

The Health Care Expenditure and National Income: The Malaysian Case

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Abstract This paper explored the determinants of health care expenditure using the demand side factors focusing the case study in Malaysia from 1981 to 2010. A seven-independent variable model is formulated with national income as one of the independent variables. The analysis began with the Augmented Dickey Fuller Test, followed by the cointegration test as well as the Vector Error Correction Modeling. The Augmented Dickey Fuller test revealed that the variables were stationary at first difference. The cointegration test showed the existence of long run relationship between the variables. The main findings in this study implied that the proportion of population aged below 15 and real GDP per capita were found positively significant in explaining the changes in real health care expenditure per capita. However, the result of Vector Error Correction Model estimation showed there was no short-run relationship between all the variables. Moreover, there was uni-directional Granger causality running from real GDP per capita to real health care expenditure per capita but not vice versa. Thus, the evidence for Malaysia clearly supported “The Income View” over “The Health View”. In short-run, health care expenditure was found to be an inferior good. However, the income elasticity of real health care expenditure per capita was found to be greater than one in long-run, meaning health care expenditure was a luxury good in Malaysia.

Keywords Cointegration, Causality, Health, National income, Income elasticity, Malaysia

1. Introduction

Malaysia's health care is a mix of public and private system. The health care system operates together with strong involvement of public sector which is heavily subsidized by the government. The total revenue collected from public health care user charges was only 4 percent of government's health expenditure, indicating a huge subsidy by the Malaysian government[1]. Both public sector and private sector of health care are still expanding. Health care services provided by the public sector are enjoyed by the majority of Malaysian population. According to the World Health Organization, Malaysia's health system was ranked 49th out of the 191 member countries.

Health care expenditure in Malaysia has increased since independence but this figure, as a percentage of GDP, is still very low. According to Malaysia National Health Accounts, the public private health care expenditure was only 4.2 percent (2007) and 4.7 percent (2008) respectively. The recorded figure was lower than the percentage of total health care expenditure over GDP of a lower middle income country of which is at 4.8 percent.

However, the allocation of health care expenditure per

capita in Malaysia was US\$350 (2009), the second highest in ASEAN[2]. Despite the low spending on health care, Malaysia's health care system as a whole had performed commendably. Reference[1] noted Malaysia as among the ASEAN countries with largest improvements in the health sector. The improvement was majorly due to Malaysia had an excellent system of public hospitals, with well-equipped general hospitals serving to a wide network of smaller but effective district hospitals all over the county. These public hospitals were heavily subsidized by the government[3].

At present, the government expenditure is 56.4 percent of total expenditure and the balance being covered by private sector, health insurance and out-of-pocket spending. Ministry of Health Malaysia claimed that the public health care spending was higher than private health care spending. The share of private health care spending began to increase from 1981 at 7.6 percent and then rising fairly rapidly to 30.6 percent (2004). Since then, the share of public-private health care in Malaysia has reversed. This scenario was aligned when the privatization wave took place.

The privatizing policy is aimed to achieve objectives include relieving the financial and administrative burden of the government, to increase efficiency and productivity, to foster economic growth, as a form of reduction in the size and presence of public sector in the economy and also to assist the reaching of national development policy targets.

The growth of private health care complements the government's health care system. It is crucial as growth in

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private sector has relieved some pressures on health care services provision to Malaysian people. In the Seventh Malaysian Plan (1996-2000), it was highlighted that “*the government will gradually reduce its role in the provision of health services and increase its regulatory and enforcement functions. A health financial scheme to meet health care costs will also be implemented. However, for the low income group, access to health services will be assured through assistance from the government...*” This allowed the government to concentrate on providing more to the poor.

However, subsidies allocated for Malaysians who could not afford private insurance or whose employers are unable to pay the costs of their favored treatment are often given to private payees. Thus, the underprivileged Malaysians began waiting long in line[4]. The expansion of health care provision by the private sector may worsen the services for the poor rather than improving them, due to the exclusion of middle class political support for health programs as they were excluded from it[5].

The increase of health care spending in Malaysia may not be solely contributed by privatization. The increasing proportion of elderly in the population, rising cost of medication and equipment, increasing demand of quality healthcare and changes in patterns of diseases will lead to a higher health care cost in the future[3]. According to Ministry of Health, changing disease patterns and the outbreak of SARS, avian flu within the year of 2001 to 2003 and also Influenza A (H1N1) in 2009 caused the hike in health care spending. The ever-rising demand for improved health services and different form of disease contributes to the expanding health care costs. Persistent urbanization was likely to increase developed-country illnesses, such as cancer, diabetes, respiratory, cardiovascular and nervous system diseases that will increase the demand for health care. Malaysia’s health care spending was estimated to rise from RM36 billion (2010) to RM62 billion by 2015[6]. Thus, it is crucial to ensure there is good health care system for citizens and sufficient financing for it.

Therefore, this paper aims to examine the causality between health care expenditure and national income in Malaysia using a time-series framework from the perspective of demand side factors. This study will contribute by showing the financing status of health care is a form of necessity or luxury in the context of Malaysia using time-series data.

2. Literature Review

The interactions between health care expenditure and national income draw ambiguous conclusions. Numerous studies were found using different types of data and different methods to get the empirical findings. Basically, researchers can use time-series data, cross-sectional data or combination of both time-series and cross-sectional known as panel or pooled data to conduct their studies. These different frameworks yield varying results. Reference[7] noted that

different results of income elasticity of health care expenditure were due to the failure to carefully specify the unit of observation. Therefore income elasticities measured on health care expenditure differs based on individuals, pooled group and national level. Estimates vary depending on the country’s sample, the time period and the analysis applied[8].

There were studies that concentrate on a group of countries; such as the OECD countries using the panel framework. Besides, there were also studies on other group of countries including Asian countries, European Union, Italian regions, oil-exporting countries, African countries, Asian-Pacific countries, developing countries and developed countries using both panel framework and cross-sectional framework. Studies using time-series framework include studies on Malaysia, Nigeria, Iran, United States, Turkey, India and South Africa

The understanding of determinants that influence the health care expenditure is important because these factors are strongly associated with the increase in the health care spending in a country for the next few decades. In this study, the causal link of the independent and dependent variable is identified to classify whether in Malaysia, health is economic-driven or the economy is health-driven.

In the cross-sectional framework, a number of studies have been conducted. Reference[9] examined the determinants of health care expenditure in 44 African countries. They studied on the cross-sectional data for the year 2001 using Ordinary Least Square (OLS) and Two-Stage Least Square (TSLS) method. They concluded that per capita real GDP and per capita real foreign aid were the two major determinants of health care expenditure. The non-income factors in this study were like persons per physician, percentage of population over 65 years and mortality per 1000 persons played a small role as determinants in health spending. In this study, health care was found to be a necessity in African countries. Similar studies were also carried out by[10]. The income elasticity of health care expenditure for African countries was barely 1.07 but for OECD, the elasticities range from 1.5 to 2.0.

Meanwhile,[11] found that the influence of health care expenditure growth was significantly different on countries with low level of economic growth when the economic growth was quantile. Countries with medium and high levels of economic growth, exceeding 5 percent would have positive influence of health care expenditure growth on economic growth. The panel quantile regression applied in this study had an advantage of providing estimated results of various quantiles under a change in economic growth.

In contrast,[12] examined the health-income relationship using panel smooth transition regression (PSTR) on 16 OECD countries over the period of 1993 to 2007. The results indicated the relationship between income and health expenditure as non-linear. The income elasticity for all members of OECD was more than 1 at value (exceeding 2.5). Health expenditure is therefore considered as a luxury good.

Reference[13] indicated health care expenditure and most of its determinants were non-stationary and linked in the long-run. Their study concentrated on 20 OECD countries from the year 1971 to 2004. The result from the analysis showed health care as a necessity rather than a luxury with an elasticity much smaller than estimated in other OECD studies. For non-income determinants, percentage of young people explains variation of health care expenditure.

On the other hand,[14] found no evidence on capital formation through health care expenditure in his study on 21 OECD countries over the period of 1970 to 2005. His findings indicated there was no evidence found on the rise in life-time expectancy Granger cause per capita GDP growth in a positive sign. Instead, his results pointed to a reverse causality from economic growth to health. He proposed three possible explanations for why there was no positive Granger causality from health to income; first, the growth effects of shocks to health capital formation were short-termed. Second, the relevant time lags were too long for the analytical framework used in the study. Third, it was because health was mostly viewed from a welfare point of view and not for the economic returns. His paper clearly favored "The Income View" over "The Health View".

Reference[15] performed a study to identify the link between health care expenditure to GDP and quality of Life (QoL) on 5 ASEAN countries; Malaysia, Singapore, Thailand, Philippines and Indonesia from 1981 to 2005. The authors used GDP and health care expenditure to measure the quality of life and applied the Granger causality test to the the direction of causality between GDP and health care expenditure. The results found that there was existence of unidirectional Granger causality running from GDP to government health care expenditure for in Malaysia and Singapore. On the other hand, Thailand and Indonesia showed a bidirectional Granger causality of GDP and health care expenditure. It concluded that economy performance is important in determining quality of life.

Reference[16] used data from 21 Sub-Saharan African countries over the period of 1975 to 1994 and 22 OECD countries over the period of 1961 to 1965 to test on the effects of human capital on the growth rate of per capita income. They found the marginal effect of positive relationship between health human capital and the growth rate per capita income eventually diminishes. Health human capital investment yields positive correlation with per capita income growth for both Sub-Saharan African countries and OECD countries. This statement was agreed by[17] as their study found health to have a positive and statistically significant effect on economic growth.

In contrast,[18] indicated there was no long term relationship between health spending in the OECD countries from of 1960-1987. The results of the study also suppressed the concern on the presence of unit root in models of HCE_GDP.

Apart from OECD countries, there were studies that apply panel approaches concentrating on different set of

countries.[19] examined the determinants of health care expenditure in the Italian regions from year 1980 to 2007. The authors used the model selection procedure and panel methodologies including Generalized Least Square-Fixed Effects (GLS-FE) and Generalized Method Moments (GMM) estimators in the study. The GSP, the unemployment rate, the number of beds in community hospitals, urbanization degree and the population with at least junior high school degree were found to have direct impact on the real health care outlay. Meanwhile, the ageing index, mortality rate, birth rate and the resident population for generic physicians were insignificant.

A study by[20] concentrated on the determinants of health care expenditure on 143 developing countries from 1995 to 2008 using standard fixed effects and dynamic models. Variables used in this study were total health care expenditure, general government expenditure on health and out-of-pockets payment. The results indicated higher income countries have higher total of health care expenditure. Besides that, higher income countries also have higher government expenditure on health but lower out-of-pocket expenditure on health. It showed that higher income countries devote more government budget share to health.

Reference[21] used panel data to identify the determinants of health care expenditure in twelve Asian countries for the period of 1995 to 2008. In the study, income, ageing population and government expenditure on health were the indicators of health expenditure. The study found income and population aged 65 and above have significant, positive relationship with health care expenditure. This indicates higher income country and countries with high ageing population will have higher amount of health care expenditure.

Reference[22] used panel data of the year 1993 to 2004 and two-stage estimation procedure to examine the determinants of health care expenditure in a decentralized health care system as a case study in Finland. The authors concluded that the differences in municipal total health expenditure were mainly explained by shares of elderly, the employment-to-population ratio, the rate of disability pensions, the municipal tax rate, the NHI reimbursements of prescription medicines and private dental care, income and population density. The measures of income elasticity were small, indicating the public health care is a major necessity in Finland.

Time series approach was much appropriate for policymakers to formulate effective policies for specific country. Reference[23] used time series data from 1975 to 2005 to find the determinants of public health care expenditure in Zimbabwe. The study applied Eagle-Granger cointegration technique and the results indicated real GDP per capita income, literacy rate, inflation and foreign health aid per capita were the key determinants in the explanation of the public health care expenditure. Population and life expectancy, however, were statistically insignificant.

Reference[24] employed the Granger causality within a

multivariate cointegration and error correction framework to examine the relationship time-series relationship between health spending, income and relative price in Malaysia from 1970 to 2009 in Malaysia. The findings indicated there is a uni-directional Granger causality running from relative price to health spending and bi-directional Granger causality between relative price and income growth in the short-run. In the long-run, health spending and income Granger caused each other but there was a uni-directional Granger causality running from relative price to health spending and income in Malaysia. The author concluded with health spending playing a vital role in promoting long-term economic development in Malaysia.

3. Data and Methodology

The dependent variable in this study was the real health care expenditure per capita (HCE). Seven variables were used in explaining HCE: proportion of population aged below 15 (POP15), total fertility rate (TFR), proportion of population aged 65 and above (POP65), crude death rate per 1000 person (CD), total tertiary school enrollment (EDU), real GDP per capita (GDP) and total number of person unemployed (TUN). The data for both health care expenditure and GDP series were in nominal terms. The GDP deflator and the population size were employed to convert the HCE and GDP into real HCE per capita and real GDP per capita terms. The total of tertiary school enrollment was used as a proxy of educational degree. The unemployment rate (TUN) was also included in the model to capture the impact of social condition. All the independent variables introduced in the model attempts to examine the impact of demand towards the health care expenditure.

Due to the availability of data, the time frame of this study focused from the year 1981 to 2010 with a sample duration of 30 years. With regard to the data collection, the data was extracted from the World Development Indicator (WDI) and Global Development Finance (GDF), Statistical Database System of Asian Development Bank, Economic Planning Unit, Department of Statistics, Malaysia, RHB Research Institute Sendirian Berhad and Kementerian Pengajian Tinggi.

4. Findings and Discussion

Since OLS estimation produced spurious regression, Johansen Cointegration method was used to determine the long-run relationship between the variables. The Normalized Cointegrating Coefficients to determine the log-run equilibrium between real health care expenditure per capita with proportion of population aged 65 and above, proportion of population aged below 15, total fertility rate, crude death rate per 1000 person, total tertiary school enrolment as the proxy of education, real GDP per capita and total of people unemployed.

The estimated t-value for proportion of population aged 65 and above (-5.85537), proportion of population aged below 15 (2.65256), total fertility rate (-4.42917) and real GDP per capita (3.32206) were greater than the critical value |1.717| at 5 percent significant level. Thus, the null hypothesis was rejected indicating population aged 65 and above, proportion of population aged below 15, total fertility rate, and real GDP per capita were significant in explaining the changes in real health care expenditure per capita in the long-run.

Meanwhile, education level (-0.53346), crude death rate per 1000 person (-1.55270) and total of people unemployed (0.72026) showed estimated t-value lower than the critical value |1.717| indicating education level and total of people unemployed were not significant in explaining changes in real health care expenditure per capita in the long-run.

In the model, the coefficient of LOG (GDP) variable can be interpreted as an estimate of the income elasticity of real health care expenditure per capita. Income elasticity of a good between zero and 1 is a necessity good whereas income elasticity of a good greater than 1 is a luxury good. The income elasticity of demand for real health care expenditure per capita of 4.580421 was more than 1. This implies more spending on health is due to increase in income. Therefore, health care expenditure is a luxury good.

Proportion of population aged 65 and above, total fertility rate, death crude rate per 1000 person and total tertiary school enrolment as a proxy of education were found to have a negative relationship with real health care expenditure per capita. The negative relationship of proportion of population aged 65 and above and real health care expenditure per capita was against the popular perception of ageing population leads to increase in health care expenditure. Reference[25] found that the proportion of population aged 18 to 64 to be responsible for more of the age-related increase than the proportion of 65 to 74. Moreover, the author mentioned that the key source of age-related health expenditure growth was the proportion of population aged 75 or more.

Again, contrary to previous hypothesis and arguments, the total fertility rate was found to have a negative relationship with health care expenditure. This suggested that more emphasis was placed to enhance the quality of health. This can be seen through the amount spent on individuals in improving their quality of life although the total fertility rate is showing a decline, signifying their optimal health expenditures are now larger.

Next, the negative sign of crude death rate per 1000 person suggested that higher investment towards health care expenditure increases the lifespan and health condition, reducing the death rate. Thus, the drop in the numbers of crude death rate per 1000 person was sustained through the increase in health care expenditure on medical aids, health products and services, health insurance and others. Meanwhile, the negative relationship between total tertiary school enrolment (as a proxy of education level) and real health care expenditure per capita implied that individuals with higher education level were more health conscious.

Thus they portray a healthier behaviour and lifestyle reducing their health care expenditure.

In contrast, the proportion of population aged below 15, real GDP per capita and total of people unemployed have a positive relationship with the real health care expenditure per capita in the long run. The positive sign of the proportion of population aged below 15 raised the health care expenditure as this group of individuals needed more health attention such as vaccination and immunization, medical attention due to sickness and accidents and also health care supplements to ensure they grow up healthy.

In a larger scale, countries with higher real GDP per capita also incur higher health care expenditure as these countries value health care more highly. So they usually spend larger amounts of money to maintain their human health, as assurance towards the quality of the countries' human capital. Apart from that, the positive relationship of total of person unemployed and health care expenditure suggested that the absence of job prospects will lead to adverse impact on health behaviour. This will raised the amount of health care expenditure as ill-health caused the demand for health care to increase.

All the error correction term 1, 2, 3 and 4 showed the estimated t-value of -0.183468, -1.625460, 1.470255, -1.617256 were smaller than the critical value $|1.717|$ at 5 percent significant level respectively. This indicated there was no existence of short-run relationship between dependent variable and all the independent variables. All the variables were found to be insignificant in explaining the changes in real health care expenditure per capita at 5 percent significance level.

However, the coefficient of $D(\text{LOG}(\text{GDP}(-1)))$ variable can be interpreted as an estimate of income elasticity of real health care expenditure per capita. The income elasticity of demand for real health care expenditure per capita of -1.414138 was less than 1. This implies that the rise in income reduced health care spending. The negative income elasticity of real health care expenditure per capita indicated health care expenditure was an inferior good in short-run.

Moreover, the F-statistic for the null hypothesis $\text{LOG}(\text{GDP})$ does not Granger Cause $\text{LOG}(\text{HCE})$ was 6.21500 with a p-value of 0.0194. Thus, the null hypothesis was rejected as the p-value is less than the 5 percent significance level. Real GDP per capita does Granger Cause real health care expenditure per capita. This indicated the direction of causality was running from real GDP per capita to real health care expenditure per capita.

Meanwhile, for the null hypothesis of $\text{LOG}(\text{HCE})$ does not Granger Cause $\text{LOG}(\text{GDP})$, the F-statistic was 0.00420 with a p-value of 0.0948. Hence, the null hypothesis was accepted as the p-value was higher than the 5 percent significance level. The results suggested that the impact of real health care expenditure per capita towards per capita national income was statistically insignificant. So, this indicates that there is no direction of causality running from real health care expenditure to real GDP per capita.

According to [26], this finding can be due to low productivity of inputs, investments and facilities inefficiency in the health sector.

This study supports "The Income View", indicating only one way or unidirectional causality towards real health care expenditure per capita determined by the national income. The results further prove that rising per capita income will lead to an increase in health care spending and improving health position. The findings supported the study conducted by researchers like [9],[10],[15] and [23] involving developing nations like Africa and Thailand. The findings does not support the study conducted by researchers [11] and [12] in developed nation or countries with high economic growth. Therefore it can be concluded that in developing nation or countries with low economic performance health care is still a luxury good supporting the income view unlike in developed nation with high economic performance it is considered as a necessity supporting the health view.

5. Conclusions

The findings of this study showed positive relationship between health care expenditure and national income in the Malaysian economics, in line with the existing literature on positive relationship between health care expenditure and national income. This relationship further supported "The Income View" as one-way causality was found; national income determines health care expenditure. This result supported income as a function of health care as proposed by [27]. However, health care expenditure was found not determining national income in Malaysia in this study.

Apart from that, proportion of population aged below 15 was the only variable that is positive and significantly influencing real health care expenditure per capita. This implies the health care consumption of this age group is high as they demand more medical and health attention in ensuring they grow healthily.

Health care in Malaysia was revealed as a luxury good in the long-run whereas it was an inferior good on the short-run. It should be emphasized that health care being a luxury good and inferior good is not a good phenomenon as this shows health care is not affordable by the poor although health is a form of necessity. So, the recommendations including minimizing the inequality of distribution of health care among people in Malaysia, improving the management n of public health service, providing cost-effective health care and promoting the importance of health care and health care information to Malaysian society should be considered in order to ensure at least primary health care services is reachable by all, regardless their financial status. The findings of this study would help policymakers to make a better judgment on the magnitude of real health care expenditure per capita in coming years, using a forecast of trend in national income.

Generally, Malaysia's Vision 2020 and Dato Seri Najib Tun Abdul Razak's mission of Malaysia becoming a

high-income country can only be realized with good health status and effective health policy. 1Care for 1Malaysia under the Tenth Malaysia Health Plan is the health sector strategic direction planned to improvise the public health sector in Malaysia. “A healthy nation is a wealthy nation” can be truly reflected as high capacity knowledge to nurture economic growth begins with health.

This study was looking at the macroeconomic perspective and provides only a general idea of the relationship between health care expenditure and its determinants. The results obtained in this study were country-specific and based on the case of Malaysia. Thus, the findings and policy recommendations should be interpreted cautiously as they may not be suitable or generalized for other countries. In order to obtain more effective result, a longer data set should be employed. Next, in future, it would be better that the supply side factors of health care expenditure such as technological and medical progresses, human capital to capture the determinants of health care expenditure wholly for both the demand side and supply side factors that ensure a more complete analysis.

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