ASSIGNMENT #2
Due Wednesday January 2004
(at the beginning of the class)

Show all your calculations for credit.

Problem I – Automatic stabilizers

1. Consider the following model – MODEL 1 - of the goods market (circle the correct answer when relevant)

\[ C = 200 + 0.75 Y_D \]  \hspace{1cm} (1)  \hspace{1cm} C \text{ is consumption}

\[ Y_D = Y - T \]  \hspace{1cm} (2)  \hspace{1cm} Y_D \text{ is disposable income}

\[ T = 500 \]  \hspace{1cm} (3)  \hspace{1cm} T \text{ is taxes and } Y \text{ is income}

\[ I = 200 \]  \hspace{1cm} (4)  \hspace{1cm} I \text{ is investment}

\[ G = 475 \]  \hspace{1cm} (5)  \hspace{1cm} G \text{ is government spending}

\[ Z = C + I + G \]  \hspace{1cm} (6)  \hspace{1cm} Z \text{ is aggregate demand}

a. Are taxes endogenous or exogenous?

b. Calculate equilibrium income \( Y = \) ________________

c. Calculate the budget surplus ________________

Throughout the assignment always include the relevant sign to indicate whether the economy is in presence of a surplus (+) or of a deficit (-)
2. Now consider a similar model - **MODEL 2** - of the goods market. All the relations are the same except for the introduction of a progressive tax to replace the flat tax.

\[
C = 200 + 0.75 Y_D \quad (1) \quad \text{C is consumption}
\]

\[
Y_D = Y - T \quad (2) \quad \text{Y}_D \text{ is disposable income}
\]

\[
T = 100 + 0.2Y \quad (3) \quad \text{T is taxes and Y is income}
\]

\[
I = 200 \quad (4) \quad \text{I is investment}
\]

\[
G = 475 \quad (5) \quad \text{G is government spending}
\]

\[
Z = C + I + G \quad (6) \quad \text{Z is aggregate demand}
\]

a. Are taxes **endogenous** or **exogenous**?

b. Calculate equilibrium income \( Y = \) ________________

c. Calculate the total amount of taxes paid by the public ________________

Calculate the budget surplus ________________

3. Let’s now carry out some experiments with the 2 models above.

Assume that a shock rocks the economy and that consumer confidence drops. This can be modeled by a decrease in the term \( C_0 \) of the consumption function.

Now, we replace the consumption function above by

\[
C = 100 + 0.75 Y_D \quad (1) \quad \text{C is consumption}
\]
a. Calculate the resulting changes in Y, in Tax and in the budget surplus with MODEL 1 (make sure you specify the sign + or – for all the changes)

\[ \Delta Y = \]  
\[ \Delta T = \]  
\[ \Delta BS = \]  

b. Calculate the resulting changes in Y, in Tax and in the budget surplus with MODEL 2

\[ \Delta Y = \]  
\[ \Delta T = \]  
\[ \Delta BS = \]  

c. Calculate the multiplier in MODEL 1 \( m^1 \) and in MODEL 2 \( m^2 \).
Explain why the impact of the shock is different in the 2 models.

**Problem 2 – The Balanced Budget Multiplier**

1. Consider the following model of the goods market

   \[ C = 200 + 0.75 \, Y_D \] \hspace{1cm} (1) \hspace{1cm} C \text{ is consumption}

   \[ Y_D = Y - T \] \hspace{1cm} (2) \hspace{1cm} Y_D \text{ is disposable income}

   \[ T = 500 \] \hspace{1cm} (3) \hspace{1cm} T \text{ is taxes and } Y \text{ is income}

   \[ I = 200 \] \hspace{1cm} (4) \hspace{1cm} I \text{ is investment}

   \[ G = 500 \] \hspace{1cm} (5) \hspace{1cm} G \text{ is government spending}

   \[ Z = C + I + G \] \hspace{1cm} (6) \hspace{1cm} Z \text{ is aggregate demand}

b. Calculate equilibrium income \( Y = \) ____________

c. Calculate the budget surplus ________________

   sign to indicate whether the economy is in presence of a surplus (+) or of a deficit (-)
2. Assume that G, government spending, *increases* by 25 i.e. $\Delta G = 25$

Calculate the resulting *changes* in $Y$ and in the budget surplus (sign).

$\Delta Y =$

$\Delta BS =$

3. Start with the original model in 1. and assume now that T, taxes, *drops* by 25 i.e. $\Delta T = -25$

Calculate the resulting *changes* in $Y$ and in the budget surplus (sign).

$\Delta Y =$

$\Delta BS =$

Let’s now compare your results in 2. and 3. above:
Does an increase in government spending and a tax cut of equal absolute value $|25|$ have the same effect on the budget?

Yes or no

Does an increase in government spending and a tax cut of equal absolute value $|25|$ have the same effect at stimulating the economy?

Yes or no

Why or why not?

4. Again starting from the original position in 1. assume finally that $G$ increases by 25 while $T$ also increases by 25 to keep the budget balanced.

Calculate the resulting changes in $Y$ (sign).

\[ \Delta Y = \] 

Use the government spending multiplier and the tax multiplier (developed in class) to calculate the balanced budget multiplier? (assuming that both $G$ and $T$ increase by 1 unit)