Problem 1 – Labor market statistics

Suppose that

- the civilian non-institutional population is 100 million
- the employed 60 million
- the unemployed 4 million

Use the information to answer the following questions:

a. what is the size of the labor force
   
   ______________________

b. how many people are out of the labor force
   
   ______________________

c. calculate the participation rate
   
   ______________________

d. calculate the unemployment rate
   
   ______________________

e. calculate the non-employment rate
   
   ______________________

f. if every month 600,000 unemployed give up looking for a job while 400,000 find a job, calculate the average duration of unemployment
   
   ______________________
g. using the data above, calculate the probability for an unemployed worker of finding a job within a month ________________

h. how many new discouraged workers are there every month? ________________

Problem 2 – Labor market model

Suppose that the firm's markup over costs is 15% and that the wage setting equation is

\[ W = zP(1-u) \]

where \( W \) is the nominal wage, \( z \) is a positive coefficient representing all the other variables that affect positively the outcome of wage setting, \( P \) is the price level (the price is constant) and \( u \) the unemployment rate (all the percentage are converted into decimal in the equations).

a. Use the price setting equation to calculate the real wage.

\[ \text{real wage} = \_______________ \]

b. Calculate the corresponding natural rate of unemployment (as a percentage) assuming that \( z \) is initially equal to .90

\[ u^* = \_______________ \% \]
c. Assume that as a result of legislative actions to reduce the minimum wage, z drops by 2%, calculate the real wage and the natural rate of unemployment (as a percentage).

real wage = \_______________ \quad u^u = \_______________ \%

d. Show the effect of the increase in z on the labor market graph below using the PS and the WS curves. (Name all the relevant axes and curves)

Problem 3 – IS-LM

An economy is described by the following equations:

- Consumption \quad C = 450 + 0.5(Y-T) - 250i
- Investment \quad I = 450 - 250i
- Government purchases \quad G = 300
- Taxes \quad T = 300
- Real Money Demand \quad L = 0.5Y - 500i
- Real Money Supply \quad M/P = 1000
where \( Y \) is output and \( i \) is the rate of interest expressed in the equations as a decimal number. (\( P, \) the price level, is constant and equal to 1). *Note that the consumption function depends on the interest rate in addition to disposable income.*

a. Derive the **equations for the LM curve** (\( i \) on the left hand) and **for the IS curve** (\( Y \) on the left hand).

\[
\text{LM: } \quad *\text{equation}\ *
\]

\[
\text{IS: } \quad *\text{equation}\ *
\]

b. Calculate the equilibrium level of income and the corresponding equilibrium for interest (as a percentage).

\[
Y^e = *\text{value}\ *
\quad i^e = *\text{value} \% *
\]

Calculate the corresponding levels of consumption  \( C = *\text{value}\ *\)

and of investment  \( I = *\text{value}\ *\)

and check your results for \( Y^e \) using the equilibrium condition equation.

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