Chief Reader Report on Student Responses:

2018 AP® Macroeconomics Free-Response Questions

- Number of Students Scored 146,673
- Number of Readers 163
- Score Distribution

Exam Score	N	%At
5	28,910	19.7
4	33,109	22.6
3	23,790	16.2
2	24,640	16.8
1	36,224	24.7

- Global Mean 2.96

The following comments on the 2018 free-response questions for AP® Macroeconomics were written by the Chief Reader Fred Smith (Professor of Economics, Davidson College, Davidson, NC) and Question Leaders Richard Rankin, Gabriel Sanchez, and Kay Strong. 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

Max. Points: 10

Topic: Stabilization Policies

Mean Score: 5.69

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 the effects of a recession in the United States on its trading partners' economies. Part (a) required students to use the AD/AS model to show the United States economy in a recession by showing that the current level of output (real gross domestic product) is less than the full employment level of output.

For part (b) students were asked to assume that the euro zone, a major trading partner of the United States, has entered into a recession. Then, in part (b)(i), students were asked to explain how the recession in the euro zone would affect exports from the United States to the euro zone. Part (b)(ii) asked students to return to the graph created for part (a) in order to show how the change in exports to the euro zone would affect real output in the United States. Part (b)(iii) asked students to conclude how the change illustrated in part (b)(ii) would affect unemployment in the United States.

For part (c) students were asked to assume that the euro zone recession caused a decrease in the demand for the United States dollar in the foreign exchange market. In part (c)(i) students were asked to explain whether this would cause the euro to appreciate, depreciate, or remain unchanged in value against the dollar. Then, part (c)(ii) asked the students to draw a correctly labeled graph of the foreign exchange market for dollars and to illustrate the effect of the decrease in the demand for dollars on the exchange rate.

Finally, for part (d), students were asked to assume that the United States enacted a combination of expansionary fiscal and monetary policies and that the expansionary fiscal policy did not lead to complete crowding out. Part (d)(i) required students to identify the policies' effect on aggregate demand in the United States, part (d)(ii) required the students to identify the policies' effect on the price level in the United States, and part (d)(iii) required the students to explain how the policies would affect interest rates in the United States

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), 77.4% of students earned the first point by drawing a correctly labeled graph of the AD/AS model. Students who earned the first point in part (a) placed the price level on the vertical axis and real gross domestic product on the horizontal axis, and they sketched a downward sloping curve labeled "AD" and an upward sloping curve labeled "AS" (or SRAS). Only 62.5% of students earned the second point in part (a), which required students to illustrate the intersection of AD and AS to the left of a vertical long run aggregate supply curve.

The first point in part (b) was earned by 21.2% of students. To earn this point students were required to explain that U.S. exports to the eurozone would decrease because income in the eurozone had declined as a result of the eurozone recession. The second point in part (b) required students to illustrate (on the graph created for part (a)) the effect of the change in exports they had just identified in part (b)(i)). Fifty-four percent of students earned this point by showing a leftward shift of the aggregate demand curve. The third point in part (b) required students to understand that the leftward shift in aggregate demand depicted in part (b)(ii)) would lead to an increase in unemployment in the United States; 78.2% of students earned this point.

Students earned the first point in part (c) by explaining that the euro would appreciate against the U.S. dollar because the recession in the euro zone would lead to Europeans supplying fewer euros to the foreign exchange market. The second point in part (c) required students to draw a correctly labeled graph of the foreign exchange market for the dollar showing the demand for the dollar shifting to the left and the dollar depreciating. (A correctly labeled graph placed euros/dollar on the vertical axis, quantity of dollars on the horizontal axis, demand for dollars on a downward sloping curve, and supply of dollars on an upward sloping curve.) Only 40.6% of student responses earned the point for part (c)(i)), whereas 42.6% of student responses earned the point for part (c)(ii)).

In part (d), students were asked to assume that a combination of expansionary fiscal and monetary policies did not lead to complete crowding out, and students who earned the point in part (d(i)) correctly asserted that the policies would lead to a rightward shift in the aggregate demand curve. Students earned the point in part (d(ii)) by correctly asserting that the policies would lead to an increase in the price level. Finally, students earned the point in part (d(iii)) by explaining that the policies' effect on interest rates is indeterminate since expansionary monetary policy puts downward pressure on interest rates in the money market and expansionary fiscal policy puts upward pressure on interest rates in the loanable funds market (due to crowding out). The point for part (d(i)) was earned in 87.6% of student responses and the point for part (d(ii)) was earned in 74.5% of student responses, but only 3.8% of student responses earned the point for part (d(iii)).

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 AD/AS graph. • Failing to use the information in the prompt to place the short run macroeconomic equilibrium (the intersection of AD/AS) to the left of the long-run aggregate supply curve (LRAS). • Missing or incorrect label on the long-run aggregate supply curve.	• Correctly labeling the vertical axis "price level" and the horizontal axis real gross domestic product. • Drawing and identifying the intersection of AD and AS at a point to the left of the LRAS. • Correctly labeling the long-run aggregate supply curve "LRAS" or indicating on the horizontal axis that the vertical curve was positioned at the full employment level of output.
Part (b) • Unable to link the recession in the euro zone to a reduction in U.S. exports to the euro zone. • Unable to link the reduction in U.S. exports to the euro zone with a reduction in aggregate demand in the United States.	• Correctly linking the recession in the euro zone to a *reduction in euro zone national income* which, in turn, leads to a reduction in the demand for U.S. goods and services. • Showing (on the graph for part (a)) that aggregate demand for the U.S. will shift in when U.S. exports to the euro zone decrease.
Part (c) • Failing to understand that if consumers in the euro zone want to purchase fewer goods and services in the U.S., then the supply of euros in the euro foreign exchange market will change.	• Explaining that euro zone consumers wanting to purchase fewer U.S. goods and services will result in a reduction in the supply of euros and an appreciation of the euro.

• Missing or incorrect labels on the axes of the foreign exchange graph.	• Correctly labeling the market for dollars with "euros/dollar" on the vertical axis and the quantity of dollars on the horizontal axis.
• Confusing currency appreciation with currency depreciation.	• Correctly explaining that the leftward shift in the demand for dollars would cause the dollar to depreciate.
Part (d) • Failing to understand that expansionary monetary and fiscal policies will lead to an indeterminate change in the interest rate.	• Explaining that expansionary fiscal policy (an increase in government spending and/or reduction in taxes) will lead to upward pressure on the interest rate (e.g. in the loanable funds market since the demand of loanable funds increases or the supply of loanable funds decreases) *and* that expansionary monetary policy will put downward pressure on the interest rate (in the money market since the supply of money will shift to the right).

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?

In part (d(iii)), students were required to understand that expansionary monetary policy and expansionary fiscal policy are associated with opposing pressures on interest rates in the economy. This is a very difficult concept, and so teachers should emphasize that expansionary monetary policy is associated with lower interest rates (in the money market) and expansionary fiscal policy is associated with higher interest rates (either in the loanable funds market or as an intermediate run effect in the money market). For the sake of completeness, teachers might want to revisit this question and ask their students how contractionary monetary policy and contractionary fiscal policy might affect interest rates in the economy. (Contractionary monetary policy should lead to higher interest rates in the money market, and contractionary fiscal policy should lead to either lower interest rates in the loanable funds market or lower interest rates in the money market in the intermediate run.)

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. In the Classroom Resources section of the course page, teachers will find a special focus project titled *Markets,* which was developed to support the proper labeling and understanding of economics graphs: A curriculum module on *Monetary Policy*; a lesson on "Teaching About Foreign Exchange" in the *Mastering Economic Thinking Skills* workshop materials; and an essay providing suggestions for how to teach international economics in the AP Macroeconomics course.

Question #2

Task: Graph and Explain
Max. Points: 5

Topic: The Loanable Funds Market and Economic Growth
Mean Score: 2.14

What were the responses to this question expected to demonstrate?

The question examined students' knowledge and understanding of the impact of a change in tax policy on the equilibrium real interest rate in the loanable funds market and how a change in the real interest rate in the loanable funds market affects the economy in the short run and the long run. In part (a) students were required to state how a decrease in the tax rate on interest earnings would affect private savings. Part (b) asked students to draw a correctly labeled graph of the loanable funds market and to show the impact of the change in the tax rate on the equilibrium real interest rate. In part (c)(i) students were required to state the impact of the real interest rate change on aggregate demand in the short run and explain why the change in aggregate demand occurs. In part (c)(ii) students were asked to explain how the change in the real interest rate affects potential real gross domestic product.

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

Sixty-six percent of students correctly asserted that the lower tax rate on interest earnings would lead to an increase in private savings. Then, in part (b), 56.1% of students earned the first point for drawing a correctly labeled graph of the loanable funds market. (A correctly labeled graph placed the real interest rate on the vertical axis, quantity of loanable funds on the horizontal axis, demand for loanable funds on a downward sloping curve, and supply of loanable funds on an upward sloping curve.) Only 31.9% of students earned the second point in part (b). To earn this point, the student was required to illustrate that the increase in private savings would shift the supply of loanable funds to the right, causing the equilibrium real interest rate to fall.

Part (c(i)) required students to explain that a lower real interest rate would lead to an increase in interest rate sensitive expenditures (consumption (C) or investment (I) spending), which would lead to aggregate demand increasing in the short run. In part (c(ii)), students earned the point if they explained that an increase in investment spending would lead to an increase in the capital stock or an improvement in technology, changes that would cause the potential real gross domestic product to increase in the long run. Thirty-one percent of students earned the first point in part (c), but only 11.6% of students earned the second 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 (a) • Failing to understand that the reduced tax rate on interest earnings would lead to households' having a greater desire to save.	• Correctly asserting that a reduction in the tax rate on interest earning increased households' willingness to save.

Part (b)	
• Failing to link a change in private savings to a shift in the supply of loanable funds. • Missing or incorrect labels on the loanable funds market graph.	• An increase in private savings leads to a rightward shift in the supply of loanable funds and a reduction in the real interest rate. • A correctly labeled graph placed the real interest rate on the vertical axis, quantity of loanable funds on the horizontal axis, demand for loanable funds on a downward sloping curve, and supply of loanable funds on an upward sloping curve.
Part (c)	
• Failing to link the reduction in the real interest rate to an increase in interest rate sensitive expenditures in C and I. • Failing to explain that an increase in investment spending (I) will lead to an increase in the capital stock (or improved technology), which affects potential real gross domestic product in the long run.	• Explaining that a reduction in the real interest rate leads to consumers and firms increasing interest rate sensitive expenditures, thereby causing a rightward shift in aggregate demand. • Correctly linking an increase in investment spending to an expansion of the capital stock (or improved technology), thereby causing potential real gross domestic product to increase (long-run aggregate supply shifts right).

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?

Part (c) required students to understand that a reduction in interest rates leads to an increase in interest rate sensitive spending and a rightward shift in the aggregate demand curve *in the short run*. But, *in the long run*, an increase in investment spending translates into an increase in the capital stock (and/or improved technology) and this is what affects the economy's potential real gross domestic product (a rightward shift in the long run aggregate supply). Students struggle to understand the timing of these effects, so successful instructors must make sure to emphasize the two separate effects associated with the change in interest rates.

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. In the Classroom Resources section of the course page, teachers will also find a special focus project titled *Markets,* which was developed to support the proper labeling and understanding of economics graphs, including the loanable funds market.

Question #3

Task: Graph and Calculate
Max. Points: 5

Topic: Opportunity cost, employment statistics.
Mean Score: 3.13

What were the responses to this question expected to demonstrate?

The question examined students' knowledge about opportunity cost and comparative advantage as well as employment statistics. In part (a) students were given information about opportunity cost and asked to identify and explain whether Country X or Country Y had a comparative advantage in the production of consumer goods. The next two parts of the question asked the students to use labor market data for Country X to calculate the unemployment rate in part (b) and the labor force participation rate in part (c). Finally, part (d) asked the students to draw a correctly labeled graph of the production possibilities curve (PPC) for Country X and to label a point (Z) that reflected the current level of unemployment the students had calculated in part (b).

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

Thirty-nine percent of students earned the point in part (a) by correctly explaining that neither country had a comparative advantage in the production of consumer goods because the two countries faced the same opportunity cost. (One unit of consumer goods cost one-half of a unit of capital goods.) In part (b), 48.9% of students earned the point by correctly calculating the unemployment rate ((20,000/200,000)*100 = 10%). Then, in part (c), 43.3% of students earned the point by correctly calculating the labor force participation rate ((200,000/300,000)*100 = 66.6%). Eighty-two percent of students earned the first point in part (d) by drawing a correctly labeled graph of the PPC. However, 61.2% of students earned the second point in part (d) by drawing and labeling a point (Z) inside of the PPC.

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) • Failing to understand that the opportunity cost of producing consumer goods was the same in Country X and Country Y.	• Correctly calculating the opportunity cost of producing one unit of consumer goods for each country. (One unit of consumer goods has an opportunity cost of one half of a unit of capital goods.)
Part (b) • Unable to correctly calculate the unemployment rate for Country X.	• Correctly calculating Country X's unemployment rate. Unemployment Rate = (Unemployed/Labor Force) * 100 UR = (20,000/(20,000+180,000))*100 = 10%

Part (c)	
• Unable to correctly calculate the labor force participation rate for Country X.	• Correctly calculating Country X's labor force participation rate. LFPR = (Labor Force/Total Population) * 100 LFPR = ((20,000+180,000)/(200,000 + 100,000)) *100 = 66.6%
Part (d)	
• Failing to understand that the 10% unemployment rate calculated in part (b) should lead to point Z being draw inside the production possibilities curve.	• Drawing and labeling point Z so that it clearly lies inside of the production possibilities curve.

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?

Some students appeared to be thrown off by part (a) of this question. They did not seem to know what to do with a problem where neither country enjoyed comparative advantage in the production of consumer goods. This is an excellent question to use for practice; it highlights the fact that countries might face the same opportunity cost for producing a good.

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.