Homework IV - solutions

1. Money and Inflation The setup gives the following information:

\[ \Delta V = 0 \]
\[ \Delta Y = 3\% \]
\[ \Delta M = 7\% \]
\[ r = 2\% \]

(a) Since \( M * V = P * Y \), when we express this in terms of changes:

\[ M * V = P * Y \]
\[ \Delta M + \Delta V = \Delta P + \Delta Y \]
\[ 7\% + 0 = \Delta P + 3\% \]

\[ \Delta P = 4\% \]

Since, \( \Delta P = \pi \), we know that inflation is 4%.

(b) Now, we use the Fisher equation together with the fact that \( \pi = 4\% \):

\[ i = r + \pi \]
\[ i = 2\% + 4\% \]
\[ i = 6\% \]

Therefore, the nominal interest rate in Hungary is 4%.

(c) If Hungary wants to bring inflation to 1% (\( \Delta P = 1\% \) per year, it needs to decrease the money growth rate:

\[ M * V = P * Y \]
\[ \Delta M + \Delta V = \Delta P + \Delta Y \]
\[ \Delta M + 0 = 1\% + 3\% \]

\[ \Delta M = 4\% \]

So, Hungary needs to lower the money supply growth rate from 7% to 4% to lower inflation from 4% to 1%.
(d) A benefit of a moderate rate of inflation comes from the fact that nominal wages never decrease. It is hard to decrease nominal wages in the real world and it is even expected to keep increasing nominal wages with time as workers remain on the same job. Persistent increase in nominal wages would lead to an increase in real wages if there was no inflation and this would cause unemployment (recall structural unemployment due to wages higher than the equilibrium value). Thus, to neutralize the effect of increased nominal wages, moderate inflation is necessary and welcome from the macroeconomic standpoint.

2. **Expectations** In the long-run, people don’t consistently under- or over-forecast inflation, so $\pi^e = \pi$, on average. However, it might happen that people start expecting that prices will increase in the future (suppose that there are rumors that the FED will increase the money supply $M$). So, if people expect next year’s prices $P$ to be higher, this means that people expect higher inflation as well. Thus, $\pi^e$ increases. Since we know that:

$$\frac{M}{P} = L(r + \pi^e, Y)$$

then, given that $r, Y,$ and $M$ are determined somewhere else (exogenous to this problem), this means the following:

$$\uparrow \pi^e \Rightarrow \uparrow i$$

Fisher effect ($i = r + \pi^e$)

$$\Rightarrow \downarrow (M/P)^d$$

Since demand for real money balances ($L$) is inversely related to the real interest rate $r$.

$$\Rightarrow \uparrow P$$

to make $M/P$ fall to re-establish the eq’m

In words,

(a) Since the expectation of inflation increases, and the real rental rate of capital is unchanged (recall: $r = MPK$), according to the Fisher equation, this increase translates into one-to-one increase in the nominal exchange rate.

(b) Given that the nominal exchange rate increases, this means that demand for real money balances decreases. Recall that the interest rate is the opportunity cost of holding money, so if the interest rate increases, it becomes more expensive to hold money in your pocket, so you want to keep less of it in your pockets.

(c) Since demand for real money balances decreased and there is no formal action from the Fed via the monetary policy ($M = \bar{M}$), the only way supply of real money balances can decrease is if prices increase. Thus, prices in the economy increase to bring the economy back to the equilibrium where demand for real money balances equals supply of real money balances.
3. Hyperinflation

(a) “The crisis will not end until workers begin to pay their fair share of taxes.”
Workers are already paying an inflation tax. It might be the case that businesses
are not paying high enough taxes or that sales taxes are not high enough. Al-
ternatively, it might be the case that the crisis is caused by lavish government
spending instead of insufficient taxation.

(b) “The central bank has demonstrated that it cannot responsibly wield its power to
create money, so we have no choice but to adopt the US dollar as our currency.”
The central bank must make a credible commitment that it will no longer auto-
matically monetize the government debt. Although adopting a US dollar, would
solve the problem, it is a drastic and perhaps unnecessary step. Recall, with-
out the currency, the government loses the ability to steer the economy via the
monetary policy.

(c) “Let’s not blame the central bank. The problem is fiscal policy, not the monetary
policy.”
Read part (c) of question 3.

4. Tax Laws and Inflation See lecture notes.

5. Unemployment I You know that when an economy is at the natural rate of un-
employment, then the number of people losing jobs (separated) equals the number of
people finding jobs. Then,

\[
\begin{align*}
    sE &= fU \\
    s(L - U) &= fU \\
    sL - sU &= fU \\
    sL &= U(s + f) \\
    \frac{U}{L} &= \frac{s}{s + f} \\
    \frac{U}{L} &= \frac{s}{s + f}
\end{align*}
\]

Since \( s = 0.01 \) and \( f = 0.09 \), then:

\[
\begin{align*}
    \frac{U}{L} &= \frac{0.01}{0.01 + 0.09} \\
    &= \frac{0.01}{0.1} = 0.1 \\
    &= 10\%
\end{align*}
\]

So, the natural rate of unemployment is 10% in this economy.
6. **Unemployment II** If the government wanted to reduce the natural rate of unemployment it would either increase the rate of job finding ($f$) and/or decrease the rate of job separation ($s$).

Since frictional unemployment is the natural rate of unemployment, any government policy that reduces $s$ or increases $f$ would decrease frictional unemployment. Some examples would include opening job finding agencies, helping unemployed workers relocate to a geographic location where more jobs are available, retrain workers to get skills which are more marketable and wanted in the labor market. Also, the government could reduce the unemployment benefits.

Structural unemployment is a direct cause of a wage rate that is above the equilibrium level. Anything that would lower the wage rate to the equilibrium level would reduce structural unemployment. An example would be to reduce the minimum wage or to remove/limit unionization of workers.

**Multiple Choice**

7. All of the following are costs of fully expected inflation except that expected inflation:
   - a. causes lower real wages.

8. The inconvenience associated with reducing money holdings to avoid the inflation tax is called:
   - d. shoeleather costs.

9. The natural rate of unemployment in the United States since 1952 has averaged between _________ and _________ percent.
   - c. 6

10. *All* of the following are possible explanations for the trends in the U.S. unemployment rate in the last half of the twentieth century except:
    - c. a generally increasing real value of the minimum wage.