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Reading Note on "Paying on the Margin for Medical Care: Evidence from Breast Cancer Treatments"

In this paper, the authors examined the "top-up" health insurance policy, which only covers the cost of a baseline treatment. That is, if patients choose some more expensive treatments, they have to pay the incremental cost by themselves. There are two alternatives: the US-style "full coverage" design that incurs no incremental cost and the UK-style "no top up" design that does not cover more expensive treatments at all. The authors presented a graphical framework to compare these three alternatives, focusing on the context of breast cancer treatments, including the baseline treatment mastectomy and the more expensive treatment lumpectomy. The ex post welfare analysis was conducted first, and then the ex ante welfare analysis that involves risk aversion.

As two common surgeries that breast cancer patients receive, mastectomy and lumpectomy yield the same survival outcome. Their difference lies in that mastectomy removes the entire cancerous breast, while lumpectomy only removes the cancer, and is followed by 25 radiation therapies. With different distances to the nearest radiation facilities, patients face different incremental cost, in terms of time cost, if they choose lumpectomy over mastectomy. Based on the variation in distances to radiation facilities, the relative valuation and demand curve for lumpectomy can be estimated. The authors employed data from the California Cancer Registry, which include demographic, diagnostic and treatment information. In particular, this dataset includes the exact address of patients. The authors also drew data on the locations of radiation facilities from IMV, a private firm, so they were able to calculate the distances between patients and their nearest radiation facilities. The graphical framework is based on the demand curve for lumpectomy: with more incremental cost, fewer patients choose lumpectomy. Under the US-style "full coverage" design, there would be some patients choosing lumpectomy even though their relative valuation of lumpectomy over mastectomy is less than the incremental cost paid by insurers. The externality here leads to inefficiency.

Likewise, under the UK-style "no top up" design, there would be some patients choosing mastectomy to avoid the full cost of lumpectomy, even though that maximizes social welfare. In contrast, the "top up" design proposed by the authors removes such externality, and thus achieves ex post efficiency.

Using the binary choice of choosing lumpectomy or not as dependent variable, travel time to nearest radiation facilities as independent variable, the authors run logit regressions with different controls, such as demographics. It is shown that a ten-minute increase in travel time to nearest radiation facilities would decrease the probability of choosing lumpectomy by about 0.7 to 1.1 percentages. The authors applied the graphical framework to the estimated demand curve for lumpectomy, demonstrating that the "top up" design outdoes the US-style "full coverage" design by 7,00 to 2,500 dollars, and outdoes the UK-style "no top up" design by 7,00 to 1,800 dollars. The authors then considered the ex ante efficiency, assuming CARA. While the "top up" design still dominated the UK-style "no top up" design, it does not necessarily dominate the US-style "full coverage" design, which removes ex ante risk exposure. If the risk coefficient is large enough, the "top up" design could be ex ante dominated.

In conclusion, the "top up" design would allocate patients with low willingness to pay to the baseline treatment, patients with high willingness to pay to more expensive treatment, resulting in greater ex post social welfare. Although the two treatments considered in the paper do not differ in terms of survival outcomes, similar analysis can be applied to more general situations for policymaking purpose. I am wondering how the monetization of survival benefits can be appropriately done. I am also wondering why the "top up" design has not become popular, given that it looks like such a great idea in this paper. Are there any difficulty for this design to be realized? Are there social or political issues behind it? Answering these questions might make the proposal more complete and convincing.