Review Notes – The Demand for Labor – Elasticities

- Wage elasticity of the demand for labor = η_w

    - What is the impact of the minimum wage on labor markets?

        - Recall that if the market is competitive then the wage increases, employment falls, and unemployment is created.

            - But how <u>much</u> does employment fall? Answering this question is the whole point of the wage elasticity of the demand for labor.

    - Definitions

        - η_w = how responsive is the demand for labor to changes in wages.

        - $\eta = \dfrac{\%\Delta L}{\%\Delta W}$

        - What do we know about price elasticities and, hence, η_w?

            - $\eta_w < 0$. Why? Make sure you know.
            - If $|\eta_w| > 1$ => $|\%\Delta\ L| > |\%\Delta\ W|$ => labor demand is wage <u>elastic</u>
            - If $|\eta_w| < 1$ => $|\%\Delta\ L| < |\%\Delta\ W|$ => labor demand is wage <u>inelastic</u>
            - If $|\eta_w| = 1$ => $|\%\Delta\ L| = |\%\Delta\ W|$ => labor demand is <u>unitary</u>
            - What do all of these mean?
            - What is η_w along a linear downward sloping demand curve?

    - What makes a demand for labor relatively more or less elastic?

        - What do we mean by relatively more or less elastic? Show it graphically.

        - Four Hicks Marshall Laws of Derived Demand

            - Recall the two effects that occur when wage changes discussed in Labor demand material. The four laws relate to these two effects.

                - **Scale effect** – w $\uparrow$ => costs of production $\uparrow$ => S of the good produced by labor $\downarrow$ => output produced $\downarrow$ => inputs used to produce the output $\downarrow$ => $D_L \downarrow$
                - **Substitution effect** – w $\uparrow$ => labor becomes more costly than its substitutes => $D_L \downarrow$ as the firm substitutes other inputs for it.

            1. $\eta_w \uparrow (\downarrow)$ as the price elasticity of the demand for the product labor produces $\uparrow (\downarrow)$. Why? What are the implications?
            2. $\eta_w \uparrow$ as it becomes easier to substitute other inputs for labor. Why? What are the implications?
            3. $\eta_w \uparrow$ as the price elasticity of supply for other inputs $\uparrow$. Why? What are the implications?
            4. $\eta_w \uparrow$ as the cost of labor as a share of total costs $\uparrow$. Why? Is this law always true?

    - Empirical estimates of η_w.

        - See Table 4.1 page 103 in the textbook

- What do the numbers mean?
- You should know the general results without memorizing the numbers explicitly.

▪ Application – Unions

- What do unions want? At least three possible goals.

    1. Increased income and power for union officials
    2. Increased wages for union members
    3. Increased union employment
    - The last two may cause the first goal to be met.

- D/S theory says that 2 and 3 are mutually exclusive.

    - Why?
    - What if demand for labor is relatively inelastic => the tradeoff between wages and employment is not as severe. Why? Show it on a graph.

- What can the union do to affect (↓) η_w – make demand labor less elastic?

    - Government policies the union might support?
    - Long term labor contracts

- Other implications

    - As η_w ↓ => union wages ↑, ceteris paribus, and the reverse.
    - Union labor organizers would tend to find labor markets with low η_w (highly inelastic D_L) more desirable.

- Cross wage elasticity of the demand for labor.

    ▪ Definitions

    - Demand for labor is affected by wages for other types of labor. Suppose two types of labor – j and k. Then the cross wage elasticity for these two types of labor (η_{JK} or η_{KJ}) equals how responsive demand for one type of labor is to changes in the wage of the other type.

        - $\eta_{JK} = \dfrac{\%\Delta L_J}{\%\Delta W_K}$

        - $\eta_{KJ} = \dfrac{\%\Delta L_K}{\%\Delta W_J}$

    ▪ What does the cross wage elasticity tell us? What does the number mean?

    - If we observe that $\eta_{JK} > 0$ => when W_K increases then L_J also increases (and the reverse) => J and K are gross substitutes. Why?

    - If we observe that $\eta_{JK} < 0$ => when W_K increases then L_J decreases (and the reverse) => J and K are gross complements. Why?

    - Recall the scale and substitution effect, but now as related to cross wage elasticities:

- **Scale effect** – W_K ↑ => costs of production ↑ => S of the good produced by labor ↓ => output produced ↓ => inputs used to produce the output ↓ => L_K ↓ <u>and</u> L_J ↓
- **Substitution effect** – W_K ↑ => L_K becomes more costly than its substitute, L_J => Firm substitutes L_J for L_K => L_K ↓ while L_J ↑ .

- Therefore two ways to observe gross complements ($\eta_{JK} < 0$).

  - Jand K are actual substitutes but the substitution effect of an increase in W_K , which causes L_J to increase, is outweighed by the scale effect of an increase in the W_K, which causes L_J to decrease => overall we observe that as W_K increases then L_J decreases even though the two types of labor are actually substitutes.
  - J and K are actual complements. In this case there is no substitution effect. Thus, the scale effect of an increase in W_K causes L_J to decrease.

- Only observe that J and K are gross substitutes if (1) J and K are <u>actual</u> substitutes and (2) the substitution effect outweighs the scale effect.

- The above tells us that cross wage elasticities are determined by:
  1. Whether the two inputs are actual complements or actual substitutes and,
  2. The relative size of the substitute and scale effects. The relative sizes are affected by the 4 Hicks/Marshall laws discussed in the previous section.

  - Consider what affects the size of the scale effect (assume that the two types of labor are union and non-union labor.) As the scale effect increases, ceteris paribus, union and non-union labor are more likely to be gross complements (what does the union want?).
    1. The union share of total costs. As this increases, the scale effect is larger (why?)
    2. The price elasticity of demand for the good that is being produced. As this increases, the scale effect is larger (why?).

  - Consider what affects the size of the substitution effect. As the substitution effect increase, ceteris paribus, union and non-union labor are less likely to be gross complements (what does the union want?).
    1. How easy is it to substitute non-union for union labor? As it becomes easier, the substitution effect is larger. How might unions affect this?
    2. How price elastic is the supply of non-union labor? As it becomes more elastic the substitution effect is larger (why?) Can unions affect this?

- Why do we care about cross wage elasticities?

  - How does public policy depend upon cross wage elasticities?

  - Empirical Findings

    1. labor and energy are gross and actual substitutes (highly inelastic)
    2. labor and materials are gross and actual substitutes (again, highly inelastic)
    3. skilled and unskilled labor probably substitutes
    4. Not sure if either skilled or unskilled labor is substitute or complement to capital.
    5. Skilled labor is more likely to be complement to capital than unskilled labor. (Why does this matter?)

3

- Should we have a minimum wage? Public policy analysis of the impacts of minimum wage laws.

  ▪ Empirical – summary of facts presented in class/book

  ▪ Theory – what happens to employment with an increase in the wage (minimum wage)?

    • L decreases (law of demand)

    • What does this impact have to do with elasticity? Focus on total wage income $w*L = I$

      • If $|\eta_w| > 1$ (labor demand is wage elastic) => $|\%\Delta L| > |\%\Delta w|$ => as $w \uparrow I \downarrow$ (make sure you understand why)
      • If $|\eta_w| < 1$ (labor demand is wage inelastic) => $|\%\Delta L| < |\%\Delta w|$ => as $w \uparrow I \uparrow$ (make sure you understand why)
      • Therefore the wage elasticity of the demand for labor speaks to effectiveness of the minimum wage law in making labor better off because of the increased minimum wage.

    • Complications of the analysis

      • This is nominal D_L and nominal wage => inflation can mitigate employment losses (see Fig 4.3 in book)
      • Statistics – as $w \uparrow L \downarrow$ <u>only</u> if other factors affecting employment are held constant (why is this a problem?)

    • The uncovered sector in minimum wage laws

      • What is the uncovered sector? (What percent of jobs are covered by minimum wage laws?)
      • Assume the following:
        1. 2 labor markets (sectors) – covered and uncovered
        2. total employment in both is fixed but workers can move between them (the two markets are substitutes)
        3. without a minimum wage the same wage prevails in both markets (really one market)

      • Results = ? You should know the graphs we used in class to analyze the results and what happens to the following variables:

        1. wages and employment in the covered sector
        2. S_L for the uncovered sector
        3. wages and employment for the uncovered sector

      • Conclusions – What impact does an uncovered sector have ultimately on the conclusion that minimum wage lowers employment and raises wages?

    • Empirical evidence regarding the impact of minimum wage laws

      • What is the evidence regarding the impact on wages and employment when first enacted in the 1930s?

- After 1930s, there is little consensus on the impact of a minimum wage on employment for unskilled labor. However evidence does indicate that η is probably smaller in absolute value for mandated wage changes like the minimum wage than for market based wage changes => evidence of monopsony power in labor markets (why?)

- Does increasing the minimum wage reduce poverty?

  - Recall that if demand for labor is inelastic, as found => as the minimum wage increases => total wage income (I) increases => should reduce poverty (shouldn't it?)

  - What is poverty? Defined by <u>household</u> not individual income. Below a set household income level, households are considered to be in poverty.

  - What is the empirical evidence? As the minimum wage increased (in 1990-1991) found that:

    - Only 22% of those individuals affected by the increase in the minimum wage (make sure you know what this means) lived in poverty.

    - Of households in poverty only 26% were affected by the increased minimum wage (why so few?)