Izmir University of Economics

Izmir Univery of Economics
Department of Economics

I. Hakan Yetkiner
http://homes.ieu.edu.tr/~iyetkiner/

ECON 202
MACROECONOMIC THEORY **24 April 2009**
Dr. Yetkiner

Key to Midterm Exam

1. (**15 Points**) Calculate the GDP of Farmland, a fictitious economy whose numbers are listed below. Do so using all three methods (value added approach, income approach, and expenditure approach). Please do indicate your calculations clearly.

Farmland, year 2008

Farmer Jones, (private firm)	
Corn Sold to Govt	$30
Corn Sold to Singapore	$25
Corn Sold to FoodCo, Inc	$20
Payment to workers	$40
Tax on profit	$15

FoodCo, Inc	
Sold Corn Flakes to Consumers	$100
Sold Corn Flakes to Govt	$20
Bought corn from Farmer Jones	$20
Bought salt from Egypt	$10
Payment to workers	$20
Tax on Profit	$15
Corn Inventory	
Beginning of Year	$0
End of Year	$5

Farmland Govt	
Taxes	$50
Purchase of Corn	$30
Purchase of Corn Flakes	$20
Unemployment benefits Paid	$15

Households	
Taxes on wage income	$10
Unemployment benefits	$15
Corn Flakes purchased	$100

	Farmer Jones			**FoodCo**		
Value-added Approach:	**(30+25+20)**	**+**		**(100+20-[20-5]-10**		**= 170**
	C	**I**	**G**	**(X-M)**		
Expenditure Approach:	**100 +**	**5 +**	**50 +**	**(25-10)**		**= 170**
	Wage Income			**Profits**	**TA**	
Income Approach:	**(40+20) +**			**(20+60) +**	**(15+15)= 170**	

Grading: 5 points each

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2. (**10 Points**) Suppose that the following equations describe the a simple Keynesian macroeconomy.

$C = 45 + 0.9(\mathrm{Y} - \mathrm{T})$; $\mathrm{T} = 50 + (0.1)\mathrm{Y}$; $I = 2500$; $G = 2000$

Find the **multiplier** and **equilibrium GDP** values of this economy.

One may find the multiplier from income-expenditure equality.

$$Y = 45 + 0.9\{\mathrm{Y} - [50 + (0.1)\mathrm{Y}]\} + 2500 + 2000 \Rightarrow$$

$$Y = 4545 + 0.9\{\mathrm{Y} - 50 - (0.1)\mathrm{Y}\} \Rightarrow$$

$$Y = 4500 + (0.81)\mathrm{Y} \Rightarrow$$

$$Y - (0.81)\mathrm{Y} = 4500 \Rightarrow$$

$$(0.19)\mathrm{Y} = 4500 \Rightarrow$$

$$\mathrm{Y} = \frac{4500}{(0.19)} \Rightarrow$$

Multiplier is $\alpha = 5.26$ and equilibrium income is $\mathrm{Y}^{*} = 23684.2$

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3. (**15 Points**) Consider the following IS-LM model:

$C = 400 + 0.25\text{YD}$; $\quad \text{T} = 400$; $\quad I = 300 + 0.25Y - 1500i$; $\quad G = 600$

$M^d / P = 2Y - 12000i$; $\quad M^s = 3000$; .

(a) Derive the IS equation.

(b) Derive the LM equation.

(c) Find the equilibrium Y and i.

(a) One may find IS equation from income-expenditure equality.

$$Y = 400 + 0.25\{\text{Y} - 400\} + 300 + 0.25\text{Y} - 1500\text{i} + 600 \Rightarrow$$

$$Y = 1200 + 0.25\text{Y} + 0.25\text{Y} - 1500\text{i} \Rightarrow$$

$$Y = 1200 + 0.5\text{Y} - 1500\text{i} \Rightarrow$$

$$0.5\text{Y} = 1200 - 1500\text{i} \Rightarrow$$

$$\text{i} = \frac{1200}{1500} - \frac{0.5}{1500}\text{Y}$$ This is IS equation

(b) LM equation can be derived from the money market.

$$3000 = 2Y - 12000i \Rightarrow$$

$$12000i = 2Y - 3000 \Rightarrow$$

$$i = \frac{2}{12000}Y - \frac{3000}{12000}$$ This is IS equation

(c) Equilibrium income and interest rate can be found via LM and IS equations.

$$\frac{1200}{1500} - \frac{0.5}{1500}\text{Y} = \frac{2}{12000}Y - \frac{3000}{12000} \Rightarrow$$

$$\frac{1200}{1500} + \frac{3000}{12000} = \frac{2}{12000}Y + \frac{0.5}{1500}\text{Y} \Rightarrow$$

$$\frac{9600 + 3000}{12000} = \frac{6}{12000}Y \Rightarrow$$

$$\text{Y}^* = 2100$$

$$i^* = 0.10$$ (=10%)

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4. (**15 Points**) Turkish government has been experiencing fiscal deficit for years. Suggest a policy mix in the IS-LM setup (i.e., price is **constant**) to achieve a decrease in fiscal deficit while keeping Y constant. **Discuss** in detail implications of this policy mix, including investment and consumption? **Do not forget to support your answer by a figure**.

The rise in T or the fall in G shifts IS left. (Y,i) decrease. The increase in M shifts LM up. Output and consumption increases.

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5. (**15 Points**) Suppose that the Turkish government decided to increase money supply through open market operations. Using the AS-AD setup (i.e., price is variable), **discuss** and **show** the effects of this change on the position of the AD, AS, IS, and LM curves and on output, the interest rate, and the price level in the short run and medium run. Assume that the economy was at the natural level of output before the increase in money supply.

LM right, AD right, AS up, LM left, Y same, i same, P up

6. (**15 Points**) Suppose the Phillips curve is

$$\pi_t - \pi_t^e = 0.1 - 2u$$

Where $\pi_t^e = (0.9)\pi_{t-1} + (0.1)\pi_{t-2}$

(i) What is the natural rate of unemployment?

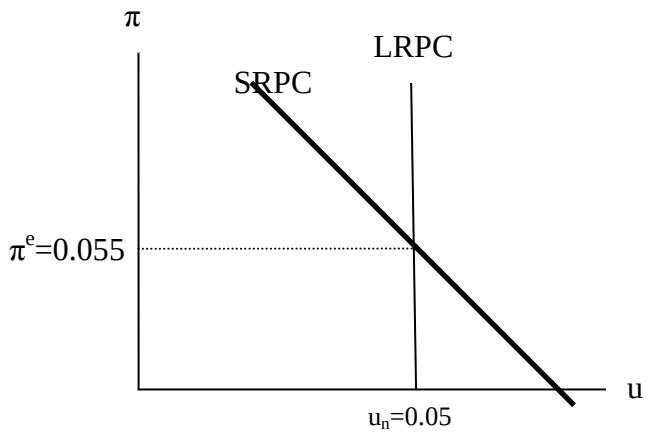
(ii) Graph the short-run and the long-run relationship between inflation and unemployment, if $\pi_{t-1} = 0.05$ and $\pi_{t-2} = 0.10$.

(iii) Suppose that unemployment is at its natural level. What must be actual unemployment in order to reduce inflation by 1.5 percentage points?

(i) At natural rate of unemployment, $\pi_t = \pi_t^e \Rightarrow$

$0.1 - 2u = 0 \Rightarrow u_n = 0.05$ (u_n is 5%)

(ii) We need to find out π_t^e. It is straightforward to show that π_t^e is $\pi_t^e = (0.9)(0.05) + (0.1)(0.1) \Rightarrow \pi_t^e = 0.055$ (= π_t^e is 5.5%).



(iii) If policy maker wants actual inflation to be 4% (5.5-1.5), then unemployment must be $0.04 - 0.055 = 0.1 - 2u \Rightarrow u = 0.0575$ (= u is 5.75%).

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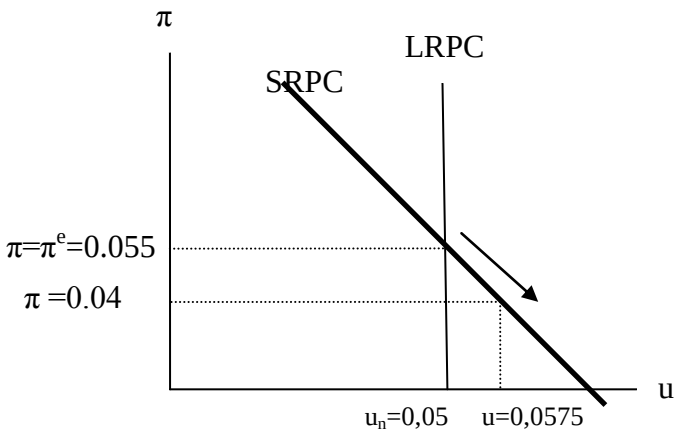

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7. (**15 Points**) Suppose that the following information is given about an economy:

Disposable Income	Saving
0	-10
100	0

What is the marginal propensity to consume (mpc) under simple Keynesian framework, if $C = \overline{C} + \text{cYD}$?

Since $C = \overline{C} + \text{cYD}$, then private saving is $S^p = -\overline{C} + (1-\text{c})\text{YD}$. From the first (S^p, YD) combination, we find $-10 = -\overline{C} + 0 \Rightarrow \overline{C} = 10$. From the second (S^p, YD) combination, we find $0 = -10 + (1-c)100 \Rightarrow 1-c = 0.1 \Rightarrow c = 0.9$.