

ECON 202
MACROECONOMIC THEORY
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Key to Midterm Exam

1. (15 Points) The following information about business activity is revealed to the Department of Commerce:

Alpha Flour Co.	\$	Beta Fruit Co.	\$	Gamma Restaurant	\$	Government	\$
Domestic Sales	200	Sales Revenue	150	Sales revenue	800	Purchases of Restaurant services	20
Wages	100	Wages	100	Wages	600		
Depreciation	30	Depreciation	20	Flour Purchases	200		
Rent	50	Indirect Taxes	10	Fruit Purchases	150		
Exports	100			Depreciation	50		
Indirect Taxes	10			Beginning stock of Flour	100		
				Ending stock of Flour	50		

Compute GDP by using product (value added), expenditure, and income approaches. Please do indicate each item that counts in GDP value clearly.

Value added approach: $300 + 150 + 400 = 850$

Expenditure Approach: $780 + -50 + 20 + 100 = 850$

Income Approach: $(100 + 100 + 600) + (110 + 20 + -250) + (100 + 20 + 50) = 850$

2. (10 Points) Suppose that the following information is given.

	Apple		Pear		Quince	
	Price (YTL)	Quantity (Kg)	Price (YTL)	Quantity (Kg)	Price (YTL)	Quantity (Kg)
2003	2	15	1	15	3	20
2004	3	12	2	10	1	20
2005	2	16	3	15	2	20

- (a) Find the real GDP for 2003 and 2004 in **2005 prices**.
 (b) Find the real GDP growth from 2003 to 2004.
 (c) Find the inflation rate from 2003 to 2004.

(a) RGDP in 2005 prices

$$2003: (2)(15) + (3)(15) + (2)(20) = 30 + 45 + 40 = 115$$

$$2004: (2)(12) + (3)(10) + (2)(20) = 24 + 30 + 40 = 94$$

(b) RGDP Growth

$$\text{From 2003 to 2004: } \frac{94 - 115}{115} = -0.182 \Rightarrow -18.2\%$$

(c) Inflation

First, find nominal GDP values:

$$2003: (2)(15) + (1)(15) + (3)(20) = 30 + 15 + 60 = 105$$

$$2004: (3)(12) + (2)(10) + (1)(20) = 36 + 20 + 20 = 76$$

Next, find Implicit GDP deflator

$$2003: \frac{105}{115} \times 100 = 91.3$$

$$2004: \frac{76}{94} \times 100 = 80.8$$

Finally, inflation are found:

$$\text{From 2003 to 2004: } \frac{80.8 - 91.3}{91.3} = -0.115 \Rightarrow -11.5\%$$

3. (20 Points) Suppose that the following equations and/or values are defined for macroeconomic variables of an economy.

$$C = 50 + 0.9(Y - T); \quad T = (0.1)Y; \quad I = 2500 - 1000i; \quad G = 2000$$

$$M^d = (0.1)Y - (5000)i; \quad M^s = 1000; \quad P = 1.$$

- Find the IS equation.
- Find LM equation.
- Find equilibrium Y and i .
- Find the equilibrium disposable income (YD), consumption (C), saving (S), and budget deficit (BD).

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

$$Y = 50 + 0.9\{Y - [(0.1)Y]\} + 2500 - 1000i + 2000 \Rightarrow$$

$$Y = 4550 + 0.9\{Y - (0.1)Y\} - 1000i \Rightarrow$$

$$Y = 4550 + (0.81)Y - 1000i \Rightarrow$$

$$Y - (0.81)Y = 4550 - 1000i \Rightarrow$$

$$(0.19)Y = 4550 - 1000i \Rightarrow$$

$$Y = \frac{4550}{(0.19)} - \frac{1000}{(0.19)}i \Rightarrow$$

$$Y = 23947 - 5263i$$

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

$$1000 = (0.1)Y - (5000)i \Rightarrow$$

$$1000 = (0.1)Y - (5000)i \Rightarrow$$

$$(5000)i = (0.1)Y - 1000 \Rightarrow$$

$$i = \frac{(0.1)}{(5000)}Y - \frac{1000}{(5000)} \Rightarrow$$

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

$$i = \frac{(0.1)}{(5000)} \left(\frac{4550}{(0.19)} - \frac{1000}{(0.19)}i \right) - \frac{1000}{(5000)} \Rightarrow$$

$$i = \frac{(0.1)}{(5000)} \frac{4550}{(0.19)} - \frac{(0.1)}{(5000)} \frac{1000}{(0.19)}i - \frac{1000}{(5000)} \Rightarrow$$

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$$i = 0.478 - (0.105)i - (0.20) \Rightarrow$$

$$(1.105)i = 0.278 \Rightarrow$$

$$i^* = 0.251$$

$$Y^* = 23947 - 5263(0.251) \Rightarrow$$

$$Y^* = 22623$$

$$T^* = (0.1)Y^* \Rightarrow T^* = 2262$$

$$YD^* = Y^* - T^* \Rightarrow YD^* = 20361$$

$$C^* = 50 + (0.9)YD^* \Rightarrow C^* = 18375$$

$$S^* = YD^* - C^* \Rightarrow S^* = 1986$$

$$BD^* = G - T^* \Rightarrow BD^* = 2000 - 2262 = -262$$

4. (10 Points) Suppose that the firm's markup over costs is 5%, and the wage-setting equation is $W = P(1 - u + z)$, where u is the unemployment rate and z is the catch-all variable that stands for all other variables that may affect the wage setting equation.

- (a) What is the real wage as determined by the price-setting equation?
(b) What is the natural rate of unemployment if $z = 0.02$?
(c) Suppose that z increases to $z = 0.03$. How does the real wage and natural rate of unemployment change? **Support your answer by a figure.**

- a. $W/P = 1/(1 + \mu) = 1/1.05 = .95$
- b. From the wage setting relation, $u_n = 1 - W/P + 0.02 = 7\%$
- c. $W/P =$ does not change; $u_n = 1 - .95 + 0.03 = 8\%$. The natural rate of unemployment rises. The increase in the catchall variable is essentially a fall in labor supply (actually a shift of the labor supply curve). Intuitively, less competition in the labor market leads to lower desired supply of output by workers and therefore to a fall in labor supply. The fall in labor supply increases unemployment but does not change the real wage.

5. (15 Points) Turkish government has been experiencing fiscal surplus for years. Suggest a policy mix in the IS-LM setup (i.e., price is **constant**) to achieve a decrease in fiscal surplus while keeping i constant. **Discuss** what you expect to happen to investment, consumption, and the real growth rate if this policy mix applied? **Support your answer by a figure** (question 7 in chapter 5).

The fall in T or the increase in G shifts IS right. The increase in M shifts LM up. Output and consumption increases. Example: There was a recession in 2001. The growth rate was low and for parts of the year, negative. The expansionary monetary and fiscal policy were partly in response to the recession.

6. (15 Points) Current developments in the global economy and Turkish politics seems to have caused a **decrease** in consumer confidence. Using the AS-AD setup (i.e., price is variable), show the effects of the **decrease** on the position of the AD, AS, IS, and LM curves in the short run and long run. Discuss the effect on output, the interest rate, and the price level in the medium run. Assume that before the changes, the economy was at the natural level of output (question 2 in chapter 7).

IS left, AD left, AS down, LM down, Y same, i down, P down

7. (15 Points) Suppose the Phillips curve is

$$\pi_t - \pi_t^e = -0.45(u - 0.06)$$

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

- (i) What is the natural rate of unemployment?
- (ii) Graph the short-run and the long-run relationship between inflation and unemployment.
- (iii) Suppose now that $\pi_{t-1} = 0.05$. How much cyclical unemployment is necessary to reduce inflation by 2 percentage points immediately?

(i) Natural rate of unemployment is 6%.

(ii)

