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学位論文の要旨

According to the rising of the importance of the evaluations of public policies and projects, a competent authority and some local governments are required to evaluate the policies they implemented. In addition, academic studies on those evaluations which include theoretical frameworks of social survey and rigorous estimation such as “Program Evaluation Econometrics” are also rapidly developing. There are, however, only few cases in which the above frameworks are fully fulfilled. It can be said that know-how of estimation is not accumulated in Japan. One Reason of this is that Japan does not have enough micro-data for the economic analysis in comparison with the U.S. or other nations, which makes Japan to lag behind to great extent in panel survey as well as econometric analysis. These are, therefore, problems on policy recommendations and the structural analysis.

This dissertation focuses on the above problems and aims to study the evaluation of public policy or projects by utilizing the panel data analysis. This dissertation mainly applies this methodology to the following two fields: (i) Information and Communication Policies; (ii) eHealth. In particular, we analyze: (i) factors promoting Japanese broadband; and (ii) the effect of reduction of medical expenditures by eHealth.

(a) Factors Promoting Japanese Broadband

It is significantly important to specify the factors promoting Japanese broadband which is highly developed all over the world, because the Japanese case can be a good example not only for policy or deregulation in developing economies which have been deploying infrastructures but also for the Next Generation Network (NGN) and wireless

access to the Internet such as WiMAX in developed economies. But all information or data related to the above policies are always open to the public, especially in the telecommunications industry which tends to be monopolistic because of the essential facilities. The evaluations of policy or the assessment of competitiveness are, therefore, represented by the data obtained from questionnaires by researchers. On the other hand, in this method, there are always some problems in estimating the robust elasticity of charges or effects of deregulations, for example, due to biases or the reliability of data obtained from questionnaires. In this dissertation, we focus on the both of ADSL and FTTH markets which are the main technologies of Japanese broadband, and estimate rigorously the effect of the policy or deregulation by the regression analysis. In the case of ADSL, we utilize the panel data of four carriers, which dominates over 90% of the market share, and as for FTTH, the prefectural panel data is utilized.

As a result of ADSL market, the elasticity of charges is low, which is consistent with those obtained by previous studies. In addition, three large increases in the number of subscribers are identified in the analysis. The first sharp increase in the number of subscribers is due to deregulation, the second jump is caused by the increase in market competition inspired by previous deregulations, and the third one by technological development. As a result of FTTH market, it is revealed that the more carriers enter the market, the more subscribers increase due to intensified market competition. In addition, the effect of migration from ADSL to FTTH is proved in the analysis.

The characteristics of these studies are emphasized by utilizing the panel data analysis, which is the first attempt in this field. The previous research which utilized cross-sectional data referred only to impacts with or without deregulations, but these studies in the dissertation enable to compare the degrees of significance among the factors, which is the important information for regulators.

(b) The effect of reduction of medical expenditures by eHealth

More than 100 of local governments are operating the eHealth system now, but there are only few studies calculating precisely its economic effects. The insufficiency amount of evaluation study actually leads to skeptical view of the effect of eHealth or telemedicine. The previous research of the evaluation of eHealth is represented by CVM (Contingent Valuation Method), but there are no other studies utilizing the receipt data of actual medical expenditures, that is, there is no study of calculating how much eHealth save medical expenditures. It is important for the medical policy to specify the

effect of reduction of medical expenditures in order to promote eHealth. This study is based on the actual implementation of an eHealth operated in Nishi-aizu Town, Fukushima Prefecture. We identified (i) the user's group, and (ii) the non-user's group of the system, and compared their medical expenditures. At first, we sent the questionnaire to ask their characteristics. Then we made the database of medical expenditures for 5 years of valid respondents. Based on the data, we estimated the effect by the regression analysis.

The main results obtained are as follows; (i) medical expenditures of eHealth users are less than those of non-users by 15,688 yen per year. This amount is 20.7% of average annual medical expenditures; (ii) medical expenditures of lifestyle-related illness can be reduced by 1,133 yen per year, if they extend using the eHealth system one more year. The amount of this reduction is 1.5% of average annual medical expenditures; (iii) the elasticity of reduction of medical expenditures with respect to the length of utilizing the system becomes larger. This implies that elasticity increases according to years of its use, and the years one uses the system, the larger the reduction in medical expenditures becomes; and (iv) although we cannot identify the difference between user and non-user groups for healthy people, eHealth has larger effect to people with diseases. The difference in medical expenditures between user and non-user groups is found to be 37,942 yen per year.

This analysis is the first to utilize the actual data of medical expenditures from receipts to evaluate eHealth. This study will provide the essential solution to problems such as maintaining health of elderly people in the depopulated areas with less medical facilities, correction of disparities in health between urban and rural areas, and reduction of medical expenditures.

論文審査の結果の要旨

政策・プロジェクト評価に対する重要性が高まり、学術的な評価研究の分野についても Program Evaluation Econometrics の分野をはじめ、社会調査手法から推計手法までの理論は急速に発展している。これらを背景に、本論文では政策・プロジェクト評価に関してパネルデータ分析を応用し、「情報通信政策」と「遠隔医療」の2つの分野の中で、(a)ブロードバンドの普及要因、(b)在宅健康管理システムの経済効果を取り上げ評価・分析している。

本論文の構成は、第1章が関連分野でのサーベイに当てられ、第2章がADSL、第3章がFTTHと電気通信政策の評価が、第4章では遠隔医療から在宅健康管理システムの医療費削減効果が分析されている。全体の結論は第5章で与えられている。

第2、3章では、それぞれADSLとFTTHに関して普及要因の分析を行い、先行研究では得られていない個別の規制緩和政策の効果や、それらの相対的な影響度を回帰分析により厳密に比較した。ADSL市場の分析では、シェアの9割を占めるADSL事業者4社の加入者数、FTTH市場の分析では都道府県のパネルデータによる普及要因の分析を行った。推計の結果、ADSLの価格弾力性は非弾力的であり、先行研究と整合的な値が得られた。普及要因については、加入者数が特に大きく伸びた3時点について、規制、競争、技術といった要因を詳細に特定することができた。FTTH市場の分析では、事業者数の数が多い地域ほど加入者が多く、競争が有意にその普及に影響を与えていることが示された。また、ADSLからのマイグレーションによる効果も大きいとの結果を得た。

第4章では、福島県の西会津町で導入されている在宅健康管理システムの実地調査に基づき、その経済効果を分析した。西会津町の住民を、在宅健康管理システムの使用者と未使用者に分類し、この2つのグループの医療支出を比較検討することにより、在宅健康管理システムの評価を行った。事前に個人属性などを問うアンケート調査を実施し、有効回答者に関して国保レセプトへ支払い請求のなされた5年間の医療費をデータベース化した。得られたデータに基づき、使用者、未使用者を回帰分析の手法を用いて実証的にその効果を測定した。

分析の結果、全疾病では使用者の医療費が高いが、生活習慣病に限定すると、年間約15,688円の医療費が削減される。在宅健康管理システムを1年使用することにより、生活習慣病の医療費は約1,155円減少する。同システムの使用による医療費の減少効果は使用年数が延びるほど大きくなる。同システムは、持病を持つ者に対しては年間約37,942円の医療費削減効果がある。以上の結果を得ている。

本論文でなされた遠隔医療の分野でレセプト・データに基づく評価は内外を通じて初であり、本稿の分析は、今後医療機関が少ない地域での高齢者の健康維持、都会と地域での健康格差の解消、医療費の削減といった喫緊の課題を解決する基礎を与えるものである。

以上の観点から、本論文は博士（応用情報科学）に値するものと認められる。