Chief Reader Report on Student Responses:

2019 AP® Macroeconomics Free-Response Questions

Set 2

- 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, Assert	**Topic:** Long-run Adjustment, Stabilization Policies, and Economic Growth
	Max. Points: 10	**Mean Score:** 5.33

What were the responses to this question expected to demonstrate?

The question examined students' understanding of the aggregate demand/aggregate supply (AD/AS) model and how the model can be used to show an inflationary output gap in the economy of Artland. 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 linkage between fiscal policy, real interest rates in the loanable funds market, and long-run economic growth.

Part (a) required students to use the AD/AS model to show Artland's economy in an inflationary gap by illustrating that the current level of output, real gross domestic product, (RGDP), is greater 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 inflationary gap. Part (b)(i) required students to show how the economy would adjust to full employment in the long run on the graph created for part (a), and it also required students to label the new equilibrium price level PL_2. Then, in part (b)(ii) the students were asked to explain how the economy would adjust to full employment in the long run.

Next, in part (c), students were told to assume that the government of Artland wanted to close the output gap using fiscal policy. In part (c)(i) the students were asked to identify a fiscal policy action that could close the output gap. Part (c)(ii) asked the students to determine how the fiscal policy action identified in part (c)(i) would affect the unemployment rate and the natural rate of unemployment. In part (c)(iii) the students were asked to determine if the automatic adjustment identified in part (b)(i) would produce a price level that was higher, lower, or the same as the price level produced by the fiscal policy identified in part (c)(i).

Part (d) asked students to draw a correctly labeled graph of the loanable funds market and to show the effect of the fiscal policy action identified in part (c)(i) on the equilibrium real interest rate.

Part (e) required students to explain why the long-run aggregate supply curve (LRAS) would shift to the right, to the left, or remain in the same location as a result of the interest rate change identified in part (d).

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), 81.6% of students earned the first point by drawing a correctly labeled graph of the AD/AS model. Students who earned this point labeled the price level on the vertical axis and real gross domestic product on the horizontal 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 70% 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 left of the intersection of AD and SRAS.

The first point in part (b) required students to show the economy returning to full employment through a leftward shift of the short-run aggregate supply curve. Students were required to label the new equilibrium price level PL_2. The second point in part (b) required students to explain that the inflationary gap would close automatically in the long run after an increase in nominal wages (or input prices) caused the short-run aggregate supply curve to shift to the left,

restoring the full employment level of output. While 51.2% of students earned the first point in part (b), only 33.6% of students earned the second point.

Part (c)(i) required students to identify a fiscal policy that could be used to close the inflationary gap, and 69.2% of students correctly identified either a reduction in government spending or an increase in taxes as appropriate policy choices. The point in part (c)(ii) was earned by 69.6% of students. This point required students to assert that the fiscal policy identified in part (c)(i) would increase the unemployment rate but not the natural rate of unemployment. Part (c)(iii) required students to correctly assert that the automatic adjustment process described in part (b) would produce a higher rate of inflation than the fiscal policy identified in part (c)(i). For this part, 60.4% of student responses earned the point.

In part (d), 66.4% 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" labeled on the vertical axis, the "quantity of loanable funds" labeled 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 in part (d) was earned by 44.4% of students, and this point required students to show that the decrease in government spending (or the increase in taxes) identified in part (c)(i) caused the demand for loanable funds curve to shift to the left (or the supply of loanable funds curve to shift to the right) and the equilibrium real interest rate to fall.

Finally, only 27.2% of students earned the point in part (e). This part required students to explain that the reduction in the real interest rate identified in part (d) would lead to an increase in investment spending which would increase capital accumulation (or increase the physical stock of capital) and cause the long-run aggregate supply curve (LRAS) to shift to the right.

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 right of the long-run aggregate supply curve (LRAS). • Missing or incorrect labels on the long-run aggregate supply curve.	• 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 right of the LRAS. • Correctly labeling the long-run aggregate supply curve "LRAS" and indicating on the horizontal axis that the vertical curve was positioned at the full employment level of output labeled Y_F.
Part (b) • Failing to understand that the economy self corrects through a shift in the short-run aggregate supply curve.	• Correctly showing that the recessionary output gap closes after the SRAS shifts to the left until the new macroeconomic

• Failing to understand that the economy will self correct in the long run.	equilibrium occurs at the intersection of AD, SRAS, and LRAS. • Correctly explaining that the recessionary output gap would close in the long run when (1) nominal wages rise in response to there being fewer workers looking for work than available jobs and (2) the SRAS would shift to the left as nominal wages increased.
Part (c) • Failing to understand when the government would use contractionary fiscal policy. • Failing to understand that when an inflationary gap exists the self-correcting mechanism leads to an increase in the price level and contractionary fiscal policy leads to a decrease in the price level.	• Correctly asserting that either a reduction in government spending or an increase in taxes would close an expansionary gap. • Correctly asserting that the automatic adjustment to long-run equilibrium through the self-correcting mechanism will lead to a higher price level than when contractionary fiscal policy is used to restore the economy to long-run equilibrium.
Part (d) • Missing or incorrect labels on the loanable funds market graph. • Unable to link a reduction in government spending or an increase in taxes to a reduction in the real interest rate.	• 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 a reduction in government spending or an increase in taxes would cause a leftward shift in the demand for loanable funds (or a rightward shift in the supply of loanable funds) and a reduction in the equilibrium real interest rate.
Part (e) • Unable to link a reduction in the real interest rate to a shift in the long-run aggregate supply curve.	• Explaining that the reduction in the real interest rate leads to an increase in investment spending and an increase in the stock of physical capital. The increase in the stock of physical capital results in an increase in potential (full employment) real GDP, and, therefore, a rightward shift in the long-run aggregate supply curve.

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 the relationship between interest rates, investment spending, and shifts in the long-run aggregate supply curve. Part (e) of this question requires students to demonstrate that they understand the entire chain of events: interest rates fall and investment spending increases, which increases the stock of physical capital in the economy. An increase in the capital stock raises labor productivity; this leads to an increase in potential (full-employment) real GDP and a rightward shift in the long-run aggregate supply curve. Many students fail to link the change in investment spending to a change in the physical stock of capital (or an improvement in technology), and teachers should emphasize this point when talking about economic growth and the long-run aggregate supply 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.

Question #2	**Task:** Graph, Explain, Assert	**Topic:** Balance of Payments, Foreign Exchange Market
	Max. Points: 5	**Mean Score:** 1.90

What were the responses to this question expected to demonstrate?

The question examined students' understanding of the current account and foreign exchange markets. Students were told that the United States current account balance is zero, and in part (a) they were asked to determine if an increase in real income in the United States led to a current account surplus, a current account deficit, or no change in the current account balance. Part (b) asked the students to draw a correctly labeled graph of the foreign exchange market for the euro and to show the effect of the increase in United States real income on the value of the euro relative to the United States dollar. Finally, in part (c) students were told to assume that interest rates had increased in the European Union. Part (c)(i) asked students to explain how the increase in interest rates would affect the demand for the United States dollar. Part (c)(ii) asked students to determine how their answer in part (c)(i) would affect the value of the United States dollar relative to the euro.

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?

Only 32% of students earned the point in part (a), which required students to explain that the increase in United States real income would lead to an increase in the U.S. demand for foreign goods and services and a United States current account deficit.

The first point in part (b) was earned by 48.4% of students. This point required students to draw a correctly labeled graph of the foreign exchange market for the euro. A correctly labeled graph had "U.S. dollars/euro" labeled on the vertical axis, the "quantity of euros" labeled on the horizontal axis, a downward-sloping curve labeled "demand for euros" (e.g., $D_€$), and an upward-sloping curve labeled "supply of euros" (e.g., $S_€$). The second point in part (b) was earned by 31.2% of students. This point required students to correctly illustrate that the increase in real income in the U.S. would lead to an increase in the demand for the euro and an appreciation of the euro.

Part (c)(i) required students to explain that if interest rates in the euro zone increase then the demand for the U.S. dollar would decrease because fewer investors/savers would want to purchase the dollar in order to buy U.S. financial assets. Part (c)(ii) required students to correctly assert that the decrease in the demand for the dollar would lead to a depreciation of the U.S. dollar. While only 41.2% of students earned the point in (c)(i), 78% of student responses earned the point in (c)(ii).

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) • Unable to link an increase in real income with an increase in the demand for foreign goods and services.	• Correctly explaining that an increase in United States real income leads Unites States consumers to purchase more goods and services from abroad, which leads to a United States current account deficit.

Part (b) • Missing or incorrect labels on the foreign exchange market graph. • Failing to understand that the increase in United States real income would lead to an increase in the demand for the euro.	• Correctly labeling the vertical axis United States dollars/euro and the horizontal axis quantity of euros. Correctly labeling the downward-sloping curve demand for euros and the upward-sloping curve supply of euros. • Showing a rightward shift in the demand for the euro and an appreciation of the euro.
Part (c) • Unable to link an increase in interest rates in the European Union to a decrease in the demand for the United States dollar. • Unable to link a decrease in the demand for the United States dollar to a depreciation of the United States dollar.	• Explaining that an increase in interest rates in the European Union would lead to a decrease in the demand for financial assets in the United States, and, therefore, a decrease in the demand for the United States dollar. • Correctly asserting that the dollar would depreciate.

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 questions that focus on foreign exchange markets. This question was especially difficult for students because it asked for a graph of the foreign exchange market for euros in part (b), but then part (c) asked questions about the foreign exchange market for the dollar. Teachers should work with their students to find ways to help them remember the correct labeling conventions for foreign exchange markets. 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, if they are graphing the foreign exchange market for the euro and the question requires the price of the euro to be expressed in terms of U.S. dollars, then the vertical axis will be labeled "dollars/euro" and the horizontal axis will be labeled "quantity of euros."

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 #3	**Task:** Graph, Explain, Perform Numerical Analysis	**Topic:** The Production Possibilities Curve, Comparative Advantage, Exchange
	Max. Points: 5	**Mean Score:** 3.47

What were the responses to this question expected to demonstrate?

The question provided the students with a table of data about the production capabilities of food and capital goods for Sweden and Norway. Part (a) asked the students to draw a correctly labeled graph of the production possibilities curve (PPC) for Sweden. Students were asked to use the numerical values from the table of data to provide the relevant numerical labels for the intercepts of Sweden's PPC. Part (b) required students to place three points on the graph created for part (a): a point labeled "E" that represented an efficient level of production, a point labeled "I" that represented an inefficient level of production, and a point labeled "U" that represented an unattainable level of production. In part (c) students were asked to identify what would happen to economic growth in Sweden in the future if Sweden moved from producing 20 units of food and 60 units of capital goods to 30 units of food and 40 units of capital goods. In part (d) students were asked to use the data in the table in order to identify and explain which country had the comparative advantage in the production of capital goods. Finally, part (e) asked students to use the data in the table to identify a specific number of units of capital goods that could be traded for 10 units of food and that would be beneficial for both countries.

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?

The point in part (a) was earned by 81.4% students. This part required students to draw a correctly labeled graph of the production possibilities curve (PPC) for Sweden in which the vertical axis was labeled "capital goods," the horizontal axis was labeled "food," and a downward-sloping PPC had an intercept of 100 on the capital goods axis and 50 on the food axis. Part (b) required students to correctly place three points on the graph they created for part (a). Students who correctly responded to part (b) put a point E on the PPC, a point I inside (below and to the left) of the PPC, and a point U outside (above and to the right) of the PPC. The point for this part was earned by 92% of all responses. To earn the point in part (c) students had to assert that in Sweden, economic growth would decrease or be harmed if it shifted production from 20 units of food and 60 units of capital goods to 30 units of food and 40 units of capital goods. The point in part (c) was earned by 52% of responses. In part (d) students were required to explain that Norway had the comparative advantage in the production of capital goods because its opportunity cost of producing one capital good was one quarter of a unit of food, whereas Sweden's opportunity cost of producing one capital good was one half a unit of food. The point in part (d) was earned by 74.4% of students. Finally, in part (e), 55.6% of students earned a point by identifying a single number of units of capital goods that could be traded for 10 units of food and result in a mutually beneficial exchange. Any number between 20 and 40 units of capital goods earned the point.

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 (c) • Unable to link production of capital goods with productivity and long-run economic growth.	• Correctly asserting that Sweden's economic growth would slow or decrease due to its decision to produce more food and fewer units of capital goods.

Part (e) • Unable to calculate a trade rate that would be beneficial for each trading partner.	• Correctly identifying a number of capital goods that could be traded for 10 units of food and produce a beneficial outcome for both Norway and Sweden. (For example, a correct answer was 30 units of capital goods.)

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?

Part (d) required students to calculate a trade rate that would be beneficial for both Norway and Sweden. Calculating mutually beneficial trade rates remains a difficult task for students, and teachers should continue to emphasize this concept in their courses. One tool that can help students to master this concept is thinking about the terms of trade in relation to the opportunity cost reflected by the slope of each country's PPC. Sweden's PPC reflects the fact that it would be forced to give up two units of capital goods for every additional unit of food it wishes to produce. Norway's PPC reflects the fact that it would be forced to give up four units of capital goods for every additional unit of food it wishes to produce. Since students established that Norway had the comparative advantage in producing capital goods in part (d), students needed to remember that each country would have produced the good in which it possesses comparative advantage and would trade for the other good. Thus, Norway would have produced capital goods to trade for food; Sweden would have produced food to trade for capital goods. In order for a trade to have been mutually beneficial, then Sweden would have needed to receive more than two capital goods for every unit of food it traded away and Norway would have had to give up fewer than four units of capital goods for every unit of food it received.

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.