## 4. Elasticities of Labor Demand
### E151A: C.Cameron

- What determines how much labor demand falls when wage increases?
- What happens when price of capital (or other inputs) increases?
- What happens when minimum wage increases?

## 4A. Own-Wage Elasticity

- Own-wage elasticity of demand for labor
  $\eta$ = the % change in employment due to a 1% change in the wage rate ($\eta$ is eta).
- E.g. $\eta = -0.5$
  $\Rightarrow$ employment $\downarrow$ 0.5% when w$\uparrow$1.0%
- $\eta = \%\Delta E / \%\Delta w$ where $\%\Delta$ is % change
- $\eta = -1$ if unit elastic demand
  $-1 < \eta < 0$ if inelastic demand
  $-\eta < -1$ if elastic demand

## 4A. Hicks Marshall Laws of Derived Demand

- Other things equal $\eta$ is high when:
  1. Price elasticity of demand for output good is high (scale)
  2. Other factors of production can be easily substituted for labor (substitution)
  3. Supply of other factors of production is highly elastic (substitution)
  4. Cost of employing labor is a large share of total production costs (scale)

## 4A. Airline deregulation & pilots

- Pre-1978 low wage elasticity of demand since applying Hicks-Marshall laws
  1. Low price elasticity of demand due to lack of competition amongst airlines
  2. Difficult to substitute other inputs
  3. Not as relevant
  4. Airline pilots small part of total costs
- Post-1978 de-regulation: competition changes 1.

## 4A. Examples

- Unions like wage inelastic demand.
- Training programs most successful if labor demand highly elastic (otherwise wage will fall greatly).
- Employment tax credits or wage subsidies have more effect the more elastic is labor demand.

## 4A. Empirical Estimates

- Vary greatly across studies.
  E.g. E&S at plant level
- scale effect $\eta = -0.5$
  (measure as short-run effect so no sub.)
- substitution effect $\eta = -0.5$
  (measure when no change in output)
- total effect $\eta = -1.0$
  (measure as long-run effect).

## 4B. Cross-wage elasticity

- $\eta_{jk}$ = the cross-wage elasticity of input j with respect to the price of input K
- $\eta_{jk} = \%\Delta E_j / \%\Delta w_k$
- Main three inputs we consider are skilled labor, unskilled labor, capital
- Not clear whether these inputs are gross substitutes with $\eta_{jk} > 0$
  gross complements with $\eta_{jk} < 0$

## 4B. Cross-wage Elasticity

- When price of capital increases
  1. Scale effect: output $\downarrow \Rightarrow$ L $\downarrow$
  2. Substitution effect:
     Capital relatively more expensive $\Rightarrow$
     a. Substitutes in prodn: L $\uparrow$
     b. Complements in prodn: L $\downarrow$
- Overall: price capital $\uparrow \Rightarrow$ labor D ?
  Labor demand $\uparrow$ then gross substitutes
  Labor demand $\downarrow$ then gross complements

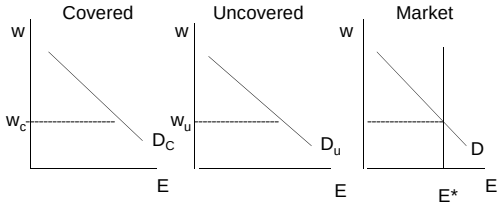
## 4C. Minimum Wage

- From chapter 3
  $w_{skilled}/w_{unskilled} = MP_{skilled}/MP_{unskilled}$
- Problem if $MP_{unskilled}$ is low.
- One solution is education to $\uparrow$ $MP_{unskilled}$
- Another is increase $w_{unskilled}$ by law
- Fair Labor Standards Act (1938) brought in federal minimum wage designed to be a livable wage
- California introduced min wage in 1916.

## 4C. Minimum Wage (cont.)

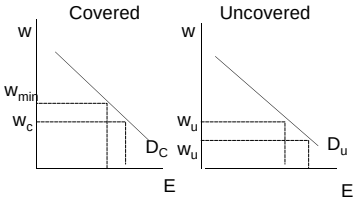
- Winners: workers who keep their jobs
- Losers: workers who lose jobs
  firms
  consumers via higher prices
- On balance lose as introduces Pareto inefficiency because leads to $MRP_L$ being different in different labor markets.

LABOR MARKET WITHOUT MINIMUM WAGE




For simplicity total supply wage inelastic and equals E*

LABOR MARKET WITH MINIMUM WAGE




$W_{min}$ exceeds $w_e$ so people lose jobs in covered sector and move to uncovered sector bidding down wage. Now MRP differes across the sector. Pareto inefficient.

## 4C. Min Wage Pareto Inefficient

- $MRP_L$ differs in two sectors
  $\Rightarrow$ Pareto inefficient as there is a possible win-win situation
  (increase output by switching marginal worker from one sector to other)
- The minimum wage blocks this transfer
- Minimum wage bad as Pareto inefficient