

Interest Rate Adjustment and Restoration of AD (Say's Law) in an Open Economy

These notes show how to obtain our Say's Law result for the classical model in an open economy with imports and exports that may not balance so that there are international capital flows (foreign saving) non necessarily equal to zero. This is an important extension of the basic Say's Law result.

Consider a negative AD shock that starts with a rise in imports holding other components of AD constant (including exports). A simple example would be foreign "outsourcing" with some part of production that used to take place in the US moving abroad. The intermediate goods produced above would be treated as imports, holding the sale of the final goods (to households, firms, or government) constant.

Suppose that initially $AD = Y^*$. After the import shock, $AD < Y^*$. The size of the initial "AD Gap" is ΔIm .

With ΔIm higher and no change in exports, the trade deficit rises. As discussed in class, an increase in the trade deficit is equivalent to an inflow of foreign saving. So, initially $\Delta Im = \Delta TrDef = \Delta S^{FOR} = AD \text{ gap}$. More intuitively, if foreigners don't spend their increased dollar income on exports they will let those dollars flow into the US financial market to buy dollar-denominated assets. That is, instead of spending in dollars (which would become US exports), foreigners save in dollars.

The expanded loanable funds diagram includes both domestic and foreign saving. Total saving is the sum of the two. As discussed in class, if foreign saving is sensitive to the interest rate (positive elasticity) then the total saving curve is necessarily flatter than the domestic saving curve by itself. Foreign saving can be either positive or negative (the latter case would hold if domestic citizens were buying more foreign assets than the domestic assets bought by foreigners). For clarity, we will assume the economy begins with zero net foreign saving (that is, any saving by foreigners in the domestic economy is offset by saving by domestic citizens abroad). The analysis that follows would be identical if we started from a different initial position. Point A in the attached diagram shows the initial condition.

The increase in foreign saving is represented by a rightward shift of the total saving curve in the attached diagram (foreign saving rises while domestic saving stays the same). The AD gap is the horizontal distance between the old and new total saving curves (distance between points A and B).

Loanable funds market equilibrium occurs where the total saving curve intersects the demand for borrowing. In this graph, business investment is the only source of borrowing (but a fixed government deficit could be added without changing anything).

The higher supply of saving pushes down the equilibrium interest rate from r_0 to r_1 . The key to understanding how interest rate adjustment leads to Say's Law results in the open economy model is to understand how the fall in the interest rate affects the various components of AD to fill the initial AD Gap.

1. Lower r reduces the cost of capital and encourages more business investment (the system slides down the investment demand curve from point A to point E). The quantitative effect is shown on the graph as distance X (between points D and E).
2. Lower r reduces total saving, as the system slides down the total saving curve from point B to E (distance Y)
3. It's obvious from the graph that the increase of investment plus the decrease in total saving equals the size of the initial AD gap.
4. The rise of investment is directly a component of AD.
5. The decrease in total saving also implies an increase in AD but the details are a little more complicated; let's see why.
 - a. The decline in total saving $\Delta S^{\text{TOT}} = \Delta S^{\text{FOR}} + \Delta S^{\text{DOM}}$
 - b. ΔS^{DOM} implies an equivalent increase in domestic consumption. You can see this amount on the graph as distance Z, between points C and D (distance Z).
 - c. ΔS^{FOR} implies an equivalent reduction in the trade deficit which means that a combination of higher exports and lower imports equals ΔS^{FOR} . This means that the trade deficit declines from the initial gap (between points A and B, equal to the sum of distances X and Y) to a final equilibrium value at r_1 (between points C and E, equal to the sum of the distances Z and X).
 - d. Therefore, ΔS^{TOT} equals the sum of higher consumption, lower imports, and higher exports, all of which raise AD.
 - e. In the final equilibrium, the trade deficit is distance Z + X (representing a loss of AD) but that deficit is exactly offset by increases in AD from higher domestic consumption (Z) and higher investment (X)
6. So, the initial AD gap is filled by a combination of higher investment, higher domestic consumption, higher exports, and lower imports, all induced by the fall in the rate of interest. Say's Law holds!

