

Problem Sets & Solutions

1114 Global Economics 2

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PS1 - National Income Accounting and Balance of Payments

Review

1.1

The textbook discusses many different definitions of national and domestic production, income, and expenditures. Consider the following measures: *GDP*, *GNI*, and *GNDI*. Which do you believe is the most accurate measure of economic performance and why?

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$$GDP = Q = A + TB = (C + I + G) - (X - M)$$

Measures the value of production within a countries borders.

$$GNI = Q + NFIA = A + TB + NFIA$$

Income earned by domestic factors of production from all sources, domestic and foreign.

$$GNDI = Y = A + CA = A + (TB + NFIA + NUT)$$

Total income resources available to the home country to spend without borrowing.

1.2.

Note following the accounting identity for gross national disposable income: $GNDI = GNI + NUT$.

- a) Starting with this definition, show that the current account is equal to domestic savings less domestic investment.
- b) From the expression in (a), show the current account plus investment is equal to private saving plus government saving.
- c) From the expression in (b), show that an increase in government spending can lead to a reduction in the current account.

.....

a)

$$Y = C + G + I + CA \Leftrightarrow (Y - C - G) - I = CA \Leftrightarrow CA = S - I$$

b)

$$S = Y - C - G \Leftrightarrow S = Y - C - G - T + T \Leftrightarrow S = (Y - C - T) + (T - G) \Leftrightarrow S = S_P + S_G$$

$$CA = S - I \Leftrightarrow CA + I = S \Leftrightarrow CA + I = S_P + S_G$$

c)

$$CA + I = S_P + S_G \Leftrightarrow CA + I = (Y - C - T) + (T - G)$$

$$CA \downarrow + \bar{I} = \overline{(Y - C - T)} + (\bar{T} - G \uparrow)$$

Exercises

1.3.

(Feenstra and Taylor) Use the following information on a hypothetical economy, Rijkdom, for the year 2006.

Balance of Payments Accounts	National Income and Product Accounts
Current account surplus of \$1,000 million _{SEP}	GNE is \$8,000 million _{SEP}
Non-reserve financial account deficit of \$850 million	Consumption is \$5,000 million
Capital account surplus of \$75 million _{SEP}	Government purchases total \$1,100 million
Foreign factors located in Rijkdom earn \$150 million	A \$250 million government budget deficit
Trade surplus of \$700 million _{SEP}	
Net of -\$50 million in unilateral transfers	

- Calculate Rijkdom's financial account balance. What has happened to Rijkdom's foreign asset position? Explain in detail in terms of Rijkdomian assets and foreign assets (owned by Rijkdomians and foreigners).
- Calculate the official settlements balance for Rijkdom. Did the Central Bank of Rijkdom experience a decrease or an increase in its foreign reserve holdings? Explain this in terms of the figure you calculated and what the official settlements balance measures [*we won't talk about the Official Settlements Balance; we just calculate the Official Reserve Transactions (ORT)*].
- Calculate net factor income from abroad for Rijkdom. How much did Rijkdomian factors abroad earn?
- Is Rijkdom a net lender or a net borrower? Explain how you know.
- Calculate Rijkdom's GDP, GNI, and GNDI.
- Calculate investment for Rijkdom.
- Calculate Rijkdom's national savings and private savings.
- Suppose that valuation effects imply a capital gain of \$220 million on external wealth. Calculate the change in Rijkdom's external wealth. Based on these data discuss the three sources of the change in external wealth. Which one appears to be most important in Rijkdom? Explain.

.....
a)

$$FA = -(CA + KA) = -(1000 + 75) = -1075 \rightarrow \text{net importer of assets}$$

b)

$$ORT = FA - FA^{NR} = -1070 + 850 = -225 (< 0) \rightarrow \text{Central Bank is accumulating foreign reserves}$$

c)

$$NFIA = CA - TB - NUT = 1000 - 700 + 50 = 350$$

$$X^{FS} = NFIA + M^{FS} = 350 + 150 = 500$$

d)

$$FA < 0 \rightarrow \text{net lender}$$

e)

$$GDP = A + TB = 8\,000 + 700 = 8\,700$$

$$GNI = GDP + NFIA = 8\,700 + 350 = 9\,050$$

$$GNDI \stackrel{1}{=} GNI + NUT = 9\,050 + (-50) = 9\,000$$

$$\stackrel{2}{=} A + CA = 8\,000 + 1\,000 = 9\,000$$

f)

$$I = A - C - G = 8\,000 - 5\,000 - 1\,000 = 1\,900$$

g)

$$S \stackrel{1}{=} CA + I = 1\,000 + 1\,900 = 2\,900$$

$$\stackrel{2}{=} Y - C - G = 9\,000 - 5\,000 - 1\,000 = 2\,900$$

$$S_P \stackrel{1}{=} S - S_G = 2\,900 - (-250) = 3\,150$$

$$\stackrel{2}{=} Y - C - T = Y - C - (G - \text{Budget Deficit}) = 9\,000 - 5\,000 - (1\,100 - 250) = 3\,150$$

h)

$$\Delta \text{external wealth} = \text{valuation effects} + (-FA) = \text{capital gains on } K + (CA + KA) = 1\,295$$

The three sources are: (1) cap gains; (2) CA contributions, positive if savings bigger than investments; (3) KA, if people are more generous.

1.4.

Explain how each of the following transactions generates two entries – a credit and a debit- in the American balance of payments accounts, and describe how each entry would be classified:

- a) A U.S. airplane manufacturer imports \$600 000 in parts from a Canadian firm. It uses a U. S. bank account to pay for the parts.
- b) The Bank of England (U. K. central bank) buys \$2 million in U.S. Treasury bonds from an American securities firm.
- c) An Italian tourist charges \$400 to his Mastercard (issued by an Italian bank) for a hotel room in NewYork City.
- d) A Chinese catering company purchases \$30, 000 in helium tanks from a U. S. welding firm. The Chinese catering company uses deposits from a bank in China.
- e) A French firm forgives a \$250 000 loan to an oil refinery located in Louisiana following a hurricane.
- f) The United States donates \$8 million in medical and food supplies to Lebanon following a month-long war.
- g) An American buys a share of German stock, paying the seller with a check on an American bank.
- h) An American buys an ink-jet fax machine from the Italian company Olivetti and pays for the purchase with a \$1 000 check, which is then deposited at New York Citibank.
- i) An American pays for a dinner in France \$200, placing the charge on a Visa credit card.
- j) U.S banks forgive \$5 000 in debt owed to them by the government of Bygonia.
- k) A U.S. owned factory in Britain uses local earnings to buy additional machinery.
- l) The Korean government carries out an official foreign exchange intervention in which it uses dollars held in an American bank to buy Korean currency from its citizens.

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a)

Therui udohvdopbj

b)

Therui udohvdopbj

c)

Therui udohvdopbj

d)

Therui udohvdopbj

e)

Therui udohvdopbj

f)

Therui udohvdopbj

g)

Therui udohvdopbj

h)

Therui udohvdopbj

i)

Therui udohvdopbj

j)

Therui udohvdopbj

k)

Therui udohvdopbj

l)

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1.5.

(Feenstra and Taylor) Consider the economy of Aureus. In Aureus, domestic investment is \$300 million and its residents earned \$10 million in capital gains during 2006. Residents of Aureus purchased \$150 million in new foreign assets during the year and foreigners purchased \$120 million in Aureus assets. Assume the valuation effects total \$1 million in capital gains. Assume $KA = 0$.

- a) Calculate the change in domestic wealth in Aureus.
- b) Calculate the change in external wealth for Aureus.
- c) Calculate the total change in wealth for Aureus.
- d) Calculate domestic savings for Aureus.
- e) Calculate Aureus' current account. Is the CA in deficit or surplus?

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a)

$$\Delta \text{domestic wealth} = I + \text{capital gains on } K = 300 + 10 = 310$$

b)

$$\Delta \text{external wealth} = \text{valuation effects} + (-FA) = 1 - (120 - 150) = 31$$

c)

$$\Delta \text{total wealth} = \Delta \text{domestic wealth} + \Delta \text{external wealth} = 310 + 31 = 341$$

d)

$$\Delta \text{total wealth} = S + KA + \text{capital gains on } K + \text{capital gains on } (A - L)$$

$$S = 341 - 0 - (10 + 1) = 330$$

e)

$$CA = S - I = 330 - 300 = 30 (> 0) \rightarrow \text{surplus}$$

1.6.

A hypothetical economy, Endor, was just hit by a hurricane. As a consequence, some information on the national accounts was lost. The following table reports the information that was possible to retrieve from the debris, for the year 2014:

National Income and Product Accounts	Balance of Payments Accounts
GNDI _____ \$ 33.500 million	Capital account _____ \$150 million
GDP _____ \$30,000 million	Official reserve transactions -\$500 million
Investment _____ \$8.000 million	Trade balance _____ -\$1000 million
Government expenditures \$2.500 million	NFIA _____ \$ 2150 million
Private savings _____ \$5.000 million	

- Calculate Endor's current account and the financial account balances. Is Endor a net lender or a net borrower? Explain your conclusions.
- Compute Endor's consumption and taxes. Is Endor government running a public deficit or surplus?
- Calculate the non-reserve financial account balance. Interpret the value of the Official Reserve Transactions balance and explain what it measures. How can these two balances be related to the Official Settlements balance?
- In the aftermath of the hurricane, the two closest Endor's neighbours prompted to offer help in different ways: the Republic of Naboo has donated \$20 million in medical and food supplies and the government of Coruscant has forgiven a \$5 million in debt owed to them by the government of Endor.
 - Explain how these transactions affected Endor's balance of payments accounts, describing how each entry would be classified.
 - What will be the effect of this transactions over Endor's current account balance, GDP, GNDI, and capital account and financial account balances? And over Endor's net international investment position?

.....
a)

$$CA = GNDI - GDP + TB = 33\,500 - 30\,000 + (-1\,000) = 2\,500$$

$$FA = -(CA + KA) = -(2\,500 + 150) = -2\,350 \rightarrow \text{net lender}$$

b)

$$C = GDP - I - G - TB = 30\,000 - 8\,000 - 2\,500 - (-1\,000) = 20\,500$$

$$T = GNDI - S_P - C = 33\,500 - 500 - 2\,650$$

$$S_G = T - G = 8\,000 - 2\,500 = 5\,500 \rightarrow \text{surplus}$$

c)

$$FA^{NR} = FA - ORT = (-2\,650) - (-500) = -2\,150$$

d)

d) i.

$$U^{IN} \uparrow \rightarrow CA \uparrow$$

$$M \uparrow \rightarrow TB \downarrow \rightarrow CA \uparrow$$

$$KA \uparrow, X^A \downarrow \rightarrow FA \downarrow$$

d) ii.

$$\Delta GDP = -20$$

$$\Delta GNDI = 0$$

2.1 — (Closed vs Open)

Consider a two-period endowment economy, where the preferences of the representative consumer are given by $U = \ln C_1 + 0.8 \ln C_2$. In this economy, current and future GDP are $Q_1 = 1125$ and $Q_2 = 1350$.

- a) Find out the equilibrium interest rate when the economy is closed to capital flows. Comparing to the rate of time preference, is this an expected result?
- b) Suppose that the economy opens to international flows of capital and that the world interest rate is $r^* = 0.5$. Describe the impact of trade openness in a graph and compute the current and future:
 - i. Consumption
 - ii. Trade balance
 - iii. GNI
 - iv. Current account
 - v. Net international investment position
- c) Departing from b), examine the implications of a fall in the interest rate to $r^* = 0$. Represent this in a graph. Will the country be better off or worse off?

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ANSWER.

2.2 — (Temporary versus permanent income shocks)

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ANSWER.

2.3 — (Infinite Horizon)

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ANSWER.

2.4 — (Small open economy with production)

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ANSWER.

2.5 — (Small economy with production: temporary shock, productivity shock)

.....

ANSWER.

2.6 — (Small economy with production: productivity shock)

.....

ANSWER.

2.7 — (Investment, Infinite Horizon)

.....

ANSWER.

S

ANSWER.

2.9 — (Risk-diversification)

	COUNTRY A			COUNTRY B			WORLD		
	Capital Income	Labor Income	<i>GDP</i> = <i>GNI</i>	Capital Income	Labor Income	<i>GDP</i> = <i>GNI</i>	Capital Income	Labor Income	<i>GDP</i> = <i>GNI</i>
State 1	36	54	90	44	66	110	80	120	200
State 2	44	66	110	36	54	90	80	120	200
Variation about mean	∓ 4	∓ 6	∓ 10	± 4	± 6	± 10	0	0	0