General Equilibrium - Problem Set 4
due: classes on Jan, 24th 2022

Problem 1 (2p) *Complete the argument from class. i.e. show there exists a unique λ^* making the utility of the working and not working household equal.*

In the following two exercises you will complete the generalization of the Rogerson (1988) model as analyzed in class. In the first you will add labor market lotteries with one budget constraint (alike Arrow-Debreu) and in the second one, additionally to labor market lotteries, you will consider two budget constraint (alike sequential or Radner eq) and additional insurance firm.

Problem 2 (2p) *So consider a model where consumers are allowed to randomize their labour supply choices:*

- *write a consumers problem, so that (s)he maximizes expected utility over two states: one when working (with probability λ) and other when not working (with probability $1-\lambda$). Consumer can choose a probability of working λ and has a single budget constraint, where expected expenditures are equal to expected earnings. Consumer can condition his/her consumption on realization of the states of the world. Wage w is hence expressed per unit of probability. Problem of the firm producing consumption goods and market clearing conditions are now the same as analyzed in class. [rewrite from class notes]*
- *write definition of Walrasian eq. [rewrite from class notes]*
- *characterize allocation and eq. prices [1p]*
- *show that this allocation is equivalent to the solution of the social planner as analyzed in class. Explain. [1p]*

Problem 3 (2p) *Continue as before but now with two budget constraint and additional insurance firm.*

- *write a consumer's problem, so that (s)he maximizes expected utility over two states: one when working (with probability λ) and other when not working (with probability $1-\lambda$). Consumer can choose a probability of working λ and has two budget constraints: one for state when working and the other when not working. Additionally, allow consumer to choose insurance level b ie. a transfer from state when working to the state when not working. Assume that a unit of income in the state when not working costs q in a state when working. [rewrite from class]*
- *write a maximization problem of an additional insurance firm selecting supply of b with prices q. This firms collect qb premiums from working population and transfers b to non working. How will a maximization problem of such firm look like? Will this firm generate profits? In the WE linearity implies specific relation between price q and probabilities λ. Find it. [rewrite from class]*
- *write a definition of WE adding a insurance market clearing condition. [1p]*
- *characterize equilibrium allocation and prices. Assume that consumer knows and observes how price q depends on λ. Try to collapse both budget constraints into a single one. [1[]*
- *will this equilibrium allocation correspond to the one obtained in the above exercise? Explain.*

Problem 4 (4p) *In the following exercise you will modify a Rogerson (1988) model as analyzed in class but now allowing for three levels of labour hours choices, i.e. $\{0, \underline{h}, \overline{h}\}$, where $0 < \underline{h} < \overline{h} \leq 1$.*

- *define WE,*
- *can a WE allocation be symmetric? (i.e. that each individual chooses the same level of hours worked?),*

- *characterize WE allocations (consider all necessary cases),*
- *consider a central planner's problem as analyzed in class. Is WE allocation the same as analyzed by a social planner?*