

## CHAPTER 8

# Policy Effects with Floating Exchange Rates

The effects of government policies on key macroeconomic variables are an important issue in international finance. The AA-DD model (not presented in this text) is used in this chapter to describe the effects of fiscal and monetary policy under a regime of floating exchange rates. The results are more comprehensive than the previous analyses of the same policies because the AA-DD model takes into account all the between-market effects across the money market, the foreign exchange (Forex) market, and the goods and services (G&S) market.

## 1. OVERVIEW OF POLICY WITH FLOATING EXCHANGE RATES

### LEARNING OBJECTIVES

1. Preview the comparative statics results from the AA-DD model with floating exchange rates.

Fiscal and monetary policies are the primary tools governments use to guide the macroeconomy. In introductory macroeconomics courses, students learn how fiscal and monetary policy levers can be used to influence the level of gross national product (GNP), the inflation rate, the unemployment rate, and interest rates. In this chapter, that analysis is expanded to an open economy (i.e., one open to trade) and to the effects on exchange rates and current account balances.

### 1.1 Results

The AA-DD model shows several important relationships between key economic variables:

**Expansionary monetary policy**

An increase in the money supply in a country.

**floating exchange rate system**

An exchange rate system in which the value of a country's currency is determined by the supply and demand for one currency in exchange for another in a private market operated by major international banks.

**Contractionary monetary policy**

A decrease in the money supply in a country.

**Expansionary fiscal policy**

An increase in government spending or transfer payments and/or a decrease in tax revenues.

**Contractionary fiscal policy**

A decrease in government spending or transfer payments and/or an increase in tax revenues.

- **Expansionary monetary policy** ( $\uparrow M^S$ ) causes an increase in GNP and a depreciation of the domestic currency in a **floating exchange rate system** in the short run.
- **Contractionary monetary policy** ( $\downarrow M^S$ ) causes a decrease in GNP and an appreciation of the domestic currency in a floating exchange rate system in the short run.
- **Expansionary fiscal policy** ( $\uparrow G$ ,  $\uparrow TR$ , or  $\downarrow T$ ) causes an increase in GNP and an appreciation of the domestic currency in a floating exchange rate system.
- **Contractionary fiscal policy** ( $\downarrow G$ ,  $\downarrow TR$ , or  $\uparrow T$ ) causes a decrease in GNP and a depreciation of the domestic currency in a floating exchange rate system.
- In the long run, once inflation effects are included, expansionary monetary policy ( $\uparrow M^S$ ) in a full employment economy causes no long-term change in GNP and a depreciation of the domestic currency in a floating exchange rate system. In the transition, the exchange rate overshoots its long-run target and GNP rises then falls.
- A central bank can influence the exchange rate with direct Forex interventions (buying or selling domestic currency in exchange for foreign currency). To sell foreign currency and buy domestic currency, the central bank must have a stockpile of foreign currency reserves.
- A central bank can also influence the exchange rate with indirect open market operations (buying or selling domestic treasury bonds). These transactions work through money supply changes and their effect on interest rates.
- Purchases (sales) of foreign currency on the Forex will raise (lower) the domestic money supply and cause a secondary indirect effect upon the exchange rate.

## 1.2 Connections

This model was developed to describe the interrelationships of macroeconomic variables within an open economy. Since some of these macroeconomic variables are controlled by the government, we can use the model to understand the likely effects of government policy changes. The two main levers the government controls are monetary policy (changes in the money supply) and fiscal policy (changes in the government budget).

It is important to recognize that these results are what “would” happen under the full set of assumptions that describe the model. These effects may or may not happen in reality. Despite this problem, the model surely captures some of the simple cause-and-effect relationships and therefore helps us to understand the broader implications of policy changes. Thus even if in reality many more elements not described in the model may act to influence the key endogenous variables, the model at least gives a more complete picture of some of the expected tendencies.

### KEY TAKEAWAYS

- The main objective of this model is to assess the effects of monetary and fiscal policy changes.
- It is important to recognize that these results are what “would” happen under the full set of assumptions that describes this model; they may or may not accurately describe actual outcomes in actual economies.

## EXERCISE

1. **Jeopardy Questions.** As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is “a tax on imports,” then the correct question is “What is a tariff?”
  - a. Of *increase, decrease, or stay the same*, this is the effect on equilibrium GNP in the short run if government spending decreases in the AA-DD model with floating exchange rates.
  - b. Of *increase, decrease, or stay the same*, this is the effect on the domestic currency value in the short run if government spending decreases in the AA-DD model with floating exchange rates.
  - c. Of *increase, decrease, or stay the same*, this is the effect on the foreign currency value (vis-à-vis the domestic) in the short run if domestic government spending decreases in the AA-DD model with floating exchange rates.
  - d. Of *increase, decrease, or stay the same*, this is the effect on equilibrium GNP in the short run if the nominal money supply decreases in the AA-DD model with floating exchange rates.
  - e. Of *increase, decrease, or stay the same*, this is the effect on the domestic currency value in the short run if the nominal money supply decreases in the AA-DD model with floating exchange rates.
  - f. Of *increase, decrease, or stay the same*, this is the effect on equilibrium GNP in the long run if the nominal money supply increases in the AA-DD model with floating exchange rates.
  - g. Of *increase, decrease, or stay the same*, this is the effect on the domestic currency value in the long run if the nominal money supply increases in the AA-DD model with floating exchange rates.

## 2. FOREIGN EXCHANGE INTERVENTIONS WITH FLOATING EXCHANGE RATES

### LEARNING OBJECTIVES

1. Learn how a country's central bank can intervene to affect the value of the country's currency in a floating exchange rate system.
2. Learn the mechanism and purpose of a central bank sterilized intervention in a Forex market.

In a pure floating exchange rate system, the exchange rate is determined as the rate that equalizes private market demand for a currency with private market supply. The central bank has no necessary role to play in the determination of a pure floating exchange rate. Nonetheless, sometimes central banks desire or are pressured by external groups to take actions (i.e., intervene) to either raise or lower the exchange rate in a floating exchange system. When central banks do intervene on a semiregular basis, the system is sometimes referred to as a “dirty float.” There are several reasons such interventions occur.

The first reason central banks intervene is to stabilize fluctuations in the exchange rate. International trade and investment decisions are much more difficult to make if the exchange rate value is changing rapidly. Whether a trade deal or international investment is good or bad often depends on the value of the exchange rate that will prevail at some point in the future. (See Chapter 4, Chapter 4.3 for a discussion of how future exchange rates affect returns on international investments.) If the exchange rate changes rapidly, up or down, traders and investors will become more uncertain about the profitability of trades and investments and will likely reduce their international activities. As a consequence, international traders and investors tend to prefer more stable exchange rates and will often pressure governments and central banks to intervene in the foreign exchange (Forex) market whenever the exchange rate changes too rapidly.

The second reason central banks intervene is to reverse the growth in the country's trade deficit. Trade deficits (or current account deficits) can rise rapidly if a country's exchange rate appreciates significantly. A higher currency value will make foreign goods and services (G&S) relatively cheaper, stimulating imports, while domestic goods will seem relatively more expensive to foreigners, thus reducing exports. This means a rising currency value can lead to a rising trade deficit. If that trade deficit is viewed as a problem for the economy, the central bank may be pressured to intervene to reduce the value of the currency in the Forex market and thereby reverse the rising trade deficit.

There are two methods central banks can use to affect the exchange rate. The indirect method is to change the domestic money supply. The direct method is to intervene directly in the foreign exchange market by buying or selling currency.

## 2.1 Indirect Forex Intervention

The central bank can use an indirect method to raise or lower the exchange rate through domestic money supply changes. As was shown earlier, increases in the domestic U.S. money supply will cause an increase in  $E_{\$/\text{£}}$ , or a dollar depreciation. Similarly, a decrease in the money supply will cause a dollar appreciation.

Despite relatively quick adjustments in assets markets, this type of intervention must traverse from open market operations to changes in domestic money supply, domestic interest rates, and exchange rates due to new rates of returns. Thus this method may take several weeks or more for the effect on exchange rates to be realized.

A second problem with this method is that to affect the exchange rate the central bank must change the domestic interest rate. Most of the time, central banks use interest rates to maintain stability in domestic markets. If the domestic economy is growing rapidly and inflation is beginning to rise, the central bank may lower the money supply to raise interest rates and help slow down the economy. If the economy is growing too slowly, the central bank may raise the money supply to lower interest rates and help spur domestic expansion. Thus to change the exchange rate using the indirect method, the central bank may need to change interest rates away from what it views as appropriate for domestic concerns at the moment. (Below we'll discuss the method central banks use to avoid this dilemma.)

## 2.2 Direct Forex Intervention

The most obvious and direct way for central banks to intervene and affect the exchange rate is to enter the private Forex market directly by buying or selling domestic currency. There are two possible transactions.

First, the central bank can sell domestic currency (let's use dollars) in exchange for a foreign currency (say, pounds). This transaction will raise the supply of dollars on the Forex (also raising the demand for pounds), causing a reduction in the value of the dollar and thus a dollar depreciation. Of course, when the dollar depreciates in value, the pound appreciates in value with respect to the dollar. Since the central bank is the ultimate source of all dollars (it can effectively print an unlimited amount), it can flood the Forex market with as many dollars as it desires. Thus the central bank's power to reduce the dollar value by direct intervention in the Forex is virtually unlimited.

If instead, the central bank wishes to raise the value of the dollar, it will have to reverse the transaction described above. Instead of selling dollars, it will need to buy dollars in exchange for pounds. The increased demand for dollars on the Forex by the central bank will raise the value of the dollar, thus causing a dollar appreciation. At the same time, the increased supply of pounds on the Forex explains why the pound will depreciate with respect to the dollar.

The ability of a central bank to raise the value of its currency through direct Forex interventions is limited, however. In order for the U.S. Federal Reserve Bank (or the Fed) to buy dollars in exchange for pounds, it must have a stockpile of pound currency (or other pound assets) available to exchange. Such holdings of foreign assets by a central bank are called **foreign exchange reserves**. Foreign exchange reserves are typically accumulated over time and held in case an intervention is desired. In the end, the degree to which the Fed can raise the dollar value with respect to the pound through direct Forex intervention will depend on the size of its pound denominated foreign exchange reserves.

### Indirect Effect of Direct Forex Intervention

There is a secondary indirect effect that occurs when a central bank intervenes in the Forex market. Suppose the Fed sells dollars in exchange for pounds in the private Forex. This transaction involves a purchase of foreign assets (pounds) in exchange for U.S. currency. Since the Fed is the ultimate source of dollar currency, these dollars used in the transaction will enter into circulation in the economy in precisely the same way as new dollars enter when the Fed buys a Treasury bill on the open market. The only difference is that with an open market operation, the Fed purchases a domestic asset, while in the Forex intervention it buys a foreign asset. But both are assets all the same and both are paid for with newly created money. Thus when the Fed buys pounds and sells dollars on the Forex, there will be an increase in the U.S. money supply.

The higher U.S. money supply will lower U.S. interest rates, reduce the rate of return on U.S. assets as viewed by international investors, and result in a depreciation of the dollar. The direction of this indirect effect is the same as the direct effect.

In contrast, if the Fed were to buy dollars and sell pounds on the Forex, there will be a decrease in the U.S. money supply. The lower U.S. money supply will raise U.S. interest rates, increase the rate of return on U.S. assets as viewed by international investors, and result in an appreciation of the dollar.

The only difference between the direct and indirect effects is the timing and sustainability. The direct effect will occur immediately with central bank intervention since the Fed will be affecting today's

#### foreign exchange reserves

Holdings of foreign assets by a country's central bank. Usually held in the form of foreign government Treasury bonds.

supply of dollars or pounds on the Forex. The indirect effect, working through money supply and interest rates, may take several days or weeks. The sustainability of the direct versus indirect effects is discussed next when we introduce the idea of a sterilized Forex intervention.

## 2.3 Sterilized Forex Interventions

There are many times in which a central bank either wants or is pressured to affect the exchange rate value by intervening directly in the foreign exchange market. However, as shown above, direct Forex interventions will change the domestic money supply. A change in the money supply will affect the average interest rate in the short run and the price level, and hence the inflation rate, in the long run. Because central banks are generally entrusted to maintain domestic price stability or to assist in maintaining appropriate interest rates, a low unemployment rate, and GDP growth, Forex intervention will often interfere with one or more of their other goals.

For example, if the central bank believes that current interest rates should be raised slowly during the next several months to slow the growth of the economy and prevent a resurgence of inflation, then a Forex intervention to lower the value of the domestic currency would result in increases in the money supply and a decrease in interest rates, precisely the opposite of what the central bank wants to achieve. Conflicts such as this one are typical and usually result in a central bank choosing to sterilize its Forex interventions.

The intended purpose of a sterilized intervention is to cause a change in the exchange rate while at the same time leaving the money supply and hence interest rates unaffected. However, the intended purpose is unlikely to be realized in practice.

A sterilized foreign exchange intervention occurs when a central bank counters direct intervention in the Forex with a simultaneous offsetting transaction in the domestic bond market. For example, suppose the U.S. Fed decides to intervene to lower the value of the U.S. dollar. This would require the Fed to sell dollars and buy foreign currency on the Forex. Sterilization, in this case, involves a Fed open market operation in which it sells Treasury bonds (T-bonds) at the same time and in the same value as the dollar sale in the Forex market. For example, if the Fed intervenes and sells \$10 million on the Forex, sterilization means it will also sell \$10 million of Treasury bonds on the domestic open market at the same time.

Empirical studies of the effects of sterilized Forex interventions tend to suggest that real-world sterilizations have generally been ineffective in achieving any lasting effect upon a country's currency value.

However, there are several reasons why sterilized interventions may be somewhat effective nonetheless. Temporary effects are certainly possible. If a central bank makes a substantial intervention in the Forex over a short period, this will certainly change the supply or demand of currency and have an immediate effect on the exchange rate on those days.

A more lasting impact can occur if the intervention leads investors to change their expectations about the future. This could happen if investors are not sure whether the central bank is sterilizing its interventions. Knowing that sterilization is occurring would require a careful observation of several markets unless the Fed announces its policy. However, rather than announcing a sterilized intervention, a central bank that wants to affect expectations should announce the Forex intervention while hiding its offsetting open market operation. In this way, investors may be fooled into thinking that the Forex intervention will lower the future dollar value and thus may adjust their expectations.

### KEY TAKEAWAYS

- If the central bank sells domestic currency in exchange for a foreign currency on the Forex, it will cause a direct reduction in the value of the domestic currency, or a currency depreciation.
- If the Fed were to sell dollars on the Forex, there will be an increase in the U.S. money supply that will reduce U.S. interest rates, decrease the rate of return on U.S. assets, and lead to a depreciation of the dollar.
- A sterilized foreign exchange intervention occurs when a central bank counters direct intervention in the Forex with a simultaneous offsetting transaction in the domestic bond market.
- The intended purpose of a sterilized intervention is to cause a change in the exchange rate while at the same time leaving interest rates unaffected.

## E X E R C I S E

1. **Jeopardy Questions.** As in the popular television game show, you are given an answer to a question and you must respond with the question. For example, if the answer is "a tax on imports," then the correct question is "What is a tariff?"
  - a. Of *buy domestic currency* or *sell domestic currency* on the foreign exchange market, this is one thing a central bank can do to cause a domestic currency depreciation.
  - b. Of *buy foreign currency* or *sell foreign currency* on the foreign exchange market, this is one thing a central bank can do to cause a domestic currency appreciation.
  - c. Of *increase, decrease, or keep the same*, this is one thing a central bank can do to the domestic money supply to induce a domestic currency appreciation.
  - d. Of *increase, decrease, or keep the same*, this is one thing a central bank can do to the domestic money supply to induce a domestic currency depreciation.
  - e. The term used to describe a central bank transaction on the domestic bond market intended to offset the central bank's intervention on the foreign exchange market.
  - f. Of *increase, decrease, or stay the same*, this is the effect on equilibrium GNP in the short run if the central bank sterilizes a sale of foreign reserves on the foreign exchange market with floating exchange rates.
  - g. Of *increase, decrease, or stay the same*, this is the effect on the domestic currency value in the short run if the central bank sterilizes a purchase of foreign reserves on the foreign exchange market with floating exchange rates.