Student ID Sol 2.

Quiz#2 Semester 1/2019: Answer the question in the area provided.

Consider a ***closed-economy*** macroeconomics model given below

$C = C_0 + 0.3Y - k_1 r;$ $\quad k_1 > 0$

$G = g_1 Y;$ $\quad 0 < g_1 < 1$

where $Y = GDP$, $C = private\ consumption$, $G = Government\ consumption$, and $r = interest\ rate.$

I=0 Exo

1.1) *(2 points)* Assume no private investment and fixed interest rate. Can we solve the model? If not, what additional equation do we need to make the model complete?

No, we need one more Equation (i) closed Economy X-M=0
That is; $Y = C + G$ (Note (ii) $I = 0$ (by assumption)

1.2) *(3 points)* State all the endogenous variables in the model.

End include Y, C, G | r is Exo now

1.3) *(3 points)* Write the above simple macroeconomics model in terms of matrix representation, i.e. Ax = d. (Hint: properly define "x".)

Define $x = \begin{pmatrix} Y \\ C \\ G \end{pmatrix}$

$$\begin{pmatrix} 1 & -1 & -1 \\ 0.3 & -1 & 0 \\ g_1 & 0 & -1 \end{pmatrix} \begin{pmatrix} Y \\ C \\ G \end{pmatrix} = \begin{pmatrix} 0 \\ k_1 r + C_0 \\ 0 \end{pmatrix}$$

$A \qquad x \qquad d$

$\Rightarrow Y - C - G = 0$

$0.3Y - C = k_1 r + C_0$

$g_1 Y - G = 0$

$|A| =$ | → next Page.

* Note: you can also define * as $\begin{pmatrix} Y \\ C \end{pmatrix}$. But If that the case, you must impose $G = g_1 Y$ to the first Equation.

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1.4) *(7 points)* Use the Cramer's rule, solve for the equilibrium solution of "C".

$$A = \begin{pmatrix} 1 & -1 & -1 \\ 0.3 & -1 & 0 \\ g_1 & 0 & -1 \end{pmatrix} \quad |A| = \begin{vmatrix} 1 & -1 & -1 \\ 0.3 & -1 & 0 \\ g_1 & 0 & -1 \end{vmatrix} \begin{matrix} 1 & -1 \\ 0.3 & -1 \\ g_1 & 0 \end{matrix}$$

$$|A| = (1 + 0 + 0) - (g_1 + 0.3)$$

$$= 1 - 0.3 - g_1$$

$$\therefore C = \frac{\det(A_2)}{|A|} = \frac{\begin{vmatrix} 1 & 0 & -1 \\ 0.3 & k_1 r - c_0 & 0 \\ g_1 & 0 & -1 \end{vmatrix}}{|A|}$$

$$(c_0 - k_1 r) + g_1 (k_1 r - c_0)$$

$$\therefore C^* = \frac{c_0 - k_1 r + g_1 (k_1 r - c_0)}{1 - 0.3 - g_1} \quad \#$$

Answer