Labour Supply

Lecture 5
**Labour Supply**

**Derivation of Labour Supply Curve**

- An increase in wage encourages individuals to work more, because it increases the opportunity cost of having leisure. The individual therefore prefers to work than to have leisure. Hence, there exist a positive relationship between wage and hours of work or labour supply.
• **Jackie spends her total income,** $Y$, **on various goods.**
  - The price of these goods is $1 per unit.

• **Her utility,** $U$, **depends on how many goods and how much leisure she consumes:**
  
  $$U = U(Y, N).$$

• **Jackie’s earned income equal:**
  
  $$wH.$$

• **And her total income,** $Y$, **is her earned income plus her unearned income,** $Y^*$:
  
  $$Y = wH + Y^*.$$
Figure 5.8 Demand for Leisure

Budget Line, $L^1$

\[ Y = w_1 H \]

\[ Y = w_1(24 - N). \]

Each extra hour of leisure she consumes costs her $w_1$ goods.
**Figure 5.8 Demand for Leisure**

Budget Line, $L^1$

$$Y = w_1 H$$

$$Y = w_1(24 - N).$$

Budget Line, $L^2$

$$Y = w_2 H$$

$$Y = w_2(24 - N).$$

$w_2 > w_1$
Figure 5.9 Supply Curve of Labor

(a) Leisure Demand

Demand for leisure

(b) Labor Supply

Supply of work hours

N, Leisure hours per day

H, Work hours per day
Income and substitution effects of a wage change

- **The income effect on leisure as a result of a wage increase is always positive but negative on the hours of work.** This is because as people make more money in the labour market, they will need more time off the labour market to enjoy their returns from work.

- The Substitution effect of a wage change, shows the changes in the amount of leisure demanded when the wage changes after the individual has been compensated for any change in real income.

- **In contrast to the income effect, the substitution effect is always negative for leisure but positive for hours of work.** This is due to the fact that, an increase in the wage rate increases the opportunity cost of not working since the individual will be foregoing more wages to enjoy an additional hour of leisure.
Since income effect is positive, leisure is a normal good.
Backward Bending Labour Supply Curve

• Theoretically, a backward bending labour supply curve can exist for an individual. At lower level of wage, the individual sees leisure as very expensive and reduces leisure when the wage increases. Thus, the substitution effect outweighs the income effect leading to a negative total effect on leisure but positive on hours worked.

• As the wage increases and the individual moves into the higher income bracket, leisure becomes less expensive and more affordable. At this stage, an increase in the wage rate will not go into increasing the number of hours worked, rather the individual will buy more leisure at the expense of working more hours.
In this case, the negative income effect is greater than the positive substitution effect of a wage increase. The total effect is positive on leisure but negative on the hours worked. Hence, more leisure will be demanded. Thus, the labour supply curve bends backwards for an individual. This is shown in the diagram below.
Backward Bending Labor Supply Curve

(a) Labor-Leisure Choice

At low wages, an increase in the wage causes the worker to work more…. but at high wages, an increase in the wage causes the worker to work less….
Family Utility Models

• **The Male – Chauvinist Model**

• This model assumes that the family consists of the husband and wife. The model argues that when the wife makes her labour supply decision, she views her husband’s earnings as non-labour income; hence an increase in the husband’s wage will lead to a reduction in her hours of work, while the husband’s labour supply decision is independent of the wife’s labour supply decision.

• This model differs from the simple model only with respect to its treatment of the wife’s labour supply. In this model, the impact of an increase in the husband’s wage on the wife’s labour supply is called the **cross income effect**.
Implications of Family Utility Model

• Married women’s labour supply is likely to be more unstable than that of married men. This is because the non-labour income of the woman is subject to changes based on the income position of the husband at any point in time.

• All other things being equal, a married woman will supply less hour of work than the unmarried woman.

• This model has been used to explain the **Added Worker Effect**. The model explains why the participation rate of married women in the labour force increases during periods of high unemployment. This is because as their husbands lose their jobs, the non-labour income of married women falls leading to their desire to participate in the labour force or to work more hours to keep the standard of living in the family at its initial level.
Family Utility – Family Budget Constraint Model

• In this model, the individual (whether man or woman) considers the leisure of the spouse in his/her labour supply decision making. The utility function now becomes:
  
  $U = U(C, L_m, L_w)$.

• Where $C$ is the total consumption of the family, $L_m$ is the Leisure of the man and $L_w$ is the leisure of the woman.

• The individual now maximises this utility function subject to the family budget constraint given as:

$$PC = w_h H_h + V_h + w_w H_w + V_w$$

• Where $PC = Y$ and is the income of the individual, subscripts $h$ represent variables for the husband and subscripts $w$ for the wife. Thus, the model assumes total family expenditures per period must equal total family income per period – consisting of property income $V$ and the sum of the earnings of its individual members.
• A significant contribution from this model is that there are two substitution effects that are relevant to the labour supply of any given family member. These are the own substitution effect and the cross substitution effect.

• The own substitution effect is the impact of one’s own wage on his/her hours of work. This is always negative on leisure but positive with respect to the individual hours of work.

• Cross substitution effect is the effect of a change in a family member’s wage on one’s hour of work.
• The cross substitution effect may be positive or negative depending on whether leisure times of husband and wife are complements or substitutes. If it is positive, then the leisure times for the two are complements and if negative, leisure for the two are substitutes.

• If the cross substitution effect is zero (0) for all members, then the only effect on one member’s labour supply as a result of a rise in another member’s wage is a pure income effect.

• In this case, the model collapses into the simple model with the only difference being the non-labour income which would include earnings of other family members.
This model leads basically to the results that labour supply decision of the wife/individual could be unstable as in the case of duopoly firms.

**Limitations of the family utility – Family budget constraint model**

The model does not show how the family utility function is generated. For example how do we aggregate individual’s utility for listening to music or watching TV or playing a game.

It ignores possible effects on the family’s Total Utility of a particular distribution of consumption goods within a family. Individual members may put greater weight on goods they prefer than those they dislike and may work less if the additional earnings are to be spent on items they dislike.
Individual Utility – Family Budget Constraint

• This model came about as a result of the shortcomings of the family utility - family budget constraint model. In this approach, each individual family member maximizes his or her own utility subject to a family budget constraint. Hence, family resources and family consumption are pooled.

• In this model, there are no cross substitution effects (because the husband’s leisure does not count) but there are several cross income effects, some direct and some indirect. The indirect cross income effect arises because their own substitution effect alters the hours of work and hence the wage earnings of each partner produce an additional cross income effect on labour supply of the spouse.
• This model leads basically to the results that labour supply decision of the individual could be unstable as in the case of duopoly firms.

• The key implication of the family utility model is that changes in the marital status of individuals are tantamount to changes in the labour supply. Therefore, an understanding of the structures in this relation could be vital for analysing employment patterns among a group of individuals.