Our analysis of the small open economy provided many useful results that apply to any open economy. For a large open economy like the United States, this analysis ignores the possible effects of shifts in U.S. saving and investment on world interest rates. We will now look at goods market equilibrium when we break up the world into two large economies: the domestic economy, denoted by \( d \), and the rest of the world, denoted by \( \text{row} \).

**Goods Market Equilibrium in Large Open Economies**

The economy of the world as a whole is a closed economy, so the world real interest rate is determined by the goods market equilibrium condition that desired world saving equals desired world investment. Translating this condition to two large economies implies that the excess of desired saving over desired investment in one economy—that is, its amount of foreign lending—must be matched by the excess of desired investment over desired saving in the other economy—that is, the amount of borrowing from foreigners that the other economy undertakes. Alternatively, we can say that the trade surplus in one economy must equal the trade deficit in the other or, equivalently, that net capital outflows from one economy must match net capital inflows from all the others.

Figure 4A1.1 illustrates how this process works with saving and investment curves for the two economies. Suppose that the world real interest rate is at \( r^w_1 \). Panel (a) shows what is happening in the domestic economy. At the world real interest rate of \( r^w_1 = r^d_1 \), domestic desired saving at point \( B_1 \) is greater than domestic desired investment at point \( A_1 \). As a result, the domestic economy is running a trade surplus of \( NX^d_1 \), which...
For the world economy described in panel (b), the same world real interest rate of $r^w_1 = r^d_1$ leads to desired investment in this economy at point $D_1$ exceeding desired saving at point $C_1$. The rest of the world is running a trade deficit of $NX_{row}^1 = -300$, which we can see is $300$ billion. This trade deficit is less than the trade surplus in the domestic economy of $500$ billion. But because the trade surplus in the domestic economy is greater than the trade deficit in the rest of the world, the domestic economy wants to lend more than the rest of the world wants to borrow. As a result, the world real interest rate will fall, as the downward arrows in both panels (a) and (b) indicate.

When will the world real interest rate stop falling? Only when it reaches $r^w_E = r^d_E$. At $r^d_E = r^w_E$, desired domestic saving at point $B_E$ in panel (a) is greater than desired domestic investment at point $A_E$ by $400$ billion, while desired investment in the rest of the world at point $D_E$ is greater than desired saving in the rest of the world at point $C_E$ by $400$ billion as well. Now the trade surplus in the domestic economy of $NX_{d}^E = 400$ billion equals the trade deficit in the rest of the world of $NX_{row}^E = 400$ billion, and so the amount of domestic residents’ desired lending at $400$ billion is equal to the amount of borrowing sought by the rest of the world. The goods market is now in equilibrium for the entire world.

Now suppose the world real interest rate were at $r^w_2$, which is below $r^w_E$. Then at $r^d_2 = r^w_2$, desired domestic saving at point $B_2$ in panel (a) is greater than desired domestic investment at point $A_2$ by $300$ billion, while desired investment in the rest of the world at point $D_2$ is greater than desired saving in the rest of the world at point $C_2$ by $500$ billion. Now the trade surplus in the domestic economy of $NX_{d}^2 = 300$ billion is less than the trade deficit in the rest of the world of $NX_{row}^2 = 500$ billion. Domestic residents’
desired lending of $300 billion is less than the $500 billion amount of borrowing that the rest of the world wants. Because the rest of the world wants to borrow more funds than the domestic economy wants to lend, the world real interest rate will rise, as the upward arrows in both panels (a) and (b) indicate. Only when the world real interest rate settles at \( r_2^w \) will it have no tendency to change, and world goods market equilibrium will be satisfied.

**Changes in Domestic Saving**

Now let’s look at what happens when desired saving increases in the domestic economy because of a decline in autonomous consumption expenditure, a tax increase, or a decline in government purchases. The domestic saving curve shifts to the right from \( S_1^d \) to \( S_2^d \) in panel (a) of Figure 4A1.2. The domestic trade surplus at any given world real interest rate will now rise. The goods market will no longer be in equilibrium because at \( r_1^w \) the trade surplus at $500 billion in the domestic economy will exceed the trade deficit of $400 billion in the rest of the world. Because domestic residents will want to lend more than the rest of the world wants to borrow, the world real interest rate will fall, as the downward arrow indicates. Only when it reaches a level of \( r_2^w \) will the goods market be back in equilibrium. At \( r_2^w \), the trade surplus in the domestic economy falls to \( NX_2^d \) of $450 billion and the trade deficit in the rest of the world \( NX_2^{row} \) rises to $450 billion. The amount of lending domestic residents want to do is equal to the amount of borrowing the rest of the world wants. We also see that the decline in the world real interest rate causes a rise in both domestic investment at point \( A_2 \) and investment in the rest of the world.
world at point $D_2$. A rise in domestic saving (from a decrease in autonomous consumption expenditure, a rise in taxes, or a cut in government purchases) 

1. raises the trade surplus and net capital outflows in the domestic economy,

2. raises the trade deficit and capital inflows in the rest of the world,

3. lowers world interest rates, and

4. raises investment in both the domestic economy and the rest of the world.

Application

The Global Saving Glut

In 2005, Ben Bernanke, now the Chairman but then a governor of the Federal Reserve, gave a famous speech in which he coined the term “global saving glut.” He was trying to explain two puzzling phenomena at the time: the very low U.S. real interest rates and the very large trade deficits. In the speech he conjectured that the source of both phenomena might be the huge increase in saving in Asian countries such as China. Does our analysis of large open economies here support his conjecture?

Indeed it does. To illustrate, let’s assume that the large domestic economy in panel (a) of Figure 4A1.2 is China. The surge in saving in China would shift the domestic saving curve to the right, from $S_1^d$ to $S_2^d$ in panel (a). As we see in the figure, this rightward shift would have several effects. First, it would cause net exports in China to rise, which would be matched by an increase in the trade deficit in the rest of the world, including the United States. Second, for the excess saving in China to reach equilibrium with the excess investment in the rest of the world, the world real interest rate would have to fall, thereby driving down real interest rates in the United States. Third, the lower domestic real interest rate resulting from the lower world real interest rate would lead to an increase in the actual level of investment in the United States and the rest of the world. This analysis matches the actual events that transpired: the global saving glut provides a coherent explanation for what at first looked like a very puzzling phenomenon.

The very low real interest rates were an important source of the housing boom that engulfed the world up until 2006. Unfortunately, when the housing boom came to an end and the housing market crashed, the world economy, starting in 2007, experienced the worst financial crisis since the Great Depression period of the 1930s, which we will discuss in detail in Chapter 15. The global saving glut’s contribution to the worst contraction of world economic activity since the 1930s has led many economists and international organizations to worry that global imbalances caused by excess saving in countries like China pose a threat to the health of the world economy.
Changes in Domestic Investment

Now let’s look at what happens when desired investment increases, say, because of a surge in business optimism in a large open economy. The domestic investment curve shifts to the right from $I_1^d$ to $I_2^d$ in panel (a) of Figure 4A1.3. The domestic trade surplus at any given world real interest rate will now fall. The goods market will no longer be in equilibrium because at $r_1^w$ the trade surplus of $300$ billion in the domestic country will be less than the trade deficit of $400$ billion in the rest of the world. Because domestic residents will now want to lend less than the rest of the world wants to borrow, the world real interest rate will rise, as the upward arrow indicates. Only when it reaches a level of $r_2^w$ will the goods market be back in equilibrium. At $r_2^w$, the trade surplus in the domestic economy falls to $NX_2^d$ of $350$ billion, and the trade deficit in the rest of the world $NX_2^{row}$ falls to $350$ billion. The amount of lending domestic residents desire is equal to the amount of borrowing the rest of the world wants. The increase in domestic investment at point $A_2$, which causes the world real interest rate to rise, leads to a fall in investment to the rest of the world at point $D_2$. **An increase in domestic desired investment lowers the trade surplus and net capital outflows in the domestic economy, lowers the trade deficit and capital inflows in the rest of the world, raises world interest rates, and lowers investment in the rest of the world.**

![Figure 4A1.3](image-url)

**Figure 4A1.3**

Response to a Rise in Domestic Investment in a Large Open Economy

A rise in domestic investment increases investment in panel (a). The domestic trade surplus at any given world real interest rate will now fall. At $r_2^w$ in panels (a) and (b), the $300$ billion trade surplus in the domestic economy (marked as $NX_1^d = 300$) is less than the $400$ billion trade deficit in the rest of the world. Because domestic residents will now want to lend less than the rest of the world wants to borrow, the world real interest rate will rise to $r_2^w$. Equilibrium occurs when the trade surplus of $350$ billion at $NX_2^d$ in panel (a) equals the $350$ billion trade deficit at $NX_2^{row}$ in panel (b). The increase in domestic investment at point $A_2$ leads to a fall in investment to the rest of the world at point $D_2$. **An increase in domestic desired investment lowers the trade surplus and net capital outflows in the domestic economy, lowers the trade deficit and capital inflows in the rest of the world, raises world interest rates, and lowers investment in the rest of the world.**
SUMMARY

1. In large open economies, a rise in domestic saving 1) raises the trade surplus and net capital outflows in the domestic economy, 2) raises the trade deficit and capital inflows in the rest of the world, 3) raises investment in both the domestic economy and the rest of the world, and 4) lowers world interest rates.

2. In large open economies, an increase in domestic desired investment 1) lowers the trade surplus and net capital outflows in the domestic country, 2) lowers the trade deficit and capital inflows in the rest of the world, 3) raises world interest rates, and 4) lowers investment in the rest of the world.

REVIEW QUESTIONS AND PROBLEMS

1. Considering the world as two large open economies, a domestic economy and the rest of the world, what condition is required for goods market equilibrium? How is this condition achieved?
2. How will a fall in domestic investment affect the trade surplus and net capital outflows in the domestic economy, the trade deficit and capital inflows in the rest of the world, investment in both economies, and the world real interest rate?
3. What is the effect of a fall in domestic saving on the trade surplus, investment, and interest rates in both the domestic and foreign economies?
4. The following graph represents the two large economies (domestic and the rest of the world). For each level of the interest rate, calculate the value of the domestic economy’s net exports and foreign lending. What would be the equilibrium world interest rate?
5. Consider the following graph, in which the equilibrium world interest rate is 4% and the domestic economy is currently running a trade surplus. What would be the effect of a decrease in government expenditure in the domestic economy? Use the graph to determine changes in the domestic economy investment level and in the equilibrium world interest rate.

![Diagram of desired saving and investment](image)

6. Investment in the United States declined sharply as a result of the global financial crisis. Assuming the United States is a large open economy, explain how a decrease in investment will affect the equilibrium world interest rate and the U.S. trade surplus.