THE HOUSEHOLD INCOME ELASTICITY OF HEALTH CARE EXPENDITURES: AN EMPIRICAL EVIDENCE FROM TAIWAN

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ABSTRACT

Over the past three decades, a considerable number of empirical studies on the income elasticity of health care expenditures (HCE), and argued that HCE is a necessity good or a luxury good. However, most of previous studies are based on the country-level data. In this paper, we use the data of Taiwan's five equal divisions of household disposable income and consumption expenditures to investigate the income elasticity of HCE. Our results find that with the increase of household disposable income, the higher the income elasticity of HCE. This is, when household disposable income increases, the health care expenditure may be changed from a necessity into a luxury.

Keywords: Health care expenditure; Income elasticity; Luxury; Necessity; Household

1. INTRODUCTION

It is well known that have a strong positive relationship between health care expenditures (HCE) and GDP. Newhouse's (1977) study indicates that income is the most critical factor of health care expenditure and points that have a strong positive correlation between per capita medical expenditure and per capita GDP. This result has been repeatedly confirmed by subsequent studies.

Over the past three decades, there is a considerable number of empirical studies on the income elasticity of health care expenditures (HCE), and debated that HCE is a necessity good (see Gbesemete and Gerdtham, 1992; Blomqvist and Carter, 1997; Cerdtham et al., 1998; Hansen and King, 1996; Di Matteo and Di Matteo, 1998; Freeman, 2003; Di Matteo, 2003; Sen, 2005; Yu and Chu, 2007; Wang, 2009; Farag et al. 2012) or a luxury good (see Newhouse, 1977; Leu, 1986; Brown 1987; Parkin et al., 1987; Gertham et al., 1992; Hitris and Posnett, 1992; Murray et al., 1994; Hitris, 1997; Murthy and Okunade, 2000; Kiymaz et al., 2006; Ang, 2010). The economic definition of a luxury good is means an increase in income causes a bigger percentage increase in demand. It means that the income elasticity is greater than one. On the other hand, however, when income is reduced, it will also reduce the greater proportion of medical expenses.

Parker and Wong (1997) suggest that in the economic crisis period, lower-income households reduce health care expenditures by proportionately more than higher-income and insured households. Farag et al. (2012) also indicate that HCE is not only a necessity, but especially for low-income countries more so. Additionally, Getzen (2000) argues that, with insurance, individual health expenditure is a necessity good, and the national health expenditure is a luxury good. Yavuz et al. (2013) find that HCE is a neutral good in the long run, but the HCE is a necessity good in short run. Sen (2005) argues that most research using cross-country data and obtain income elasticity of HCE equal to or above one. These results might be come from omitted variables bias or some mis-specification. Leu et al. (2010) indicate that the income elasticity is not constant but varies with income levels. To sum up, those conclusion means the income elasticity of HCE may be differing with the economic situation, the method of the estimates and the time period are different.

In this paper, we use the data of Taiwan's five equal divisions of household disposable

income and consumption expenditures over the period 1995-2011 to investigate the household income elasticity of HCE. Our results find that with the increase of household disposable income, the higher the income elasticity of HCE. This is, when household disposable income increases, the health care expenditure may be changed from a necessity into a luxury. To the best of our knowledge, previous empirical literatures have very little attention to this direction. This study contributes to the literature by complementing this gap.

The remainder of the paper is organized as follows. Section 2 introduces the literature. Section 3 describes the data. Section 4 presents the empirical procedure, and results. Finally, Section 5 presents the conclusions.

2. LITERATURE REVIEW

2.1. Health care is a luxury good

Newhouse (1977) uses 13 developed countries data around 1972 to examine the relationship between country's medical-care expenditures and its income. Newhouse found that per capita medical expenditure in these countries can be explained over 90% by per capita GDP, and concludes that income is the major determinant in health care spending among countries. Furthermore, Newhouse also indicates the income elasticity of national medical expenditure is from 1.13 to 1.31.

Leu (1986) using cross-sectional data for 19 OECD countries for year around 1974 to examines the role of DGP and other non-income variables in health care expenditure, and found that income elasticity of health care expenditure ranging from 1.18 to 1.36.

Gerdtham et al. (1992) utilize a single cross-section of 19 OECD countries in 1987 to examine the determinants of aggregate health care expenditure. Their results indicate that per capita GDP can significantly to explain the HCE between countries and report that an income elasticity of 1.33.

Hitiris (1997) uses data for 10 OECD countries over the period 1960–1991 and finds that the income elasticity of health expenditure ranges from 1.142 to 1.165.

Ang (2010) investigates the dynamics relationship between long-run and short-run of the health care expenditures in Australia over the period 1960–2003. His study finds that the income elasticity for health care is greater than one, and suggests that health care is a luxury good in Australia.

2.2. Health care is a necessity good

Parkin et al. (1987) argues that these implications rely upon the application of microeconomic analysis to macroeconomic data is not appropriate. They using a cross-sectional data of 18 OECD countries based on Purchasing Power Parity(PPP) index in 1980 and found that an income elasticity of 0.90. This is implies that health expenditure is a necessity good.

Gbesemete and Gerdtham (1992) use a cross-sectional sample of 30 African countries in 1984 and reported that per capita GNP was the most significant factor in explaining per capita health expenditures but the elasticity was slightly less than one.

Di Matteo and Di Matteo (1998) utilize a pooled time-series cross-section data set for Canada's provinces over the period 1965–1991 to examine the determinants of real per capita provincial government health expenditures. They find that HCE has an income elasticity of 0.77 in Canada and conclude that health care is not a luxury good.

Sen(2005) using 15 OECD countries data over the period 1990–1998, and adopting two-way fixed effects model, and employing inclusion various demand and supply based determinants, the empirical results suggest that an income elasticity of health care between 0.21 and 0.51.

Di Matteo (2005) argued that ageing population and income explain a relatively small portion of health expenditures, and "time effect" is the most important determinant. His study concludes that "time effect" can be seen as a proxy for technological change and has strong explanatory power in real per capita health expenditures.

Farag et al. (2012) using a panel data for 173 countries over the period 1995–2006, and found that health care has an elasticity of income below one. Furthermore, they also found that health care spending is least responsive to changes in low-income countries and most responsive to in middle-income countries. This means that the low-income countries have relative lower income elasticity.

2.3. Health care is a mix normal good

Hitiris and Posnett (1992) used 20 OECD countries, 560 pooled time-series and cross-section data over the period 1960–1987. Their results indicate that strong and positive correlation between per capita health spending and GDP, namely, GDP is an important determinant of health spending, while estimated the income elasticity equal to or around unity.

Parker and Wong (1997) examining the data of Mexican National Survey of Income and Expenditures of 1989. Their empirical results show that, with insurance, the income elasticity of household is 0.795(the lower-income 50%) and 1.2(the upper-income 50%); and with un-insurance, the income elasticity of household is 1.6(the lower-income 50%) and 0.959(the upper-income 50%). This is shows that health care expenditures by Mexican households, particularly, are more sensitive to changes in the lower-income uninsured group. Simultaneously, this also implies that the property of the health care expending differ with the economic situation.

In addition, Getzen (2000) argues that the issue over whether health care is or is not a luxury good is because of failure to distinguish clearly variation within groups from variation between groups. Leu et al. (2010) indicate that the income elasticity is not constant but varies with income levels.

3. DATA AND METHODLOGY

In this paper, we use the data of Taiwan's five equal divisions of household disposable income (HDI) and consumption expenditures are released by the Directorate-General of Budget, Accounting and Statistics (DGBAS) of Taiwan to investigate the household income elasticity of HCE. The range of households income from lowest to highest are divided into five equal parts, has 20% of households in each part. In addition, we use the average household HCE as the dependent variable for each part, and the average household disposable income(HDI) as the explanatory variables. Simultaneously, we establish five regressions and adopt the OLS method to estimate the income elasticity of HCE between different household groups. The purpose of this paper is to estimate the household income elasticity of health care expenditures in Taiwan.

We use a regression approach as follows:

$$\ln HHCE_{i,t} = \beta_0 + \beta_1 \ln HDI_{i,t} + \beta_2 \ln HHCE_{i,t-1} + \varepsilon_{i,t}$$

where $HHCE_{i,t}$ is per capita health care expenditures; $HDI_{i,t}$ is per capita household disposable income; $HHCE_{i,t-1}$ is the per capita health care expenditures of period t-1, we think that $HHCE_{i,t}$ and $HHCE_{i,t-1}$ are closely related; and $\varepsilon_{i,t}$ is the error term.

4. EMPIRICAL RESULTS

We use a simple time-series of statistical methods and attempt to depict the shape of the income elasticity of HCE between different income households. In addition, we employ Durbin-Watson statistics to test the problem of autocorrelation, and utilize AR (1) to amend. As table 1 shown, we find that the income elasticity is 0.45 of HCE in the lowest-income household, the Second-income is 0.61, the third-income is 1.09, the fourth-income is 1.07 and the highest-income is 1.34. That is, different groups of households with different income elasticity. Meanwhile, with the increase in household income, the income elasticity has an increasing trend. This result is consistent with our expectations.

Average disposable income per household of each fifth					
	Lowest-income	Second-income	Third-income	Fourth-income	Highest-income
Elasticity	0.448	0.606	1.093	1.070	1.341
t-Statistic	2.829	2.133	4.398	2.018	3.390
Prob.	0.014	0.053	0.001	0.065	0.006
R-squared	0.955	0.962	0.988	0.972	0.991
Adjust R-square	0.948	0.956	0.984	0.967	0.988

Table 1 Summary statistics

Liu el al. (2010) argue that the income elasticity is not constant but varies with income levels. Farag et al. (2012) indicate that low-income countries present a relatively lower elasticity among observed countries. Parker and Wong (1997) also point that the difference of the income elasticity between Mexican household groups. Our empirical results suggests that the relatively low elasticity of HCE resulting in lower income households. However, different from Parker and Wong (1997), our household classified data are from the official statistics.

This is just an initial regression results, not a final conclusion, this study still need some modification. However, we believe and expect that with different incomes, the income elasticity is also different.

5. CONCLUSIONS

During the past three decades, a lot of empirical studies on the income elasticity of health care expenditures (HCE), however, most of previous studies are based on the country-level data. In this paper, we use the data of Taiwan's household disposable income and consumption expenditures data to investigate the household income elasticity of HCE.

Our initiative results find that health care is a necessity in the household of the lowest-income and the second-income, but health care is a luxury in the household of third-income, the fourth-income and the highest-income. Furthermore, we also find that the income elasticity rise as household disposable income increases, the HCE may be changed from a necessity into a luxury.

This result is similar to Farag et al. (2012) that low-income countries have a relatively lower elasticity among countries, but in the same country comparison of the different groups of households, and supports Leu et al. (2010) that the income elasticity is not constant but varies with income levels. To the best of our knowledge, previous empirical literatures have very little attention to this direction. This study contributes to the literature by filling this gap.

It is expected that different groups may regarded HCE as a necessity or a luxury. However, when a people with the income increases, and is willing to spend more income ratio in health care, which implies that the use of medical resources is relative inadequate in lower income people(or groups). This study, the empirical method may still needs to amend, but to convey a national health care policy must focus more on lower income groups is the major purpose of this paper.

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