The Demand for Preventive Care Services and it’s Relationship with Inpatient Services

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Motivation and Objective of Study

• Use of preventive care services is crucial to maintaining and improving the health status of individuals
  – An effective preventive care services has been reported to improve health and result in less need for curative care services (Sindelar 1982; Burton et al. 1995)
Motivation and Objective of Study

• after the implementation of the NHI in Taiwan, the utilization of preventive care services
  – increased from 29.30% in 1993 to 42.50% in 1996 and reached to approximately 50% in 1999 but decreased to 43% in 2003
  – nearly 3 years, around 34%
Motivation and Objective of Study

• In 2006,
  – the overall medical expenditure of the middle aged and elderly covers about 56% of the total expenditure while the proportion of this group only covers about 26% of total population
  – the overall medical expenditure of the elderly (65+) covers about 32.7% of the total expenditure while the proportion of this group only covers about 10% of total population
Motivation and Objective of Study

• In 2006,
  – among the overall outpatient medical expenditure, the middle aged and elderly covers around 52% while the inpatient medical expenditure covers about 64%
Motivation and Objective of Study

• if an adequate preventive care services are utilized
  - it may prevent illness and result in less need for subsequent services such as inpatient services
  - it may help reduce the unbalanced budget of the NHI program since inpatient services cost a lot
Motivation and Objective of Study

• most research analyzed factors affect the utilization of preventive care services
Motivation and Objective of Study

• little is investigating the relationship between the utilization of preventive health care services and inpatient services
  – Nakanishi and Tatara (1998) use the aggregate measure of preventive care services and aggregate patient-level data to find that preventive care services may reduce the subsequent use of inpatient and outpatient services for aged 40 or older
Motivation and Objective of Study

- few similar studies use observational and cross-sectional data or quasi-experimental study designs to analyze the relationship between primary care services and specialty, emergency department and inpatient services utilization
  - Bindman et al. 1995; Weinberger et al. 1996; Gill et al. 2000; Fortney et al. 2005
Motivation and Objective of Study

• In this paper, we use a recursive simultaneous model (avoid endogeneity problems) and use data at individual level
  – not only investigate factors affect the utilization of preventive care services
  – but also examine the relationship between the utilization of preventive health care services and inpatient services by the middle aged and elderly in Taiwan
Conceptual Framework

• Grossman’s (1972) health demand model
  – viewed health as one form of human capital
  – argued that human capital stock affects individuals’ productivity but health capital stock determines the total amount of time to produce commodities and money earnings
Conceptual Framework

- gross investments in health capital can be produced by household production function \((Z)\) with the own time of the individual \((M)\), and with inputs of market goods \((X)\) such as medical care i.e. \(Z = f(X, M)\)

- individual’s utility comes from household production (gross investment in health capital in this case) and leisure \((L)\) i.e. \(U = (Z, L)\)
Conceptual Framework

– Thus investment in health capital can be viewed as a derived demand for “good health”

– If more inputs of market goods were used to increase of health capital investment, there could be more time to be reserved to do market and non-market activities i.e. health produces an output of healthy time
Conceptual Framework

• Further studies (Cropper, 1977; Phelps, 1978) extend Grossman’s (1972) model by distinguish the utilization of medical care between preventive and curative care
  – preventive care is viewed as a health capital investment which tends to lower the probability of getting illness
  – investment in preventive care services may increase the expected utility of the individual
Conceptual Framework

• investment decision depends on
  – the cost
    • individual’s health insurance status (positive)
  – the depreciation rate
    • age (negative)
  – the individual’s subjective discount rate
    • the discount rate (negative)
Conceptual Framework

• Health demand model can be extended to include health information (Kenkel 1990)
  – health information may affect individual’s perception to obtain preventive care services in the positive direction
Conceptual Framework

- In public health theory (Russell 1986),
  - either primary or secondary preventive care services are considered to lower the chances to catch serious illness and prevent subsequent utilization of medical services such as inpatient services
Data

• the 2003 administrations of the Health and Living Status of the Middle Aged and Elderly Survey in Taiwan
  – Taiwan Provincial Institution of Family Planning and the Population Studies Center of University of Michigan
Data

• This dataset
  – includes all non-institutionalized and institutionalized elderly people and is nationally representative
  – contains demographic information and information about family structure, living arrangements, health information, medical care utilizations, social support and exchange, work, retirement, mental status, economic condition and utilization of elderly social welfare programs
Sample Description

- the proportion of interviewees to utilize inpatient services is 17% while the proportion of interviewees to utilize preventive care services is 32.5% in our sample.
- Interviewees with knowledge in preventing kidney diseases are 47.6%; in the symptoms of diabetes is 31.5% and in preventing high blood and diabetes by dietary control is 58.8%. Interviewees with regular exercises are covered about 63%.
- the average age of the interviewees is 67.16 years old, about 56% is aged above 65.
- male is made up of 49.6% and about 69.4% of those surveyed had spouses.
- sample size is 4,548.
Empirical Model

• since endogeneity maybe presented in the case that the unmeasured severity of illness may both affect the utilization of preventive care and inpatient services
  – we construct a recursive simultaneous model to avoid this problem (Chen et al. 2007)
Empirical Model

(1) \( Pr \)eventive = \( \beta_1 X_1 + \varepsilon_1 \),

(2) \( Inpatient = \gamma_1 Pr \)eventive + \( \gamma_2 X_2 + \varepsilon_2 \)

\[ [\varepsilon_1, \varepsilon_2] \sim BVN\left[ (0, 0, \sigma_1^2, \sigma_2^2, \rho) \right] \]

• \( \varepsilon_1 \) and \( \varepsilon_2 \) are assumed to be correlated across the two equations
• \( \sigma_1 \) are \( \sigma_2 \) standard deviation
• \( \rho \) is the correlation coefficient of the two error terms
Empirical Model

where

– Preventive is a dichotomous variable indicating whether or not the individual received preventive care services

– Inpatient is whether or not the individual received inpatient care services

– Xs are vectors of explanatory variables including health information, demographic information, health status etc.
Empirical Model

• There are four models present in this study
  – in the first model, I utilize health status as the controlling variables
  – the second model adds limitations in activities of daily living (ADLs) as additional controllers
Empirical Model

• because self-reported “health status” is subjective and may cause biased results
  – in the third model, health status was replaced with chronic illness status i.e. specific health conditions such as hypertension, heart disease and stroke etc.
  – and the fourth model adds ADLs as additional controllers
  – other explanatory variables are the same in all models
Estimation Results

• the preventive care services utilization
  – We find that when individuals know the information of how to prevent kidney disease; how to prevent high blood pressure and diabetes by dietary control and have regular exercises, they tend to have a significantly positive likelihood of receiving preventive care services
Estimation Results

- aged above 65 years old is found to have a significantly positive likelihood of receiving preventive care services
- individuals with no other types of insurance tend to have lower chance to utilize preventive care services and so does the one who faces the most serious economic hardship in life
Estimation Results

• the utilization of preventive care services on the likelihood of obtaining inpatient care
  – we found that the utilization of preventive care services significantly decrease the likelihood of receiving inpatient care in all 4 models
  – the marginal effects of preventive care utilization on inpatient service utilization are 9.74%, 15% and 7.68% in model 1, 3 and 4
Conclusion and Discussion

• most of the factors we hypotheses to affect the utilization of preventive care services have the right signs
  – except for aged 65 years old or older ones
  • this result may indicate that as the accessibility of medical services increase, this may promote the utilization of preventive care services since NHI program provides free adult preventive care services for aged 65 years old or older every year
Conclusion and Discussion

• our findings of utilizing preventive care services reduce the probabilities of utilizing inpatient medical services also correspond to previous findings (Nakanishi and Tatara, 1998)
  – this provides good reference for government or policy makers to focus more on promotions of adult preventive care services
  – outreach strategies can be carried to promote the utilization of preventive care services
Conclusion and Discussion

– such as flyers and TV commercials or just through primary doctors
– future research can stress on analyzing the impact of outreach strategies on the utilization of preventive care services
  • this may provide good references on how to promote preventive care services efficiently
Conclusion and Discussion

some limitations

1. most of people in Taiwan do not utilize preventive care services directly but just use primary care services to do similar preventive care services when they feel uncomfortable

2. physicians may ask their patients to utilize preventive care services while patients are on the regular outpatient services
   – we can not measure this induced demand directly in the study

3. quality of care may affect the health outcome
   – this may affect the probability of utilizing inpatient services
Conclusion and Discussion

• in sum, promoting and increasing the utilization of preventive care services indeed needs to be carried on persistently
• hopefully, this may promote individuals healthier lifestyles, enhance their quality of life, and provides them early detection of illness
• further, by regularly preventive care service utilizations, we hope the medical resources can be managed more efficiently and possibly reduce the financial burden of NHI program in decreasing the probability of receiving inpatient care services
Thanks!