Reading Notes on *Paying on the Margin for Medical Care: Evidence from Breast Cancer Treatments*

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In contrast to the previous approaches to control the growing medical expenditures in the United States, this article discusses a new solution: the "top-up" insurance design that insurance company covers the baseline treatment cost, and patients internalize the marginal cost of more expensive treatment. By comparing with other two insurance designs: US "full coverage" policy and UK "no top-up" policy, the authors explain the welfare consequence of choosing between lumpectomy and mastectomy among breast cancer patients under different insurance policies with the graphical framework from an ex post perspective. They use the demand curve to quantify the welfare effects of different treatment choices with the above insurance policies. Besides, they also consider the influence of risk exposure in analyzing the welfare effect from an ex ante perspective.

In this paper, in terms of those two treatment choices, lumpectomy with the subsequent radiation therapy is more expensive than mastectomy while there is no significant difference in treatment effect between these two regimes. Concerning the insurance policies, the UK "no top-up" regime only covers the expenditure of cheaper treatment mastectomy. The "top-up" insurance policy requires the patients to pay incremental costs of lumpectomy while patients do not need to pay those costs if they choose more expensive treatment under US "full coverage" regime. In doing empirical analysis, the authors have combined the patient-level cancer registry dataset from the California Cancer Registry (CCR), which includes demographics information, diagnostic information, and treatment information with data on radiational facilities from the private firm IMV to examine the willingness of the breast cancer patients between 1997 and 2009 to pay for lumpectomy.

The authors firstly analyze the welfare effect of alternative insurance policies based on the treatment choices by graphing the demand curve of patients' willing to pay for lumpectomy. They use the travel time to the radiation facilities to better measure patients' demand for lumpectomy under different insurance contract designs. The demand curve shows the patients' preferred treatment choices at various distances to the nearest radiation facilities. Patients are willing to receive lumpectomy only if they get the positive utility. They find that the probability of choosing lumpectomy will decrease about 0.7 to 1.1 percentage with the increase of the travel time to the nearest radiation facilities. Although authors have studied other factors like demographics and clinical characteristics, this result has not been affected.

According to the estimated demand curve, the authors use the standard logit regression and

random-coefficient logit model to quantify the welfare effects of different insurance policies. Experimental results show that when the incremental cost of lumpectomy is $10,000, compared with “no top-up” policy, the “top-up” policy raises the lumpectomy rate by 15 to 40 per cent. However, when compared with “full coverage” policy, the “top-up” policy decreases the lumpectomy rate by 35 to 40 per cent. Overall, with the “top-up” policy, the social welfare efficiently increases $700 to $2500 for each patient if they receive lumpectomy.

Since the previous studies assume that risk exposure of all patients is identical, the authors also consider how risk exposure influences the treatment choices under different insurance designs and the ex ante utility. Specifically, with the CARA utility function, the authors set three different levels of absolute risk aversion and discuss their influence on patients’ willingness to pay for the lumpectomy and the social welfare change. The “top-up” policy is a good option when risk aversion is the lowest. When the level of risk aversion is high, the social welfare under the “full-coverage” policy is much better than under the “top-up” policy. The reason of this result is that gains from a reduction in risk exposure is larger than the loss from ex post inefficient treatment choices. Besides, the authors think about the feasibility of other insurance designs. They put forward the “first best” policy, which is believed to be effective both from ex ante perspective and ex post perspective; it turns out to be not practical given its inconvenient payment form. Then they consider another way of only providing partial “top-up” coverage, but it might lead to the adverse selection problem under certain conditions.

In summary, this paper studies the social welfare gains of three different insurance policies when facing two treatment choices and concludes that the “top-up” policy produces more social welfare gains. However, there might exist one limitation. The breast cancer cells can remain after lumpectomy and mastectomy, and breast cancer will recur. Since the follow-up treatment measures and costs might be different, the authors might need to consider this situation.