

Current Accounts and Demand Transmission in a Two-Country World

Econ 182, 11/17/99

Marc Muendler

The first thought in international economics usually is to consider a *small open economy*. When doing macroeconomics in this framework, we like to believe that domestic disposable income has an immediate effect on the current account. In fact, the assumption that the current account, CA , is determined solely by domestic disposable income and the real exchange rate lies at the heart of the classic Mundell-Fleming model:

$$\begin{aligned} CA &= \underset{+}{CA}(Q, \underset{-}{Y}^{GNP} - T) \approx \underset{+}{EX}(Q) - \underset{-}{IM}(\underset{+}{Q}, \underset{+}{Y}^{GNP} - T) = \\ &= \underset{+}{EX}(Q) - Q \cdot \underset{-}{EX}^*(\underset{+}{Q}, \underset{+}{Y}^{GNP} - T), \end{aligned}$$

where $Q \equiv \frac{EP^*}{P}$ is the real exchange rate and $(Y^{GNP} - T)$ denotes domestic disposable income. For our simplified economy the current account is roughly equal to net exports $EX - IM$. In a demand-driven world à la Keynes, disposable income immediately affects demand for domestic goods, C , and foreign goods, IM . It does not, however, have any effect on exports, EX . Therefore, the current account worsens when disposable income rises, as domestic residents demand more imports. By our convention for the real exchange rate, a rise in Q means that the real exchange rate depreciates so that exports increase, imports fall, and the current account as a whole improves (as long as the *Marshall-Lerner condition* holds).¹

Many economies are not small. Why should a change in foreign disposable income not have any impact on our exports? After all, we were already willing to accept that our domestic income does have an immediate effect on the exports of the rest of the world to us. So, if we take this small economy current account one step further to a *two-country world*, we better write the current as a function of both domestic and foreign disposable income:

$$\begin{aligned} CA &= \underset{+}{CA}(Q, \underset{-}{Y}^{GNP} - T, \underset{+}{Y}^{GNP,*} - T^*) \approx \\ &\approx \underset{+}{EX}(Q, \underset{+}{Y}^{GNP,*} - T^*) - \underset{-}{IM}(\underset{+}{Q}, \underset{+}{Y}^{GNP} - T). \end{aligned}$$

With this seemingly innocent assumption we have in fact catapulted our model to a new dimension. Any domestic policy that affects domestic output will now be transmitted abroad through a change in the current account. Whenever

¹The *Marshall-Lerner condition* states that the demand response of both exports and imports in sum exceeds the price effect. The pure price effect may, however, prevail in the very short run when quantities do not adjust. In fact, the pure price effect of a devaluation would worsen the current account because imports would become relatively more expensive in domestic terms (*J-curve*). However, in the short but not too short run, quantities will adjust and outweigh the price effect (*Marshall-Lerner condition*).

our domestic disposable income rises, foreign output will, so that the increase in foreign disposable income will spill back into our economy, raise domestic output and thus disposable income, and so forth. When the dust has finally settled, and if no other variable is counteracting, both countries will end up at a new short run equilibrium with higher output.²

Since we are not trading with the inhabitants of mars or other extraterrestrials, the sum of all current accounts in the world must be equal to zero. Our entire world consists of only two countries. We can therefore be sure that the domestic current account balance must equal the negative of the foreign current account balance. There is one caveat, however: we need to adjust the current account balances with the right exchange rate beforehand. In a two country world there are also two commodity baskets, and two price levels P and P^* . By now we are used to the convention that this kind of baskets is a helpful simplification for a macroeconomist, no more and no less. Let the foreign current account CA^* be expressed in units of the foreign commodity basket, and the domestic current account CA in units of the domestic basket. Then, multiplying the domestic current account balance with the domestic price level, and the foreign current account balance with the foreign price level times the nominal exchange rate will make the two conform to each other in nominal terms:

$$P \cdot CA = -EP^* \cdot CA^*,$$

or

$$CA^* = -\frac{CA}{Q}.$$

With these definitions of the current account as a starting point, let us now complete the model. Since good old Keynes is dear to our hearts, we don't hesitate to write domestic output by splitting it up into its least suspect components:

$$Y = C(Y_{+}^{GNP} - T) + I_{+} + G_{+} + CA(Q, Y_{-}^{GNP} - T, Y_{+}^{GNP,*} - T^*). \quad (1)$$

In equilibrium output must be equal to the income it creates $Y \approx Y^{GNP}$.³ Having said this, we are making the unfortunate discovery that there needs to

²In fact, a domestic fiscal expansion works exactly in this way because the appreciation in the (domestic) real exchange rate Q will further push foreign output without contracting domestic output too much. In contrast, a domestic monetary expansion will only push up domestic output and contract foreign output. The reason is that the foreign economy will suffer more from the depreciation of the real exchange rate Q than it can benefit from the demand transmission.

³This, again, is only roughly correct. To be entirely precise, we would have to say that

$$Y = Y^{GDP} = C + G + I + EX - IM$$

and

$$Y^{GNP} = C + G + \Delta K + \Delta W.$$

Output is best described by gross domestic product Y^{GDP} , and national income is best captured by gross national product Y^{GNP} . Here investment $I = \Delta K$. ΔW is an increase in a country's net wealth (its foreign asset holdings).

be an additional argument. Output is affected by national income both positively (through $C(\cdot)$) and negatively (through $IM(\cdot)$ and hence $CA(\cdot)$). Luckily, macroeconomists are allowed to make assumptions readily. We simply say that the marginal propensity to consume domestic goods C ($c = 1 - s$) is larger than the marginal propensity to buy imports IM (m) so that the positive effect of Y^{GNP} on Y prevails. Yet, do not sigh too early.

Foreign output is even trickier to determine. Since the world's current accounts add up to zero, we can write

$$Y^* = C(Y^{GNP,*} - T^*) + I^* + G^* - \frac{1}{Q} CA(Q, Y^{GNP} - T, Y^{GNP,*} - T^*). \quad (2)$$

Again, foreign national income enters both negatively and positively. This is not the trickiest part yet. After having compared the marginal propensities to consume in the home country, we can simply state with similar confidence: When foreign national income rises, foreign output will increase. But what about the real exchange rate? The same mess once more, it both enters negatively and positively in the foreign output equation. This time we have to dig a little deeper in our bag of tricks. Not too deep, though. We just think back to an assumption that is, by now, an old friend of ours: *Marshall-Lerner* takes care of the current account. When the *Marshall-Lerner condition* holds, we know that pure price effects have little impact. Therefore, we can simply ignore the $\frac{1}{Q}$ term in 2. Then foreign output depends negatively on the (domestic) real exchange rate. And this makes a lot of sense. A rising Q means that the real exchange rate is depreciating from a domestic perspective, thus it is appreciating from the foreign country's perspective. Their exports to the home country will decline and their imports from the home country will rise.

We have come a long way, but we have still not arrived at a complete two-country model. We would like to include the domestic money market, the foreign money market and the foreign exchange market, too. Don't worry, we just impose three painless equilibrium conditions that are well known to us and

Since the production of Y^{GDP} creates income for all the factors that are employed domestically, especially labor L and capital K , we have

$$Y^{GDP} = R \cdot K + w \cdot L,$$

where w denotes the (domestic) wage rate and R the international interest rate ($R = R^*$). In contrast, gross national income also includes income from foreign assets (the country's net wealth):

$$Y^{GNP} = R \cdot W + R \cdot K + w \cdot L.$$

Thus, the precise definition of the current account is

$$CA = R \cdot W + EX - IM.$$

Since savings are equal to income less expenditure, $S = Y^{GNP} - C - G$, we can equivalently state that

$$CA = S - I = \Delta W.$$

As cannot be stressed often enough, a current account *surplus* is equal to a capital *outflow*. And a capital outflow is nothing but an increase in a country's net wealth W .

then quickly exile them in the back of our minds. The following conditions take care of the three financial markets, respectively:

$$\frac{M}{P} = L(Y, R) \tag{3}$$

states the requirement that domestic money supply and demand be equal in equilibrium,

$$\frac{M^*}{P^*} = L^*(Y^*, R^*) \tag{4}$$

states the same for foreign money supply and demand, and the Uncovered Interest Parity Condition (UIP)

$$R = R^* + \frac{E^e - E}{E} \tag{5}$$

finally closes the model.

Puh, five equations, 1, 2, 3, 4, and 5. They will make sure that our five endogenous variables Y , Y^* , R , R^* , and E are precisely determined. Still, we don't really want to carry them along. So, let's simplify life again without making it uninteresting.

First of all, let's make sure that we keep all the rest of the variables exogenous. In particular, since we are looking at the short-run mainly, let's leave prices sticky. That is, P and P^* , the aggregate price levels, remain unchanged. This is neat because every move in the nominal exchange rate E will now directly translate into a change of the real exchange rate $Q = E \frac{P^*}{P}$ (just magnified or shrunk by a factor $\frac{P^*}{P}$). In addition, we will only make changes to the expected nominal exchange rate E^e when it deems sensible, that is, when we are concerned with *permanent* shocks or *permanent* policy changes. All other variables are truly exogenous anyway: I and I^* (because interest rates don't affect them in our model), G and G^* , M and M^* , T and T^* .

Then, in a second step, let's pretend that there is nothing special going on in the foreign money market 4. After all, we are living in a symmetric world, and any monetary policy measure abroad will have the same consequences as a monetary policy at home. We only need to change our costumes, reliable home as foreign and vice versa.

Finally, let's banish equations 3 and 5 to the back of our minds. By now we already know what fiscal and monetary policies do to our nominal exchange rate E in a small open economy. It is a simple exercise to use the Mundell-Fleming model and analyze the impact of autonomous changes in any other variable or functional relationship. The following overview summarizes the findings.

Temporary Change in	Effects on
$G \uparrow, T \downarrow, C(\cdot) \uparrow, CA(\cdot) \uparrow$	$E \downarrow, R \uparrow, Q \downarrow$ (sticky prices)
$M \uparrow, P \downarrow, L(\cdot) \downarrow$	$E \uparrow, R \downarrow, Q \uparrow$ (sticky prices)

Permanent Change in	Effects on
$G \uparrow, T \downarrow, C(\cdot) \uparrow, CA(\cdot) \uparrow$	$E^e \downarrow, E \downarrow, R \uparrow, Q \downarrow$ (sticky prices)
$M \uparrow, P \downarrow, L(\cdot) \downarrow$	$E^e \uparrow, E \uparrow, R \downarrow, Q \uparrow$ (sticky prices)

And that's it. We are down to one diagram if we so choose. If we label the x-axis Y and the y-axis Y^* , the two equations 1 and 2 undergo a metamorphosis into two curves. A steeper one, called HH and associated with equation 1, and a flatter one, called FF and associated with equation 2. From the little plus and minus signs in the two respective equations 1 and 2 we know where these curves shift when a variable is changed autonomously. And from the above table we know how we get the remaining three dimensions in to the two visible ones. We simply shift the two curves in the direction that the sign in the equation and the arrow in the table indicate. What more can an economist want? Make educated statements about the whole (two-country) world without ever touching more than two thin curves in a plane.