

## **Econ613 Reading Note**

### **Paying on the Margin for Medical Care:**

#### **Evidence from Breast Cancer Treatments**

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High and increasing medical expenditure has always been a problem in the United States. To reduce the spending on health care, some policy and academic strategies focus on increasing cost sensitivity on both demand and provider side. One solution that contrasts to the standard “full coverage” insurance and UK-style “no top-up” design is the “top-up” design, which covers the cost of a baseline treatment and patients could decide whether they will pay an incremental price for more expensive treatment options. To illustrate the potential welfare gains from a “top-up” health insurance policy, Liran Einav, Amy Finkelstein and Heidi Williams (2016) conducted an empirical analysis on breast cancer treatments which includes two steps. They first presented a graphic framework that shows the welfare consequence of the three different insurance designs. Since the relative willingness to pay curve for the more expensive treatment option is the key to evaluate the welfare consequence, the next important step is to estimate the demand curve for the more expensive treatment using variation in distance to the nearest radiation facility. Basing on the results, the authors estimated that compared to the other two policies, the “top-up” insurance policy increases the social welfare.

Since the analysis was based on breast cancer treatment, the authors mainly focused on two key treatment choices: lumpectomy and mastectomy. According to clinical trial, the results showed that the two treatment choices has nearly the same survival outcomes, however, lumpectomy with radiation is more expensive than mastectomy. Also, the time cost of traveling to receive radiation therapy associated with lumpectomy is another factor affecting patients’ choices. Based on the background, the analysis used two datasets: a patient-level cancer registry dataset drawn from California Cancer Registry (CCR), which directly collected data from cancer patients’ medical record including patients’ address at the time of diagnosis, as well as data on radiation treatment facility locations from IMV. The authors restricted the data to 323,612 female breast cancer patients that were diagnosed between 1997 and 2009 and chose either mastectomy or lumpectomy as their initial treatment and matched each patient to her nearest radiation facility.

The authors first constructed a graphic conceptual framework, in which they input willingness to pay for lumpectomy to show the welfare consequence of the three different insurance designs. Then they tried to quantify these tradeoffs by applying the empirical strategy of estimating the utility of patients, including two preference parameters, distance of patient to the nearest radiation facility, the incremental price, and the opportunity cost of time. One important assumption is that conditional on the opportunity cost of time, price and distance have the same effect on utility. The patient would choose lumpectomy if and only if one’s utility is positive.

According to the empirical strategy and assumptions, the authors first showed that women who live

further from radiation facilities are less likely to receive lumpectomies. They further estimated the relationship between breast cancer treatment choice of lumpectomy and travel time to the nearest radiation facility from logit regressions, including six demand specifications such as model with no control, models added covariates for demographics, census block controls and clinical controls successively, model added interactions between these covariates and distance, as well as model added random coefficients on distance. They found that having the nearest radiation facility ten minutes further from the patient's residence makes her less likely to choose lumpectomy by about 0.7 to 1.1 percentage points.

In the next section, the authors plot the implied demand curve for lumpectomy based on the simplest (with no control) and the richest (with random coefficients) model. The figures show that based on the simplest specification, the US-style policy raises the lumpectomy rate by about 37 percentage points with \$2,000 welfare cost per patient, while only about 10 percentage points under the richest specification with \$710 welfare cost. The UK-style policy reduces the lumpectomy rate by about 21 percent, with \$1,400 welfare cost per patient, while only about 4.5 percentage points under the richest specification, with \$800 welfare cost per patient.

After quantifying the impact of alternative insurance designs on the price the customers face lumpectomy, the authors considered their impact on risk exposure and hence ex ante utility. They found that when ex ante utility is considered, the top-up policy has higher social welfare ranking relative to the UK policy, however, social efficiency can be higher under a US-style policy for high enough levels of risk aversion since the gains from reduction in risk exposure can exceed the loss from ex post inefficient treatment choices.

In conclusion, this paper presents a framework to illustrate welfare gains from "top-up" health insurance policy basing on the treatment choice between lumpectomy and mastectomy for breast cancer patients. The authors estimated the demand curve for lumpectomy using the distance to the nearest radiation facility and quantified the welfare consequences for the alternative insurance policies and found that top-up design has welfare gains compared to the other two designs. Finally, considering risk exposure and ex ante utility, they found that compared to US-style design, the top-up policy may expose an individual to ex ante risk exposure.

Furthermore, there may exist two possible limitations in this paper. First, I think the choice of treatment is affected not only by distance but also by other factors such as the reputation of facilities and doctors. These factors can be quantified by the rating of facilities and doctors on corresponding websites or third-parties. It may be better to include these factors into analysis. Second, the authors stated that the fact that average survival does not differ across the two treatments allows them to focus on the difference in treatment costs, however, the survival rate is not the only measurement, since the side effect can also be a reason for patients to choose one instead of the other. Thus, more assumptions should be made and more factors should be added into this paper.