Julian Sauvage
Reading Note 2
Paying on the Margin for Medical Care: Evidence from Breast Cancer Treatments

Health insurance policy has been the subject of significant debate in recent years, particularly in the United States where medical expenditures continue to rise on a yearly basis. In this paper, the authors highlight an alternative insurance policy to the typical US and UK regimes and illustrate its potential welfare gains in the context of breast cancer treatments. They argue that to effectively assess the welfare implications of policy designs, we must integrate the relative demand, or willingness-to-pay, for more expensive alternatives. The authors estimate the relative demand function by taking advantage of variation in treatment choice as well as distance to the nearest treatment facility. Based on these estimates, they compute the effect of price on demand for the most expensive treatment, and the subsequent efficiency of the policy design.

The standard insurance design in the United States is "full coverage", in which consumers have minimal incremental costs associated with choosing a more expensive treatment. On the other hand, the UK uses a "no top-up" system in which only medical treatments that are "cost-effective" are fully covered, while more expensive treatments are not covered at all. The authors propose an alternative "top-up" design wherein insurance pays up to the cost of some baseline treatment and any additional incremental costs are covered by the consumer. As opposed to the US system, this "top-up" alternative would incentivize the less expensive treatment, thereby ensuring individuals internalize differences in treatment costs, without overpricing the more expensive treatment as with UK-style policies.

The authors focus their analysis on breast cancer treatment choice, specifically individuals' demand for a lumpectomy relative to the less expensive mastectomy. This choice set is particularly valuable because the treatments do not measurably vary in survival rate or quality of life, allowing for an explicit focus on the difference in treatment costs. Moreover, the lumpectomy treatment differs from the mastectomy in that it requires more travel to treatment facilities, however travel time varies based on patient location. Using a California cancer patient-level dataset containing individual locations, as well as data on Californian radiation treatment facility locations, the authors are able to determine patients' distance to their nearest treatment facility. This variation in distance is vital for the analysis, because out-of-pocket treatment costs are effectively zero under California's "full coverage" policy regardless of treatment choice. Thus, rather than exploiting variation in relative price, the authors use variation in distance to treatment.

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Building upon prior work, the authors confirm that distance to treatment facilities is related to treatment choice, before estimating a demand curve for lumpectomies and investigating how patients might respond to changes in insurance designs. With patients' treatment decisions and distance to treatment in hand, they can estimate the relative utility of a lumpectomy and the effect of travel time on treatment choice. Since treatment choice is binary, they estimate a logit model of the relationship between treatment choice of lumpectomy and travel time, integrating a number of covariates in successive models. They find that a 10-minute increase in travel time makes a patient 0.7-1.1 percentage points less likely to choose a lumpectomy. They utilize the estimated demand function to calculate a patient's willingness-to-pay for a lumpectomy, thereby mapping variation in distance to variation in cost. Plotting the estimated effect of price on treatment choice allows the authors to calculate how many individuals would choose the more expensive treatment (lumpectomy) under different policy types. Based on their richest model, the US "full coverage" system raises lumpectomy rates 10 percentage points above the efficient level, whereas the UK-type policy reduces the lumpectomy rate 4.5 percentage points below the efficient level. The efficient "top-up" policy saves between $710-2,000 per patient over the US system, and $800-1,400 per patient over the UK system, depending on the model specification.

While the "top-up" policy is *ex post* efficient, because only those who want the more expensive treatment are subject to its costs, it is potentially less efficient when considering risk exposure. When patients are risk averse, the "full coverage" policy may be preferred since it creates no risk exposure. On the other hand, when patients have low risk aversion, social welfare is maximized under the "top-up" policy.

This paper presents an alternative health insurance policy to those that are typically found in the US and UK today and compares its welfare implications in the context of breast cancer treatment. The authors argue that a policy's welfare consequences fundamentally depend on its impact on relative demand, which are often ignored in favor of absolute costs. They find that the "top-up" insurance system is more efficient in terms of spending and patient allocation *ex post*, however a "full-coverage" system may be more efficient *ex ante* if risk aversion is sufficiently high.