

EXERCISE 5

THE 45 DEGREE MODEL

October 30, 2018

1. Suppose an open economy is described by the following values

Autonomous private consumption	100
Private investment	1 000
Public expenditure	250
Exports	300
Transfers to private sector	500
Marginal Propensity to Consume	0.6
Average tax rate	0.4
Marginal propensity to import	0.16

- (a) Calculate the equilibrium income and the external balance using the 45 degree model.
- (b) Is the private sector of this economy a net borrower or lender?
- (c) Determine national savings and national investment. Explain the difference (the current account).
- (d) How would the equilibrium income and the current account change if exports increased to 400?
- (e) How would the equilibrium income and the current account change if investment increased to 1100?

2. Consider an open economy defined by the equations on the right, with Y being the income and Y_D being the disposable income.

Consumption	$C = 250 + 0.85Y_D$
Investment	$I = 2500$
Government expenditure	$G = 2000$
Taxes	$T = 50 + 0.2Y$
Transfers	$TR = 250$
Exports	$X = 1000$
Imports	$Q = 0.18Y$

- (a) Calculate the equilibrium income using the 45 degree model.
- (b) Calculate domestic private consumption, tax returns, savings, imports and the government budget balance
- (c) What are the effects of an increase in private investment? How does it affect the budget balance and the trade balance? (You don't have to do any calculations.)
- (d) What would be the effect of an increase in the marginal propensity to save to 0.3 on the Keynesian multiplier?

3. Given an open economy described by the macroeconomic equations given on the right side, with Y being the income and Y_D being the disposable income.

- (a) Calculate the equilibrium income using the 45 degree model.
- (b) Calculate the Keynesian multiplier.
- (c) Suppose that there is full employment (no “structural” unemployment) at an income level of 15 500. Find the income gap to this level.
- (d) The government wants to reach full employment by using fiscal policy. By how much must the government expenditure increase in order achieve that goal? By how much transfers?
- (e) Consider the tax rate increased to 0.5. Represent the initial equilibrium graphically and show how the aggregate expenditure curve would change.

Private consumption	$C = 900 + 0.8Y_D$
Private investment	$I = 5000$
Government expenditure	$G = 2500$
Taxes	$T = 0.3Y$
Transfers	$TR = 250$
Exports	$X = 1000$
Imports	$Q = 0.2Y$

4. We have the following data on the main macroeconomic variables of an open economy, with Y being the income and Y_D being the disposable income.

- (a) Calculate the national income using the 45 degree model.
- (b) If the government spending increased by 100, by how much would the equilibrium income increase?
- (c) If this increase in spending is financed entirely by an increase in taxes, what is the new national income in equilibrium? (Assume that the fixed part of the tax increases.)
- (d) Compare the public budget balances and the equilibrium incomes generated by these policies.
- (e) Show graphically how the aggregate expenditure function and the equilibrium change with these policies.

Consumption	$C = 500 + 0.75Y_D$
Investment	$I = 1250$
Government expenditure	$G = 1000$
Taxes	$T = 200 + 0.2Y$
Transfers	$TR = 250$
Exports	$X = 750$
Imports	$Q = 50 + 0.1Y$

5. Consider a closed economy with the macroeconomic variables on the right side, with Y being the income and Y_D being the disposable income.

- (a) Find the national income and the government budget balance in the equilibrium of the 45 degree model.
- (b) Calculate the new equilibrium income and budget balance if the government increases spending by 50 units funded by a raise in taxes by the same amount.
- (c) Determine the tax burden as share of national income in both cases.
- (d) Analyse the path of national income from (a) to (b).

Private Consumption	$500 + 0.75Y_D$
Investment	1000
Public spending	250
Taxes	500
Transfers	250
