

**Problem Set 4**

*Due August 1<sup>st</sup> at 2 pm*

Problem sets submitted after class will not be graded.

**Section I (15 points)**

Brazil's real GDP = 6 trillion Brazilian Real

U.S. real GDP = 20 trillion dollars

\$1 buys 3 Brazilian Real

1 Big Mac costs \$5 in the U.S.

1 Big Mac costs 10 Brazilian Real in Brazil

U.S. population in 2016: 320 million

Brazil population in 2016: 220 million

1. One Wall Street analyst uses the data above to claim that per capita real GDP in the U.S. economy is about 7 times as large as per capita real GDP in Brazil. Reproduce his analysis. **(6 points)**
  
  
  
  
  
  
  
  
  
  
2. A different Wall Street analyst uses the data above to claim that the per capita real GDP in the U.S. is only about 5 times the size of per capita real GDP in Brazil.
  - a. What concept does she invoke to come to this conclusion? **(3 points)**
  
  
  
  
  
  
  - b. Reproduce her analysis. **(6 points)**

## Section II (45 points)

Assume:

- In 2018:Q4 U.S. real GDP = \$19.5 trillion and U.S. NX = \$-0.5 trillion
- U.S. real GDP growth rate, without stimulus equals 2.5%:
  - 1.5% contribution from productivity, 1% from growth in the labor force.
- U.S. growth rate for domestic spending (real GDP-NX) is also 2.5% , if no stimulus is enacted.
- $U = 5\%$  and  $\pi = 2\%$  in 2018:Q4 and  $U = 5\%$  at end-of-year 2019, if there is no stimulus.

Suppose Congress, when it returns from Turkey day fails to deliver a tax cut, but quickly pivots and gets bipartisan support for a \$200 billion increase in infrastructure spending. Assume the multiplier on domestic spending is 2 from the enacted fiscal policy changes. (In other words, for this analysis, assume the policy changes drive domestic demand:  $Y-NX$ ). Assume the effects of the policy, enacted end of 2018, occur over the four quarters of 2019.

**Optional:** Filling in the table below may help you as you sort out the questions below.

	2018:Q4	2019:Q4	2019:Q4
		w/o stimulus	with stimulus
Y (Real GDP, \$ trillions)			
NX (Net Exports, \$ trillions)			
$Y - NX$ (Domestic Demand, \$ trillions)			

1. If no policy is enacted, what is the level of domestic spending in 2019:Q4? Show your work. **(5 points)**
2. If the policy occurs, what is the level of domestic spending in 2019:Q4? What is the growth rate for domestic spending between 2018:Q4 and 2019:Q4? Show your work. **(5 points)**
3. Suppose the boom for USA spending, is not matched by an acceleration for spending in the rest of the world. Likewise, the boom lifts U.S. interest rates, but rest-of-world interest rates stay steady.

- a. What do you think happen to the value of the dollar? **(5 points)**
  
  - b. Given the dollar's move and the different spending growth rates what do you think happens to U.S. exports and U.S imports? Briefly explain. **(5 points)**
  
  - c. Given the dollar's move and the different spending rates, would you expect U.S. real GDP to grow at the same rate as U.S. real domestic demand? Briefly explain. **(5 points)**
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- 4. Suppose U.S. NX is -\$0.8 trillion (i.e. NX deficit) in Q4:2019. What is the level and the growth rate for U.S. real GDP in Q4:2019? **(5 points)**
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- 5. One economist, Freddy, correctly forecast the new level for real GDP. He also predicted the unemployment rate would fall materially (say to 4%). What must he have assumed about labor productivity and the labor force participation rate? **(5 points)**

6. A different economist, Betty, also correctly forecast the new level for real GDP. She, however, predicted the unemployment rate would remain at 5%. What must she have assumed about labor productivity and the LFPR? **(5 points)**

7. Will the Fed tighten more if Freddy is right or Betty is right? Explain. **(5 points)**

### Section III (25 points)

Assume:

- The U.S. economy can grow at 2.8% per year.
- The Federal Reserve thinks the ideal inflation rate is 2%.
- The natural rate of unemployment is 4%.
- The Fed thinks  $r^*$ , the real interest rate at which the economy neither speeds up nor slows down, is 2%.

1. Jerome Powell assumed office as Chair of the Fed on February 2018. Next year Powell shocks the world and announces he will pursue a monetarist approach to conducting monetary policy. His approach to monetary policy comes from the quantity theory of money. At what rate will he aim to increase the money supply? **(4 points)**
2. Although the Powell-led Fed successfully hits its target growth rate for money, by late 2019 inflation is running very hot. President Trump denounces this policy as a 'complete and utter disaster'. What false assumption made by Jerome Powell led to the policy not resulting in steady growth and inflation. **(3 points)**

3. President Trump now replaces Jerome with a 'tremendous guy' from Stanford whose monetary policy rule has helped guide central banks for many decades. Who is he? Write down his rule. **(4 points)**
  
4. Assume that at that point, unemployment is 3% and inflation is 5%. If the new chair follows his own rule, what will the fed funds rate be? Show your work. **(4 points)**
  
5. After a year of this policy, inflation has been vanquished, falling below target, to 1%. Unemployment has risen to 8%. What fed funds rate does the rule now suggest? Show your work. Why is this a problem? **(4 points)**
  
6. Use our expanded loanable funds model to demonstrate how the Fed could now move to QE, to continue to ease, despite the problem identified in question 5. **(6 points)**

#### Section IV (20 points, 4 points each)

Suppose that  $\alpha = 1.4$ ,  $U^* = 5\%$ ,  $U_t = 5\%$ , and  $\pi^e = 2\%$ .

1. Write down an equation for the Phillips Curve. What is current inflation  $\pi_t$  equal to?
2. If the unemployment rate doubles, what does the equation predict will be the value of inflation, all else equal?
3. In the Great Recession, the unemployment rate indeed doubled. Compared to actual inflation, did our calibration for the Phillips curve over or underpredict inflation?
4. Some economists disagree about the value of  $\alpha$  in the Phillips curve. Would a lower or higher  $\alpha$  help the Phillips curve fit the data better?
5. Does a lower  $\alpha$  imply lower or higher credibility in the central bank for determining inflation?

**Section V (15 points)**

1. Suppose New Zealand discovers a giant diamond mine. The U.S. demand for these diamonds causes the New Zealand trade surplus with the U.S. to soar.
  - a. What happens to the U.S. demand for the NZD—New Zealand's currency? **(2 points)**
  - b. What happens to the value of the NZD versus the U.S. dollar, if all other things remain the same? **(3 points)**
  - c. Draw two charts (one for the market for NZD, one for the market for U.S. dollars) depicting the shifts in supply and demand, before and after the surge in the trade surplus. **(5 points)**
  
2. Suppose the central bank of New Zealand wants to prevent a change in the exchange rate. Reproduce your graphs above and add in the action that the central bank of New Zealand could take in order to prevent a change in the exchange rate. **(5 points)**