

**SOLUTIONS**  
**PROBLEMS CHAPTER 11**  
**TRADE AND INVESTMENT IN THE NATIONAL ACCOUNTS**

The table on the next page provides flows and stocks in the national accounts of a fictitious economy. The various variables are as defined in the text on *Trade and Investment in the National Accounts*. The stock variables denote values at the *beginning* of each period. The return on government bonds (foreign or domestic) is  $r = 8\%$  and the depreciation rate on domestic capital is  $\delta = 10\%$ . Government bonds are the only form of foreign asset holdings and they do not depreciate. The population size and productivity level are assumed constant over time and we abstract from the possibility of human capital accumulation.

- a) Use the identities provided in the document on *Trade and Investment in the National Accounts* in order to fill in the blanks in the table. For years 2000 and 2001, state the identity being used for each calculation.
- b) How would you explain the drop in GDP between years 2000 and 2001? Are people poorer in 2001 as a consequence? Explain.
- c) How would you explain the increase in GDP between years 2001 and 2002? Discuss the implication on people's welfare during year 2001.
- d) How did consumers manage to increase their consumption level by so much between 2001 and 2002? Is that sustainable in the long run? Begin the discussion by calculating the *net international asset position* in 2005.

**SOLUTIONS**

- a) See the last two pages.
- b) The drop in GDP between 2000 and 2001 is attributed to the smaller *capital stock* in 2001. People are not necessarily poorer as a consequence because the *national income* must also include the income from *net foreign asset holdings*. Indeed, once we account for this, national income has remained the same between 2000 and 2001 as given by the *GNP* value which is equal to 100 in both years. In other words, the drop in domestic output - or, equivalently, income - that was caused by a lower capital stock has been compensated for by the higher income from foreign asset holdings.

Note that the increase in net foreign asset holdings is achieved through exports that exceed imports, i.e., a positive *trade balance*. In this way, some of the domestic output is used to accumulate foreign assets instead of being invested in domestic capital. Whether this is a good thing or not depends, in part, on the returns that one gets from foreign assets compared to domestic capital.

- c) The increase in GDP between 2001 and 2002 is due to the larger capital stock. This was achieved through a jump of 15 in the investment level in 2001 as compared to 2000

(from 20 to 35). This jump in investment has been mostly financed by higher savings as consumption dropped by 10 (from 70 to 60), but it has also been financed by an increase in imports of 5.8 (from 10 to 15.8). Note that the counterpart of this increase in imports is the drop in net exports from 10 in 2000 to 4.2 in 2001, i.e., the trade balance has gone down by 5.8 and as a result, the capital account balance has dropped from 10 in 2000 to 5 in 2001. In other words, the higher domestic capital stock is due to both higher savings and lower accumulation of foreign assets. The increase in investment has made people richer in 2002 since the national income has increased. However, this was achieved through sacrificed consumption in 2001 and has certainly contributed to reduce their welfare in that year.

- d) The consumption level increased from 60 to 80 between 2001 and 2002. This increase is due to both a lower investment level (from 35 in 2001 to 25 in 2002) and higher imports (from 15.8 in 2001 to 24.5 in 2002). Because of higher imports, the drop in investment is not so severe as the increase in consumption. However, the trade balance has now turned negative (to -4.5) and as a consequence, the current account balance is also negative (at -3.3) though it is partly compensated by the positive investment income balance (at 1.2).

The fact that the domestic stock of capital has remained largely the same between 2002 and 2003 while net foreign asset holdings have decreased (from 15 to 11.7) means that people are selling off their foreign assets in order to increase their consumption level. This may not be sustainable as the stock of net foreign asset holdings will eventually turn negative. Indeed, in 2005, we have  $B_5 = 2.64 - 9.79 = -7.15$ , which implies that the country will begin to make net payments to foreign asset holders, i.e., it will have to make *debt service* payments. In the long run, those debt service payments may become so large that the country will be forced to export more than it imports and as a consequence, its consumption level will have to decrease.

## SOLUTIONS

### Trade and investments in the national accounts

(See attached table)

a) For year 2000, we have (using  $t=0$ ):

$$rB_0 = 0 \text{ since } B_0 = 0$$

$$Y_0^N = Y_0 + rB_0 = 100 + 0 = 100$$

$$X_0 = Y_0 - C_0 - I_0 + Q_0 = 100 - 70 - 20 + 10 = 20$$

$$NX_0 = X_0 - Q_0 = 20 - 10 = 10$$

$$CA_0 = rB_0 + NX_0 = 0 + 10 = 10$$

For year 2001, we have:

$$\begin{aligned} K_{1,1} &= K_0 - \delta K_0 + I_0 \\ &= 250 - 0.9(250) + 20 = 245 \end{aligned}$$

$$B_1 = B_0 + CA_0 = 0 + 10 = 10$$

$$rB_1 = 0.08 \cdot 10 = 0.8$$

$$Q_1 = -Y_1 + C_1 + I_1 + X_1 = -99.2 + 60 + 35 + 20 = 15.8$$

$$NX_1 = 20 - 15.8 = 4.2$$

$$Y_1^N = Y_1 + rB_1 = 99.2 + 0.8 = 100$$

$$CA_1 = rB_1 + NX_1 = 0.8 + 4.2 = 5$$

And so on for years 2002 to 2004.

year t	Y	C	I	X	Q	NX	B	rB	Y <sup>N</sup>	CA	K
2000	100	70	20	<b>20</b>	10	<b>10</b>	0	<b>0</b>	<b>100</b>	<b>10</b>	250
2001	99.2	60	35	20	<b>15.8</b>	<b>4.2</b>	<b>10</b>	<b>0.8</b>	<b>100</b>	<b>5</b>	<b>245</b>
2002	100.5	80	25	20	<b>24.5</b>	<b>-4.5</b>	<b>15</b>	<b>1.2</b>	<b>101.7</b>	<b>-3.3</b>	<b>255.5</b>
2003	100.45	80	<b>30.45</b>	10	20	<b>-10</b>	<b>11.7</b>	<b>0.94</b>	<b>101.39</b>	<b>-9.06</b>	<b>255</b>
2004	101.2	80	<b>31.2</b>	10	20	<b>-10</b>	<b>2.64</b>	<b>0.21</b>	<b>101.41</b>	<b>-9.79</b>	<b>259.95</b>