

Macroeconomic Theory and Policy

Lecture 4

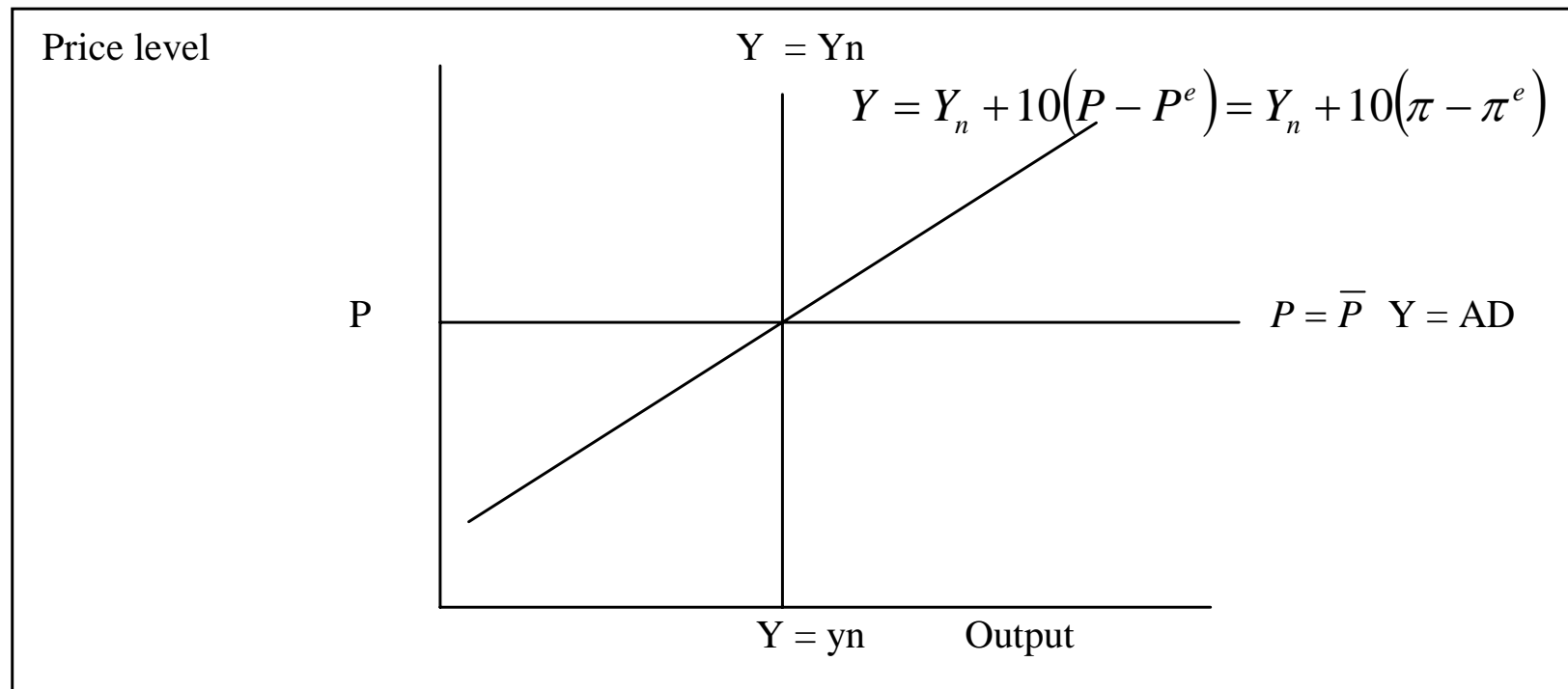
New Keynesian Theory of Aggregate Supply

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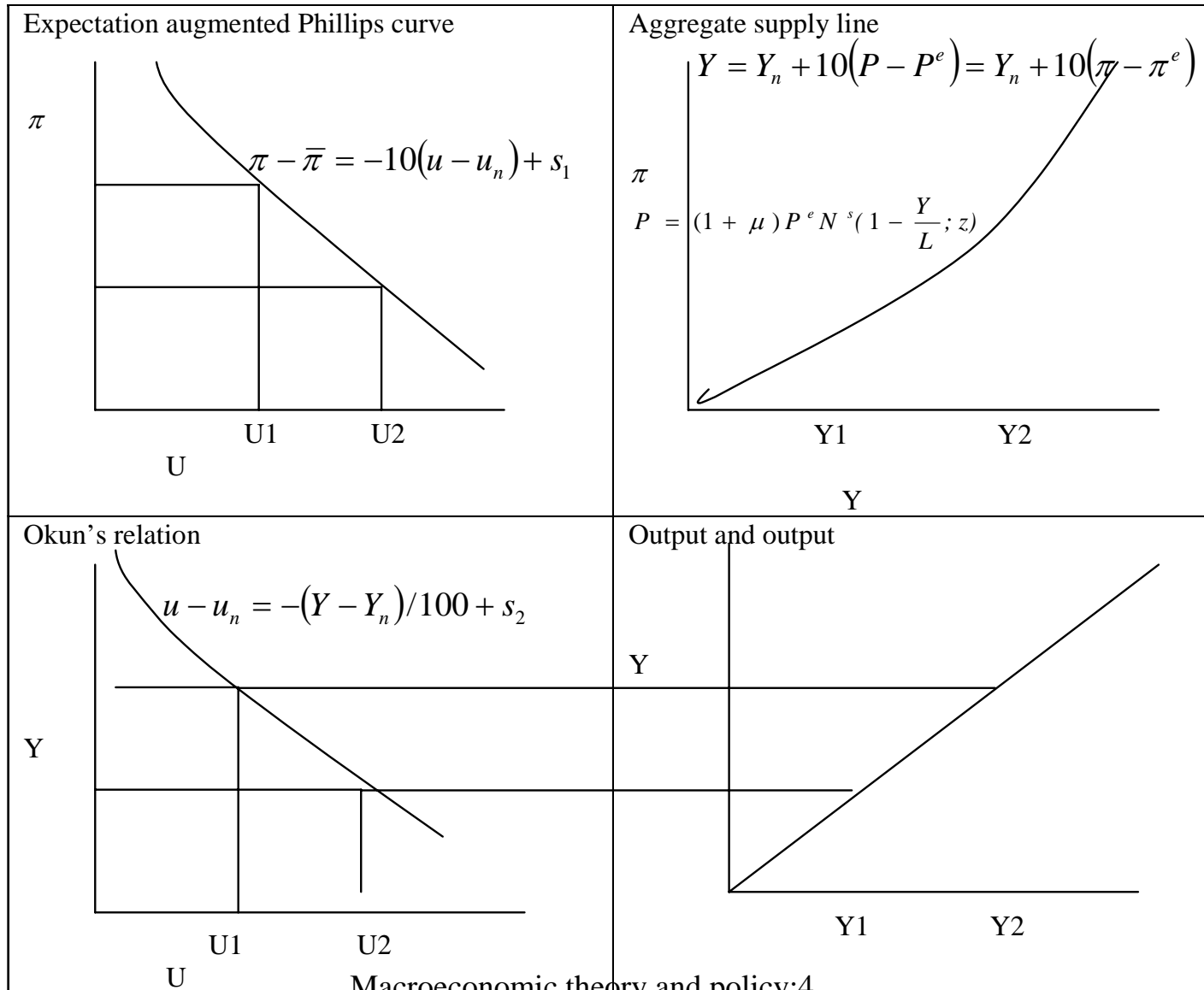
- Short-run and Long-run Aggregate Supply
- New Keynesian aggregate supply equation
- Phillips' curve and Okun Curve and AS
- Four theories on why AS is upward sloping
- Price setting and Wage-setting process
- Natural rate of unemployment
- Level of Employment and Aggregate supply

Classical, Keynesian and New Keynesian Aggregate Supply curves

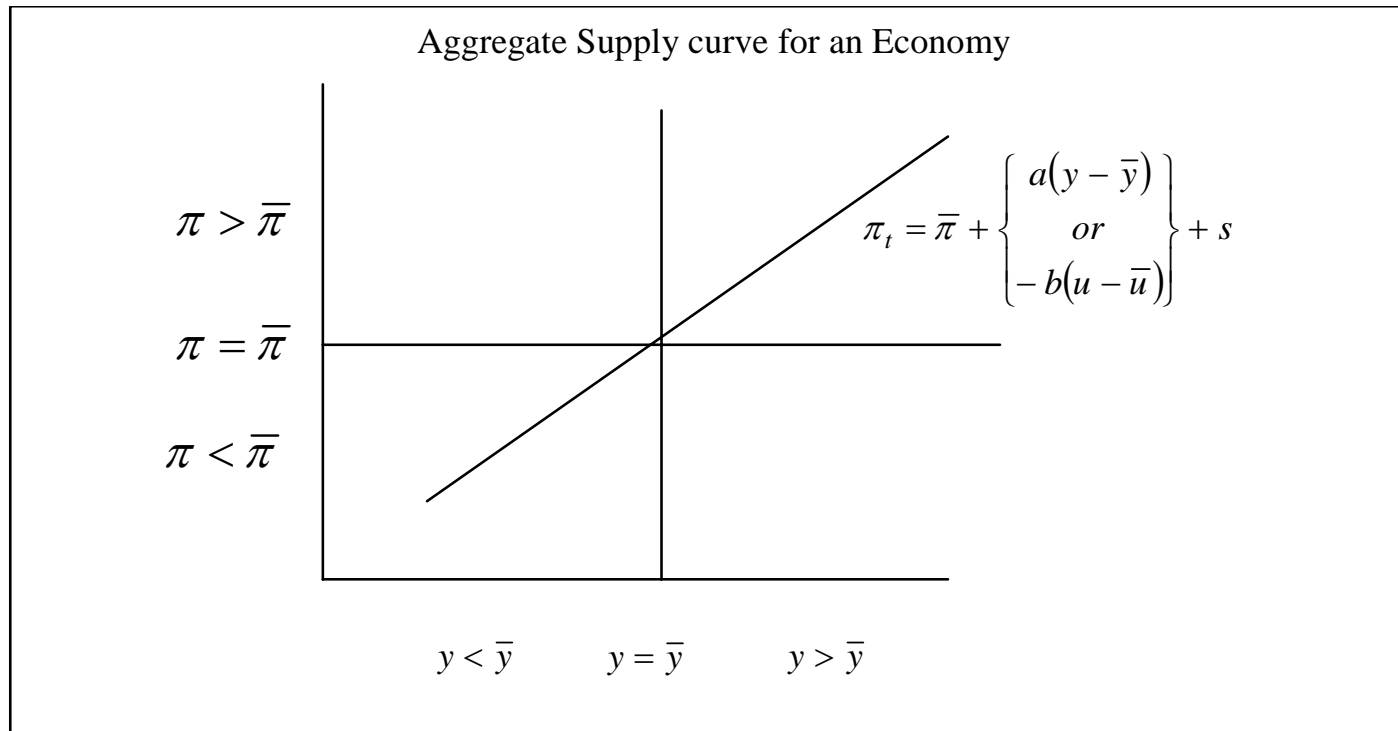
Classical, Keynesian and New Keynesian Aggregate Supply curves



Deriving Aggregate Supply Using Phillips and Okun Curves



Inflation and Output in the Short Run



Why is the Aggregate Supply Curve Upward Sloping

Suppose that the labour is the only input. Price charged by a firm need to cover this cost. In additions firms often charge prices over than that. The extra amount is called the up mark-up as given by θ in the equation below.

$$P_t = (1 + \theta)W_t \quad (1)$$

Unions (or workers) charge a mark-up γ over the expected price while negotiating the wage rate from the employer.

$$W_t = (1 + \gamma)P_t^e \quad (2)$$

Using (2) in (1) we have

$$P_t = (1 + \theta)(1 + \gamma)P_t^e \quad (3)$$

Why is the Aggregate Supply Curve Upward Sloping

Both mark-ups θ and γ increase in the boom time and decrease in the slump.

These mark ups are normally higher in boom periods and lower in the slump. This reflected by the equation below.

$$\theta + \gamma = a(y - \bar{y}) = -b(u - \bar{u}) \quad (4)$$

This all can be used to derive an equation for aggregate supply curve for an economy. Divide (3) by P_{t-1} on

both sides

$$\frac{P_t}{P_{t-1}} = (1 + \theta)(1 + \gamma) \frac{P_t^e}{P_{t-1}}$$
$$1 + \pi_t = (1 + \theta + \gamma + \gamma\theta)(1 + \bar{\pi}) \quad (5)$$

Mark-ups and Inflation

With $\bar{\pi}$ as the expected or the core inflation that firms and unions use while settling the wage rate.

$$\pi_t = (1 + \theta + \gamma + \gamma\theta + \bar{\pi} + \bar{\pi}\theta + \bar{\pi}\gamma + \bar{\pi}\gamma\theta) - 1$$

$$\pi_t = \theta + \gamma + \gamma\theta + \bar{\pi} + \bar{\pi}\theta + \bar{\pi}\gamma + \bar{\pi}\gamma\theta \quad (6)$$

The product of small number θ , γ , $\bar{\pi}$ are $\bar{\pi}\theta$, $\bar{\pi}\gamma$, $\bar{\pi}\gamma\theta$, $\theta\gamma$ are small and negligible numbers.

$$\pi_t = \theta + \gamma + \bar{\pi} \quad (7)$$

$$\pi_t - \bar{\pi} = \theta + \gamma \quad (8)$$

Aggregate Supply and Inflation

$$\pi_t = \bar{\pi} + a(y - \bar{y}) \quad \pi_t = \bar{\pi} - b(u - \bar{u}) \quad (9)$$

The actual inflation depends both on expectations as well as the cyclical components.

Now include the supply shock to represent all non-labour costs

$$\pi_t = \bar{\pi} + \left\{ \begin{array}{l} a(y - \bar{y}) \\ or \\ -b(u - \bar{u}) \end{array} \right\} + s \quad (10)$$

Four theories on why the aggregate supply curve is upward slopping in response to increase in demand

<p>1. Sticky wage model: $W = \omega P^e$ or $\frac{W}{P} = \omega \frac{P^e}{P}$ Labour becomes cheaper and firms hire more, output increases. $L^D = L^D\left(\frac{W}{P}\right)$</p>	<p>3. Imperfect information model (agents, both workers and firms, know only their own prices but not other prices, there are too many. They expect lower prices from own experience): $Y = Y_n + \alpha (P - P^e)$</p>
<p>2. Worker misperception model (firms see but workers do not see that prices are rising, more labour used for low real wages) $L^D = L^D\left(\frac{W}{P}\right); L^S = L^S\left(\frac{W}{P^e}\right);$ $\frac{W}{P^e} = \frac{W}{P} \frac{P}{P^e}$</p>	<p>4. Sticky price model (firm's desired price, menu costs, long term contracts): $p = P + a(Y - \bar{Y})$ When prices are sticky there is more output in response to higher demand</p>