Public Economics

Lecture 09: Taxation III

Income Taxation

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Outline of Lecture

1. Overview Income Taxation
2. Consumption-Leisure Trade-Off
3. Theoretical Effects of an Income Tax
4. Empirical Evidence on Income Tax Effects

Overview Income Taxation

- **Definition:** A direct tax imposed on individuals or entities based on their income.
- **Purpose:**
  - Revenue generation for public goods and services.
  - Redistribution of wealth to address income inequality.
- **Key Features:**
  - *Progressive vs. regressive structure:* Higher income, higher tax rate vs. higher income, lower tax rate.
  - *Deductions and credits:* Reduce taxable income or taxes owed (e.g., EITC, child tax credit, charitable contributions, etc.).

Outline of Lecture

Consumption-Leisure Trade-Off

- **Concept:** Individuals face a trade-off between labor (earning income for consumption) and leisure (non-working time).
- **Key Idea:** Time is a finite resource, and allocating more time to leisure reduces income for consumption, while working more increases consumption but reduces leisure.
- **Implications for Policy:**
  - Taxes and benefits can shift the trade-off.
  - High marginal tax rates may reduce the incentive to work, but not necessarily (income vs. substitution effect).

Utility Function and Indifference Curves

- **Utility Function:**

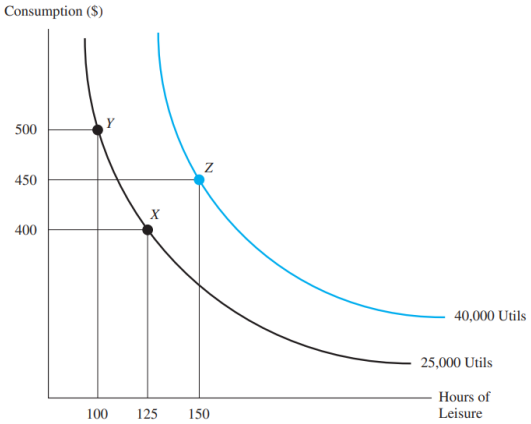
$$U = f(C, L)$$

  - Captures the satisfaction (utility) derived from consumption C and leisure L.
  - Assumption: More consumption and more leisure increase utility (C and L are "goods").
- **Indifference Curve:**
  - Represents all combinations of C and L that yield the same utility (e.g., 25,000 utils).
  - Example: A person is indifferent between:
    - $C = \$500, L = 100$ hours of leisure.
    - $C = \$400, L = 125$ hours of leisure.
  - Points on the same indifference curve provide equal satisfaction.
- **Illustration:** Indifference curves show trade-offs individuals are willing to make between consumption and leisure while maintaining the same level of happiness.

Utility Function and Indifference Curves

FIGURE 2-2 Indifference Curves

Points X and Y lie on the same indifference curve and yield the same level of utility (25,000 utils); point Z lies on a higher indifference curve and yields more utility.



Source: Borjas and Van Ours (2010)

Budget Constraint: Consumption and Leisure

- A person's consumption (C) and leisure (L) are constrained by:
  - **Time:** Total hours available to divide between labor and leisure.
  - **Income:** Derived from both labor and nonlabor sources.
- **Time** (T) is allocated between work (h) and leisure (L), such that $T = h + L$
- **Nonlabor Income (V):** Income independent of working hours (e.g., property income, dividends).
- **Gross Labor Earnings (wh):** Product of hourly wage (w) and hours worked (h).
- **Net Labor Earnings ($(1-\tau)wh$):** Depend on the tax rate $\tau \rightarrow (1-\tau)wh$

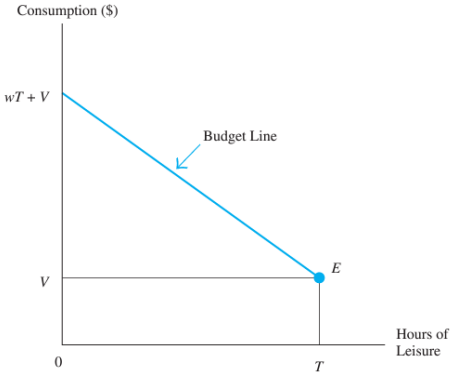
Budget Constraint:

$$C = (1-\tau)wh + V$$
$$\longleftrightarrow C = (1-\tau)w(T-L) + V$$

$\rightarrow$ Expenditures on goods (C) must equal labor earnings plus nonlabor income.

Budget Constraint

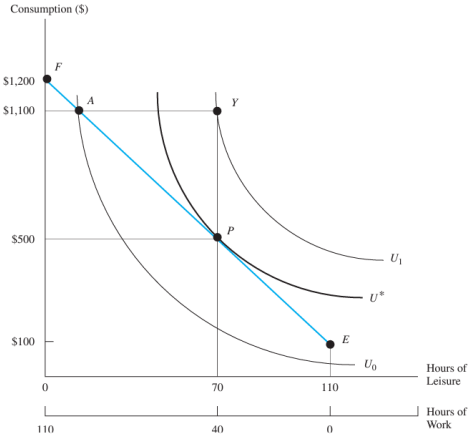
FIGURE 2-5 **The Budget Line Is the Boundary of the Worker's Opportunity Set**
Point E is the endowment point, telling the person how much she can consume if she does not enter the labor market. The worker moves up the budget line as she trades off an hour of leisure for additional consumption. The absolute value of the slope of the budget line is the wage rate.



Source: Borjas and Van Ours (2010)

Optimal Choice

FIGURE 2-6 **An Interior Solution to the Labor-Leisure Decision**
A utility-maximizing worker chooses the consumption-leisure bundle given by point *P*, where the indifference curve is tangent to the budget line.

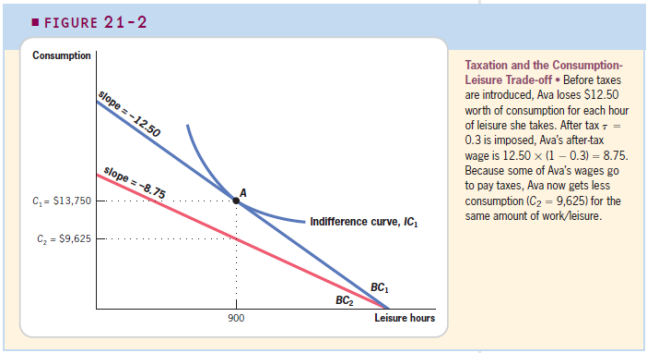


Source: Borjas and Van Ours (2010)

- **Utility Maximization:** The worker selects the combination of goods and leisure that maximizes utility (U^*) while adhering to the budget constraint.
- **Optimal Choice:** At the utility-maximizing point (P), the budget line is tangent to the highest attainable indifference curve.
- Example: 70 hours of leisure, 40 hours of work, and \$500 of goods.

Outline of Lecture

Income Tax Shifts the Budget Constraint



Source: Gruber (2005)

- Income taxes reduce the after-tax wage, changing the slope of the budget constraint (opportunity cost of leisure decreases).
- *Example:* A 30% tax reduces Ava's after-tax wage from \$12.50 to \$8.75, pivoting her budget constraint inward and decreasing consumption at the same leisure level (from C_1 to C_2).
- Taxes lower the return to work, potentially reducing labor supply by incentivizing more leisure.

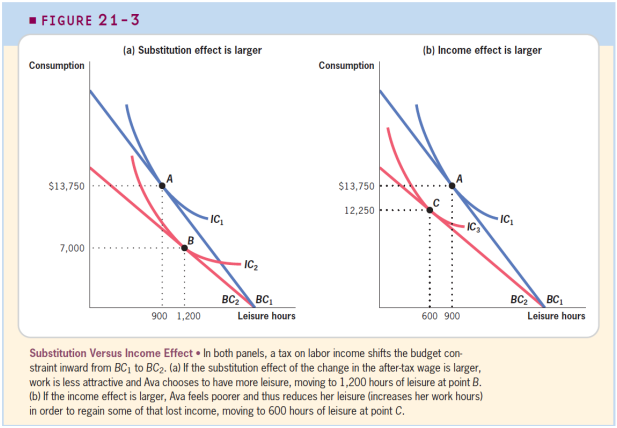
Substitution and Income Effects on Labor Supply

- **Substitution Effect:** A lower after-tax wage reduces the price of leisure, incentivizing more leisure and less work.
- **Income Effect:** Lower after-tax earnings reduce overall income, leading to individuals working more (as they want a higher income).
- **Overall Effect:** The substitution and income effects pull labor supply in opposite directions, making the net impact of taxation on work hours uncertain.

Illustration: Income Effect on Labor Supply

- **Income Target Example:** Ava works to buy 1 Vinyl per week.
  - Vinyl costs \$20, Ava earns \$5/hour $\Rightarrow$ works 4 hours.
  - With 20% tax, after-tax wage drops to \$4/hour $\Rightarrow$ works 5 hours.
- **Outcome:** Despite the lower wage, Ava works harder to meet her target income.
  - **Income Effect:** Ava works more due to a fixed income target.
  - **Result:** Quantity of labor supplied increases.

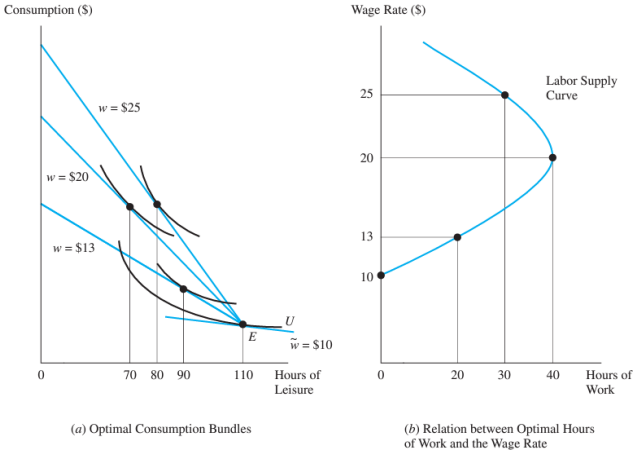
Substitution and Income Effects on Labor Supply



Source: Gruber (2005)

- In Panel (a), the substitution effect of taxation dominates, increasing leisure and reducing labor supply.
- In Panel (b), the income effect dominates, leading to more work and less leisure as Ava aims to maintain consumption.
- The shape of the labor supply curve depends on the relative strength of substitution vs. income effects, with potential upward or downward slopes.

Labor Supply Curve



Source: Figure 2-11 (Borjas and Van Ours, 2010)

- The labor supply curve (b) shows the relationship between the wage rate and hours worked, derived from the utility-maximization problem.
- At low wage rates (e.g., below \$20), substitution effects dominate, and individuals may choose to work less after a tax increase, while at higher wages (e.g., above \$20), income effects dominate, causing an increase in hours worked.
- A backward-bending labor supply curve arises.

Ambiguous Theoretical Effects of Income Taxes on Labor Supply

- **No Clear Theoretical Prediction:** The overall effect of income taxes depends on whether the substitution or income effect dominate.
- **Work Hour Constraints:** Many labor markets impose restrictions on adjusting hours, such as fixed schedules due to production requirements (e.g., manufacturing lines), limiting workers' ability to align hours with their optimal labor supply.
- **Overtime Pay Rules:** Laws requiring higher pay for hours beyond 40/week increase costs for firms, discouraging longer work hours and reducing responsiveness of labor supply to after-tax wages.

Outline of Lecture

Empirical Evidence on Income Tax Effects

Primary Earners (Main source of household income):

- Low responsiveness to wage changes.
- Work decisions are largely unaffected by taxes due to fewer outside options.

Secondary Earners:

- High responsiveness to wages.
- However, most response stems from labor force participation, not hours worked.
- Tax rates influence secondary earners' decisions to work or not work at all.

Thank you and good luck for the final exam!

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References I

Borjas, G. J. and Van Ours, J. C. (2010). *Labor economics*, McGraw-Hill/Irwin Boston.

Gruber, J. (2005). *Public Finance and Public Policy*, Worth Publishers.