

Exam 1. Econ520. Spring 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 [32 points]

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

1. [8 points] Consider two natural experiments that have been used to study cause and effect questions:
 - (a) Divided countries: Capitalist South Korea grew much faster after the 1950s than did autocratic North Korea. This is seen as evidence for the importance of institutions for countries' development.
 - (b) A country increases its income tax rates. Subsequently, its output falls. This could be used to measure how much taxes reduce output.

Which natural experiment is more compelling and why? Explain what must be true for a natural experiment to identify causal effects.

Answer _____

More compelling: divided countries.

A natural experiment mimics the random treatment of randomized controlled trials. For a natural experiment to “work,” the treatment must be assigned in a way that is not correlated with other determinants of the outcome (GDP).

For the Korea “experiment,” quasi random assignment is plausible. The country was divided along lines that were determined by the outcome of the Korean war.

For the tax “experiment,” quasi random assignment is far less plausible. The tax change is a decision of the government that likely responds to other events in the country and may go hand in hand with other reforms.

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2. [6 points] What is NAIRU and why do we care about it?

Answer _____

NAIRU stands for “non-accelerating inflation rate of unemployment.” It is the rate of unemployment that is consistent with stable inflation. We care because an unemployment rate below NAIRU indicates “overheating” (inflation will likely rise); the Fed will need to step on the brakes. By contrast, an unemployment rate above NAIRU indicates that there is slack in the labor market (the economy can run “hotter” without inflation taking off). The Fed can step on the accelerator.

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3. [6 points] Does the Fed have direct control over the money supply? Why or why not?

Answer _____

The Fed directly controls “high powered money” (currency + deposits with the Fed). It does not control broader monetary aggregates, such as M1. Those include assets that are created by banks (e.g., deposits in checking accounts).

The Fed can influence banks’ behavior by setting interest rates and reserve requirements (among other instruments). But in the end it’s up to banks whether or not Fed reserves get converted into loans or whether they are hoarded with the Fed. There is no guarantee that an expansion in high powered money translates into a larger (broad) money supply.

In fact, ever since the financial crisis, banks have been hoarding reserves instead of lending out their excess reserves.

4. [6 points] It has been argued (a lot) that government regulations, such as environmental protections, destroy jobs. This seems obviously true as higher costs lead firms to lay off workers. Do you agree?

Answer _____

The obvious argument that firms’ higher costs cause layoffs is not relevant. It works this way for any given firm and for given prices and wages. But general equilibrium works differently.

Medium run employment is determined by labor supply (not obviously affected by regulation) and labor productivity (through the real wage). In our model: $Y^S = F(W/P, z)$.

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). Aside from that, there is no effect on employment.

5. [6 points] Explain why inflation expectations can be a useful policy instrument for the Fed. How do inflation expectations affect aggregate demand? When are they a particularly useful instrument?

Answer _____

Private spending depends on the real interest rate $r = i - \pi^e$. Higher inflation expectations lower the real interest rate and stimulate demand.

Changing inflation expectations is especially useful when it is not feasible to move the nominal interest rate – typically when it hits the zero lower bound.

2 IS/LM Model [25 points]

Consider an IS/LM closed economy model where

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

and

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

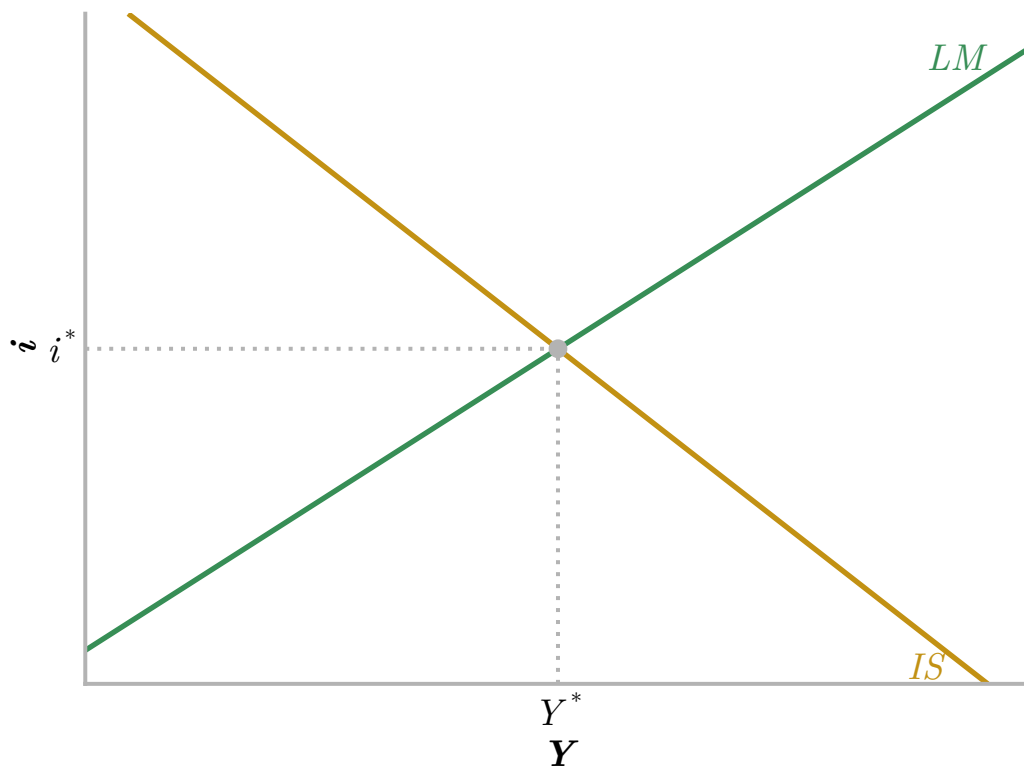
What happens to the effectiveness of monetary and fiscal policies when money demand is highly interest elastic?

- [5 points] Explain in words why a higher interest elasticity of money demand (a high $L'(i)$ or dL/di) makes the LM curve flatter.

Answer _____

A given reduction in i increases money demand a lot. Holding M/P fixed, a large reduction in Y is required to clear the money market.

- [10 points] Does the high interest elasticity of money demand increase or decrease the effect of **government spending** on output? Show your answer in a graph and **explain** the intuition.



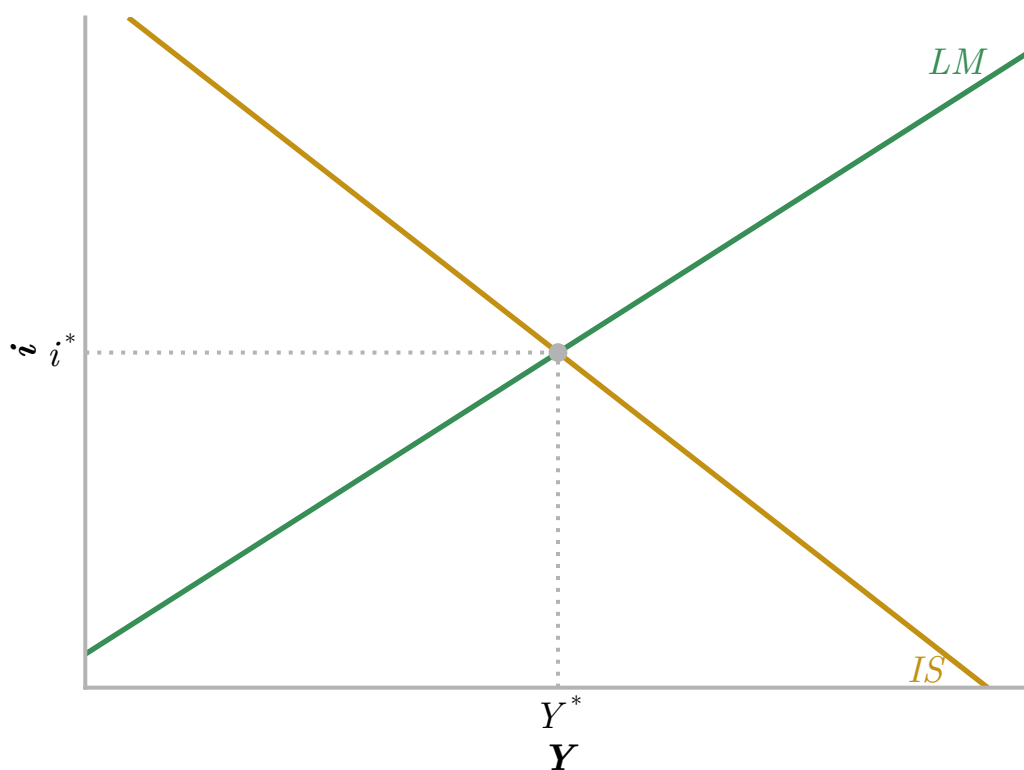
Answer _____

The IS curve shifts to the right by an amount that does not depend on the interest elasticity of money demand.

If LM is flat, we get a large rise in Y and a small rise in i (moving along a flat LM curve).

Intuition: Higher G increases AD and thus Y . Households need more money. They sell bonds, which drives up i . If money demand is interest elastic, households stop selling bonds after a small rise in i . The small increase in i reduces investment by a small amount.

3. [10 points] Does the high interest elasticity of money demand increase or decrease the effect of **monetary policy** on output? **Explain** the intuition. Hint: How much does LM shift to the right (holding i fixed) when M/P increases?



Answer _____

Key: holding i fixed, an increase in M/P shifts LM to the right by a fixed amount, no matter what $L(i)$ looks like.

Flat LM now implies a small increase in output.

Intuition: Higher M induces households to buy bonds. That lowers i . When households are very interest sensitive, a small reduction in i is enough to make households hold the larger money supply. Then we get a small increase in I and thus Y .

3 AS/AD Model [18 points]

Recall the equations for the AS/AD model:

- AS: $Y = F\left(\frac{P}{P^e} \frac{1}{1+m}, z\right)$
- IS: $Y = C(Y - T) + G + I(Y, i)$
- LM: $M/P = YL(i)$

Recall that the AD curve is derived as the intersection of IS and LM as the price P varies. Here, we consider the implications of a **liquidity trap**.

1. [11 points] Using an IS/LM diagram, show that the AD curve turns vertical when the price level gets low enough for a liquidity trap. Explain the economic intuition.

Answer _____

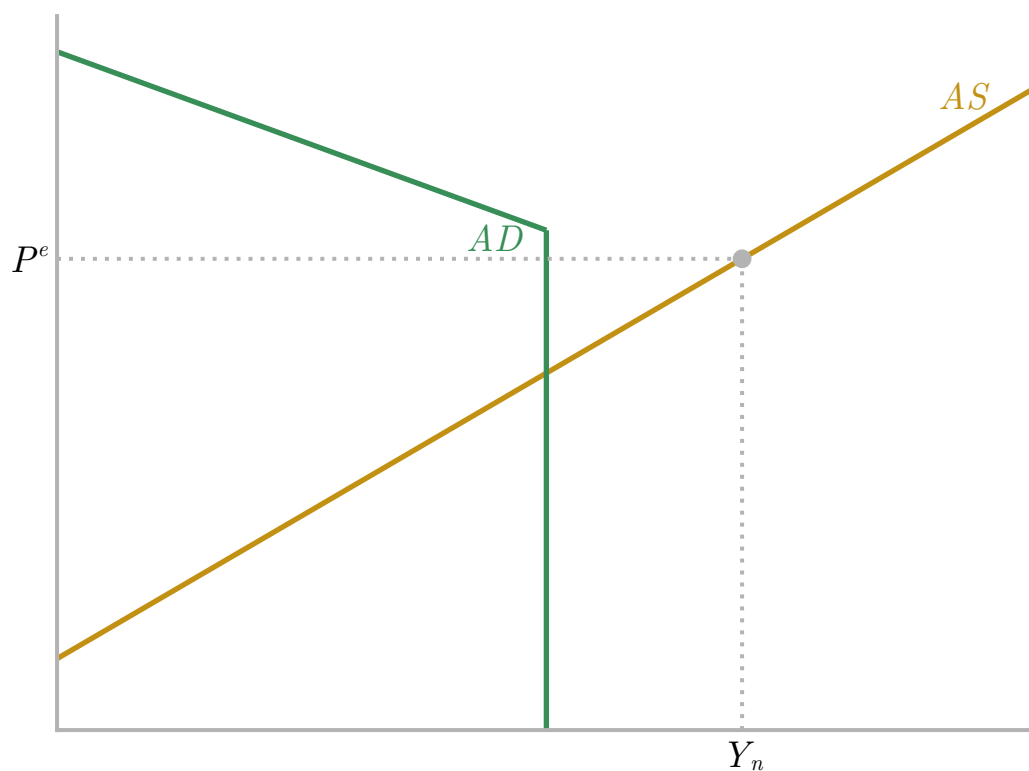
Start from a standard IS/LM diagram. When $P \downarrow$ the LM curve shifts out. Usually, the interest rate falls, moving the equilibrium along IS (as $I \uparrow$). This is the monetary transmission mechanism.

In the liquidity trap, the interest rate hits zero. The LM curve becomes flat at zero interest. Lowering P shifts LM to the right, but this can no longer reduce i . The AD curve becomes vertical ($P \downarrow \implies Y$ unchanged).

Intuition: the transmission mechanism ($i \downarrow \implies I \uparrow$) is broken.

Looking ahead to the next question: If a lower P does not raise output, then a higher M does not either. This means that raising M does not shift the AD curve (the intersection of IS/LM).

2. [7 points] Using the AS/AD graph below, show the implications of a monetary expansion when the economy is in a liquidity trap. Explain the economic intuition.



Answer _____

When the equilibrium is in the vertical part of AD, a monetary expansion does nothing at all. The AD curve does not shift. Higher M shifts LM to the right. Just like lower P , this does not increase output in the IS/LM diagram. Therefore, AD does not shift.

Intuition: The reason why AD usually shifts right when $M \uparrow$ is that $i \downarrow$. But, as the IS/LM diagram shows, this does not work in a liquidity trap. Households absorb the additional liquidity at a fixed interest rate.

End of exam.