

Past-paper walk-through

Long-Run Self-Adjustment ■ 3.7

eXercise

Questions in this set

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Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 1

2026 ■ Q1

The economy of Micanapy is in short-run equilibrium and is experiencing an inflationary gap.

(a)(i) Draw a correctly labeled graph of the aggregate demand, short-run aggregate supply, and long-run aggregate supply curves for Micanapy, and show each of the following.

The current equilibrium real output and price level, labeled Y_1 and PL_1 , respectively.

(a)(ii) Draw a correctly labeled graph of the aggregate demand, short-run aggregate supply, and long-run aggregate supply curves for Micanapy, and show each of the following.

The full-employment real output, labeled Y_F .

Question 1

2026 ■ Q1

The economy of Micanapy is in short-run equilibrium and is experiencing an inflationary gap.

(b) Assume that policymakers take no action to close the inflationary gap. Explain how Micanapy's economy will self-adjust to full employment in the long run.

Question 1

2026 ■ Q1

The economy of Micanapy is in short-run equilibrium and is experiencing an inflationary gap.

(c)(i) Suppose instead that Micanapy's central bank is considering using monetary policy to close the inflationary gap in the short run. The banking system in Micanapy has limited reserves.

Identify a specific open-market operation that the central bank of Micanapy would implement to close the inflationary gap in the short run.

(c)(ii) Draw a correctly labeled graph of the money market in Micanapy, and show the effect of the open-market operation identified in part C (i) on the nominal interest rate.

Question 1

2026 ■ Q1

The economy of Micanapy is in short-run equilibrium and is experiencing an inflationary gap.

(d)(i) Based solely on the interest rate change shown on your graph in part C (ii), will each of the following increase, decrease, or remain the same in the short run?

International financial capital flows into Micanapy. Explain.

(d)(ii) Based solely on the interest rate change shown on your graph in part C (ii), will each of the following increase, decrease, or remain the same in the short run?

The price of previously issued bonds in Micanapy.

(d)(iii) Based solely on the interest rate change shown on your graph in part C (ii), will each of the following increase, decrease, or remain the same in the short run?

Private domestic investment spending in Micanapy.

Question 1

2026 ■ Q1

The economy of Micanapy is in short-run equilibrium and is experiencing an inflationary gap.

(e) Based solely on the change in private domestic investment spending identified in part D (iii), will the unemployment rate in Micanapy increase, decrease, or remain the same in the short run? Explain.

Question 2

2025 Set 1 ■ Q2

The economies of Country L and Country A are currently in short-run equilibrium at output levels below full employment. Both countries intend to use monetary policy to close their output gaps. Country L has a banking system with limited reserves, and Country A has a banking system with ample reserves.

- (a)** What open-market operation would Country L implement to move the economy toward full employment in the short run?
- (b)** What specific monetary policy action would Country A implement to move the economy toward full employment in the short run?
- (c)** Draw a correctly labeled graph of the reserve market in Country A, and show the effect of the monetary policy action identified in part B on the policy rate.
- (d)** Assume instead that no policy actions are taken in Country A and that the economy remains in short-run equilibrium at an output level below full employment.

Question 2

Will short-run aggregate supply in Country A increase, decrease, or remain the same as the economy self-adjusts in the long run? Explain.

Solution 2

(a)

Mark scheme

- Country L's central bank would conduct an open-market PURCHASE of bonds (buy government securities). This injects reserves into the banking system, increasing the money supply and lowering interest rates, which stimulates spending and moves the economy toward full employment. 1 point.

Solution 2

(b)

Mark scheme

- Country A's central bank would DECREASE its administered interest rate(s) — e.g., decrease the interest rate paid on reserves (or decrease the discount rate) — to lower the policy rate and stimulate the economy toward full employment. 1 point.

Solution 2

(c) Mark scheme

- Draw the reserve market in Country A: vertical axis = Policy Rate, horizontal axis = Quantity of Reserves; a vertical supply curve S_R and a demand curve D_R that intersects S_R in the flat ('ample reserves') portion of D_R , at policy rate PR_1 (1 point). Then show the monetary policy action from part B — a decrease in the administered interest rate (e.g., interest on reserves) — shifting the flat/lower-bound portion of D_R down, so the policy rate falls from PR_1 to PR_2 (equivalently accepted: show the lower bound of the demand curve shifting down with the same PR_1 -to- PR_2 result) (1 point). 2 points total.

Solution 2

(d)

Mark scheme

- Short-run aggregate supply (SRAS) will INCREASE until it reaches full employment, as the economy self-corrects in the long run. With output below full employment, high unemployment pushes down input prices (e.g., nominal wages) and/or inflationary expectations, which increases (shifts right) SRAS. 1 point.

Question 1

2024 Set 1 ■ Q1

The economy of Alpha is in short-run equilibrium with a cyclical unemployment rate of 3%, a frictional unemployment rate of 4%, and an actual unemployment rate of 8%.

(a) Calculate Alpha's natural rate of unemployment. Show your work.

Question 1

2024 Set 1 ■ Q1

The economy of Alpha is in short-run equilibrium with a cyclical unemployment rate of 3%, a frictional unemployment rate of 4%, and an actual unemployment rate of 8%.

(b) Draw a correctly labeled graph of the aggregate demand, short-run aggregate supply, and long-run aggregate supply curves for Alpha, and show each of the following.

- (i) The current equilibrium output and price level, labeled Y_1 and PL_1 , respectively
- (ii) The full-employment output, labeled Y_F

Question 1

2024 Set 1 ■ Q1

The economy of Alpha is in short-run equilibrium with a cyclical unemployment rate of 3%, a frictional unemployment rate of 4%, and an actual unemployment rate of 8%.

(c)(i) Assume that policymakers take no action to close the output gap.

Explain how Alpha's economy will adjust to full employment in the long run.

(c)(ii) On your graph in part (b), show how Alpha's economy will adjust to full employment in the long run, labeling the new equilibrium price level PL_2 .

Question 1

2024 Set 1 ■ Q1

The economy of Alpha is in short-run equilibrium with a cyclical unemployment rate of 3%, a frictional unemployment rate of 4%, and an actual unemployment rate of 8%.

(d) Assume instead that Alpha's central bank is considering using monetary policy to close a recessionary output gap. The banking system in Alpha has ample reserves. Identify a specific monetary policy action the central bank of Alpha would take to close the output gap in the short run.

Question 1

2024 Set 1 ■ Q1

The economy of Alpha is in short-run equilibrium with a cyclical unemployment rate of 3%, a frictional unemployment rate of 4%, and an actual unemployment rate of 8%.

(e) Draw a correctly labeled graph of the reserve market in Alpha, and show the effect of the action taken by the central bank identified in part (d) on the policy rate.

Question 1

2024 Set 1 ■ Q1

The economy of Alpha is in short-run equilibrium with a cyclical unemployment rate of 3%, a frictional unemployment rate of 4%, and an actual unemployment rate of 8%.

(f)(i) Based on the change in the policy rate shown in part (e), what would happen to each of the following in the short run in Alpha?

The price of previously issued bonds

(f)(ii) The price level. Explain.

Solution 1

(a)

Mark scheme

- Natural UER = Actual UER – Cyclical UER = $8\% - 3\% = 5\%$. (Equivalent method: Structural UER = Actual UER – Cyclical UER – Frictional UER = $8\% - 3\% - 4\% = 1\%$; Natural UER = Frictional UER + Structural UER = $4\% + 1\% = 5\%$.) Final answer: natural rate of unemployment = 5%, with work shown by either method.

Solution 1

(b)

Mark scheme

- Draw a Price Level (vertical axis) vs. Real GDP (horizontal axis) graph. Point 1: a downward-sloping AD1 curve and an upward-sloping SRAS1 curve intersecting at a point labeled PL1 (price level) and Y1 (real GDP) directly below it. Point 2: add a vertical LRAS curve positioned to the right of Y1, with its base on the horizontal axis labeled YF (full-employment output) — showing Alpha currently below full employment ($Y1 < YF$, a recessionary gap).

Solution 1

(c)(i)

Mark scheme

- With no policy action, the recessionary gap ($Y_1 < Y_F$) means unemployment exceeds the natural rate, so input prices (e.g., nominal wages) and/or inflationary expectations fall over time. This lowers production costs, causing SRAS to increase (shift right), and this continues until the economy returns to full employment output Y_F .

Solution 1

(c)(ii)

Mark scheme

- On the graph from part (b), shift SRAS1 rightward to SRAS2 so that it now intersects AD1 and LRAS at the same point, at output YF. Label the new, lower equilibrium price level PL2 ($PL2 < PL1$). Also show the SRAS curve shifting right and output moving from Y1 to YF.

Solution 1

(d)

Mark scheme

- The central bank would decrease its administered interest rate(s) — e.g., decrease the interest rate paid on reserves (IOR) — or otherwise decrease interest on reserves, lowering the policy rate as expansionary monetary policy to close the recessionary output gap.

Solution 1

(e) Mark scheme

- Draw the reserve market graph: Policy Rate on the vertical axis, Quantity of Reserves on the horizontal axis. Point 1: a vertical supply curve SR and a demand curve DR that slopes down then becomes flat, intersecting SR within the flat 'ample reserves' region at PR1, Q1 — a correctly labeled graph with S intersecting D in the ample-reserves range. Point 2: show the effect of the action in part (d) — the administered rate (floor of DR) shifts down, so the flat portion of DR shifts down, producing a new, lower policy rate $PR2 < PR1$ at the same quantity Q1 (equivalently framed as a decrease in the lower bound of the reserve demand curve lowering the policy rate).

Solution 1

(f)(i)

Mark scheme

- The price of previously issued bonds will increase. Because the policy/nominal interest rate has fallen, existing bonds carrying the older, higher fixed coupon become relatively more attractive, so their market price rises (bond prices move inversely with interest rates).

Solution 1

(f)(ii)

Mark scheme

- The price level will increase. Explanation: the decrease in the nominal interest rate lowers borrowing costs, which increases interest-sensitive spending — consumption (especially durable goods), investment, and/or net exports — thereby increasing aggregate demand (AD shifts right) and raising the price level in the short run.

Question 1

2024 Set 2 ■ Q1

Assume that the economy of Moneyland is in equilibrium with an actual unemployment rate equal to the natural rate of unemployment.

(a) Draw a correctly labeled graph of the aggregate demand, short-run aggregate supply, and long-run aggregate supply curves, and show each of the following.

(a)(i) The current equilibrium real output and price level, labeled Y_1 and PL_1 , respectively

(a)(ii) The full employment output, labeled Y_F

Question 1

2024 Set 2 ■ Q1

Assume that the economy of Moneyland is in equilibrium with an actual unemployment rate equal to the natural rate of unemployment.

(b) Assume that consumer spending in Moneyland decreases from \$110,000 to \$100,000 as a result of a decrease in disposable income in Moneyland from \$135,000 to \$110,000.

(b)(i) Calculate the marginal propensity to consume in Moneyland. Show your work.

(b)(ii) Show the short-run effect of the decrease in consumer spending in Moneyland on your graph in part (a), labeling the new equilibrium real output and price level Y_2 and PL_2 , respectively.

Question 1

2024 Set 2 ■ Q1

Assume that the economy of Moneyland is in equilibrium with an actual unemployment rate equal to the natural rate of unemployment.

(c) Following the decrease in consumer spending, explain how the economy would adjust in the long run in the absence of any policy actions.

Question 1

2024 Set 2 ■ Q1

Assume that the economy of Moneyland is in equilibrium with an actual unemployment rate equal to the natural rate of unemployment.

(d) The central bank of Moneyland is concerned about the short-run effects of the decrease in consumer spending on the broader economy and is considering taking action rather than waiting for the long-run adjustment process. Assuming the banking system in Moneyland has ample reserves, identify a specific monetary policy action the central bank of Moneyland would take to increase consumer spending.

Question 1

2024 Set 2 ■ Q1

Assume that the economy of Moneyland is in equilibrium with an actual unemployment rate equal to the natural rate of unemployment.

(e) Draw a correctly labeled graph of the reserve market in Moneyland, and show the effect of the monetary policy action identified in part (d) on the policy rate.

Question 1

2024 Set 2 ■ Q1

Assume that the economy of Moneyland is in equilibrium with an actual unemployment rate equal to the natural rate of unemployment.

(f) How would the change in the policy rate shown on your graph in part (e) affect each of the following in Moneyland in the short run?

(f)(i) The quantity of national savings

(f)(ii) Unemployment. Explain.

Solution 1

(a)

Mark scheme

- Setup instruction only (no independent points) — draw one AD–SRAS–LRAS diagram with Price Level on the vertical axis and Real GDP on the horizontal axis, showing a downward-sloping AD_1 curve and an upward-sloping $SRAS_1$ curve. The two scored elements are given in (a)(i) and (a)(ii).

Solution 1

(a)(i)

Mark scheme

- Label the intersection of AD_1 and $SRAS_1$: drop dashed lines to the axes to show equilibrium price level PL_1 (vertical axis) and equilibrium real output Y_1 (horizontal axis) at that intersection.

(a)(ii)

Mark scheme

- Add a vertical long-run aggregate supply curve (LRAS) positioned exactly at the $AD_1/SRAS_1$ intersection — i.e., at Y_1 — and label it Y_F , showing $Y_1 = Y_F$ (the economy begins at full-employment/potential output).

Solution 1

(b)

Mark scheme

- Stem/data only — consumer spending in Moneyland falls from \$110,000 to \$100,000 as disposable income falls from \$135,000 to \$110,000. Scored in (b)(i) and (b)(ii) below.

Solution 1

(b)(i)

Mark scheme

$$\blacksquare \text{ MPC} = \frac{\Delta \text{Consumer Spending}}{\Delta \text{Disposable Income}} = \frac{\$100,000 - \$110,000}{\$110,000 - \$135,000} = \frac{-\$10,000}{-\$25,000} = 0.4.$$

Award the point for showing this calculation and arriving at $\text{MPC} = 0.4$.

Solution 1

(b)(ii)

Mark scheme

- On the graph from part (a), shift the AD curve leftward from AD_1 to AD_2 (a fall in consumer spending is a fall in aggregate demand). The new AD_2 curve intersects $SRAS_1$ at a lower price level, labeled PL_2 (with $PL_2 < PL_1$), and lower real output, labeled Y_2 (with $Y_2 < Y_1 = Y_F$).

Solution 1

(c)

Mark scheme

- Because Y_2 is below full-employment output Y_F , the economy has a recessionary (negative) output gap with higher-than-natural unemployment. This puts downward pressure on input prices (e.g., nominal wages) and/or lowers inflationary expectations, so short-run aggregate supply increases (SRAS shifts rightward) over time. SRAS keeps shifting right until it re-intersects AD_2 at Y_F , restoring full-employment equilibrium at a lower price level — the economy self-corrects without policy action.

Solution 1

(d)

Mark scheme

- The central bank should use expansionary monetary policy. Since the banking system has ample reserves, an open-market purchase would not move the policy rate; instead the central bank should decrease an administered rate — e.g., decrease the interest rate paid on reserve balances (interest on reserves), or decrease the discount rate — to pull the policy/floor rate down and lower the cost of borrowing, increasing consumer spending.

Solution 1

(e) Mark scheme

- Draw a reserve-market graph with Policy Rate on the vertical axis and Quantity of Reserves on the horizontal axis: a vertical reserve supply curve S_R in the ample-reserves range intersects the kinked demand curve D_R (downward-sloping then flat) on its flat segment, at quantity Q_1 and initial policy rate PR_1 (1 point). For the second point, show the effect of the monetary action from part (d): shift the flat (administered-rate) segment of D_R downward, so the new intersection with S_R occurs at the same quantity Q_1 but a lower policy rate $PR_2 < PR_1$ (a decrease in the lower bound of the demand curve for reserves, or equivalently a downward shift of the administered rate, lowers the policy rate).

Solution 1

(f)

Mark scheme

- Stem only — asks for the short-run effect of the lower policy rate from part (e) on (i) the quantity of national savings and (ii) unemployment. Scored in (f)(i) and (f)(ii) below.

Solution 1

(f)(i)

Mark scheme

- The quantity of national savings would decrease. A lower policy/interest rate reduces the return to saving, so households and firms choose to save less (equivalently, in the loanable funds market a lower interest rate corresponds to a lower quantity of national savings supplied).

Solution 1

(f)(ii)

Mark scheme

- Unemployment would decrease. Explanation: the decrease in the policy rate lowers nominal (and real) interest rates, which increases interest-sensitive spending — consumption (e.g., durable goods bought on credit), investment (business borrowing for capital), and/or net exports (via currency depreciation). This raises aggregate demand and real output, moving the economy back toward/beyond full employment and lowering the unemployment rate.

Question 1

2023 Set 1 ■ Q1

Assume the economy of Vanderlandia is in short-run equilibrium with a real GDP of 500 million. The full – employment level of real GDP is 550 million.

- (a)** Draw a correctly labeled graph of the aggregate demand, short-run aggregate supply, and long-run aggregate supply curves, and show each of the following.
- (i) The current equilibrium real output and price level, labeled Y_1 and PL_1 , respectively
 - (ii) The full-employment output, labeled Y_F

Question 1

2023 Set 1 ■ Q1

Assume the economy of Vanderlandia is in short-run equilibrium with a real GDP of 500 million. The full – employment level of real GDP is 550 million.

(b)(i) Assume no policy action is taken to restore full employment.

Explain how the economy will adjust in the long run.

(b)(ii) Following the long-run adjustment process, will the price level in Vanderlandia be greater than, less than, or equal to PL_1 shown on your graph in part (a)?

Question 1

2023 Set 1 ■ Q1

Assume the economy of Vanderlandia is in short-run equilibrium with a real GDP of 500 million. The full – employment level of real GDP is 550 million.

(c)(i) Assume instead that policymakers in Vanderlandia are considering changing government spending to restore full employment in the short run and that the marginal propensity to save is 0.2.

Calculate the minimum change and state the direction of change in government spending required to completely close the output gap in the short run. Show your work.

(c)(ii) On your graph in part (a), show the short-run effect of the change in government spending in part (c)(i), labeling the new equilibrium price level PL_2 .

Question 1

2023 Set 1 ■ Q1

Assume the economy of Vanderlandia is in short-run equilibrium with a real GDP of 500 million. The full – employment level of real GDP is 550 million.

(d) Draw a correctly labeled graph of the loanable funds market, and show the effect of the change in government spending in part (c)(i) on the equilibrium real interest rate.

Question 1

2023 Set 1 ■ Q1

Assume the economy of Vanderlandia is in short-run equilibrium with a real GDP of 500 million. The full – employment level of real GDP is 550 million.

(e)(i) Based on the change in the real interest rate shown on your graph in part (d), what will happen to each of the following?

The price of previously issued bonds

(e)(ii) The rate of economic growth in the long run. Explain.

Solution 1

(a)

Mark scheme

- Draw a standard downward-sloping AD curve and upward-sloping SRAS curve (Price Level on the vertical axis, Real GDP on the horizontal axis). Label their intersection as the current equilibrium, with equilibrium output Y_1 on the horizontal axis and equilibrium price level PL_1 on the vertical axis (dashed lines from the intersection to each axis) — this earns Point 1. Then add a vertical long-run aggregate supply curve (LRAS) positioned to the RIGHT of Y_1 , and label the real GDP value at which it sits Y_F (full-employment output) — this earns Point 2.

Solution 1

(b)(i)

Mark scheme

- Since Y_1 is below full-employment output Y_F (a recessionary gap), in the long run nominal wages and other input prices (and/or inflationary expectations) will decrease. This fall in input costs causes short-run aggregate supply (SRAS) to increase (shift rightward) until the economy self-corrects back to equilibrium at full employment, Y_F .

Solution 1

(b)(ii)**Mark scheme**

- The price level following the long-run adjustment will be LESS THAN PL_1 — as SRAS shifts rightward, the new equilibrium slides down along AD, so both output rises to Y_F and the price level falls below its original level PL_1 .

Solution 1

(c)(i)

Mark scheme

- Spending multiplier $= 1/\text{MPS} = 1/0.2 = 5$. Minimum change in government spending $= \frac{\text{Output Gap}}{\text{Spending Multiplier}} = \frac{\$50 \text{ million}}{5} = \10 million . Government spending must INCREASE by \$10 million to fully close the recessionary output gap in the short run.

Solution 1

(c)(ii)

Mark scheme

- On the graph from part (a), shift the AD curve rightward (from AD_1 to AD_2) so the new short-run equilibrium occurs exactly where AD_2 intersects $SRAS_1$ at the vertical LRAS curve (i.e., at Y_F), with the new, higher equilibrium price level labeled PL_2 (where $PL_2 > PL_1$).

Solution 1

(d) Mark scheme

- Draw a standard loanable funds market graph (Real Interest Rate on the vertical axis, Quantity of Loanable Funds on the horizontal axis) with a downward-sloping demand curve D_{LF_1} and an upward-sloping supply curve S_{LF_1} intersecting at equilibrium interest rate r_1 and quantity Q_1 — this earns Point 1. Then show the effect of the increased government spending/borrowing from part (c)(i): the government's borrowing increases the demand for loanable funds, shifting D_{LF_1} rightward to D_{LF_2} (an equally valid alternative is showing the supply of loanable funds decreasing from S_{LF_1} to S_{LF_2}). Either shift raises the equilibrium real interest rate from r_1 to a higher r_2 — this earns Point 2.

Solution 1

(e)(i)

Mark scheme

- The price of previously issued bonds will DECREASE. Bond prices and interest rates move inversely: as the real interest rate rises from r_1 to r_2 , existing bonds with fixed coupon payments become less attractive relative to new, higher-rate bonds, so their market price falls.

Solution 1

(e)(ii)

Mark scheme

- The rate of long-run economic growth will **DECREASE**. Explanation: the increase in the real interest rate raises the cost of borrowing, which decreases investment spending on physical capital, human capital, and/or research and development. Since these are key drivers of an economy's productive capacity (they shift LRAS rightward over time), less investment in them slows the long-run growth rate.

Question 1

2023 Set 2 ■ Q1

1. The economy of Northland is in short-run equilibrium with an actual unemployment rate of 7% and an actual inflation rate of 1%. The natural unemployment rate in Northland is 5%.
 - (a) Using the relevant numerical values given, draw a correctly labeled graph of the short-run and long-run Phillips curves. Label the current short-run equilibrium point as X. Plot the relevant numerical values provided on the graph.
 - (b) Is the expected inflation rate greater than, less than, or equal to 1% ? Explain.
 - (c) Assume the marginal propensity to consume is 0.9.
 - (i) If the government decreases income taxes by \$20 billion, calculate the maximum change in aggregate demand. Show your work.
 - (ii) If instead the government increases spending by \$20 billion, calculate the maximum change in aggregate demand. Show your work.
 - (d) On your graph in part (a), show a possible new short-run equilibrium point labeled Z that would result if the government increases spending and there is no change in inflationary expectations.

Question 1

- (e) How would an increase in unemployment compensation affect aggregate demand in the short run? Explain.
- (f) Assume instead the government takes none of the preceding policy actions. (Northland is still in short-run equilibrium; the actual unemployment rate is 7%, the actual inflation rate is 1%, and the natural unemployment rate is 5%.) What will happen to each of the following in the long run?
- (i) The short-run aggregate supply curve. Explain.
 - (ii) The short-run Phillips curve
 - (iii) The actual unemployment rate

Begin your response to this question at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number.

Solution 1

(a)

Mark scheme

- Graph with Inflation Rate (%) on the vertical axis and Unemployment Rate (%) on the horizontal axis. Point 1: a downward-sloping short-run Phillips curve (SRPC) is drawn and labeled. Point 2: a vertical long-run Phillips curve (LRPC) is drawn at the natural rate of unemployment (5%), and point X is plotted on the SRPC to the right of the LRPC at the actual unemployment rate (7%) and the actual inflation rate (1%).

Solution 1

(b)

Mark scheme

- The expected inflation rate is greater than 1%. Explanation: the actual unemployment rate (7%) is greater than the natural rate of unemployment (5%) — equivalently, the economy is in a recession/below full employment — which places the economy on the SRPC to the right of the LRPC, a position that occurs only when expected inflation exceeds the actual inflation rate (1%).

Solution 1

(c)(i)

Mark scheme

- Maximum $\Delta AD = -\$20 \text{ billion} \times \frac{-0.9}{1-0.9} = -\$20 \text{ billion} \times (-9) = \180 billion . The tax multiplier is $-\text{MPC}/(1-\text{MPC}) = -9$; a \$20 billion decrease in taxes raises aggregate demand by a maximum of \$180 billion. Full work (multiplier + arithmetic) is required for the point.

Solution 1

(c)(ii)

Mark scheme

- Maximum $\Delta AD = \$20 \text{ billion} \times \frac{1}{1-0.9} = \$20 \text{ billion} \times 10 = \200 billion . The spending multiplier is $1/(1-MPC) = 10$; a \$20 billion increase in government spending raises aggregate demand by a maximum of \$200 billion. Full work (multiplier + arithmetic) is required for the point.

Solution 1

(d)

Mark scheme

- On the same SRPC used in part (a), plot point Z to the left of point X (a lower unemployment rate and a higher inflation rate than X), reflecting the increase in aggregate demand from the expansionary fiscal policy in part (c), with no change in inflationary expectations.

Solution 1

(e)

Mark scheme

- Aggregate demand would increase. Explanation: an increase in unemployment compensation raises households' disposable income, which increases consumption spending — a component of aggregate demand.

Solution 1

(f)(i)

Mark scheme

- The short-run aggregate supply curve will shift to the right. Explanation: as the economy self-corrects from the recessionary gap (actual unemployment $7\% >$ natural rate 5%), input prices (e.g., nominal wages) and/or inflationary expectations decrease, lowering production costs and shifting SRAS rightward.

Solution 1

(f)(ii)

Mark scheme

- The short-run Phillips curve will shift to the left (inward), reflecting the fall in inflationary expectations and/or input prices as the economy self-corrects toward long-run equilibrium.

(f)(iii)

Mark scheme

- The actual unemployment rate will decrease, moving back toward the natural rate of unemployment (5%) as the self-correcting economy returns to long-run equilibrium.

Question 2

2021 Set 2 ■ Q2

2. An economy is currently in short-run equilibrium with a recessionary output gap of \$600 billion.
- (a) Draw a single correctly labeled graph with both the short-run and long-run Phillips curves. Label the initial short-run equilibrium point X.
- (b) Suppose the government implements fiscal policy in order to achieve full-employment output and the marginal propensity to consume is 0.75.
- (i) Calculate the minimum change in government spending required to increase aggregate demand by the amount of the output gap of \$600 billion. Show your work.
 - (ii) Suppose instead the government wants to change taxes rather than government spending. Calculate the minimum change in taxes required to increase aggregate demand by the amount of the output gap of \$600 billion. Show your work.

Question 2

(c) Assume instead the government takes no policy action to close the output gap shown in part (a). Explain how the economy will adjust in the long run.

Begin your response to this question at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number.

Solution 2

(a)

Mark scheme

- Draw a single correctly labeled graph with vertical axis = inflation rate (%), horizontal axis = unemployment rate (%), and a downward-sloping short-run Phillips curve (SRPC) (1 point). Second point: add a vertical long-run Phillips curve (LRPC) and label point X on the SRPC to the RIGHT of the LRPC (i.e., at an unemployment rate above the natural rate, with dashed lines from X to both axes). 2 points total: 1 for the correctly labeled SRPC graph, 1 for the LRPC plus point X correctly positioned to the right of it on the SRPC.

Solution 2

(b)(i)

Mark scheme

- Minimum change in government spending = 150 billion. Work : $\text{Spending multiplier} = 1/(1 - \text{MPC}) = 1/(1 - 0.75) = 1/0.25 = 4$. $\text{Change in government spending} = \text{Desired change in GDP} \div \text{Spending multiplier} = 600 \text{ billion} \div 4 = 150 \text{ billion}$. 1 point for the correct value (150 billion) with the multiplier work shown.

Solution 2

(b)(ii)

Mark scheme

- Minimum change in taxes = $-\$200$ billion (i.e., a $\$200$ billion tax CUT).
Work: Tax multiplier = $-MPC/(1 - MPC) = -0.75/(1 - 0.75) = -0.75/0.25 = -3$. Change in taxes = Desired change in GDP $\div$ Tax multiplier = $\$600$ billion $\div (-3) = -\$200$ billion. 1 point for the correct value (a $\$200$ billion decrease in taxes) with the multiplier work shown.

Solution 2

(c)

Mark scheme

- In the long run, SRAS will INCREASE (shift rightward), due to a decrease in nominal wages, input prices, or inflationary expectations, as the economy self-corrects from the inflationary/output gap back toward full-employment (potential) output. 1 point.

Question 1

2019 Set 1 ■ Q1

Canada is an open economy that is currently in a recessionary output gap.

(a)(i) Draw a correctly labeled graph of the long-run aggregate supply, short-run aggregate supply, and aggregate demand curves, and show the current equilibrium real output and price level, labeled as Y_1 and PL_1 , respectively.

(a)(ii) Draw a correctly labeled graph of the long-run aggregate supply, short-run aggregate supply, and aggregate demand curves, and show full-employment output, labeled Y_f .

Question 1

2019 Set 1 ■ Q1

Canada is an open economy that is currently in a recessionary output gap.

(b)(i) The central bank and the government do not take any policy actions to close the output gap. Explain how the economy will adjust to full employment in the long run.

(b)(ii) The central bank and the government do not take any policy actions to close the output gap. On your graph in part (a), show how the economy adjusts to full employment in the long run.

Question 1

2019 Set 1 ■ Q1

Canada is an open economy that is currently in a recessionary output gap.

(c)(i) Suppose the Canadian government is unwilling to wait for the long-run adjustment process. The marginal propensity to consume is 0.8. The equilibrium real output is 500 billion and the full-employment output is 540 billion. Calculate the minimum change and indicate the direction of change in government spending required to shift the aggregate demand curve by the amount of the output gap.

(c)(ii) Suppose the Canadian government is unwilling to wait for the long-run adjustment process. The marginal propensity to consume is 0.8. The equilibrium real output is 500 billion and the full-employment output is 540 billion. Calculate the minimum change and indicate the direction of change in taxes required to shift the aggregate demand curve by the amount of the output gap.

Question 1

2019 Set 1 ■ Q1

Canada is an open economy that is currently in a recessionary output gap.

(d) Assume instead that the Canadian central bank takes actions to restore the economy to full-employment output by influencing investment spending. Draw a correctly labeled graph of the money market, and show the effect of the actions taken by the central bank on the equilibrium interest rate.

Question 1

2019 Set 1 ■ Q1

Canada is an open economy that is currently in a recessionary output gap.

(e) Canada and Mexico are trading partners. Draw a correctly labeled graph of the foreign exchange market of the Canadian dollar, and show the effect of the change in the interest rate in part (d) on the value of the Canadian dollar with respect to the Mexican peso.

Solution 1

(a)(i)

Mark scheme

- Draw a downward-sloping aggregate demand curve (AD1) and an upward-sloping short-run aggregate supply curve (SRAS1) on a graph with Price Level on the vertical axis and Real GDP on the horizontal axis. Their intersection is the current short-run equilibrium: drop dashed lines to the axes and label the equilibrium price level PL1 and the equilibrium real output Y1. 1 point for a correctly labeled AD1/SRAS1 graph with the equilibrium point marked Y1 and PL1.

Solution 1

(a)(ii)

Mark scheme

- On the same graph, add a vertical long-run aggregate supply curve (LRAS) positioned to the right of Y_1 (Canada is in a recessionary output gap, so full-employment output exceeds current output). Label the output level where LRAS meets the horizontal axis as Y_f , with $Y_f > Y_1$. 1 point for a correctly labeled vertical LRAS curve with Y_f shown to the right of Y_1 .

Solution 1

(b)(i)

Mark scheme

- With no policy action, the recessionary gap ($Y_1 < Y_f$) means unemployment is above the natural rate, putting downward pressure on nominal wages, other input prices, and/or expected inflation. As these fall over time, the short-run aggregate supply curve shifts rightward, lowering the price level and raising real output until the economy self-corrects back to full employment at Y_f . 1 point for explaining that falling nominal wages/input prices/expected inflation shift SRAS rightward until real GDP returns to Y_f .

Solution 1

(b)(ii)

Mark scheme

- On the graph from part (a), draw a new short-run aggregate supply curve, SRAS2, to the right of SRAS1, such that AD1, SRAS2, and LRAS all intersect at the same point directly above Y_f (at a lower price level than PL1). 1 point for showing SRAS shifting rightward until it intersects AD1 and LRAS exactly at Y_f .

Solution 1

(c)(i)

Mark scheme

- Output (recessionary) gap = $Y_f - Y_1 = 540 \text{ billion} - 500 \text{ billion} = 40 \text{ billion}$. $\text{Spending multiplier} = 1/(1 - MPC) = 1/(1 - 0.8) = 1/0.2 = 5$. $\text{Minimum change in government spending} = \text{output gap} / \text{multiplier} = 40 \text{ billion} / 5 = 8 \text{ billion}$. Government spending must INCREASE by 8 billion. 1 point for the correct calculation ($40B/5 = 8B$) and the correct direction (increase).

Solution 1

(c)(ii)

Mark scheme

- Tax multiplier = $-MPC / (1 - MPC) = -0.8 / 0.2 = -4$. Minimum change in taxes = output gap / tax multiplier = \$40 billion / $(-4) = -\$10$ billion. Taxes must DECREASE by \$10 billion. 1 point for the correct calculation ($\$40B / -4 = -\$10B$) and the correct direction (decrease).

Solution 1

(d) Mark scheme

- Draw the money market with Nominal Interest Rate on the vertical axis and Quantity of Money on the horizontal axis: a vertical money supply curve MS1 and a downward-sloping money demand curve MD, intersecting at interest rate r_1 (1 point for the correctly labeled base graph). To raise investment spending and close the recessionary gap, the central bank conducts expansionary monetary policy (e.g., buys bonds / lowers the required reserve ratio / lowers the discount rate), increasing the money supply and shifting it rightward to MS2; the new equilibrium nominal interest rate r_2 is lower than r_1 (1 point for showing MS shifting right and the resulting lower equilibrium interest rate).

Solution 1

(e) Mark scheme

- Draw the foreign exchange market for the Canadian dollar with the exchange rate (Mexican Pesos per Canadian Dollar) on the vertical axis and the Quantity of Canadian Dollars on the horizontal axis: an upward-sloping supply curve S_1 and a downward-sloping demand curve D_1 , intersecting at exchange rate e_1 and quantity Q_1 (1 point for the correctly labeled base graph). Because the Canadian nominal interest rate fell in part (d), Canadian assets become less attractive relative to foreign assets, so foreign demand for Canadian dollars decreases (demand shifts left to D_2) – or equivalently, Canadians supply more dollars to buy foreign assets (supply shifts right to S_2). Either shift lowers the equilibrium exchange rate to e_2

Solution 1

< e1: the Canadian dollar DEPRECIATES against the Mexican peso (1 point for showing the correct shift and that the Canadian dollar depreciates).

Question 1

2019 Set 2 ■ Q1

Assume the economy of Artland is currently operating above full employment.

(a) Draw a correctly labeled graph of the short-run aggregate supply, long-run aggregate supply, and aggregate demand curves, and show each of the following.

- (i) The current equilibrium real output and price level, labeled as Y_1 and PL_1 , respectively
- (ii) The full-employment output, labeled as Y_f

Question 1

2019 Set 2 ■ Q1

Assume the economy of Artland is currently operating above full employment.

(b) Assume the central bank and the government do not take any policy actions to close the output gap.

- (i) On your graph in part (a), show how the economy automatically adjusts in the long run and label the new equilibrium price level PL_2 .
- (ii) Explain the cause of the adjustment shown in part (b)(i).

Question 1

2019 Set 2 ■ Q1

Assume the economy of Artland is currently operating above full employment.

(c) Alternatively, suppose the government wants to close the output gap using fiscal policy.

(i) Identify a fiscal policy action the government could implement to close the output gap.

(ii) How will the fiscal policy action identified in part (c)(i) affect the following?

- The unemployment rate
- The natural rate of unemployment

(iii) In closing the output gap, will the automatic adjustment identified in part (b)(i) produce a higher, a lower, or the same price level compared to the fiscal policy identified in part (c)(i)?

Question 1

2019 Set 2 ■ Q1

Assume the economy of Artland is currently operating above full employment.

(d) Draw a correctly labeled graph of the market for loanable funds. Show the effect of the fiscal policy action identified in part (c)(i) on the equilibrium real interest rate.

Question 1

2019 Set 2 ■ Q1

Assume the economy of Artland is currently operating above full employment.

(e) Given the interest rate change identified in part (d), will the long-run aggregate supply curve shift to the right, shift to the left, or remain the same in the long run? Explain.

Solution 1

(a) Mark scheme

- Draw a standard AD-AS graph: Price Level on the vertical axis, Real GDP on the horizontal axis. Draw a downward-sloping AD curve and an upward-sloping SRAS curve intersecting at the current equilibrium, labeled Y_1 (output) and PL_1 (price level). Add a vertical LRAS curve positioned to the LEFT of Y_1 , with the full-employment output labeled Y_f (so $Y_f < Y_1$, i.e. the economy is producing beyond full employment). Full credit requires: (1) a correctly labeled AD (downward-sloping) and SRAS (upward-sloping) with equilibrium Y_1 and PL_1 , and (2) a correctly labeled vertical LRAS with Y_f to the left of Y_1 .

Solution 1

(b) Mark scheme

- With no policy action, output is above full employment ($Y_1 > Y_f$), so tight labor/input markets push costs up over time and the SRAS curve shifts LEFTWARD (SRAS1 to SRAS2), moving the economy up along AD to a new long-run equilibrium at Y_f with a HIGHER price level, labeled PL2 ($PL_2 > PL_1$). Cause of the adjustment: since output exceeds the full-employment level, unemployment is below the natural rate, so rising input prices, rising nominal wages, and/or rising inflationary expectations increase production costs, shifting SRAS to the left until output returns to Y_f . Full credit requires: (1) SRAS shown shifting left with PL2 drawn/labeled higher than PL1, and (2) an explanation

Solution 1

citing increased input prices, nominal wages, or inflationary expectations as the cause of the leftward SRAS shift.

Solution 1

(c) Mark scheme

- (i) A valid contractionary fiscal policy action: a decrease in government spending, a decrease in transfer payments, OR an increase in taxes (any one). (ii) Effect on unemployment: the (actual/cyclical) unemployment rate will INCREASE, because the contractionary policy reduces AD and pulls output back down toward Y_f ; the natural rate of unemployment will NOT CHANGE, since fiscal policy does not alter the economy's structural/frictional unemployment. (iii) Price-level comparison: the automatic adjustment identified in part (b)(i) produces a HIGHER price level than the fiscal-policy route. The automatic mechanism raises the price level to PL2 as costs/wages rise (SRAS shifts left), whereas closing the gap via contractionary fiscal policy works by reducing AD, which keeps the price

Solution 1

level lower than the automatic-adjustment outcome. Full credit requires all three components: a valid contractionary fiscal policy, unemployment rising while the natural rate stays constant, and the automatic adjustment yielding a higher price level than the fiscal-policy route.

Solution 1

(d) Mark scheme

- Draw a loanable funds market graph: Real Interest Rate on the vertical axis, Quantity of Loanable Funds on the horizontal axis, with an upward-sloping supply curve S_{LF1} and a downward-sloping demand curve D_{LF1} intersecting at the initial equilibrium real interest rate r_1 and quantity Q_1 . Then show the effect of the contractionary fiscal policy from part (c)(i) (less government spending/transfer payments, or higher taxes, means a smaller budget deficit and less government borrowing): the DEMAND for loanable funds shifts LEFTWARD from D_{LF1} to D_{LF2} (equivalently, this can be shown as the SUPPLY of loanable funds shifting RIGHTWARD), which LOWERS the equilibrium real interest rate from r_1 to a lower r_2 . Full credit requires: (1) a correctly labeled

Solution 1

initial loanable-funds market graph, and (2) a leftward shift in demand for loanable funds (or rightward shift in supply) that lowers the equilibrium real interest rate.

Solution 1

(e)

Mark scheme

- The LRAS curve will shift to the RIGHT in the long run. Explanation: the lower real interest rate identified in part (d) reduces the cost of borrowing, which increases investment spending on capital goods; this greater capital formation raises the economy's productive capacity (a larger capital stock), shifting LRAS to the right.

Question 1

2017 ■ Q1

Assume that the economy of Country X has an actual unemployment rate of 7%, a natural rate of unemployment of 5%, and an inflation rate of 3%.

(a) Using the numerical values given above, draw a correctly labeled graph of the short-run and long-run Phillips curves. Label the current short-run equilibrium as point B. Plot the numerical values above on the graph.

Question 1

2017 ■ Q1

Assume that the economy of Country X has an actual unemployment rate of 7%, a natural rate of unemployment of 5%, and an inflation rate of 3%.

(b)(i) Assume that the government of Country X takes no policy action to reduce unemployment. In the long run, will each of the following shift to the right, shift to the left, or remain the same?

Short-run aggregate supply curve. Explain.

(b)(ii) Long-run Phillips curve

Question 1

2017 ■ Q1

Assume that the economy of Country X has an actual unemployment rate of 7%, a natural rate of unemployment of 5%, and an inflation rate of 3%.

(c) Identify a fiscal policy action that could be used to reduce the unemployment rate in the short run.

Question 1

2017 ■ Q1

Assume that the economy of Country X has an actual unemployment rate of 7%, a natural rate of unemployment of 5%, and an inflation rate of 3%.

(d) Draw a correctly labeled graph of aggregate demand and short-run aggregate supply, and show the impact on the equilibrium price level and real gross domestic product (GDP) of the fiscal policy action identified in part (c).

Question 1

2017 ■ Q1

Assume that the economy of Country X has an actual unemployment rate of 7%, a natural rate of unemployment of 5%, and an inflation rate of 3%.

(e) Based on the change in real GDP identified in part (d), will the supply of Country X's currency in the foreign exchange market increase, decrease, or remain the same? Explain.

Question 1

2017 ■ Q1

Assume that the economy of Country X has an actual unemployment rate of 7%, a natural rate of unemployment of 5%, and an inflation rate of 3%.

(f) Based on your answer to part (e) and assuming a flexible exchange rate system, will Country X's currency appreciate, depreciate, or remain the same in the foreign exchange market?

Solution 1

(a)

Mark scheme

- Graph axes: inflation rate (%) vertical, unemployment rate (%) horizontal. Draw a downward-sloping short-run Phillips curve (SRPC) (1 point). Draw a vertical long-run Phillips curve (LRPC) at the natural rate of unemployment, 5%, and plot point B on the SRPC to the right of the LRPC at the actual unemployment rate 7% and inflation rate 3% (1 point).

Solution 1

(b)(i)

Mark scheme

- The short-run aggregate supply (SRAS) curve will shift to the right in the long run. Explanation: with unemployment above the natural rate (a recessionary gap), nominal wages fall in response to the high unemployment, lowering production costs and shifting SRAS rightward.

Solution 1

(b)(ii)

Mark scheme

- The long-run Phillips curve (LRPC) will remain the same (unchanged) — it stays vertical at the natural rate of unemployment, 5%.

Solution 1

(c)

Mark scheme

- An expansionary fiscal policy: the government should either increase its expenditures (purchases) or decrease taxes to reduce the unemployment rate in the short run.

Solution 1

(d)

Mark scheme

- Graph axes: price level vertical, real GDP horizontal. Draw a downward-sloping AD curve, upward-sloping SRAS curve, with initial equilibrium price level PL1 and real GDP Y1 (1 point). Show AD shifting rightward from AD1 to AD2 (from the expansionary fiscal policy in part c), with equilibrium price level rising from PL1 to PL2 and real GDP rising from Y1 to Y2 — i.e., both the price level and real GDP increase (1 point).

Solution 1

(e)

Mark scheme

- The supply of Country X's currency in the foreign exchange market will increase. Explanation: the increase in real GDP (from part d) raises income, which increases spending on imports; residents supply more of Country X's currency on the foreign exchange market to purchase the foreign currency needed for those imports.

Solution 1

(f)

Mark scheme

- Under a flexible exchange rate system, Country X's currency will depreciate, because the increased supply of the currency (from part e), with demand unchanged, lowers its equilibrium value in the foreign exchange market.