Chapter 7
Labor Supply: Household Production, the Family, and the Life Cycle

Summary

The labor supply model presented in Chapter 6 assumed that individuals derive utility from consumption and leisure time. At any given point in time, the model postulates that individuals try to maximize their utility subject to the constraint that they cannot consume more than their income. Their income in turn is a function of the wage rate, the level of nonlabor income, and the number of hours they work (which equals the total time available less what they demand in leisure). This approach provides a valuable framework for thinking about labor supply issues, particularly the effects of government social welfare policies on work incentives.

The purpose of this chapter is to discuss three modifications to the labor supply model presented in Chapter 6. These modifications reflect more recent developments in labor supply theory. First, the assumption that individuals divide their time only between leisure and market work is relaxed. Instead, it is assumed that individuals divide their time between market work, work at home, and leisure time, and a model of the choice between market work and work at home is developed. Second, the assumption that decisions about the allocation of time are made independently by individuals is relaxed. Instead, decisions are looked at as part of a joint husband-wife decision. Third, the assumption that labor supply decisions are essentially the same at any point in time is abandoned. Instead, it is recognized that important differences in wages, market and household productivity, and preferences for leisure exist over an individual's life cycle and that these differences affect decisions about labor supply. A life-cycle perspective is then used to model the choice of retirement age.

The model of the choice between market work and work at home is a recasting of the labor supply model from Chapter 6. The model assumes that an individual or family derives utility from consuming market goods, household goods (such as meals and laundry), and leisure. These goods are, to some extent, substitutes for each other, and thus, as in Chapter 6, we can graph indifference curves showing the tradeoff between market goods and household time (a combination of time spent producing and consuming household goods and consuming leisure). The budget constraint is again a function of any nonlabor income, the wage rate, and available hours. From this model, we can derive the same implications about labor supply as in the previous chapter. Increases in nonlabor income will increase consumption of household time and reduce hours spent on paid work, while increases in the wage rate have both income and substitution effects, and thus the effect on hours of work is undetermined. The size of these effects will depend on preferences and the ease with which market and household goods can be substituted. For example, a particularly good cook may have a harder time substituting restaurant meals for home production of food. And preferences may change over the life cycle of the family; as children get older, mothers may be more likely to enter the labor force.

The chapter also explores the interdependency between the labor supply decisions of husband and wife. One possibility is that there will be complete specialization: one partner will work full time in the market while the other will stay at home. Historically, men’s wages have been higher than those of women, while there are indications that women have been more productive at child-rearing, and thus this decision may be the result of optimizing behavior.
Another possibility is that both partners will work for pay. In general, each person should work additional hours in the market provided an extra hour of work makes up for the household production lost because of the time spent at work. This weighing of costs and benefits, however, is complicated by the interdependency between a spouse’s productivity at home and the other spouse’s labor supply. In most instances, spouse A’s productivity at home rises when spouse B increases his or her market work (implying that they are substitutes in household production), increasing the incentive for A to work at home instead of in the market. However, the utility A derives from a certain amount of household production is likely to be inversely related to the time B works, dampening A’s incentive to work at home (and implying that they are complements in production).

Cross effects are also common when one member of the household loses a job due to a recession. When this results in the spouse decreasing time spent in household production to enter the labor market, the increase in the labor force is called the added worker effect. This effect tends to raise the observed unemployment rate. At the same time this is happening, however, the person who has been laid off may actually withdraw from the labor force because of the substitution effects associated with a lower expected wage. This counteracting effect on the labor force is part of the discouraged worker effect, and it tends to lower the observed unemployment rate. Overall, however, discouraged worker effects appear to dominate, because the labor force tends to shrink during recessions and grow during recovery.

Market and household productivity can also vary for an individual because of differences that occur over the life cycle, or intertemporal aspects of the labor supply. Over the life cycle, workers will tend to work most when their earning capacity is high (relative to home production). As reflected by the wage, market productivity starts low when the worker is young, rises quickly with age, and then levels off or even falls. Workers familiar with this traditional path of wages may be able to generate an estimate of expected lifetime wealth. Then, as these expected wage changes occur over time, they produce a substitution effect but no income effect (since they do not change expected lifetime wealth). In a life-cycle context, only unexpected wage changes can produce both income and substitution effects.

An intertemporal perspective can also be used to model a worker’s choice of retirement age. In general, delaying retirement means a higher yearly Social Security benefit, and it also allows the additional accumulation of market earnings. The additions to remaining lifetime income that come from delaying retirement an additional year can be thought of as the effective wage associated with delaying retirement. It is this wage, together with overall level of benefits, that must be combined with a worker’s preferences for leisure and income to arrive at the optimal retirement age.

Example

Consider a worker who is currently 65 years old and expects to live until age 80. His or her current and expected future wage is $20,000 per year. After retirement, the person will not work and will receive only Social Security payments for income. Table 7-1 shows the hypothetical yearly Social Security payments (in thousands of dollars) the worker is eligible for at retirement ages between 65 and 70.

Table 7-1 also shows the lifetime Social Security payments that will accrue (yearly Social Security payments multiplied by the number of years left to live), additional lifetime earnings (yearly wage multiplied by number of years to retirement), and the total lifetime income remaining at different retirement ages (all dollar values in thousands). For simplicity, assume the market interest rate is zero so that future dollars do not have to be discounted.
Table 7-1

<table>
<thead>
<tr>
<th>Retirement age</th>
<th>Yearly social security</th>
<th>Lifetime social security</th>
<th>Lifetime earnings</th>
<th>Total lifetime income</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>8.0</td>
<td>120</td>
<td>0</td>
<td>120</td>
</tr>
<tr>
<td>66</td>
<td>8.5</td>
<td>119</td>
<td>20</td>
<td>139</td>
</tr>
<tr>
<td>67</td>
<td>8.9</td>
<td>115.7</td>
<td>40</td>
<td>155.7</td>
</tr>
<tr>
<td>68</td>
<td>9.2</td>
<td>110.4</td>
<td>60</td>
<td>170.4</td>
</tr>
<tr>
<td>69</td>
<td>9.4</td>
<td>103.4</td>
<td>80</td>
<td>183.4</td>
</tr>
<tr>
<td>70</td>
<td>9.5</td>
<td>95</td>
<td>100</td>
<td>195</td>
</tr>
</tbody>
</table>

If the worker ranks combinations of leisure and income according to a Cobb-Douglas utility function given by the formula

$$ U = L^{\alpha} Y^\beta, $$

where $U$ is the index of satisfaction (higher values are better), $L$ is the number of years to be spent at home in retirement, and $Y$ is remaining lifetime income, what is the optimal retirement age for this worker? Assuming for simplicity that $L$ and $Y$ are each given equal weight in the worker’s preferences, the constants $\alpha$ and $\beta$ can both be set equal to 1. Having computed the remaining lifetime income associated with each retirement age, Table 7-2 shows the ranking of various leisure/income combinations. Under this ranking the optimal retirement age is 68.

Table 7-2

<table>
<thead>
<tr>
<th>Retirement age</th>
<th>Leisure years ($L$)</th>
<th>Lifetime income ($Y$)</th>
<th>Utility ranking ($U = LY$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td>15</td>
<td>120</td>
<td>1,800</td>
</tr>
<tr>
<td>66</td>
<td>14</td>
<td>139</td>
<td>1,946</td>
</tr>
<tr>
<td>67</td>
<td>13</td>
<td>155.7</td>
<td>2,024.1</td>
</tr>
<tr>
<td>68</td>
<td>12</td>
<td>170.4</td>
<td>2,044.8</td>
</tr>
<tr>
<td>69</td>
<td>11</td>
<td>183.4</td>
<td>2,017.4</td>
</tr>
<tr>
<td>70</td>
<td>10</td>
<td>195</td>
<td>1,950</td>
</tr>
</tbody>
</table>

The lifetime income/retirement age constraint is shown graphically by points $a$ through $f$ in Figure 7-1. The slope between any two points can be thought of as the effective wage rate associated with working an additional year, while the height of the constraint in the earliest year can be thought of as the level of nonlabor income associated with the model. As Figure 7-1 makes clear, the effective wage rate varies from year to year.

![Figure 7-1](image-url)
The preferences of the worker are represented by the indifference curve $U_1$. The optimum retirement age occurs at point $d$ where the highest indifference curve consistent with the constraint is attained.

The chapter concludes by returning to the basic model of the choice between household and market work, where household work includes time spent in child rearing. The model is used to analyze a proposal for a child support assurance program. Under this proposal, a single parent eligible for child support would receive the child support payments from the government in the event that the absent parent does not make the payment. The proposal is evaluated within the context of a welfare system that provides a certain guaranteed income level if the person does not work at all, and then reduces welfare benefits dollar for dollar with income earned. In contrast, the guaranteed level of child support is available regardless of how much the parent earns in the labor market, but if the parent chooses not to work, the child support payment is subtracted from the maximum welfare subsidy.

Child care subsidies that reduce the fixed cost of child care encourage work among those who would otherwise be out of the labor force but create an income effect that may reduce hours for those already working. Subsidies that reduce the hourly cost of child care are more likely to create work incentives for all workers, because substitution effects dominate in participation decisions and, generally, at low levels of income.

**Review Questions**

Choose the letter that represents the **BEST** response.

**The Theory of Household Production**

1. The theory of household production assumes that the family derives utility (satisfaction) from
   a. income.
   b. time spent in home production.
   c. the wage rate.
   d. leisure, commodities (e.g., meals, a clean home, the growth of children) produced by the family, and goods purchased with family income.

2. In a graphical representation of the household production theory, an indifference curve represents
   a. all the combinations of household production time and market purchased goods and services that can produce a certain level of utility.
   b. all the combinations of household production time and market purchased goods and services that can produce a certain level of output.
   c. all the combinations of leisure time and work that can produce a certain level of utility.
   d. both a and b.

3. Which of the following is a true statement about the budget constraint in a household production model?
   a. For any given level of household production time, it shows the maximum amount of goods and services that the family can purchase in the market.
   b. The magnitude of its slope equals the level of nonlabor income.
   c. The height of the constraint equals the wage rate.
   d. All of the above.