Problem Set 1

1.) The following data (number of individuals) are available for a country:

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>181,512</td>
</tr>
<tr>
<td>Employed Males</td>
<td>60,704</td>
</tr>
<tr>
<td>Unemployed Males</td>
<td>4,595</td>
</tr>
<tr>
<td>Employed Females</td>
<td>47,857</td>
</tr>
<tr>
<td>Unemployed Females</td>
<td>3,932</td>
</tr>
<tr>
<td>Males out of labor force</td>
<td>20,116</td>
</tr>
</tbody>
</table>

Determine the following labor market indicators for this country:
(a) Labor force participation rate (b) Unemployment rate (c) Employment rate (employment–population ratio) (d) Number of persons out of labor force (e) Unemployment rate of males (f) Employment rate of females

2.) This problem involves the static labor supply model. Assume the following utility function for an individual:

\[ U = x + L^{(\beta)} \]

with

\[ L^{(\beta)} = \begin{cases} \frac{L^{\beta-1}}{\beta} & \text{for } \beta \neq 0 \\ \ln(L) & \text{for } \beta = 0 \end{cases} \]

where \( x \) denotes the consumption good and \( L \) leisure. The budget constraint is given by

\[ p \cdot x = V + w \cdot H, \]

where the available time \( T \) is divided into \( H \) hours of work and \( L \) hours of leisure (\( T = L + H \)). Furthermore, \( V \) denotes nonlabor income, \( w \) the hourly wage, and \( p \) the price of the consumption good. Consumption expenditure \( C \) is given by \( C = p \cdot x \).

a) Determine the marginal utility of leisure. Which values can the parameter \( \beta \) take in order that the utility function is quasi–concave?

b) Derive the labor supply function for an interior solution (\( 0 < H < T \)). Check the second order condition. Determine the ceteris paribus effect of an increase in the wage \( W \). Is the direction of the wage effect unambiguous? What is the level of labor supply for the following parameters: \( \beta = 1/3, p = 4, w = 1, T = 16, V = 20 \)?
c) Determine the reservation wage. What is the level of labor supply when the price increases to $p = 9$ compared to the previous situation?

d) Demonstrate the Slutsky decomposition for the labor supply function in this problem. Discuss the direction of the income effect.

e) Under what conditions does the individual work during the entire available time $H = T$?

3.) Freddy Lazy receives each week 100 Euro as dividends on his stocks. Not working he is just as happy as working one hour per week and receiving a total income of 105 Euro or working two hours per week and receiving a total income of 112 Euro.

a) What is Freddy’s reservation wage assuming discrete hours choices? (Use a graphical argument)

b) Would Freddy accept work with an hourly wage of 5.50 Euro?

c) Due to a recession, Freddy’s dividends decline. How does his reservation wage change?

4.) Discuss the following claim and determine whether it is true, false, or uncertain: “Leisure must be an inferior good if the labor supply curve is backward bending for an individual (i.e. for low wages the labor supply curve exhibits a positive slope and for high wages a negative slope).” Explain your answer.

5.) In the debate on tax reforms in Germany, it is common place to argue that marginal taxes should be reduced. At the same time, the possibilities for tax deductions should be cut in order to keep tax revenues at the same level as before the reform. Analyze the incentive effects of such a reform in the context of the static labor supply model. Assume that the government succeeds in keeping the tax revenues constant.

6.) The new government of a country with a strictly proportional income tax considers the introduction of a minimum monthly income of 1000 Euro as transfer payment for those individuals without another source of income. In order to finance this policy, the tax rate will be increased from 15% to 20%. For a typical worker, analyze labor force participation and hours worked before and after the policy change. Discuss whether the likely effects differ between the group of male workers in the age group 25 to 54 years and the age group 55 to 64 years assuming mandatory retirement at age 65.