Reading note 2

While both scholars and policymakers are concerned about the solutions to the increasing medical expenditures, this paper proposes a "top-up" health insurance policy that requires consumers to pay an incremental cost for more expensive medical methods and thus bring the whole society higher welfare. To clarify this, the author firstly draws a demand curve visualizing the relationship between the incremental price of the more expensive therapy (Lumpectomy) and the share of choosing L under different policy designs. Then the author quantifies the demand curve to estimate i) the relative demand given different nearest distances to the radiation facility and ii) the ex-post (For patients) welfare effects of "top-up" design. Finally, the paper considers the differential risk exposure in the ex-ante perspective and concludes that the top-up policy does not necessarily outweigh the full coverage under higher risk aversion. The analysis provides a systematic perspective to measure the willingness to pay for L and use the demand curve to evaluate the welfare effect.

This paper first shows the cost difference (including Medicare payment and time cost) between mastectomy(M) and lumpectomy(L), which provides the base for the **important assumption** for the demand curve that the travel time can be monetized, and that people have the same willingness to reduce either the time cost or any other price difference, thus allowing the author to use the variation in the distance as variation in the incremental price for L. Combining the data from CCR (patient level data) and IMV(radiation treatment facility location), the author restrict the data to female breast cancer patients choosing either M or L(focus on binary option) and do the empirical part.

The framework and strategy used by the paper are as follows: the article starts its proof by drawing the demand curve that describes the relationship between the incremental price of L and the share of choosing L, leading to the finding that the efficient allocation is given by "top-up" design while "no top-up" and "full coverage" design both causes welfare loss. Given the framework above, this paper then proposes the utility function including incremental price p and time cost (patient-specific) based on the assumption mentioned above. Then the author could estimate alpha and beta using the variation in the distance by standard logit regression and random-coefficient logit model, a model that takes heterogeneity of the population into account.

In line with the framework and strategy, 1) the initial evidence from the data shows that the longer the distance to radiation facilities, the more likely the woman to choose M, and this relationship is not very sensitive to the inclusion of differences in demographic or hearth characteristics. 2)Then the paper uses two types of logit model (Homogeneous logit and heterogeneous logit) to quantify the relationship, where the explained variable is a binary variable that equals 1 if the patient chooses L and the concerned explaining variable is distance. The homogeneous logit includes controls variables that do not affect beta while the heterogeneous logit model then adds the interaction (beta changes) and other random coefficients (assumes that beta follows a lognormal distribution). 3)After getting a reasonably robust result, the paper then draws the implied demand system for L based on the estimates from the previous models. In the implied demand curve given by model 1 with no controls, compared to the "top-up" design, the "full coverage" design raise the share of L from 21% to

58% and thus reduces the whole welfare by about $2000 per patient while the "no top-up" design drops the share of L from 21% to nearly 0% and thus reduces the whole welfare about $1400 per patient. For the implied demand curve given by model 6 with random coefficients, compared to the "top-up" design, the "full coverage" design raises the share of L from 48% to 58% and thus reduces the whole welfare $710 per patient while the "no top-up" design drops the share of L from 48% to 43.5% and thus reduces the welfare about $800 per patient. As a result, given a different logit model, the paper lists the reduction in demand given certain charging prices (which can be transferred by travel times), change in consumer surplus, change in insurer profits, and the change in the sum of both parties' welfare.

While the previous part stands as a patient's risk exposure, the next step considers ex-ante utility. Here the utility model is CARA function including risk aversion r an annual probability of illness. The results show that the top-up design does not dominate the full coverage policy when the value of the risk aversion is higher. Then other two designs are introduced by the paper. 1) The first one is the "first-best" policy which provides a continuum of indemnity insurance policies, leaving individuals unexposed to risk. Although the first best insurance dominates full coverage policy in welfare, it is impractical since the market offers discrete coverage. 2) The more practical way, is to offer partial "top-up" coverage and to search for the maximum efficiency point.

To sum up, the paper uses the framework to quantify the welfare effect and thus demonstrate the superiority of the top-up design. Then the author considers the ex-ante efficiency and finds that the top-up policy cannot necessarily dominate the full coverage design since the top-up policy exposes the individual to ex-ante risk while the full coverage does not. The application does not only limit to two options with the same benefits but can also expand to the alternative treatment that takes incremental benefit. Nevertheless, this paper assumes the two medical treatments have the same benefit but may ignore the possible benefit such as body integrity.