

PART A: Pencil and Paper Exercises

Part A is to be handed in showing ALL your work deriving solutions.

Consider Hypothetica, an open economy, described by the following system:

Private Sector:

$$C = \$100 + .75 Y_d.$$

$$I = \$125$$

(based on average levels of expectations and a 6% real rate of interest)

Public Sector:

$$G = \$175$$

$$T = \$0 + .25*Y$$

Foreign Sector:

$$X = \$95$$

$$M = \$65 + .1*Y$$

Question 1: Suppose that the current level of GDP is 700.

Calculate:

- | | |
|-------------------------|---|
| a) Consumption spending | b) Investment |
| c) Government spending | d) NX (ie/ net exports) |
| e) The value of AE? | e) This is not an equilibrium, why (think inventory story)? |

To answer e – sketch a rough 45° Diagram and explain the current position.

Question 2: Find equilibrium values:

• **Calculate:**

- | | |
|--|--------------------------------|
| a) The equilibrium level of income | b) The value of the multiplier |
| c) The Government's Budget Position at Equilibrium | d) NX at Equilibrium |

Question 3 Suppose the target level of income was \$900.

- What is the required value of G to drive the economy to $Y_e = 900$?
- What is the resulting government budget position (ie the size of the surplus or deficit)?
- How does this compare to the budget position in Question 1 – be as precise as possible?
- What happens to the value of Net Exports?

Question 4: Write down and graph the equations for T-G

Question 5: Write down and graph the equations for Net Exports

PART B: Simulation Exercises

Do on your own after you complete Part A. Obtain the file Hypothetica.XLS

This file allows you to “simulate” changes to Hypothetica using various EXCEL tools in conjunction with the basic Keynesian Model. Understanding these exercises is crucial for the Mid Term.

When you open the file you will see a series of sheets. Each sheet covers a sector of the Hypothetican model. The first sheet, Simulator shown below, allows us to play various games with the Model. We can then skip to other sheets for more detailed results.

Sectoral Assumptions ("If"):

This worksheet is protected except for the shaded cells which students can access to simulate various changes to the Hypothetican Economy.

Households

	Current	Base
Intercept a	100	100.00
mpc b	0.75	0.75

of Yd

Government Sector

	Current	Base
Purchases G_0	175	175.00
Net Tax intercept: T_0	0	0.00
slope: t	0.25	0.25

of Y

Investment Demand

	Current	Base
Real Rate of Interest	0.06	0.06
Expectations of Firms	A	A
Investment I_0	125.00	125.00

Foreign Sector

	Current	Base
Exports EX_0	95	95.00
Imports intercept: IM_0	65	65.00
slope: m	0.10	0.10

of Y

Predictions ("Then")

AE (or APE):

	Current	Base
Intercept	430.00	430.00
Slope	0.4625	0.463
Equilibrium Y_e	800.00	800.00

Multipliers

	Current	Base
Multiplier	1.860	1.860
Tax Multiplier	-1.395	-1.395
Transfer Multiplier	1.395	1.395

To Reset Model to Base
Click on This Button

Click on this cell to see the formula for finding Y_e

Not part of model

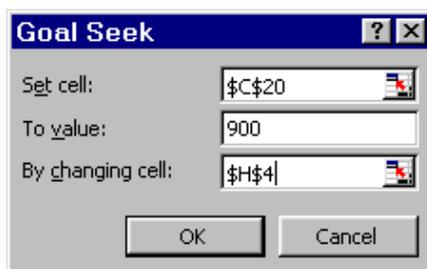
Shaded cells allow you to enter data for example you can change expectations to:
A-average
O-optimistic
P-pessimistic

Each Sheet shows charts or calculations for various sectors of the economy

The simulations below ask you to input various changes to the assumptions (for example we might change the value of Exports) look at the situation and then do a policy exercise using Goal Seek to simulate fiscal or monetary policy.

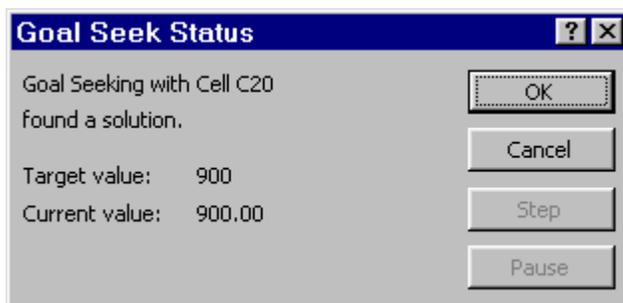
Simulation #0: Sample Simulation based on Part A Question 3.

1. Bring out your pencil and paper calculations for Part A
2. Open the file and go to the sheet: Simulator
3. Observe that the “base” values are the values you employed in your calculation of the equilibrium.
4. To get a feel for how the model works:
 - Replace 100 in cell C3 with 200 –this simulates an increase in (autonomous) Consumption
 - Confirm the idea graphically – look on the Cons.Chart
 - What should this do to Y_e – look on the Simulator sheet to see what is done
 - Click on cell C20 and you can see the formula for finding equilibrium –look familiar?
 - Confirm the idea graphically – look on the EquilmChart
 - What did it do to the government sector – look on the sheets
 - When you’re finish go to the Simulator sheet and hit the Reset (Macro) button
5. Now lets use the Simulator approach to the paper and pencil Question 3 (increasing G to drive the economy to Potential)
 - Make sure you Reset the model
 - Select Tools ==> Goal Seek then fill in the Dialogue box by clicking on cells and typing in 900 so that it looks like:



Translation: You are asking the Simluator to set Y_e , ie equilibrium income, to a value of 900 by altering G , the value of government purchases of goods and services

- Select **OK**
- EXCELL tells you Goal Seek found a solution:



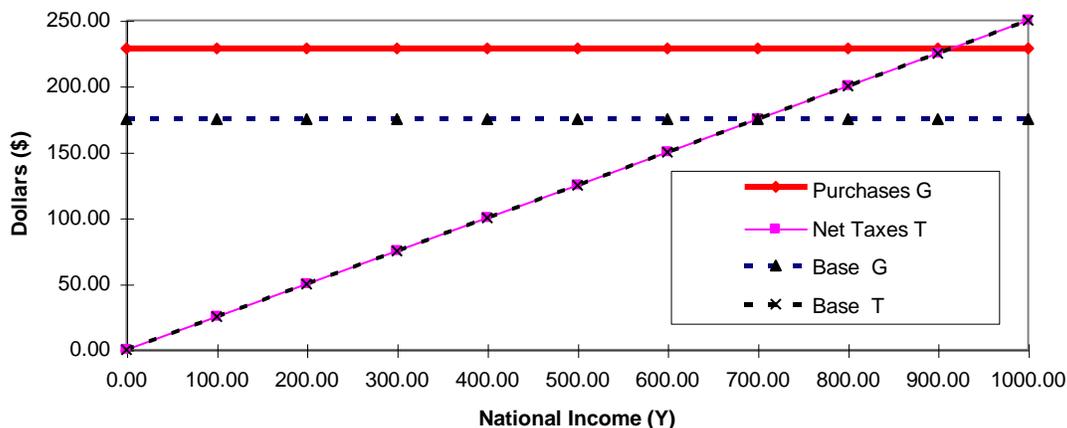
- Select **OK**.

Compare to the pencil and paper solution

- What is the required value of G to drive the economy to $Y_e = 900$?

Look at the value of government spending Goal Seek placed in the cell on the Simulator sheet
Confirm the idea by checking the Government Chart

Hypothetica: Government Sector



- What is the resulting government budget position (ie the size of the surplus or deficit)?
- How does this compare to the budget position in Question 1 –be as precise as possible?

Click on the Government Sector Sheet:

	F	G	H
4	Equilibrium Values		
5			
6		Current	Base
7	Purchases	228.75	175.00
8	Net Taxes	225.00	200.00
9	Budget	Deficit of -3.75	Surplus of 25

This should agree with your pencil and paper solution. The government runs an increased deficit (reduced surplus) as a result.

- What happens to the value of Net Exports?

Click on the Net Export data to confirm

When you are finished go back to the Simulator sheet and Reset the model.

Assignment Questions

Note: The model assumes a fixed exchange rate and no current inflationary problems.

Simulation #1: Comparing Tax and Transfer Solutions Versus G_0 .

1. Suppose that the Government wants to drive the economy to the target of \$900 by giving the public a transfer payment (T_0). Run the appropriate Goal Seek.

How does this solution differ from the use of G_0 (compare the T_0 results to the results in the table on page 4 above)?

2. Suppose that the Government wants to drive the economy to the target of \$900 by changing the tax rate (t). Before running Goal Seek explain whether the rate should rise or fall.

Run Goal Seek.

How does this solution differ from the use of G_0 (compare the t results to the results in the table on page 2 above)?

Simulation #2: Monetary Policy.

RESET the MODEL

Suppose that instead of using fiscal policy to drive the economy to \$900 the Central Bank used monetary policy (i.e. the Bank changes the interest rate - we'll do the details after Spring Break).

1. Before running Goal Seek explain whether the interest rate should rise or fall.
2. Run Goal Seek:
 - What interest rate is necessary to drive the economy to \$900?
 - What did monetary policy do to private sector spending, why?
 - How does the monetary policy solution impact on the government budgetary position. Compare this to the results for increased G_0 from page 2 above. Explain why they are quite different.

Question for thought: As a general rule of thumb “conservatives” or and most business types prefer monetary action to fiscal action when discretionary policy is used. Do your simulations of Fiscal and Monetary Policy suggest any reasons for this. (Note: conservatives also tend to favour less government action in general –we will return to this idea later in the course).

Simulation #3: A decline in Foreign Sector spending

RESET the MODEL

1. You are told exports have declined and domestic firms have become pessimistic (“P”). Before running the simulator explain:
 - What might cause such a decline in exports from Hypothetica (note before you answer: there is no change in imports at the current equilibrium income and this is a fixed exchange rate model)?
2. Predict using basic economic theory the direction of change for the following (increase, decrease or no change because ...):
 - the level of income?
 - the multiplier?
 - the level of net exports in the economy?
 - the government’s budgetary position (ie move toward surplus or toward deficit)?
3. Now run simulator using setting EX0 to 75 and Expectations to P.
 - Do the numerical results agree with your answers to 2?
 - If they do not agree you should rethink your answer to 2.

DO NOT RESET the MODEL

Responding to the decline in Foreign Sector spending

4. Predict, using basic economic theory, the direction of change for the following if the government tries to drive the GDP back to its original level of 800 using a tax rate change (increase, decrease or no change because ...):
 - the new tax rate?
 - the multiplier?
 - the level of net exports in the economy?
 - the government’s budgetary position (ie move toward surplus or toward deficit)?
5. Run Goal Seek and see if the numerical examples agree with your answers to 4. If they do not agree you should rethink 4:

RESET the MODEL

Now set $EX_0 = 75$ and Expectations = P before going on to question 6:

6. Predict using basic economic theory the direction of change for the following if the Central Bank uses monetary policy to drive the economy back to a GDP of 800 (increase, decrease or no change because ...):
 - the interest rate?
 - The level of Investment?
 - the multiplier in the economy?
7. Run Goal Seek and see if the numerical examples agree with your answers to 6. If they do not agree you should rethink your answers.

Simulation #4: Increased private sector spending

RESET the MODEL

1. Suppose that consumers get excited to spend more so that consumption rises (at the current level of GDP) and this is re-enforced by firms becoming very Optimistic about the future.
 - What could cause consumer spending to “shift” in this fashion?
 - How would this change in consumer expenditure impact on the AE line?
 - How would the changed investment impact on the AE line?
2. Predict using basic economic theory the direction of change for the following based on 1 (increase, decrease or no change because ...):
 - level of investment
 - level of income?
 - the multiplier in the economy?
 - level of net exports in the economy?
 - the government’s budgetary position?
3. Test your answers to 1 (the second and third bullets) and 2 by setting a to 150 and Expectations to O. Rethink any answers that do not agree with the simulator.
4. List the numerical results for 2 above to use as reference values in tackling the question on page 8.

DO NOT RESET the MODEL

Responding to the increase private sector spending

5. Predict, using basic economic theory, the direction of change for the following if the government tries to drive the GDP back to its original level of 900 using a change in its purchases (increase, decrease or no change because ...):
 - the new level of G_0 ?
 - the multiplier?
 - the government's budgetary position (ie move toward surplus or toward deficit)?
6. Run Goal Seek and see if the numerical examples agree with your answers to 5. If they do not agree you should rethink 4:

RESET the MODEL

Now set $a = 150$ and Expectations = 0 before going on to question 7:

7. Predict using basic economic theory the direction of change for the following if the Central Bank uses monetary policy to drive the economy back to a GDP of 900 (increase, decrease or no change because ...):
 - the interest rate?
 - The level of Investment?
 - the multiplier in the economy?
8. Run Goal Seek and see if the numerical examples agree with your answers to 6. If they do not agree you should rethink your answers.