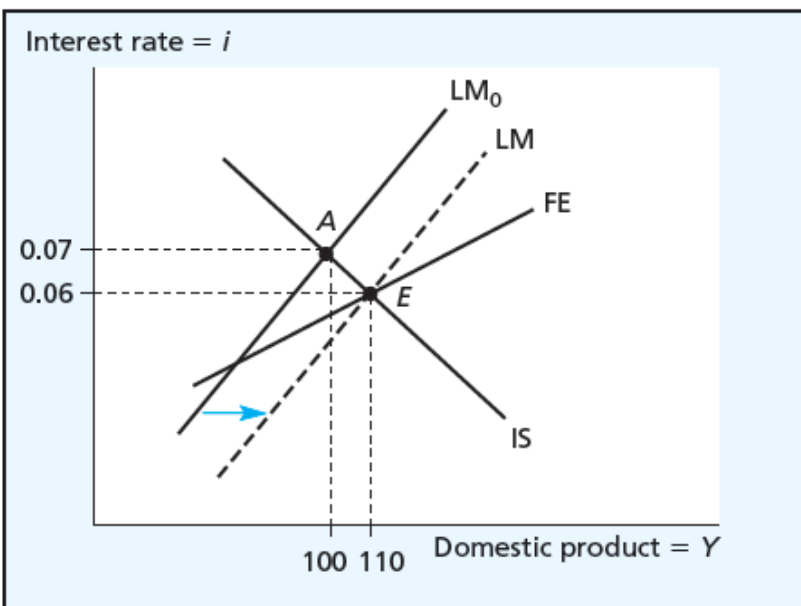


The purpose of the ISLM-FE<sup>1</sup> framework is to relate the goals of domestic macroeconomic policy – economic growth or full employment – to the trade and financial flows that link the country to the rest of the world.



<sup>1</sup> It is more usually called the ISLM-BP framework, where BP stands for balance of payments.

Figure 1: The ISLMFE framework. The IS curve shows output as a function of the interest rate. The LM curve shows interest rates as a function of output (reflecting a limited supply of “money” or bank credit, and/or a central bank policy rule). The FE curve shows the combination of output levels at which there is no net flow of foreign exchange into or out of the country – that is where a trade deficit is just balanced by a financial inflow, or a trade surplus is just balanced by a financial outflow.

The movement of the LM curve shown here represents a shift toward more expansionary monetary policy.

From Pugel, *International Economics*, chapter 23.

The ISLM framework was introduced by John Hicks in the 1940s as a simplified presentation of John Maynard Keynes’ arguments in the *General Theory*. It is a device to talk about the conditions that must be satisfied for an economy to be at full employment, or potential output, reasons why actual output might fall short of potential, and the kinds of macroeconomic policy that can bring output back to potential. <sup>2</sup>You can think of each curve in the diagram as telling a particular story about the behavior of capitalist economies. The ISLM diagram expresses, in compact form, the following stories:

- Output is based on expenditure. In a modern capitalist economy (as opposed to, say, a simple subsistence economy or a centrally planned economy like the former Soviet Union) the output of goods and services does not directly depend on productive capacity, but rather on spending choices of households, businesses and governments. Goods are produced only if they can be sold, and businesses almost always would prefer to sell more rather than less. So output increases if and only if someone decides to spend more. When we are talking about an economy as a whole, we can use the terms output and spending interchangeably.
- There is a negative relationship between desired spending and the

<sup>2</sup> There is a close relationship between output and unemployment known as *Okun’s rule*. For the US, we can write this as  $\Delta U \approx 0.5(2.5 - \Delta Y)$ . That is, the change in the unemployment rate is equal to about half the difference between 2.5 and the growth rate of output. This means that 2.5% growth is needed to keep unemployment from rising, and that two additional points of growth are needed to reduce unemployment by one point. The exact numbers vary between countries but the general form will be the same. This means that we can treat higher economic growth and lower unemployment as equivalent, as far as macroeconomic policy is concerned.

prevailing interest rate. Originally, this was thought of in terms of those combinations of interest rate and incomes that would result in desired saving being equal to desired investment. (That is why it's called the "IS" curve.) But it's simpler to just think of the IS curve as describing the fact that higher interest rates will cause a reduction in credit-financed spending, especially business investment and investment-like spending by households, such as home purchases. Higher interest  $\rightarrow$  lower output.

- On the other hand, higher output  $\rightarrow$  higher interest rates. This is shown by the LM curve. Originally, the idea was that higher spending means increased demand for liquidity, which has to be satisfied by a fixed stock of money. (Thus the name "LM.") Higher demand for money shows up as higher interest rates. In modern economies it makes no sense to think of a fixed stock of money, but the logic of the same if you imagine that banks have a limited capacity to make new loans. As more people want to borrow, interest rates will rise as the borrowers compete for a limited supply of bank credit. Or, we can think of this as reflecting a central bank *policy rule* – as output rises, unemployment will fall and inflation may rise, causing the central bank to tighten or shift policy in a *contractionary* direction. Again, this leads to interest rates rising as output rises.
- Over time, the economy will end up at the unique level of output where the two previous relationships are satisfied. That is, households and businesses are just satisfied with their current level of spending given prevailing interest rates, and financial market participants and/or the central bank are just satisfied with the current interest rate given the level of spending.
- To increase output a government can either increase spending at the given interest rate – that is, shift the IS curve rightward – most directly by increasing public spending. Or it can reduce interest rates at a given level of spending – shift the LM curve downward – through expansionary monetary policy – what exactly this means will depend on the institutional arrangements in the financial system and the tools through which the central bank operates. Typically expansionary monetary policy will involve the central bank buying assets of some kind. Of course the two curves can also shift as a result of changes in the behavior of private actors. If businesses become more optimistic about the future and increase investment as a result, that will shift the IS curve to the right; if owners of financial wealth become more frightened or risk-averse and want to hold safer assets, that will shift the LM curve upward.

The FE (or BP) curve embodies the following additional stories:

- Higher output is associated with higher imports. As people increase their spending, a certain fraction will fall on imported goods (In most countries, the change in imports will be more than proportional to the change in spending.) Exports, on the other hand, don't respond to domestic incomes or output, but only to foreign spending. (And income flows don't respond reliably to any macroeconomic variables in the short run.) So increased output → more negative current account balance.
- Higher interest rates are associated with greater net financial inflows. All else equal, foreign investors prefer higher returns to lower returns. So the higher are interest rates domestically, the more likely are owners of financial wealth – both domestic and foreign – to purchase this country's assets, as opposed to assets abroad. So higher interest rates → more positive financial balance.
- Given the previous two relationships, there is some set of combinations of output and employment at which the country will just achieve balance of payments equilibrium, with the trade surplus or deficit just counterbalanced by the financial deficit or surplus. This is represented by the FE curve. It slopes upward since, the higher is a country's output, the greater are its imports and the greater is the financial inflow required to pay for them.
- The slope of the FE curve depends on how responsive are trade flows to income, and how responsive are financial flows to interest differentials. We usually focus on the second factor. If there are no international financial flows at all, the curve is vertical – payments are balance only if trade is balanced, which is possible only at a certain level of output. If capital is perfectly mobile, with no barriers to foreign investment at all, the FE line is horizontal – the domestic interest rate cannot vary from the world interest rate. This implies that a country can borrow without limit at the world interest rate.
- Factors that improve a country's trade balance shift the FE curve to the right. This includes, most obviously, falls in relative price, for instance due to an exchange rate depreciation; but it also includes anything that increases the rest of the world's demand for domestic goods, or that decreases domestic demand for foreign goods. It also includes increases in foreign income. Similarly, factors that reduce demand for a country's goods shift the FE curve to the left. Factors that make a country's assets more attractive to foreign investors shift the FE curve downward, since the same capital inflow

can now be achieved with a lower interest rate. Similarly, factors that make a country's assets less attractive shift the curve upward.

- There is no mechanism guaranteeing that the economy will in fact occupy a point on the FE curve. If it is below the curve, foreign exchange is flowing out of the country. We usually think of this as meaning that the central bank is losing reserves, but it also could mean that households and businesses are spending down their accounts in foreign banks, for example. Similarly, if the country occupies a point above and to the left of the curve, there is a net inward flow of foreign exchange. If capital is highly mobile, then these net flows will be very large and it is impossible to imagine them being sustained for any significant period of time. But if capital is relatively immobile, a balance of payments surplus or deficit might be maintained for a while. A surplus might even be maintained indefinitely, but not a deficit – foreign exchange reserves will eventually be exhausted.

Finally, two other features of the full ISLMFE structure:

- Changes in the trade balance also shift the IS curve. Anything that increases demand for a country's goods relative to foreign goods shifts the IS curve to the right (but less than it shifts the FE curve).
- At a given exchange rate, there is a unique level of output associated with trade balance. If output is above this level, there will be a trade deficit; if below it, a trade surplus.

Some of the relationships embodied in the ISLMFE system clearly are important in the real world; others are more questionable. Among the most reliable and realistic ones is income  $\rightarrow$  imports. This is expressed in the *income elasticity* of import demand – the percentage increase in imports resulting from a one percent increase in GDP. In the US, for example, the income elasticity of import demand is around 2.5, and seems to be quite stable. Other countries have different elasticities but they also tend to be stable. If we are interested in changes in trade flows over periods of a year or so, the majority of the variation is explained by this one relationship.

This presents a problem: A country that grows more rapidly than its trade partners will tend to develop a trade deficit, leading to a flow of money to the rest of the world. So faster growth may be inconsistent with balance of payments equilibrium.

Among Keynesian economists, this idea has been formalized in the idea of **balance of payments constrained growth**, originally developed by A. P. Thirlwall.<sup>3</sup> This says that most countries' growth rates are limited by their need to generate foreign exchange. Regardless

<sup>3</sup> Thirlwall's 2011 article "Balance of payments constrained growth models: history and overview" provides a comprehensive overview.

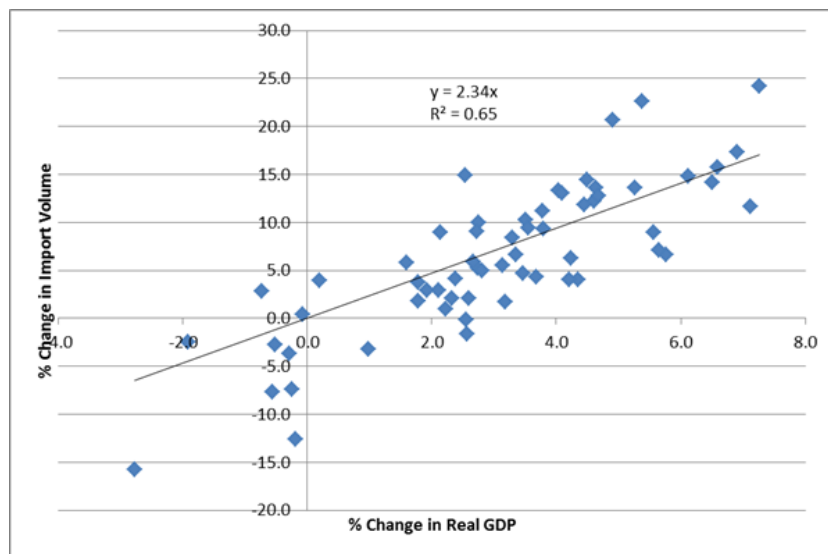


Figure 2: This scatterplot shows the annual change in US real GDP and in import volume for each year since World War II. As the regression line shows, an additional one percentage point of real GDP growth is associated with 2.3 percentage points of additional import growth. In other words, the income elasticity of US import demand is a bit less than 2.5, a value that seems quite stable over time. This simple equation explains about two-thirds of the annual variation in US imports – an exceptionally strong relationship for macroeconomics.

of domestic considerations like full employment, a country's growth rate is ultimately limited by the growth of its trade partners.<sup>4</sup> There is strong empirical evidence that most countries do, in fact, grow at rates close to those predicted by the theory of balance of payments constrained growth.

Of course, countries can grow faster than the balance-of-payments constraint level if they are willing to run trade deficits. For the US and a few other countries, this is sufficient. But for most countries, persistent large trade deficits can create serious problems. So for countries where the balance of payments constraint is a problem, faster growth can, paradoxically, be a bad thing.

In mainstream economics, there are four lines of defense against the problem of balance of payments constraints on growth. (Note: These are four *claims* often made by economists. None of them are necessarily true!)

1. Flexible exchange rates will adjust to eliminate trade imbalances. Persistent surplus countries will see their currencies appreciate until their goods are priced out of the market, while persistent deficit countries will see their currencies depreciate until their goods are competitive. Exchange flexibility will ensure that over the long run trade is more or less balanced.
2. Prices can also adjust to eliminate trade imbalances. If a country has a trade deficit and for some reason its currency does not depreciate, it will tend to experience depreciation, or at least lower inflation, as its goods have to compete with lower-cost imported

<sup>4</sup> Formally, we can write  $\frac{g}{g^*} \leq \frac{\mu^*}{\mu}$ , where  $g$  is the country's growth rate,  $g^*$  is the average growth rate of its trade partners,  $\mu$  is the country's income elasticity of import demand and  $\mu^*$  is the income elasticity of foreign demand for the country's exports. Or:

$$g \leq g^* \frac{\mu^*}{\mu}$$

goods. Similarly, countries with persistent surpluses should experience higher inflation. The result is that even if nominal exchange rates don't adjust to eliminate trade imbalances, real exchange rates will still do so.

3. Capital is today extremely mobile. High capital mobility ensures that any trade deficits that do develop can be financed without limit at the world interest rate.
4. If financial flows are for some reason insufficiently free to allow the country to borrow without limit at the world interest rate, it can still borrow as much as it needs to from abroad (or induce domestic savers to keep their money at home) by increasing domestic interest rates.

One of the main purposes of the ISLMFE model is to show that if exchange rates are fixed then the interest rate is not available as a tool for achieving domestic policy goals. In the case of perfect capital mobility, the domestic interest rate cannot move at all from the world rate – any attempt to change it by the central bank would be overwhelmed by massive financial flows into the country (in the case of an increase) or out of it (in the case of a decrease). But even in a world of limited capital mobility, the LM curve must eventually move so that it passes through the intersection of the IS and FE curves, since large net foreign exchange flows cannot be maintained indefinitely (Or at least, the LM curve cannot permanently cross the IS curve below the FE curve, since large outflows cannot be sustained without reserves eventually being exhausted). On the other hand, the combination of high capital mobility and fixed exchange rates is supposed to make fiscal policy more effective, since the government is no longer competing with domestic borrowers for credit but can borrow from the rest of the world.

On the other hand, according to the model, a floating exchange rate means that the central bank can focus on domestic objectives (growth or employment) just as in a closed economy, since exchange rate adjustments will take care of external balance. The logic is supposed to go like this:

Suppose the central bank decides that output is too low (or unemployment is too high), and lowers interest rates in an effort to boost demand. Lower interest rates lead to an outflow of capital. They also lead to higher spending, which increases imports, moving the trade balance toward deficit. Both of these effects tend to produce a balance of payments deficit. But, with floating rates, this balance of payments deficit does not actually lead to an outflow of foreign exchange, but instead causes the currency to depreciate. The depreciation makes

the country's exports more competitive. The improvement in the trade balance closes the balance of payments deficit. The improvement in the trade balance also boosts domestic demand, allowing the central bank to raise interest rates back toward their old level. Eventually output reaches its target level but with payments still balanced thanks to the depreciation. The increase in demand comes partly from interest rates (which are still normally somewhat lower than the initial value) and partly from higher net exports. In a world of perfectly mobile capital, the demand boost would come entirely from net exports.<sup>5</sup> In a world of perfectly immobile capital the demand boost would come entirely from lower interest rates – the trade balance would not change. In a world of somewhat mobile capital, both would contribute.

When most countries shifted to floating rates after the Bretton Woods system broke up in the 1970s, many economists had great hope that the system of floating exchange rates would solve the problem of balance of payments imbalances, and leave national governments and their central banks free to pursue full employment and growth for their own economies. (Some also saw the end of government "intervention" in the foreign exchange markets as a good thing in itself.)

<sup>5</sup> Note that this means that in a world of flexible exchange rates and perfect capital mobility, monetary policy is a zero sum game. Central banks can boost demand for their own economies only by depressing demand for their trade partners. In a world of perfectly immobile capital, on the other hand, there is no conflict – increased demand from expansionary monetary does not come at the cost of one's trade partners.

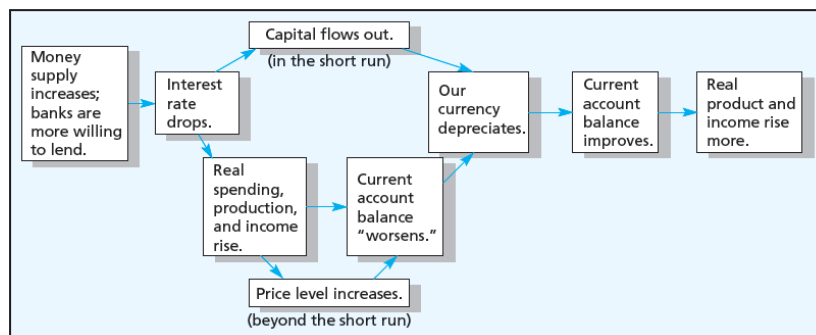


Figure 3: The logic of expansionary monetary policy in a world of mobile capital and floating exchange rates. From Pugel, *International Economics*, chapter 24.

The hopes for the floating-rate system have not been borne out. Balance of payments constraints still bind, with many countries forced to limit output and growth to eliminate payments deficit. Large trade imbalances continue to exist, and cannot always be easily financed. And foreign exchange crises are common, where financial flows into a country suddenly reverse, leading to banking crises and large depreciations occur almost overnight – something that almost never happened in the era of fixed exchange rates and regulated capital flows.

Why have the four lines of defense against balance of payments constraints failed to work? To begin with, why don't relative prices

adjust to eliminate trade imbalances?

1. First, trade flows do not always respond to relative price changes. The problem is that while a fall in the value of our currency does tend to reduce the amount we import and increase the amount we export, it also makes our imports more expensive (in our own currency) or to reduce the price of our exports (in foreign currency). These negative price effects might overwhelm the positive effects of the depreciation on trade volumes. For example, suppose a country like Jamaica sees a fall in the value of its currency. Jamaica's imports are mostly price in dollars, so the depreciation does not reduce the flow of dollars out of the country for imports until or unless people reduce their purchases of imported goods. If local goods are not good substitutes for imports, it is unlikely they will do so to a significant extent. Meanwhile, tourism and other exports become cheaper in dollars. If these exports don't increase in volume sufficiently, Jamaica will end up earning less foreign exchange than before the depreciation.

Formally, we say that a depreciation will improve the trade balance only if the **Marshall-Lerner condition** is satisfied.<sup>6</sup> In its simplest form, the Marshall-Lerner condition says that a depreciation will improve the trade balance if and only if the sum of the absolute values of the price elasticities of imports and exports is greater than one.<sup>7</sup> The *price elasticity* of imports or exports is the percentage change in trade volume in response to a one percent change in the exchange rate. So for instance, suppose we estimate that a one percent devaluation of the Jamaican currency will increase the volume of exports by 1% and reduce the volume of imports by 0.25%. Then the export elasticity is one and the import elasticity is -0.25; since  $1 + 0.25 = 1.25$ , which is greater than one, the condition is satisfied and the depreciation will increase foreign exchange earnings. On the other hand, suppose that one percent depreciation increases exports by only half a percent. Then we have  $0.5 + 0.25 = 0.75$ , and the condition is not satisfied. In that case, a depreciation will reduce foreign exchange earnings and move the country even further from balance of payments equilibrium.

Why would trade flows fail to respond to exchange rate changes? It's not surprising that imports would be relatively unresponsive – most countries import goods from abroad that they don't produce at home, and if local goods are not close substitutes for imported goods then there is little possibility of reducing import purchases in response to trade changes. Exports should be more responsive, but this depends on what kinds of goods the country exports,

<sup>6</sup> This is named for Alfred Marshall, the father of modern economics, and the American economist Abba Lerner. Some people argue that Keynes' student Joan Robinson deserves equal credit for formalizing the condition, so it should be called the Marshall-Lerner-Robinson condition.

<sup>7</sup> The simple form assumes that goods are priced in the seller's currency, there is no supply response, and the country initially has balanced trade. For the more complicated equation that applies when these assumptions don't hold, see Appendix H of the Pugel textbook.



and how much its trade is integrated into supply chains that are hard to adjust. For example, suppose a multinational computer manufacturer buys semiconductor chips from a factory in Taiwan. The total amount of chips it purchases will depend on how many computers it is selling, which in turn will depend on market conditions and on the price of other inputs coming from other countries. There is no reason that even a large depreciation in the Taiwanese currency would cause it to buy significantly more chips. More generally, a depreciation will not have much effect if the markets the country sells to are *monopsonistic*, with only one or a few buyers. At the opposite extreme, a country whose exports are sold in a highly competitive market will sell them at the world price (in foreign exchange) regardless of what happens to its own currency. In this case, a depreciation will neither increase nor reduce its export earnings; any improvement in the trade balance would have to come from reduced imports.

People who believe that depreciations do not generally improve the trade balance are sometimes called *elasticity pessimists*.

2. Even if price changes (whether brought about by exchange rate movements or inflation/deflation) are effective at restoring balanced trade, they take time. Most economists believe that it takes at least 18 months before a country that depreciates will begin to see an improvement in its trade balance, assuming it does so at all. In a crisis, that is too slow. This initial negative response of the trade balance to a depreciation, followed by a positive response, is called the **J-curve**. During that period, the widening trade balance will continue to create balance of payments problems, and require other adjustments – usually a deep fall in income. And because the depreciation takes time to work, it will be too large once it finally does take effect. (Imagine trying to drive a car where the wheels only responded to the steering wheel after a long delay. First you would steer way too far to the left, then way too far to the right.)
3. Even if exchange rate changes are effective at restoring balance, large swings in exchange rates are costly. They create uncertainty for anyone who buys goods from abroad or who sells to foreign markets, and for anyone who has invested abroad or borrowed money abroad. For businesses that source goods from many countries and sell goods in international markets, large exchange rate changes are especially costly, because they have long-lasting investments and cannot reorganize their business every time exchange rate changes. There are good reasons why so many countries try to manage their exchange rates.

4. The above point goes double for adjustment of the real exchange rate through the price level rather than the nominal exchange rate. As a practical matter, the burden of adjustment falls on the deficit countries rather than the surplus countries – balance of payments surpluses can be sustained indefinitely, but balance of payments deficits mean that reserves will be exhausted sooner or later. For the deficit countries to devalue their real exchange rate through deflation means extended periods of falling prices, which in modern economies is extremely destructive, involving large-scale bankruptcies, foreclosures, business failures, unemployment and widespread suffering. This sort of *internal devaluation* is possible, but it is slow and extremely painful.
5. Second, exchange rates may not move in the correct direction. Exchange rates are primarily determined by the choices of speculators in foreign exchange markets, not by “fundamentals.” If speculators believe for whatever reason that a given currency ought to be strong, then it will remain strong. If they think it ought to be weak, it will weaken. And the beliefs of speculators, being based mainly on their guesses about the beliefs of other speculators, are highly unstable and subject to herd behavior and other positive feedbacks. It may be that participants in the foreign exchange market believe that a country with trade deficits will see its currency depreciate, in which case that will indeed happen; but it is perfectly possible that they will think something else.
6. Even if exchange rates are based on fundamentals, they may not lead to trade balance. Investors may have a rational basis for preferring assets in a particular country, in which case that country’s currency will appreciate. For example, Switzerland has been very attractive as a safe haven for foreign investment. As a result, portfolio flows into Switzerland have been very large and its currency has appreciated sharply, despite its large and rising trade deficits. (And despite its central bank’s efforts, for a while, to prevent the appreciation.)
7. In the longer run, some form of *relative purchasing power parity* (PPP) may hold, limiting the movement of real exchange rates. In a world where relative PPP is true, there can be no long run changes in real exchange rates, so there is no way for countries to grow faster than the balance-of-payments constrained rate, unless they are prepared to run persistent current account deficits.
8. Finally, countries may deliberately intervene to prevent their currencies from adjusting. Certainly, some countries seek to keep their currencies weak in order to promote exports. (And some currencies seek to keep their currencies strong for other reasons,

incidentally promoting imports.) It's common to blame such "currency manipulation" for persistent trade imbalances, and in some particular cases there may be some truth to it. But it is clear that even when governments do not actively intervene in foreign exchange markets, exchange rates do not reliably move so as to balance trade or payments. And it is also clear that all macroeconomic policy decisions affect exchange rates to some degree, so the idea of a "free" foreign exchange market is a mirage. In particular, in a world of floating exchange rates and freely mobile capital, any central bank that raises interest rates will tend to produce an appreciation of its currency, and any central bank that reduces interest rates will tend to produce a depreciation.<sup>8</sup>

So we can't be confident that a country with a trade deficit will necessarily see its currency depreciate, or that a country with a trade deficit will see its currency depreciate. And even if the currencies do move in the correct direction, we can't be sure that this will produce an appropriate response in trade flows, certainly not quickly enough to obviate the need for other adjustment mechanisms.

As for the international capital flows, it is true that countries can and do sustain trade deficits for extended period, counterbalanced by financial inflows. But it is not possible for a country to borrow abroad without limits. In the first place, foreign investors may be unwilling to hold assets in the country, either because they can get a higher return elsewhere, because of economic or political risk, or because the country's assets are *illiquid* – lacking "thick," stable markets and not reliably saleable at a predictable price. And in the second place, to the extent that financial inflows can be attracted by higher interest rates, the required rates may be too high from the point of view of the domestic economy, and lead to depressed output and financial distress.

As a result, in the absence of some **surplus recycling mechanism**, balance of payments equilibrium is most often maintained by slower growth in the countries that would otherwise run deficits.

<sup>8</sup> This is why the government of Brazil a few years ago accused the United States of conducting "currency war," despite the fact that the US has no official policy of intervening in foreign exchange market: Low interest rates in the United States have tended to weaken the dollar relative to other currencies, including the Brazilian real.