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Macroeconomics

Study Question: A Large Open Economy
(Answers on the subsequent pages)

Recall the example of a world with only two large economies, X and Z, that we first encountered in the notes file 5312-opensave:

The following equations describe country X:

full employment real national income, $Y^x = 8000$
$C^x = 1000 + .8(Y^x - T^x) - 50r^w$
$I^x = 2000 - 20r^w$
$G^x = 1000$
$T^x = .25Y^x$

And these equations describe country Z:

full employment real national income, $Y^z = 8000$
$C^z = 1000 + .8(Y^z - T^z) - 50r^w$
$I^z = 3200 - 20r^w$
$G^z = 1000$
$T^z = .25Y^x$

Recall that the world interest rate was 20 and that country Z had a current account deficit of 600. (Meaning: NX = -600, so country Z is importing 600 more of goods than it is exporting).

Now the government in country Z increases national savings by reducing G to 300.

Calculate the change in the world interest rate and the change in country Z's current account deficit.

Calculate equilibrium values for r^w, and a bunch of other stuff

To calculate r^w, let's set world savings equal to world investment:

$S^x + S^z = I^x + I^z$

$S^x + S^z = (2000 – 20r^w) + (3200 – 20r^w)$

$S^x + S^z = 5200 – 40r^w$

But wait! What are S^x and S^z?

$S^x = (Y^x – C^x – G^x)$
$= 8000 – [1000 + .8(8000 - .25(8000)) – 50r^w] - 1000$
$= 8000 – 1000 – 4800 + 50r^w - 1000$
$S^x = 1200 + 50r^w$

$S^z = (Y^z – C^z – G^z)$
$= 8000 – [1000 + .8(8000 - .25(8000)) – 50r^w] - 300$
$= 8000 – 1000 – 4800 + 50r^w - 300$
$S^z = 1900 + 50r^w$

Now substitute these values into our world savings = world investment equation

$(1200 + 50r^w) + (1900 + 50r^w) = 5200 – 40r^w$

$3100 + 100r^w = 5200 – 40r^w$

$140r^w = 2100$

$r^w = 15$

So the NEW equilibrium world interest rate is 15 (down from the original 20 percent).

Now let's use the r^w=15 to calculate equilibrium values for C^x, S^x, I^x, NX^x, CA^x, and KA^x:

$C^x = 1000 + .8(8000 - .25(8000)) – 50(\mathbf{15}) = 5050$

$I^x = 2000 – 20(\mathbf{15}) = 1700$

$NX^x = Y^x – C^x – I^x – G^x = 8000 – 5050 – 1700 – 1000 = 250$

$CA^x = NX^x \rightarrow CA^x = 250$

$KA^x = -CA^x \rightarrow KA^x = -250$

This economy has a smaller current account surplus and a smaller capital account deficit than at the original 20 percent interest rate.

$S^x = 1200 + 50r^w = 1200 + 50(\mathbf{15}) = 1950$

Check: $S^x = I^x + CA^x$? 1950 = 1700 + 250. Yes!

Nezt let's use the r^w=15 to calculate equilibrium values for C^z, S^z, I^z, NZ^z, CA^z, and KA^z:

$C^z = 1000 + .8(8000 - .25(8000)) – 50(\mathbf{15}) = 5050$

$I^z = 3200 – 20(\mathbf{15}) = 2900$

$NZ^z = Y^z – C^z – I^z – G^z = 8000 – 5050 – 2900 – 300 = -250$

$CA^z = NZ^z \rightarrow CA^z = -250$

$KA^z = -CA^z \rightarrow KA^z = 250$

Country Z has a smaller current account deficit and a smaller capital account surplus than at the original 20 percent interest rate.

$S^z = 1900 + 50r^w = 1900 + 50(\mathbf{15}) = 2650$

Check: $S^z = I^z + CA^z$? 2650 = 2900 + (-250). Yes!

Analysis of the above algebraic example

Notice that an increase in national savings is an excellent long run method of reducing a current account deficit for country z. Country Z also increased investment (aiding long term economic growth). Notice also how investment rose in country X!