Question 1: (True/False)

1.1 IS (random) shocks can generate a bigger volatility in real GDP under elastic money demand than under inelastic money demand.

1.2 The effect of fiscal policy is the strongest when monetary authority chooses to accommodate the government policy by fixing the interest rate.

1.3 Based on the Keynesian theory, demand shocks produce a negative co-movement between price and output. That is, price is a countered-cyclical variable under demand shocks.

1.4 Based on the Keynesian theory, interest rate is a countered-cyclical variable under supply shocks.

1.2 true

1.4 true, since the supply shock have the change in technology (z), change in market structure, change in labour force, change in capital, change in number of leisure, change in labour supply which these variebles have a negative relationship with interest rate. Hence, interest rate is counter-cyclical variable under supply shock.

2.2 Suppose the economy is operating at the long-term trend, i.e. natural level. Analyze the impact of a permanent decrease in government transfers under the following scenarios.

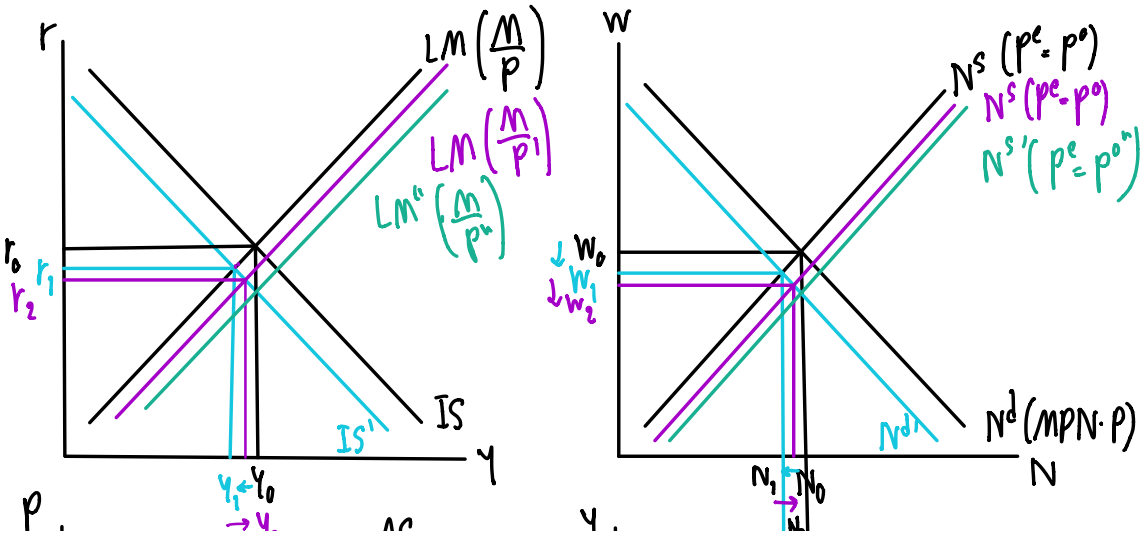
a. What would be the short-run impact on macroeconomic variables if *the permanent cut is* ***unexpected***. Use the 4-diagram that we discussed in class.

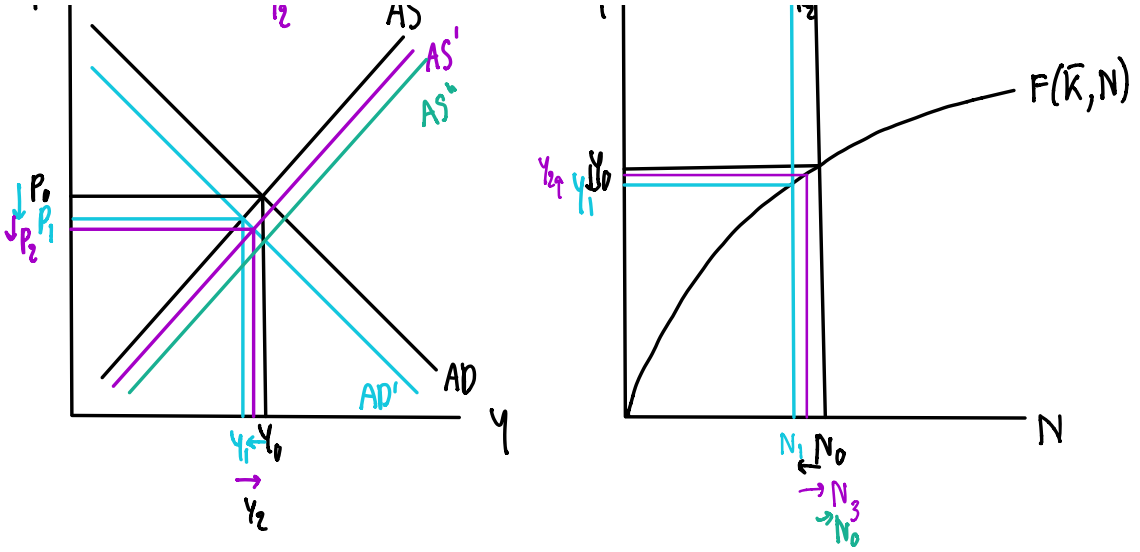
b. Describe what would happen over the medium-run. Link your analysis to the 4-diagram used in the previous sub-question.

c. Based on your analyses above, complete the following table.

Variables	Short-run (relative to initial level)	Medium-run	
		Relative to after-shock level (short-run)	Relative to initial level before shock
Output (real GDP)	decrease	increase	decrease
Consumption	increase	increase	increase
Investment	increase	increase	increase
Labor employment	decrease	increase	decrease
Nominal wage W	decrease	decrease	decrease
Price	decrease	decrease	decrease
Real wage (W/P)	constant	constant	constant
Interest rate	decrease	decrease	decrease.

d. If the permanent cut in government transfers is **anticipated**, what would be the short-run impact on macroeconomic variables? Would one observe a deviation of actual output from the trend level?





In short-run, as there is a decrease in government transfers. That would cause IS shift down (shift left) (Y_0 decrease to Y_1 & r_0 to r_1 that makes consumption & Investment increase. AD shifts left as a result, and makes P decreases from P_0 to P_1. From drop of P, causing N^d shift left due to the fact that $N^d = MPN \cdot P$. Moving from N_0 to N_1 & W_0 to W_1. Decreasing in P also affect LM to shift right that $LM = \frac{M_s}{P}$, as $P\downarrow \rightarrow LM\uparrow$ ∴ It shifts to the right. Resulting in production market in decrease in labor & output.

In medium-run, N^s (labor) relise that price has decreased, so they would work less (N^s shift right) & labor increase from N_1 to N_2. When N^s shift right. It makes AS shift to the right as well. And price would drop even further to P_2, and Y_1 rises to Y_2. In production market, Y increase from Y_1 to Y_2 & N rise from N_1 to N_3.

In long-run adjustment N^s will shifts right until labor equal to N_2, and LM would shift until it back to same Y_0. As well As would shift until it is vertical at Y_0.

Question 3

given $\theta = 0$ $u^n = 5\%$ $V_t = 0$ $\pi = 2\%$ $u_t = 3\%$

3.1) $\pi^e_t = (1-\theta)\bar{\pi} + (\underbrace{\theta \cdot \pi_{t-1}}_{\text{past info doesn't matter}})$

$\pi^e_t = \bar{\pi} = 2\%$

$$\left.\begin{aligned} \pi_t &= 0.02 - 0.7(0.03 - 0.05) + 0 \\ \pi_t &= 0.02 - 0.7(0.03 - 0.05) + 0 \\ &\vdots \\ \pi_{t+5} &= 0.2 - 0.7(0.03 - 0.05) + 0 \end{aligned}\right\} 0.036 = 3.4\%$$

$\pi_t, \pi_{t-1}, \pi_{t-2}, \pi_{t-3}, \pi_{t-4}, \pi_{t-5} = 3.4\% > 2\% = \pi$

3.2) No, because it is unlikely for theta to be zero and people will use the information in the past to form inflation expectation.

3.3) because adaptive expectation, people are more likely to form expected inflation by assuming past information strongly relates to expected information.

3.5) given $u = 3\%$, $\theta = 1$

$\pi^e_t = (1-1)\bar{\pi} + (1 \cdot \pi_{t-1})$

$= \pi_{t-1}$ => past year

at π_{t+6}: $\pi^e_t = \pi_{t+5} = 0.034$

$\pi_{t+6} = 0.034 - 0.7(0.03 - 0.05) = 0.048 = 4.8\%$.

$\pi_{t+7} = 0.048 - 0.7(0.03 - 0.05) = 0.062 = 6.2\%$.

$\pi_{t+8} = 0.062 - 0.7(0.03 - 0.05) = 0.076 = 7.6\%$.

$\pi_{t+9} = 0.076 - 0.7(0.03 - 0.05) = 0.09 = 9\%$.

3.6) $u_t = 5\%$ $u^n_t = 5\%$ $\bar{\pi} = 2\%$

$\pi_{t+10} = 0.09 - 0.7\,(0.05 - 0.05) = 0.09 = 9\%$

$\pi_{t+10} > \bar{\pi}$

So, central bank did not archeive target inflation.

3.7) To achieve the targeted level of inflation at $\bar{\pi} = 2\%$ in period π_{t+n} government has to increase unemployment rate to

$$0.02 = 0.09 - 0.7(u_t - 0.05)$$

$$u_t = 0.15$$

$$= 15\%.$$

3.8) $\theta = 1$, $u_t = 5\%$

$\pi_{t+12} = 0.02 - 0.7(0.05 - 0.05) = 0.02$

$\pi_{t+13} = 0.02 - 0.7(0.05 - 0.05) = 0.02$

$\pi_{t+14} = 0.02 - 0.7(0.05 - 0.05) = 0.02$

$\pi_{t+15} = 0.02 - 0.7(0.05 - 0.05) = 0.02$

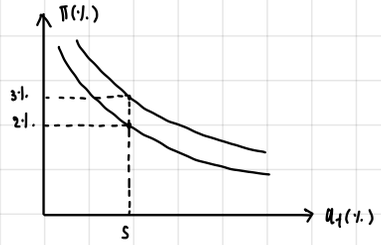
$\therefore$ Inflation of given period is 2%.

3.9) Since the theta value reduce to zero, it implied that mean past inflation did not affect future inflation.

3.10) $t+16, v_t = 0$ $t+17, v_t = 1$ $t+18, v_t = 0$ $\theta = 0$ $\pi_t^e = \bar{\pi}$ $u_t^n = 5\%$. $u_t = 5\%$.

$\pi_{t+16} = 0.02 - 0.7(0.05 - 0.05) + 0 = 0.02 = 2\%$.

$\pi_{t+17} = 0.02 - 0 + 0.01 = 0.03 = 3\%$.



with change in supply shock, Philip Curve will shift upward

3.11) $\pi_{t+18} = 0.02 - 0.7(0.05 - 0.05) + 0 = 0.02$

$\pi_{t+19} = 0.02 - 0.7(0.05 - 0.05) + 0 = 0.02$

$\therefore$ The inflation of both period is 2%.

3.12) $\theta = 1$, $\pi_{t+16} = 2\%$.

$\pi_{t+17} = 0.02 - 0.07(0.05 - 0.05) + 0.01 = 3\%$.

$\pi_{t+18} = 0.03 - 0.07(0.05 - 0.05) + 0 = 3\%$.

3.13) $\pi_{t+19} = \pi_{t+18} - 0.7(0.05 - 0.05) + 0$

$= 0.03 = 3\%$.

Therefore, in order to decrease inflation rate, government have to increase unemployment rate by $0.02 = 0.03 - 0.7(u_t - 0.05) + 0 \rightarrow 0.064$

3.14) Based on question 3.1-3.4, there is no volatility since $\pi_t = \pi_t^e$ and $u_t = u_t^n$. However, if v becomes more than zero, π_t^e will be less than π_t. Hence, in order to maintain level of inflation, government has to adjust unemployment rate by increasing $u_t > u_t^n$.
The targeted inflation rate is indicator for stability in economy for example, if π_t drastically deviate from $\bar{\pi}$, it could implied that economy is not much stable.

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