

Exam 1. Econ520. Fall 2023

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UNC

Instructions:

- Answer all questions.
- Write legibly.
- If you need more space, attach additional pages. Number your answers. Do not write on the back of the pages.
- *Explain* your answers – do not just state them.
- *Show* your derivations – do not just state the final result.
- Do not refer to any notes or books. You may use a calculator.
- The total time is 75 minutes.
- The total number of points is 75.

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1 Short Questions [44 points]

Here, I am looking for short answers that get to the main point.

1. [7 points] In the IS/LM model, how does the transmission from a monetary expansion to an increase in aggregate demand work? Explain in words.

Answer _____

If the money supply expands, agents hold more liquidity than they find optimal. They try to sell money and buy bonds. This drives up the price of bonds and lowers the interest rate. Investment demand rises.

2. [9 points] Explain how a firm's labor demand curve shifts when demand for the firm's product rises. Why doesn't aggregate demand for labor behave the same way when aggregate demand for all goods rises? How would your answer change if wages were sticky?

Answer _____

For the firm: labor demand is determined by wage equals value marginal product of labor: $W = MPL \times p_j$ where p_j is the price of firm j 's product. Higher demand for good j allows firms to raise prices and move down the MPL curve (hire more labor).

For the economy as a whole: If all prices rise, (flexible) wages will rise as well. Firms can raise prices, but their costs (W) rise as much as their marginal revenues ($MPL \times p_j$), so employment stays the same.

With sticky wages, aggregate demand affects the firm in the same way as a rise in its own demand. Employment (labor demand) rises.

3. [7 points] Empirical studies find that the marginal propensity to consume is sometimes very small and sometimes close to 1. What gives rise to such variability in the MPC?

Answer _____

Mental framework: Permanent income model. Households aim for smooth consumption. They spread their lifetime incomes smoothly across ages.

Reasons for variable MPC:

- (a) age: MPC depends on life expectancy.
- (b) persistence of shocks: transitory shocks have small effects on lifetime incomes; therefore MPC is small.
- (c) borrowing constraints: those who would like to borrow but cannot have high MPC.

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4. [7 points] Over the business cycle, wages and hours worked move together (in expansions, wages and hours are high). But over the long term, wages and hours move against each other. Wages grow over time while hours worked decline. Why don't economists find this apparent contradiction surprising?

Answer _____

Mental model: income and substitution effects.

Transitory shocks: small income effects; substitution effects cause comovement between wages and hours worked. Intuitively, leisure becomes more expensive when wages rise.

Permanent shocks: large income effects, which push the other way. Intuitively, higher incomes lead households to demand more of all (normal) goods, including leisure.

5. [7 points] Why is the medium run supply curve vertical ($Y_n = F\left(\frac{1}{1+m}, z\right)$)?

Answer _____

Target hours are determined by preferences (F), real wages ($1/(1+m)$), and other work incentives (z). There is no good reason why the price level should play a role. The price level matters in the short run only because changing prices affect (perceived) real wages. In the medium run, this is not the case ($P = P^e$).

6. [7 points] Does government regulation reduce total employment in the medium run? Through which channels? Explain using the AS/AD model as a guide.

Answer _____

The obvious answer is (as so often) wrong: Regulation raises firms' costs. Firms hire fewer workers. This logic works when applied to a single firm, but not in equilibrium (when workers can move between firms and prices can adjust).

In the medium run, regulation likely has little effect on employment. Employment is determined by labor supply (not obviously affected by regulation) and labor demand (real wage). Regulation presumably reduces the marginal product of labor and hence labor demand. Some employment reduction is possible this way. But then the long-run labor supply curve is probably very wage inelastic (think long-run employment trends).

2 Interest Rate Rule

Recall the equations of the IS/LM model:

$$IS : Y = C(Y - T) + I(Y, i) + G \quad (1)$$

$$LM : M/P = YL(i) \quad (2)$$

Empirically, Fed policy is well approximated by a “Taylor rule” where the interest rate is a function of the output gap ($Y - Y_n$) and inflation. Here we consider the case where only the output gap matters (b/c prices are fixed) and the Fed sets

$$i = i_0 + d(Y - Y_n) \quad (3)$$

with $d > 0$ and Y_n is the Fed’s full employment target.

Questions: Consider shocks to the demand for goods (e.g., $G \uparrow$) or to the demand for money (e.g., $L \uparrow$ for given i). For each case:

- Does the Taylor rule stabilize output compared with the baseline model where the Fed simply holds M/P constant?
- How does the Fed change M in response to the shock?

How do your answers depend on the value of d and the slope of LM? Illustrate your answers in graphs and explain the intuition. (Space for answers is on the next pages.)

1. [21 points] Fiscal shock

Answer _____

Let's work with the model. We now have 3 equations: IS, LM, Taylor. So we need 3 endogenous variables: i, Y, M . If we place i and Y on the axes of the graph (as usual), IS and Taylor determine those variables. LM determines M . We are basically replacing the LM curve with the upward sloping Taylor rule curve (slope d).

The fiscal shock moves the IS curve out. The equilibrium moves north-east along the Taylor rule curve. The LM curve no longer matters for equilibrium b/c M is now endogenous.

Does the Taylor Rule stabilize output? The answer depends on whether the Taylor Rule is steeper or flatter than the LM curve. This is determined by the value of d .

Start with the case where the Taylor rule curve has the same slope as LM. Then we get constant money and the same outcomes as in the baseline model.

If the Taylor rule is steeper than LM (the Fed places more emphasis of output stability), we get the same result as if the LM curve were steeper. To get that, the Fed has to contract M when $G \uparrow$. The opposite happens when d is small.

Intuition: Start with the extreme case where d is very large. Then the Taylor rule curve is essentially vertical and output never deviates much from Y_n . The Fed achieves this outcome by raising i a lot (contracting M a lot) when Y starts to rise above Y_n . Any shock to output is immediately neutralized through monetary policy.

2. [10 points] Money demand shock

Answer _____

Output and the interest rate are again determined by IS and Taylor. The LM curve only determines M . Any shocks to LM are immediately neutralized by the Fed. If money demand rises, the Fed simply supplies more money to keep the interest rate and output fixed.

End of exam.