Chief Reader Report on Student Responses:

2017 AP® Macroeconomics Free-Response Questions

• Number of Students Scored	141,649			
• Number of Readers	159			
• Score Distribution	Exam Score	N	%At	
	5	24,686	17.4	
	4	33,024	23.3	
	3	23,930	16.9	
	2	22,354	15.8	
	1	37,655	26.6	
• Global Mean	2.89			

The following comments on the 2017 free-response questions for AP® Macroeconomics were written by the Chief Reader, Fred Smith (Professor of Economics at Davidson College, Davidson NC), and Operational Question Leaders Richard Rankin, Gabriel Sanchez, and Bernice Scott. They give 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 and explain   **Topic:** Stabilization Policies, Open Economy (Foreign Exchange)

Max. Points: 9   **Mean Score:** 4.77

What were responses expected to demonstrate in their response to this question?

The question examined students' understanding of the Phillips curve and the domestic and international effects of a fiscal policy action to reduce unemployment. Part (a) required students to use the Phillips curve model to show the relationship between inflation and unemployment in the short run (the short-run Phillips curve) and in the long run (the long-run Phillips curve) and to show an economy in short-run equilibrium when actual unemployment exceeds the natural rate of unemployment. From the short-run equilibrium, assuming the government takes no policy action, students were asked in part (b) to explain how the short-run aggregate supply curve will change, and to indicate what will happen to the long-run Phillips curve. The remainder of the question addresses the fiscal policy needed to lower unemployment and the effects of that fiscal policy. Part (c) asked students to identify a fiscal policy action necessary to lower unemployment. Part (d) required students to use an aggregate demand/aggregate supply model to show the effects of the fiscal policy they identified in part (c). Part (e) required students to explain how the change in real gross domestic product shown in part (d) will impact the supply of Country X's currency on the foreign exchange market. Part (f) required students to state whether Country X's currency will appreciate, depreciate, or remain the same in the foreign exchange market.

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), 37% of student-responses earned the first point which required students to draw a graph with the inflation rate on the vertical axis, the unemployment rate on the horizontal axis, and a downward sloping short-run Phillips curve (SRPC). Only 24% of students earned the second point in part (a). This point required students to draw a vertical long-run Phillips curve (LRPC), to plot a point labeled "B" on the SRPC to the right of the LRPC, to indicate that the natural rate of unemployment of 5% coincided with the location of the LRPC on the horizontal axis, and to correctly label the inflation rate and unemployment rate associated with point "B" with the values provided – 3% and 7% respectively.

The first point in part (b) was earned by 14% of students. This point required students to recognize that because unemployment is currently above the natural rate of unemployment and the government is taking no policy action to reduce unemployment, the economy will self-correct in the long run. Students earned this point by stating that in the long run the short-run aggregate supply curve would shift to the right because nominal wages would fall in response to the current unemployment rate being above the natural rate. Thirty-four percent of students earned the second point in part (b) which required the students to state that the long-run Phillips curve would remain in the same location.

Part (c) required students to identify a fiscal policy action that would reduce unemployment in the short run, and 38% of students correctly responded by stating that the government should increase spending and/or lower taxes.

The first point in part (d) required students to draw a graph of the aggregate supply/aggregate demand model. A graph that earned the point placed the price level on the vertical axis, real GDP on the horizontal axis, and it depicted an appropriately-labeled upward-sloping short-run aggregate supply and downward-sloping aggregate demand curve with the equilibrium price level and equilibrium real GDP indicated. While 41% of students earned this graphing point, only 31% of student responses earned the second point in part (d). The second point required the student to illustrate on their graph the effect of the fiscal policy identified in part (c). Thus, a student earned the second point in part (d) by drawing a graph illustrating the aggregate demand curve shifting to the right and showing an increase in real GDP and the price level.

Part (e) asked students to identify what would happen to the supply of Country X's currency based on the change in real GDP identified in part (d). A student earning the point in part (e) needed to assert that the supply of the currency would increase. However, earning the point also required the student to explain that the supply would increase

because the increase in national income (real GDP) would lead to greater spending on imports. Only 15% of student responses earned the point in part (e).

Finally, part (f) asked the student to assert how the change in the currency market identified in part (e) would lead to an appreciation or depreciation (or no change) in the value of Country X's currency. Thirty-one percent of students correctly responded that the currency would depreciate.

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 axes of the Phillips curve graph. • Improper relationship between inflation and unemployment on the short-run Phillips curve (SRPC) and/or the long-run Phillips curve (LRPC). • Missing or incorrect label on the short-run Phillips curve. • Missing or incorrect label on the long-run Phillips curve (LRPC). • Failure to correctly use the information in the prompt to label the natural rate of unemployment and to draw point "B" in the correct location with the appropriate labels.	• Correctly labeling the vertical axis with "inflation rate" and the horizontal axis with "unemployment rate". • Drawing the short-run Phillips curve as a downward sloping line/curve that indicates unemployment increases as inflation falls. Drawing the long-run Phillips curve as a vertical line that indicates unemployment is always at the natural rate of unemployment (5%). • Labeling the downward-sloping curve "SRPC". • Labeling the vertical curve "LRPC". • Clearly indicating the LRPC is located where the unemployment rate is 5%, that point "B" is on the SRPC to the right of the LRPC, and that point "B" is associated with an inflation rate of 3% and an unemployment rate of 7%.
Part (b) • Unable to identify the change in nominal wages necessary to reduce unemployment. • Unable to link the change in the nominal wage rate to a shift in the short-run aggregate supply curve.	• Explaining that high rates of unemployment would lead to reductions in the nominal wage rate. • Explaining that a reduction in the nominal wage rate would lead to a rightward shift of the short-run aggregate supply curve.

• Confusing the factors or conditions that would lead to a shift in the LRPC.	• Asserting that the LRPC would not shift. (Understanding that the LRPC would not shift due to the current unemployment rate being above the natural rate of unemployment.)
Part (c) • Identifying a monetary policy action that would reduce unemployment instead of indentifying a fiscal policy action that would reduce unemployment.	 • Stating that the government should increase government spending and/or lower taxes.
Part (d) • Missing or incorrect labels on the axes or the curves in the aggregate supply/aggregate demand model. • Incomplete/missing labels indicating the increase in real GDP and the price level when AD shifts to the right.	 • Sketching a graph that has price level on the vertical axis, real GDP on the horizontal axis, a label of AS or SRAS on an upward-sloping curve, and a label of AD on a downward-sloping curve. • Clearly indicating that the price level has increased and that the level of real GDP has increased when AD shifted to the right as a result of expansionary fiscal policy.
Part (e) • Shifting the demand for Country X's currency instead of (or in addition to) shifting the supply of Country X's currency. • Shifting the supply of Country X's currency in the wrong direction and/or failing to provide an explanation for why the supply is shifting.	 • Clearly indicating that the supply of Country X's currency increased. • Clearly indicating that the supply of Country X's currency increased due to national income rising and the demand for imported goods increasing as a result.
Part (f) • Confusing currency appreciation with currency depreciation	 • Correctly asserting that the value of Country X's currency would depreciate.

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

Teachers should continue to emphasize the importance of drawing correctly-labeled graphs. Correctly labeled graphs must have the appropriate labels on both axes and on any curves depicted in the graph.

Teachers should also continue to work with examples that will help students to understand foreign exchange market graphs and currency appreciation (depreciation). These are difficult graphs for students to master, and, in particular, it is essential that students learn to provide correct labels for the axes. In particular, the vertical axis label is tough for students to remember. There are two ways to help students with this issue. First, try to help them master a simple rule of thumb, that the denominator of the exchange rate on the vertical axis should match the currency that is being exchanged (the horizontal axis label). For example, suppose a student faces a question about trade with Country X and is asked to graph the foreign exchange market for Country X's currency. In this case, the horizontal axis label needs to be "Quantity of Country X's currency," and the vertical axis label would be "Units of foreign currency/Unit of Country X's currency." Second, emphasize that one way of correctly labeling the vertical axis is to simply label it as the "exchange rate" (or "real exchange rate"). While this label isn't very helpful in determining whether a currency has increased or decreased in value, it is a correct label.

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

Teachers should visit the AP Macroeconomics course page on AP Central for supplemental resources, including a link to the Davidson Next online modules, which were created to help AP teachers and students master the most challenging aspects of the course. Teachers will also find a special focus project titled "Markets" which was developed to support the proper labeling and understanding of economics graphs on the Classroom Resources section of the course page.

Question #2

Task: Graph and explain
Topics: Financial Sector, National Income and Price Determination
Max. Points: 6
Mean Score: 2.57

What were responses expected to demonstrate in their response to this question?

The question examined students' knowledge and understanding of the impact of a change in the demand for money on the nominal interest rate and the effect of the interest rate-change on bond prices, the price level, real gross domestic product, and the velocity of money, including identifying a specific monetary policy to reverse the interest-rate change. In part (a) students were required to draw a money market graph and show the effect of reduced holdings of money on the nominal interest rate. In part (b) students were asked to identify the impact of the change in the interest rate on the prices of previously issued bonds and to explain the effect of the change in the nominal interest rate on the price level and real income. In part (c) students were required to use the equation of exchange to determine what happens to the velocity of money, based on the price level and real income change identified in part (b). In part (d) students were asked to identify the open-market operation the central bank would use to reverse the change in the interest rate identified 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), students earned the first point by drawing a graph of the money market with correctly labeled axes (nominal interest rate on the vertical axis, quantity of money on the horizontal axis), a downward-sloping curve labeled "money demand," and a vertical (or upward-sloping) curve labeled "money supply." While 32% of student responses earned the first point in part (a), only 18% of student responses earned the second point. The second point in part (a) required students to show that the money demand curve would shift to the left (due to consumers' desire to hold less money) and that the nominal interest rate would fall.

For the first point in part (b), students had to state that the prices of previously-issued bonds would increase. Approximately 22% of all student responses earned this point. Only 7% of student responses earned the second point in part (b). This point required the students to explain that, due to the reduction in the interest rate depicted in part (a), interest rate sensitive spending (C, I, and/or NX) would increase, resulting in a rightward shift in aggregate demand curve and an increase in the price level and real income (real GDP).

In part (c), students earned the point by stating that the velocity of money would increase (as a result of the increase in the price level and real income). Eighteen percent of student responses earned this point.

Finally, in part (d), students earned a point for stating that the central bank would need to sell bonds to reverse the interest rate change identified in part (a). Nearly 26% of student responses earned the point in part (d).

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 in the money market graph. In particular, incorrect labels for the horizontal axis (e.g. quantity of loanable funds).	• Drawing a money market graph with correctly-labeled axes (nominal interest rate on the vertical axis, quantity of money on the horizontal axis), a downward-sloping curve labeled "money demand," and a vertical (or upward-sloping) curve labeled "money supply."

• Misunderstanding the effect that consumers' desire to hold less cash would have on the money market (e.g. Shifting the money supply curve instead of the money demand curve).	• Showing a leftward shift of the money demand curve and a reduction in the equilibrium nominal interest rate.
Part (b) • Not understanding the relationhip between interest rates and the price of previously-issued bonds. • Failing to link changes in the interest rate to changes in interest rate sensitive spending and aggregate demand. • Confusion about the definition of real income.	• Prices of previously-issued bonds will rise (since the nominal interest rate decreased in part a). • The decrease in the interest rate in part (a) would lead to an increase in the interest rate sensitive components of C, I, and/or NX. Since C, I, and NX are components of aggregate demand, an increase in any of them will lead to an increase in aggregate demand. • The decrease in the interest rate in part (a) leads to an increase in interest rate sensitive spending, a rightward shift in aggregate demand curve, and an increase in the price level and real income. Real income is a synonym for "real GDP" or "national income" in the context of a macroeconomics free response question.
Part (c) • Not understanding (or not remembering) the quantity theory of money: M×V = P×Y	• Given a constant value for M, the increase in P and Y in part (b) must lead to an increase in velocity (V).
Part (d) • Identifying monetary policy tools that are **not** open market operations.	• To reverse the decrease in the interest rate change from part (a) the central bank should sell bonds. Students should not list other monetary policy tools that are **not** open market operations (e.g. raising the discount rate or raising the required reserve ratio).

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

Teachers must remember to discuss the relationship between the prices of previously-issued bonds and interest rates. This is an easy topic to overlook, but it is important. Teachers also need to make sure that students are familiar with the quantity theory of money. It is listed in the course outline – Section IV, Part C2.

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

Teachers should visit the AP Macroeconomics course page on AP Central for supplemental resources, including a link to the Davidson Next online modules, which were created to help AP teachers and students master the most challenging aspects of the course. Teachers will also find a special focus project titled "Markets" on the Classroom Resources section of the course page which was developed to support the proper labeling and understanding of economics graphs.

Question #3

Task: Graph and explain   **Topic:** Economic Growth

Max. Points: 5   **Mean Score:** 2.71

What were responses expected to demonstrate in their response to this question?

The question examined students' knowledge of the production possibilities curve and the impact of an increase in national savings on the loanable funds market and on the long-run aggregate supply. In part (a) students were asked to draw a graph of a production possibilities curve and to label a point of full employment. Part (b) consists of two parts. The first part required students to draw a graph of the loanable funds market. In the second part students were required to illustrate the change in the real interest rate that results from the increase in national savings on the graph for the loanable funds market. Part (c) referred students back to part (a) and asked them to identify a new point on the production possibilities curve to illustrate how the increase in national savings affected the combination of capital goods and consumer goods produced. In part (d) students were asked to state what happens to the long-run aggregate supply curve based on the new combination of capital and consumer goods identified on the production possibilities curve.

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), 87% of students earned a point for drawing a graph that placed consumer goods on the horizontal axis and capital goods on the vertical axis, that included a clearly-labeled production possibilities curve (frontier), and that had a point – labeled X – drawn on the production possibilities curve.

The first point in part (b) required students to draw a graph of the loanable funds market that placed the real interest rate on the vertical axis, the quantity of loanable funds on the horizontal axis, included a downward-sloping curve labeled "demand for loanable funds," and an upward-sloping curve labeled "supply of loanable funds." Approximately 58% of students earned this point, but only 42% earned the second point in part (b). Students earned the second point in part (b) by indicating that the supply curve of loanable funds would shift to the right and that the equilibrium real interest rate would fall as a result of an increase in national savings.

In part (c), students earned a point for placing a new point, Z, to the left of point X on the production possibilities curve drawn for part (a). Approximately 51% of student responses earned the point in part (c).

Part (d) required students to state that the long-run aggregate supply curve would shift to the right as a result of the increase in capital accumulation depicted in part (c). Nearly 23% of student responses earned this 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 (b) • Inability to connect an increase in national savings to a change in the supply of loanable funds.	• An increase in national savings leads to a rightward shift in the supply curve of loanable funds and a decrease in the equilibrium real interest rate.
Part (d) • Misunderstanding of the linkage between capital accumulation and a rightward shift in the long-run aggregate supply curve.	• The increase in capital accumulation indicated in part (c) would lead to a rightward shift in the long-run aggregate supply curve because of an increase in labor productivity.

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

N/A

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

Teachers should visit the AP Macroeconomics course page on AP Central for supplemental resources, including a link to the Davidson Next online modules, which were created to help AP teachers and students master the most challenging aspects of the course. Teachers will also find a special focus project titled "Markets" on the Classroom Resources section of the course page which was developed to support the proper labeling and understanding of economics graphs.