A. Small Open Economy Saving-Investment Model:

1. Clearly and accurately draw and label a diagram of the Small Open Economy Saving-Investment Model.

2. Provide an economic explanation of the shape of the curve(s) in your diagram in #1.

The desired saving function is the **positive relationship** between desired saving and the real interest rates.

The desired saving function slopes upward because an increase in the real interest rate will increase desired saving because the reward to saving has increased (the substitution effect), the cost to borrowers has increased (a negative income effect), and the benefit to savers has increased (a positive income effect). Empirical evidence suggests that the first two effects are larger than the last effect, i.e., the net effect is positive but inelastic.

The desired investment function is the **inverse relationship** between desired investment and the real interest rate.
The desired investment function slopes downward because an increase in the real interest rate will raise the tax-adjusted user cost of capital, making it more expensive to acquire new capital, thereby reducing the desired capital stock, and reducing desired investment.

The world interest rate may be above (as I have drawn it), at, or below the interest rate that would establish equilibrium in a closed economy. Because in a small open economy, the world interest rate is exogenous, it does not change with the level of desired saving or desired investment in the economy.

When the world interest rate is above the closed economy equilibrium interest rate, desired saving will exceed desired investment. This “excess” supply of saving at the world interest rate will lead to net foreign lending, a capital and financial account deficit, and a current account surplus.

If the world interest rate is below the closed economy equilibrium interest rate, desired investment will exceed desired saving. This “excess” demand for saving at the world interest rate will lead to net foreign borrowing, a capital and financial account surplus, and a current account deficit.

3. List the endogenous and exogenous variables in this model.

Same as in the closed economy desired saving-desired investment model with the deletion of the domestic interest rate as an endogenous variable (it disappears from the analysis) and the addition of the current account balance as an endogenous variable and the world interest rate as an exogenous variable.

Endogenous: desired saving, desired consumption, desired investment, the current account balance.

Exogenous: the world interest rate, wealth, expected future income, government purchases, taxes, expected future marginal product of capital, and the tax-adjusted user cost of capital when it comes from changes in the price of capital and/or the effective corporate tax rate. (The depreciation rate is also an exogenous variable but we typically ignore it in our analysis because changes in the depreciation rate are relatively small and infrequent.)

As in the closed economy model, current output is actually an endogenous variable although it is often treated as if it were an exogenous variable in this model. That is because the model often treats the economy as being a full-employment, which is a long-term concept. However, the relationships we have developed are also true in the short-term when current output is endogenous.]
4. List the variables (and the direction of their change) that would shift the saving function to the right. Also provide an economic explanation for why each of these variables would shift the saving function.

Same as in the closed economy desired saving-desired investment model.

A rise in current output would increase both desired consumption (by the marginal propensity to consume) and desired saving directly.

A decrease in wealth or a decrease in expected future income would reduce desired consumption for any given current income. Consequently, desired savings would increase.

A decrease in government spending would increase desired saving directly.

A rise in current taxes would increase government saving directly. A rise in current taxes (without Ricardian equivalence) would also reduce private disposable income, causing desired consumption to decline by the marginal propensity to consume and private saving to decline by the marginal propensity to save. However, because the increase in government saving is much larger than the decline in private saving, desired national saving rises.

5. List the variables (and the direction of their change) that would shift the investment function to the right. Also provide an economic explanation for why each of these variables would shift the investment function.

Same as in the closed economy desired saving-desired investment model.

An increase in the expected future marginal product of capital increases the expected return to capital, thereby increasing the desired capital stock, and increasing desired investment.

A decrease in the tax-adjusted user cost of capital from a decline in the effective corporate tax rate or a decline in the price of capital makes it less expensive to acquire new capital, thereby increasing the desired capital stock, and increasing desired investment.

6. Assume that the economy starts in equilibrium. Suppose now that the effective corporate tax rate decreases. Describe the adjustment process that moves the economy from its initial equilibrium to its final equilibrium.

A decrease in the effective corporate tax rate would lower the tax-adjusted user cost of capital, making capital less expensive, increasing desired investment, and shifting the desired investment curve to the right.

At the (fixed) world interest rate, there is no change in desired saving. Thus, an increase in desired investment reduces the “excess” of desired saving (or the supply of loanable funds) over desired investment (or the demand for loanable funds). As a result, net foreign lending must decline, the capital and financial account deficit must decline, and the current account surplus must decline.

These changes in net foreign lending, the capital and financial account, and the current account continue until desired saving exactly equals desired investment plus the current account balance at the world interest rate.
B. Large Open Economy Saving-Investment Model:

1. Clearly and accurately draw and label a diagram of the Large Open Economy Saving-Investment Model.

![Diagram of Large Open Economy Saving-Investment Model]

2. Provide an economic explanation of the shape of the curve(s) in your diagram in #1.

   The desired saving function is the positive relationship between desired saving and the real interest rates.

   The desired saving function slopes upward because an increase in the real interest rate will increase desired saving because the reward to saving has increased (the substitution effect), the cost to borrowers has increased (a negative income effect), and the benefit to savers has increased (a positive income effect). Empirical evidence suggests that the first two effects are larger than the last effect, i.e., the net effect is positive but inelastic.

   The desired investment function is the inverse relationship between desired investment and the real interest rate.

   The desired investment function slopes downward because an increase in the real interest rate will raise the tax-adjusted user cost of capital, making it more expensive to acquire new capital, thereby reducing the desired capital stock, and reducing desired investment.

   The world interest rate is established where the current account surplus in the HOME country is exactly equal to the current account deficit in the FOREIGN country.
3. List the endogenous and exogenous variables in this model.

Same as in the closed economy desired saving-desired investment model with the deletion of the domestic interest rate as an endogenous variable (it disappears from the analysis) and the addition of the current account balance and the world interest rate as an endogenous variable.

Endogenous: desired saving, desired consumption, desired investment, the current account balance, and the world interest rate.

Exogenous: wealth, expected future income, government purchases, taxes, expected future marginal product of capital, and the tax-adjusted user cost of capital when it comes from changes in the price of capital and/or the effective corporate tax rate. (The depreciation rate is also an exogenous variable but we typically ignore it in our analysis because changes in the depreciation rate are relatively small and infrequent.)

[As in the closed economy model, current output is actually an endogenous variable although it is often treated as if it were an exogenous variable in this model. That is because the model often treats the economy as being a full-employment, which is a long-term concept. However, the relationships we have developed are also true in the short-term when current output is endogenous.]

4. List the variables (and the direction of their change) that would shift the saving function to the right. Also provide an economic explanation for why each of these variables would shift the saving function.

Same as in the closed economy desired saving-desired investment model or the small open economy desired saving-desired investment model.

A rise in current output would increase both desired consumption (by the marginal propensity to consume) and desired saving directly.

A decrease in wealth or a decrease in expected future income would reduce desired consumption for any given current income. Consequently, desired savings would increase.

A decrease in government spending would increase desired saving directly.

A rise in current taxes would increase government saving directly. A rise in current taxes (without Ricardian equivalence) would also reduce private disposable income, causing desired consumption to decline by the marginal propensity to consume and private saving to decline by the marginal propensity to save. However, because the increase in government saving is much larger than the decline in private saving, desired national saving rises.
5. List the variables (and the direction of their change) that would shift the investment function to the right. Also provide an economic explanation for why each of these variables would shift the investment function.

Same as in the closed economy desired saving-desired investment model or the small open economy desired saving-desired investment model.

An increase in the expected future marginal product of capital increases the expected return to capital, thereby increasing the desired capital stock, and increasing desired investment.

A decrease in the tax-adjusted user cost of capital from a decline in the effective corporate tax rate or a decline in the price of capital makes it less expensive to acquire new capital, thereby increasing the desired capital stock, and increasing desired investment.

6. Assume that the economy starts in equilibrium. Suppose now that the effective corporate tax rate decreases. Describe the adjustment process that moves the economy from its initial equilibrium to its final equilibrium.

A decrease in the effective corporate tax rate in HOME would lower the tax-adjusted user cost of capital. This would make capital less expensive, increase desired investment, and shift the desired investment curve of HOME to the right.

At HOME and at the initial world interest rate, an increase in desired investment reduces the “excess” of desired saving (or the supply of loanable funds) over desired investment (or the demand for loanable funds). As a result, the world interest rate begins to rise. A higher world interest rate causes an increase in desired saving along the (unchanged) desired saving function and a decrease in desired investment along the (new) desired investment function.

In addition, because the higher world interest rate was caused by an increase in desired investment, net foreign lending declines, the capital and financial account deficit declines, and the current account surplus declines.

At FOREIGN, a rise in the world interest rate would increase desired saving along the (unchanged) desired saving function and decrease desired investment along the (unchanged) desired investment function.

In addition, because the higher world interest rate was caused by an increase in desired investment in HOME, net foreign borrowing declines, the capital and financial account surplus declines, and the current account deficit declines.

These changes in net foreign lending/borrowing, the capital and financial account balances, and the current account balances continue in both countries until the world interest rate has increased to a level where desired saving exactly equals desired investment plus the current account balance in BOTH countries. At this new equilibrium world interest rate, the absolute value of the (smaller) current account surplus in HOME will exactly equal absolute value of the (smaller) current account deficit in FOREIGN.