Problem 1.   Here, match some stuff.

Definitions

(a) decreases in the general price level
(b) decreases in the inflation rate
(c) increases in the general price level
(d) nominal interest rate minus expected inflation rate
(e) the interest rate charged on a loan

Terms

(i) inflation
(ii) real interest rate
(iii) deflation
(iv) ex-ante real interest rate
(v) disinflation
(vi) nominal interest rate
(vii) recession

Answer 1.

(a) **Deflation** is a general decrease in the price level

(b) **Disinflation** is a decrease in the inflation rate

(c) **Inflation** is an increase in the general price level.

(d) The **ex-ante real interest rate** is the nominal interest rate minus the *expected* inflation rate. *Ex-ante* refers to the fact that we use the *expected* inflation rate because we don't know how prices will rise into the future.

(e) **Nominal interest rate** is the rate applied to the dollar amount of loans.

The *rate of inflation*, denoted π for some reason, is the percentage at which a price level changes from one time period to the next, say, from P_1 to P_2. It is given by the growth rate formula

$$\pi = \frac{P_2 - P_1}{P_1} \times 100.$$

Problem 2. What is the relationship between the real interest rate, the nominal interest rate, and inflation?

Answer 2. First we need to distinguish between *ex-ante* and *ex-post*.

Suppose we are in year 1. We do not know for certain what the price level will be in year 2, and hence we are uncertain about what inflation will be over that time period. Instead, we have an *expectation* about the period 2 price level, and thus an expectation about inflation. With that in mind, the *ex-ante* real interest rate is given by

$$r^e = R - \pi^e.$$

This says that the *ex-ante* real interest rate is the nominal interest rate minus whatever amount we expect inflation to be.

Now suppose we are in year 2. We know for sure what the price level now is, and hence we know what inflation was over the last year. The ex-post real interest rate is given by

$$r = R - \pi.$$

In other words, the *ex-post* real interest rate is the nominal interest rate minus whatever amount inflation actually turned out to be.

These equations are sometimes called the *Fisher equation*.

Problem 3.

$$\begin{aligned}
\text{nominal interest rate in 2017:} \quad & 6\% \\
\text{general price level in 2017:} \quad & 100 \\
\text{general price level expected in 2018:} \quad & 104 \\
\text{actual general price level in 2018:} \quad & 107
\end{aligned}$$

Find the expected one-year rate of inflation in 2017.

Answer 3.   We expect the price level to be 104 one year from now. Hence we expect inflation over this period to be

$$\frac{104 - 100}{100} \times 100 = 4\%.$$

Problem 4.

$$\begin{aligned}
\text{nominal interest rate in 2017:} &\quad 6\% \\
\text{general price level in 2017:} &\quad 100 \\
\text{general price level expected in 2018:} &\quad 104 \\
\text{actual general price level in 2018:} &\quad 107
\end{aligned}$$

Find the ex-ante real interest rate in 2017.

Answer 4.   The ex-ante real interest rate is the nominal interest rate minus the expected inflation rate. The Fisher equation $r^e = R - \pi^e$ gives

$$6\% - 4\% = 2\%.$$

Problem 5.

$$\begin{aligned}
\text{nominal interest rate in 2017:} &\quad 6\% \\
\text{general price level in 2017:} &\quad 100 \\
\text{general price level expected in 2018:} &\quad 104 \\
\text{actual general price level in 2018:} &\quad 107
\end{aligned}$$

Find the ex-post real interest rate in 2017.

Answer 5. The ex-post real interest rate is the nominal interest rate minus actual the inflation rate—so we can only calculate this after time has passed and we know how the price level has actually changed. The Fisher equation $r = R - \pi$ gives

$$6\% - 7\% = -1\%.$$

Problem 6.   Leopnard and Brad both expect 4% inflation over the next year. Brad borrows some money from Leopnard at the interest rate of 7%. Next year, the inflation rate turns out to be only 2%. In this story

(a) Leopnard will be better off than expected

(b) Leopnard will be worse off than expected

(c) Brad will be better off than expected

(d) Both will be worse off than expected

(e) "Leopnard" is a really funny name.

Answer 6: a and e, but mostly a.   The ex-ante real interest rate Brad and Leopnard agreed to was $7\% - 4\% = 3\%$. However, one year later actual inflation turned out to be only 2%, so the ex-post real interest rate was $7\% - 2\% = 5\%$. Leopnard therefore receives 3% more real return than expected; Brad pays 3% more in real interest payments than expected. The moral of the story is

- below-expected inflation benefits lenders and hurts borrowers,

- above-expected inflation benefits borrowers and hurts lenders.

Problem 7.   Schtolteheim Reinbach III inherits some cash from his aunt and deposits it in his checking account. He realized that inflation is going to erode the purchasing power of those deposits. His financial adviser tells him to buy gold coins and put them in a safe deposit box. The fee Schtolteheim pays the adviser, plus the cost of the safe deposit box, is

(a) menu costs

(b) shoe-leather costs

(c) hedging costs

(d) inflation costs

(e) none of the above

(f) above of the none

Answer 7: b.   The phrase **shoe-leather costs** refers broadly to the costs people incur to protect the purchasing power of their money holdings.

Problem 8.   Apple Computers raises the pries of iPhones and iPads just to keep up with the general inflation. As a result, it has to modify its computer programs, issue new online catalogues, and inform the retail stores about the new prices. The costs of all these activities incurred by Apple are called

(a) menu costs

(b) shoe-leather costs

(c) inflation costs

(d) price-change costs

(e) none of the above

(f) all of the below

Answer 8: a.   **Menu costs** include such costs as printing new catalogues by business firms and sending them to their branches, updating their websites with the new pricing information, informing their wholesale buyers, and changing their computer programs.