TOPIC 4 MEDIUM-TERM ADJUSTMENT THEOREM

SECTION 1: LABOR MARKET AND AGGREGATE SUPPLY FOUNDATION

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AGENDA

- ~~Labor market classifications: stylized-fact and dynamic~~
- ~~Theoretical frameworks to labor market outcome modelling~~
- **The aggregate supply**
- The Natural rate of unemployment

AGGREGATE SUPPLY

- Given that we observed the labor market outcome, each firm chooses their level of production.
- The resulting aggregate output can be determined, and the aggregate supply
- **Aggregate supply:** relationship between total output and price.

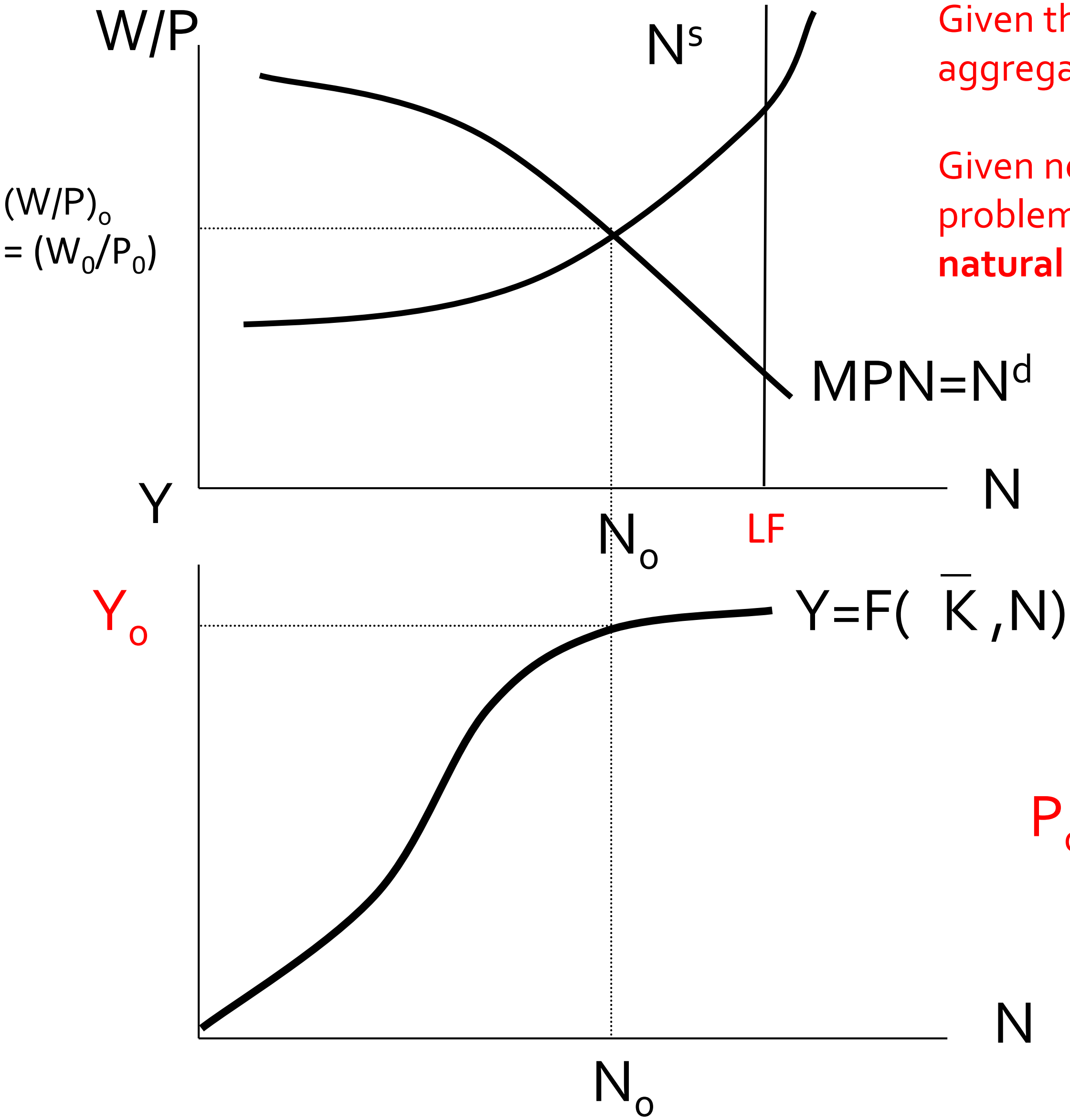
AGGREGATE SUPPLY: LONG-RUN

- The long-run aggregate supply

- **Definition:** the level of aggregate supply when
  - There is flexible price and wage adjustment (no nominal frictions)
  - There is NO information problem (perfect/complete information)

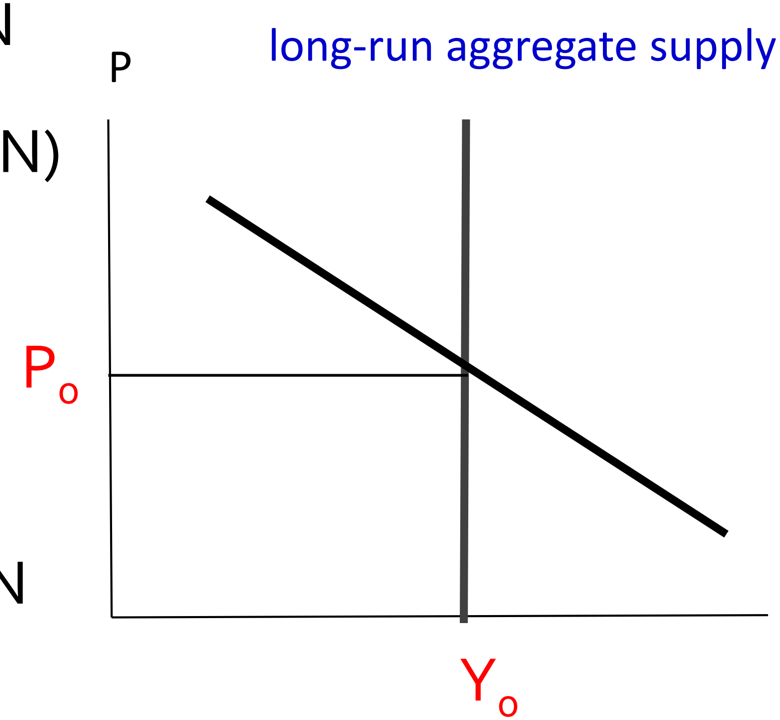
- The supply is a **vertical line**

Equilibrium of labor market and Aggregate supply



Given the equilibrium labor employment, aggregate output can be determined.

Given no nominal frictions and information problem, economist defines the No, Yo as **natural rate of employment and output.**

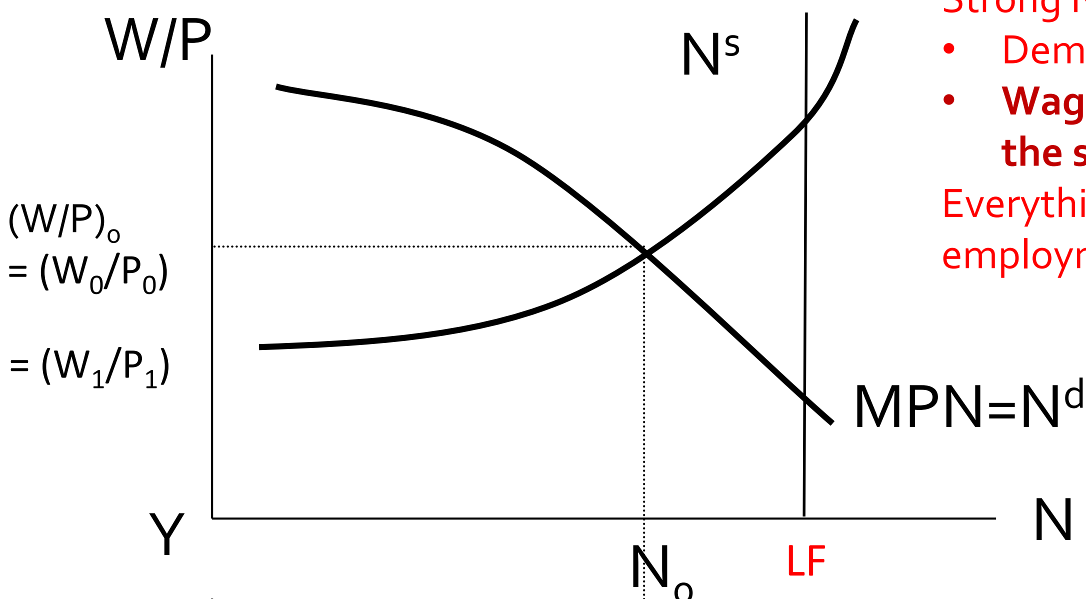


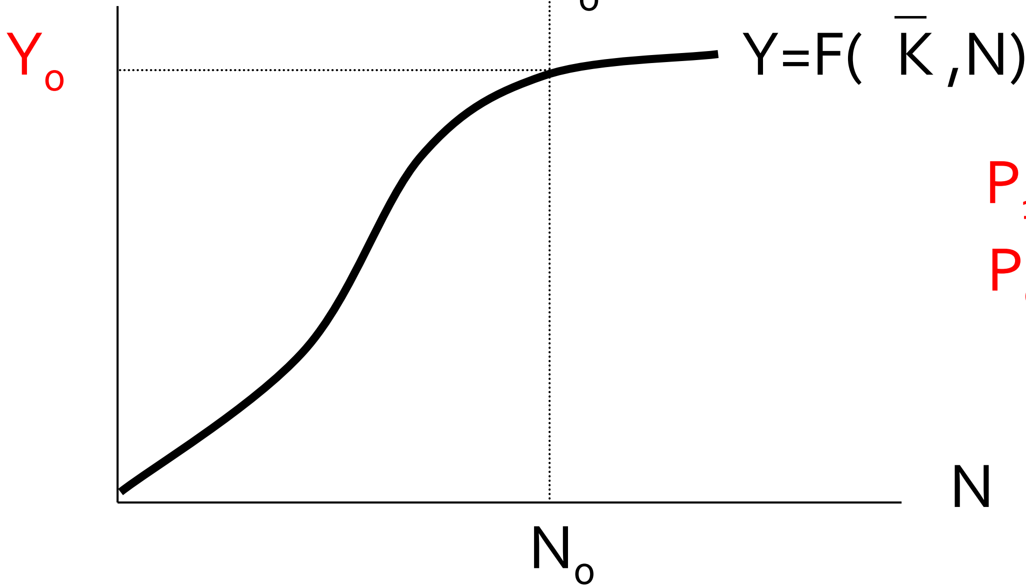
Equilibrium of labor market and Aggregate supply

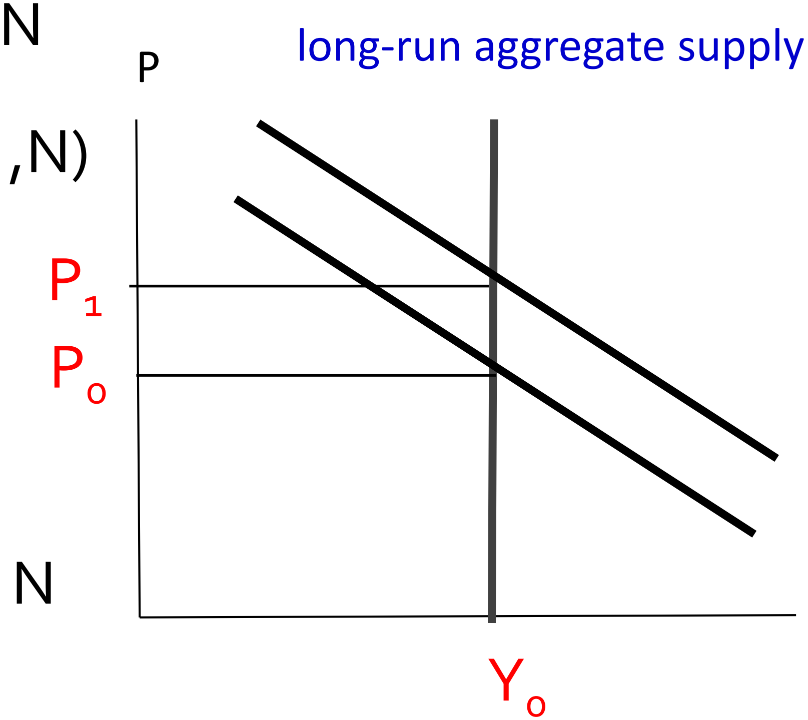
Strong Neutrality result = Classical Dichotomy

- Demand does NOT matter to real variables.
- **Wage and price rise proportionally, leaving the same real wage.**

Everything the same, and hence the total employment and output







FUNDAMENTAL DRIVERS TO NATURAL RATE OF UNEMPLOYMENT

Market structure

- Monopoly power of firm (Big firm) → lower demand → rising natural rate
- Monopoly power of labor (union) → lower supply → rising natural rate

Firm's productivity

- Productivity slowdown → less job posted → rising natural rate

Institutional aspects

- Stronger labor law → affect recruiting cost of firm → lower recruitment → rising natural rate
- Generous unemployment benefit (size/duration) → Less incentive to look for job → affect supply for labor → rising natural rate

CRITIQUES TO THE NEOCLASSICAL APPROACH

- Prediction does not match with evidences: **demand shocks matter**

- Deep down: **The assumptions do not fall in line with reality.**
  - In the reality, **each party talks and negotiates in nominal term.**
  - Moreover, **nominal wage contracting** is preset at least a period in advance.
  - Given institutional aspects, **the case of real-wage contract (with full indexation) is hardly found**; **the case for nominal wage contract is mostly observed.**

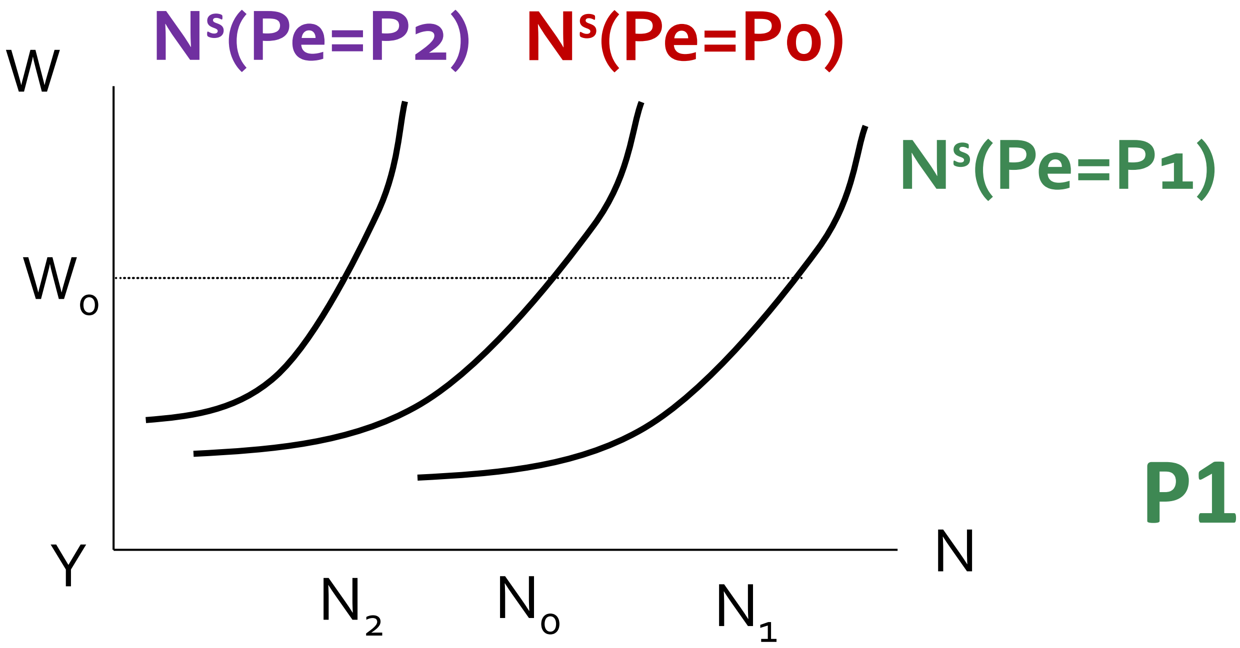
RESPONDING TO THE CRITIQUES: EXPECTATION-DRIVEN LABOR SUPPLY AND AGGREGATE SUPPLY

- Introduce a notion of *"expectation-driven or expectation-augmented labor supply (aggregate supply)"*

- Idea: despite that they don't quote in real wage, each party has their own "**expectation of price"** in their mind, and negotiate accordingly

- Workers have pre-committed to a nominal contract wage contract (variable rate), given an expected level of price.
  - **The labor supply is an upward sloping in nominal wage,** **but varied with respect to the changing in expected price level.**

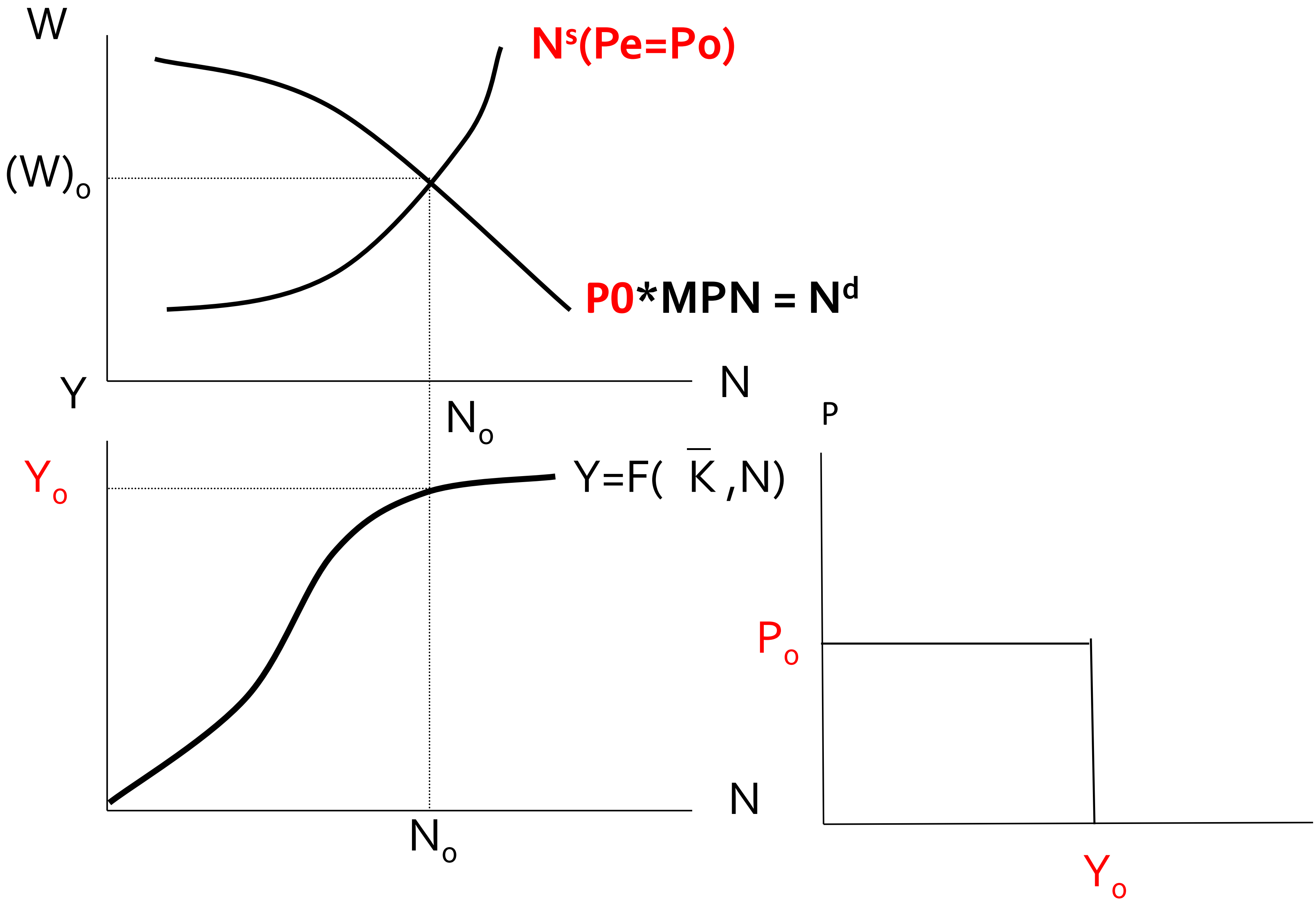
Labor supply with price expectation and pre-committed wage setting



P1 < P0 < P2

The higher expected price, the lower labor supply (the higher nominal wage required for each working hour).

Equilibrium of labor market and the determination of expectation-based production level

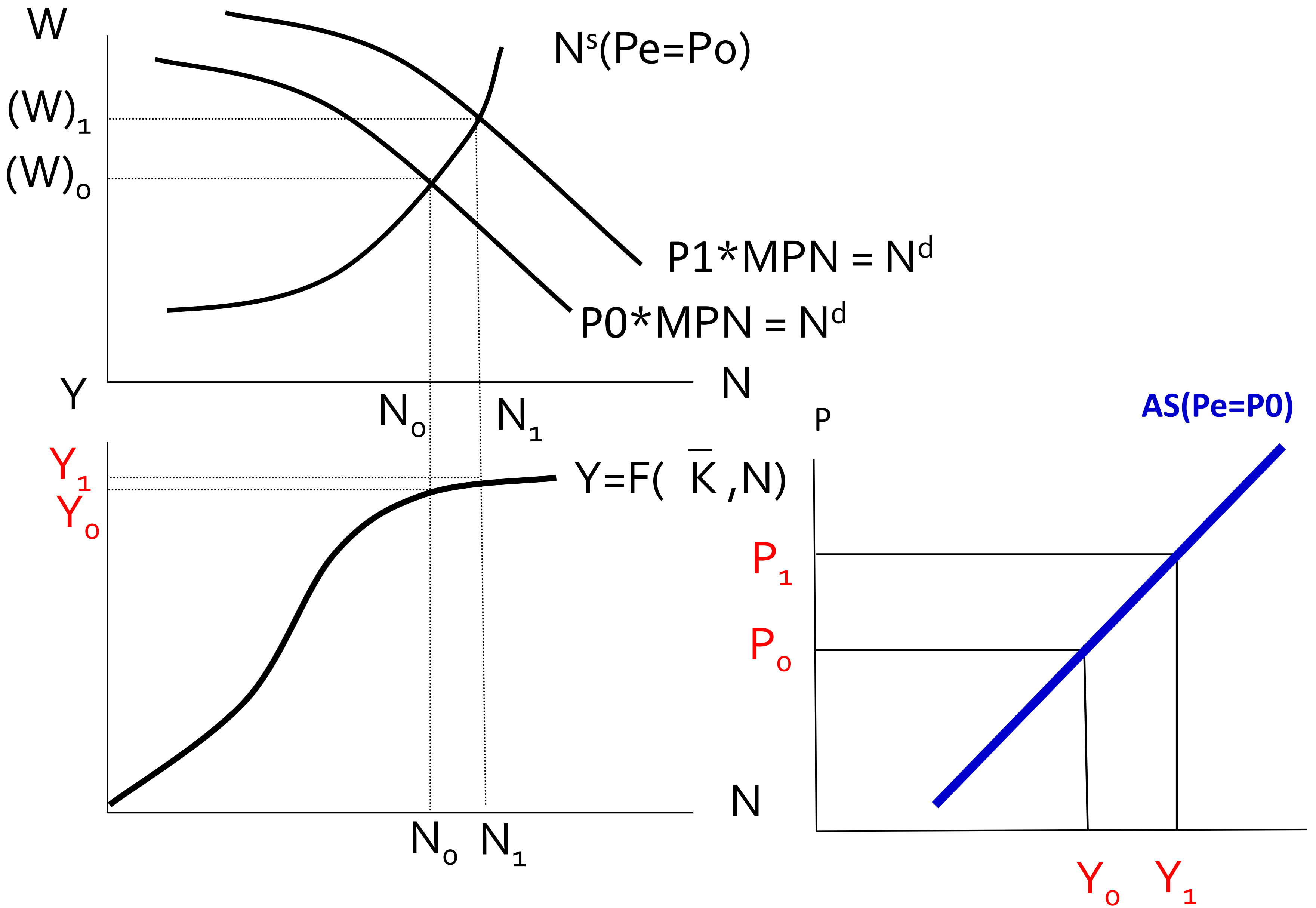


EXPECTATION-DRIVEN AGGREGATE SUPPLY

- In the short-run, the aggregate supply is **NOT** always equal to Yo, **due to the "price surprise"!**
  - The aggregate supply depends on the **"actual price"** and the **"expected price"**

- Suppose that actual price **is higher than** the expected price.
  - Firms will hire more worker as wage cannot catch up along with.
  - Firms get more profit, and hence produce more

Equilibrium of labor market and expectation-driven Aggregate Supply



MODERN INTERPRETATION OF SHORT-RUN AGGREGATE SUPPLY: LUCAS SUPPLY CURVE

Robert Jr. Lucas
Nobel Laureate 1995

- **Traditional interpretation**

$$y_t = f(p_t, others)$$

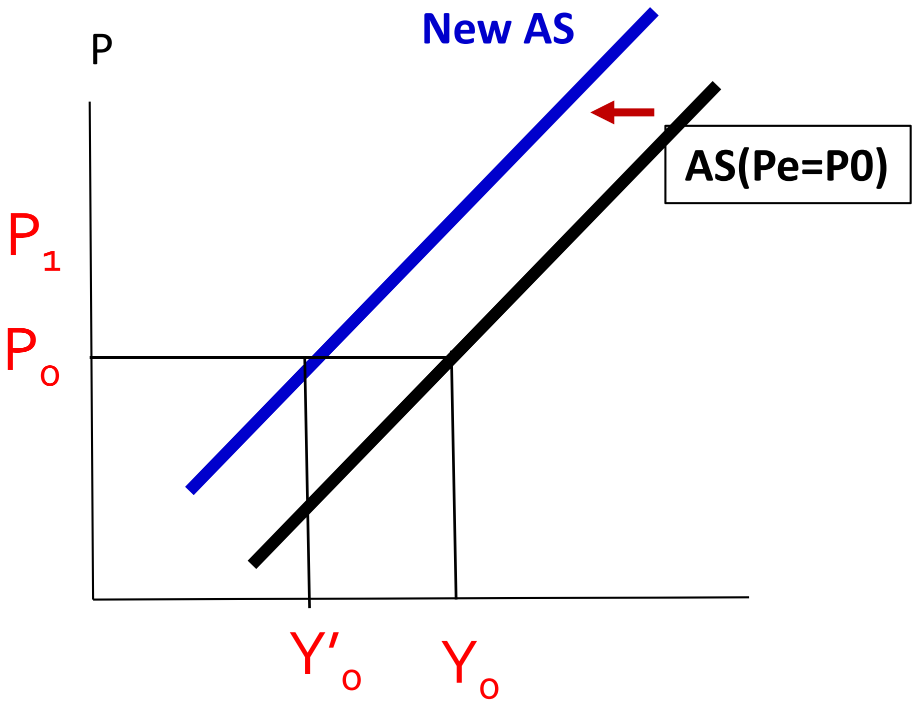
- **Modern interpretation**

$$y_t = f(p_t - p_t^e, others)$$

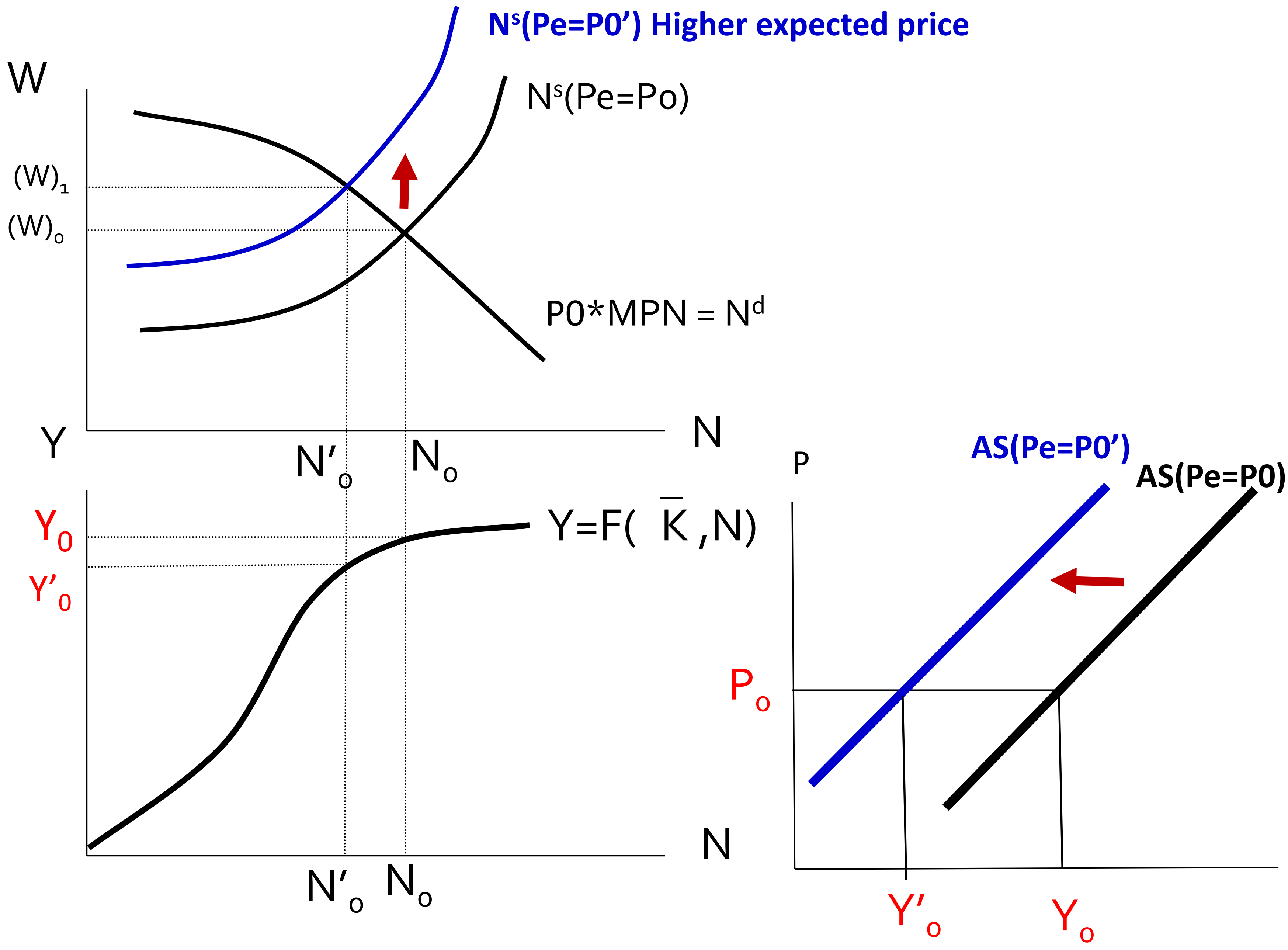
EXPECTATION-DRIVEN AGGREGATE SUPPLY: DETERMINANTS

- Very much like standard AS that we learned in EE212 / 102 class

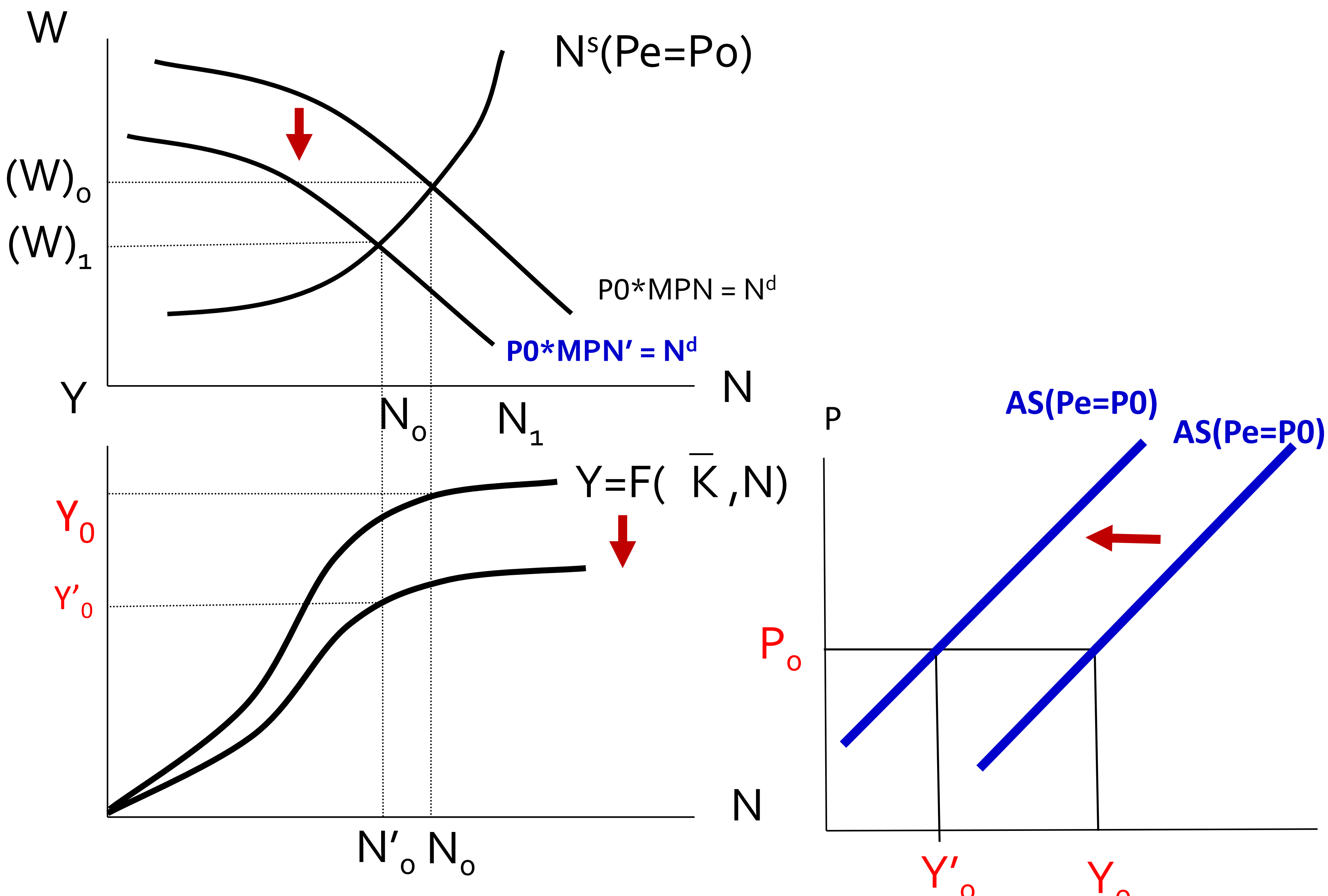
- Examples
  - Change in expected price
  - Production technology
  - Change in market structure
  - Government policies



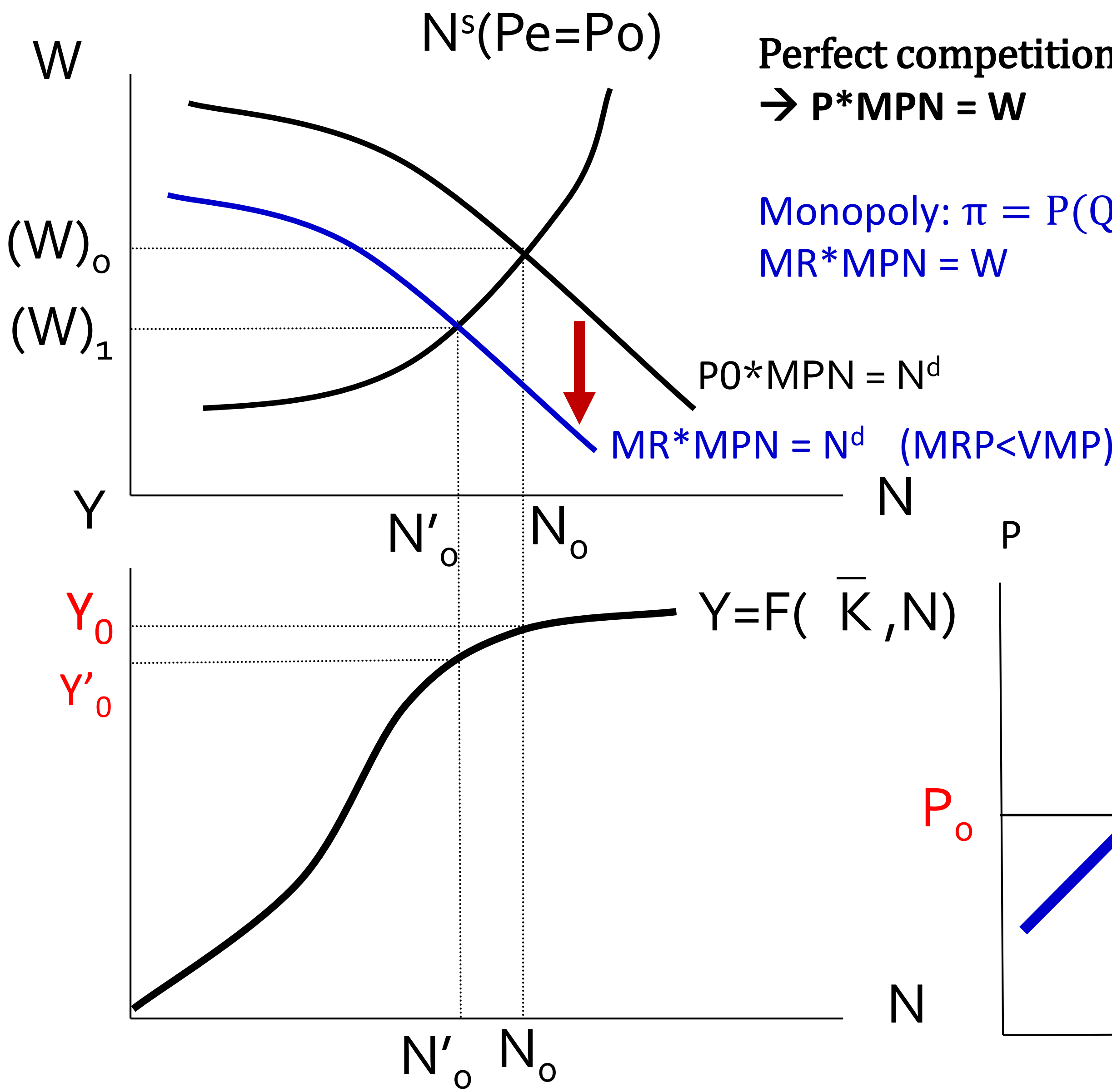
Example: Higher expected price



Example: Negative productivity shocks / Capital destruction



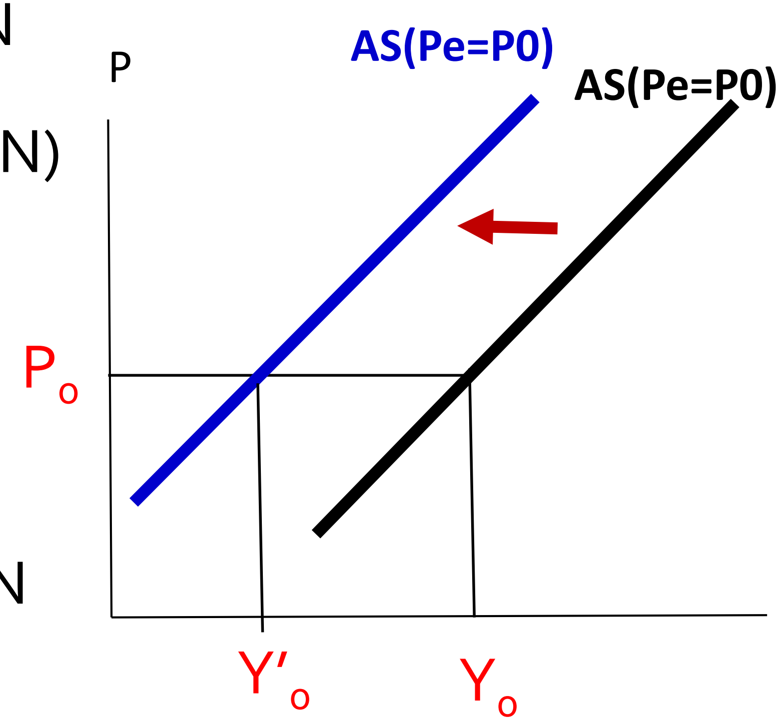
Example: Firm Monopoly power (mark-up power)



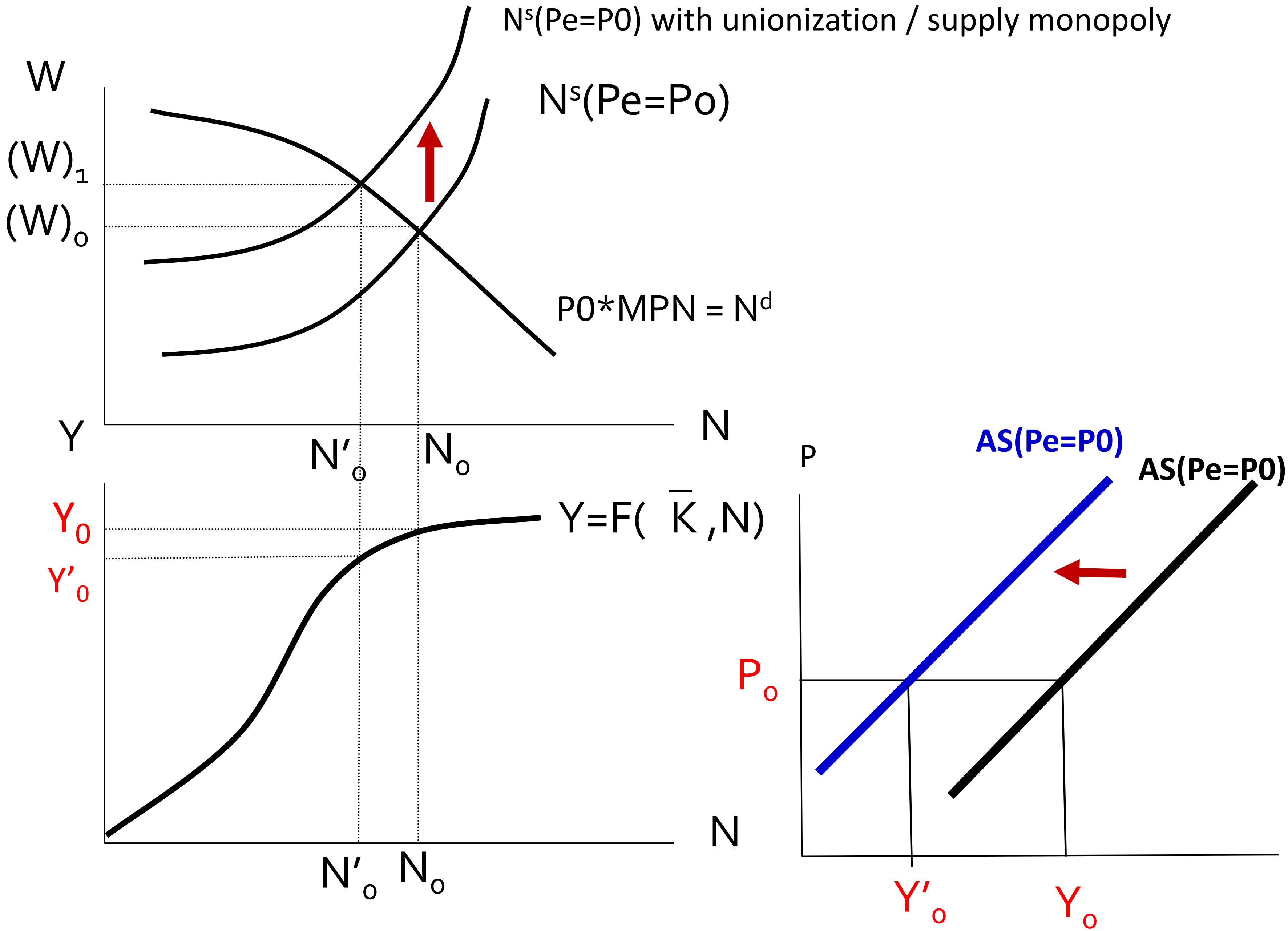
Perfect competition: $\boldsymbol{\pi = P * F(K,N) - WN}$

→ P*MPN = W

Monopoly: $\pi = P(Q) * F(K,N) - WN$ →
MR*MPN = W

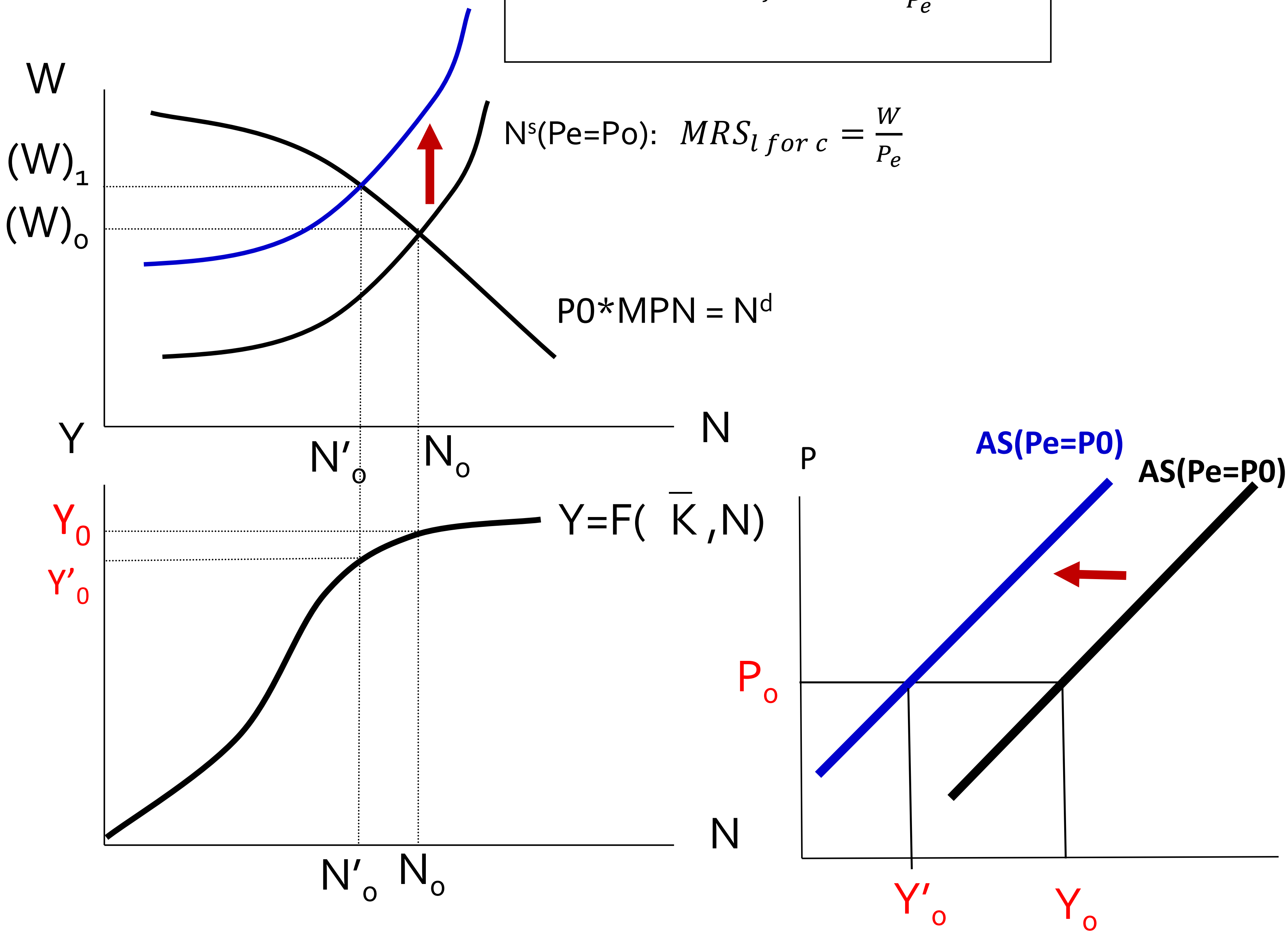


Example: Unionization



Example: Pay-roll tax

N^s(Pe=P0): $MRS_{l\ for\ c} = \frac{W(1-t)}{P_e}$



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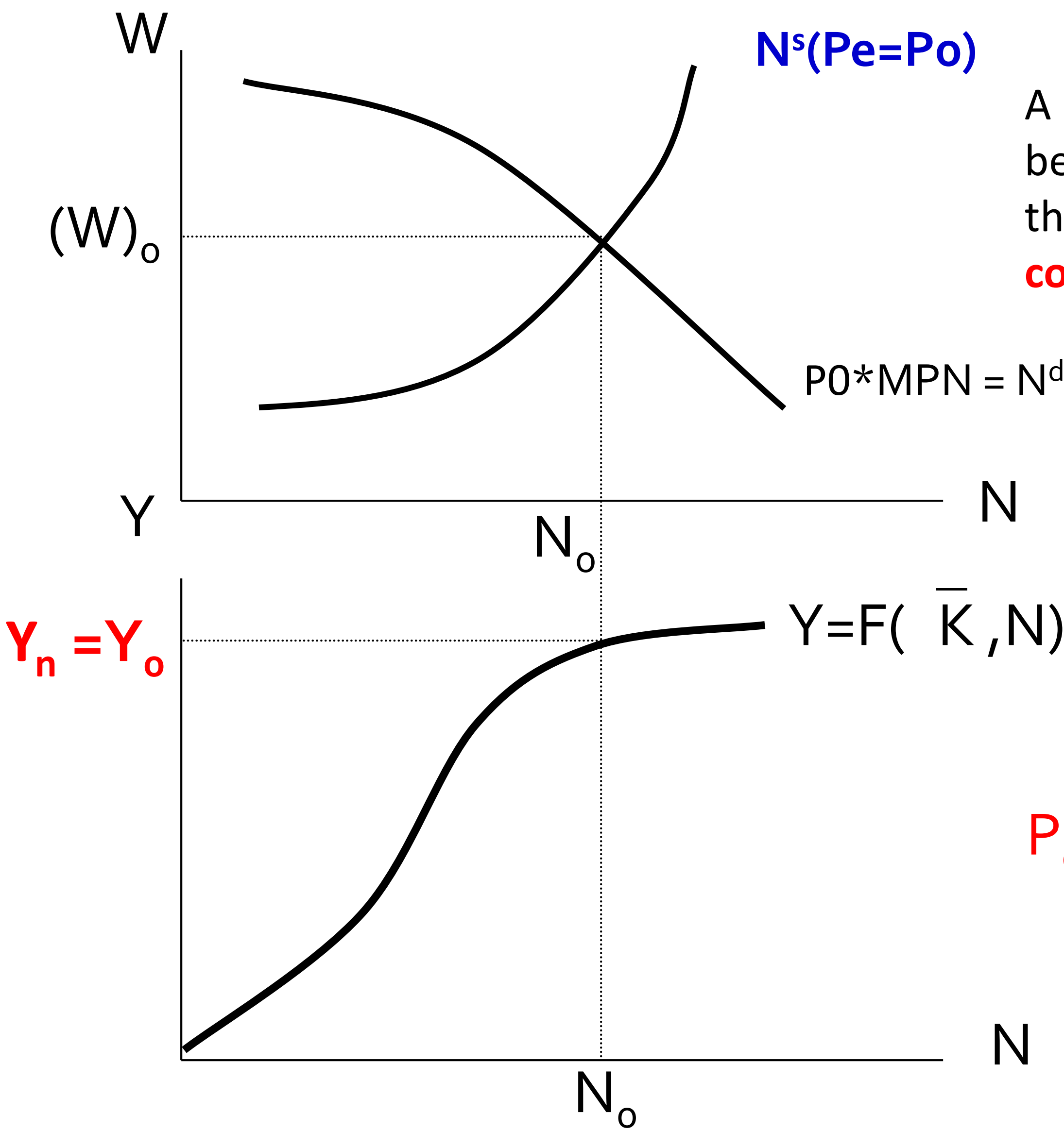
- The Natural rate of unemployment

NATURAL RATE OF UNEMPLOYMENT UNDER EXPECTATION-DRIVEN FRAMEWORK

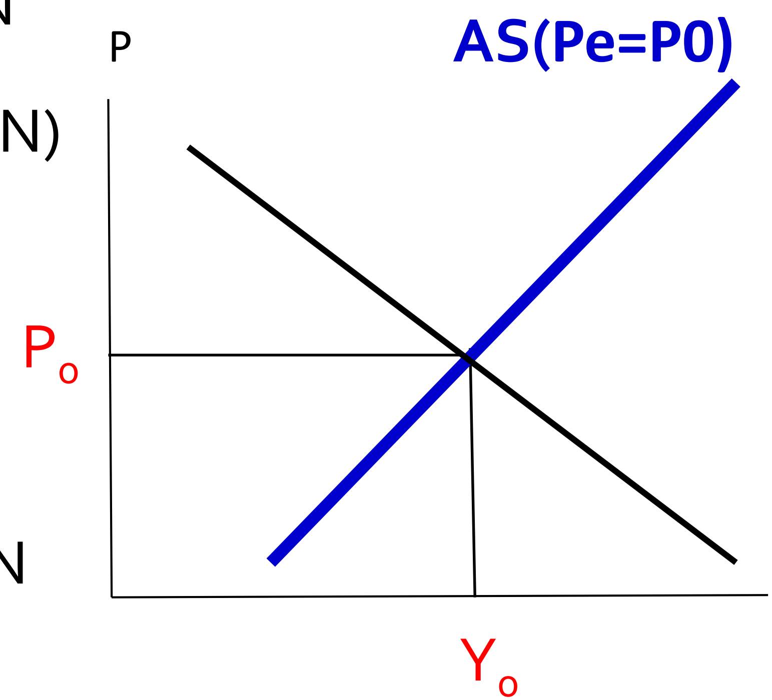
- We have seen the definition of Natural rate of unemployment under the **neo-classical framework**
  - **Equilibrium under no nominal frictions and no institutional restrictions on wage-price setting (Ideal full-indexation)**

- With the institutional elements, the concept of natural rate of unemployment can be reinterpreted in our modified framework as **the equilibrium when workers make a *correct* price expectation!**
  - **Actual price = Expected price**

Expectation-driven Aggregate Supply and **Natural rate of unemployment**



A natural rate of output $Y_n=Y_0$ because the equilibrium represents the situation when agents make a **correct expectation on price level**.



EFFECT OF DEMAND SHOCKS

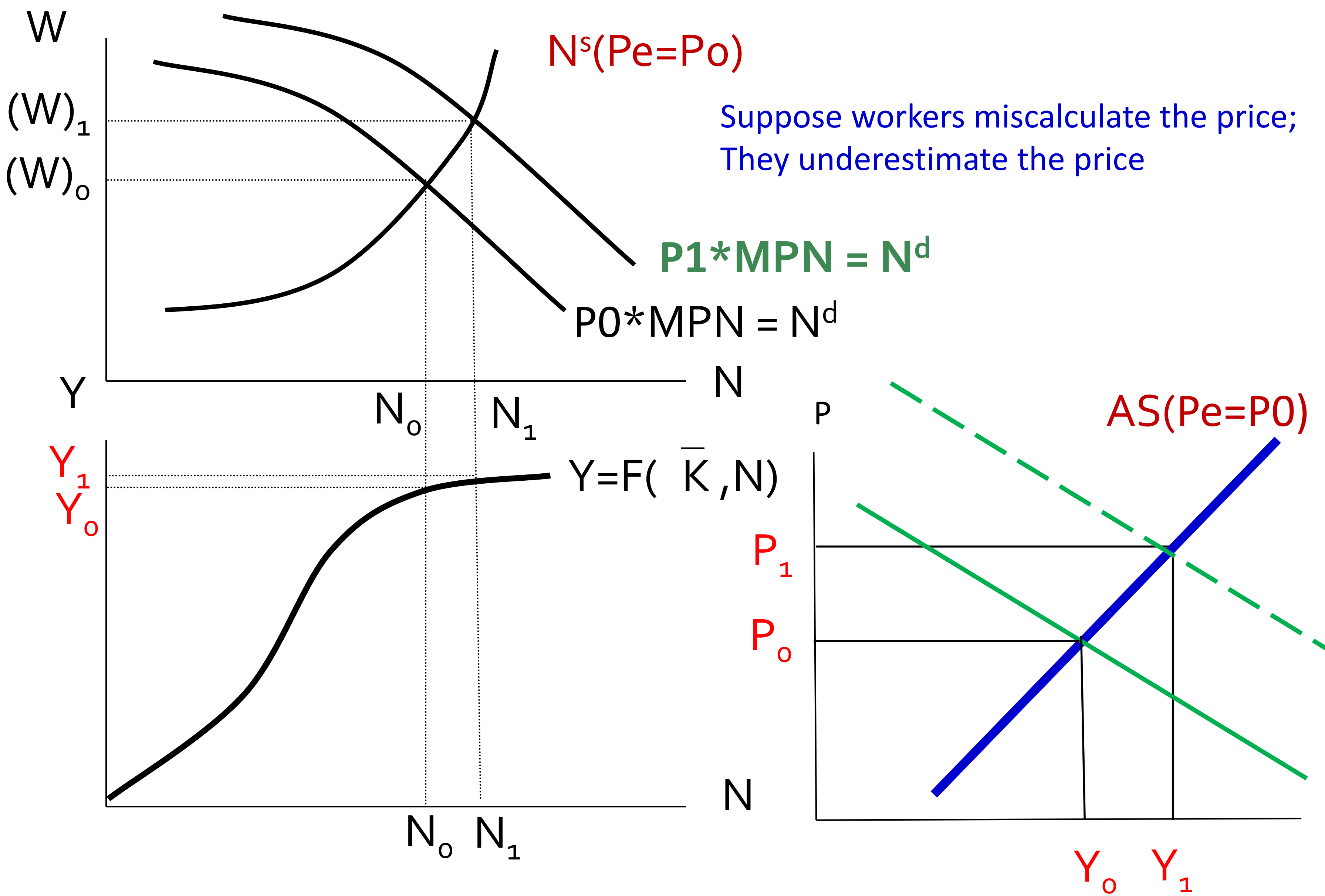
- Given the possibility that actual price can be **higher** or **lower** than expected price, demand shocks can have real effect on output.

- For example, central bank surprisingly increases money supply (**and workers didn’t aware of this**.)

- Their price expectation was initially set too low when they chose to supply labor, (and hence pre-committing nominal wage offers.)

Expectation-driven Aggregate Supply and Effect of demand shock

Suppose workers miscalculate the price;
They underestimate the price



THE SELF-CORRECT MECHANISM

❑ Self-correcting mechanism

- Labor market will adjust to the imbalance that is generated by error in the price expectation

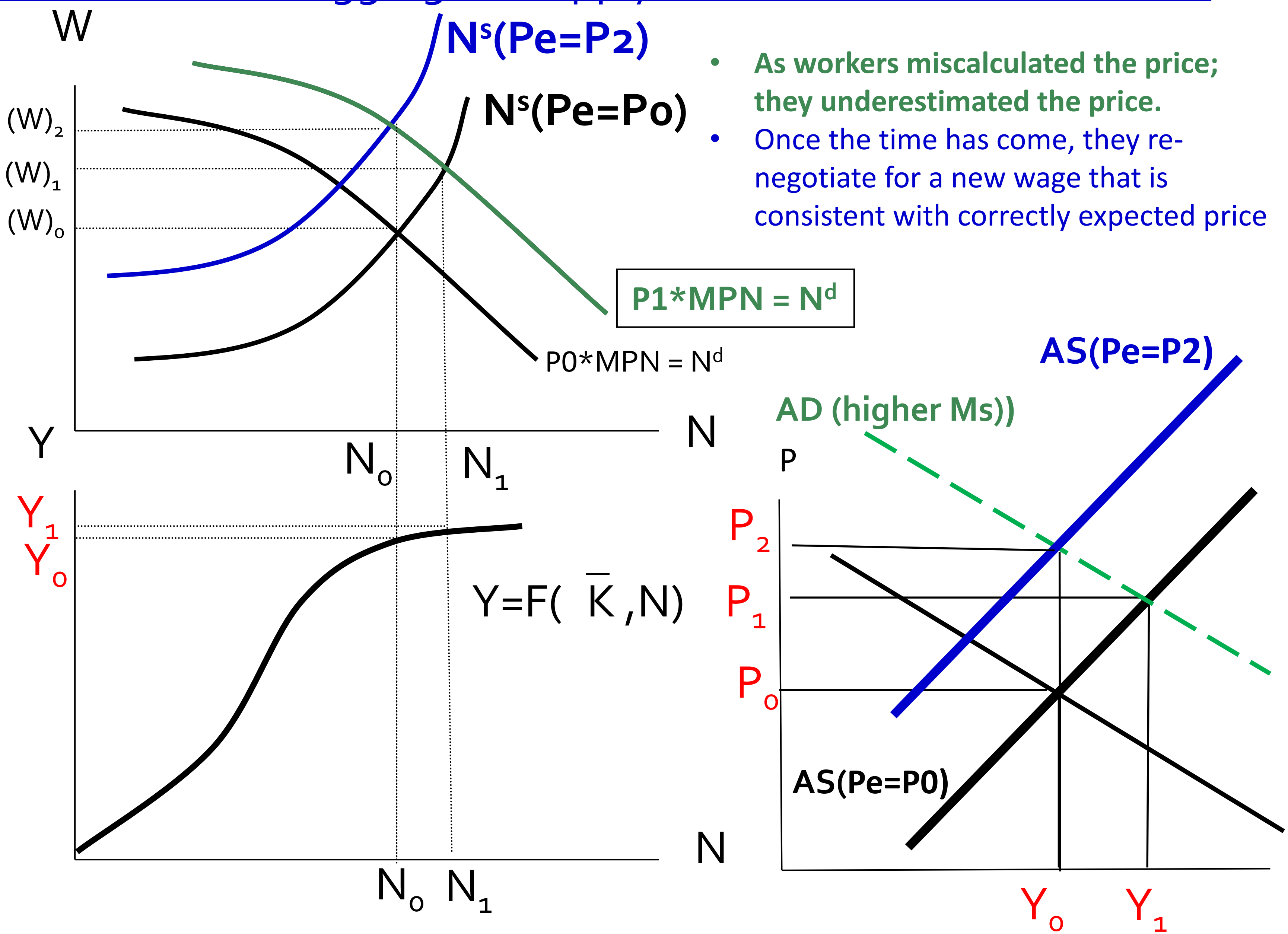
- **Workers renegotiate for higher wage because they previously underestimated the actual price**

- Contraction in labor supply, and hence a rise wage, would cut the production as the cost of production increases

- **Natural rate level can be restored with the medium-term adjustment process**

Expectation-driven Aggregate Supply and Effect of demand shock

- **As workers miscalculated the price; they underestimated the price.**
- Once the time has come, they re-negotiate for a new wage that is consistent with correctly expected price



PRACTICAL IMPLICATION FOR NATURAL RATE OF UNEMPLOYMENT

- Both natural rate of unemployment and potential output are **unobservable**!

- However, the measurement concept can be guided by our theoretical consideration

- **Natural rate of unemployment** *or* **Full-employment output** should be consistent to the level that ***price pressure does not exist*** –i.e. **no further adjustment in price expectation, and hence wage-setting, required**