The Digital Economist

Intermediate Macroeconomics
Worksheet #6: **The Algebra of Demand-Side Equilibrium** Name:_____

Product Markets:

$AE_t = C_t + I_t + G_t + NX_t$ *Aggregate Expenditure*
$Y_t = AE_t$ *Equilibrium condition {Income = Expenditure}*

$C_t = b(Y_t - tY_t)$ *Consumption Expenditure*
{0<b<1, b = MPC, t = income tax rate}

$I_t = I_o - h(r)$ I_o = f(RGDP, Price of Capital, Productivity of Capital)
{h = interest sensitivity of Investment Exp.}

$G_t = G_o$ *Government Expenditure – A policy variable*

$NX_t = EX_o – IM_o$ *Net Export Expenditure*
$EX_o = f(e.r.)$
(-)
$IM_o = f(e.r.)$
(+)
{e.r. = exchange rate -- €P/$, P/$, …}

$AE_t = b(Y_t - tY_t) + I_o - h(r) + G_o + NX_t$

$= [A_o - h(r)] + b(Y_t - tY_t)$ $\{A_o = I_o+G_o+NX_t\}$

note: [Ao - h(r)] defined as *Autonomous Exp.*

in equilibrium,

$Y_t = [A_o - h(r)] + b(Y_t - tY_t)$

or

$Y_t - b(Y_t - tY_t) = [A_o – h(r)]$

or

$Y_t[1 - b(1 - t)] = [A_o – h(r)]$

or

$Y_t^* = \alpha[A_o – h(r)]$ where 'α' = $\frac{1}{[1 - b(1 - t)]}$. ... the spending multiplier

1. Given the following equations:

$C_t = 0.75(Y_t - T)$	*Consumption Expenditure*
$I_t = 200 - 500(r)$	*Investment Expenditure*
$G_t = 250$	*Government Expenditure*
$NX_t = 100$	*Net-Export Expenditure*
$T = 0.20Y_t$	
$Y_t = C_t + I_t + G_t + NX_t$	*Equilibrium Condition*

a. Determine the following:

i. the Marginal Propensity to Consume:_____

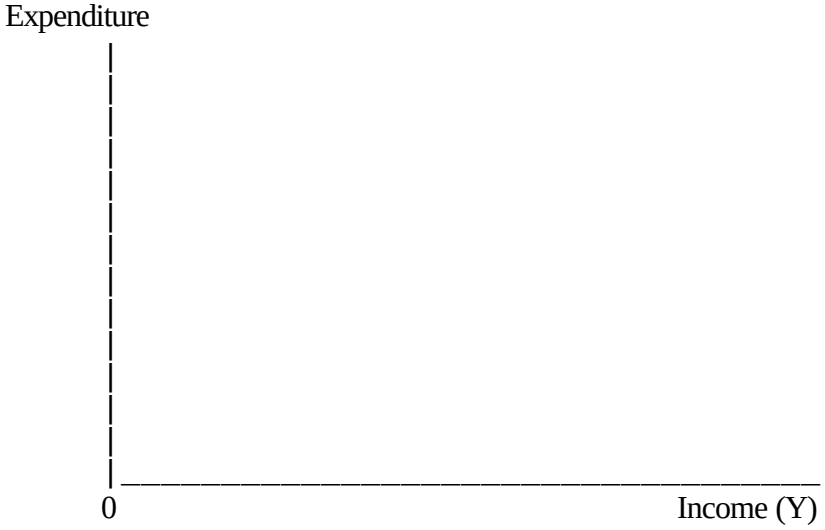
ii. the Interest Sensitivity of Investment:_____

iv. the (Income) tax rate:_____

v. the level of Autonomous Expenditure for r = 0.10:_____

vi. the Spending multiplier: {1/[1-b(1-t)]}:_____

b. find the level of equilibrium income for a market interest rate of 10% (r = 0.10) and graph this relationship in the diagram below:



c. Given this equilibrium level of income, calculate the level of tax revenue collected:_____ Is the government running a surplus or deficit:?_____

d. Calculate the level of savings:_____ and investment expenditure:_____ at the equilibrium level of income. Is there a funds (savings-investment) surplus or deficit?_____ How are these surplus or deficit funds being used?_____

2. Suppose that Income is fixed at **$1000**. Using the equations of page 2, calculate the corresponding value of the real interest rate, investment expenditure, savings, and the budget deficit.

How will a $50 ($\Delta G = 50$) increase in government spending impact the real interest rate?

How does this shock affect: savings, investment expenditure, and the budget surplus/deficit.

3. The equilibrium condition can be rewritten as follows:

$$Y_t^* = \alpha[A_o - h(r)]$$

solving for 'r':

$$r = A_o/h - (1/\alpha h)Y_t$$

Using the equations of page 2 graph the equilibrium condition in the diagram below: