NANYANG TECHNOLOGICAL UNIVERSITY
SCHOOL OF SOCIAL SCIENCES
SEMESTER 1 AY25-26

HE1002 MACROECONOMICS I

PROBLEM SET 10

10-1
Two series of hypothetical price index values used to calculate headline and core inflation for 2014 through 2018 are found in Table 16P-1.

a. Calculate the annual inflation rate for each series.

b. Which series represents core inflation and which represents headline inflation?

c. How do you know? Is there inflation or deflation in each year?

Table 16P-1

Year	Series 1	Series 2
2014	134.00	125.00
2015	137.22	127.56
2016	141.26	129.68
2017	146.24	132.72
2018	148.81	135.72

10-2
Determine whether each of the following events is likely to cause deflation, disinflation, no change in the price level, or inflation.

a. A bubble in the biomedical industry just burst.

b. A new technology is introduced into the economy, sparking an economic boom.

c. The Federal Reserve conducts contractionary monetary policy.

d. The Federal Reserve is successful at meeting its dual mandate of full employment and price stability.

10-3

Identify whether the following individuals will be affected by bracket creep next year given the rates of taxation and levels of inflation found in Table 16P-2.

Table 16P-2

Marginal tax rate (%)	Income level ($)
10	0–10,000
15	10,001–30,000
18	30,001–50,000
20	50,001–100,000
23	100,001–150,000
25	150,001 and up

a. Gabriela makes $9,500, and inflation is at 5 percent.

b. Cooper makes $160,000, and inflation is at a record high of 20 percent.

c. Shawna makes $140,000, and inflation is at 8 percent.

d. Samuel makes $45,000, and inflation is at 6 percent.

e. Marguerite makes $96,000, and inflation is at 6 percent.

10-4

Cookie Monster has decided to channel his love of cookies into a new business, "Me Want Cookies Inc.," a new partnership he has formed with Miss Piggy. They are considering different countries in which to start their venture and would like to rank the countries based on the inflationary environment. They decide to give a country 10 "menu-cost" points for each percent of actual inflation in the last year, since inflation will cause their menu costs to increase. They also dislike unstable inflation, so they will give a country 20 "uncertainty" points for each percent difference in the actual inflation rate when compared to the projected inflation rate. Countries with the least total points will receive the highest rankings. Complete Table 16P-3 for Cookie Monster.

Table 16P-3

Country	Projected inflation (%)	Actual inflation (%)	Uncertainty points	Menu-cost points	Total points	Rank
Kermikopia	2	4				
Gonzoland	4	5				
Elmostan	7	8				
Oscaria	10	13				
Bertico	14	14				

10-5

Jack recently took out a loan from Diane at an interest rate of 6 percent. Diane expected this year's inflation rate to be 3 percent and the real interest rate to be 3 percent. The loan is due at the end of this year. Complete Table 16P-4, showing the real interest rate for each possible inflation rate. For each situation, determine whether the unexpected inflation level benefits Jack or Diane.

Table 16P-4

This year's actual inflation rate (%)	Actual real interest rate (%)	Who benefits?
1		
2		
−1		
−3		

10-6

Assume the prices shown in Table 16P-5 are the prices of Big Macs in 2030, 2031, and 2032, and that changes in the price of Big Macs tend to closely keep up with inflation. For each of the four instances, determine the following.

Table 16P-5

	Price in 2030 ($)	Price in 2031 ($)	Price in 2032 ($)
a.	1.00	1.02	1.03
b.	1.00	0.99	0.97
c.	0.01	0.05	1.00
d.	1.00	1.10	1.15

a. The percentage changes in price levels between each consecutive year.

b. Whether the economy was experiencing inflation, deflation, disinflation, or hyperinflation over each period. (Assume that inflation above 100 percent constitutes hyperinflation.)

10-7
Assuming that inflation above 100 percent is hyperinflation, categorize each of the inflation rates in Table 16P-6 as deflation, disinflation, inflation, or hyperinflation as we move from one year to the next.

Table 16P-6

	Year	Inflation rate (%)	Description
a.	1900	90	
b.	1901	80	
c.	1902	120	
d.	1903	40	
e.	1904	−2	

10-8
Suppose you live in Frigidia, a country near the North Pole that is experiencing hyperinflation. You work for a U.S. company that pays you a monthly income of $100 U.S. Today, you can exchange those dollars for frigids, the currency of Frigidia, at a rate of 1,000 frigids/dollar. You pay a monthly heating bill that costs $10 U.S. Instead of paying the heating bill, you could simply burn Frigidia notes (which you can obtain in one-frigid denominations) at a rate of 1 million per month to supply heating. What would the exchange rate between frigids and U.S. dollars have to be for you to decide to burn bills instead of paying for heating? What level of inflation does this represent, assuming the real exchange rate remains the same?

10-9
"The problem wasn't having the wrong idea about interest rates," a sheepish central bank official says at a conference, "but rather not having the right idea about inflation rates." What does the official mean? How does the inflation rate affect the central bank's interest rate target, and how can a wrong prediction about inflation make monetary policy go awry?

10-10
In which scenario, A or B, is monetary policy likely to be more effective? Explain.

Scenario A—The inflation rate in the country has hovered close to zero for the last three years.

Scenario B—The inflation rate in the country has averaged 3 percent for the last three years.

10-11
Consider a country that has experienced a decline in labor demand that results in a 2 percent reduction in the equilibrium real wage.

a. If the inflation rate in the country has been at zero percent, what has to happen to the nominal wage to restore labor market equilibrium?

b. If the inflation rate in the country has been at 4 percent, what has to happen to the nominal wage to restore labor market equilibrium?

c. Do you think workers and employers would prefer to have a zero percent inflation rate or a 4 percent inflation rate in this case? Explain.

10-12

Which of the following can be affected by the money supply in the long run?

a. Nominal GDP.

b. Real GDP.

c. Inflation.

d. Unemployment.

10-13

The average individual in a country earns an annual salary of $62,000, of which $24,800 is spent on housing, $11,160 on food, $11,160 on transportation, and $14,880 on other goods and services. Suppose the government in this country mandates that all salaries and the prices of all goods and services be reduced by 40 percent.

a. How much does the average individual now earn?

b. How much does the average individual now spend on housing, food, transportation, and other goods and services?

c. What happened to the average individual's real salary?

10-14

To increase the self-esteem of dieters everywhere, powerful fashion designers lobby Congress to redefine “five pounds” as “one pound.” Under this system, what would have previously been five pounds of bananas will now be one pound of bananas and a 500-pound gorilla would now weigh only 100 pounds.

a. How much would someone who originally weighed 180 pounds now weigh as a result of this redefinition?

b. Has there been a nominal change in the person’s weight? A real change?

c. How is this story similar to contractionary monetary policy via a decrease in the money supply in the long run? (Hint: Congress essentially shrunk the “pounds supply” by redefining the word.)

10-15

"Monetary policy is incredible," your friend says. "Just a little manipulation of the money supply and interest rates, and we end up at just the right price level and amount of output." Is your friend overstating the Fed's control over price levels and output? Why or why not?

10-16

Your dormitory Griffingate has appointed you central banker of its economy, which deals in the currency of wizcoins. Assume that the velocity of wizcoins in Griffingate is constant at 10,000 transactions per year. Right now, real GDP is 1,000 wizcoins, and there are 2,000 wizcoins in existence.

a. What will be the value of each of the variables that make up the quantity equation—M, V, and P?

b. Now indicate how the other variables will respond to each of the following scenarios, taking each case separately and assuming that velocity remains constant.

   (i) Real GDP: You increase the money supply to 4,000, and prices increase twofold.

   (ii) Price level: Start with the initial values. Real GDP drops to 500 wizcoins, and the money supply remains constant.

   (iii) Real GDP: Start with the initial values. Prices increase threefold because of a sudden scarcity of soda, and you decide to keep the supply of wizcoins constant.

   (iv) Real GDP: Start with the initial values. You increase the money supply to 5,000 wizcoins, and prices rise by 350 percent.

10-17

Express the following relationships using the equation for the quantity theory of money.

a. The money supply is given by nominal GDP divided by the velocity of money.

b. The relationship of the money supply to the price level is the same as the relationship between real GDP and velocity. (Hint: Start by dividing the money supply by the price level.)

c. Real GDP is given by the flow of money divided by the price level.

d. The price level of an economy can be found by dividing the product of the money supply and its velocity by real GDP.

10-18
Answer each of the following questions assuming the economy is experiencing a positive output gap.

a. Is inflation decreasing, increasing, or stable?

b. Is actual output greater than or less than potential output?

c. Is unemployment rising or falling?

d. Is the Federal Reserve more likely to pursue expansionary or contractionary monetary policy?

e. Is the economy likely experiencing an expansion or contraction?

10-19
Answer each of the following questions assuming the economy is experiencing a negative output gap.

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d. Is the Federal Reserve more likely to pursue expansionary or contractionary monetary policy?

e. Is the economy likely experiencing an expansion or contraction?

10-20
Determine whether the Federal Reserve would pursue contractionary monetary policy, expansionary monetary policy, or no change in policy in each of the following situations.

a. Inflation is 10 percent, above its average of 3 percent in the last several years.

b. The output gap is positive.

c. Unemployment is at a record high.

d. The economy is experiencing full employment.

e. The economy is on the brink of deflation.

f. A new technology causes output to surge.

10-21
Assume the Phillips curve is given by the simple equation $U = -I + 15$. The non-accelerating rate of unemployment is 8 percent. If inflation changes to 14 percent, what will be the unemployment rate in the short run? What will it be in the long run?

10-22

Using what you know about the Phillips curve, determine whether the following quantities will increase, decrease, or remain the same.

a. Unemployment in the short run after an increase in inflation.

b. Unemployment in the long run after an increase in inflation.

c. Inflation in the short run after a decrease in unemployment.

d. Inflation in the long run after a decrease in unemployment.