

Introduction to Macroeconomics

Second Homework Exercise

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This homework considers a full IS-LM model of a closed economy with fixed prices. It differs from the typical textbook examples by its specification of the liquidity function. You will note that most numerical examples in textbooks use a money demand function that is not proportional to nominal income. This is no coincidence, as a linear and proportional ‘simple’ money demand implies an intractable non-linear solution for the whole economy. This one here is tractable but do not be surprised if expressions become a bit unwieldy.

1. The goods model is specified by the usual components: consumer demand of households

$$C = c_0 + c_1(Y - T),$$

investment demand of firms

$$I = d_0 + d_1Y - d_2i,$$

with all parameters assumed as positive, the identity for demand components in a closed economy

$$Y = C + I + G,$$

with exogenous government intervention (fiscal) variables G and T . First determine the *fiscal multiplier*, if you for the moment (only for this part) assume that the interest rate i is exogenous and (for all of the following) that $c_1 + d_1 < 1$. [Note that this cannot be the same formula for the fiscal multiplier as in the exogenous-investment model of Chapter 3] Express Y

as a function of i (and of exogenous fiscal variables and parameters, no Y must appear on the right hand side of this expression). This function is already the *IS function* or *IS curve*.

2. The financial sector is described by the money demand function

$$M = \frac{\$Y}{m_0 + m_1 i},$$

with M matching the money supply imposed by the central bank in equilibrium. As usual, assume $\$Y = Y \cdot P$, with exogenous P . Express i as a function of Y (and of exogenous variables M and P and parameters, no i must appear on the right hand side). This function is already the *LM function* or *LM curve*. Note that m_0 and m_1 are assumed positive and that money demand is a falling function of i .

3. Substitute i from the LM relation into the IS equation and solve for Y . Y , the equilibrium in both markets, is now a function of exogenous variables G , T , P , and M . Isolate the coefficient of G , which is then the *fiscal multiplier* for the full IS-LM model (formally $\partial Y / \partial G$) and which depends on real money M/P . Show that it is always smaller (or possibly equal) than the multiplier of part #1. In what sense (positively, negatively, or not at all) is it affected by increasing d_2 (the reaction of investment to interest), by increasing M/P , and by increasing m_1 (the reaction of money demand to interest)?