

Answers to Old Exams

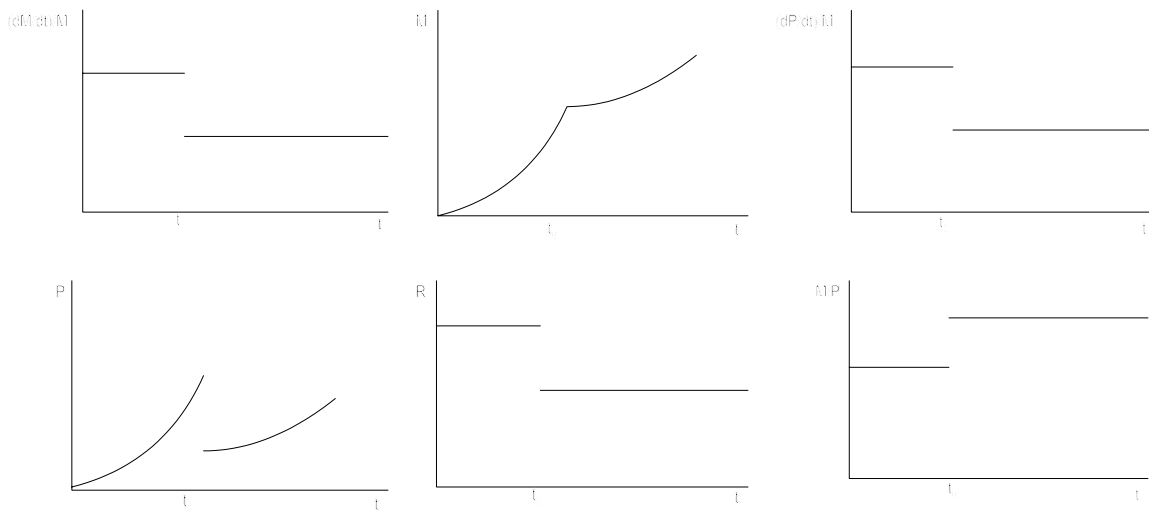
1. Turkey recently reduced the growth rate of its nominal money supply. Draw graphs showing the time paths of the

- money growth rate
- level of the nominal money supply
- inflation rate
- price level
- nominal interest rate
- real money supply

before the change and then after it. Assume no one expected the reduction before it happened and that everyone believes the reduction in money growth is permanent. Explain the economic reasoning behind your graphs.

Answer:

The graphs:



Brief explanation:

Reduced money growth causes an equal reduction in inflation. As a result, the nominal interest rate R falls (by the same amount as the drop in inflation). The nominal interest rate is the opportunity cost of holding money, so a drop in R causes an increase in the demand for real money. For equilibrium to hold in the money market, the supply of real money must rise to match the increase in the demand. The only way for that to happen is for the price level to drop discretely, which is why there is a discontinuity in the path of the price level P . Except for that discontinuity, the path of P is the same as the path of nominal money M .

2. Suppose the exchange rate between two countries A and B floats freely. Country A has a real rate of economic growth of 3% a year and a money growth rate of 10% a year. Country B has a real rate of economic growth of 2% a year and a money growth rate of 2% a year. Trade is completely free, there are no transportation costs, and there are no capital market imperfections.

Explain:

- (1) the behavior over time of the exchange rate between the currencies for countries A and B
- (2) the relation between the nominal interest rates countries A and B.

Answer:

(1) The exchange rate will reflect the inflation rates in the two countries. A country's inflation rate equals its money growth rate minus the growth rate of real income. Therefore, country A's inflation rate is 7% a year, and country B's inflation rate is 0% a year. The exchange rate for country B's currency in terms of country A's currency (units of currency A required to buy one unit of currency B) will rise by 7% a year.

(2) Because there are no frictions, all countries have the same real interest rate. The nominal interest in each country is the world real interest rate r plus that country's inflation rate. Therefore, country A's nominal interest rate R_A is $r + 0.07$, and country B's nominal interest rate R_B is $r + 0.00$. The difference between the two nominal rates is 0.07, or 7%.

3. The money growth rate μ , the inflation rate π , and the real money supply M/P for a few years in Bolivia were:

Year	μ	π	M/P
1979	22%	20%	9533
1980	28%	47%	8260
1981	23%	32%	7671
1982	103%	124%	6973
1983	239%	276%	6295

We see immediately that

- (a) μ and π have upward trends over the five year period
- (b) M/P has a downward trend
- (c) π has a general tendency to be larger than μ

Explain the economic relationships that cause the observed behavior among μ , π , and M/P .

Answer:

If μ were constant, we would expect approximate equality between μ and π . However, with μ rising, we expect π to grow with it, which explains the upward trend in π . We also expect π to be greater than μ during periods of rising μ for two reasons:

(1) Each time μ rises, the inflation rate will rise, too. As a result, demand for real money will fall, making it less than real money supply. To restore equilibrium in the money market, the price level must jump up discontinuously. If we collect data at discrete times (such as once a year), the discontinuous jumps will be included in measured inflation, making π larger than μ for the same period.

(2) If people anticipated that μ would increase in the future, then they would have reduced their demand for real money in advance of the increase in μ , causing a price jump before the increase in μ actually occurred. That jump would make measured inflation higher than the money growth rate in the period of that the jump occurred.

4. Unexpected changes in the money supply can have different effects on the economy in the short run (when the actual price level P does not necessarily equal the expected or perceived price level P_e) and in the long run (when $P = P_e$). Suppose the government unexpectedly reduces the money supply. Explain both the short-run effects and the long-run effects of such a policy change on

- (i) the level of output
- (ii) the price level
- (iii) the interest rate
- (iv) the level of employment
- (v) the real wage
- (vi) the nominal wage

[So explain 12 things: (i) through (vi) for the short run and (i) through (vi) for the long run.]

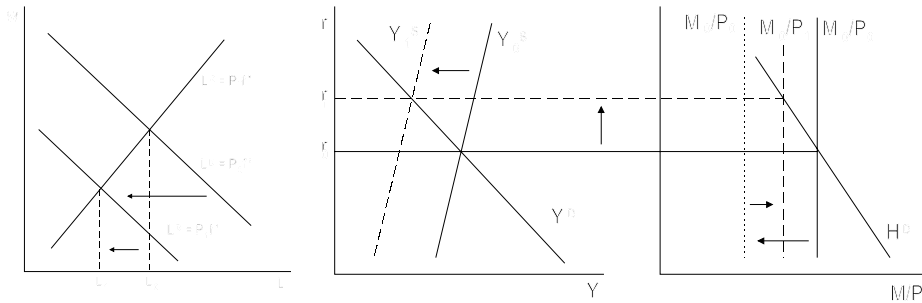
Answer:

Short run:

The decrease in M shifts the real money supply to the left, opening a gap between money demand and money supply. In response, the price level starts to fall. As the price level falls, workers' perception lags behind; we simplify here by supposing that the perceived price does not change at all. Workers see their nominal wage fall. Because they see no corresponding change in the price level, they believe their real wages have fallen and therefore work less. As a result, output falls, which causes the real interest rate to rise. When general equilibrium is attained:

- | | |
|------------------------------|-----------|
| (i) the level of output | is lower |
| (ii) the price level | is lower |
| (iii) the interest rate | is higher |
| (iv) the level of employment | is lower |

- (v) the real wage is lower
- (vi) the nominal wage is lower



Long run:

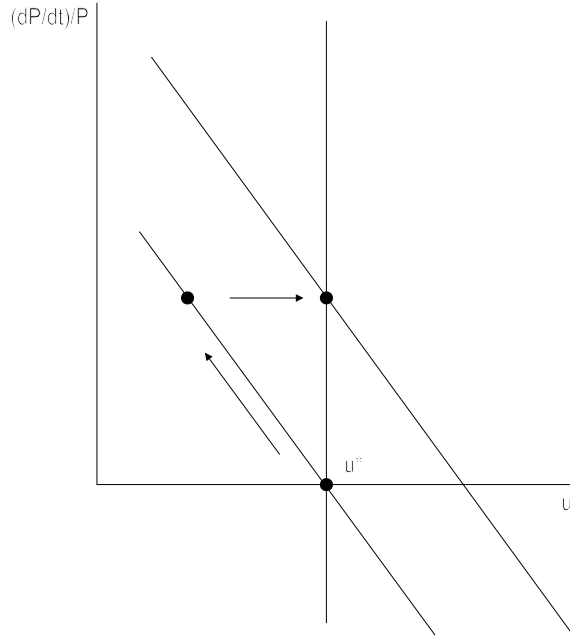
Eventually, perceptions adjust to reality. When everything is correctly perceived, the real economy returns to its original values. The only changes are in nominal values.

- (i) the level of output is back at its pre-shock value
- (ii) the price level is even lower than in the short run
- (iii) the interest rate is back at its pre-shock value
- (iv) the level of employment is back at its pre-shock value
- (v) the real wage is back at its pre-shock value
- (vi) the nominal wage is even lower than in the short run

5. Suppose the government unexpectedly increases the rate of growth of the nominal money supply and maintains the higher growth rate forever. Explain how output and employment evolve over time in response to this policy change. Be sure to include an explanation of what happens in both the short run and the long run.

Answer:

This is only an outline of the answer because this is a combination of questions 1 and 4 above. The short run analysis is similar to that in the previous answer except that the shock is in the opposite direction. The long run differs from that in question 4 because the nominal money stock keeps changing as time passes. In the long run equilibrium, M and P will be growing at the same rate. We can use the short-run and long-run Phillips curves to describe the behavior of the unemployment rate:



6. Explain whether the following statements are true or false:

- A. A increase of one percentage point in the growth rate of the nominal money supply is accompanied by approximately an increase of one percentage point in the inflation rate.
- B. It is possible for the actual real interest rate (not the expected real interest rate) to be negative.
- C. An increase in the monetary growth rate that creates inflation requires people to work additional hours if they want to keep their real consumption from falling.

Answer:

A. False in the short run (first period), True in the long run (after the first period). In general equilibrium, demand for real money must equal supply of real money. An increase in the growth rate of the nominal money supply raises the inflation rate. The nominal interest rate rises with the inflation rate, so money demand falls. The drop in money demand causes a one-time upward jump in the price level, which would be included in measured inflation. Inflation in the first period therefore would exceed the money growth rate. After that, the same equilibrium condition, $H^D = M^S/P$, requires that M and P grow at the same rate.

B. True. The actual real interest rate is the nominal rate R minus the actual inflation rate π :

$$r = R - \pi$$

The rule for setting the nominal interest rate R is that it equals the desired real rate r^e plus the expected inflation rate π^e :

$$R = r^e + \pi^e$$

If π is greater than π^e , then it is possible for the actual real interest rate to be negative:

$$r = (r^e + \pi^e) - \pi$$

C. False. If everyone understands that inflation is in progress, it will be built into nominal wages and interest rates, leaving real wages and interest rates unaffected.