Available online at www.jeeir.com

JEEIR

e-ISSN: 2289-2559

Journal of Emerging Economies & Islamic Research 6(3) 2018, 1 – 14.

Journal of Emerging Economies and Islamic Research

Empirical analysis of factors influencing the public health expenditure in Malaysia

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ARTICLE INFO

Article history:
Received 15 May 2018
Received in revised form
24 July 2018
Accepted 6 August 2018
Published 30 September 2018

Keywords:
Autoregressive distributed lag
Public health expenditure
Time series analysis
Wagner's law

ABSTRACT

This study aims to investigate the determinants of public health expenditure in Malaysia. An Autoregressive Distributed Lag (ARDL) approach proposed by Pesaran & Shin (1999) and Pesaran et al. (2001) is applied to analyse annual time series data during the period from 1970 to 2017. The study focused on four explanatory variables, namely per capita gross domestic product (GDP), healthcare price index, population aged 65 years and above, as well as infant mortality rate. The bounds test results showed that the public health expenditure and its determinants are cointegrated. The empirical results revealed that the elasticity of government health expenditure with respect to national income is less than unity, indicating that public health expenditure in Malaysia is a necessity good and thus the Wagner's law does not exist to explain the relationship between public health expenditure and economic growth in Malaysia. In the long run, per capita GDP, healthcare price index, population aged more than 65 years, and infant mortality rate are the important variables in explaining the behaviour of public health expenditure in Malaysia. The empirical results also prove that infant mortality rate is significant in influencing public health spending in the short run. It is noted that macroeconomic and health status factors assume an important role in determining the public health expenditure in Malaysia and thus government policies and strategies should be made by taking into account of these aspects.

1. Introduction

Good health and well-being is one of the sustainable development goals (SGDs) or global agenda introduced by the United Nations in September 2015 to replace the millennium development goals (MDGs) begun from 2016 to 2030. Good health is essential to improve the quality of life. According to the World Health Organization (WHO), health is defined as the perfection of physical, mental and social well-being

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and not just the absence of disease or weakness. In short, health can be defined as the ideal level to be achieved by an individual.

In general, Malaysia has two healthcare systems, namely the public and private health sectors. Based on the National Health Expenditure Report (MNHA) 1997-2016 issued by the Ministry of Health Malaysia (Figure 1), total health expenditure in Malaysia (including public and private sectors) for the period 1997-2016 was within the range from RM8,604 million in 1997 to RM51,742 million in 2016. The total health expenditure to Gross Domestic Product (GDP) ratio for the same period was from 3.05 per cent in 1997 to 4.21 per cent in 2016. Overall, per capita health spending in Malaysia has increased by 4 times over a period of 20 years, from RM395 in 1997 to RM1,636 in 2016.

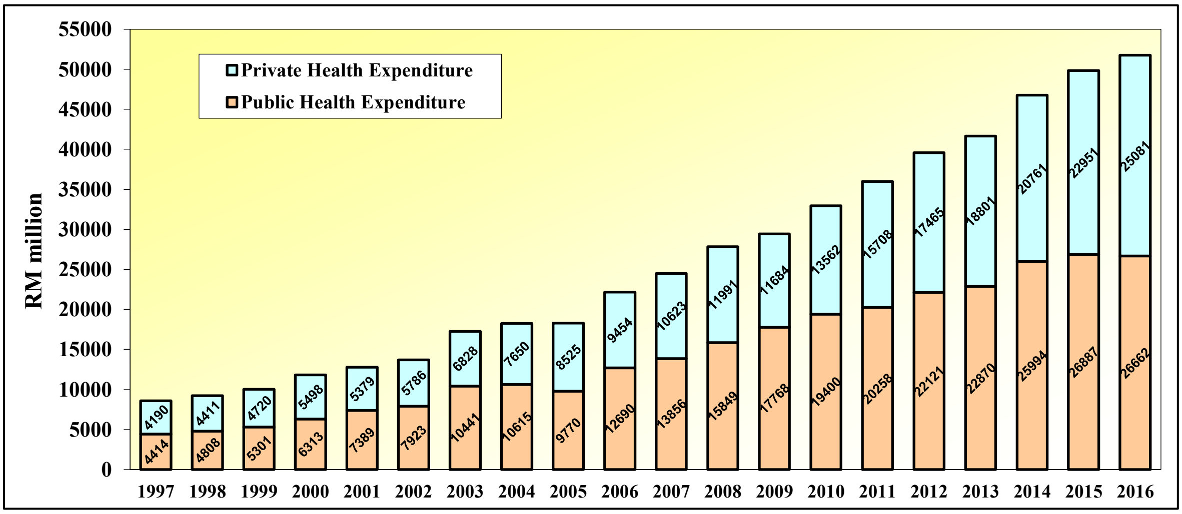

Fig. 1: Public and Private Health Expenditures in Malaysia, 1997-2016
(Source: Malaysia National Health Accounts, Ministry of Health Malaysia, 2017)

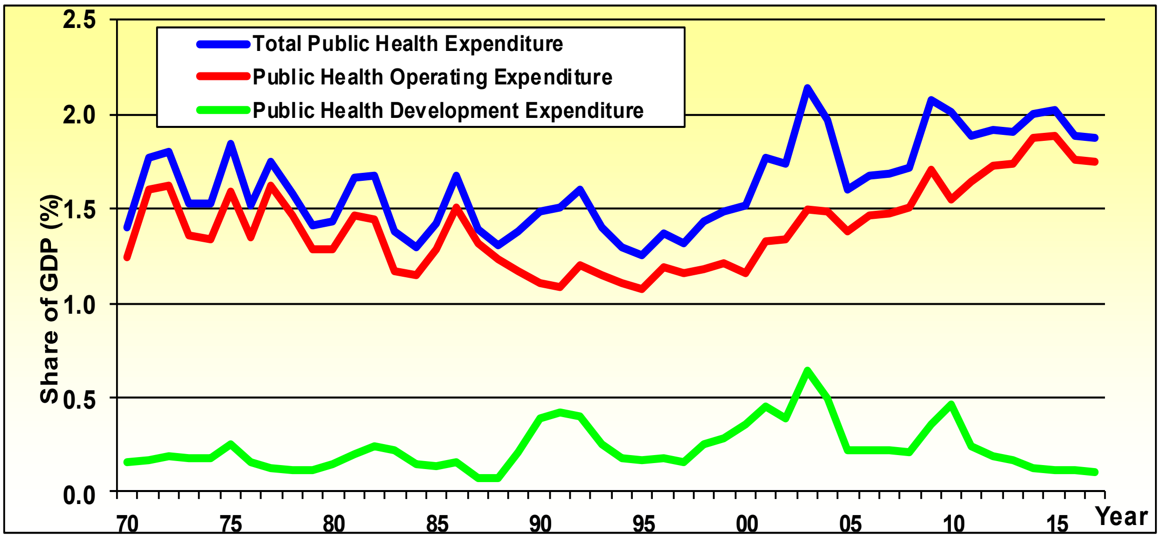

Fig. 2: Public Health Expenditure in Malaysia, 1970-2017
(Source: Ministry of Finance Malaysia, 2017)

To achieve a good and sustainable health status and to enable Malaysians to enjoy a high quality of life, the Federal Government of Malaysia has allocated a number of public spending budgets including operating and development expenditures to finance the health sector. However, this budget allocation is very small and minimal. Figure 2 shows the public health expenditure to GDP ratio is low, at an average of just 1.8 per cent for the past 48 years (1970-2017). The public health spending to GDP ratio fluctuated from 1.4 per cent (1970) to 1.9 per cent in 2017. During that period, the public health spending to GDP ratio had reached the highest level of 2.1 per cent in 2003 and 2009 respectively, while it has reached the lowest (1.2%) in 1995. In addition, it is found that the size of health operating expenditure exceeds five times greater than the size of health development expenditure, except in 1990-1993, 1998-2004 and 2009-2010.

With this background, the objective of this study is to analyse long-term and short-term factors affecting public health expenditure in Malaysia for the period of 1970 to 2017 using the Autoregressive Distributed Lag (ARDL) method. Identification of these determinants is crucial for Government policy makers to take appropriate measures including formulating policies and implementing programs that are more appropriate in developing the health sector in Malaysia. This article is divided into five sections. The next section covers literature review, research methodology, empirical result and conclusion.

2. Literature Review

Through literature reviews, there are two general approaches applied by previous researchers to explain the relationship between Government spending (expenditure size for the public sector) and economic growth. The first approach was the Keynesian theory (1936) which states that the expenditure is a key factor in generating economic growth. Government spending can affect the level of public consumption, productivity, factors of production, distribution and economic development. If public spending is planned efficiently, it will increase employment, productivity and national income. In addition, Keynes also stated that Government's spending is an exogenous variable. To prove his hypothesis, he takes into account the multiplier values of the Government spending and tax with respect to economic growth. His study found that the value of multiplier spending is greater than the tax effect in generating and stabilising economic growth. Hence, Government spending plays an important role throughout the business cycle.

For the second approach, the theory of the increase in Government spending growth was founded by a German economist, namely Adolph Wagner (1958). He introduced the Wagner law which considers Government's expenditure as an endogenous variable to economic growth. This law states that there is a natural tendency of various stages of Government's activity to intensively and extensively increase in economic growth. In his findings, the law says that Government spending growth is rising faster than economic growth. This is due to rising demand for the three categories of goods and services. First category is the ever increasing demands of regulation and protection. Besides, other important factors also include the increasing demand for social services (including education and health), defence and security as well as the demand for the effort to overcome the monopolistic activities embodied in the industrial sector that has a large-scale economy. Theoretically concerned, Wagner's law was created based on historical facts involving changes in public spending and long-term economic growth.

Empirical studies in developed countries have proven that national income (GDP per capita) is the key determinant factor in influencing health spending. For instance, previous studies in the developed countries of the Organization for Economic Cooperation and Development (Kleiman 1974; Hitiris 1977; Newhouse 1977; Leu 1986; Getzen 2000) proved the existence of Wagner's law where their studies found that the elasticity of per capita health spending on per capita GDP is greater than one, ranged from 1.20 to 1.50. However, it should be noted that regression models involving time series data sometimes give false or spurious results, or the value is dubious. In other words, it gives a fairly good result in the model but when it comes to further review, the previous result seems doubtful. For example, a weakness of the Hitiris study (1997) on the determinants of health spending in the 10 European Union countries for the period 1960 to 1991 is the study ignores the problem of non-stationary variables without doing unit root test. The same data was then reviewed by Roberts (2000) by conducting a unit root test and followed by a cointegration test. The review found that the income elasticity is less than one.

To our knowledge, there has been little research done on public health expenditure in Malaysia. Most of the previous studies involving Malaysia were conducted by Sinha (1998), Furuoka (2008), Tang (2009), Tang (2001), Hasnul (2015), and Lahirushan & Gunasekara (2015). These studies are more focused on the impact of public spending on national income and vice versa. The major obstacle of the research on public health expenditure in Malaysia is due to lack of sample size of data that can be obtained from the relevant authorities. Furuoka et al. (2011) has applied fixed effects and random effects to identify the determinants of public health spending for the period 1995-2008 in 12 selected Asian countries including Cambodia, China, Indonesia, Japan, Laos, Malaysia, Mongolia, the Philippines, Singapore, South Korea, Thailand and Viet Nam. The results of their study showed that GDP per capita and the percentage of the population aged 65 years and above are significant in influencing public health expenditure per capita in the 12 Asian countries. However, it is noted that the sample of the study is very small because the data obtained from the World Bank has only 14 years, so the long-term impact cannot be identified.

In order to address the shortage of health expenditure data, Tang (2010) has expanded the sample size of the 48 year research from 1960 to 2007 using the data obtained from the Ministry of Finance, Malaysia. The study applied the bounds test for cointegration and bootstrap simulation methods to examine the relationship between public health spending and Malaysia's true income. However, his research failed to prove public health spending and true income was cointegrated. Tang (2010) subsequently improved his research model by using the Johansen-Juselius cointegration method to investigate the determinants of public health spending in Malaysia for the period 1967-2007. The results of this study found that real per capita public health expenditure and determinants such as real per capita GDP, health price index and the ratio of the population aged over 65 years are cointegrated in the long run. However, the variables in his research model are limited as other variables that have a high impact on public health spending in Malaysia are not included. For instance, apart from determining factors such as national income, price index of health and ageing population, determinants of public health spending also depend on the quality status of health such as infant mortality rate. Theoretically, the need for health services will be reduced by improving the health status of the community. Lv & Zhu (2014) study has shown that infant mortality rate per 1,000 live births has a significant negative impact on public health spending for 42 African countries over the period 1995-2009.

Based on the literature review, all the determinants that have been discussed are important to influence the Government's expenditure in the health sector. Thus, the macroeconomic factor variables used in this study (Figure 3) are nominal per capita GDP (2010 = 100) as proxies to current income, while the health price index (2010 = 100) represents the health sector inflation rate. Besides, the population ageing variable represented by a population over the age of 65, and the infant mortality rate per 1,000 live births are proxies to the health status that may affect per capita public health expenditure in Malaysia. According to the conceptual framework, research hypotheses/questions can be summarised as follows:

H1: Long run and short run relationships between per capita public health expenditure and per capita GDP are significant and positive.

H2: Long run and short run relationships between per capita public health expenditure and health price index are significant and negative.

H3: Long run and short run relationships between per capita public health expenditure and population over the age of 65 are significant and positive.

H4: Long run and short run relationships between per capita public health expenditure and infant mortality rate are significant and negative.

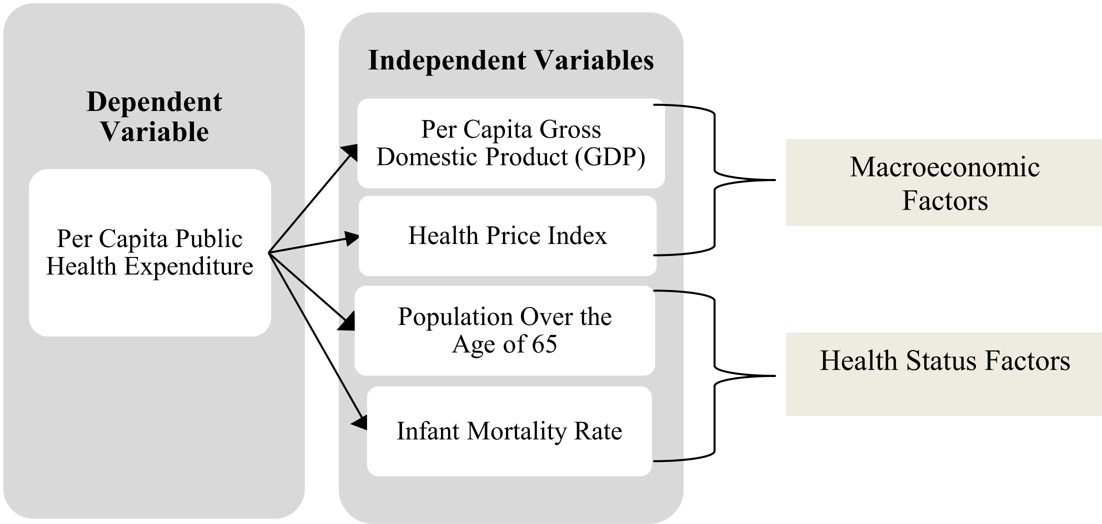

Fig. 3. Conceptual Framework

3. Research Methodology

The study employs Autoregressive Distributed Lag (ARDL) proposed by Pesaran and Shin (1999) and Pesaran et al. (2001) to estimate the determinants of public health spending. The ARDL method was chosen for three main reasons. Firstly, the bounds test procedure carried out in the ARDL approach is simple compared to other multivariate cointegration methods such as Engle & Granger (1987), Johansen (1988) and Johansen & Juselius (1990). This method allows the cointegration relationship to be estimated by the ordinary least squares (OLS) method as soon as the lag model is identified. Secondly, ARDL method does not require pre-test for stationarity (unit root test) to be done on variables in the model. It means that the cointegration test can be carried out regardless of the degree of stationarity of these variables on the level of integration I(0), I(1) or a combination of both. Thirdly, the ARDL method also has a non-biased, efficient and highly suitable nature for a small sample size or has a limited number of observations.

The data used in the study are secondary data covering the 48 year time series data, from 1970 to 2017. There are 48 observations in this study and it meets the time series requirements that allow at least 30 observations to ensure the results of the analysis are stable and accurate. These data are obtained from annual reports published by Malaysian Government agencies such as the Malaysian Economic Report, and time series data from the Department of Statistics, Malaysia. Since the objective of the study is to look at the determinants that affect public health expenditure in Malaysia, then a common function can be written as follows:

$$lnPCPHE = f\,(lnPCGDP,\ lnHPI,\ lnPOP65,\ lnIMR) \quad (1)$$

Total population in Malaysia is used to derive per capita terms. The natural logarithm transformation (ln) is used in this model to reduce the problem of heteroscedasticity in the regression model as well as to measure the elasticity of which is represented by the slope coefficients for each independent variable. Hence, multiple log-linear regression model (constant elasticity model) between the dependent variable with independent variables that can be formed in the following equation:

$$lnPCPHE_t = \beta_0 + \beta_1 lnPCGDP_t + \beta_2 lnHPI_t + \beta_3 lnPOP65_t + \beta_4 lnIMR_t + u_t \quad (2)$$

where $lnPCPHE_t$, $lnPCGDP_t$, $lnHPI_t$, $lnPOP65_t$ and $lnIMR_t$ are the natural logarithms of the per capita public health expenditure, per capita nominal GDP, health price index, population aged over 65 years and infant mortality rate, respectively. Meanwhile β_0 is a constant and u_t is an error term.

Equation (2) will be estimated using the ARDL model as proposed by Pesaran et al. (2001). Through the estimation of equation (2), the determinants that influencing public health spending can be identified. Basically, the ARDL approach does not require a unit root test to be performed on all variables in advance. It means that the cointegration test based on the ARDL approach can be directly applied regardless of whether all variables are reaching stationarity in the form of I(0), I(1) or a combination I(0) and I(1). However, this study still conducts a unit root test to ensure stationarity of each variable is not at stage I(2). Therefore, to test the presence of the unit root in a time series, the Phillip-Perron (PP) test was used for this study.

Next, to estimate the ARDL model, there are three steps that must be followed. The first step is to estimate the long run relationship (cointegration) among the time series variables. Besides that, equation (2) needs to be written as the Unrestricted Error Correction Model (UECM) as follows:

$$\Delta lnPCPHE_t = \theta_1 + \pi_1 lnPCPHE_{t-1} + \pi_2 lnPCGDP_{t-1} + \pi_3 lnHPI_{t-1} + \pi_4 lnPOP65_{t-1} + \pi_5 lnIMR_{t-1} + \sum_{i=1}^{p} \lambda_1 \Delta lnPCPHE_{t-i} + \sum_{i=0}^{q} \lambda_2 \Delta lnPCGDP_{t-i} + \sum_{i=0}^{r} \lambda_3 \Delta lnHPI_{t-i} + \sum_{i=0}^{s} \lambda_4 \Delta lnPOP65_{t-i} + \sum_{i=0}^{t} \lambda_5 \Delta lnIMR_{t-i} + \varepsilon_{1t} \quad (3)$$

where Δ is the first difference operator, (p, q, r, s, t) is the optimum lag and ε_t refers to the error term. To identify the existence of a long run relationship between the variables in equation (3), the null hypothesis and alternative hypothesis is tested using the F-statistical test as follows:

H_0 : There is no cointegration : $(\pi_1 = \pi_2 = \pi_3 = \pi_4 = \pi_5 = 0)$
H_1 : There exists cointegration : $(\pi_1 \neq \pi_2 \neq \pi_3 \neq \pi_4 \neq \pi_5 \neq 0)$

If the computed value of the F-statistic exceeds the upper bound critical value, the null hypothesis should be rejected, which describes a significant long run relationship (cointegration) among the time-series variables. Conversely, if the F-statistic value is estimated less than the lower bound critical value, then the null hypothesis failed to be rejected. In addition, if the computed F-statistic value is between the critical values of the lower and upper bounds, then the result is inconclusive. It cannot be identified whether there is a cointegration or not because the degrees of integration of the explanatory variables are unknown. However, if there is no cointegration between the variables, the direction of causality can be done using the vector autoregressive model (VAR) in the first difference, I(1).

Having confirmed the existence of cointegration, then the second step is to estimate the long run ARDL (p, q, r, s, t) conditional model as follows:

$$lnPCPHE_t = \theta_{11} + \sum_{i=1}^{p} \pi_{11} lnPCPHE_{t-i} + \sum_{i=0}^{q} \pi_{22} lnPCGDP_{t-i} + \sum_{i=0}^{r} \pi_{33} lnHPI_{t-i} + \sum_{i=0}^{s} \pi_{44} lnPOP65_{t-i} + \sum_{i=0}^{t} \pi_{55} lnIMR_{t-i} + \varepsilon_{11t} \quad (4)$$

In the last step, the short run ARDL model should be estimated taking into account the error correction term (ECT) that derive from long run model estimation. The error correction model (ECM) can be expressed as the following equation:

$$\Delta lnPCPHE_t = \theta_{111} + \varphi_2 ECT_{t-1} + \sum_{i=1}^{p} \lambda_{111}\, \Delta lnPCPHE_{t-i} + \sum_{i=0}^{q} \lambda_{222}\, \Delta lnPCGDP_{t-i} + \sum_{i=0}^{r} \lambda_{333} \Delta\, lnHPI_{t-i} + \sum_{i=0}^{s} \lambda_{444}\, \Delta lnPOP65_{t-i} + \sum_{i=0}^{t} \lambda_{555}\, \Delta lnIMR_{t-i} + \mu_{111t} \quad (5)$$

In equation (5), the ECT coefficient value can explain two things. First, it measures the speed of adjustment in the direction of long-term balance, which is the time taken by the explanatory variables to converge towards a long run equilibrium. Second, the ECT can also explain the direction of long run causality among independent variables against dependent variable.

4. Empirical Results

The Phillip-Perron (PP) test results of each variable are as reported in Table 1. PP test is used as it allows milder assumptions against error distribution. Furthermore, the test controls for higher serial correlation and is robust against heteroscedasticity. The result of PP test shows that the null hypotheses of non-stationary variables at level are failed to be rejected, except for lnPCPHE (with intercept and trend) which is stationary at level I(0) with a 10% level of significance. However, after taking the first difference, all variables have become stationary for both cases (with intercept only and with intercept and trend). All null hypotheses are rejected for every test at first difference at a minimum 5% level of significance. Hence, we can conclude that all variables are stationary at integrated of order one or I(1).

Table 1. Phillip-Perron (PP) test

Variable	Phillip-Perron (PP)			
	Level I(0)		First Difference I(1)	
	Intercept	Intercept and Trend	Intercept	Intercept and Trend
lnPCPHE	-1.8736	-3.3430 *	-7.0128 ***	-7.0716 ***
	(0.3416)	(0.0719)	(0.0000)	(0.0000)
lnPCGDP	-2.0594	-2.1459	-5.9740 ***	-6.4439 ***
	(0.2615)	(0.5076)	(0.0000)	(0.0000)
lnHPI	-2.4944	-1.1308	-4.4171 ***	-5.0822 ***
	(0.1232)	(0.9127)	(0.0009)	(0.0008)
lnPOP65	3.0124	0.7144	-3.0556 **	-4.6623 ***
	(1.0000)	(0.9995)	(0.0372)	(0.0026)
lnIMR	-2.3667	0.2245	-6.4682 ***	-11.3248 ***
	(0.1565)	(0.9976)	(0.0000)	(0.0000)

Note: Figures in parentheses indicate the probability value (*p-value*); and
Null hypothesis indicates a time series is non-stationary or contains a unit root.
Rejection of the null hypothesis is based on the critical value of MacKinnon (1996).
* significant at 10% level of significance
** significant at 5% level of significance
*** significant at 1% level of significance

It means that all variables can form a set of cointegration. This condition also indicates that spurious regression can be avoided as all the variables are stationary in the first difference I(1) with the presence of only intercept or intercept and trend. This decision allows the cointegration test to be done by using the ARDL model as proposed by Pesaran et al. (2001) since the size of the observation is only 48 which is smaller.

Table 2 reports the results of ARDL cointegration test. To test the presence of long run relationships between independent variables on per capita public health expenditure, bound tests will be carried out on equation (3). To avoid problem of over parameters, the optimum lag length is found to be 2. The lag length selection is determined by the Akaike Information Criterion (AIC) method. To determine the existence of cointegration, the computed F-statistic value obtained from hypothesis testing should be compared with the critical value for the bounds test, Table Case III: unrestricted intercept and no trend (Narayan, 2000). It is found that the null hypothesis that there is no long run relationship can be rejected at the 5% level of significance because the estimated F-statistic (5.3362) exceeds the upper bound of critical value (4.416). The findings show that there is a significant long run relationship (cointegration) between the time series variables in equation (3).

Table 2. ARDL cointegration test

	F-stat		Lag
F_{PCPHE} (lnPCPHE | lnPCGDP, lnHPI, lnPOP65, lnIMR)	5.3362	**	2

Case III: unrestricted intercept and no trend[1], n=50 and k=4

Critical Value Bounds		
Level of Significance	I(0)	I(1)
10%	2.614	3.746
5%	3.136	4.416
1%	4.306	5.874

Note: [1] Critical value bounds obtained from Narayan Table (2005), Case III.
** significant at 5% level of significance

Due to the existence of a long run relationship between the variables studied, then the next step is to estimate the long-term elasticity for each independent variable. In other words, we examine the impact of macroeconomic and health status factors on per capita public health spending. Based on AIC, ARDL (1,0,0,0,0) is selected as the most optimum model. The estimation results of the long run coefficients based on ARDL model (1,0,0,0,0) are shown in Table 3. Based on the t-statistic value, population over 65 years old with an elasticity of 1.0394, followed by per capita income elasticity (0.8079), are most significant explanatory variables in influencing per capita public health expenditure at 1% level of significance. While the infant mortality rate (-0.5319) and the health price index (-1.2389) are also significant at 5% and 10% level of significance, respectively.

The relationship between per capita GDP and the population aged 65 years against per capita public health expenditure is positive. It means that when per capita income rises 1%, per capita public health expenditure will increase by 0.81%. Likewise, a 1% increase in the population group aged over 65 years will increase the allocation of per capita public health expenditure by 1.04%. Population ageing variable is more elastic compared to income elasticity. This means that population ageing is an important contributing factor in the increase of per capita public health expenditure.

Table 3. Long run ARDL cointegration model (1,0,0,0,0)

Dependent Variable : lnPCPHE			
Independent Variable	Coefficient	t-Statistic	
lnPCGDP	0.8079	2.7078	***
lnHPI	-1.2389	-1.8539	*
lnPOP65	1.0394	3.8558	***
lnIMR	-0.5319	-2.0554	**
Constant	-2.7630	-1.3830	

Note: * significant at 10% level of significance
** significant at 5% level of significance
*** significant at 1% level of significance

The results of this study are consistent with the findings of the studies by Tang (2010); Furuoka et al. (2011); and Fasoranti (2015). The positive relationship between the state's income and public health spending coincided with the findings by Kleiman (1974); Newhouse (1977); Leu (1986); Getzen (2000); Tang (2010); Furuoka et al. (2011); and Fasoranti (2015). However, the results of the study are different from previous studies as income elasticity is less than one (0.8079), which indicates that public health spending is not a luxury good but it is a basic necessity.

Theoretically, the infant mortality rate for every 1,000 live births is negatively associated with per capita public health spending. It shows that an improvement in infant mortality rate will reduce public health expenses. The elasticity value is -0.53, meaning that when the infant's ability to live improved by 1% (equivalent to a 1% reduction in infant mortality rate), per capita public health expenditure decreased by 0.53%. The negative relationship between infant mortality rate and public health spending is in line with the findings of Lv & Zhu study (2014). Health price elasticity of -1.2389 is in accordance with the law of demand and the findings of Tang (2010) which states that there is a negative relationship between the health price index and public health spending. It means that a 1% increase in the price of healthcare will cause decrease of 1.24% in Government funding for the health sector.

The dynamic estimation result of the short-term coefficient is derived from the error correction model (ECM) as shown in Table 4. The results has shown that in the short run, only infant mortality rate is taken into account by the Government in determining the allocation of public health spending. It is significant at the 5% level of significance.

Table 4. Short run ARDL cointegration error correction model (1,0,0,0,0)

Dependent Variable : ΔlnPCPHE			
Independent Variable	Coefficient	t-Statistic	
ΔlnPCGDP	-0.0443	-0.2960	
ΔlnHPI	-0.1647	-0.4205	
ΔlnPOP65	0.4486	0.9944	
ΔlnIMR	-0.2698	-2.3820	**
ECT(-1)	-0.5436	-6.2114	***

Note: * significant at 10% level of significance
** significant at 5% level of significance
*** significant at 1% level of significance

While other factors such as per capita income, health price index and population ageing are insignificant in the short run. The coefficient of error correction term (ECT) is significant at the 1% level of significance. Approximately 54.4% (ECT = -0.5436) of the disequilibrium of the previous year's shock is converged and adjusted back to the long run equilibrium of the current year. In this case, the speed of adjustment is quite normal, and it will take nearly 1.8 years to reach long run equilibrium in the model.

Table 5. Diagnostic tests

Diagnostic Test	Statistic Value	*p*-value
[a] Autocorrelation	3.2367	0.1982
[b] Heteroscedaticisty	3.6867	0.5953
[c] Normality	2.6427	0.2668
[d] Funtional Form	0.1741	0.6787

Note: [a] Breush-Godfrey (BG) Serial Correlation LM Test
[b] Breush-Pagan-Godfrey Heteroscedasticity Test
[c] Jarque-Bera Normality Test
[d] Ramsey RESET Test

The ARDL regression model shows a high R^2 value of 0.996. It means that 99.6% of the variation in per capita public health expenditure is explained by independent variables such as per capita GDP, health price index, population aged 65 years and above, as well as infant mortality rate. The robustness of the model is confirmed by several diagnostic tests as shown in Table 5.

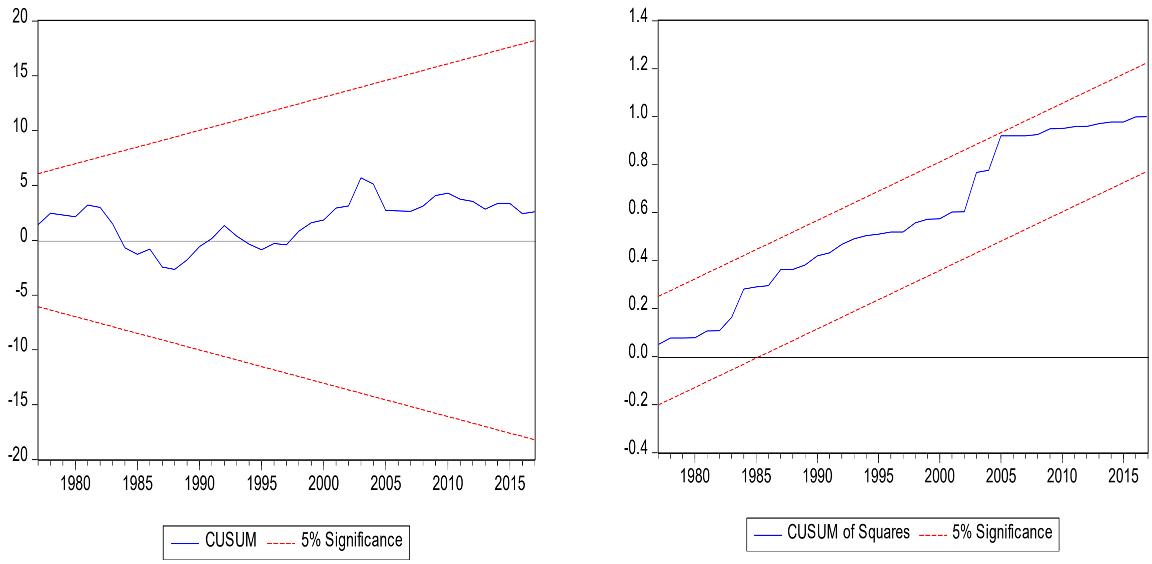

Fig. 4. (a) Plot of CUSUM statistic; (b) Plot of CUSUMSQ statistic

Based on the result of diagnostic tests, there is no problem of serial correlation and heteroscedasticity in residuals as proposed by Pesaran et al. (2001). The residuals are normally distributed, where skewness is 0.3675 and kurtosis is 3.8996. Ramsey RESET test also indicates that the model is correctly specified. In addition, the stability test shows that long run and short run parameters in the model are stable. The plot of the Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) statistics do lie inside the critical boundaries of 5% level of significance as shown in Figure 4 (a) and (b).

5. Conclusion

This empirical study analyses the effects of macroeconomic and health status factors on the public health expenditure in Malaysia from 1970 to 2017 by using the ARDL approach. Cointegration analysis proves that there is a long-term relationship between dependent variable and independent variables. The stability of long run relationship between public health expenditure and other independent variables is estimated through the error correction term. The ECM's results show that a 54.4% of disequilibrium will occur in each year.

The empirical results also show that infant mortality rate is significant in influencing per capita public health expenditure for both long run and short run periods. While other independent variables such as per capita income, population ageing, and health price index are taken into account as important determinants of public health expenditure for the long run. The findings prove that Wagner's law does not exist in the short-term and long-term in Malaysia. This is due to the elasticity of per capita public health expenditure with respect to per capita national income is less than unity. Hence, public health spending is considered as a basic necessity only.

Given the health price index is an important variable in determining the allocation of public health expenditure, thus the Government must give serious attention and seek radical solutions to overcome the issue of rising cost of healthcare. The Government intervention is urgently needed in view of the failure of private sector in the health market as their main objective is profit-oriented. If the Government does not intervene, it is definite that lower income group cannot afford medical services because the health care costs incurred by the private sector is high due to the issue of rising inflation of health each year. This situation will certainly increase the gap between the rich and the poor. Therefore, the Government intervention in the healthcare market is needed to provide better health services and to improve the welfare of people at the maximum possible.

Examples of Government interventions in the health market can be seen when the Selangor State Government's action recently introduced '*Healthcare Subsidisation Scheme'* (medical and healthcare coverage) for the bottom 40% of households (B40) with monthly income of less than RM3,000. They are the most depressed group due to the rising cost of living. For the implementation of the scheme, the Selangor State Government has allocated a total of RM125 million per year to provide free healthcare services to 250 thousand families or one million Malaysians who earn RM3,000 and below.

In addition, Malaysia is facing the issue of population ageing, where the life expectancy is improving and an increasing population of 65 years and above. Theoretically, the needs for health service will be increased with a rising population aged over 65 years. Therefore, Government spending on health should be given more focus on this population group. With the increase in the financing of public health spending, it will be able to help elderly citizens and low incomes group enjoy healthcare services through the implemented health programmes. Similarly with rural residents, they will also benefit from the provision of health services provided.

In order to fulfil the social contract between the Government and the people, the task of providing health services is fully placed under the Government's responsibility. The Malaysian Federal Government which is currently in the process of reviewing the implementation of a voluntary and non-profit based national health insurance scheme seems to be a very sound act. It should be noted that health is also a public good.

It is inseparable from the following characteristics that require financing from the Government, namely:

- goals to serve all people regardless of race, colour, rank and religion;
- investment required in the health sector is a huge amount; and
- returns or profits gained from investments in the health sector is slow and not in the form of monetary value, but it is important in terms of improving the status of health, mental and physical, which ultimately will increase the productivity of labour.

Recognising the importance of Government's financing in the health sector that will contribute to Malaysia's socio-economic growth and development towards achieving sustainable development goals, it is recommended that the Government to revamp the allocation of public health budget. The budget allocation for health expenditure should be increased at least to 5 per cent of annual budgetary allocation as recommended by the WHO. With the increased health budget, we will be able to address problems including inadequate access to quality healthcare, lack of resources/manpower especially in professional fields, congestion in public health facilities, high cost of treatment in private hospitals, and increased lifestyle-related illnesses such as obesity and heart diseases, which cause a higher demand for healthcare.

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