

Econ 613 Reading Note #2

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

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This paper evaluates the welfare gain from different types of health insurance policies (US- style “full coverage”, “top-up”, and UK-style “no top-up”) for reimbursement of breast cancer treatment choices. By establishing the relationship of the patient’s willingness to pay for lumpectomy and the distance between their residence and the nearest radiation clinic, this paper estimates the demand curve of lumpectomy treatment and calculates the ex post efficiency with the overall welfare under different policies. It shows total welfare gains from “top-up” policy is between \$700 and \$1,800 per patient relative to a “no top-up” policy and between \$700 and \$2,500 per patient relative to a “full coverage” policy. Furthermore, the differential risk exposure measured by the ex ante efficiency is considered in the advanced welfare analysis, and the result indicates the “top-up” policy continues to dominate the “no top-up” policy, but the relative ranking of the “top-up” policy and the “full coverage” policy is ambiguous.

The empirical analysis is based on the California patient-level breast cancer registry dataset including demographic, diagnostic and treatment information and the distance to the radiation treatment facility locations from their residence. The baseline sample covers 323,612 breast cancer patients that were diagnosed between 1997 and 2009.

This paper starts with the statistical summary of breast cancer data, and declares that there is significant relationship between distance from radiation facilities and treatment choice which is also confirmed by previous medical literature. The utility from lumpectomy is given by $u_i \equiv \alpha_i - \beta_i(\theta_i d_i + p)$, and patient will choose lumpectomy only if $u_i > 0$. Then, utility is simplified to $u_i \equiv \alpha_i - \beta'_i d_i$ and authors estimate logit regressions of whether a patient will choose lumpectomy based on distance considering both the control variables and the heterogeneity of coefficients. The results show the effect of distance is statistically significant and is quantitatively reasonably stable across all specifications. With the assumptions of patient’s willingness to pay for lumpectomy and distance, authors estimate the demand curve. By taking the “full coverage” policy as benchmark which the price of lumpectomy is 0, this paper calculates the overall change in welfare which consists of changes in consumer surplus and issuer benefit under different incremental charge levels. The results show total welfare gains from “top-up” policy is between \$700 and \$2,500 per patient relative to “no top-up” and “full coverage” policies.

In addition, ex ante efficiency is considered into the welfare analysis and authors set it as $\pi_i = \frac{1}{r} \log[\rho \cdot \exp(r \cdot \min(v_i; p)) + 1 - \rho]$ with a coefficient of absolute risk aversion r , the annual probability of illness ρ , the relative price of lumpectomy p and monetized risk of v_i . The calibration illustrates that the welfare gain from “top-up” policy is still higher than “no top-up” one, but the relative efficiency ranking to “full coverage” one depends on the risk aversion. For the lowest risk aversion, social welfare is higher under the “top-up” policy, but for higher risk aversion it is higher under the “full coverage” policy.