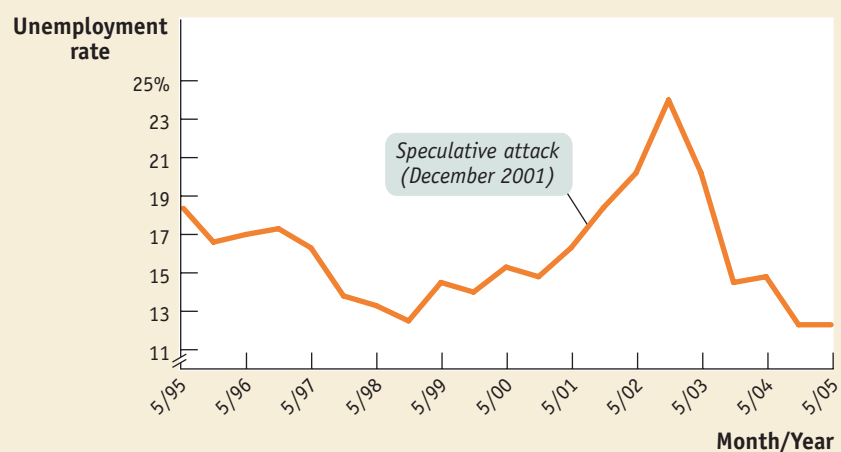
Why do some but not all speculative attacks have such devastating effects on the economy? This is a subject of current macroeconomic research. Most economists studying crises such as Argentina's focus on two ways in which a sudden depreciation of a country's currency can disrupt the country's financial system: *bank runs* and *balance-sheet effects*. Both have the effect of forcing firms and individuals to slash spending, precipitating a recession.

Figure 7

Speculative Attack: Disaster in Argentina

The fall of the Argentine peso in December 2001 was followed by a very severe economic contraction, which brought the unemployment rate to Depression-era levels. Fortunately, the economy soon began a strong recovery. But the Argentine disaster reminds us that our ability to fight recessions remains limited.

Source: Instituto Nacional de Estadísticas y Censos de Argentina.



The **balance-sheet effect of depreciation** is the reduction in wealth that occurs when individuals and firms have debts denominated in foreign currency when a country's currency depreciates.

Bank Runs We discussed bank runs in our chapter “Money, Banking, and the Federal Reserve System.” There we saw how a loss of confidence by depositors can cause a bank to collapse, even if the value of its assets exceeds the value of its liabilities. In the United States and other wealthy countries, banks are protected from runs both by deposit insurance and by the fact that the central bank is ready to supply cash when needed. In poorer countries, these protections aren't always as effective. Furthermore, in some countries many people hold bank deposits in another country's currency. For example, in Argentina many bank accounts were in U.S. dollars. Since the central bank of Argentina does not have the right to print dollars, it can't necessarily provide cash to prevent a bank run.

Balance Sheet Effects The **balance-sheet effect of depreciation** is the reduction in wealth that occurs if individuals and firms in a country have debts denominated in foreign currency when that country's currency depreciates. In 2001, many families and companies in Argentina had debts denominated in dollars—the amount they were required to repay was specified as a number of U.S. dollars rather than Argentine pesos. When the Argentine peso depreciated from \$1 to about \$0.30, these debts suddenly became much larger in terms of pesos. For example, a family with debt of \$10,000 suddenly found that debt rising from 10,000 pesos to more than 30,000 pesos. This squeeze on wealth led to a sharp fall in spending as well as to widespread bankruptcies and financial confusion.

Countries vary greatly in the extent to which they are vulnerable to financial disruption when the national currency depreciates. By and large, wealthy countries are less vulnerable than poorer countries, but some poorer countries are less vulnerable than others. For example, in the late 1990s Brazilian individuals and firms were less likely to have debts in dollars than their Argentine counterparts. This is probably the main reason the depreciation of Brazil's currency in 1999 wasn't followed by a severe recession but the depreciation of Argentina's currency at the end of 2001 was followed by a dramatic economic collapse.

Crisis and Policy Disputes

The period from 1992 to 2002 was marked by an unusually large number of speculative attacks, often with serious economic consequences. As we have already noted, Argentina suffered an economic slump comparable to the Great Depression; in 1998 Indonesia suffered almost as badly. The central mission of macroeconomics is to prevent such slumps from happening. But there are heated disputes about what policies countries should follow when threatened with currency crises. Let's focus on three hotly contested issues: the appropriate responses of monetary and fiscal policy, the role of international “rescue” operations, and the possible usefulness of controls on capital flows.

Monetary and Fiscal Responses to Crisis When economies suffer from demand shocks, macroeconomic theory offers clear guidance to monetary and fiscal policy: governments should use expansionary monetary and fiscal policy to offset recessionary gaps and should use contractionary monetary and fiscal policy to offset inflationary gaps.

But suppose that the shock facing an economy is a speculative attack: investors have become convinced that your currency is likely to depreciate, and the resulting currency speculation is causing large capital outflows. How should monetary and fiscal policy respond? The answer is that there is no clear answer.

In some cases, countries try to fend off a speculative attack by raising interest rates to provide investors with an incentive to keep their funds in the country. But this runs the risk of causing a recession, possibly a severe one. In other cases, countries refuse to raise interest rates and allow their currencies to depreciate. But this also runs the risk of causing a severe recession, perhaps via balance-sheet effects.

Fiscal policy also creates a dilemma. In some cases countries try to build their credibility with investors by raising taxes and cutting spending. But this can be contractionary. In other cases, countries try to stimulate demand with expansionary fiscal policy. But this runs the risk of raising doubts about government solvency and can worsen the speculative attack.

The point is that speculative attacks create dilemmas for policy makers, and there are no clear guidelines about the appropriate response.

Rescue Operations and the International Monetary Fund We noted earlier that one reason a speculative attack can force a country to abandon a fixed exchange rate is that a country may run out of foreign exchange reserves. It is, however, sometimes possible for countries to borrow additional funds that they can use to intervene in the foreign exchange market. In particular, other governments or international institutions can provide loans during a crisis.

An example of help from another government came during the Mexican crisis of 1994–1995. The U.S. government, concerned about the economic and political stability of its neighbor, directly loaned Mexico about \$20 billion and helped organize large additional loans from other sources. This package did not prevent a sharp drop in the Mexican peso and a severe Mexican recession, but it may have helped limit the damage. (The loan was eventually repaid in full.)

The main rationale for lending to countries in difficulty is the argument that their problems are only temporary. In some cases, given time, a country may be able to change its policies in a way that ends speculation against its currency. In other cases a speculative attack may be a self-fulfilling prophecy; if a loan lets a country weather the storm, the attack may simply go away.

In many cases, loans to countries in difficulty are made by the International Monetary Fund (IMF), an institution based in Washington, D.C., that is set up like a bank: member countries in effect deposit funds with the IMF that can be lent out when needed. The IMF was originally created as part of the Bretton Woods system of fixed exchange rates, instituted at the end of World War II. Today, the IMF's most important role is as a lender during economic crises. When a country is in difficulty, it negotiates an agreement with the IMF under which the country agrees to take specified economic policy actions that the IMF believes will stabilize its economy, and the IMF provides a loan to help the country deal with its immediate problems. The IMF played a central role in managing the wave of crises that swept Asia in 1997 and 1998, and it was very involved in Argentina's attempts to fend off a crisis before the fall of the peso.

In practice, the IMF's role is very controversial. On one side, it is often accused of imposing on countries needlessly harsh policies in return for loans. In particular, it has often insisted that countries raise taxes and cut spending during crises, even though there is dispute among economists about whether that's the right policy. (The IMF routinely lectures the United States and other wealthy countries on the need to bring down their budget deficits. But because the United States isn't seeking an emergency loan, it doesn't have to take the IMF's advice.) On the other side, the IMF has been accused of encouraging risky borrowing and lending, because investors and countries expect to be bailed out. In the specific case of Argentina, the IMF supported the fixed exchange rate policy for a number of years, and the collapse of that policy was widely held to reflect badly on the IMF's judgment.

Still, the IMF continues to play an important role. An example of the continuing importance of the IMF came in 2002. Officials in the U.S. government had been highly critical of the IMF and its lending policies during the previous year. Some people thought the United States would turn away from its previous support for IMF lending. Yet when Brazil faced difficulties that year, the U.S. government helped arrange a large IMF loan to Brazil.

FOR INQUIRING MINDS

CAN IT HAPPEN HERE?

In 2005 the United States ran a huge deficit in its balance of payments on current account—about 7% of GDP. This deficit was comparable to those of Mexico before its 1994 crisis, Indonesia before its 1997 crisis, and Argentina before its 2001 crisis. And a few economists wondered whether the United States might be vulnerable to a similar currency crisis.

The good news is that the United States seems much less vulnerable to financial dis-

ruption than countries that have had serious currency crises. Our banking system is well protected against runs. Although the United States has substantial debts to foreigners, these debts are primarily denominated in dollars, not foreign currency, so that even a sharp fall in the dollar wouldn't have large balance-sheet effects.

The bad news is that macroeconomic analysis of currency crises is still very much a work in progress. Although some macro-

economists correctly predicted speculative attacks against the Mexican peso in 1994 and several Asian currencies in 1997, the severe recessions that followed these speculative attacks came as a surprise. (Argentina's suffering was, however, widely predicted.) Because we don't understand the macroeconomics of currency crises as well as we'd like, some economists worry that the United States may face risks larger than today's economic models suggest.

Capital controls are controls on foreign exchange transactions that restrict international capital flows.

Are Capital Controls Ever Justified? One of the most contentious issues in international macroeconomics is whether and when it makes sense for countries to impose **capital controls**, a special type of control on foreign exchange transactions that restricts international capital flows. Typically, countries that impose capital controls make it illegal for domestic residents to buy foreign currency unless they need that currency to pay for imported goods and services or to make other transactions that appear in the balance of payments on current account. Transactions that would appear in the balance of payments on capital account are forbidden. For example, a resident of Genovia would be allowed to buy dollars in order to pay for a new U.S.-made tractor but wouldn't be allowed to acquire dollars to buy U.S. stocks or bonds. In principle, capital controls can be used to halt currency speculation during a crisis. The argument against them is the claim that they require a lot of red tape to enforce, distort incentives, and undermine the confidence of investors.

In 1998, as currency crises were affecting a number of Asian countries, the IMF and the U.S. government were adamantly opposed to the use of capital controls as a possible solution. One country, Malaysia, defied this opposition and imposed controls. The theory behind these controls was more or less that they would act like a curfew in a city suffering from riots: they would stop currency speculation temporarily and could be removed once things calmed down.

Views about how Malaysia's controls worked remain divided. They clearly did not have disastrous effects—Malaysia recovered fairly well from the crisis. But there are hard-to-resolve arguments about whether the controls contributed to Malaysia's recovery or whether that recovery would have happened anyway. The International Monetary Fund, which was opposed to capital controls in 1998, now agrees that they may be useful as an emergency measure.

International Crises as a Crucial Macroeconomic Issue

The history of macroeconomics shows that major advances in our understanding often follow real-world problems. The Great Depression led to the creation of macroeconomics as we know it. The problem of stagflation in the 1970s led to major revisions of macroeconomic theory.

As we've seen, crises in Asia and Latin America led to some of the worst macroeconomic difficulties since the Great Depression. At this point, there is not a general consensus among macroeconomists about how such crises can be prevented or dealt with when they happen. As a result, macroeconomists are working feverishly to improve their understanding of currency crises before the next one hits.

18 CURRENCIES AND CRISES

SUMMARY

1. Bonds from different countries differ in their **currency denomination**. As a result, relative yields depend on changes in exchange rates as well as interest rates.
2. Investors engage in **currency speculation** when they decide where to invest based on expectations about future appreciation and depreciation. These expectations reflect a variety of factors, including comparisons of inflation rates, deviations from purchasing power parity, and current account imbalances. Investors also try to predict future changes in exchange rate regimes. Under floating rates, expectations that a currency will depreciate in the future lead to depreciation today.
3. Even currencies under fixed rates are subject to **speculative attacks**, also known as **currency crises**, in which investors expect future depreciation after the fixed rate regime is abandoned. A speculative attack on a fixed exchange rate leads to more rapid loss of foreign exchange reserves.
4. One way in which speculative attacks occur is that investors see that a country with a fixed exchange rate will eventually run out of reserves. By anticipating the eventual end of the fixed rate, investors bring that end about more quickly. There are also more subtle causes of speculative attack; for example, political resistance to increases in interest rates can lead investors to speculate.
5. In some cases, speculative attacks may represent self-fulfilling prophecies: a fixed exchange rate regime that could have been maintained collapses because investors expect the fixed exchange rate to be abandoned. Self-fulfilling speculative attacks may explain “contagion” of crises among different countries.
6. Speculative attacks don’t always have negative economic effects; in some cases, countries seem to benefit from the end of a fixed exchange rate and its constraints on monetary policy. In other cases, however, speculative attacks lead to bank runs and **balance-sheet effects of depreciation**, causing severe recessions.
7. There are major controversies over the role of macroeconomic policy in the face of speculative attacks. Economists aren’t even sure in which direction monetary and fiscal policy should move. They disagree about the role of rescue operations, such as those carried out by the International Monetary Fund, and about whether **capital controls** are a useful emergency measure.

KEY TERMS

Currency denomination, p. 2
 Currency speculation, p. 4

Speculative attack, p. 7
 Currency crisis, p. 7

Balance-sheet effect of depreciation, p. 14
 Capital controls, p. 15

PROBLEMS

1. From 1994 to 1995 the Mexican peso depreciated drastically against the U.S. dollar; the exchange rate went from approximately 3.3 pesos per dollar to 6.4 pesos per dollar. The peso depreciated less rapidly from 1996 to 1997, with the exchange rate going from approximately 7.6 pesos per dollar to 7.9 pesos per dollar.
 - a. Look at Figure 1, which shows interest rates in the United States and Mexico. During the period from 1994 to 1995, did investors do better by buying peso-denominated bonds or dollar-denominated bonds? What about the period from 1996 to 1997?
 - b. As we can see from the answer to part a, sometimes it’s clear with the benefit of hindsight that many investors bought the wrong country’s bonds. Why might they have made that mistake in the case of Mexico versus the United States?
2. On November 25, 2005, *Business Week* reported that investors were finding U.S. dollar bonds more attractive than euro bonds, because the U.S. bonds offered a real interest rate of about 2%, versus 1.5% for European bonds. Why did *Business Week* emphasize real interest rates? Why not focus on the difference in nominal interest rates, which were about 4.5% in the United States versus 3% in Europe?
3. Explain how each of the following events would be likely to affect the exchange rate between the U.S. dollar and the euro:
 - a. The new chairman of the Federal Reserve announces his support for a target inflation rate of between 2% and 3% per year, but the head of the European Central Bank declares that its target is an inflation rate between 0% and 2% percent.
 - b. A new report shows that European business productivity, which has been lagging behind that of the United States, is taking off, which will open up new investment opportunities in Europe.
 - c. Forecasts of the effect of climate change on agriculture suggest that Europe will have to import more food in a few years but that U.S. agricultural exports will surge.

- d. The head of the European Central Bank warns that an excessively strong euro is endangering the European economy and hints that he may be prepared to intervene in the foreign exchange market.
4. During 2005 the government of China used foreign exchange market intervention to maintain a fixed exchange rate against the U.S. dollar. Over the course of the year, China added several hundred billion dollars to its foreign exchange reserves.
- Draw a diagram illustrating the situation in the market for the yuan, China's currency.
 - Many members of Congress, angry about China's trade surpluses, demanded that China do something to reduce those surpluses. In response, U.S. officials began pressuring China to revalue its currency, and there was widespread expectation that China would eventually give in. Again using a diagram, show how this pressure might affect the market for the yuan.
5. The nation of Freedonia has fixed its exchange rate against the euro. Instead of using foreign exchange market intervention, Freedonia's central bank adjusts the interest rate to keep the exchange rate between the euro and its national currency (the freedon) fixed.
- Suppose that Freedonia has a recessionary gap. Why can't it cut interest rates to reduce this gap without undermining the fixed exchange rate?
 - Suppose that investors suspect that the Freedonian government, facing political pressure to do something about unemployment, will eventually cut interest rates anyway. How will the government have to respond if it wants to keep the exchange rate fixed?
 - Why might expectations of a depreciation of the freedon become a self-fulfilling prophecy?
6. Consider a hypothetical business in Argentina. In 2001 this business had assets worth 100,000 pesos and debts worth 50,000 pesos. Then, at the end of the year, the peso depreciated sharply, falling from an exchange rate of 1 peso = US\$1 to 1 peso = US\$0.30.
- Assume that the business's assets retained their value in pesos. Explain what would happen to the financial position of the business in each of two situations: the firm's debt was in pesos, and the firm's debt was in dollars.
 - During the crisis, Argentina's government "pesified" debt: it declared that if a firm borrowed, say, 1 million pesos before the currency crisis, its debt was 1 million pesos after the crisis, even if the loan was denominated in dollars. Explain how this would have helped our hypothetical firm. Why would lenders be upset about this rule?
 - After the Argentine crisis many economists argued that it was very important for Latin American countries to develop markets in which borrowers could sell bonds denominated in local currency. Explain why this seemed important.

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