Econ 2
Spring 2014
Problem Set 5 Answers

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A. Potential Output

- Suppose that it is December 2020, current forecasts are for a year-2022 level of real GDP of $19.5 trillion without policy changes. Suppose further that you have just moved to Washington to work for the newly-chosen President-Elect as Special Assistant to the Chief Economist of the Office of Management and Budget. Suppose still further that the short-term safe interest rates the Federal Reserve controls are still very close to zero and that the Federal Reserve has promised to keep them very close to zero until at least 2023. Suppose still further that risk spreads on interest rates of different assets are at normal levels.

A. Potential Output II

- Your boss, the Director of Office of Management and Budget, has asked you to assume that the economy would be producing at potential output come 2022 if it had a real GDP then of $21 trillion, and has asked you to come up with a plan to "get the economy moving again" and restore American production to potential output so that it can once again be, as Ronald Reagan liked to say, "morning in America". In the income-expenditure framework...

A. Potential Output III

- The key numbers for real GDP to extract from the verbiage:
  - Potential output in 2022: $21 trillion
  - Forecast baseline in 2022: $19.5 trillion
  - Output gap: $1.5 trillion
- And: $Y = \mu[c_0 + (G - c_yT) + (I + c_wW + X)(r)]$

A.1. What policies come to mind as ones that the government might adopt in order to meet this goal for the economy in 2022?

- Your boss, the Director of Office of Management and Budget, has asked you to assume that the economy would be producing at potential output come 2022 if it had a real GDP then of $21 trillion, and has asked you to come up with a plan to "get the economy moving again" and restore American production to potential output so that it can once again be, as Ronald Reagan liked to say, "morning in America". In the income-expenditure framework…
    - **The things that come to mind are:**
    - **Increases in government purchases G**
    - **Reductions in taxes T**
    - **A "weak dollar" policy to boost exports X**
        - **Stepping away from free trade…**
    - **Various forms of loan guarantees to reduce risk spreads and so boost investment**
    - **Non-standard monetary policies of various sorts to affect expectations of future real interest rates, risk spreads, and inflation**
    - **"Hooverism": focus on cutting spending and balancing the government budget to reduce expectations of future safe real interest rates, risk spreads, and inflation**

A.2. Suppose that you choose to recommend an expansion of government purchases G as the way to get the economy's level of production back up to potential output. If you think that the marginal propensity to consume c_y is 0.5, how large an expansion of government purchases do you recommend?

- Your boss, the Director of Office of Management and Budget, has asked you to assume that the economy would be producing at potential output come 2022 if it had a real GDP then of $21 trillion, and has asked you to come up with a plan to "get the economy moving again" and restore American production to potential output so that it can once again be, as Ronald Reagan liked to say, "morning in America". In the income-expenditure framework…

  - **You have a multiplier μ of 2…**

  - **You have an output gap of $1.5T…**

  - **Expand government purchases G by $750B…**

A.3. Suppose that you choose to recommend an expansion of government purchases G as the way to get the economy's level of production back up to potential output. If you think that the marginal propensity to consume c_y is 0.667, how large an expansion of government purchases do you recommend?

- Your boss, the Director of Office of Management and Budget, has asked you to assume that the economy would be producing at potential output come 2022 if it had a real GDP then of $21 trillion, and has asked you to come up with a plan to "get the economy moving again" and restore American production to potential output so that it can once again be, as Ronald Reagan liked to say, "morning in America". In the income-expenditure framework…

  - **You have a multiplier μ of 3…**

  - **You have an output gap of $1.5T…**

  - **Expand government purchases G by $500B…**

A.4. Suppose that you choose to recommend a cut in taxes T as the way to get the economy's level of production back up to potential output. If you think that the marginal propensity to consume c_y is 0.667, how large a cut in taxes do you recommend?

- Your boss, the Director of Office of Management and Budget, has asked you to assume that the economy would be producing at potential output come 2022 if it had a real GDP then of $21 trillion, and has asked you to come up with a plan to "get the economy moving again" and restore American production to potential output so that it can once again be, as Ronald Reagan liked to say, "morning in America". In the income-expenditure framework…

- **You have an MPC c_y of 2/3…**

- **So you need half again as big a tax cut T as you needed a government purchases increase…**

- **You have a multiplier μ of 3…**

- **You have an output gap of $1.5T…**

- **You would have to expand government purchases G by $500B…**

- **So you would have to cut taxes T by $750B…**

A.5. Suppose that you choose to recommend a cut in taxes T as the way to get the economy's level of production back up to potential output. If you think that the marginal propensity to consume c_y is 0.5, how large a cut in taxes do you recommend?

- Your boss, the Director of Office of Management and Budget, has asked you to assume that the economy would be producing at potential output come 2022 if it had a real GDP then of $21 trillion, and has asked you to come up with a plan to "get the economy moving again" and restore American production to potential output so that it can once again be, as Ronald Reagan liked to say, "morning in America". In the income-expenditure framework…

- **You have an MPC c_y of 0.5…**

- **So you need twice as big a tax cut T as you needed a government purchases increase…**

- **You have a multiplier μ of 2…**

- **You have an output gap of $1.5T…**

- **You would have to expand government purchases G by $750B…**

- **So you would have to cut taxes T by $1.5T…**

A.6. Suppose that total real exports X in 2022 are forecast to be $3 trillion…

- …and that a 1% decline in the value of the dollar will, you project, raise exports by 1% of their total. The Treasury Secretary believes that if he goes on TV and says "a weaker dollar is in America's interest" that the value of the dollar, the exchange rate, will fall by 10%. If you think that the marginal propensity to consume $c_{y\ y}$ is 0.5, by how much would this adoption of an explicit "weak dollar communications policy" boost year-2022 GDP?

  - **A 10% fall in the exchange rate would boost X by $300B…**

  - **You have a multiplier μ of 2…**

  - **So it would boost Y by $600B…**

A.7. Suppose that the Office of Federal Housing Enterprise Oversight…

- …projects that by spending $10 billion in 2022 in housing mortgage subsidies the government could boost housing construction in 2022 by $100 billion. If you believe that the marginal propensity to consume c_y is 0.5, by how much would this expansion of mortgage insurance subsidies do to boost year-2022 GDP?

- **You have a multiplier μ of 2…**

- **You have a boost to I of $100B…**

- **So you have a boost to Y of $200B…**

B. Potential Output II

- Consider the same setup as (A), but suppose that the Federal Reserve disagrees with your boss, the Director of Office of Management and Budget. Suppose that the Federal Reserve believes that the year-2022 level of potential real GDP is not $21 trillion but rather $19.5 trillion, and that rather than promising to keep interest rates very low until 2023 the Federal Reserve has announced that it will, if necessary, raise interest rates in order to keep real GDP in 2022 from exceeding potential output.

B.1. What policies now come to mind as ones that the government might adopt in order to meet your boss's goals for the economy in 2022? Briefly, explain what you see as the pluses and minuses of these different policies.

- **You have a problem: the Federal Reserve gets to decide on interest rates after it sees whether your fiscal stimulus program is going to make its way through congress or not. So there is nothing you can do—other than lobby the Federal Reserve to change its policies, or to find some way of changing the decision-makers at the Federal Reserve…**

B.2. Suppose that you consider the same expansion of government purchases G that you recommended in (A2)…

- …and that you still think that the marginal propensity to consume c_y is 0.5. What do you forecast would be the effects of the (A2) policy on the state of the economy in 2022?

- The hope was that students would remember the "Greenspan Rule" and be able to apply it:

  - An increase in r of 1%pt reduces investment spending I by $100B/year, reduces exports X by $50B, and reduces C through the wealth channel by $50B...

- But that seems to be a bridge too far: we are happy with qualitative answers--G goes up, other components of GDP go down, Y and E unchanged…

B.2. Suppose that you consider the same expansion of government purchases G that you recommended in (A2)… II

- You try to expend G by $750B (and C by $750B)…
- The Federal Reserve raises interest rates to shrink I by $375B, X by $187.5B, $c_w W$ by $187.5B, and $c_y Y$ by $750B…
- The net effect is:
  - G up by $750B
  - I down by $375B
  - X down by $187.5B
  - C down by $187.5B

B.3. Suppose that you consider the same expansion of government purchases G that you recommended in (A3)…

- …and that you still think that the marginal propensity to consume c_y is 0.667. What do you forecast would be the effects of the (A3) policy on the state of the economy in 2022?

  - **You try to expend G by $500B and C by $1000B…**

  - **The Federal Reserve raises interest rates to shrink I by $250B, X by $125B, and $c_w W$ by $125B, and $c_y Y$ by $1000B…**

  - **The net effect is:**

    - **G up by $500B**

    - **X down by $125B**

    - **I down by $250B**

    - **C down by $125B**

B.4. Suppose that you consider the same cut in taxes T that you recommended in (A4)…

- …and that you still think that the marginal propensity to consume is 0.6667. What do you forecast would be the effects of the (A4) policy on the state of the economy in 2022?

  - **You try to expand C by $1.5T**

  - **The Federal Reserve raises interest rates to shrink I by $250B, X by $125B, and C by $1125B…**

  - **The net effect is:**

    - **X down by $125B**

    - **I down by $250B**

    - **C up by $375B**

B.5. Suppose that you consider the same cut in taxes T that you recommended in (A5)…

- …and that you still think that the marginal propensity to consume $_y$ is 0.5. What do you forecast would be the effects of the (A5) policy on the state of the economy in 2022?

  - **You try to expand C by $1.5T**
  - **The Federal Reserve raises interest rates to shrink I by $375B, X by $187.5B, and C by $937.5B…**
  - **The net effect is:**
    - **X down by $187.5B**
    - **I down by $375B**
    - **C up by $562.5B**

B.6. Suppose that total real exports X in 2022 are forecast to be $3 trillion…

- …and that a 1% decline in the value of the dollar will, you project, raise exports by 1% of their total. The Treasury Secretary believes that if he goes on TV and says "a weaker dollar is in America's interest" that the value of the dollar, the exchange rate, will fall by 10%. If you think that the marginal propensity to consume c_y is 0.5, what do you think would be the effects of this adoption of an explicit "weak dollar communications policy" on the year-2022 economy?

- **You try to talk down the exchange rate to boost X by $300B and C by $300B**

- **The Federal Reserve raises interest rates to reduce I by $150B, X by $75B, and C by $375B**

- **The net effect**

  - **C down by $75B**

  - **I down by $150B**

  - **X up by $225B**

B.7. Suppose that the Office of Federal Housing Enterprise Oversight…

- …1. projects that by spending $10 billion in 2022 in housing mortgage subsidies the government could boost housing construction in 2022 by $100 billion. If you believe that the marginal propensity to consume c_y is 0.5, what do you think the effects of this expansion of mortgage insurance subsidies would be on the year-2022 economy?

  - **You try to boost I by $100B and C by $100B…**

  - **The Federal Reserve raises interest rates to reduce I by $50B, reduce C by $125B, and reduce X by $25B…**

  - **Net effect:**

    - **I up by $50B**

    - **C down by $25B**

    - **X down by $25B**

C. Forecasting

- Suppose that it is June 2015 and you are working in New York forecasting the 2016 economy for Medium-Sized Hedge Fund Named After a Local Geographic Feature. Your bosses want you to inform them about the likely shape of the economy in 2016--not just the total level of real GDP Y, but the levels of consumption spending C, investment spending I, government purchases G, and exports X. Your baseline forecasts--which you get via a painfully-expensive subscription to Mississippi Valley Forecasters--are that for 2016 real GDP (measured in dollars of 2009 purchasing power) and its components will be:

C. Forecasting II

- X: Exports: $2.3T
- G: Government Purchases: $3.0T
- I: Investment Spending: $2.9T
- C: Consumption of Domestically-Produced Commodities: $8.9T
- Y: TOTAL: $17.1T
- Suppose that you believe the marginal propensity to consume c_y= 0.6667.

C.1. Suppose that in June 2015 President Obama…

- …the Democratic leaders in Congress, and the Republican leaders in Congress suddenly reach agreement on a large infrastructure investment program to rebuild America. They pass a low boosting government purchases G in 2016 by $300 billion. Assuming that you believe the Federal Reserve will not change the path of interest rates in response to this policy shift, what do your forecasts of X, G, I, C, and Y for 2016 change to?

  - **Multiplier μ of 3…**
  - **G goes from $3T to $3.3T…**
  - **C goes from $8.9T to $9.5T…**
  - **Y goes from $17.1T to $18.0T…**

C.2.Suppose that between today, March 2014, and 2016…

- …the view of the Federal Reserve changes: by 2016 is no longer believes that there is significant slack in the labor market and no longer believes there is a significant gap between actual real GDP and potential output. As a result, if ever the Federal Reserve forecasts that GDP will exceed potential GDP, it will raise interest rates in advance in order to reduce it back to potential. Suppose the Federal Reserve's forecasters are as smart as and think like you. And, last, suppose that when the Federal Reserve raises interest rates in order to reduce spending and production each dollar by which spending is reduced is divided, with $.25 in reduced consumption spending because of lower household wealth due to the higher interest rates, $.25 in reduced exports because of a higher value of the currency due to the higher interest rates, and $.50 in reduced business investment spending because of the higher interest rates. What now is your forecast of the effects on the economy of the infrastructure investment program?

  - **G goes from $3T to $3.3T**
  - **The Federal Reserve raises interest rates to offset the increase in Y that the fiscal expansion has set in train…**
  - **X goes from $2.3T to $2.225T**
  - **I goes from $2.9T to $2.75T**
  - **C goes from $8.9T to $8.825T**
  - **Y is unchanged at $17.1T**

C.3. In the setup of part one…

- is the infrastructure investment program likely to be good policy? Why or why not?

- **Almost surely yes: there are unemployed workers who are not doing anything productive: better to have them building infrastructure and making consumption goods than simply standing idle**

C.4. In the setup of part two…

- …is the infrastructure investment program likely to be good policy? Why or why not?

  - **This is much dicier. Because what matters is not whether there is slack in the economy but whether the Federal Reserve believes that there is slack, the fact that you think there are (and that there may be) excess unemployed workers is irrelevant. The policy is good if it is good to shift production from investment and exports to infrastructure and consumption; the policy is bad if it is not…**

D. Aggregate Supply

- Suppose that the aggregate supply curve for 2016 is given by:
  - P = 1.10 for Y < $18.9T (2009)
  - P > 1.10 for Y = $18.9T (2009)
  - No possibility of Y > $18.9T (2009)
- With the price level in 2015 being 1.08, so that expected inflation over the year from 2015 and 2016 is 1.85%.

D. Aggregate Supply II

- You are working in New York forecasting the 2016 economy for Medium-Sized Hedge Fund Named After a Local Geographic Feature. Your bosses want you to inform them about the likely shape of the economy in 2016--not just the total level of real GDP Y, but the levels of consumption spending C, investment spending I, government purchases G, and exports X. Your baseline forecasts--which you get via a painfully-expensive subscription to Mississippi Valley Forecasters--are that for 2016 real GDP (measured in dollars of 2009 purchasing power) and its components will be:
    - X: Exports: $2.3T (2009)
    - G: Government Purchases: $3.0T (2009)
    - I: Investment Spending: $2.9T (2009)
    - C: Consumption of Domestically-Produced Commodities: $8.9T (2009)
    - Y: TOTAL: $17.1T (2009)
- and your estimate of the marginal propensity to consume c_y=0.667.

D. Aggregate Supply III

- Suppose that in March 2015 President Obama, the Democratic leaders in Congress, and the Republican leaders in Congress suddenly get into furious negotiations over a large infrastructure investment program to rebuild America. Assume that you believe the Federal Reserve will not change the path of interest rates in response to this policy shift.

D.1. Thanks to the Supreme Court's campaign-financing decision of April 2, 2014…

- …your principals find themselves besieged by phone calls from legislators of both parties begging them to commit massive donations to their campaigns so that they can protect America from the other party. In the course of these phone calls, the legislators ask for advice as to how large the infrastructure investment program should be in 2016. What do you tell your bosses they should answer? Why?

  - **Your MPC of 2/3 gives you a multiplier of 3.**

  - **You have forecast a baseline output gap of $1.8T (2009)**

  - **A $600B (2009) infrastructure investment program would close that gap if the Federal Reserve keeps interest rates constant**

D.2. Total spending--nominal, not real…

- …in the baseline scenario for 2016 is projected to be equal to P x Y = 1.1 x $17.1T (2009) = $18.8T (nominal). Suppose that the government in fact enacts an even larger infrastructure spending program than you calculated as optimal in (1), so that total nominal spending P x Y in 2016 is going to be $22T (nominal). What do you forecast the price level will be in 2016? What do you forecast the inflation rate will be in 2016?

  - **Given your AS curve, there is only $17.1T (2009) of real output that can be produced.**

  - **If $22T is spent, that means the price level in 2016 will be: $P_{2016} = 1.286$**

  - **That is a $P_{2016}/P_{2015} - 1 = 28.7\%$ inflation rate for 2016…**

D.3. If the Federal Reserve decides to raise interest rates…

- …in order to keep inflation from being as high as you calculated in (2), what should it aim to make nominal spending in 2016 in order to keep inflation from 2015 to 2016 under 3%?

- **Maximum Real GDP in 2016 is $18.9T (2009)**

- **3% inflation from 2015 to 2016 gives you a P_{2016} of 1.08 x 1.03 = 1.1124**

- **1.1124 x $18.9T = $21.0T as your nominal spending target**