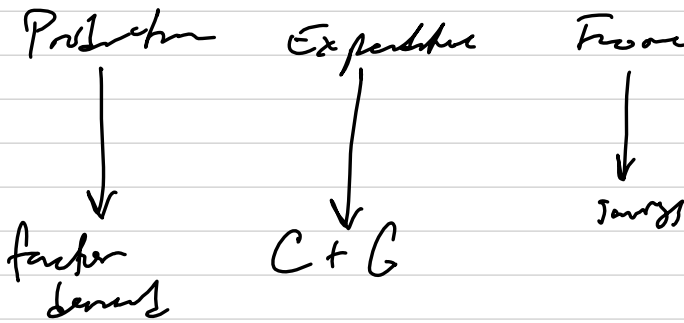


Dylan Black

## Chapter 3 The Production Function in Macro



Production Function

output is a function of  $K, N$

$$Y = A \cdot F(K, N)$$

↑    ↑    ↑    ↑  
output   productivity   capital   labor  
          constant

Shape

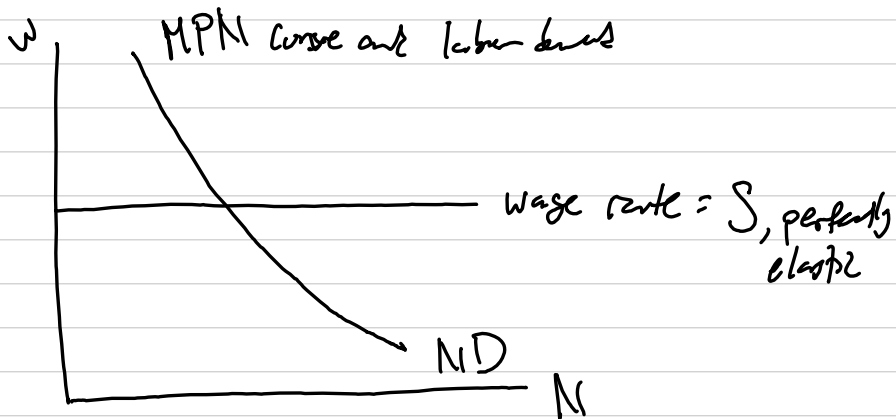
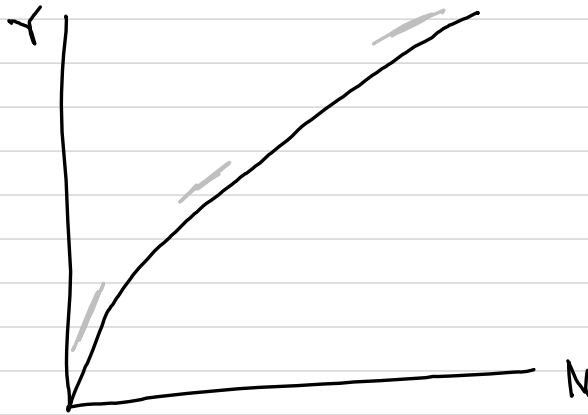
↳ upward sloping + concave



$$MPK = \frac{\Delta Y}{\Delta K} \quad (\text{slope of production function w.r.t } K)$$

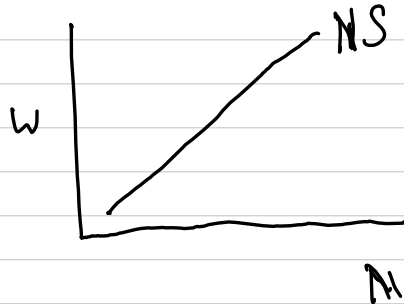
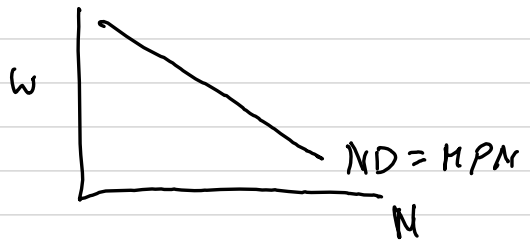
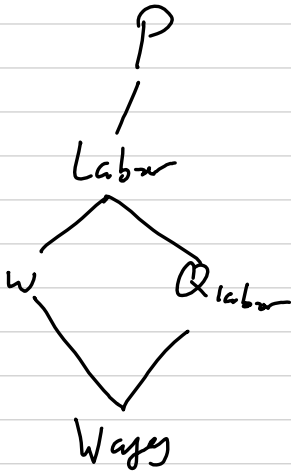
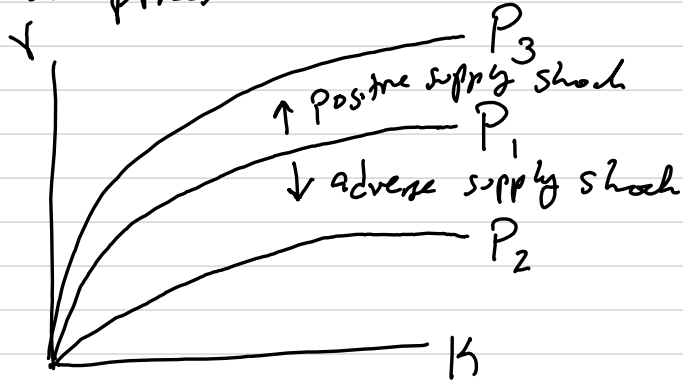
Demand for Labor

- $MPN > 0$
- $MPN$  diminishing
- $D$  for labor =  $MPN$



Supply shock = productivity shock = change in  
a production function  
- affect  $Y$  for all levels of input

Eg. weather, inventories + transportation, gov't regulation,  
oil prices



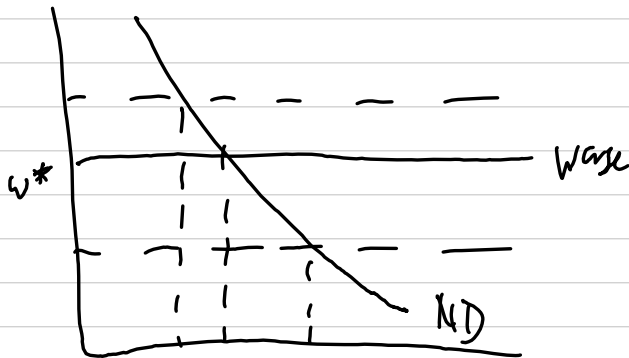
Should change  $A$  in  $Y = AF(N, K)$

Assumptions

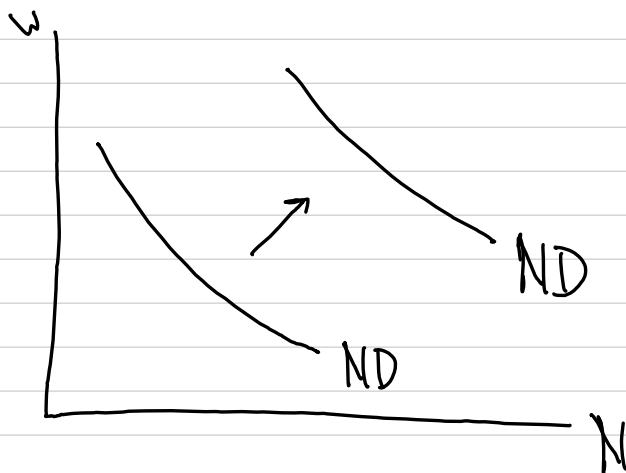
- hold fixed capital stock fixed
- all workers are alike
- labor market is competitive
- Firms maximize profits

$$\underset{\substack{\uparrow \\ \text{nominal} \\ \text{marginal} \\ \text{product of} \\ \text{labor}}}{MRPN} = \underset{\substack{\uparrow \\ \text{price}}}{P} \times MPN$$

$$w = MRPN \equiv w = MPN$$



Profit maximized when  $w = MPN$



## Labour Supply Curve

Supply determined by individuals

- ↳  $ASN = \sum \text{labour supply}$
- ↳ Labour-leisure trade off

## Real wages + labour supply

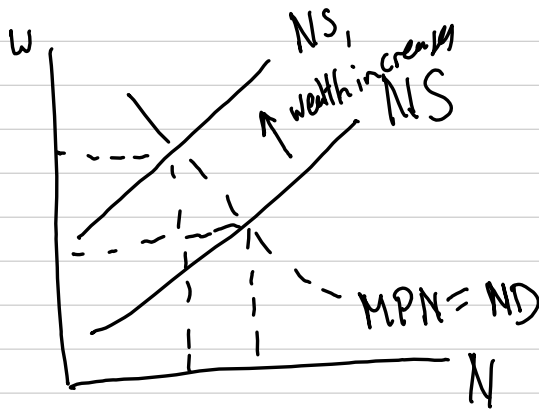
Sub. effect - higher wage increases willingness to work  
 Wealth effect - higher wealth implies less work

## Labour Supply Curve

- increase in wage rate  $\Rightarrow \uparrow Q_{NS}$

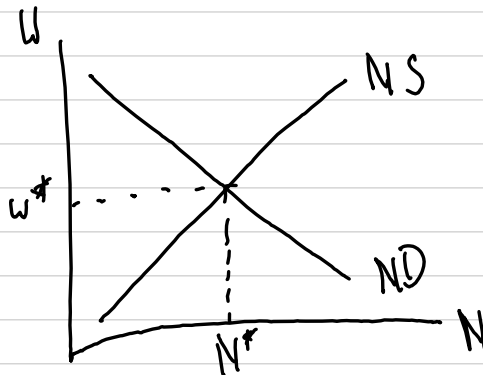
## Factors that shift

-



Expected future real wage - higher  $\Rightarrow$  left  
 lower  $\Rightarrow$  right

Increase in working age population  $\Rightarrow$  right  
 Increase in labor force participation  $\Rightarrow$  right



Classical vs. Keynesian School

Classical - market adjusts quickly  
 Keynesian - prices & wages are sticky

Durkin rule

Frictional unemployment - between jobs

$$\text{Natural rate} = v - \bar{v}$$

Oleus Law

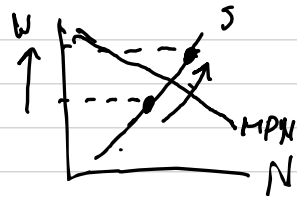
$$\frac{\bar{Y} - Y}{\bar{Y}} = 2(v - \bar{v})$$

2% reduction of output substituted w/ 1% increase in unemployment

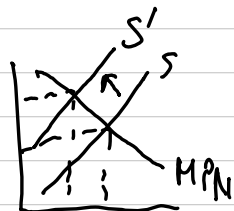
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Ch. 3 Vocabulary

Sub effect - higher wage  $\rightarrow$  more work  
- movement along labor supply

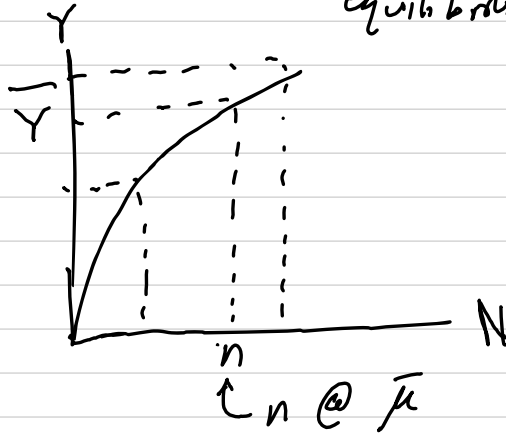


Wealth effect - Higher real wage increases income, so can afford



Full employment output:

Potential output = level of output @ long run equilibrium



$$\text{Cyclical unemployment} = \mu - \bar{\mu}$$

Frictional - search activity due to heterogeneity