

FINAL EXAM

Answer the following questions True, False, or Uncertain. Briefly explain your answers. No credit without explanation. (8 points each).

1. According to Milton Friedman, the optimal rate of inflation is zero.

FALSE. Milton Friedman argued that the optimal rate of inflation is *negative* (i.e., a deflation). In particular, the Central Bank should produce a deflation rate equal to the real interest rate. By the Fisher equation, this produces a zero nominal interest rate, which makes money costless to hold. This is optimal because money is (nearly) costless to produce.

2. An increase in the variance of the wage distribution will increase the equilibrium unemployment rate.

TRUE. Accepting a job offer is like exercising an option (assuming you can't search while on the job). Since you don't have to accept low wage offers, increasing the variance of the wage distribution just increases the probability that you receive a really good offer. This will increase the reservation wage, and thereby increase the equilibrium unemployment rate.

3. According to the Mundell-Fleming model, when the U.S. cuts taxes output in Canada falls.

FALSE. A cut in taxes represents a U.S. fiscal expansion, which shifts out the IS curve in the U.S. This puts upward pressure on the U.S. interest rate, which causes the U.S. dollar to appreciate against the Canadian dollar. This increases Canadian net exports, which shifts Canada's IS curve to the right, causing output in Canada to rise.

4. Increases in government spending cause current account deficits.

UNCERTAIN. This would tend to be true in the Keynesian Mundell-Fleming model, for the reasons outlined in the previous question. Fiscal expansion causes interest rates to rise and the currency to appreciate, which reduces net exports. It would also be true in the market-clearing model if the increase in spending is thought to be *temporary*. In that case, the output demand curve shifts out since households reduce spending less than the government increase (intertemporal substitution). Assuming the outward shift in the output demand curve is greater than the outward shift in the output supply curve (due to wealth and intertemporal substitution effects on labor supply), then the market clearing interest rate would increase. In a small open economy, this manifests itself as a current account deficit. However, if the spending increase is thought to be *permanent*, then the household spending reduction exactly offsets the government increase, so that on net there is no change in the Y^d curve. Instead, there is an accentuated wealth effect on labor supply, which shifts out the Y^s curve further than before. As a result, the interest rate would fall. In a small open economy, this would manifest itself as a current account *surplus*. For full credit they should discuss the temporary vs. permanent distinction.

5. Macroeconomic policy should attempt to stabilize the level of output.

UNCERTAIN. It depends on your theory of business cycles. According to the Real Business Cycle approach, output fluctuations represent the economy's response to productivity shocks. Using government policy in an effort to offset these shocks can only make matters worse. On the other hand, according to the Keynesian approach, output fluctuations are primarily caused by aggregate demand shifts in the presence of sticky prices. In this case, it might be beneficial to use government policy to

facilitate the economy's convergence back to the long-run equilibrium (defined to be a situation where all prices have fully adjusted).

The following questions are short answer. Clarity will be rewarded.

6. (20 points). In the closed-economy Real Business Cycle model, suppose government spending increases temporarily. Illustrate the equilibrium effects of this on employment, real wages, output, consumption, investment and the real interest rate. Based on your answer, do you think fluctuations in government spending provide a promising explanation of business cycles? Why or why not?

This question is straight out of the book. In particular, see Figure 9.19. A temporary increase in government spending causes the labor supply curve to shift out, due to both a negative wealth effect and a higher market clearing interest rate, which causes households to substitute toward future leisure. In the goods market, the Y^d shifts out, since households reduce spending less than the government increase (due to intertemporal substitution). At the same time, the Y^s curve shifts out, since labor supply has increased. Presumably, the shift in the Y^s curve is less than the shift in the Y^d curve, since the only non-interest rate effect on labor supply is coming about due to a negative wealth effect, which is probably pretty small when the increase in government spending is known to be temporary. On net, therefore, the market-clearing interest rate rises. (Don't penalize them if they instead assume that Y^s shifts more than Y^d , but they should explain why they do this, and follow up on the consequences).

There are two main problems with this as an explanation of business cycles. First, it predicts wages are countercyclical (wages fall since N^s shifts out). Second, and more importantly, it predicts investment is countercyclical, since the higher market-clearing interest rate crowds out investment. This is strongly at odds with the data. (Note that consumption could go either way, since output increases, which increases consumption, but the interest rate rises, which decreases consumption).

7. (20 points).

- (a) Suppose an economy experiences a temporary decline in the demand for its exports. Use the Mundell-Fleming model to compare and contrast how the economy responds under fixed and flexible exchange rates.

With flexible rates, the downward shift in the IS curve puts downward pressure on the interest rate, which causes the currency to depreciate. This offsets the original decline in net exports, causing IS to shift back to where it was. With fixed rates, the pressure for the currency to depreciate forces the central bank to sell fx reserves, which shifts the LM curve to the left, reinforcing the decline in domestic output.

- (b) Now suppose there is a temporary increase in money demand, perhaps due to a financial crisis. Again compare and contrast how the economy responds under fixed and flexible exchange rates.

An increase in money demand causes the LM curve to shift up. With flexible rates, the currency appreciates, which reduces net exports, causing the IS curve to shift left. This reinforces the decline in output. With fixed rates, the pressure for the currency to appreciate forces the central bank to purchase fx reserves, shifts the LM curve back to where it originally was. Therefore, output doesn't change.

- (c) Use your answers to parts (a) and (b) to draw conclusions about whether fixed or flexible exchange rate systems are more effective at stabilizing the level of output.

Clearly, according to Mundell-Fleming, flexible rates will be better if most shock are 'real' (i.e., they shift IS), while fixed rates will be better if most shocks are 'financial' (i.e., they shift LM).

8. (20 points). Suppose the following ‘expectations-augmented Phillips Curve’ describes the relationship between inflation and unemployment:

$$u = u^n - \alpha(\pi - \pi^e)$$

where u^n is the ‘natural rate of unemployment’, and π^e is the public’s expectation of inflation. Assume the Bank of Canada sets the inflation rate in order to minimize the following loss function:

$$L(u, \pi) = u + \gamma\pi^2$$

where γ is a parameter representing how much the Bank of Canada dislikes inflation relative to unemployment.

- (a) What are the equilibrium unemployment and inflation rates if the Bank of Canada can commit to follow a fixed rule?

In either case, Rational Expectations imply $\pi^e = \pi$. If the government can commit, it will minimize losses while imposing this Rational Expectations outcome. Clearly, the government will set $\pi = 0$, and the resulting unemployment rate will be $u = u^n$.

- (b) What is the outcome if the Bank of Canada cannot commit to follow a rule?

If the government cannot commit, it will take π^e as given, since it no longer has the ability to shape private sector expectations. Minimizing losses with π^e given produces the following first-order condition:

$$-\alpha + 2\gamma\pi = 0$$

which then implies $\pi = \alpha/2\gamma$. (Note that due to the linearity of the loss function with respect to u , π^e doesn’t enter the first-order condition). Of course, the public will expect this outcome, and set its inflation expectations accordingly. Again, we have $u = u^n$.

- (c) Why does commitment to a rule lead to a better outcome?

According to this model, the central bank has an incentive to surprise the public. If the public knows this, then they will factor this incentive into their expectations, until a point is reached where the central bank no longer has an incentive to deviate from the public’s expectations. If the government could *commit* ahead of time to not exploit the low inflation expectations of the public, a better outcome would occur (i.e., lower inflation with the same unemployment rate). Thus, we get the counterintuitive result that imposing constraints on yourself makes you better off!