

Homework I Solutions

- 1a. growth rate in nominal GDP
in 2000-2002 period $= [(2002 \text{ nominal GDP} - 2000 \text{ nominal GDP}) / 2000 \text{ nominal GDP}] * 100$
 $= [(365 - 300) / 300] * 100 = 21.67 \%$
- b. average annual growth rate in real GDP
in 2000-2002 period $= [(2002 \text{ real GDP} / 2000 \text{ real GDP})^{1/2}] - 1$
 $= [(221 / 213)^{1/2}] - 1 = 1.9\%$
- c. (implicit) GDP deflator $= (\text{nominal GDP} / \text{real GDP}) * 100$
 $(300 / 213) * 100 = 140.8$ for 2000
 $(350 / 228) * 100 = 153.5$ for 2001
 $(365 / 221) * 100 = 165.1$ for 2002
- d. inflation rate in
2000-2002 period $= [(2002 \text{ price index} - 2000 \text{ price index}) / 2000 \text{ price index}] * 100$
- i. by using CPI
inflation rate in
2000-2002 period $= [(119 - 100) / 100] * 100 = 19 \%$
- ii. by using (implicit) GDP deflator
inflation rate in
2000-2002 period $= [(165.1 - 140.8) / 140.8] * 100 = 17.3 \%$
- e. per capita real GDP $= \text{real GDP} / \text{population}$
per capita real GDP $= 213 / 62,2 = 3.42$ in 2000
 $= 221 / 64,9 = 3.41$ in 2002
growth rate in per capita real GDP
in 2000-2002 period $= [(2002 \text{ per capita real GDP} - 2000 \text{ per capita real GDP}) / 2000 \text{ per capita real GDP}] * 100$
growth rate in per capita real GDP
in 2000-2002 period $= [(3.41 - 3.42) / 3.41] * 100 = -0.29\%$
- f. monthly real wage in 2001 $= (\text{nominal wage in 2001} / \text{CPI in 2001}) * 100$
monthly real wage in 2001 $= (560 / 112) * 100 = 500$
- g. monthly real wage in 2000 $= (450 / 100) * 100 = 450$
monthly real wage in 2002 $= (580 / 119) * 100 = 487.4$
growth rate in monthly real wage in
2000-2002 period $= [(2002 \text{ real wage} - 2000 \text{ real wage}) / 2000 \text{ real wage}] * 100$
 $= (487.4 - 450) / 450 * 100 = 8.3\%$

$$\begin{aligned}
 2. \text{ GDP} &= \text{Priv. Cons. Expenditure} + \text{Private Inv.} + \text{Public Cons. Expen.} + \text{Public Inv.} + \\
 &\quad (\text{Exports} - \text{Imports}) \\
 &= C_p + I_p + C_g + I_g + X - M \\
 &= 450 + 250 + 250 + 100 - 110 = 940
 \end{aligned}$$

$$b. \text{ GNP} = \text{GDP} + \text{NFI}$$

NFI = Income generated by a domestic company in France - Income generated by a foreign company in Turkey

$$= 310 - 130 = 180$$

$$\text{GNP} = 940 + 180 = 1120$$

$$c. \text{ NFI} = 180 \text{ calculated above}$$

$$d. \text{ CAB} = X - M + \text{NFI} + \text{Net unrequited transfers}$$

$$100 - 110 + 180 + 80 = 250$$

$$e. \text{ NDP} = \text{GDP} - \text{Depreciation}$$

$$= 940 - 100 = 840$$

$$f. \text{ NNP} = \text{GNP} - \text{Depreciation}$$

$$= 1120 - 100 = 1020$$

$$g. \text{ PI} = \text{NNP}_{fp} - \text{Undistributed profits} - \text{Social security contributions} - \text{Corporate taxes} + \text{Government transfer and indirect payments to individuals}$$

$$\text{NNP}_{fp} = \text{NNP} - \text{Indirect taxes} - \text{subsidies}$$

$$= 1020 - 54 + 65$$

$$\text{PI} = 10310 - 27 - 35 - 43 + 88 = 1014$$

$$h. \text{ Disposable Income} = \text{Personal Income} - \text{Income taxes}$$

$$= 1014 - 94 = 920$$

3. a. The value added at each stage is \$10 (farmer), \$90 (bakery), \$5 (wholesaler), and \$5 (retailer).

$$b. \text{ GDP would be } \$1 \times 110 = \$110.$$

$$c. \text{ GDP would be } \$10 + \$90 + \$5 + \$5 = \$110.$$

4. Cumulative households (%) Cumulative incomes (%)

20	2.7
40	8.2
60	19.3
80	39.9
100	100

5. a. $GDP = C + I + G + (X - M) = \$370 + \$80 + \$43 + (\$55 - \$63) = \$485$.
 $GNP = GDP + \text{Net foreign factor income} = \$485 + \$3 = \488 .
 $\text{Aggregate income} = \text{Employee compensation} + \text{Rent} + \text{Profit} + \text{Interest} = \$329 + \$14 + \$96 + \$49 = \488 .
- b. $\text{Depreciation} = \text{Investment} - \text{Net investment} = \$80 - \$72 = 8$.
- c. $NDP = GDP - \text{Deprecation} = \$485 - \$8 = \477 .

6.	Real Interest Rate	Nominal Interest Rate	Inflation
	5	7	2
	4	7	3
	3	12	9

$\text{Inflation} = \text{Nominal interest rate} - \text{Real interest rate}$

$\text{Nominal interest rate} = \text{Real interest rate} + \text{Inflation}$

$\text{Real interest rate} = \text{Nominal interest rate} - \text{Inflation}$

7. One must be careful when comparing real GDP per capita between countries. Two reasons are: (1) GDP includes only market activities and it is likely that many people in Burundi grow their own food and barter—activities that would not be included in measured output. (2) GDP measures activities at the market price and relative prices in Burundi are likely to be lower compared to prices in the United States. Both issues suggest that \$800 is an underestimate of output in Burundi.