# Econ 702 Macroeconomics I

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Spring 2020

# Lecture 15: New Keynesian IS-LM-AD

# Organization

- Course website https://www.ssc.wisc.edu/~mchinn/web702s2_s20.html
- Problem Sets on main website

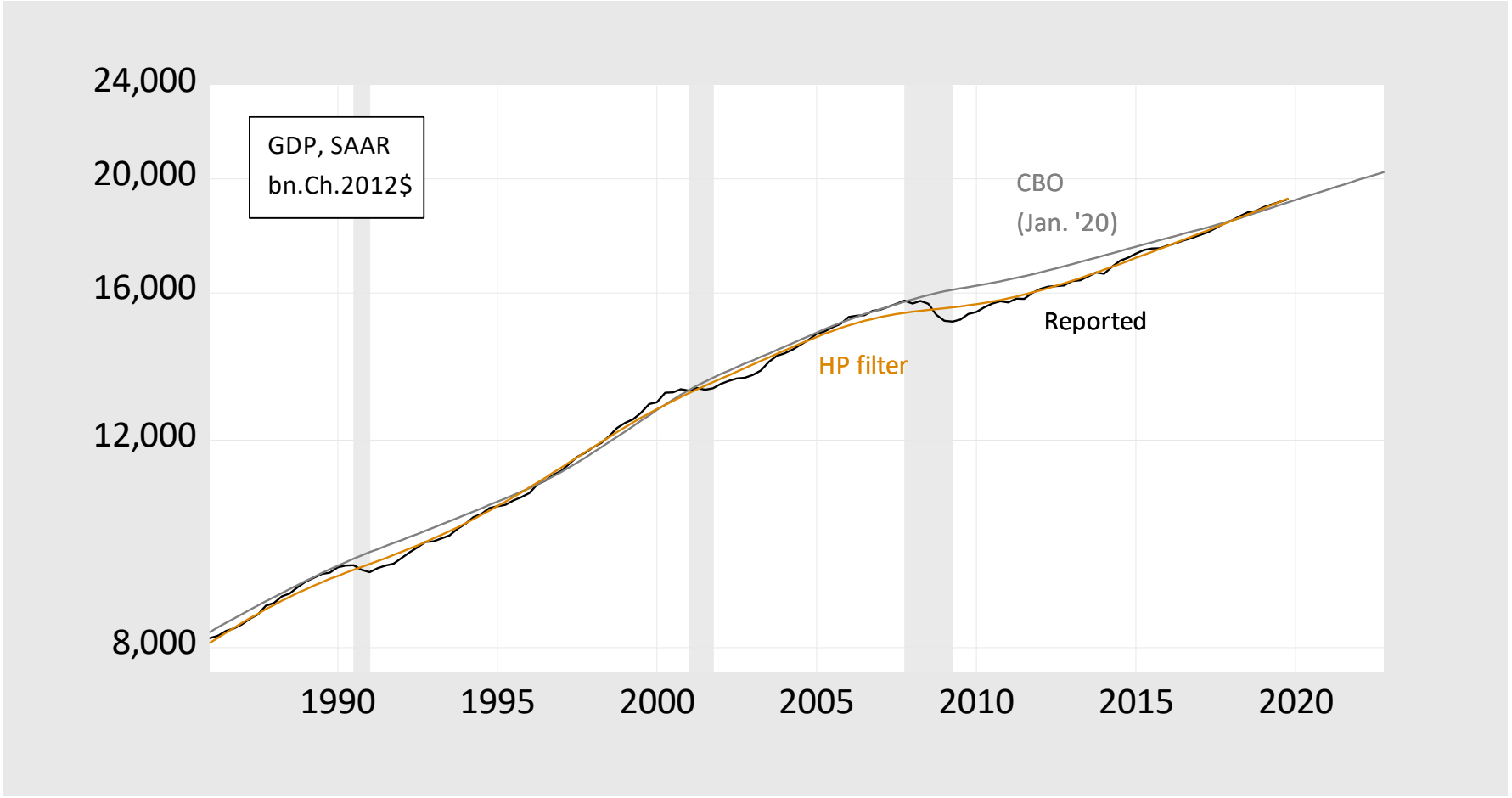
 - Policy on Problem Sets: work together, but submit individual problem set answers!

- Slides online before lectures
- Office hours Tu, Th 1:30-2:30 (preliminary)

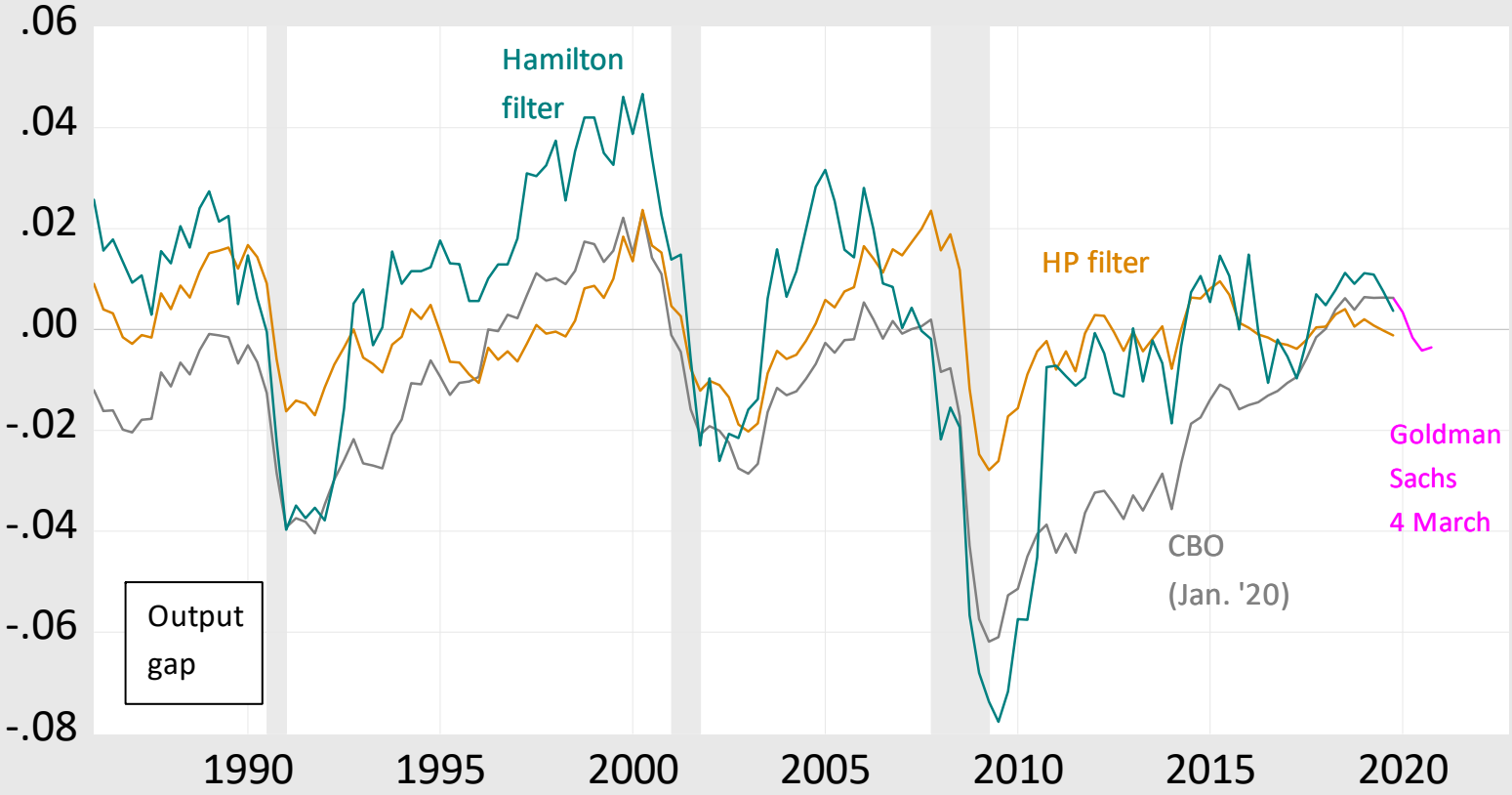
# Outline

- Motivation
- The demand side
- And preface of supply side and equilibrium

# Reported GDP and Estimated Potential



# (Log) Output Gaps



# Gali's Survey

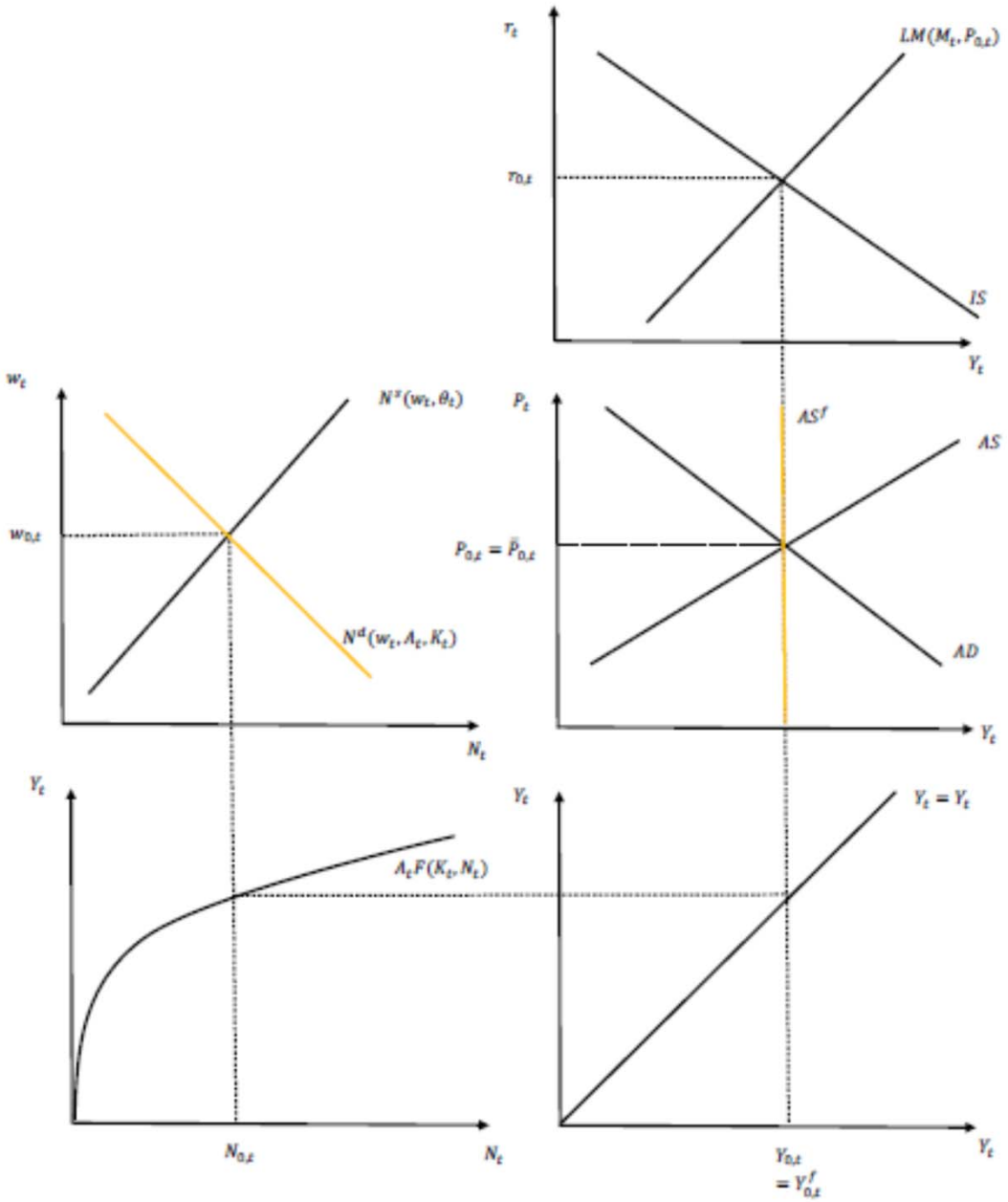
What does New Keynesian economics add to the standard real business cycle apparatus? One can pinpoint three significant modifications.

- First, it introduces nominal variables explicitly: prices, wages, and a nominal interest rate.
- Second, it departs from the assumption of perfect competition in the goods market, allowing for positive price markups.
- Third, it introduces nominal rigidities…

# Where we are headed

IS-LM-AD-AS, combines Keynesian and New Classical attributes w/forward looking expectations

Figure 25.11: Equilibrium in the Partial Sticky Price Model



# The IS-LM-AD Model

- New Keynesian - expectations matter
- This version incorporates neo-Ricardian equivalence
- Old Keynesian - uses the Hicksian decomposition
- But yields largely the same results that monetary and fiscal policy can be effective
- Can dichotomize economy into real and financial sides, where individual agents separately solve for real activities and for asset choices
- For exposition at beginning, assume the price level can be held constant

# The IS-LM-AD Model

$$C_t = C^d(Y_t - G_t, Y_{t+1} - G_{t+1}, r_t) \tag{23.1}$$

$$I_t = I^d(r_t, A_{t+1}, K_t) \tag{23.2}$$

$$Y_t = C_t + I_t + G_t \tag{23.3}$$

$$M_t = P_t M^d(r_t + \pi^e_{t+1}, Y_t) \tag{23.4}$$

$$r_t = i_t - \pi^e_{t+1} \tag{23.5}$$

# The IS-LM-AD Model

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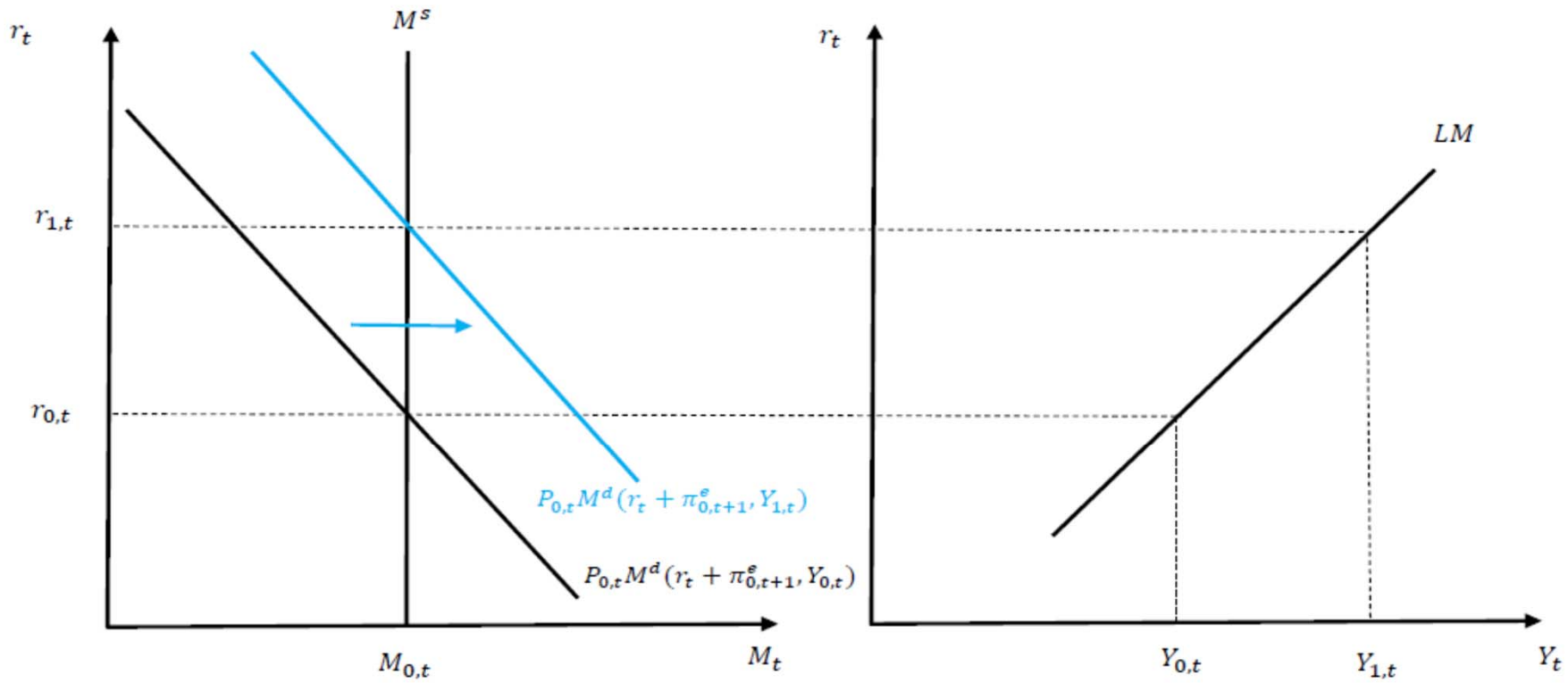
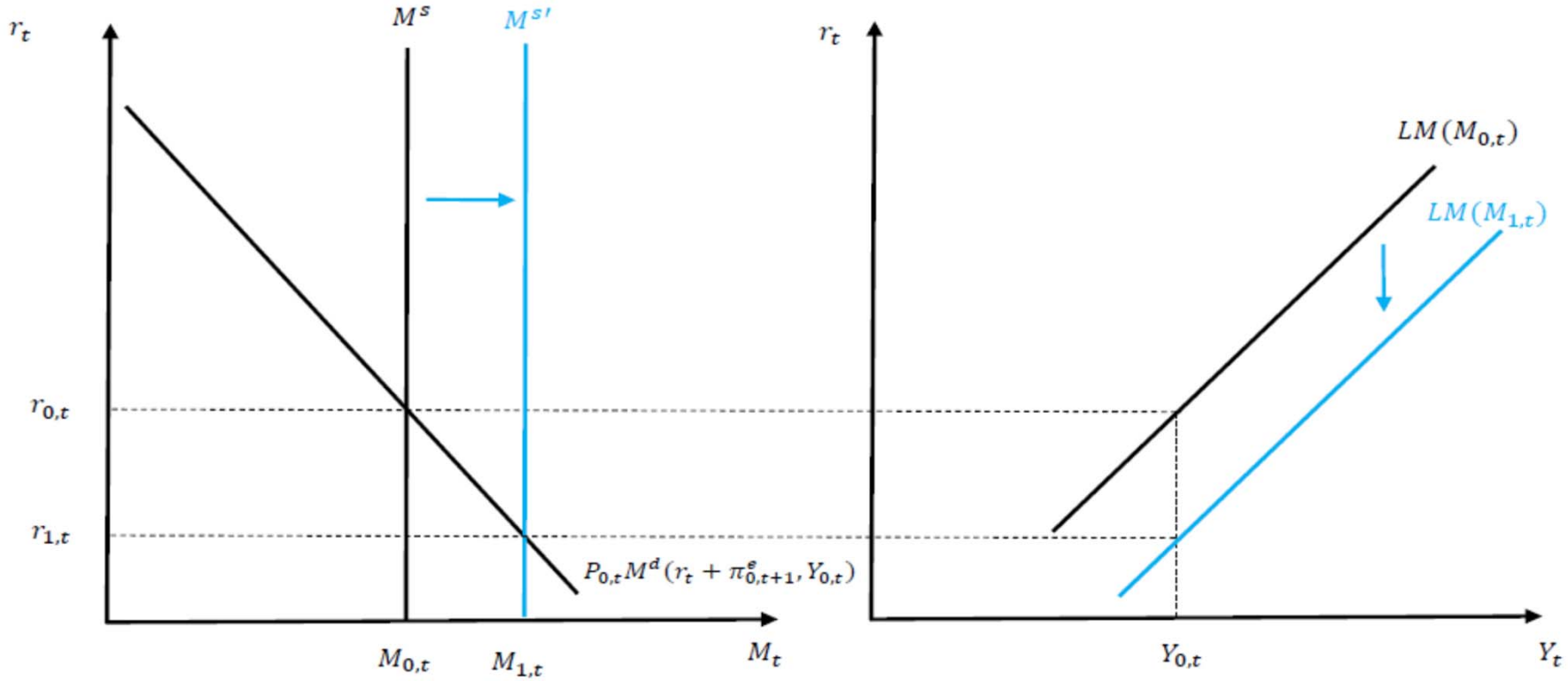
# Money Market

Figure 23.1: The LM Curve: Derivation



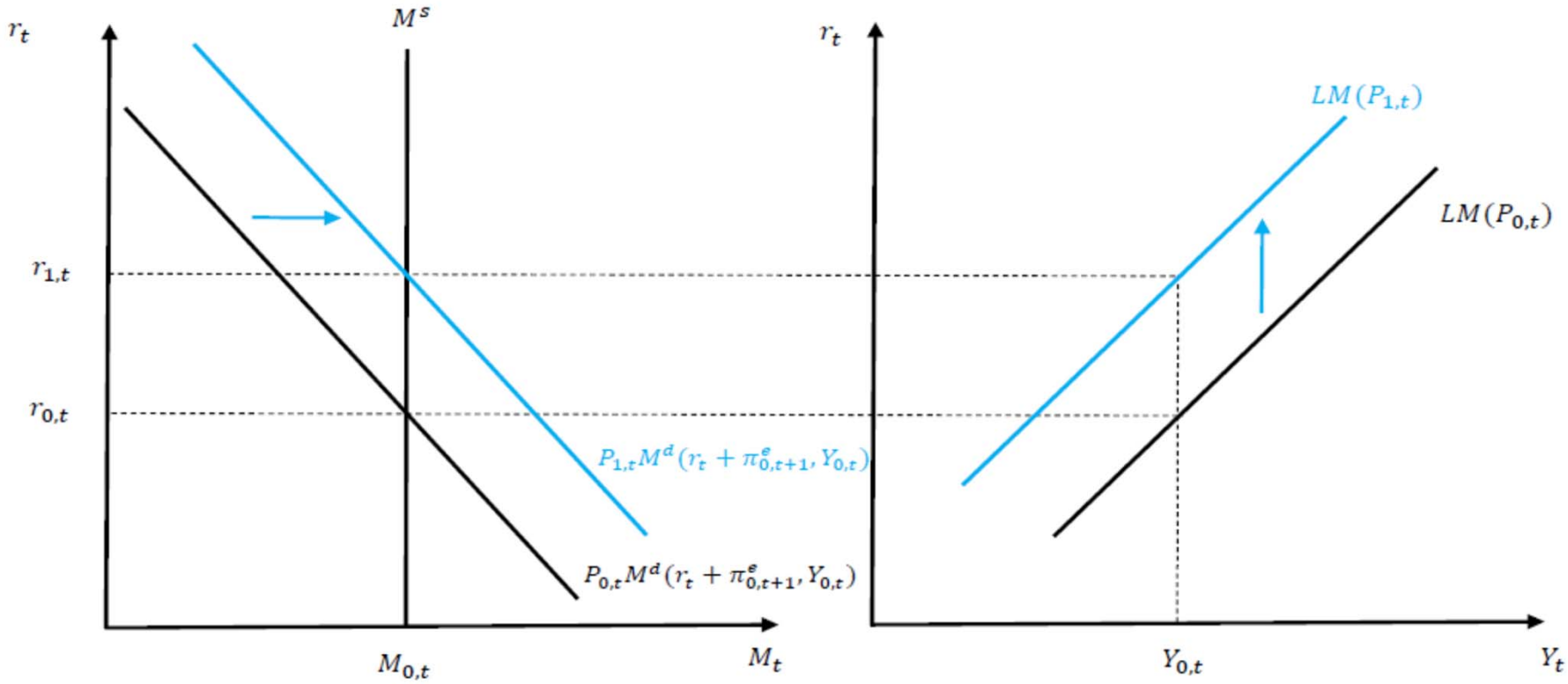
# Money Market & Monetary Policy

Figure 23.2: The LM Curve: Increase in $M_t$



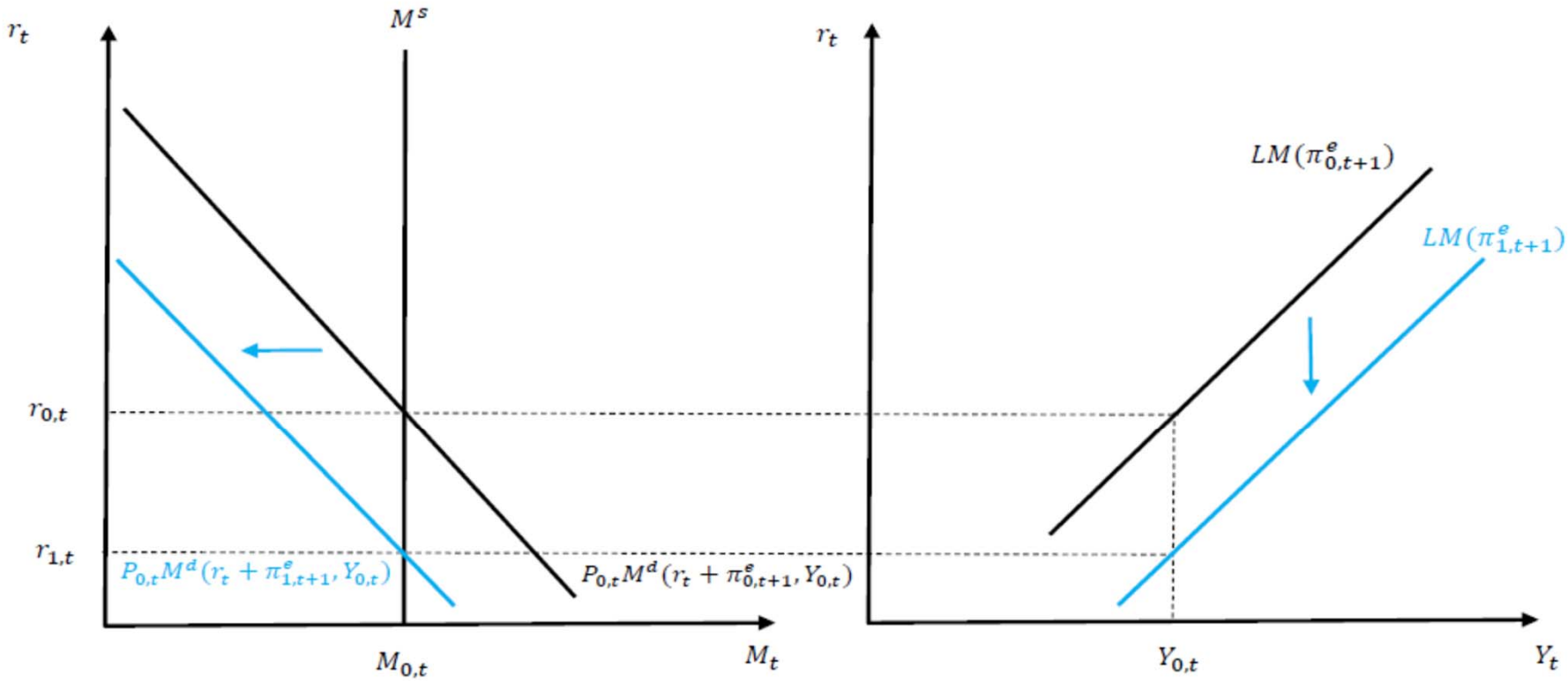
# Price Inflation and the Money Market

Figure 23.3: The LM Curve: Increase in $P_t$



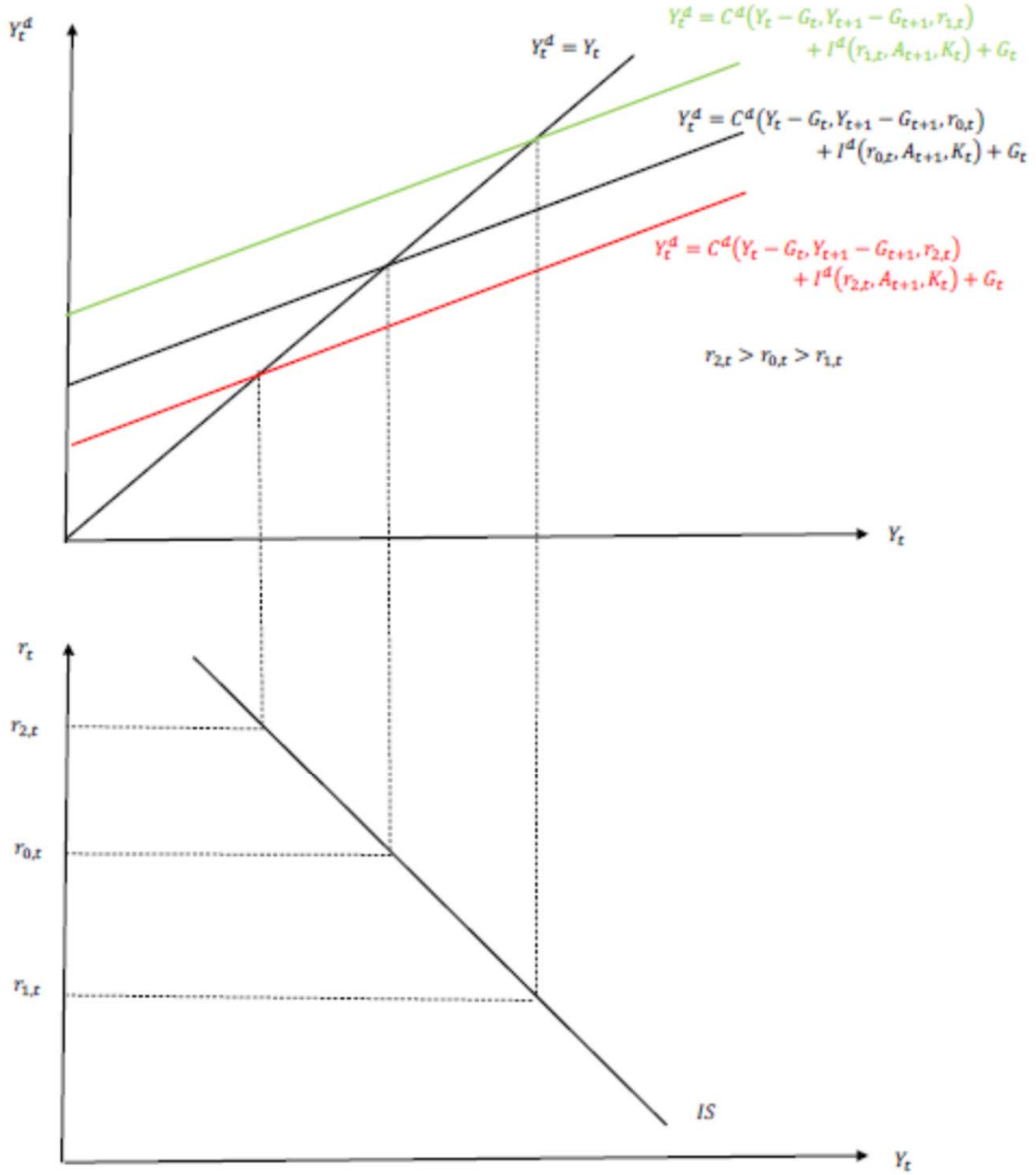
# Expected Inflation and the Money Market

Figure 23.4: The LM Curve: Increase in $\pi^e_{t+1}$



# The Real Side of the Economy

Figure 23.5: The IS Curve: Derivation



# Summary of IS-LM

Table 23.1: LM Curve Shifts

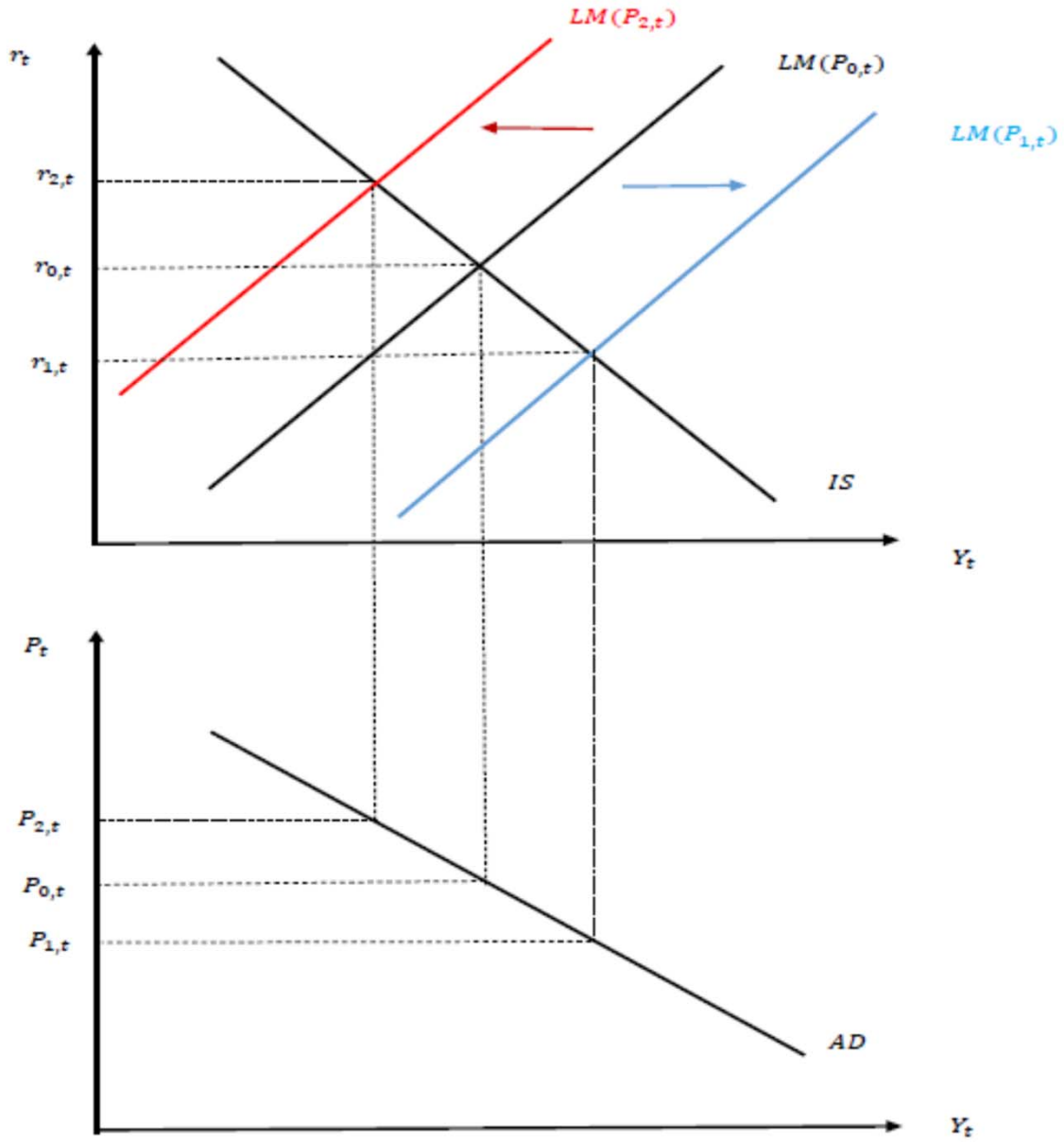
| Change in Variable | Direction of Shift of LM |
|---|---|
| $\uparrow M_t$ | Down (Right) |
| $\uparrow P_t$ | Up (Left) |
| $\uparrow \pi^e_{t+1}$ | Down (Right) |

Table 23.2: IS Curve Shifts

| Change in Variable | Direction of Shift of IS |
|---|---|
| $\uparrow A_{t+1}$ | Right |
| $\uparrow G_t$ | Right |
| $\uparrow G_{t+1}$ | Left |

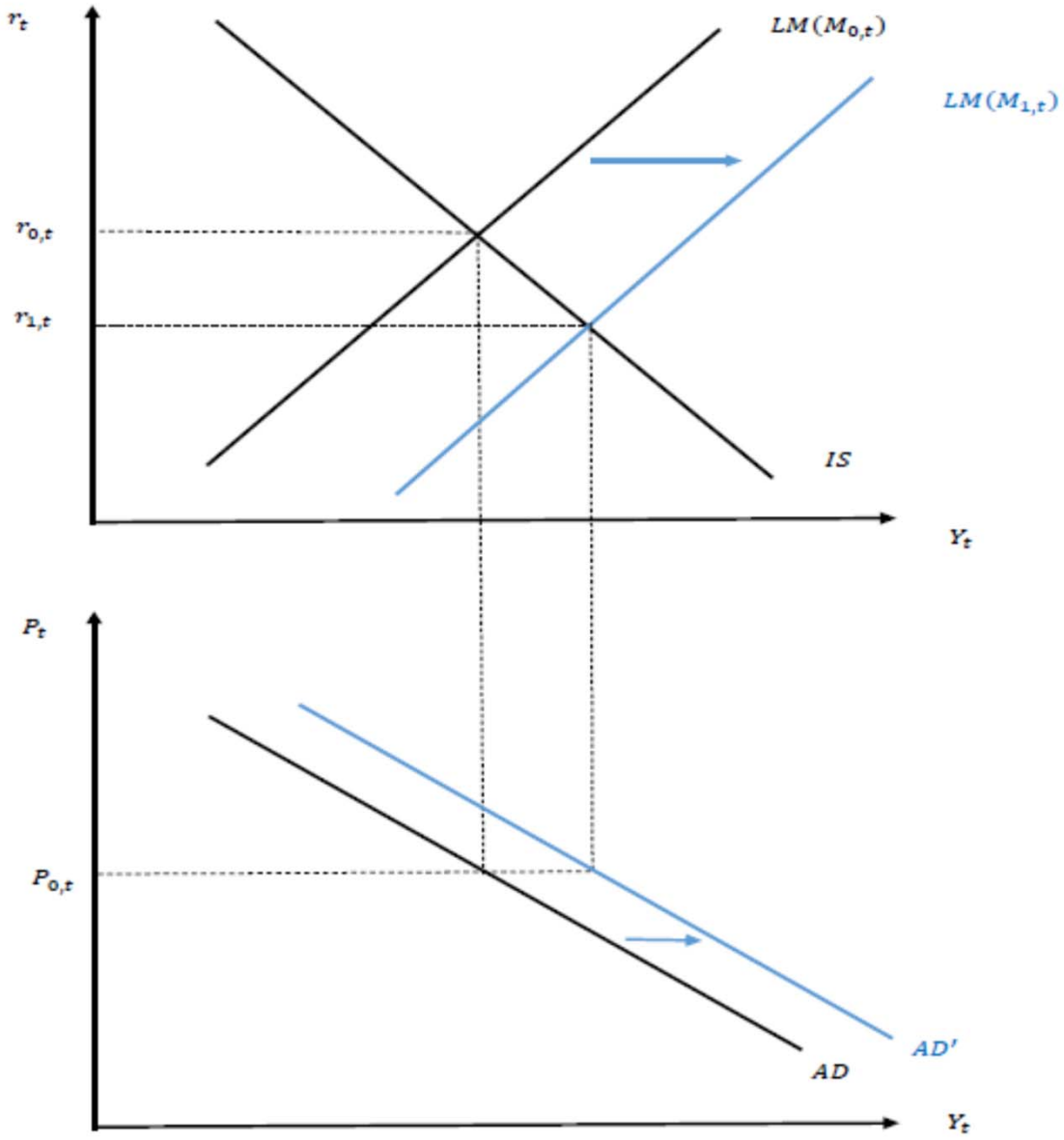
# Aggregate Demand

Figure 23.6: The AD Curve: Derivation



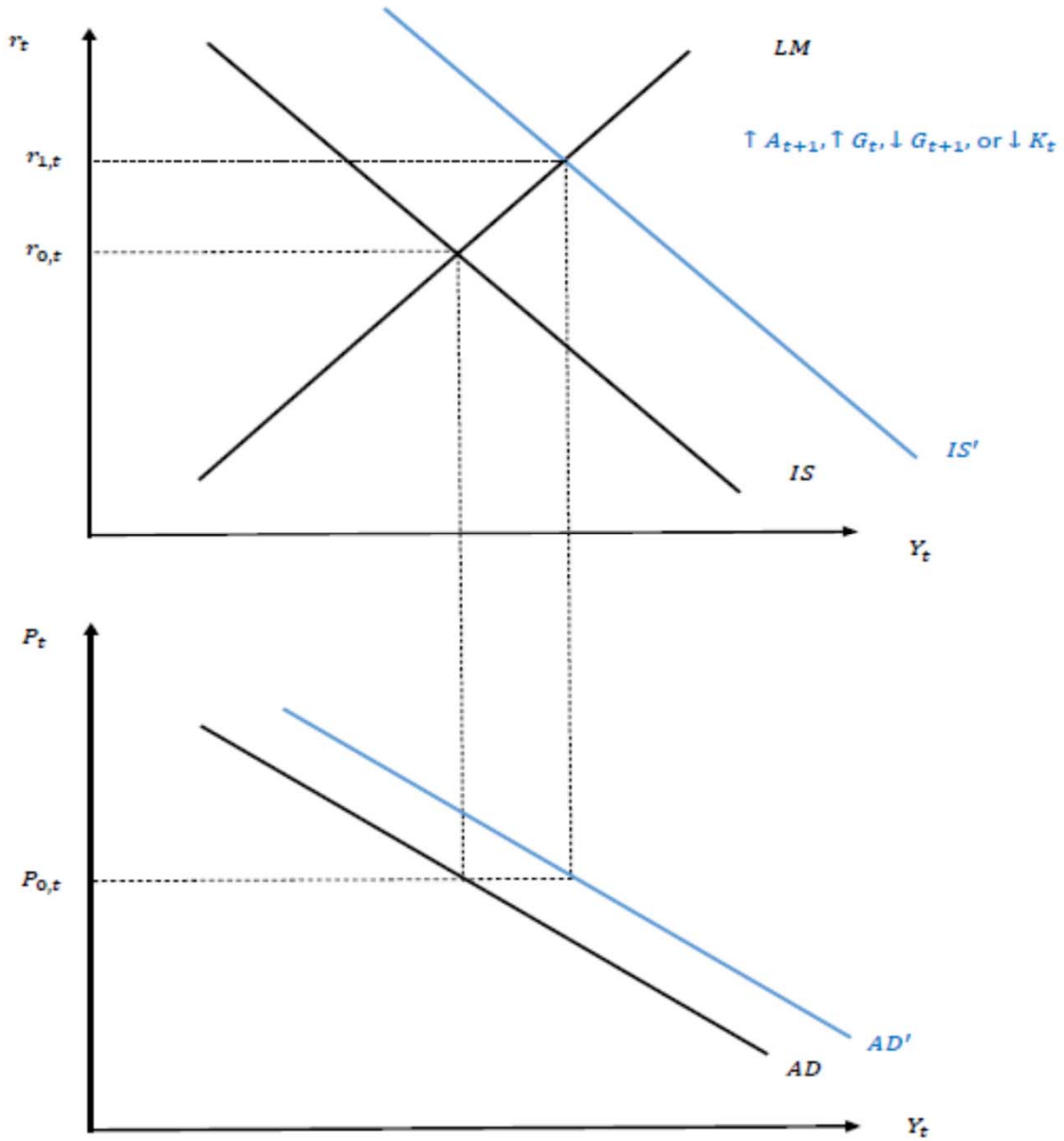
# Policy in Aggregate Demand

Figure 23.7: Shift of the $AD$ Curve: Increase in $M_t$



# Shocks in Aggregate Demand

Figure 23.8: Shift of the $AD$ Curve: IS Shock



# Summary of AD

Table 23.3: AD Curve Shifts

| Change in Variable | Direction of Shift of AD |
|---|---|
| $\uparrow M_t$ | Right |
| $\uparrow \pi^e_{t+1}$ | Right |
| $\uparrow A_{t+1}$ | Right |
| $\uparrow G_t$ | Right |
| $\uparrow G_{t+1}$ | Left |

# Aggregate Supply – partial price adjustment

$$N_t = N^s(w_t, \theta_t) \tag{24.7}$$

$$P_t = \bar{P}_t + \gamma(Y_t - Y_t^f) \tag{24.8}$$

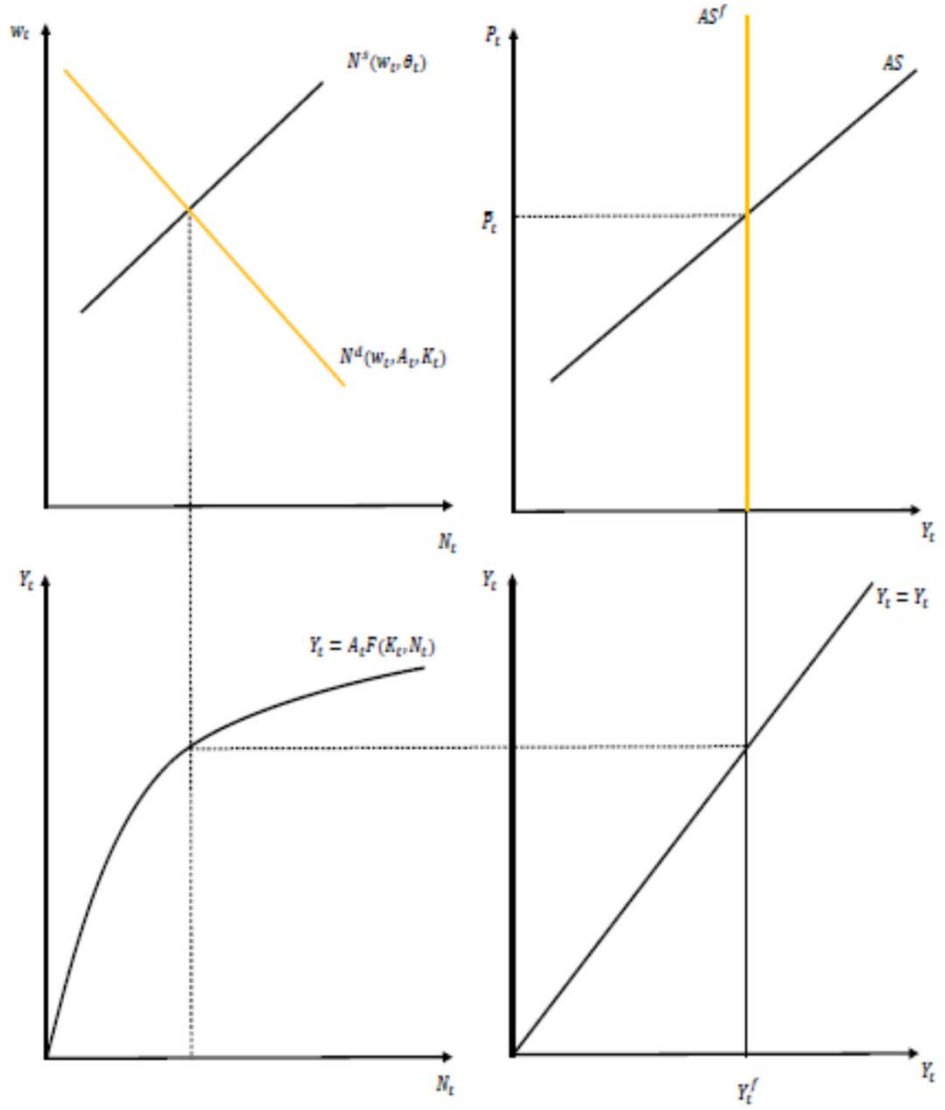
$$Y_t = A_t F(K_t, N_t) \tag{24.9}$$

$$N_t^f = N^s(w_t^f, \theta_t) \tag{24.10}$$

$$N_t^f = N^d(w_t^f, A_t, K_t) \tag{24.11}$$

$$Y_t^f = A_t F(K_t, N_t^f) \tag{24.12}$$

Figure 24.6: The Partial Sticky Price AS Curve: Derivation



# IS-LM-AD-AS

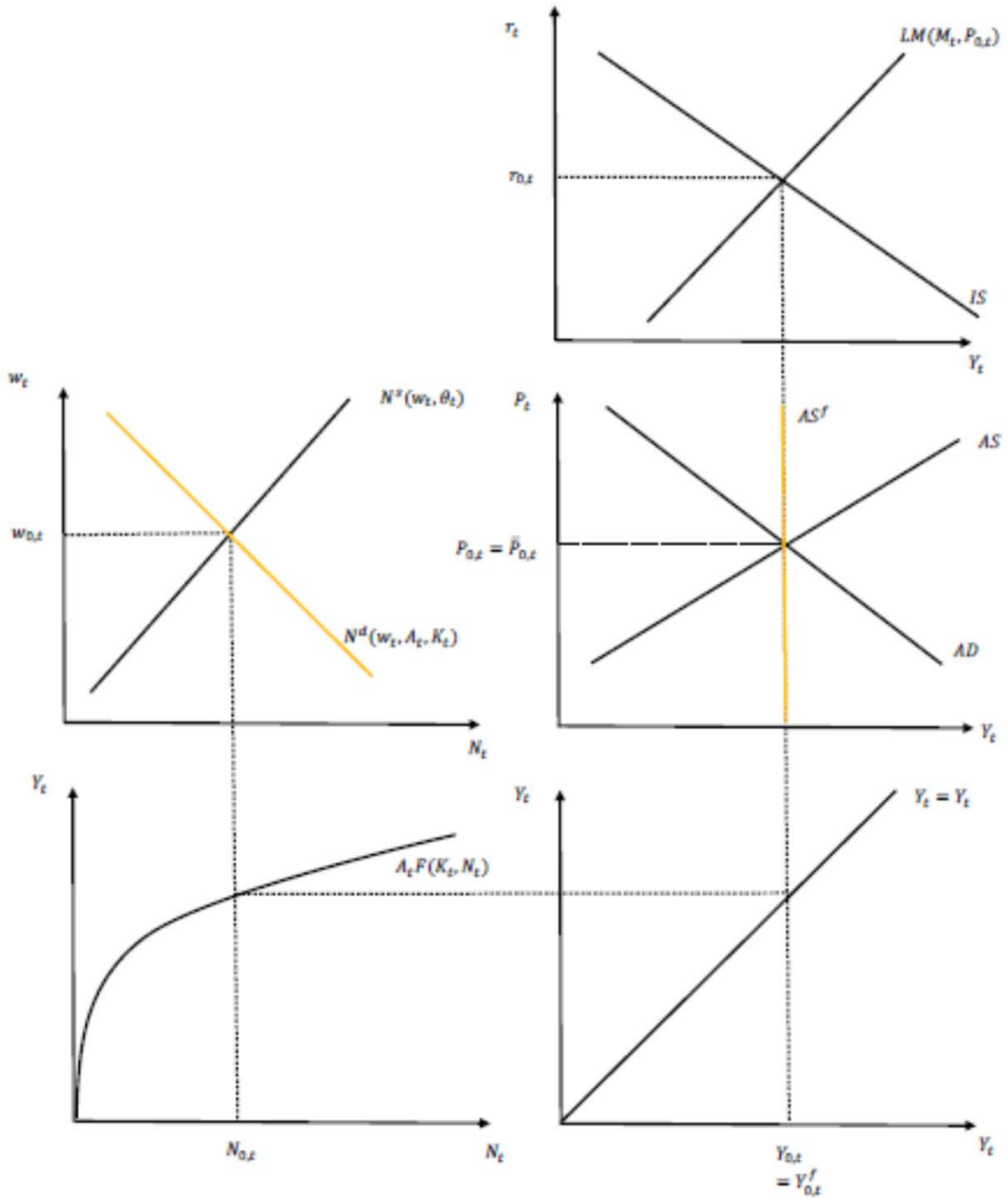



Figure 25.11: Equilibrium in the Partial Sticky Price Model