Chief Reader Report on Student Responses:

2019 AP® Macroeconomics Free-Response Questions

Set 1

- Number of Students Scored 146,091
- Number of Readers 169
- Score Distribution

Exam Score	N	%At
5	27,899	19.1
4	33,586	23.0
3	24,619	16.9
2	21,706	14.9
1	38,281	26.2

- Global Mean 2.94

The following comments on the 2019 free-response questions for AP® Macroeconomics were written by the Chief Reader, Fred H. Smith, Professor of Economics at Davidson College. He gives an overview of each free-response question and of how students performed on the question, including typical student errors. General comments regarding the skills and content that students frequently have the most problems with are included. Some suggestions for improving student preparation in these areas are also provided. Teachers are encouraged to attend a College Board workshop to learn strategies for improving student performance in specific areas.

Question #1 **Task:** Graph, Explain, Calculate **Topic:** Long-run Adjustment, Stabilization Policies, and Foreign Exchange

Max. Points: 10 **Mean Score:** 4.77

What were the responses to this question expected to demonstrate?

This question examined students' understanding of the aggregate demand/aggregate supply (AD/AS) model and how the model can be used to show a recessionary output gap in the Canadian economy. The question also asked students to demonstrate their understanding of how the economy could return to long-run equilibrium through the process of self-correction or, alternatively, through the use of fiscal policy. Finally, the question examined students' understanding of the linkages between the performance of the Canadian economy and the foreign exchange market for the Canadian dollar.

Part (a) required students to use the AD/AS model to show the Canadian economy in a recession by illustrating that the current level of output, real gross domestic product (RGDP), is less than the full employment level of output. For part (b) students were asked to assume the central bank and the government take no policy actions to close the recessionary gap. Then, in part (b)(i) the students were asked to explain how the economy would adjust to full employment in the long run. Part (b)(ii) required the students to show the adjustment process described in part (b)(i) on the graph created for part (a).

In part (c) students were told to assume that the Canadian government was unwilling to wait for the long-run adjustment process to return the economy to full employment. Furthermore, the students were told to assume that the marginal propensity to consume was 0.8, that the current level of output was $500 billion, and that the full employment level of output was $540 billion. In part (c)(i) the students were asked to calculate the minimum change in government spending needed to close the gap. Part (c)(ii) asked the students to calculate the minimum change in taxes needed to close the gap. In both parts of (c) the students were required to indicate the direction of change (i.e., an increase or decrease in government spending or taxes) in addition to the magnitude of the change.

Part (d) asked students to assume that instead of the Canadian government using fiscal policy to close the gap, the Canadian central bank took the appropriate policy action to close the gap by influencing investment spending. Students were required to draw a correctly labeled graph of the Canadian money market and to show the effect of the policy action on the equilibrium interest rate.

Part (e) asked students to draw a correctly labeled graph of the foreign exchange market for the Canadian dollar and to show the effect of the change in the interest rate illustrated in the money market graph in part (d) on the exchange rate.

How well did the responses address the course content related to this question? How well did the responses integrate the skills required on this question?

In part (a), 84.4% of students earned the first point by drawing a correctly labeled graph of the AD/AS model. Students who earned this point placed the price level on the vertical axis and real gross domestic product on the horiztonal axis, and then they sketched in a downward-sloping curve labeled AD and an upward-sloping curve labeled SRAS. In addition, students were required to label the current equilibrium price level and real output with the appropriate labels, PL_1 and Y_1. The second point in part (a) was earned by 78.6% of students. To earn this point students were required to draw the long-run aggregate supply curve as a vertical line labeled "LRAS," with a label on the horizontal axis "Y_f," indicating the full employment level of output; students were also required to place the LRAS to the right of the intersection of AD and SRAS.

The first point in part (b) was earned by 26% who explained that the recessionary gap would close automatically in the long run after a decline in nominal wages (or input prices) caused the short-run aggregate supply curve to shift to the right, restoring the full employment level of output. The second point was earned by 41.8% of students who showed that the economy was returning to full employment through a rightward shift of the short-run aggregate supply curve.

In the stem of part (c) students were told that the current level of output was $500 billion, the full employment level of output was $540 billion, and the marginal propensity to consume was 0.8. In part (c)(i) students were required to calculate the minimum change in government spending necessary to close the recessionary output gap. To earn the point, students had to determine the size of the output gap ($540 billion-$500 billion) = $40 billion and the spending multiplier (1/(1–0.8)) = 5) in order to calculate the minimum change in government spending needed to close the gap (ΔG = $40 billion/5 = $8 billion increase in spending). Only 41.6% of students earned this point. Part (c)(ii) required students to calculate the minimum change in taxes that would have been necessary to close the output gap. To earn the point, students needed to use the output gap of $40 billion determined in part (c)(i) and determine the tax multiplier (0.8/(1 – 0.8) = 4) in order to calculate the minimum change in taxes needed to close the output gap (Δ taxes = $40 billion/–4 = –$10 billion, i.e. $10 billion decrease in taxes). The point in this part was earned by 31.8% of students.

To earn the first point in part (d), students had to draw a correctly labeled graph of the money market; the nominal interest rate labeled on the vertical axis, the quantity of money labeled on the horizontal axis, a vertical curve labeled "money supply" (e.g., MS), and a downward-sloping curve labeled "money demand" (e.g., MD). The second point was earned by showing the effect of the Canadian central bank's efforts to return the economy to full employment. To earn this point, students were required to show the money supply curve shifting to the right and to show that the equilibrium nominal interest rate had fallen as a result of the shift in the money supply curve. The first point in part (d) was earned by 67.2% of students, but only 53.2% of student responses earned the second point.

Finally, in part (e), 48.3% of student responses earned the first point and 34.4% earned the second point. The first point in part (e) was earned by drawing a correctly labeled graph of the foreign exchange market for the Canadian dollar. A correctly labeled graph had "Mexican pesos/Canadian dollars" labeled on the vertical axis, the "quantity of Canadian dollars" labeled on the horizontal axis, a downward-sloping curve labeled "demand for Canadian dollars" (e.g., $D_{C\$}$), and an upward-sloping curve labeled "supply of Canadian dollars" (e.g., $S_{C\$}$). The second point in part (e) required the student to illustrate a decrease (depreciation) in the value of the Canadian dollar by showing either a reduction in demand (leftward shift) for the Canadian dollar or an increase in supply (rightward shift) of the Canadian dollar.

What common student misconceptions or gaps in knowledge were seen in the responses to this question?

Common Misconceptions/Knowledge Gaps	*Responses that Demonstrate Understanding*
Part (a) • Missing or incorrect labels on the short-run macroeconomic equilibrium. • Failing to use the information in the prompt to place the short-run macroeconomic equilibrium (intersection of AD/SRAS) to the left of the long-run aggregate supply curve (LRAS).	• Correctly labeling the short-run macroeconomic equilibrium with PL_1 on the vertical axis and Y_1 on the horizontal axis at the location of the intersection of the AD and SRAS curves. • Drawing the intersection of AD and SRAS at a point to the left of the LRAS. • Correctly labeling the long-run aggregate supply curve "LRAS" and indicating on the horizontal axis that the vertical curve was

• Missing or incorrect labels on the long-run aggregate supply curve.	positioned at the full employment level of output labeled Y_F.
Part (b) • Failing to understand that the economy will self correct in the long run. • Failing to understand that the economy self corrects through a shift in the short-run aggregate supply curve.	• Correctly explaining that the recessionary output gap would close in the long run when (1) nominal wages fall in response to there being more workers looking for work than available jobs and (2) the SRAS would shift to the right as nominal wages fall. • Correctly showing that the recessionary gap closes after the SRAS shifts to the right until the new macroeconomic equilibrium occurs at the intersection of AD, SRAS, and LRAS.
Part (c) • Unable to calculate the ouput gap, the spending multiplier, the minimum change in government spending needed to close the recessionary gap, the tax multiplier, or the minimum change in taxes needed to close the recessionary gap.	• Correctly calculating: ○ The size of the output gap: \$540 billion–\$500 billion = \$40 billion ○ The spending multiplier: (1/(1–0.8)) = 5 ○ The minimum change in government spending needed to close the gap: ΔG = \$40 billion/5 = \$8 billion increase in spending. ○ The tax multiplier: 0.8/(1 – 0.8) = 4 ○ The minimum change in taxes needed to close the output gap: Δ taxes = \$40 billion/–4 = –\$10 billion or \$10 billion decrease in taxes
Part (d) • Missing or incorrect labels on the money market graph. • Failing to understand that the Canadian central bank will increase the money supply.	• Correctly labeling the vertical axis nominal interest rate and the horizontal axis quantity of money. Correctly labeling the downward-sloping curve demand for money and the vertical curve supply of money.

	• Correctly shifting the money supply curve to the right and showing a reduction in the nominal interest rate.
Part (e) • Missing or incorrect labels on the foreign exchange market graph. • Failing to understand that the reduction in the nominal interest rate identified in part (d) would lead to a reduction in the demand for (or increase in the supply of) Canadian dollars.	• Correctly labeling the vertical axis Mexican pesos/Canadian dollar and the horizontal axis quantity of Canadian dollars. Correctly labeling the downward-sloping curve demand for Canadian dollars and the upward-sloping curve supply of Canadian dollars. • Showing a leftward shift in the demand for (or a rightward shift in the supply of) the Canadian dollar and a depreciation of the Canadian dollar.

Based on your experience at the AP® Reading with student responses, what advice would you offer teachers to help them improve the student performance on the exam?

Students continue to struggle with drawing correctly labeled graphs of a foreign exchange market. In particular, students fail to label the vertical axis correctly. Teachers should work with their students to find ways to help them remember the correct labeling conventions. Since the vertical axis label will be expressed as a ratio, it may be helpful to remind students that the currency in the denominator in the label on the vertical axis must be the same as the currency that is the label for the horizontal axis. For example, graphing the foreign exchange market for Canadian dollars, if the question requires the price of Canadian dollars to be expressed in terms of Mexican pesos, then the vertical axis will be labeled "pesos/dollars" and the horizontal axis will be labeled "quantity of dollars."

What resources would you recommend to teachers to better prepare their students for the content and skill(s) required on this question?

Teachers may log in to AP Classroom to access formative questions and past AP questions on the content and skills addressed in this question. Additional resources are also available on the Classroom Resources section of the AP Macroeconomics course page; there teachers will find a curriculum module titled *Markets* with a chapter on Foreign Exchange Markets and another curriculum module titled *Mastering Economic Thinking Skills* with a chapter on Teaching About Foreign Exchange.

Question #2 **Task:** Graph, Assert, Explain **Topic:** Short-run and Long-run Phillips Curves

Max. Points: 5 **Mean Score:** 2.22

What were the responses to this question expected to demonstrate?

This question examined students' understanding of the short-run and long-run Phillips curve models, as well as their understanding of the relationship between real and nominal values. In the prompt students were asked to assume that the expected inflation rate was 3%, the current unemployment rate was 6%, and that the natural rate of unemployment was 4%. In part (a) students were asked to draw a correctly labeled graph of the short- run Phillips curve (SRPC) and the long-run Phillips curve (LRPC). Furthermore, students were asked to use the information from the prompt to label a point X to indicate the short-run equilibrium in the economy. Part (b) asked students to identify whether the actual inflation rate was greater than, less than, or equal to the expected inflation rate of 3%. Then, given the expected inflation rate of 3%, part (c) asked students to explain whether lenders would be better off or worse off after realizing the actual inflation rate that had been identified in part (b). Finally, part (d) asked students to consider the relationship between actual and expected inflation by determining what would happen to the natural rate of unemployment in the long run given the state of the economy depicted in part (a).

How well did the responses address the course content related to this question? How well did the responses integrate the skills required on this question?

In part (a), 63.4% of students earned the first point by creating a correctly labeled graph of the short-run Phillips curve. A correctly labeled graph had the inflation rate labeled on the vertical axis, the unemployment rate labeled on the horizontal axis, and a downward-sloping curve labeled "short-run Phillips curve" (SRPC). The second point was earned by only 30.6% of students. This point required students to draw a correctly labeled long-run Phillips curve (LRPC) to the left of a point X marked on the short-run Phillips curve. The second point also required students to use the numerical values from the stem of the question: the intersection of the SRPC and LRPC had to be labeled with the expected rate of inflation (3%), the LRPC had to be labeled with the natural rate of unemployment (4%), and point X had to be labeled with the current unemployment rate (6%).

Part (b) required students to correctly assert that the actual inflation rate was less than the expected inflation rate; 63.3% of students earned this point.

Part (c) required students to explain that lenders who made loans taking into account the expected inflation rate of 3% would be better off as a result of the actual rate of inflation being lower than the expected rate. Thus 45.8% of students earned this point by correctly explaining that the value of loan payments made to lenders given the actual rate of inflation would be greater than the value of the loan payments that would have been made to the lenders at the expected rate of inflation of 3%.

Finally, part (d) required students to correctly assert that the relationship between the actual and expected rates of inflation identified in part (a) would have no effect on the natural rate of unemployment in the long run. The point in part (d) was earned by 42% of students.

What common student misconceptions or gaps in knowledge were seen in the responses to this question?

Common Misconceptions/Knowledge Gaps	*Responses that Demonstrate Understanding*
Part (a) • Missing or incorrect labels on the Philips curve graph. • Failing to use the information in the prompt to correctly label point X, the expected rate of inflation, and the natural rate of unemployment.	• Correctly labeling the vertical axis inflation rate and the horizontal axis unemployment rate. Correctly labeling the downward-sloping curve short-run Phillips curve (SRPC) and the vertical curve long-run Phillips curve (LRPC). • Correctly labeling the intersection of the SRPC and LRPC with 3% (the expected rate of inflation) and 4% (the natural rate of unemployment). Correctly labeling a point X on the SRPC that is to the right of the intersection of the SRPC and the LRPC and indicating that the current unemployment rate associated with point X is 6%.
Part (b) • Failing to understand the relationship between expected and actual inflation rates in the Philips curve model.	• Correctly identifying that point X, which is associated with a 6% actual rate of unemployment, is located in a position on the SRPC that reflects actual inflation below expected inflation.
Part (c) • Failing to understand the relationship between real and nominal values.	• Understanding that loans made when expected inflation was at 3% will lead to a lender being better off if the actual inflation rate is less than 3%. The lenders are repaid in currency that has greater purchasing power than had been expected when the loan was made, for the price level hasn't risen as rapidly as had been expected.
Part (d) • Failing to understand the link between the natural rate of unemployment and inflation.	• Understanding that the expected rate of inflation is set by the intersection of the SRPC and the LRPC, but the natural rate of unemployment is set by the position of the LRPC on the horizontal axis.

Based on your experience at the AP® Reading with student responses, what advice would you offer teachers to help them improve the student performance on the exam?

Students continue to have difficulty mastering the Phillips curve model, and teachers should make an effort to emphasize the economic relationships explained by the Phillips curves. In particular, teachers should emphasize the correct labels for the axes (inflation rate on the vertical axis, unemployment rate on the horizontal axis), as well as the significance of the intersection of the short-run and long-run Phillips curves. Students need to be aware that the expected rate of inflation is found at the intersection of the SRPC and the LRPC; they also need to be aware that the location of the LRPC is determined by the natural rate of unemployment. Moreover, teachers should emphasize to their students that a change in inflationary expectations is accompanied by a *shift* in the short-run Phillips curve.

What resources would you recommend to teachers to better prepare their students for the content and skill(s) required on this question?

Teachers may log in to AP Classroom to access formative questions and past AP questions on the content and skills addressed in this question. Additional resources for teaching the Phillips curve are also available on the Classroom Resources section of the AP Macroeconomics course page; there teachers will find a curriculum module titled *Mastering Economic Thinking Skills* with two chapters on the Phillips curve.

Question #3 **Task:** Graph, Explain, Assert **Topic:** The Loanable Funds Market and the Foreign Exchange Market

Max. Points: 5 **Mean Score:** 2.30

What were the responses to this question expected to demonstrate?

This question asked students to assume that the households in Econland have increased their savings for retirement. Part (a) asked the students to draw a correctly labeled graph of the loanable funds market and to show how the increased savings for retirement affected the equilibrium real interest rate. Based on the real interest rate change shown in part (a), part (b) asked students to explain what would happen to Econland's purchases of foreign assets. Part (c) asked students to consider the market for Econland's currency, and part (c)(i) required the students to identify what would happen to the international value of Econland's currency based on the change identified in part (b). Finally, in part (c)(ii) students were asked to determine whether Econland's central bank would buy or sell Econland's currency in the foreign exchange market in order to offset the change identified in part (c)(i).

How well did the responses address the course content related to this question? How well did the responses integrate the skills required on this question?

In part (a), 66.7% of students earned the first point by drawing a correctly labeled graph of the loanable funds market. A correctly labeled graph had the real interest rate on the vertical axis, the quantity of loanable funds on the horizontal axis, a downward-sloping curve labeled "demand" for loanable funds (e.g., D_{LF}), and an upward-sloping curve labeled "supply of loanable funds" (e.g., S_{LF}). The second point was earned by 41% of students. This point required students to show that the increase in saving for retirement caused the supply of loanable funds curve to shift to the right and the equilibrium real interest rate to fall.

Part (b) required students to explain that the falling real interest rate shown in part (a) would lead to an increase in Econland's purchases of foreign assets because foreign assets would now be more attractive due to the relatively higher rate of return these assets would provide. Only 22.5% of student responses earned this point.

Part (c)(i) asked students to identify that the increase in purchases of foreign assets identified in part (b) would lead to depreciation in the value of Econland's currency. Part (c)(ii) asked students to identify that the Econland's central bank would need to buy Econland's currency in the foreign exchange market to offset the change in the currency identified in part (c)(i). The first point was earned by 56.4% of students and the second point was earned by 59.9% of students.

What common student misconceptions or gaps in knowledge were seen in the responses to this question?

Common Misconceptions/Knowledge Gaps	*Responses that Demonstrate Understanding*
Part (a) • Missing or incorrect labels on the loanable funds market graph. • Unable to link a change in savings to a shift in the supply of loanable funds.	• Correctly labeling the loanable funds market with the real interest rate on the vertical axis, the quantity of loanable funds on the horizontal axis, a downward-sloping curve labeled demand for loanable funds, and an upward-sloping curve labeled supply of loanable funds.

	• Showing that an increase in savings will lead to a rightward shift in the supply curve in the market for loanable funds and a decrease in the equilibrium real interest rate.
Part (b) • Unable to link the reduction in the real interest rate in Econland with an increase in Econland's purchases of foreign assets.	• Explaining that the reduction in the real interest rate in Econland makes investment in foreign assets relatively more attractive, and, therefore, Econland will purchase more foreign assets.
Part (c) • Unable to link Econland's increase in purchases of foreign assets to a reduction in the demand for (or increase in the supply of) Econland's currency. • Unable to link the depreciation in Econland's currency with a central bank action that would offset the depreciation in the currency.	• Correctly asserting that the value of Econland's currency will fall. • Correctly asserting that to offset the depreciation in Econland's currency, Econland's central bank would need to buy Econland's currency.

Based on your experience at the AP® Reading with student responses, what advice would you offer teachers to help them improve the student performance on the exam?

Students had a great deal of trouble with part (b) of this question. Part (b) required students to understand the relationship between Econland's real interest rate determined in the loanable funds market and the demand for foreign assets. It appears that students did not understand that foreign assets would become relatively more attractive after the real interest rate in Econland had fallen. Teachers should emphasize to their students that in open economies investors/savers will seek out the highest real rate of return they can earn. Therefore, if real interest rates fall in Econland, then the real rate of return that can be earned by purchasing foreign assets will be relatively greater than it had been previously, and investors/savers will choose to purchase foreign assets.

What resources would you recommend to teachers to better prepare their students for the content and skill(s) required on this question?

Teachers may log in to AP Classroom to access formative questions and past AP questions on the content and skills addressed in this question.