Introduzione alla macroeconomia aperta

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National accounts in an open economy

- Let us define domestic absorption as $A_t^d = C_t + I_t + G_t$ and total absorption as, A_t, as $A_t = A_t^d + IM_t$. Therefore one can write

$$Y_t = A_t^d + EX_t - IM_t$$

- Adding to both sides of the equation rB_{t-1}, one can obtain

$$Y_t + rB_{t-1} = A_t^d + EX_t - IM_t + rB_{t-1} = A_t^d + TB_t + rB_{t-1}$$

- Bringing A_t^d to the left-hand side and keeping in mind that $CA_t = TB_t + rB_{t-1}$, one can obtain

$$Y_t - A_t^d + rB_{t-1} = CA_t$$

If an economy absorbs more than its output and external revenues it will have a deficit of the current account.

Intertemporal approach: a two-periods model, examples

- Let us consider a two-periods time horizon. At time 1, the external net position of the economy is nil, $B_0 = 0$. This entails

$$CA_1 = B_1 - B_0 = B_1 = Y_1 - I_1 - C_1 \tag{1}$$

- In the second period, the trade balance will be

$$CA_2 = B_2 - B_1 = Y_2 + rB_1 - C_2 - I_2 \tag{2}$$

- On the other hand, $B_2 = 0$, otherwise the domestic economy would have a credit or a debit in the second period that are impossible to redeem. $I_2 = 0$ otherwise there would be investments, whose yields are impossible to enjoy.

Intertemporal approach: a two-periods model, examples

- Therefore (2) can be rewritten as

$$CA_2 = -B_1 = Y_2 + rB_1 - C_2 \tag{3}$$

- Let us suppose that $B_1 > 0$:
  - $B_1 = Y_1 - I_1 - C_1 > 0$. The economy produces more than what it absorbes. It is saving an amount equal to B_1 and it is investing what it saves abroad
  - $-B_1 = Y_2 + rB_1 - C_2 < 0$. The economy absorbes more than its output and its external revenues. It is decumulating its foreign activities by an amount equal to B_1.

Intertemporal approach: a two-periods model, examples

- Suppose that $B_1 < 0$:
  - $B_1 = Y_1 - I_1 - C_1 < 0$. The economy produces less than what it absorbes. At the end of period 1, it will have an external debt equal to B_1.
  - $-B_1 = Y_2 + rB_1 - C_2 > 0$. The economy produces more than its absorption and the cost of its external debt. It is decumulating its assets by an amount equal to B_1.
- Suppoose that $B_2 \neq 0$ and that $B_1 < 0$
  - $B_2 - B_1 = Y_2 + rB_1 - C_2 > 0$. There is a current account surplus. B_2 is less negative than B_1.
  - $B_2 - B_1 = Y_2 + rB_1 - C_2 < 0$. There is a current account deficit. B_2 is more negative than B_1

Intertemporal approach: detailed calculation of the intertemporal budget constraint

- Let us consider (3), bring to the left hand side rB_1 to obtain

$$\begin{aligned} -B_1 - rB_1 &= Y_2 - C_2 \\ B_1 &= \frac{C_2 - Y_2}{1+r} \end{aligned} \tag{4}$$

- Let us substitute (1) into (4) to obtain

$$Y_1 - I_1 - C_1 = \frac{C_2 - Y_2}{1+r}$$

- Re-arranging one obtains

$$C_1 + \frac{C_2}{1+r} = Y_1 + \frac{Y_2}{1+r} - I_1$$

Intertemporal approach: a two-periods model

- The aim of the individual is to maximize the discounted utility over the two periods subject to the intertemporal budget constraint

$$\max_{C_1, C_2} V = U(C_1) + \delta U(C_2) \tag{5}$$

$$s.t.\ C_1 + \frac{C_2}{1+r} = Y_1 - I_1 + \frac{Y_2}{1+r} \tag{6}$$

where $\delta < 1$ is the discount rate

- Let us solve (6) with respect to C_2

$$C_2 = (Y_1 - I_1 - C_1)(1+r) + Y_2$$

- and let us substitute the result into (5), obtaining

$$\max_{C_1} V = U(C_1) + \delta U\left[(1+r)(Y_1 - I_1 - C_1) + Y_2\right] \tag{7}$$

Intertemporal approach: a two-periods model

- Let us differentiate 7 with respect to C_1 and equating the first derivative to zero one can obtain the first order condition

$$U'\left(C_1\right) - \delta\left(1+r\right)U'\left[\left(1+r\right)\left(Y_1 - I_1 - C_1\right) + Y_2\right] = 0 \qquad (8)$$

- Substituting into (8) C_2 we obtain

$$U'\left(C_1\right) = \delta\left(1+r\right)U'\left[C_2\right]$$

An example of balance of payments

Items	2000	2001
Current account	-6305	-178
Goods	10368	17775
Services	1167	338
Factor incomes	-13099	-11575
Unilateral transfers	-4742	-6716
Capital accounts	3195	938
Intangible assets	-72	-311
Unilateral transfers	3267	1249
Financial accounts	4287	-2889
Direct investments	1149	-7377
Portfolio investments	-26255	-7640
Derivatives	2501	-477
Other investments	29950	12121
Variation in official reserves	-3058	484
Errors and omissions	-1177	2129

An example of balance of payments

Items	2000
Current account (A)	-6305
Goods	10368
Services	1167
Factor Incomes	-13099
Unilateral transfers	-4742
Capital account (B)	10540
Intangible assets	-72
Unilateral transfers	3267
Direct investments	1149
Portfolio investments	-26255
Derivatives	2501
Other investments	29950
Errors and omissions	1177
A+B-C	1177
Variation of official reserves (C)	3058