

Lecture 19: The New Keynesian Model II

ECON 30020: Intermediate Macroeconomics

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Readings

GLS Ch. 25 (the supply side)

GLS Ch. 26 (effects of shocks)

The Neoclassical Model

$$C_t = C^d(Y_t - G_t, Y_{t+1} - G_{t+1}, r_t)$$

$$N_t = N^s(w_t, \theta_t)$$

$$N_t = N^d(w_t, A_t, K_t)$$

$$I_t = I^d(r_t, A_{t+1}, f_t, K_t)$$

$$Y_t = A_t F(K_t, N_t)$$

$$Y_t = C_t + I_t + G_t$$

$$M_t = P_t M^d(i_t, Y_t)$$

$$r_t = i_t - \pi_{t+1}^e$$

The IS Curve

$$C_t = C^d(Y_t - G_t, Y_{t+1} - G_{t+1}, r_t)$$

$$N_t = N^s(w_t, \theta_t)$$

$$N_t = N^d(w_t, A_t, K_t)$$

$$I_t = I^d(r_t, A_{t+1}, f_t, K_t)$$

$$Y_t = A_t F(K_t, N_t)$$

$$Y_t = C_t + I_t + G_t$$

$$M_t = P_t M^d(i_t, Y_t)$$

$$r_t = i_t - \pi_{t+1}^e$$

The LM Curve

$$C_t = C^d(Y_t - G_t, Y_{t+1} - G_{t+1}, r_t)$$

$$N_t = N^s(w_t, \theta_t)$$

$$N_t = N^d(w_t, A_t, K_t)$$

$$I_t = I^d(r_t, A_{t+1}, f_t, K_t)$$

$$Y_t = A_t F(K_t, N_t)$$

$$Y_t = C_t + I_t + G_t$$

$$M_t = P_t M^d(i_t, Y_t)$$

$$r_t = i_t - \pi_{t+1}^e$$

The AD Curve

$$C_t = C^d(Y_t - G_t, Y_{t+1} - G_{t+1}, r_t)$$

$$N_t = N^s(w_t, \theta_t)$$

$$N_t = N^d(w_t, A_t, K_t)$$

$$I_t = I^d(r_t, A_{t+1}, f_t, K_t)$$

$$Y_t = A_t F(K_t, N_t)$$

$$Y_t = C_t + I_t + G_t$$

$$M_t = P_t M^d(i_t, Y_t)$$

$$r_t = i_t - \pi_{t+1}^e$$

The AS Curve

$$C_t = C^d(Y_t - G_t, Y_{t+1} - G_{t+1}, r_t)$$

$$N_t = N^s(w_t, \theta_t)$$

$$N_t = N^d(w_t, A_t, K_t)$$

$$I_t = I^d(r_t, A_{t+1}, f_t, K_t)$$

$$Y_t = A_t F(K_t, N_t)$$

$$Y_t = C_t + I_t + G_t$$

$$M_t = P_t M^d(i_t, Y_t)$$

$$r_t = i_t - \pi_{t+1}^e$$

The New Keynesian Supply Side

The New Keynesian model only differs from neoclassical model on the supply side

And only in one equation!

Keynesian models rely on some form of nominal stickiness: prices or wages

Price stickiness:

- Replace labor demand with some restriction on P_t

Wage stickiness:

- Replace labor supply with some restriction on W_t (nominal)

Simple Sticky Price Model

Assume $P_t = \bar{P}_t$, where $\bar{P}_t$ is exogenous

Nominal price literally cannot move within period (e.g., “menu costs”)

Replace labor demand curve with $P_t = \bar{P}_t$

Firm has to hire labor to meet demand at $\bar{P}_t$ rather than to maximize its value

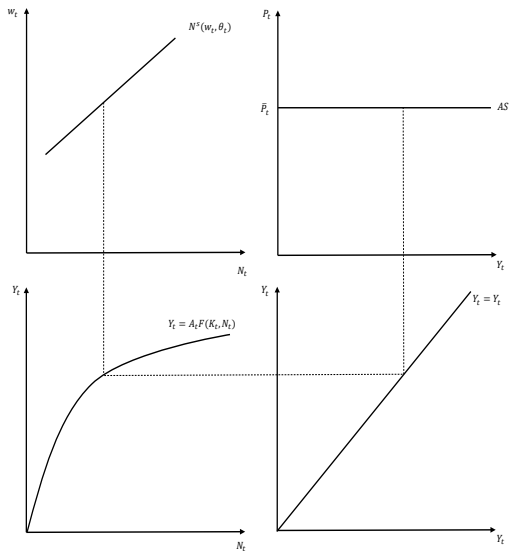
AS curve is horizontal. Supply conditions:

$$N_t = N^s(w_t, \theta_t)$$

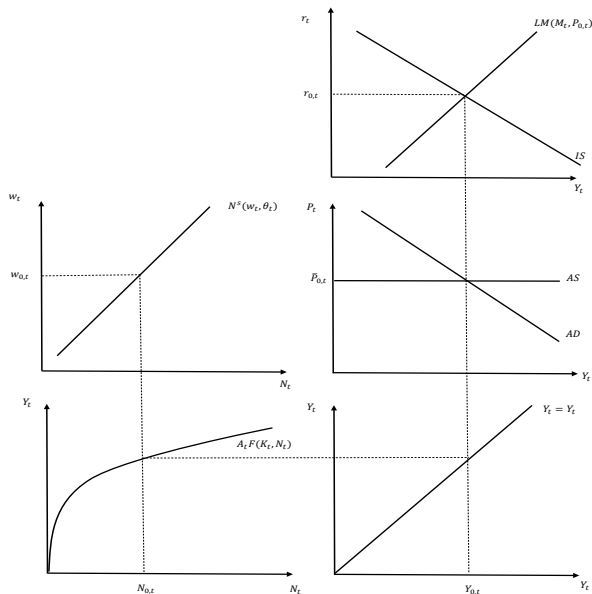
$$P_t = \bar{P}_t$$

$$Y_t = A_t F(K_t, N_t)$$

The Simple Sticky Price AS Curve



Simple Sticky Price IS-LM-AD-AS Equilibrium



Simple Sticky Price Model

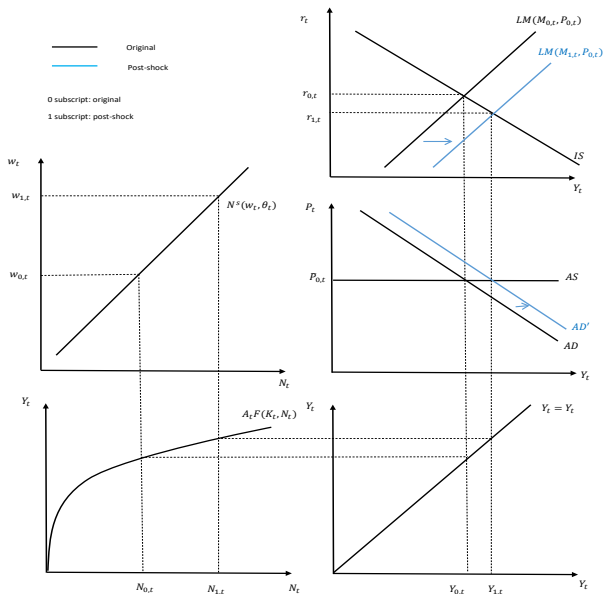
In this model, output is solely demand-determined

- Position of AD determines Y_t
- Given Y_t , determine the required N_t
- Given N_t , determine w_t from labor supply curve

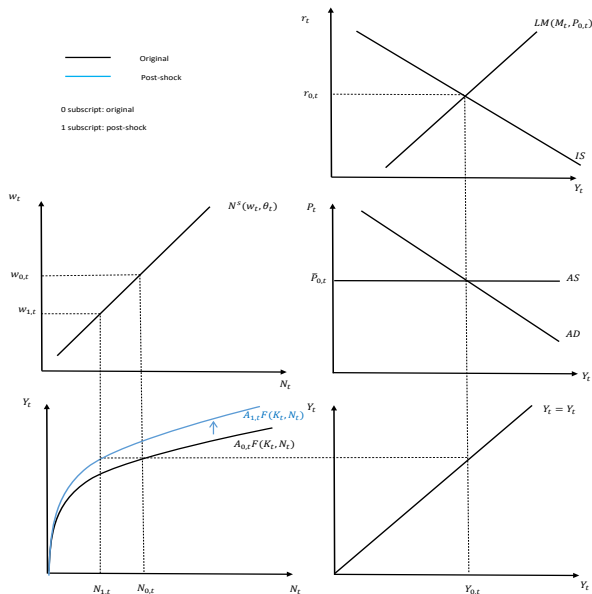
In a sense, this is opposite (or backwards) of neoclassical model

- Labor demand and supply jointly determine w_t and N_t
- N_t determines Y_t
- Position of AD determines P_t

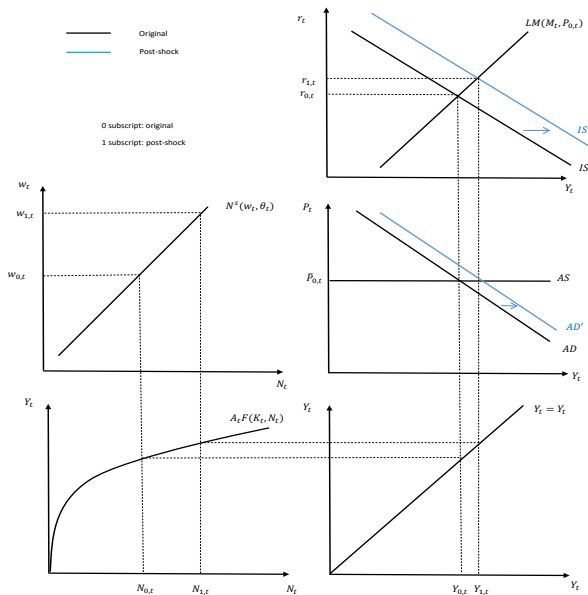
Increase in M_t : Monetary non-Neutrality



Increase in A_t : “Contractionary” Effect on N_t



Positive IS Shock: Simple Sticky Price Model



Effects of Shocks: Simple Sticky Price vs. Neoclassical Model

Relative to the neoclassical model, in the simple sticky price model:

- Output over-reacts to demand shocks (nominal or real)
- Output under-reacts to supply shocks

Basic intuition:

- When demand goes up, if price can't rise, firm has to accommodate higher demand by producing more
- When productivity improves, if price can't fall, firm can't produce any more, and needs less labor

Partial Sticky Price Model

Assume:

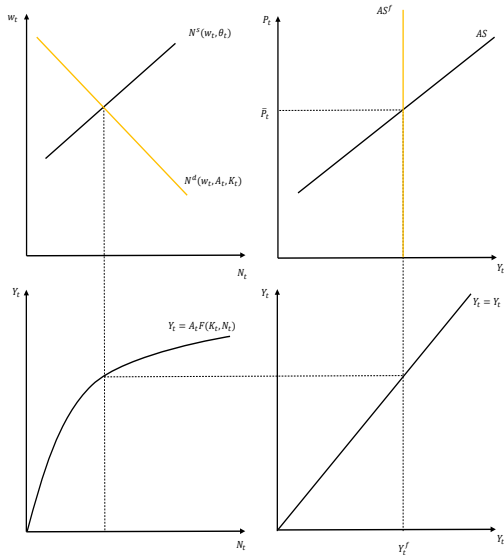
$$P_t = \bar{P}_t + \gamma (Y_t - Y_t^f)$$

Y_t^f : hypothetical equilibrium from neoclassical model

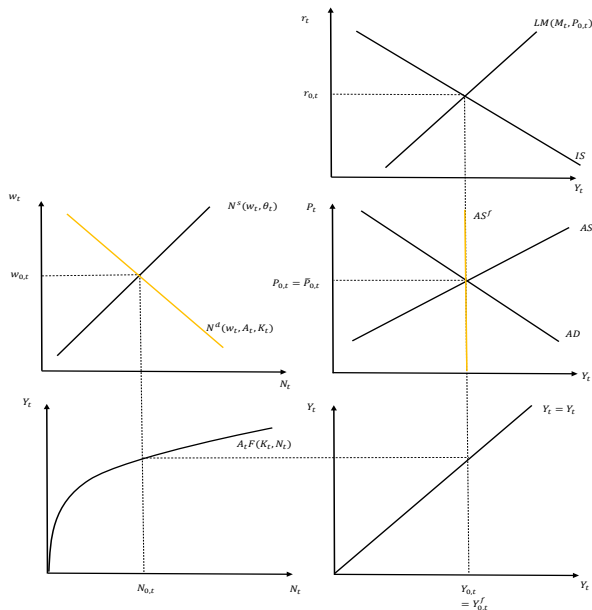
$\gamma \geq 0$: parameter governing degree of price stickiness

- Smaller γ , stickier prices (flatter AS)
- $\gamma = 0$: simple sticky price model (horizontal AS)
- $\gamma \rightarrow \infty$: neoclassical model (vertical AS, $Y_t = Y_t^f$)

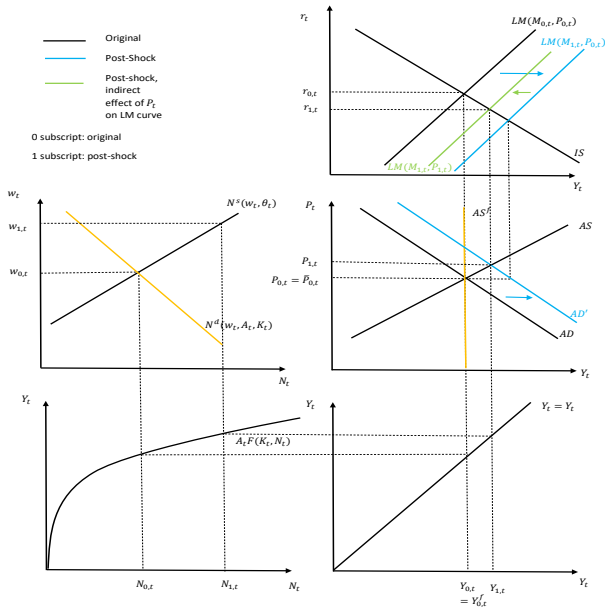
The Partial Sticky Price AS Curve



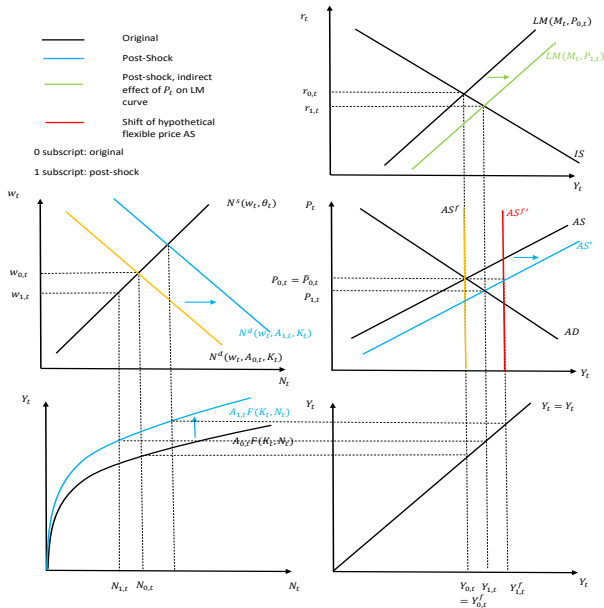
Partial Sticky Price IS-LM-AD-AS Equilibrium



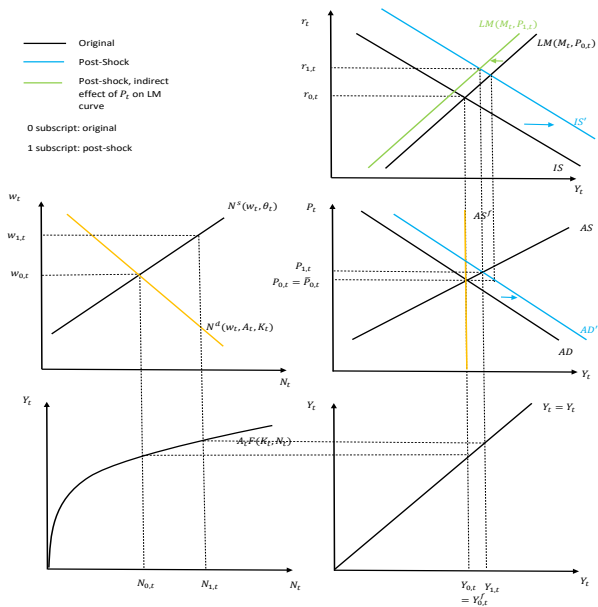
Increase in M_t : Monetary non-Neutrality



Increase in A_t



Positive IS Shock



Simple vs. Partial Sticky Price vs. Neoclassical

How the economy behaves in the partial sticky price model depends on γ (the slope of the AS, how sticky/flexible prices are)

Results from the partial sticky price model are in between the extremes of the simple sticky price model ($\gamma = 0$) and the neoclassical model ($\gamma \rightarrow \infty$)