

Introduction to Macroeconomics

First Homework Assignment

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1. An open economy produces aniseed (A) and basil (B). All basil is exported. Residents consume aniseed and cinnamon (C). All cinnamon is imported. The following table shows quantities and prices for the three goods for two successive years.

year	quantities			year	prices		
	A	B	C		A	B	C
1	100	50	60	1	5	5	8
2	110	70	50	2	5	7	10

Note that, in year 2, households have replaced some expensive imported cinnamon by some additional demand for aniseed, while the world market demands for more basil even at a higher price. Also note that GDP consists of aniseed and basil only. You see this from the production definition, but also from the account-zero identity in an open economy $Y = C + I + G + X - IM$, with $G = I = 0$, C corresponding to aniseed plus cinnamon, IM to cinnamon, and X to basil.

- (a) Determine the GDP deflator for year 2, if it has been set at 1 in the base year 1 and it is assumed to follow the traditional Paasche concept. Also state the rate of inflation for year 2.
 - (b) Determine a consumer price index, which is defined as a Laspeyres index for household consumption, in year 2 when it has been set at 100 in the base year 1. Also state the rate of inflation.
 - (c) Determine the less customary counterparts to (a) and (b), the Laspeyres index for GDP and the consumption deflator and the corresponding rates of price inflation.
 - (d) Calculate the nominal GDP for both years, deflate the GDP for year 2 by the GDP deflator from question (a) and compare to the direct (Laspeyres-type) formula for real GDP given in the lecture notes. The two values should coincide.
2. The goods market of a closed economy obeys the following equation system:

$$C = 50 + 0.9 * (Y - T) \quad Z = C + I + G,$$

with the given exogenous values $I = 100$, $G = 600$, $T = 500$.

- (a) Determine the equilibrium values for output at $Y = Z$, for C , and for disposable income $Y - T = Y_D$. Evaluate the fiscal multiplier.
- (b) This equilibrium is unsatisfactory, as government expenditures exceed revenues and thus public saving is negative. Determine the values for G and T that are required to fulfill the condition $G = T$ and nevertheless keep output Y at the same level. Evaluate C and Y_D .
- (c) Suppose the government now increases G as well as T by the same amount, say by 100. By how much does Y change if at all? The corresponding value $\Delta Y / \Delta G$ is called the *balanced-budget multiplier*.
- (d) Now re-consider the original economy in (a), i.e. without assuming $G = T$, but assume that taxes T depend on output $T = 0.2Y$. Determine the fiscal multiplier for this modified model.