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Problem Set #4
## Due: beginning of class December 3

1. A venture capital fund is considering a project that costs $1200 and would pay off $220 if started this period. Thereafter, it can have three payoffs that repeat in each subsequent period:

    $(p_L, p_M, p_H) = (\$50, \$150, \$400)$

    The fund assigns probabilities to these three outcomes: $(q_L, q_M, q_H) = (0.3, 0.3, 0.4)$

    The discount rate is 10 percent. The fund has the option to wait for one period before deciding.
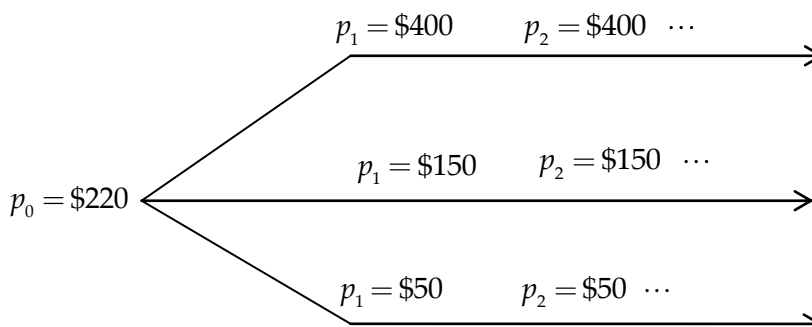

a. Compute the standard deviation of this investment project (2 points).
b. Compute the net present value (NPV) of investing in period 0 (2 points).
c. Compute the NPV of investing in period 1 if the project is a high-return investment (1 point).
d. Compute the NPV of investing in period 1 if the project is a medium-return investment (1 point).
e. Compute the NPV of investing in period 1 if the project is a low-return investment (1 point).
f. What is the value of waiting one period to invest in the project (2 points)?
g. As the economic outlook improves, the worst-case scenario becomes less likely and less damaging, but competition also increases. The probabilities are now: $(q_L, q_M, q_H) = (0.25, 0.4, 0.35)$.

   The returns are now: $(p_L, p_M, p_H) = (\$80, \$150, \$400)$

   What is the standard deviation of the project (2 points)?
h. What is the value of waiting to invest now (5 points)?
i. What impact does a decline in uncertainty have on aggregate demand (2 points)?

2. In one paragraph, describe how fiscal deficits can cause hyperinflations. Use the quantity theory to help frame your discussion. (10 points)

3. In the 1990s, the U.S. experienced a period of high output growth and low inflation, contrary to the "Philips Curve" view of the economy. In a couple of sentences, give a likely explanation. In an AS/AD framework, how this might have occurred? (10 points)

4. Classify the following developments as shocks to aggregate supply (AS) or aggregate demand (AD) and show in a table whether they are stimulative (+) or restrictive (-) with respect to output and, separately, with respect to prices. (10 points)

    Oil price surge
    Equity market crash
    Heightened fear of job losses
    Deregulation of airlines, finance and telecommunications
    Sales tax holiday
    Fed increases interest rate paid on reserves
    Improved inventory control
    Government limits workweek
    New information technology
    Fed embarks on quantitative easing

5. You have been asked by your boss to explain the Taylor Rule and how it can be a helpful guide to the Fed in making monetary policy.

    a. Using the Taylor Rule workbook data on Blackboard, plot a Taylor rule and the Federal funds rate on a graph from 1970 to 2011. (5 points)

    b. What was the impact of keeping the federal funds rate well below the Taylor rule rate for much of the 1970s? Why might the Fed have chosen this policy? (5 points)

    c. Fed deviations from a Taylor Rule were smaller and less persistent after 1985. What was the impact on output and inflation? (5 points)

    d. Why can't the Fed lower the federal funds rate sustainably below zero? (2 points)

   e. What can the Fed do to stimulate aggregate demand if the Taylor rule rate is below zero? (5 points)

f. The figure below shows an initial equilibrium in the market for reserves at a zero interest rate (point A). Show graphically how the Fed can exit from quantitative easing *without* selling assets. (You should be able to click inside the graph object and edit it.) Label any changes in the reserve supply and reserve demand curves, along with the new target federal funds rate. Label the equilibrium where demand and supply meet as point B. (3 points).

Market Federal
Funds Rate

Lending Rate

Reserve Supply

Reserve Demand

Zero Bound

A

Quantity of
Reserves
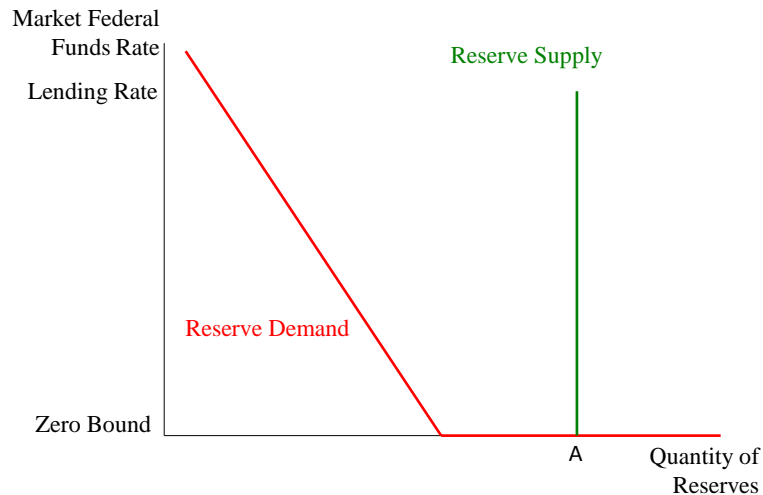
g. Using the graph in question f, explain the mechanism by which the Fed can set an interest rate target without adjusting the level of reserves? (5 points)

6. This question focuses on the slope of the aggregate supply curve.

a. Why does the short-run aggregate supply curve have a positive slope? (5 points)

b. Why is the long-run aggregate supply curve vertical? Explain why it differs from short run aggregate supply. (5 points)

7. Deflation—broad and persistent decreases in the price level—can be troublesome. Falling prices raise the expected real rate of interest, helping to discourage spending. For example, if consumers expect deflation to continue, they will postpone purchases and try to save more, lowering their demand at any current price level.

The economy is initially at the long run equilibrium, as shown in the figure below.
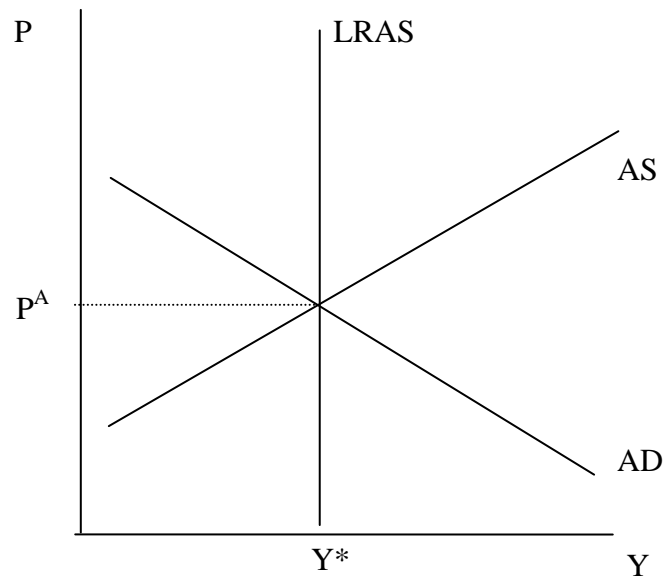
a. How does the figure above change when consumers expect deflation in the future? Label the new short run equilibrium (Y^B, P^B). Are the consumers' expectations correct? (6 points)

b. What can the Federal Reserve do to counteract this deflationary cycle? Show the Fed's response on the figure above. Label the new short run equilibrium (Y^C, P^C). (6 points)