Introductory Macroeconomics
Homework 5: The IS-LM Model

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1. T/F. In the IS–LM model, prices are assumed to be fixed in the short run.
2. T/F. Crowding out occurs when expansionary fiscal policy raises the interest rate and reduces investment.
3. T/F. The IS-LM framework is consistent with the classical dichotomy in the long run.
4. T/F. Money demand for transactional motives is primarily influenced by the interest rate rather than income.
5. T/F. In a liquidity trap, increases in the money supply have little effect on the interest rate.
6. Briefly explain the three motives for holding money according to Keynes.
7. The following are the money demand and money supply functions in an economy: $M_{\mathrm{S}} = 8000$ and $M_{\mathrm{D}} = 40000(0.25 - r)$.
   (a) Calculate the equilibrium interest rate.
   (b) What should be money supply for the equilibrium interest rate to be 0.10?
   (c) Plot the situations of (a) and (b) in the same graph. Quantity of money in the horizontal axis and the interest rate in the vertical axis.
8. In the IS-LM model, illustrate graphically the following policy mix. An expansionary fiscal policy followed by an expansionary monetary policy. The goal is to counteract the crowding out effect generated by the initial fiscal policy.
9. Consider a closed economy in the short run with the following information. The price level is absent because it's been normalized to $P = 1$.

$$\begin{aligned} C(Y, r) &= 500 + 0.5(Y - T) - 100r \\ I(r) &= 350 - 100r \\ G &= 200 \\ T &= 200 \\ L(Y, r) &= 2Y - 800r \\ M &= 3600 \end{aligned}$$

   (a) Find the IS relationship.
   (b) Find the LM relationship.
   (c) Find the equilibrium. This includes: r, Y, C, I.
   (d) Plot the IS, the LM, and the equilibrium in the same graph.
   (e) Now $G = 230$. Repeat the exercise. Show the change in your previous graph.

(f) Disregard (e). Now $M = 3640$. Repeat the exercise. Show the change in your graph.

The final answer should include two graphs so you can illustrate the changes in (e) and (f) separately. Please adjust the axes to make the plots clear.

10. Work with a particular case of the IS-LM model where the LM is horizontal. This is known as the liquidity trap case.

    (a) Briefly explain the concept of liquidity trap.

    (b) Suppose the government does expansionary fiscal policy in this context. Will there be crowding out? Explain why or why not.

11-15. Instability in Money Demand. The goal of this exercise is to argue that in recent years money demand may depend on more factors than those made explicit in the usual liquidity preference function. Download annual data on nominal GDP, M1, and the nominal interest rate.

    (a) Briefly explain what the monetary base, the reserves, and the monetary aggregates M1, M2, and M3 are. You can consult Greenlaw, Shapiro, and MacDonald (Chapter 14).

    (b) Calculate the ratio $\frac{\text{M}_1}{\text{nGDP}}$. This ratio is meant to represent the real money balances net of demand due to transactional motives $\frac{M}{PY}$.

    (c) Plot the correlation between $\frac{\text{M}_1}{\text{nGDP}}$ on the horizontal axis and the interest rate on the vertical axis before the eighties.

    (d) In a different plot repeat for the period $1980 - 2015$.

    (e) Since the eighties. How the use of ATMs, debit cards, and credit cards could have affected money demand? Think about what's included in M1 and what's not.

    Your answer should include two scatterplots and short answers for (a) and (e). Please do not submit any intermediate step you took to create the scatterplots. If you want to expand on this, check figure 12.14 of Williamson's *Macroeconomics*.