

PART 1

SHORT-RUN BUSINESS CYCLES FLUCTUATIONS

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AGENDA FOR THIS TOPIC

1. IS-LM model and Aggregate demand
2. Labor market activities and Aggregate supply
3. Equilibrium analysis, fiscal and monetary policy
4. Demand and Supply shocks: business cycles interpretation

Readings:

Froyen: chapter 5 - 8

AGGREGATE SUPPLY: FOUNDATION

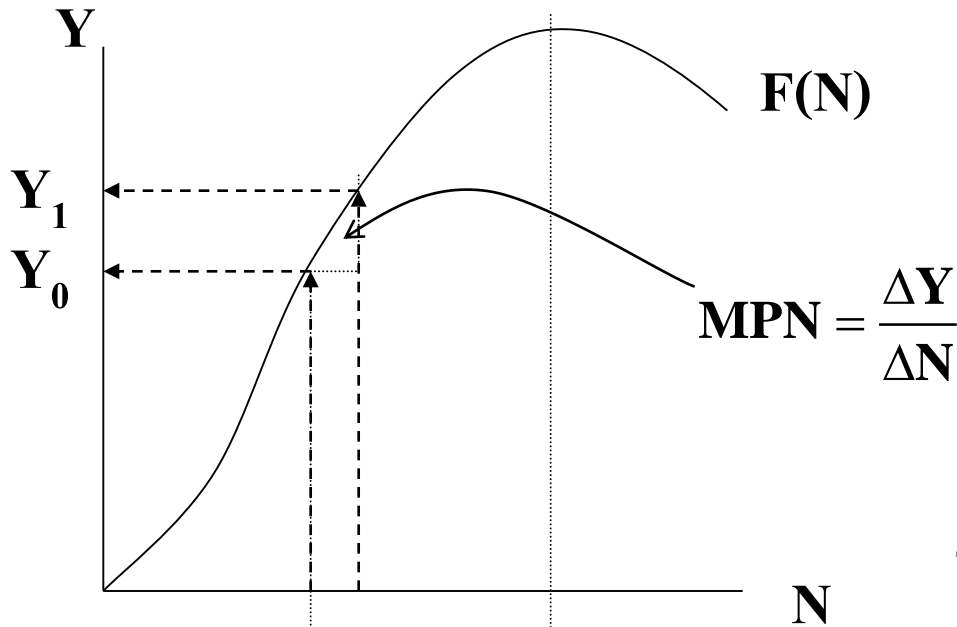
- This section provides a foundation for the theory of aggregate supply.
- Aggregate supply is the theory that describes the relationship between “**price**” and “**amount of the output produced by firms**”.
- The foundation of AS theory can be derived from micro-founded individual supply theory.
- Understanding AS requires your priori understanding on production function and optimal labor input decision.

AGGREGATE SUPPLY: FOUNDATION

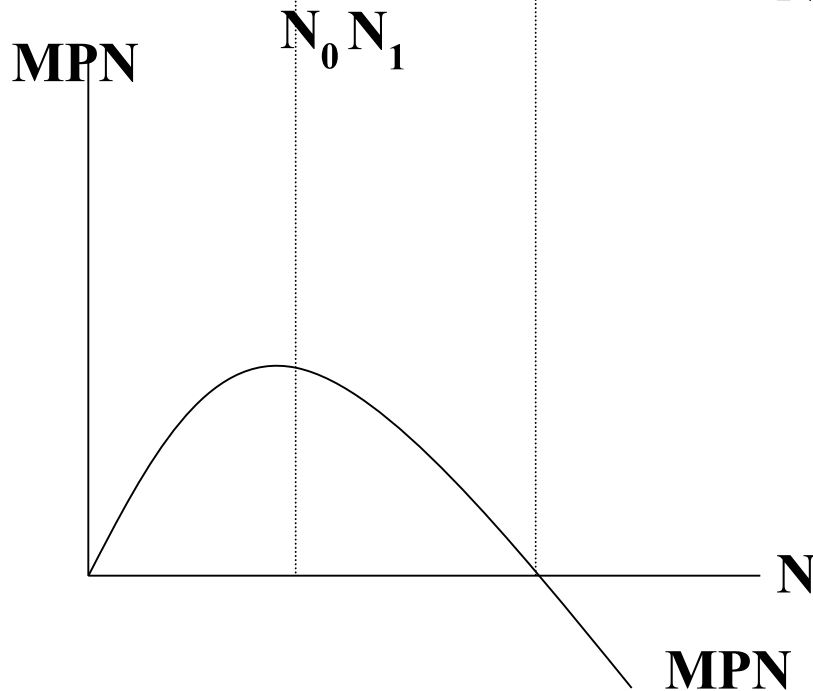
- What does the firm do?
 - Firm is a production unit; transform **inputs** into **outputs** using **production technology** that they have.
- Production technology is usually denoted by concept of the production function.

$Y = F(K, N)$ where $K = \text{Capital}$ and $N = \text{labor hired}$

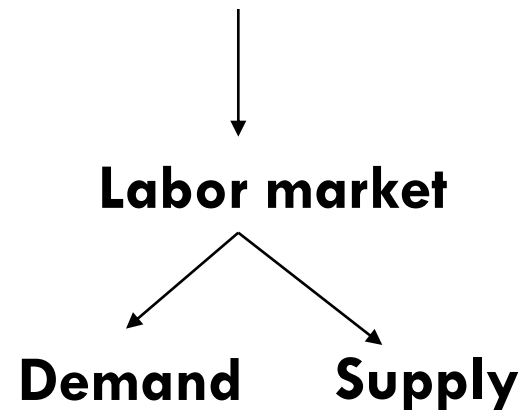
- In the short-run, K is fixed, i.e. $Y = F(\bar{K}, N)$.
 - Firm's production depends on the amount of labor hired/employed.



- Law of diminishing marginal productivity
- Marginal Product of Labor: MPN



Total output supply depends on the number of labor employment

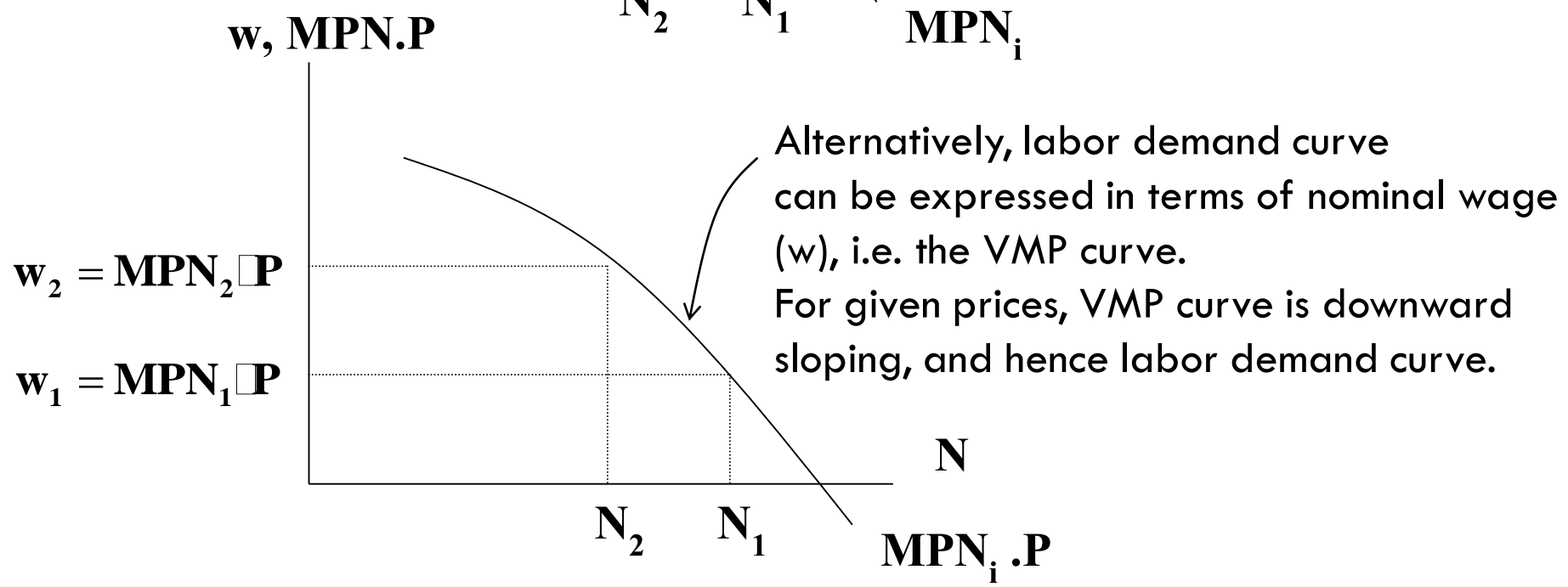
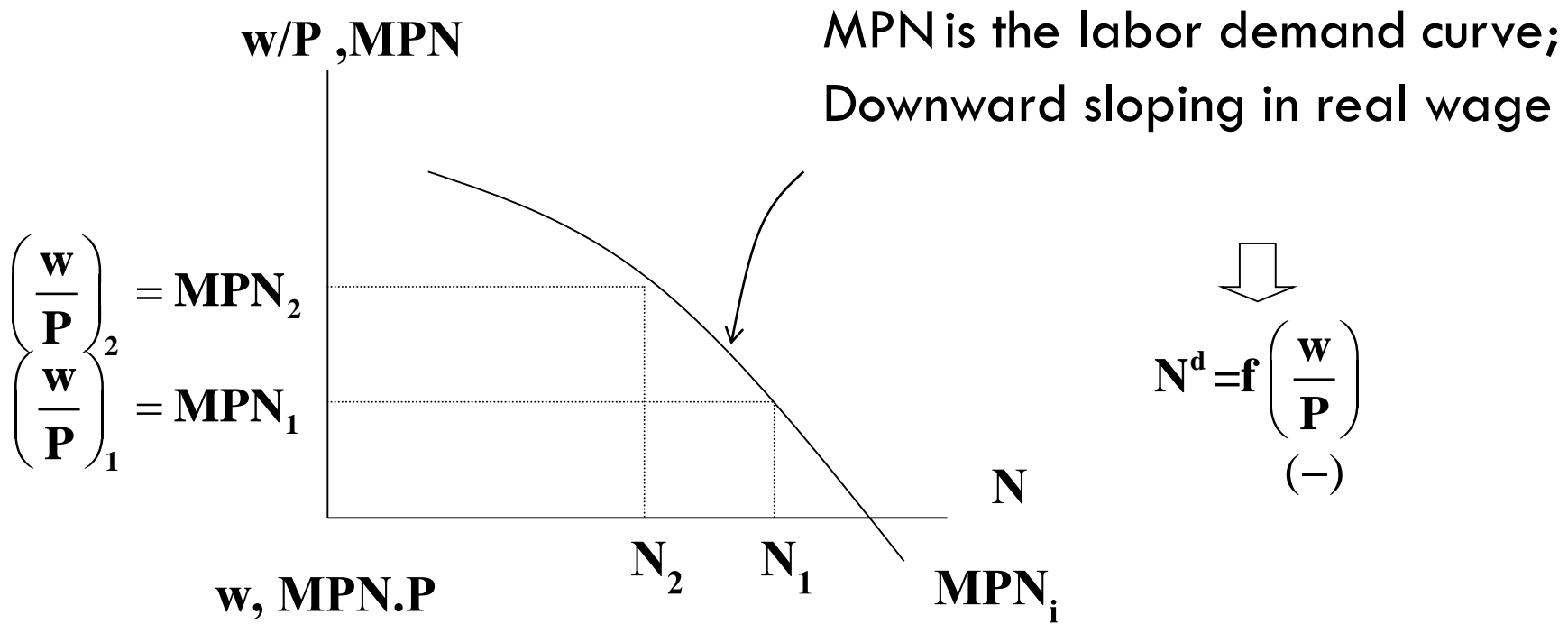


LABOR MARKET DEMAND

- How to best transform inputs into outputs? (N? into Y?)
- Firm chooses for optimal level of inputs that maximizes profit.
- Optimizing condition suggests that firms choose the optimal level of employment where **marginal cost of labor equalizes with marginal benefit of labor**

$$W = P * MPN \text{ (nominal wage = Value marginal product)}$$

$$W/P = MPN \text{ (real wage = marginal product)}$$



LABOR MARKET SUPPLY

- Where does the supply of labor come from?
- Households supply labor force to the market. Why?
- They get work and paid; income earned can be used for purchasing goods in the goods market.
- Theorem for labor market supply emerges from foundation of individual labor supply, i.e. the **consumption-leisure model**.

LABOR MARKET SUPPLY

- Households choose for two things: consumption level (C) and leisure (L).
- Problem is not obvious as household needs to **trade-off** between the two.
 - More leisure is good, but associated with lower consumption.
 - More consumption is good, but household need to work a lot more; less leisure.
- Household is guided by preference or utility function, depends on “C” and “L”. They choose for optimal C and optimal L under the constraint that they face.

Consumption – Leisure problem

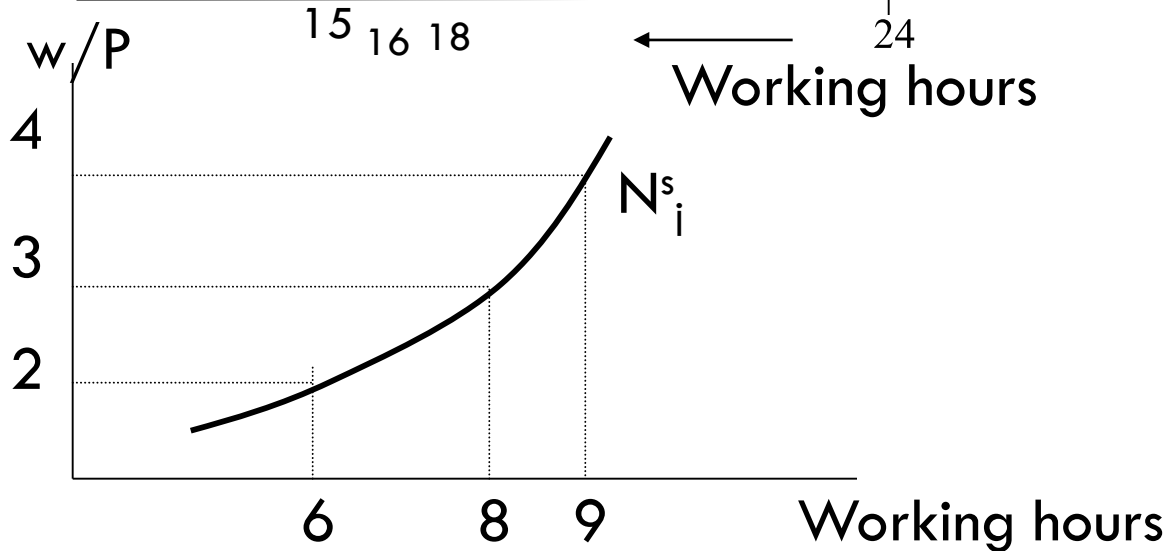
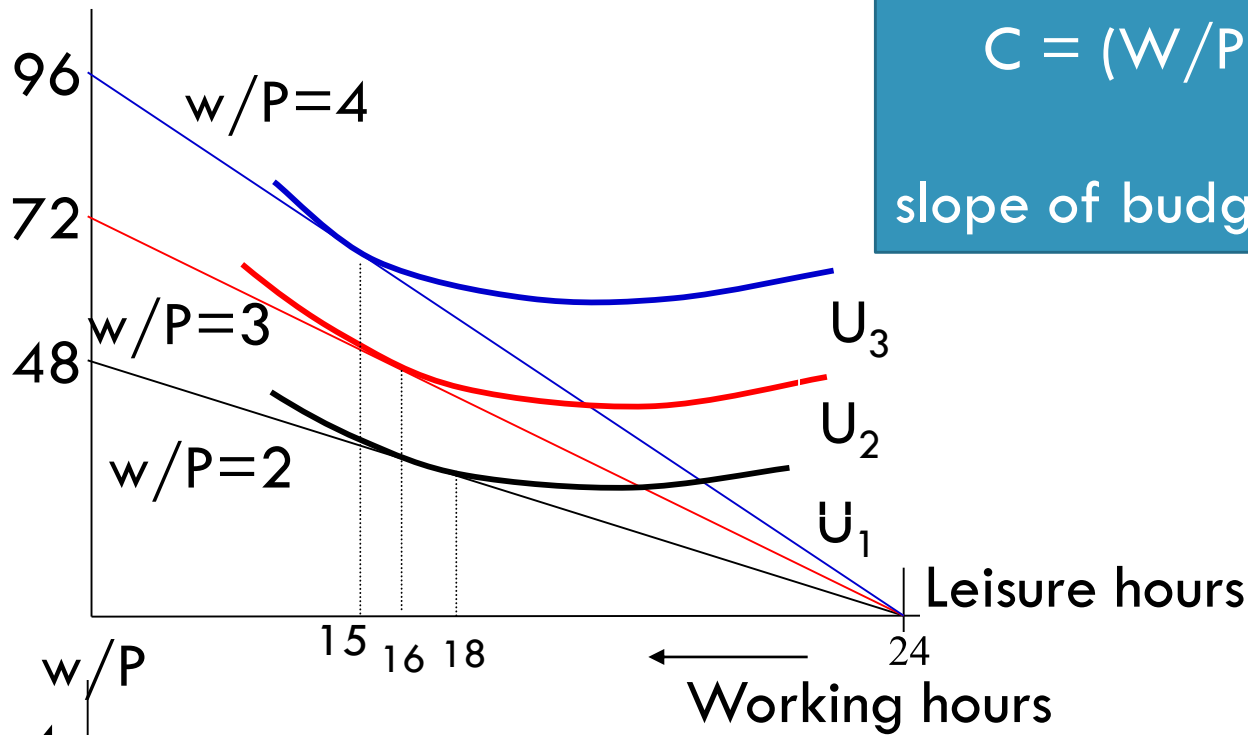
$$\text{Max } U(C,L)$$

$$\text{s.t. } PC = WN = W(24-L)$$

$$C = (W/P) (24 - L)$$

slope of budget line = W/P

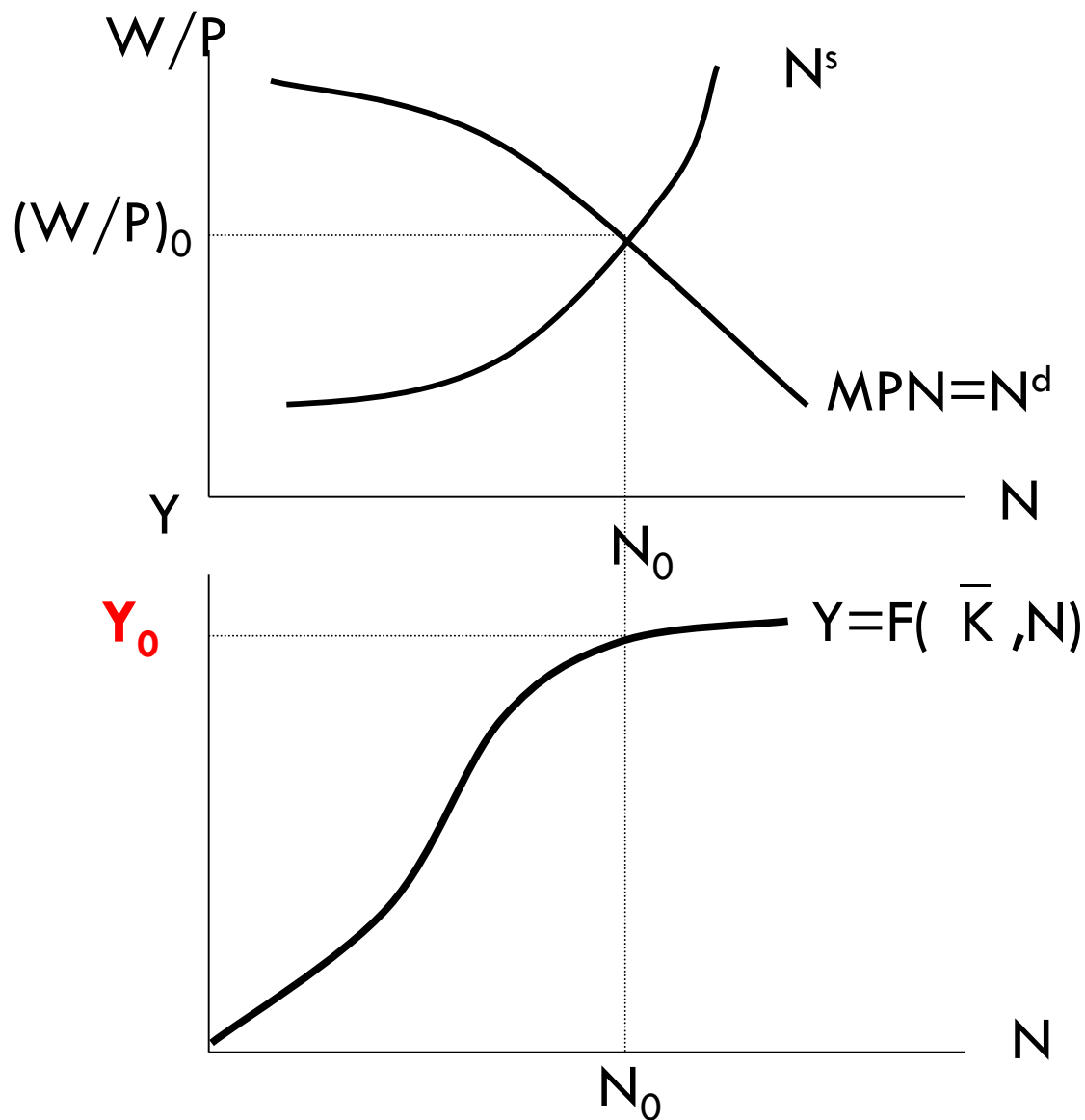
Consumption



$$N^s = g\left(\frac{w}{P}\right)$$

(+)

Equilibrium of labor market and optimal production level



AGGREGATE SUPPLY AND LABOR MARKET OUTCOME

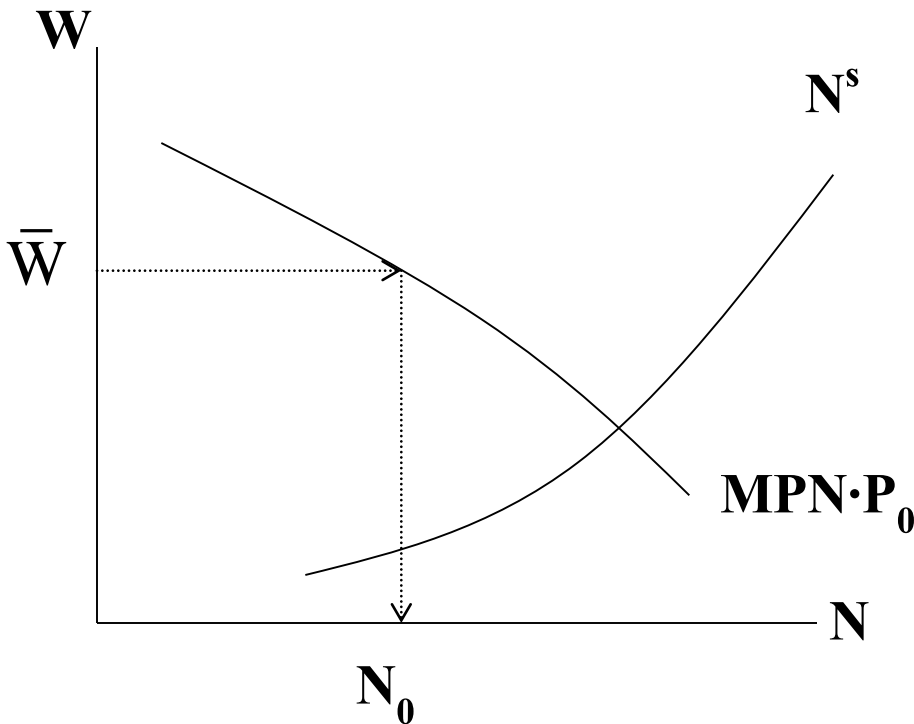
- Economy always produces at the full-employment output (Y_0 and N_0).
 - Aggregate supply is always a vertical line; **neoclassical/classical aggregate supply (Long-run aggregate supply)**
- The supply concept rests on a very strong, and controversial, assumption that **price and wage can be perfectly adjusted with a complete synchronization (no delay)**.
- Keynesian theorists then argue that classical foundation to Aggregate supply is misleading; **empirically, nominal wage adjusts slower than nominal price.**

WHAT'S RIGHT ABOUT LABOR SUPPLY: KEYNESIAN POINT OF VIEW

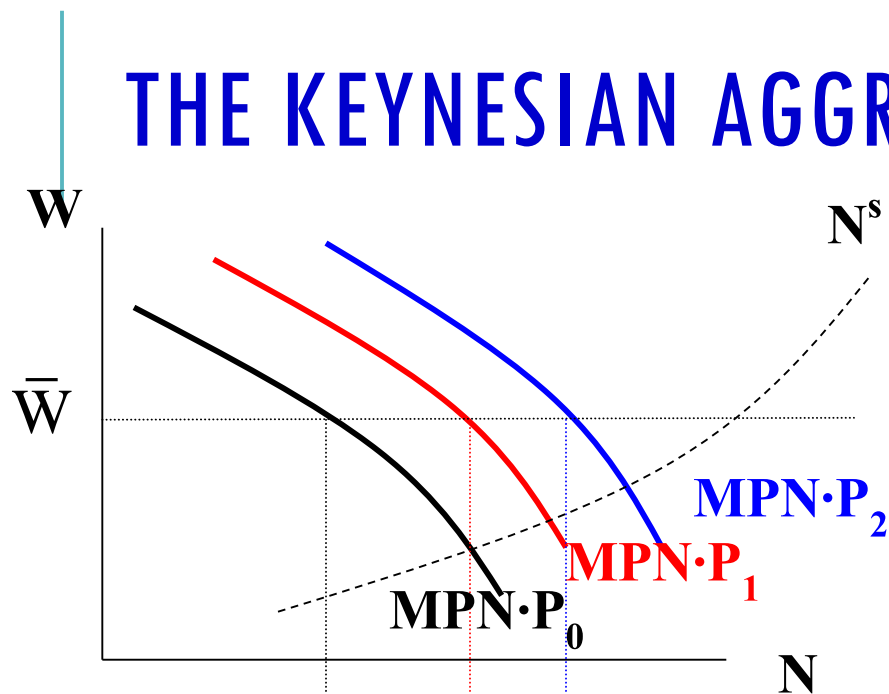
- Labor market decision involves with **contractual agreement**, and **length and duration of hiring**.
- Wage is usually **pre-specified** in advance, based on the bargaining problem between employers and employees.
- Lot more institution features that make it hard for wage to be adjusted instantaneously over time; **wage stickiness**.

HOW DOES THE INTRODUCTION OF KEYNESIAN FEATURES AFFECT THE AGGREGATE SUPPLY?

Perfectly rigidity in wage, *Exogenous* long-term *nominal wage* contract
The amount of employment is given by *labor demand* $W = MPN \cdot P$

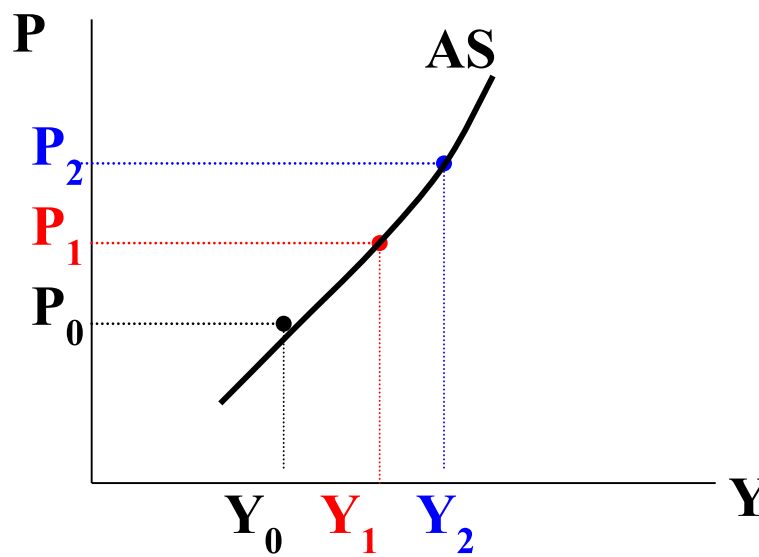
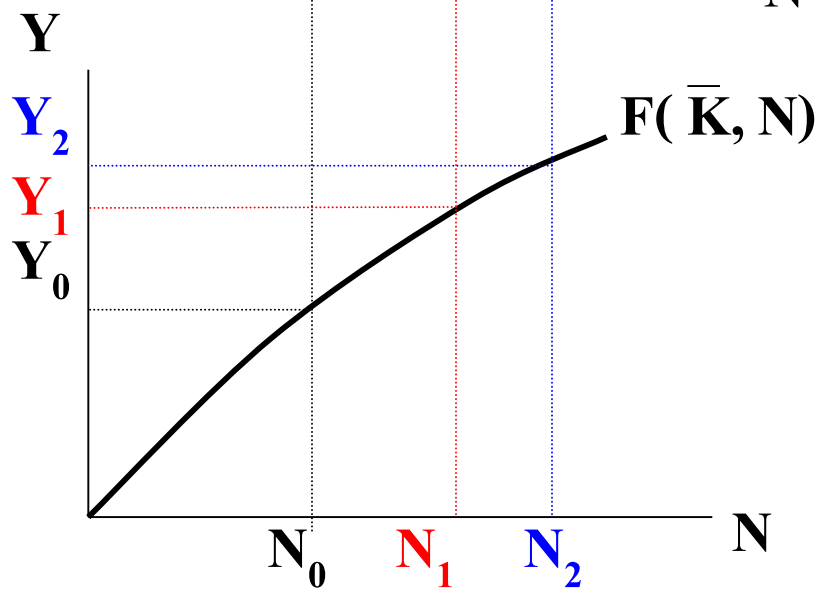


THE KEYNESIAN AGGREGATE SUPPLY



As price increases, firm hires more labor. Output will increase.

AS is upward sloping



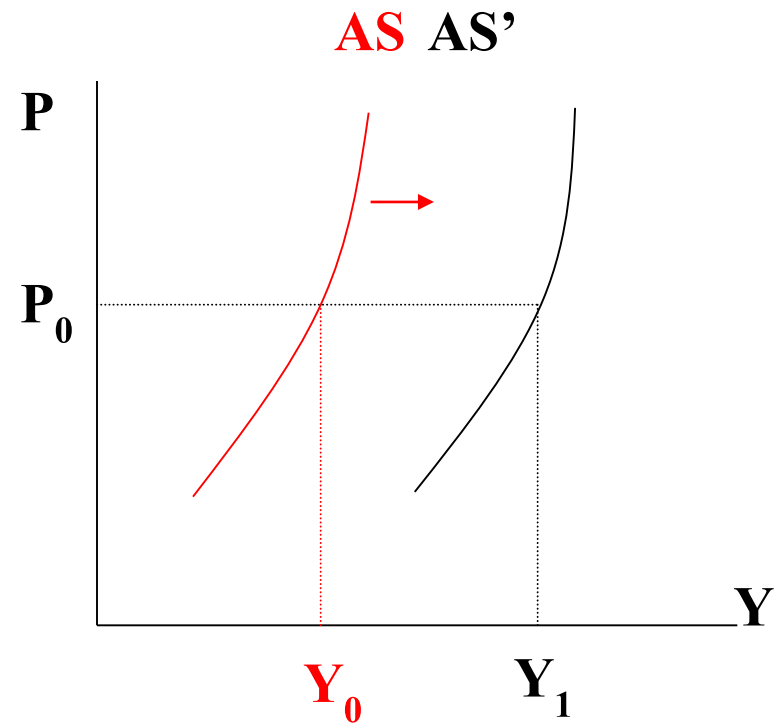
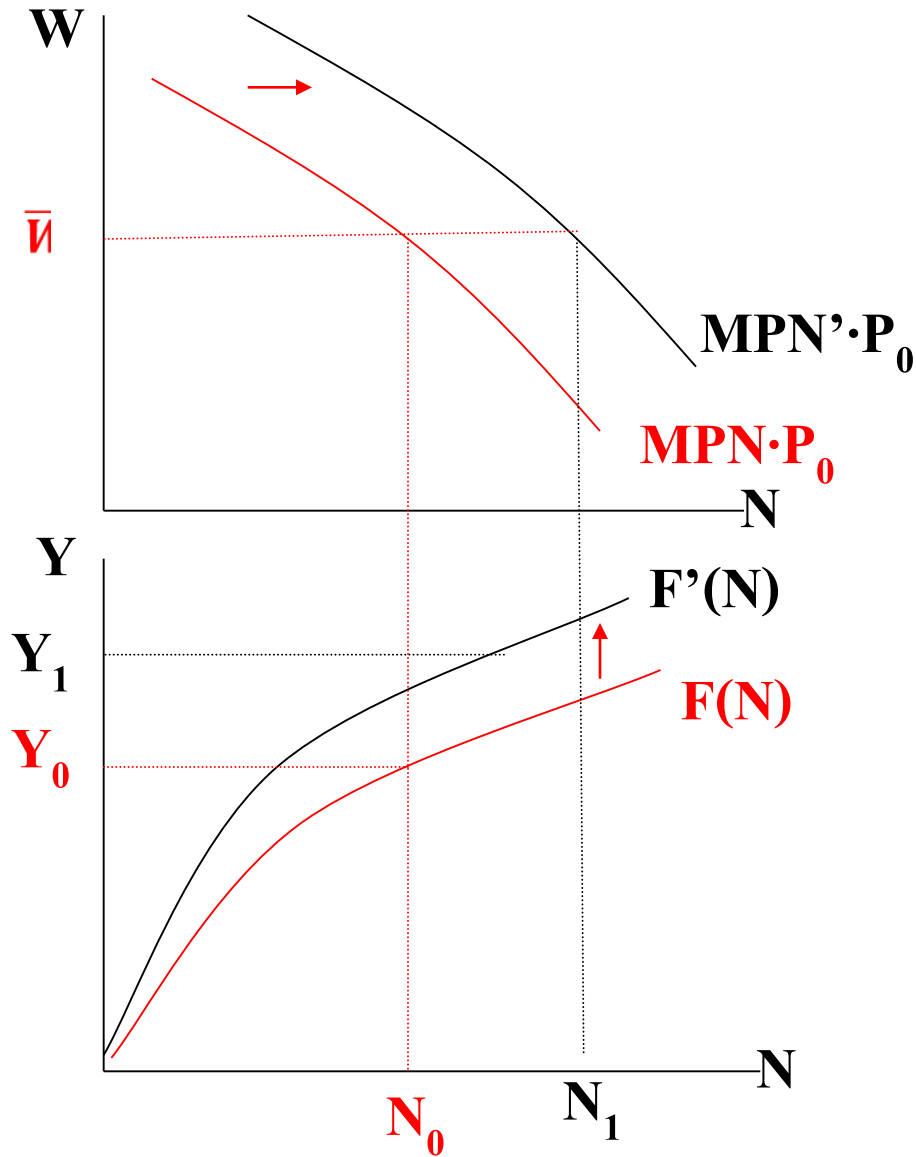
FACTORS AFFECTING AGGREGATE SUPPLY CURVE

- We knew about the foundation of an upward sloping AS curve.
- Several factors are kept steady while we are deriving the upward sloping curve. What if they change?
- Their changes cause a **shift in the Aggregate supply**.

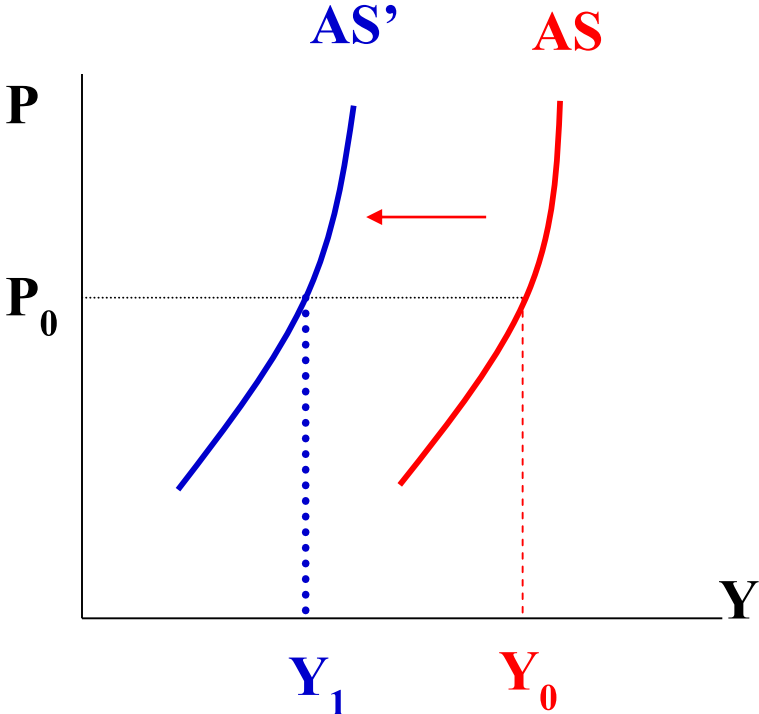
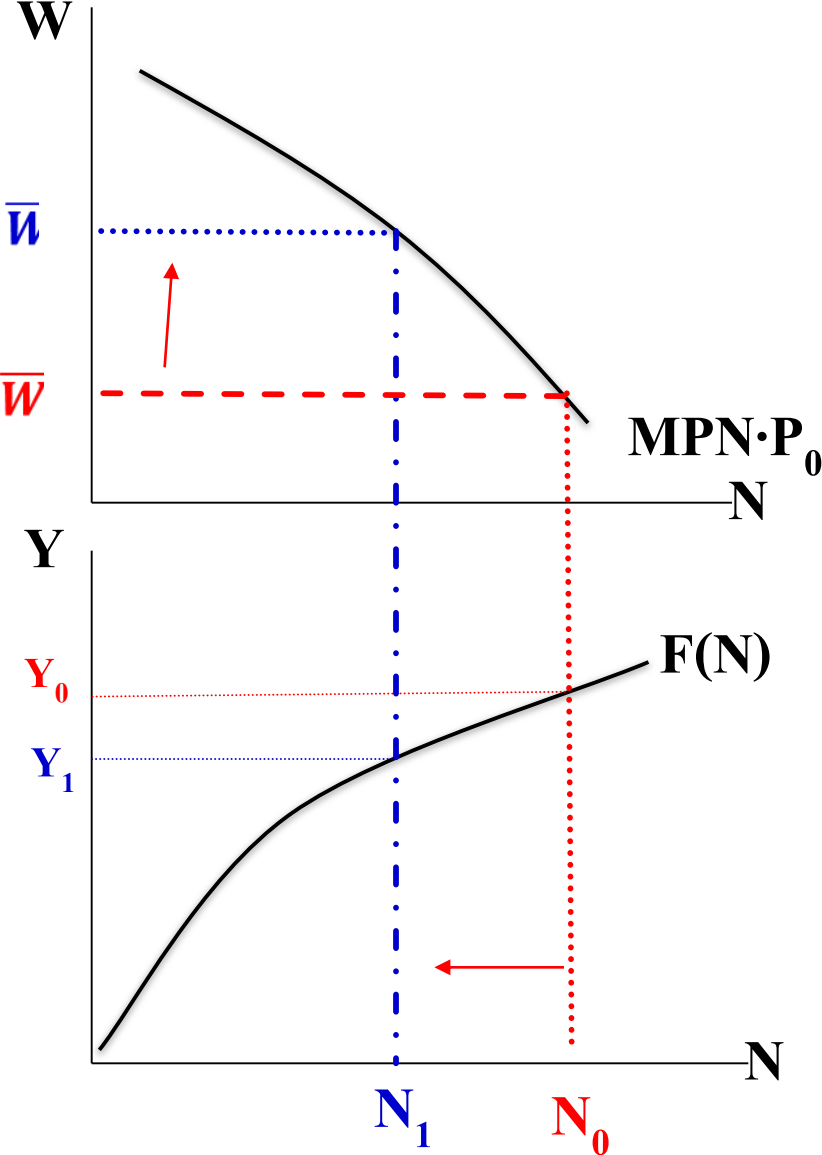
FACTORS AFFECTING AGGREGATE SUPPLY CURVE

- Technological factors
- Cost-push factor; oil price and material inputs price.
- The level of nominal contract wage.

The impact of technological improvement



Change in bargained wage



WHAT DETERMINE THE LEVEL OF BARGAINED WAGE?

- Exogenous story doesn't make sense?
- What is the foundation of endogenous wage bargaining level? **Ultimate drivers that cause the movement in bargained wage?**
- Several factors might determine the level of (fixed) wage set in the contract.
 - Bargaining power between employers and employees
 - Labor market conditions (tight/slack)
 - Price expectation; negotiated to keep up with standard of living

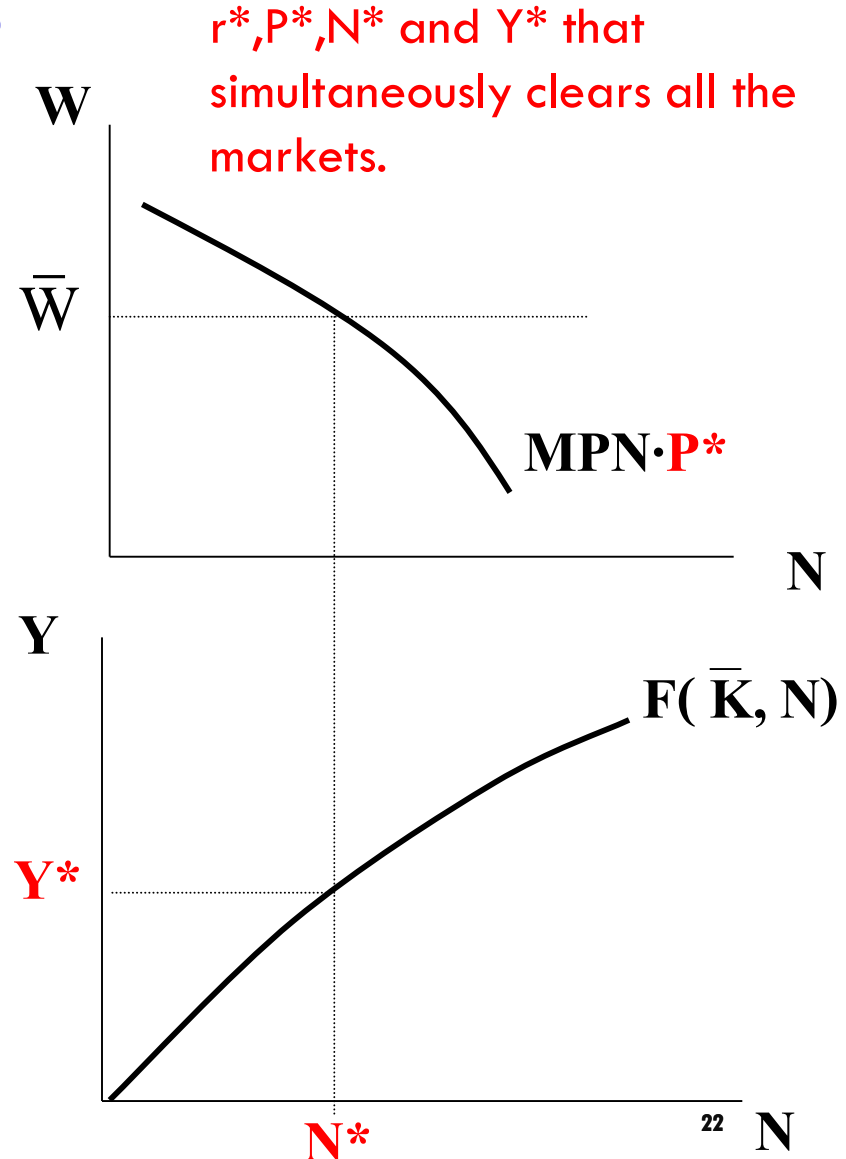
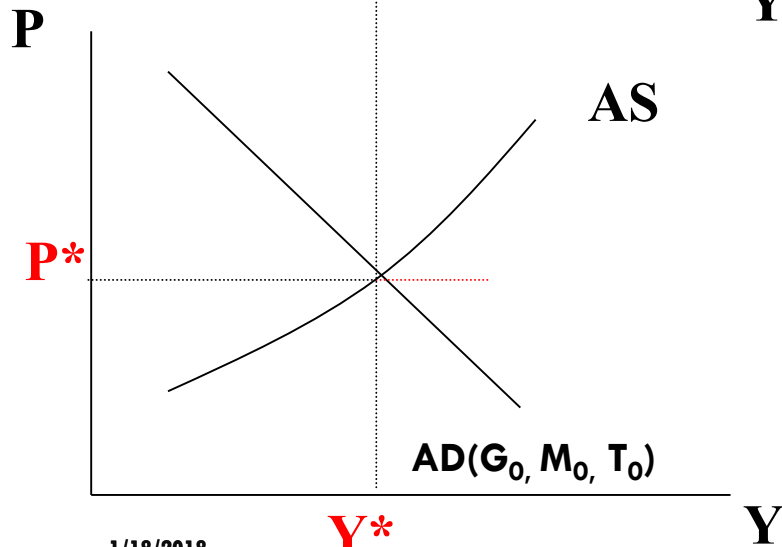
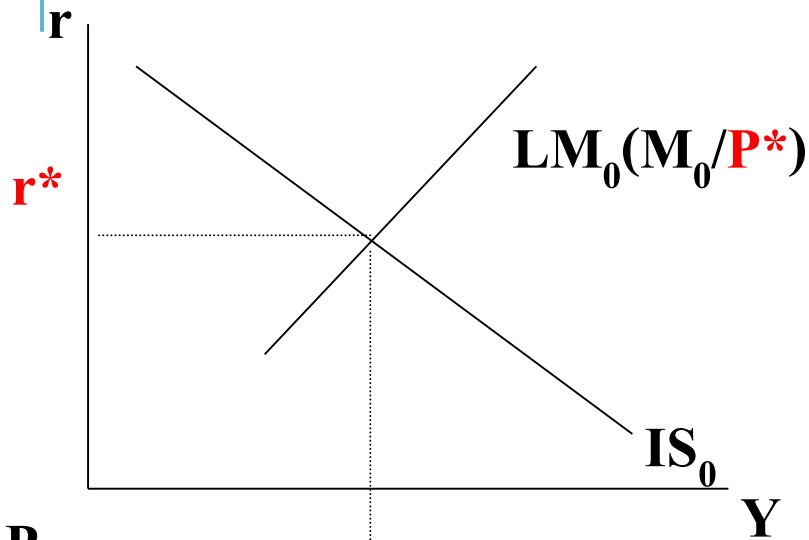
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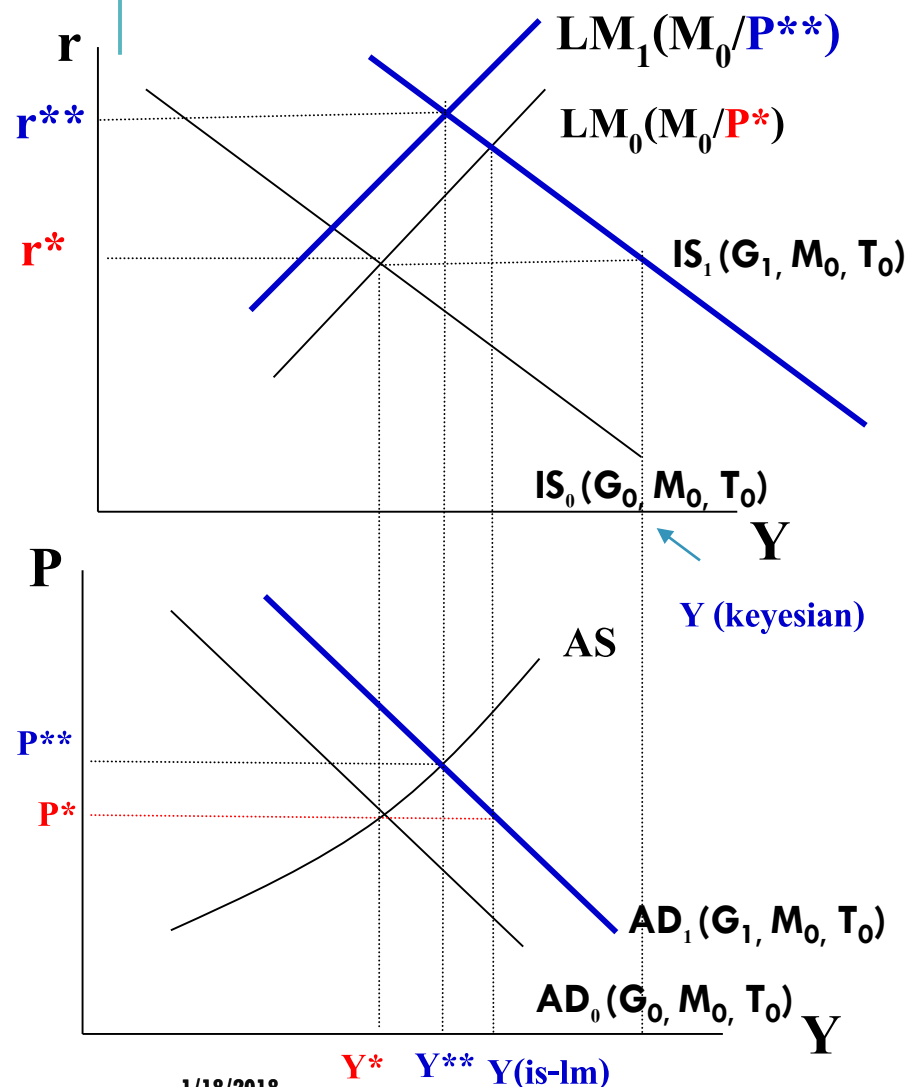
Froyen: chapter 5 - 8

EQUILIBRIUM ANALYSIS



r^*, P^*, N^* and Y^* that simultaneously clears all the markets.

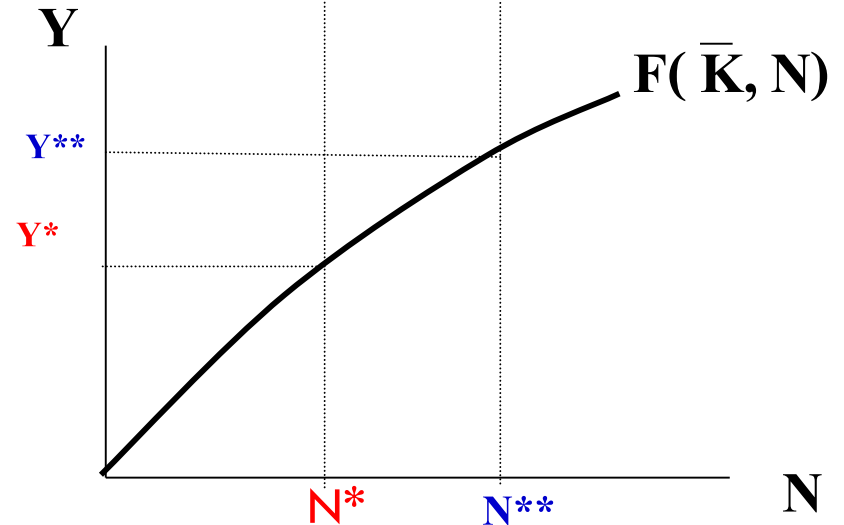
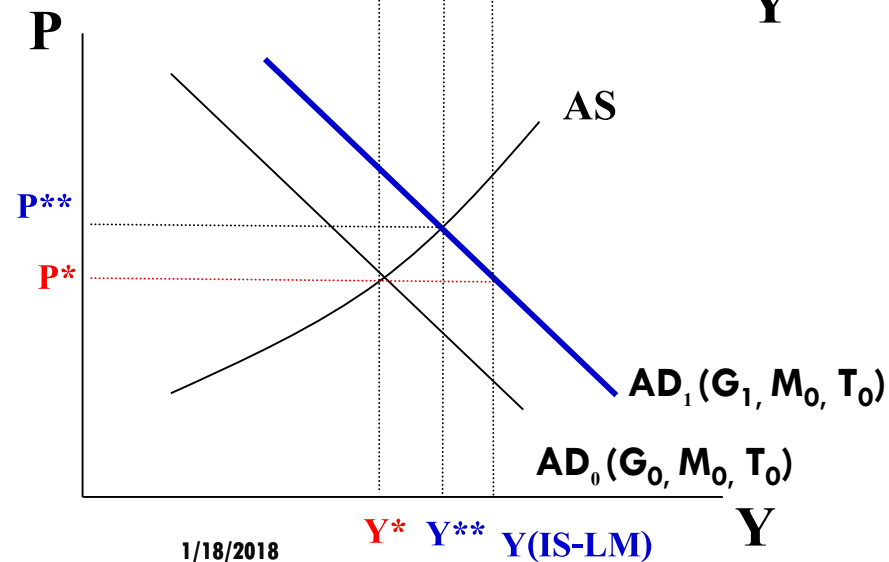
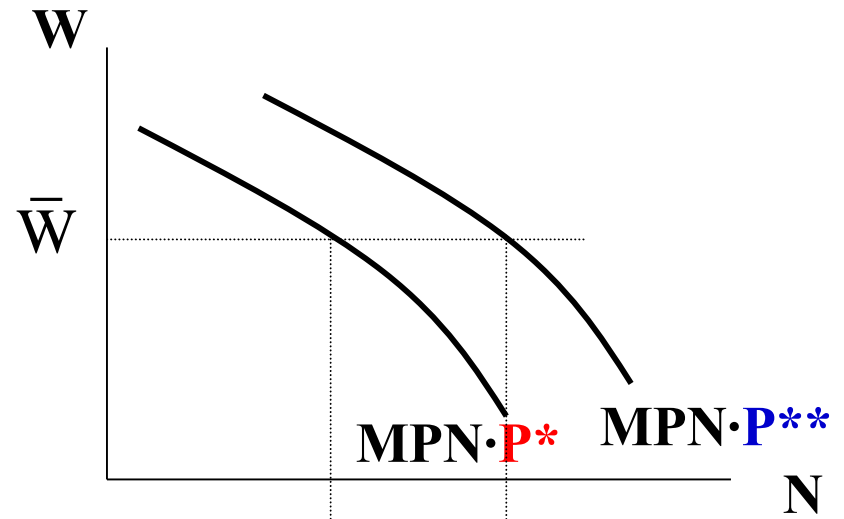
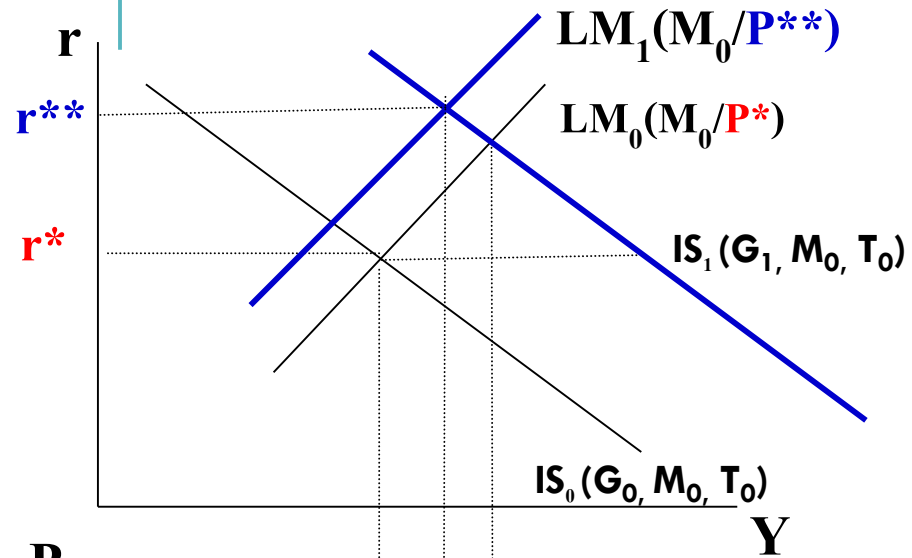
EQUILIBRIUM ANALYSIS: FISCAL POLICY



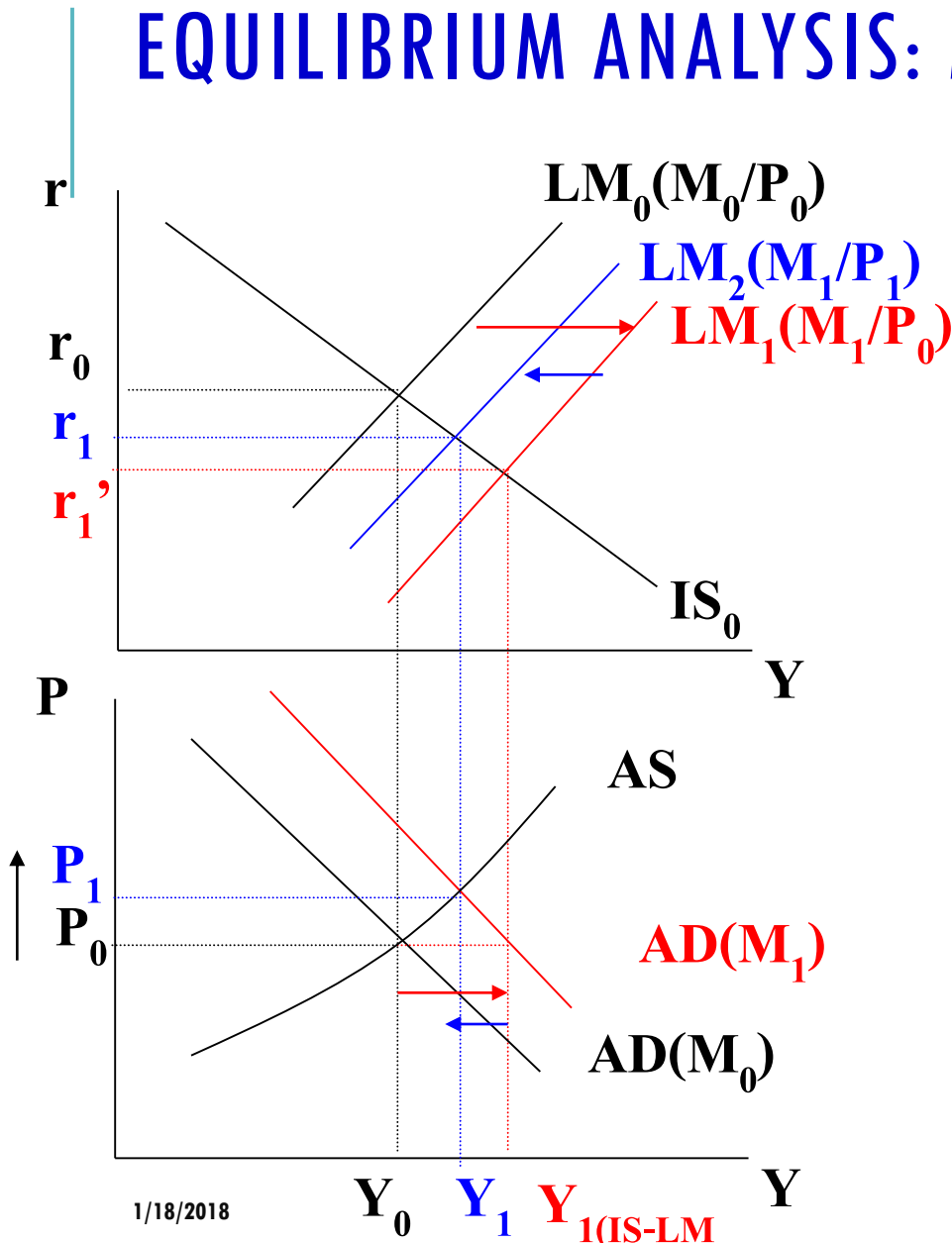
Mechanisms of Fiscal policy

1. Suppose price fixed equal to P^* .
2. $G_0 \rightarrow G_1$; IS_0 curve shifted to IS_1 .
3. AD_0 shift to AD_1 . (Horizontal shift?)
4. At P^* , we have excess demand; price starts to rise from P^* to P^{**} .
5. Rising price offsets the initial impact of "G" as it tends to push up the market interest rate; this is called the **price effect**.

EQUILIBRIUM ANALYSIS: FISCAL POLICY



EQUILIBRIUM ANALYSIS: MONETARY POLICY



Mechanisms of Monetary policy

- Increase nominal money supply ($M_0 \rightarrow M_1$): LM shifts right.
- At P_0 , AD shift right.
- At P_0 , we have excess demand; price must be rising. It rises to P_1 .
- This causes the LM curve to shift left because real money supply decreases.
- The effect on Y is smaller than the effect under IS-LM model.

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ACCOUNTING SOME STYLIZED FEATURES IN DATA IN MACROECONOMY WITH MODEL

Long-term view

1. Long-term growth (positive; output growing over time.)
2. Inflation rate is positive (around 2% p.a. after 2001)

Short-term view

1. Output growing more in some periods; choppy fluctuations.
2. Inflation is sometimes higher or lower than the long-term trend (the 2% after 2001)

STYLIZED FEATURES IN DATA IN MACROECONOMY

Question: How can we explain/reconcile all these with in the AD-AS model. How to put all these stories together in the language of AD-AS model

ACCOUNTING FOR THE LONG-TERM GROWTH

Think about AD and AS growing over time.

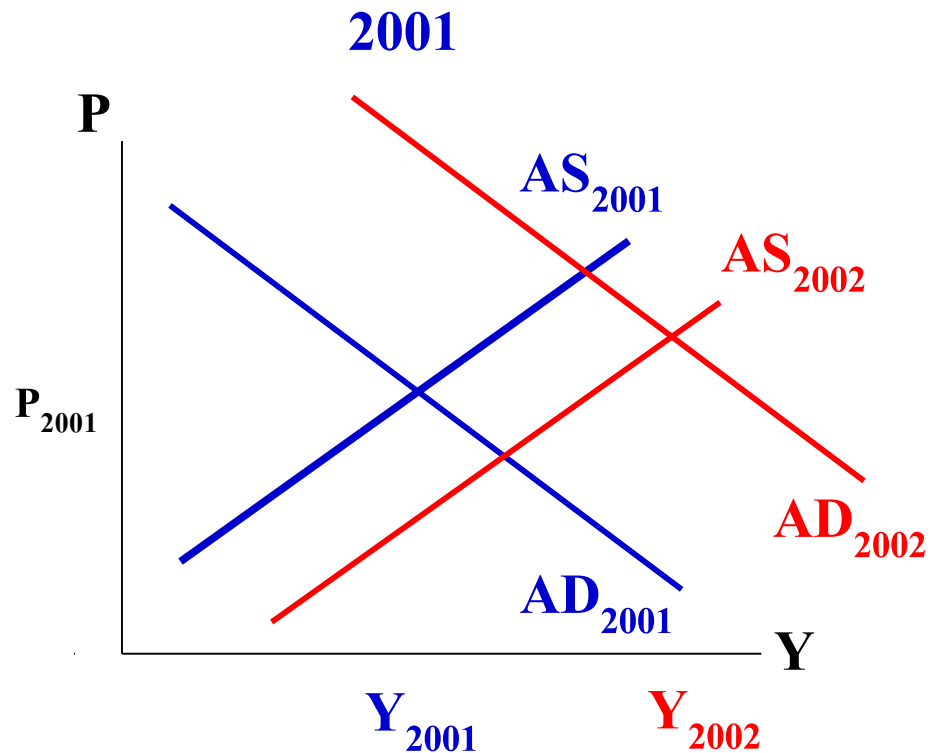
Example:

- Money supply grows over time; Government spending grows over time.

- The level of technology improvement grows over time.

Account for positive inflation;

Demand growth might need to be growing faster than supply growth?



ACCOUNTING FOR THE CYCLES

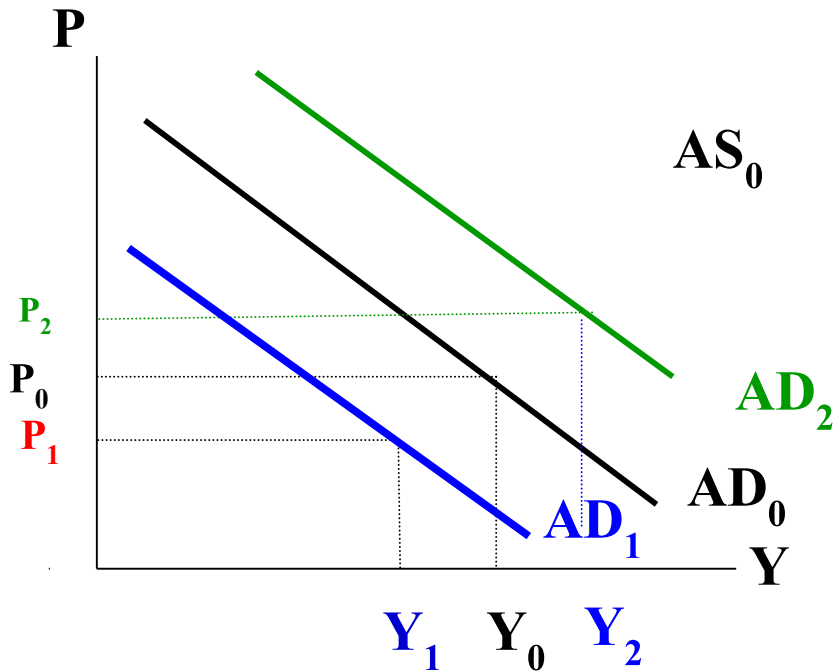
- Then, how does the cycles occur?
 - The cycle occurs because AD and AS might be growing more or less than the rate required to ensure $x\%$ output growth.
 - These deviations usually come at surprise; people call and treat them as **shocks/disturbances**.
- AD curve → **Demand shocks**
 - IS shocks: private spending shocks, animal spirits, etc.
 - LM shocks: financial panic, financial innovations, etc.
- AS curve → **Supply shocks**

DATA V.S. MODEL: TESTABLE IMPLICATIONS

- **Question:** Can we tell/identify the main source of shocks?
- If you believe that your AD-AS story is right, the answer is yes. Why?
- Both types of shocks do not predict the same cyclical relationship; data will tell us about the correct answer.

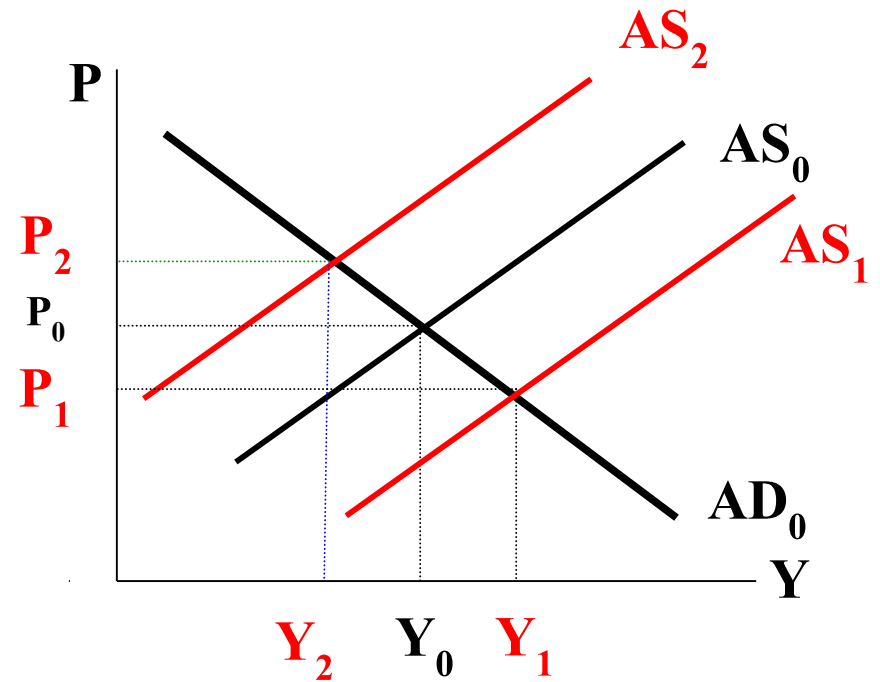
SUPPLY V.S. DEMAND SHOCKS

Demand shocks



Positive correlation: output and inflation

Supply shocks



Negative correlation: output and inflation