HOUCK ELEMENTS OF AGRICULTURAL TRADE POLICIES

Reserve Reading

Chapter 15

Currency Exchange Rates and Trade Policy

Throughout the 1970s and early 1980s, major changes occurred in the entire international financial network. Part of this change was a major increase in the day-to-day and week-to-week volatility of currency exchange rates among most trading nations. This phenomenon reflected a broad-based move toward more flexibility in the pricing of one nation's currency in relation to other national monies. Flexible and changing exchange rates have important implications for trade policy decisions in agriculture and elsewhere. Exchange rate movements can easily swamp or obscure the desired price, trade, and production effects of any specific agricultural commodity policy. Because of the pervasive impact of exchange rate adjustments on total trade flows and values, it is important that students of agricultural trade policies have at least a rudimentary knowledge of how currency exchange rates affect commodity markets and prices.

Exchange rates among national currencies are simply the prices of one nation's money in terms of other currencies. At any specific moment, they represent the terms by which domestic prices, costs, and other values for goods and services are translated from the domestic economy onto the broader, international scene. Exchange rate adjustments typically influence national economic activity by affecting a broad array of industries, products, and occupations. Consequently, individual commodity or sectoral interests can be dominated by aggregate economic forces and policy. Hence, in a flexible regime, traditional trade policy decisions can be made with less freedom of action and much less certainty of result than if exchange rates were fixed.

In this chapter we will not attempt to describe or analyze either the complex economics of exchange rate determination or the underlying processes of adjustment through time. That would carry us far into the realm of macroeconomics and general equilibrium trade theory. Our more modest goal in this chapter is (1) to establish some basic ideas about currency exchange rates as a set of interrelated prices, (2) to use these ideas to probe the partial equilibrium economics of how exchange rate changes affect international commodity markets and prices, and (3) to discuss such topics as overvaluation, undervaluation, and multiple exchange rates.

Our approach here will be to assume that the flow of causality and reaction is from externally determined exchange rates to international agricultural product markets. We will not consider the feedback or economywide aspects here. Hence, our discussion will not involve international balance of payments issues, the dynamics of exchange rate adjustments, forward markets for traded currencies, or exchange rates and inflation. These are important topics, but beyond the scope of this book. Exchange rate policy is clearly macroeconomic trade policy. Except for some aspects of multiple exchange rate schemes, to be discussed later, it does not fit easily into the typical analytical approach employed thus far.

Even with our relatively narrow focus, it is still true that clear thinking about exchange rates is not easy. To cope with this inherent complexity, we adopt a rather simplified framework—a three-nation trading world in which both importing and exporting nations are represented in partial equilibrium style.

SOME BASIC IDEAS

Think of three trading nations, A, B, and C, with separate national currencies called alphas (α), betas (β), and gammas (γ) respectively. Imagine also that these three national currencies can be freely traded for each other on international money markets. Thus, we can visualize each of these currencies as a commodity that at any time has a known market price in terms of each of the other two.

For each alpha, there is a beta price and a gamma price. For instance, the beta price of an alpha (which we might write as β/α) is the number of betas you can obtain by selling one alpha. There is an alpha and a gamma price for each beta, and an alpha and a beta price for each gamma. These add up to six possible currency prices. But three of these exchange rates are merely reciprocals of the other three. That is, if you can get two betas for one alpha ($\beta/\alpha = 2$), in a simple and open currency market you can get 0.5 alphas by selling one beta ($\alpha/\beta = 1/2 = 0.5$).

Even after the three reciprocals are set aside, the three remaining currency prices reflect only *two* fully independent exchange rates. An open functioning

currency market will ensure that once two of the three remaining exchange rates are established, the third is also determined. To illustrate this idea, imagine that we are citizens of country A, equipped with some α's. We face two international exchange rates directly—namely, the number of β's we can obtain per α (β/α) and the number of γ's we can obtain per α (γ/α). (The number of our α's that other people can obtain for their β's and γ's are the respective reciprocals, α/β and α/γ.)

Suppose the two market-determined exchange rates that we, as α holders, face are the following:

$$\frac{\beta}{\alpha} = 0.8 \tag{15.1}$$

$$\frac{\gamma}{\alpha} = 1.2 \tag{15.2}$$

Aside from the reciprocals of Eqs. (15.1) and (15.2), the only other exchange rate of interest in this three-country situation is the number of β's that can be obtained for each γ (β/γ). However, the equilibrium β/γ exchange rate is already implied as the ratio of Eq. (15.1) to Eq. (15.2). That is,

$$\frac{\beta}{\gamma} = \frac{\beta}{\alpha} \div \frac{\gamma}{\alpha} \tag{15.3}$$

$$= 0.8 \div 1.2$$

$$= 0.67$$

So, 0.67 β's can be obtained per γ; reciprocally, 1.5 γ's can be obtained per β.

Thinking beyond our three-country setting, we can show that with four trading nations there will be three independent exchange rates, with five trading nations there will be four independent exchange rates, and so on. In general, with n trading nations there will be $n - 1$ independent exchange rates.

If our currency (α) falls in value, we can obtain fewer β's and/or γ's than before. We can say that the α has *depreciated* or has experienced *devaluation*. On the other hand, if our α's increase in value so that we can obtain more β's and/or γ's than before, we say that the α has *appreciated* or has experienced *revaluation*. If the α depreciates relative to the β, this implies, conversely, that the β has appreciated in value relative to the α. Being able to get fewer β's when you sell one α naturally means you can get more α's when you sell one β.

If our α appreciates relative to the β but depreciates relative to the γ, the value of γ's must appreciate in the market relative to β's. Otherwise, currency dealers could make huge profits by arbitraging in the markets for the three currencies—selling more valuable α's for β's, for instance, trading them for γ's at the old γ/β rate, and finally exchanging those γ's for more α's than they originally started with. In fact, as α's appreciate relative to β's, the behavior of currency holders and traders will turn in this direction and the resulting market pressures will pull up the market value of γ's relative to β's. This example and others like it indicate that across the trading world, currency exchange rates are interlocked but also capable of independent adjustment.

ANALYTICAL SETTING

In all our previous analyses, we have implicitly assumed that one currency could be exchanged for another at a fixed and unchanging rate. Hence, the question of what currency to use to measure prices and values across international borders was was not really important for our theoretical inquiry. Now let us abandon that view. Let us investigate how shifting currency exchange rates affect our partial equilibrium analysis in international commodity markets.

For the moment, visualize the α as the currency on which we will focus our attention. This might be because (1) we are especially interested in the economics of Nation A's trade, (2) because the α is a major currency in which international assets are held, or (3) because the α is the currency in which world prices are usually quoted for products of interest. For the rest of this chapter, let Nation B always be a net importer of q (the product in question) and let Nation C always be a net exporter of q. This situation is shown in the lower panels of Fig. 15.1. The excess demand for q by Nation B is priced in β's and is labeled ED_B. The excess supply of q by Nation C is shown as ES_C priced in terms of γ's.

In the upper panels of Fig. 15.1, the excess demand and supply curves of Nation B and C *are priced in α's*, with the horizontal axes remaining the same. At the initial exchange rates of α's for β's and α's for γ's (say, $1\alpha = 1\beta = 1\gamma$), ED_B is the same as ED_B^0 and ES_C is the same as ES_C^0. In this diagram and those that follow, the superscript notation on excess demand and supply curves will indicate that the original national curve has been expressed in terms of another currency—namely, α's. Hence, ED_B^0 indicates that the excess demand of Nation B, measured originally in β's, is now expressed in terms of α's at some given exchange rate between α's and β's. Similarly, ES_C^0 is the α-priced equivalent of Nation's C's ES_C curve at a given α to γ exchange rate.

To help illustrate these ideas, pick any point a and any point g on the horizontal axes of Nations B and C respectively. The vertical line segment ab is equal to segment ce for Nation B. For Nation C, gh is equal to jl. This equality indicates that $1\alpha = 1\beta = 1\gamma$ in the original situation. These line segments are identified simply to help show how the relative positions of the ED and ES curves change as exchange rates alter.

First, let the β and the γ appreciate relative to the α. This is the same

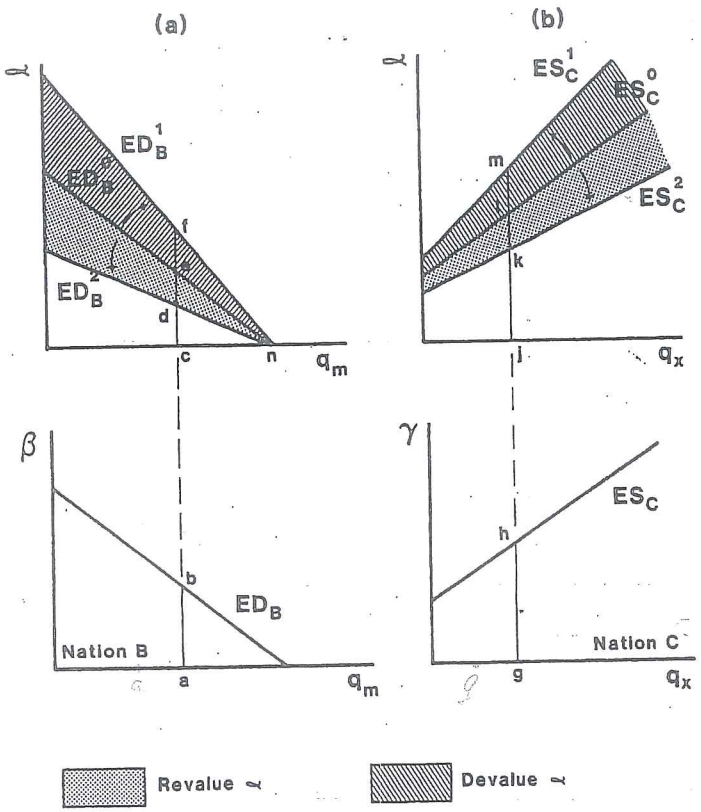

Figure 15.1 Effects of devaluation and revaluation

as a general devaluation of α. Each β will command more α's than before, so the translation of ED_B from β's into α's will generate an excess demand function like ED_B^1. At an import quantity point like *a*, the "new" excess demand curve measured in α's will pass through point *f* rather than point *e*. The ratio *ef* to *ce* is a measure of the extent of β's appreciation. An exactly comparable argument generates ES_C^1 on the Nation C side of Fig. 15.1, with the ratio *lm* to *jl* measuring the extent of γ's appreciation relative to α. Therefore, devaluation of the currency of interest α rotates B's demand for imports outward to the right around point *n* when it is measured in that particular currency. Conversely, devaluation of α rotates C's supply of exports upward and to the left in terms of that devalued currency. The more α is devalued relative to β and γ, the more ED_B^1 and ES_C^1 will rotate away from ED_B^0 and ES_C^0 respectively.

Now if β's and γ's are devalued relative to the α, exactly the reverse argument produces ED_B^2 and ES_C^2 in Fig. 15.1. Here the α is revalued relative to both other currencies. The appreciation of α compared with β and γ causes the excess demand curve, denominated in α's, to rotate downward and to the left to ED_B^2. The corresponding excess supply curve rotates downward and to the right to ES_C^2. The ratios of *ed* to *ce* and *lk* to *jl* indicate the extent of the devaluation of β and γ respectively. The stronger the appreciation of α, the more ED_B^2 and ES_C^2 rotate.

Because currency exchange-rate changes are proportional alterations in per-unit values, the negatively sloped excess demand curve will seem to pivot on its *q*-axis intercept (point *n* in Fig. 15.1), turning clockwise for a devaluation of the currency on the vertical axis and counterclockwise for an appreciation of that currency. The positively sloped excess supply curve also seems to pivot on its quantity-axis intercept (not visible in Fig. 15.1), turning counterclockwise for a devaluation of the currency on its vertical axis and clockwise for an appreciation of that currency.

From the point of view of a particular country (say A) and its national currency (say α), devaluation rotates excess demand curves displayed by foreign nations outward (to the right) and excess supply curves displayed by foreign nations backward (to the left). Appreciation (or revaluation) has the reverse effect, rotating foreign excess demand curves to the left and foreign excess supply curves to the right.

To see how exchange-rate adjustments affect trade and prices, we need to bring excess demand and supply functions together, then alter currency values. To do this in a relatively simple way, we will again adopt the viewpoint of Nation A, considering the α as either "our" currency or the main international medium of exchange. We also will retain the notion that Nation B is a net importer of the product *q* and that Nation C is a net exporter.

If Nation A is an exporter of *q*, Nation B is our international customer and Nation C is our international competitor. If Nation A is a net importer of *q*, Nation C is our supply source, also sought by Nation B for its own import requirements. To make the following arguments more realistic, we can easily consider that the excess demand curve labeled with a B is a composite of numerous foreign importing countries and that the excess supply curve labeled with a C is a similar composite of foreign exporters—foreign, that is, from Nation A's viewpoint.

Figure 15.2 expands on the format of Fig. 15.1. It is the same as Fig. 15.1 in the panels for Nations B and C (on the right). The panel for Nation A depicts A as a net exporter of *q*. The excess supply of Nation A, denominated in α's, is labeled ES_A. The function $ED(R)$ is the excess demand for the rest of the world. It is the horizontal difference between ED_B^0 and ES_C^0 at various α prices. In Fig. 15.2, with fixed exchange rates among α, β, and γ, the dotted lines represent the equilibrium prices in the various currencies, the amount exported by A, the amount imported by B, and the other exports supplied by C.

One could easily draw a counterpart diagram to Fig. 15.2 in which Nation A, viewed as a net importer, would display an excess demand function to interact with a rest-of-world excess supply function, formed as the horizontal difference between ES_C^0 and ES_B^0.

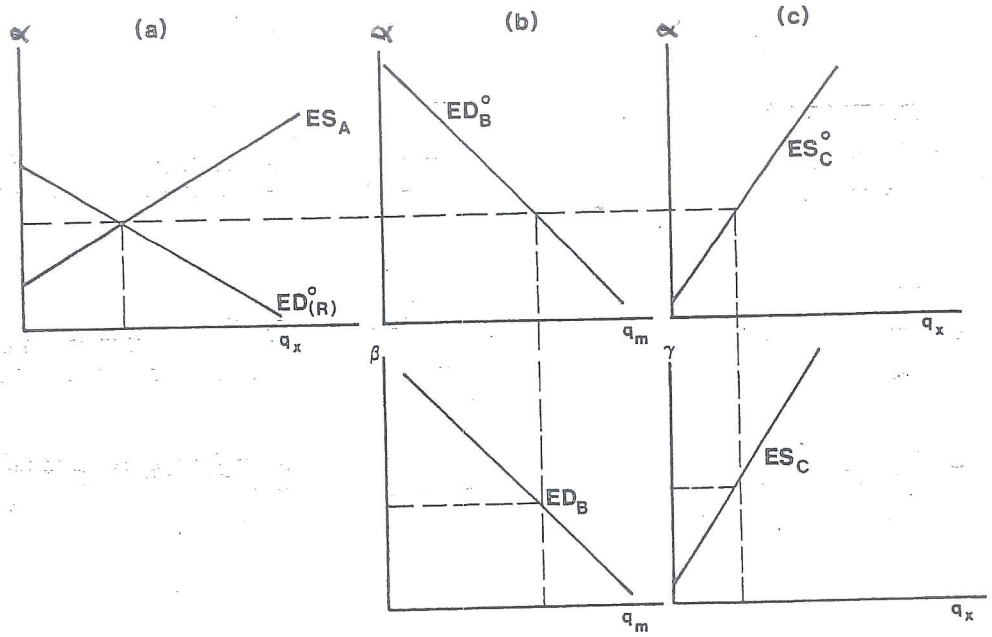

Figure 15.2 Three-nation trade equilibrium at fixed exchange rates

TRADE EFFECTS OF EXCHANGE RATE CHANGES

With three nations in our purview, there are six fundamental exchange-rate scenarios to consider. Three involve A as an importer and three involve A as an exporter. Each includes devaluation and revaluation of α, β, and γ relative to the other two currencies. The following list describes the central characteristics of each of these six scenarios from the viewpoint of Nation A—the first three with A as an exporter and the next three with A as an importer.

Nation A as an Exporter of *q*

1 The α is devalued or revalued relative to both the β and γ. The economics of this scenario indicates how an exporter's situation alters as its currency changes in value relative to the currencies of both its importing customers and its competing exporters.
2 The β is devalued or revalued relative to both the α and γ. The economics of this scenario indicates how an exporter's situation alters as the currency value of a major importer changes relative to all exporters.
3 The γ is devalued or revalued relative to both the α and β. This scenario illustrates how an exporter's position alters as the currency of one or more of its competing exporters changes relative to the rest of the world, including importers.

Nation A as an Importer of *q*

4 The α is devalued or revalued relative to both the β and γ. The economics of this scenario indicates how an importer's situation alters as its currency changes in value relative to the currencies of its supply sources and other importers of the same product.
5 The β is devalued or revalued relative to both the α and γ. This scenario illustrates how an importer's situation alters when a competing importer's currency changes relative to its own currency and to those of all exporters.
6 The γ is devalued or revalued relative to both the α and β. The economics of this scenario shows how an importer's situation changes as the exporter's currency changes relative to *all* importers.

For our purpose in this chapter, it is not necessary to provide a complete analytical discussion of all six of these exchange-rate scenarios. With the ideas that emerge in discussing three of them, the reader can construct a general system for examining the other three, plus additional complications as desired. The three scenarios to be discussed here in some detail are scenarios 1 and 2 with A as an exporter and scenario 4 with A as an importer.

Alpha Value Changes: A as Exporter (Scenario 1)

Imagine that the α is either devalued or revalued relative to both the β and γ—no change occurs in the relative value of the β vis-à-vis the γ. The partial equilibrium economics of this situation is shown in Fig. 15.3. These changes appear as clockwise and counterclockwise rotations of the excess demand and supply functions denominated in α's. The original position before any exchange-rate changes occur is indicated by the system of dotted lines in Fig. 15.3. Hence, the effects of devaluation or appreciation are reflected as movements away from this pattern of prices, production, and trade.

Consider first a devaluation of the α. The α will now be exchanged for fewer units of the importer's β and fewer units of the competing exporter's γ than before. In Fig. 15.3, this change is indicated by the clockwise rotation in B's excess demand curve from ED_B^0 to ED_B^1 and in the counterclockwise rotation of C's excess supply curve from ES_C^0 to ES_C^1. Together, this increase in demand and decrease in competitive supply (expressed in α's) generates an increase in the total excess demand function faced by A as an exporter—from $ED^0(R)$ to $ED^1(R)$. With no other changes occurring in the system, Nation A responds by increasing its exports, as reflected in the left-most panel of Fig. 15.3.

Because the net international excess demand facing Nation A increases (rotates toward the right), the α price of q increases as indicated. Although the α price of q increases, the α devaluation process reflected in ED_B^1 and ES_C^1 causes both the β and γ prices to fall, as shown in the lower panels of Fig. 15.3. As a consequence, more is imported by Nation B and less is exported by Nation C. Nation A's export market share will increase as its total imports

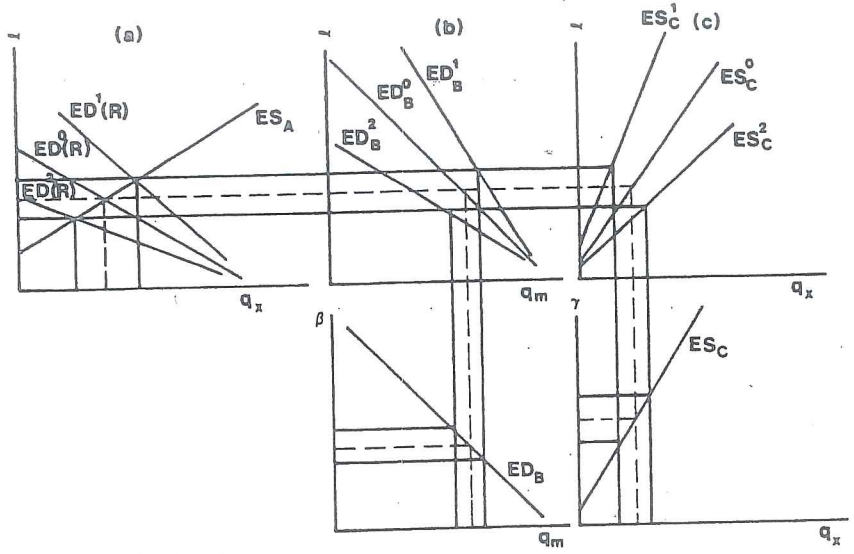

Figure 15.3 Change in α with A as exporter

increase and as competitive exports fall. The price effects of an α devaluation are split between a rise in the α price and a fall in prices expressed in other currencies.

A revaluation or appreciation of the α has exactly opposite effects. These are illustrated in Fig. 15.3 as a consequence of ED_B^0 rotating to ED_B^2 and ES_C^0 rotating to ES_C^2. Since these changes indicate a decrease in demand by B and an increase in the competitive supply from C, the net excess demand facing Nation A rotates to the left—from $ED^0(R)$ to $ED^2(R)$. With nothing else occurring, Nation A responds by decreasing its exports along ES_A as it is pushed out of shrinking international markets by the competitive exporter C.

This rearrangement in total trade and market share occurs because prices expressed in α's fall, while prices expressed in β's and γ's rise as ED_B^2 and ES_C^2 become relevant. The β price rise puts downward pressure on total imports, but the γ price rise generates export expansion by C. Together, these movements squeeze Nation A into a smaller trade volume at a lower α price. Thus, the price effects of a revaluation in α are split between a fall in the α price and an increase in the β and γ prices of the product in question.

All Exporters' Currency Values Change: A as Exporter (Scenario 2)

In this scenario, the currency values of both exporter nations, A and C, move together relative to that of the importer, B. For simplicity, we will consider only the situation in which both the α and the γ change relative to the β, but not relative to each other. The partial equilibrium economics of this scenario is shown in Fig. 15.4. The layout and interpretation of this figure parallel those of Fig. 15.3, the original position being indicated by the network of dotted lines.

In this case, joint devaluation or appreciation of the α and γ relative to the β are depicted as rotation in the excess demand function of Nation B, expressed with α's on the vertical axis. Devaluation of the exporters' currencies results in the rightward rotation from ED_B^0 to ED_B^1 in the B panel and, consequently, in the rightward rotation from $ED^0(R)$ to $ED^1(R)$ in the A panel. Note that ES_C^0 does not change position. This is because there is no change in the value of α relative to γ. This adjustment generates an increase in the α and γ prices of q, to which both A and C respond by increasing exports.

The increase in total exports is accommodated by an expansion in the quantity of imports purchased by B as a consequence of the falling β price. Both exporters share in this expansion. How much of the increase goes to each exporter is determined by the relative price responsiveness (or elasticity) of ES_A compared with that of ES_C^0. When more than one exporter devalues relative to importers, the potential trade increase for any devaluing seller is less than if it were the only one to devalue.

The reverse argument for a revaluation in α and γ relative to β is also summarized in Fig. 15.4, with the rotation of EB_B^0 to ED_B^2 and of $ED^0(R)$ to $ED^2(R)$. Markets for revaluing exporters shrink as the price effects are split

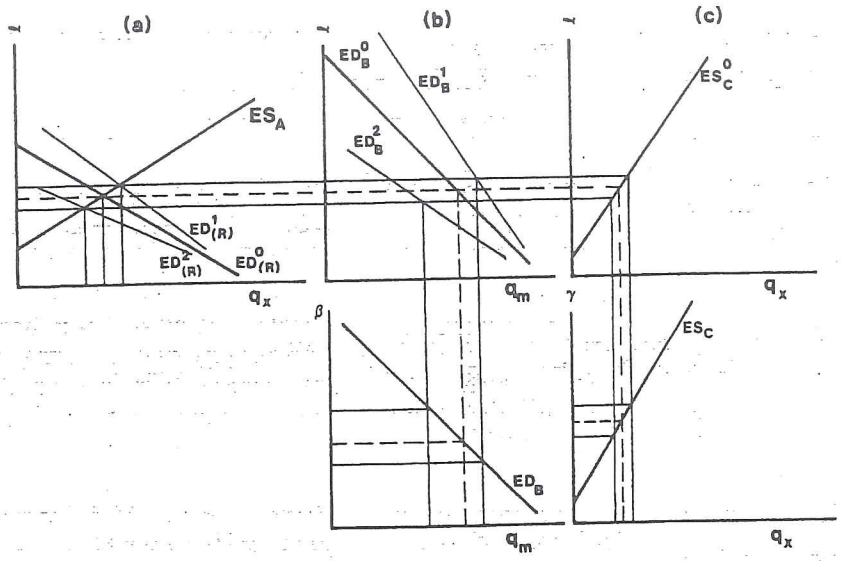

Figure 15.4 Exporters' currencies change relative to importers'

between a fall in the α and γ prices and an increase in the β price, the latter forcing a contraction in total imports of the product in question.

Alpha Value Changes: A as Importer (Scenario 3)

This scenario is similar in some ways to the first one—α changing in value relative to the β and γ. However, in this instance, we change our viewpoint to consider Nation A as an importer of q rather than an exporter. This switch in trading status for Nation A does not change the basic diagrammatics for Nations B and C. But it does cause us to reverse the sense of the excess demand and supply curves depicted for Nation A. In Fig. 15.5, the demand function ED_A in the A panel is the excess demand for imports registered by Nation A at various α prices. The import supply function facing buyers in Nation A is $ES^0(R)$ at the original exchange rate. This function is the horizontal difference between the excess supply of total exports ES_C^0 and the excess demand of other importers, ED_B^0. Again, the original position is denoted by dotted lines.

First, assume that α is devalued relative to both β and γ. In this case, ED_B^0 rotates to ED_B^1 and ES_C^0 rotates to ES_C^1. Together, these shifts imply a movement of $ES^0(R)$ to $ES^1(R)$. The lowered purchasing power of the α in international markets produces upward pressure on α prices and, consequently, a decrease in the amount of imports demanded by Nation A.

This decrease in imports into A means that the additional availability of

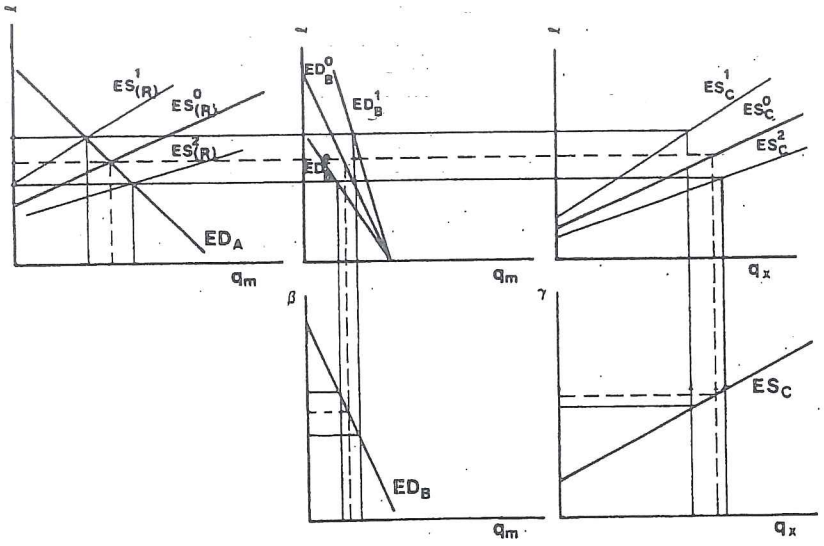

Figure 15.5 Change in α with A as importer

export supplies on the world market will press down prices expressed in β's and γ's. More will be imported by B at lower β prices, but less total exports will be supplied by C at decreased γ prices (Fig. 15.5). So the shrinkage in purchases by the devaluing importer (A) is accounted for by larger imports elsewhere and by smaller total supplies on the world market. As usual, the price effects are split between the devaluing nation, whose domestic prices increase, and the others, whose domestic prices decrease.

Revaluation of α when A is an importer produces opposite price, trade, and market share effects than those just discussed for α devaluation (Fig. 15.5). Prices in the revalued currency fall, while prices in terms of the other currencies rise. More is imported by the revaluing nation A than previously. These additional imports are drawn both from increased exports from international suppliers and decreased takings by other importers. These effects occur as ES_C^0 rotates to ES_C^2 and ED_B^0 rotates to ED_B^2. Together, they cause $ES^0(R)$ to shift to $ES^2(R)$.

OVERVALUED AND UNDERVALUED EXCHANGE RATES

Economic theory and common sense both suggest that with freely operating markets for national currencies, equilibrium or balanced exchange rates would tend to emerge. Because currency exchange rates are fundamentally prices, equilibrium rates would continually reflect the net effect of all economic, political, and social forces at play on international transactions. Exchange rates would certainly change from period to period, but these changes would not reflect deliberate intervention by national governments to change the relative value of their own or other currencies.

When governments intervene in exchange-rate determination, domestic currency values relative to foreign currencies can be pushed or set either higher or lower than they would otherwise be. They can be "overvalued" or "undervalued" respectively. Overvaluation and undervaluation are, in reality, subjective ideas since equilibrium exchange rates generally are unknown.

Government intervention in exchange-rate determination can be direct or indirect. Direct intervention occurs (1) when a national government sets its currency exchange rates officially, then controls domestic access to foreign currency and foreign access to domestic currency through administrative mechanisms, or (2) when the government buys or sells domestic and foreign currencies in sufficient amounts to hold the international price of domestic currency at either some specific value or within some relatively narrow band relative to other monies. Indirect intervention, on the other hand, occurs when sustained government activity affecting the money supply, inflation, interest rates, or other factors leads to an overvaluation or undervaluation of the nation's exchange rate as a side effect.

Whether or not any particular exchange-rate overvaluation or undervaluation is caused by direct or indirect intervention and why such action is taken

are beyond the scope of this book. In the following sections we will examine the price, trade, and production effects in commodity markets of both an overvalued and an undervalued currency.

Overvaluation

Suppose that a national government overvalues its currency. Imagine, for instance, that Nation A systematically sells its holdings of β's and γ's on foreign exchange markets in order to buy α's. As long as Nation A is able to sell β's and γ's, the α will be "overvalued" since its price will be higher than it would be otherwise. Suppose the original exchange-rate pattern was $1\,\alpha = 1\,\beta = 1\,\gamma$. Purchases of α's by Nation A's government would pull up the exchange value of α to perhaps $1\,\alpha = 1.4\,\beta = 1.4\,\gamma$.

The effect of this overvaluation in international markets involving Nation A is similar to the revaluation effects depicted as the relevant functions shift from $ED^0(R)$ to $ED^2(R)$ in Fig. 15.3 and from $ES^0(R)$ to $ES^2(R)$ in Fig. 15.5. From the exporter's point of view (Fig. 15.3), overvaluation causes a foreign demand shrinkage, resulting in a decrease of export volume and prices. It is like an export tax levied by A on itself. From the importer's viewpoint (Fig. 15.5), overvaluation causes an outward shift in the foreign supply function, resulting in an increase of imports and a fall in domestic prices. It is like an import subsidy applied by A's government.

By curtailing exports and stimulating imports, overvaluation of a currency presses down domestic prices, tends to punish trade-related producing sectors, and favors domestic consumers. Generally speaking, overvaluation is deflationary.

Undervaluation

Now suppose that Nation A undervalues the α by deliberately selling α's on the international currency market in order to obtain β's and γ's. The value of α in terms of β and γ will tend to fall as long as the government of A can systematically acquire foreign currency. Again suppose that the original exchange rate pattern was $1\,\alpha = 1\,\beta = 1\,\gamma$. Sales of α's by Nation A's government might drive the exchange value of α down to perhaps $1\,\alpha = 0.8\,\beta = 0.8\,\gamma$.

The international market effects of this undervaluation are similar to the devaluation effects depicted as $ED^0(R)$ shifts to $ED^1(R)$ in Fig. 15.3 and from $ES^0(R)$ to $ES^1(R)$ in Fig. 15.5. From the exporter's point of view (Fig. 15.3), undervaluation appears as an increase in the foreign demand function, resulting in more exports and higher α prices. It is like an export subsidy paid by the A government. From the importer's point of view (Fig. 15.5), undervaluation causes a decrease in the foreign supply function, reducing import volume and boosting domestic prices of import goods. It is like an import tax or tariff levied by Nation A on itself.

By encouraging exports and discouraging imports, undervaluation raises domestic prices, promotes economic activity in trade-related sectors, and is unfavorable to domestic consumers. Generally speaking, undervaluation is inflationary.

MULTIPLE EXCHANGE RATES

Alterations in national currency exchange rates, even if deliberate, are not usually thought of as trade policy in the same way as traditional import tariffs or export subsidies. However, there is one class of exchange-rate manipulation that can be viewed as trade policy in a more narrow or specific sense—multiple exchange rates.

Multiple exchange rates are often used by developing nations to stimulate or inhibit trade for specifically designated commodity groups. The central idea is that the official or authorized exchange rate between foreign and domestic currency depends, at least partly, on the product being traded. For instance, one exchange rate might apply for imports of television sets. Another rate might apply for imports of industrial drill presses. Differing rates also might apply for exports of diamonds versus exports of coffee.

To institute and sustain a multiple exchange-rate system, the national government must be able to control strictly the access to foreign currency by would-be domestic importers and access to local currency by exporters who earn foreign currencies from sales abroad. In addition, the government also must be able to document and monitor actual physical purchases and sales on the international market to ensure compliance with its multiple exchange-rate scheme.

In a multiple exchange-rate regime, the rate is deliberately undervalued for purchases of import items the government wishes to discourage or for sales of export items it wishes to encourage. The rate is deliberately overvalued for imports the government wishes to encourage or exports it wishes to discourage. Numerous rates may be adopted across broad or narrow product categories depending on the complexity of the scheme and the trade policy goals sought by the government. Consider a specific, relatively simple hypothetical example.

The nation of Fiberia has a large, traditional cotton- and textile-producing sector it wishes to protect and encourage. It also has a fledgling automobile manufacturing industry it wishes to promote. Since Fiberia is a relatively poor nation, the government also wants to keep domestic food prices as low as possible. One way Fiberia has chosen to pursue these goals is through a multiple exchange rate system operated by the Fiberian Central Bank (FCB), which has direct control of all foreign-exchange transactions.

For illustration, consider two import goods and two export goods purchased and sold by Fiberian merchants. The import goods are passenger cars and farm tractors. The two relevant export goods are cotton textiles and wheat. The initial equilibrium, across-the-board exchange rate between U.S. dollars and the Fiberian currency (denoted by ϕ) is 1 to 1. That is, \$1.00 = ϕ1.00.

The FCB managers of the multiple-exchange rate scheme now set two rates for exchanging ϕ's into dollars for potential imports. The reciprocals of these two rates are employed for exchanging dollars into ϕ's for potential exports. One rate is "overvalued" at $\phi 1.00 = \$1.10$ (or $\$1.00 = \phi 0.91$) and one rate is "undervalued" at $\phi 1.00 = \$0.90$ (or $\$1.00 = \phi 1.11$). On the import side, purchasers of foreign tractors get the overvalued rate but purchasers of foreign cars face the undervalued rate. Imagine for simplicity that on the international market, farm tractors and passenger cars cost $10,000 each. So instead of costing $\phi 10{,}000$ each, tractors and passenger cars carry different prices inside Fiberia even though their international prices remain at $10,000 each. Tractors now cost $\phi 9{,}091$ and imported cars cost $\phi 11{,}111$. So compared with the original, across-the-board exchange-rate regime, tractor imports are encouraged and passenger car imports are discouraged.

The export side reflects essentially the reverse situation. Sellers of textiles get an undervalued rate but wheat exporters face an overvalued rate. So textile exports that earn $10,000 in foreign markets will now generate $\phi 11{,}111$ domestically rather than the original $\phi 10{,}000$. On the other hand, wheat exports earning $10,000 on the world market will now return $\phi 9{,}091$ instead of $\phi 10{,}000$. Thus, textile exports are encouraged and wheat exports are discouraged with this multiple exchange-rate scheme.

As long as the FCB can maintain tight control on foreign currency transactions involving ϕ's, and as long as the Fiberian government can monitor and regulate compliance with the authorized international transactions, this multiple-rate program will tend to promote the cotton/textile sectors, protect the domestic automobile industry, and push down domestic food prices without involving large direct government outlays. It will, however, punish Fiberian wheat farmers with lower prices received and Fiberian purchasers of automobiles with higher prices paid.

SUMMARY

Exchange rates between national currencies are the prices of one country's currency in terms of other currencies. They translate domestic prices of goods, services, and other economic values across international borders. Like other prices, they are subject to change. Where currencies are freely traded on international money markets or when central authorities attempt to value their currency to balance international accounts, exchange rates move in accordance with differential effects of inflation, productivity, interest rates, and other macroeconomic forces among nations.

Since exchange-rate changes usually affect international transactions across the board, their movements can override and obscure the effects of other, more specific or narrow trade and economic policies. When a nation's currency rises in value relative to those of other countries, exports of goods and services tend to fall and imports tend to rise. When a nation's currency falls in relative value, exports tend to be stimulated and imports curtailed.

When a currency's value is rising internationally, domestic prices of traded goods tend to fall and foreign prices of the same goods tend to rise. When a currency's value is falling, domestic prices of traded goods tend to rise while international prices tend to fall. A rising exchange rate (appreciation) is deflationary, but a falling exchange rate (devaluation) is inflationary.

Higher-than-equilibrium exchange rates act like export taxes and import subsidies. Lower-than-equilibrium rates act like export subsidies and import tariffs. Therefore, some nations impose multiple exchange rates on their own currency relative to other monies. In such cases, differing rates apply to international transactions depending on the product or service being traded. Multiple exchange rates can be used to achieve results similar to tariffs, import quotas, export taxes, and export subsidies.

QUESTIONS

15.1 Assume that Nation A is an exporter of soybeans. Nation C also exports soybeans. Both sell to Nation B. After a period of relative stability in exchange rates, the γ of Nation C is devalued relative to the α of A and the β of B. Illustrate and discuss the implications of this change on the international soybean market, considering prices, production, consumption, and trade.

15.2 What kind of exchange-rate changes on the part of Nation B could change Nation A from an exporter of soybeans to an importer?

15.3 During a speech, an international trade expert asserts that her country's currency is "overvalued" relative to those of major trading partners. She also argues that this condition has the effect of an export tax on coffee exports from her country. Explain and illustrate.

15.4 The country of Trombonia employs a complex multiple exchange-rate system. The nation's central bank will exchange horns (the domestic currency) for international monies at various rates depending on the item to be sold or purchased. Here are a few examples from the Trombonia exchange rate schedule for horns and U.S. dollars.

- **a** For beef exports: 4 horns per dollar
- **b** For grain imports: 28 cents per horn
- **c** For incoming tourists: 5 horns per dollar
- **d** For packaged food imports: 20 cents per horn
- **e** For television exports: 4.3 horns per dollar
- **f** For traveling Trombonians: 21 cents per horn

Discuss the trade policy aspects of these data from the Trombonian perspective.

ADDITIONAL READINGS

Caves, R. E., and Jones, R. W. 1981. *World Trade and Payments: An Introduction*, 3rd ed., Little, Brown and Co., Boston, Massachusetts, Chap. 18. (A mainly general