

Homework #1
(Econ 512M)

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1. Zainab's utility depends on consumption c and leisure l . She earns a wage equal to w per hour, has an investment income equal to $M \geq 0$ and needs to sleep at least 8 hours a night.

- (i) Draw her indifference curves between hours of leisure and consumption, her budget line and her equilibrium choice of c and l . What is the slope of the budget line and what are the intercepts?
- (ii) Redo the above in terms of L , labor supply.
- (iii) Distinguish between income effects and substitution effects of an increase in wage. How does this differ in comparison to the traditional analysis for a good (wine?) that Zainab buys in the market. Demonstrate using the Slutsky equation.
- (iv) Is the labor supply "upward-sloping" or "backward-bending". Explain in terms of income and substitution effect.
- (v) What is the impact of a lump-sum tax on labor supply?
- (vi) What is the impact of a labor income tax on labor supply?
- (vii) If a high income individual is on the backward-bending portion of his labor supply curve, what would be the effect on his labor supply of a reduction in his marginal tax rate?
- (viii) What is the impact of an income tax (wage plus investment income) on labor supply?
- (ix) How does the wage elasticity of labor supply varies with M ?

2. Ali has the following utility function for consumption, C , and leisure, l :

$$U(C, l) = C^{0.25}l^{0.75}.$$

There are 50 weeks in the work year and 168 hours per week to be allocated to labor, L , or leisure, l , (so $L + l = 168$). He has no other sources of income.

- (i) Given a wage of \$25.00 per hour and a 20% income tax rate, sketch Ali's weekly budget constraint. How many hours a week will he work? What will his annual income be before paying taxes? What will his annual income be after paying taxes?
- (ii) Assume now, that tax code is progressive. On any income less than \$20,000 per year, Ali must pay 20% in income tax, while on any income over \$20,000 per year, he must pay 40% in income tax. Sketch Ali's new budget constraint and label the kink-point carefully. How many hours a week will he work? What will his annual income be before and after taxes?
- (iii) Assume an additional tax bracket is added so that the marginal tax rate on income over \$30,000 is taxed at the rate of 60%. How many hours of week will Ali work in this case? What will his annual income be before and after taxes?

3. Kim is a single head of a household with two children and has the following utility function over consumption, C , and leisure, l :

$$U(C, l) = C^{0.2}l^{0.8}.$$

There are 50 weeks in the work year and 168 hours per week. Assume that Kim earns \$10.00 per hour and has no other sources of income.

- (i) Suppose initially that the government gives \$4,000 to every family regardless of the family's income. It then taxes all earnings at the rate of 30%. Sketch the family's weekly budget constraint. How many hours a week will Kim work? What will the family's annual consumption be?
- (ii) Now assume that instead of the "unearned" credit, there is an earned income tax credit (EITC) for low-income households. The EITC provides a 40% credit if Kim earns less than \$10,000. Continues to pay a \$4,000 credit until Kim reaches \$15,000 and then is phased out at a 40% rate, so that by \$25,000 Kim receives no credit. Any income above \$25,000 is taxed at the rate of 30%. Sketch the family's weekly budget constraint with the EITC program in place. How many hours a week will Kim work? What will the family's annual consumption be?