

3**EQUILIBRIUM
OUTPUT AND
TRADE BALANCE**

- 3.1 *Trade Balance*
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- 3.3 *Effects of Increase in Domestic and Foreign Demand*

3.1 TRADE BALANCE

In Chapter 1 we looked at aggregate demand for domestic goods in an open economy. It was summed up in Equation (4) as

$$Y = C + I + G + NX$$

If we keep all the variables that affect demand, (discussed in Chapter 1); taxes, interest rate, government spending, foreign income (or output), and real exchange rate constant, we can plot the following diagram in Fig. 3.1 below.

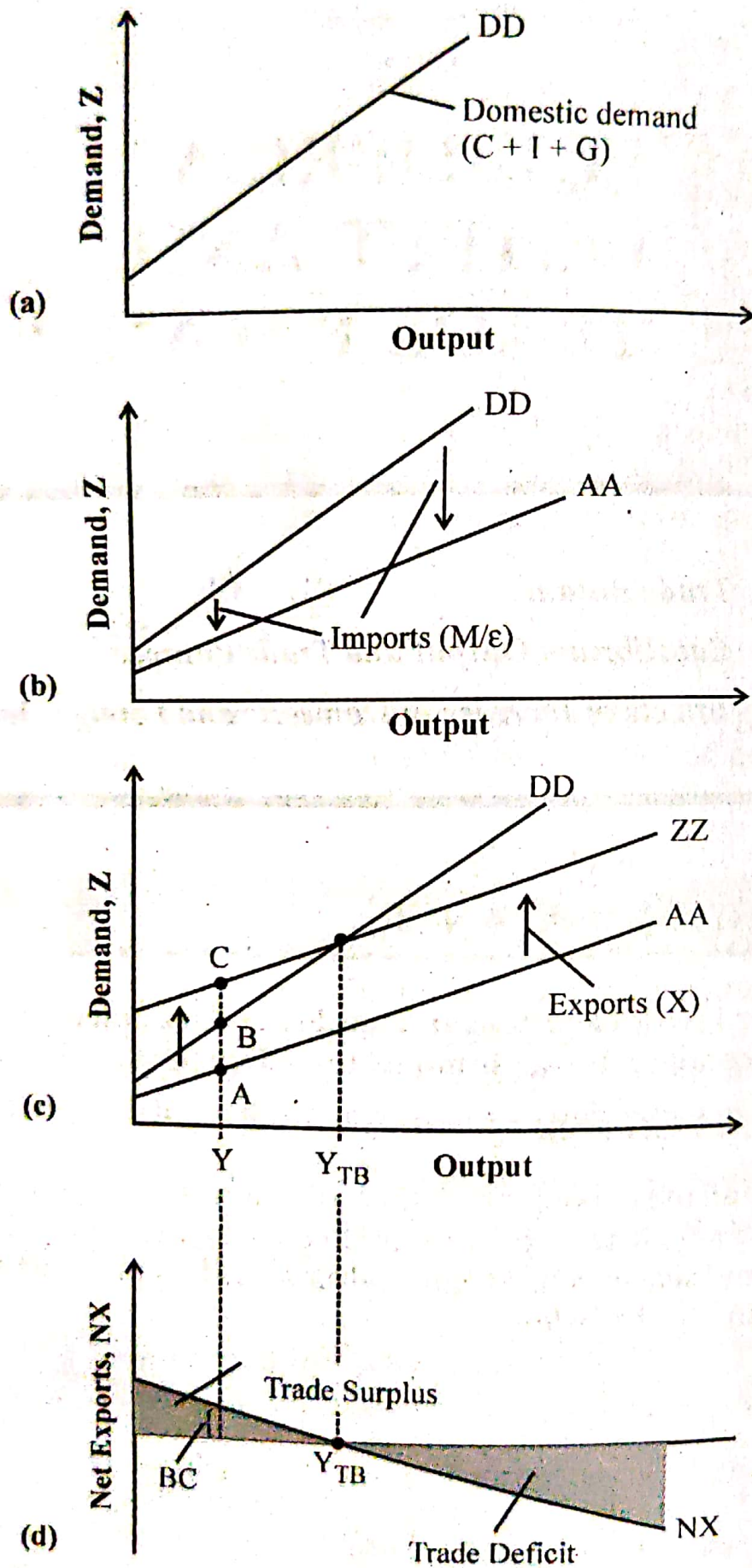


Fig. 3.1 : Demand for Domestic Goods and Net Exports

In Panel (a), the line DD plots domestic demand ($C + I + G$) as a function of output (or income), Y . The slope of the function DD is positive but less than one. This is explained by: an increase in output (or income) increases demand but less than one for one.

To arrive at the demand for domestic goods, we must first subtract imports. This is done in Panel (b), and that gives us the line AA. AA represents the domestic demand for domestic goods. The distance between DD and AA represents the value of imports. Since the quantity of imports increases with income, the distance between AA and DD increases with income.

Note that :

- (i) AA is flatter than DD. As income increases, some of the additional domestic demand is for foreign goods rather than domestic goods. That is, as income increases, the domestic demand for domestic goods increases less than total domestic demand.
- (ii) Secondly, as long as some of the additional demand is for domestic goods, AA has a positive slope. An increase in income leads to some increase in the demand for domestic goods.

Finally, we must add exports. This is done in Panel (c), and gives us line ZZ, which is above AA. The line ZZ represents the demand for domestic goods. The distance between ZZ and AA equals exports, X . However, because exports do not depend on domestic income (they depend on foreign income), the distance between ZZ and AA is constant, which is why the two lines are parallel. Also, because AA is flatter than DD, ZZ is also flatter than DD.

From the information in Panel (c), we can explain the behaviour of net exports - difference between exports and imports - as a function of output. For example, at output level Y , exports are given by the distance AC, and imports by the distance AB; so, it follows net exports are given by the distance BC.

This relation between net exports and output, is represented by the line NX (net exports) in Panel (d). Net exports are a decreasing function of output (income). As output (income) increases, imports increase and exports are unaffected, so net exports decrease.

Call Y_{TB} (TB for trade balance) the level of output at which the value of imports equals the value of exports, so that net exports are equal to zero. Levels of output above Y_{TB} lead to higher imports, and to a trade deficit. Levels of below Y_{TB} lead to lower imports, and to a trade surplus.

3.2 EQUILIBRIUM OUTPUT AND TRADE BALANCE

The goods market is in equilibrium when domestic output equals the demand (both domestic and foreign) for domestic goods.

$$Y = Z$$

Collecting all the relations for the components of demand :

$$C = C(Y - T),$$

$$I = I(Y, r),$$

$$G = G,$$

$$M = M(Y, \epsilon),$$

$$X = X(Y^*, \epsilon),$$

We get,

$$Y = C(Y - T) + I(Y, r) + G - M(Y, \epsilon) + X(Y^*, \epsilon) \quad \dots (1)$$

Equation (1) determines output as a function of all the variables we take as given, from taxes to the real exchange rate to foreign output. We can explain this graphically in Fig. 3.2 below.

In Panel (a), demand is measured on the vertical axis, and output (production or income) on the horizontal axis. The line ZZ plots demand as a function of output. This line just replicates the line ZZ in Fig. 3.1 (c). ZZ is upward sloping but with a slope less than one.

Equilibrium output is at the point where demand equals output, at the intersection of the line ZZ and the 45-degree line: that is point A in Fig. 3.2, Panel (a), with associated output level Y.

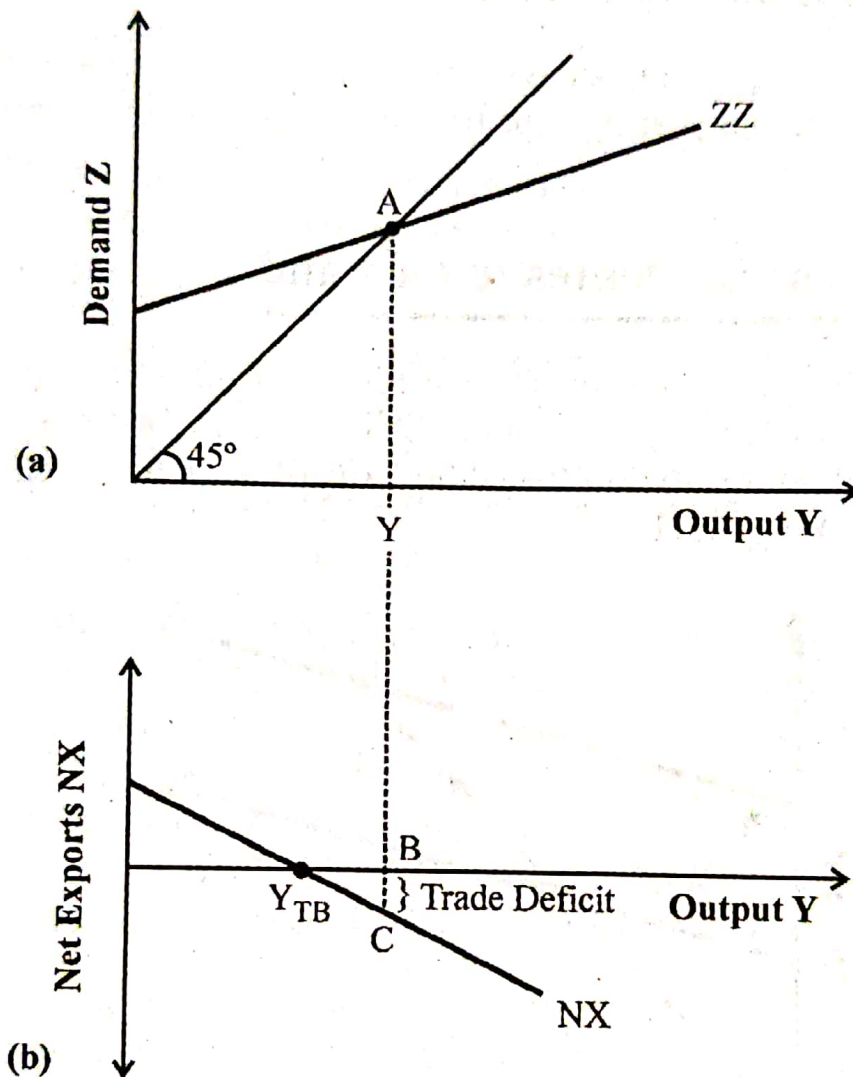


Fig. 3.2 : Equilibrium Output and Net Exports

Panel (b) of Fig. 3.2, replicates Panel (d) of Fig. 3.1. It shows net exports as a decreasing function of output. There is, in general, no reason why the equilibrium level of output, Y, should be the same as the level of output, at which trade is balanced, Y_{TB} .

In Fig. 3.2, the equilibrium output is associated with a trade deficit equal to distance BC. Note that Fig. 3.2 could have been drawn differently, so equilibrium output could have been associated instead with a trade surplus.

3.3 EFFECTS OF INCREASE IN DOMESTIC AND FOREIGN DEMAND

In this part of the chapter we consider how changes in domestic and foreign demand affect equilibrium output and the implications for trade balance.

(1) Increase in Domestic Demand

Suppose that an economy is in a recession and the government decides to increase government spending in order to increase domestic demand. The effects on output and trade balance are explained in Fig. 3.3 below.

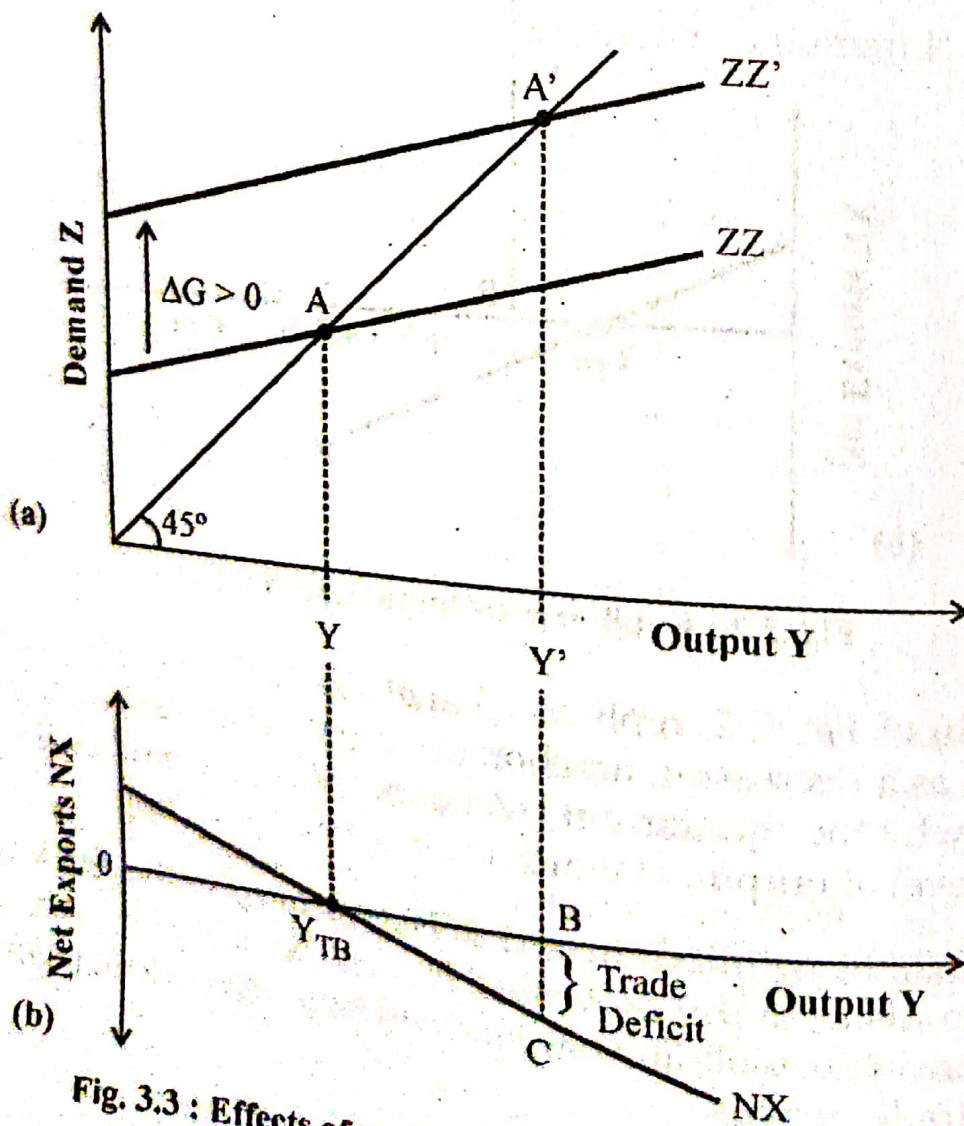


Fig. 3.3 : Effects of an Increase in Domestic Demand
(Government Spending)

Before the increase in government spending demand is given by ZZ in Panel (a), and equilibrium is at point A , where output equals Y . We assume that trade is initially balanced, so in Panel (a) $Y = Y_{TB}$.

When the government increases spending by ΔG , at any level of output, demand is larger by ΔG , shifting the demand relation up by ΔG from ZZ to ZZ' . The equilibrium point moves from A to A' , and the equilibrium output increases from Y to Y' . The increase in output is larger than the increase in government spending as there is a multiplier effect.

The impact on trade balance is seen in terms of a trade deficit equal to BC . Imports go up, and exports do not change. This is because government spending does not enter the export relation nor the import relation directly. Thus, the relation between net exports and output in Panel (b) does not shift.

Secondly, not only does the government spending now generate a trade deficit, but the effect of government spending on output is smaller than it would be in a closed economy. In terms of the diagram the smaller the slope of ZZ , the smaller the multiplier. In the diagram the demand relation ZZ is flatter than the demand relation in a closed economy DD (shown in Fig. 3.1). This means that the multiplier is smaller in the open economy.

The reason for the trade deficit and the smaller multiplier is the same. Since the economy is open, an increase in demand now falls not only on domestic goods but also on foreign goods. So, when income increases, the effect on the demand for domestic goods is smaller than it would be in a closed economy, leading to a smaller multiplier. Also, since, some of the increase in demand falls on imports - and exports are unchanged - the result is a trade deficit.

These two implications are important. In an open economy, an increase in domestic demand has a smaller effect on output than in a closed economy and an adverse effect on the trade balance. In fact, the more open the economy, the smaller the effect on output and the larger the adverse effect on the trade balance.

(2) Increase in Foreign Demand

Suppose now that there is an increase in foreign output, that is, an increase in Y^* . This could be due to an increase in foreign government spending or any other reason. It is not necessary for us to know exactly where the increase in Y^* comes from. The effects on domestic output and trade balance are explained in Fig. 3.4 below.

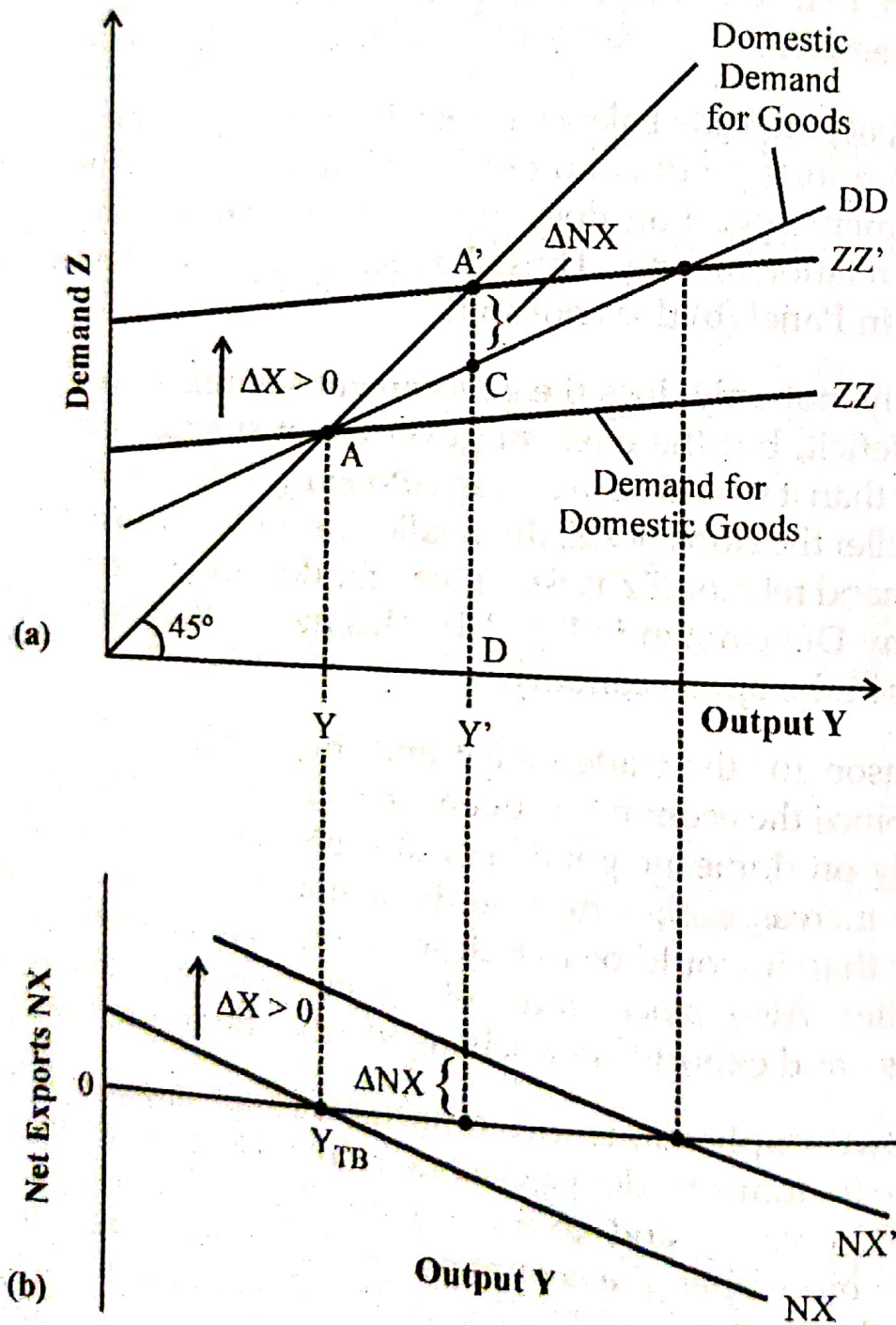


Fig. 3.4 : Effects of an Increase in Foreign Demand

Fig. 3.4 shows the effects of an increase in foreign activity on domestic output and the trade balance. The initial demand for domestic goods is given by ZZ in Panel (a). The equilibrium is at point A , with the output level Y . Assuming that initially trade is balanced, the net exports associated with Y equal zero and $Y = Y_{TB}$.

The line DD shows the domestic demand for goods $C + I + G$ as a function of income. The line DD is steeper than ZZ (See Fig. 3.1). The difference between ZZ and DD equals net exports, so if trade is balanced at point A , then ZZ and DD intersect at point A .

Suppose now there is an increase in foreign output, ΔY^* . Higher foreign output means higher demand, including higher foreign demand for domestic goods. So, the direct effect of the increase in foreign output is an increase in domestic exports by the same amount, which we denote as ΔX .

This implies:

- (i) For a given level of output, this increase in exports leads to an increase in the demand for domestic goods by ΔX , so the line showing the demand for domestic goods as a function of output shifts up by ΔX , from ZZ to ZZ'
- (ii) For a given level of output, net exports increase by ΔX . So, the line showing net exports as a function of output in Panel (b) also shifts up by ΔX , from NX to NX' .

The new equilibrium is at point A' in Panel (a), with output level Y' . The increase in foreign output leads to an increase in domestic output. The channel is as follows. Higher foreign output leads to higher exports of domestic goods, which increases domestic output and the domestic demand for goods through the multiplier.

We know that exports go up, but the question is does the trade balance deteriorate or improve? Could it be that the increase in domestic output leads to a large increase in imports and that the trade balance deteriorates? The answer is no; the trade balance does not deteriorate.

When foreign demand increases, the demand for domestic goods shifts upward from ZZ to ZZ' . But the line DD which gives the domestic demand for goods as a function of output, does not shift.

At the new equilibrium level of output, Y' , domestic demand is given by the distance DC, the demand for domestic goods is given by DA' . Net exports are therefore given by the distance CA' - which is because DD is below ZZ' , is necessarily positive. Thus, while imports increase, the increase does not offset the increase in exports, and the trade balance improves.

In conclusion, we can reiterate two results:

- (i) An increase in domestic demand leads to an increase in domestic output, but also leads to a deterioration of the trade balance. (Our discussion has been in terms of an increase in government spending, but we would have reached the same conclusion even if we had considered a decrease in taxes or an increase in consumer spending, etc.)
- (ii) An increase in foreign demand (whatever the source similar to what changes were discussed in the case of domestic demand) leads to an increase in domestic output and in improvement in the trade balance.

Both these results have important implications. Namely:

1. Shocks to demand in one country affect all other countries.
2. The stronger the trade links between countries, the stronger the interactions, and the more countries move together.
3. These interactions complicate the task of policy makers especially for fiscal policy.

REVIEW QUESTIONS

1. Using a diagram explain the trade balance of an open economy.
2. The equilibrium level of output need not be the same as the level of output at which there is trade balance. Discuss.
3. Derive the relationship between equilibrium output and trade balance.
4. Explain how the trade balance changes when there is an increase in domestic demand.
5. Explain how the trade balance changes when there is an increase in foreign demand.