

Health Expenditure and Economic Development in Low-and Middle-Income Countries

(Perbelanjaan Kesihatan dan Pembangunan Ekonomi di Negara Berpendapatan Rendah dan Sederhana)

Suhaila Saad

Universiti Kebangsaan Malaysia

Norashidah Mohamed Nor

Universiti Putra Malaysia

ABSTRACT

The purpose of this study is to examine whether health expenditure has any significant impact on economic development in low- and middle-income countries (LAMICs). We employed static panel data analysis involving 67 countries which were split into two groups: low-income countries and middle-income countries, and the time frame is spanning from 2010 to 2014. Both groups were analysed separately to measure the different impacts of health expenditure on the countries' economic development. The results indicate a significant relationship between health expenditure and economic development for both groups of countries, whereby the impact was found to be slightly greater in middle-income countries compared to low-income countries. This finding denotes that the barrier for economic development in LAMICs is due to the considerably low allocation invested into health sectors, accompanied by the burden of many health-related problems. Therefore, strengthening the health sector by boosting health expenditure should be another priority in LAMICs to become developed countries.

Keywords: Health expenditure; human capital; economic development; low-and middle-income countries

ABSTRAK

Tujuan kajian ini dilakukan adalah untuk melihat sama ada terdapat kesan signifikan perbelanjaan kesihatan ke atas pembangunan ekonomi di negara berpendapatan rendah dan sederhana (LAMICs). Kajian ini menggunakan analisis data panel statik ke atas 67 buah negara yang dibahagikan kepada dua kumpulan pendapatan: kumpulan negara berpendapatan rendah dan negara berpendapatan sederhana yang merangkumi tahun 2010 hingga 2014. Kedua-dua kumpulan negara dianalisis berasingan untuk mengukur perbezaan kesan perbelanjaan kesihatan kepada pembangunan ekonomi. Keputusan kajian menunjukkan terdapat hubungan yang signifikan antara perbelanjaan kesihatan dan pembangunan ekonomi di kedua-dua kumpulan negara dengan impaknya adalah lebih besar bagi negara berpendapatan sederhana berbanding negara berpendapatan rendah. Dapatan ini menunjukkan halangan kepada pembangunan ekonomi di LAMICs adalah kerana peruntukan yang terlalu rendah ke atas sektor kesihatan, seiringan dengan beban banyak masalah berkaitan kesihatan. Justeru, pengukuhan sistem kesihatan melalui penambahan nisbah perbelanjaan kesihatan perlu diutamakan untuk mencapai pembangunan negara.

Kata kunci: Perbelanjaan kesihatan; modal insan; pembangunan ekonomi; negara berpendapatan rendah dan sederhana

INTRODUCTION

Economic development is the ultimate goal for most of the world's nations. Prior to the 1970s, economic growth was a common proxy used to measure development (Todaro & Smith 2009). Nevertheless, this measure is no longer relevant in determining economic development as growth in output does not guarantee an increase in social welfare. Modern economics evaluates economic development on broader dimensions other than solely relying on income growth. The evaluation takes into account other aspects such as poverty eradication, unemployment rate, income distribution and regional inequality (Bedir 2016). In a

previous study, Kim (2014) acquiesces that the discussion of economic development needs to incorporate quality of life and human development collectively with income growth. In other words, economic development also considers the growth of human potential and quality, apart from growth in income (Grosse & Harkavy 1980).

The process of achieving development for Low-and Middle-Income Countries (LAMICs) could be more complex as these countries have to address various challenges, particularly those related to resource constrains in health markets. The impediment in this domain emerges in terms of the availability, quality and financing of health care (Lewis et al. 2012). Health



care has been viewed as an important sector due to its significant contribution to human capital development. A healthy individual is an asset in production that would bring about higher productivity and more efficient work force, apart from a reduced absenteeism in workplace. Moreover, Nordhaus (2003) reveals that in the first half of the 20th century, investment in health probably contributed to the change of total income over of the investment made into non-health goods services as compared to the early 1950s, which saw a marginally lesser contribution than non-health good services. Clearly, health has a prominent role in economic development which thus, has led to the increasing emphasis given to health-related policy, particularly the health expenditure in many of countries, including LAMICS.

Health expenditure in LAMICS is greatly dominated by out-of-pocket health expenditure, which consists of a significant proportion spent on total health (Asante et al. 2016). On average, 50 percent and 30 percent of financial sources to access health care services in low-income countries and middle income countries respectively come from out-of-pocket spending. This amount is considered high compared to high-income countries which recorded an allocation of 14 percent. The financial burden has resulted to limited access to healthcare services, primarily for those coming from poor families and those living in rural and remote areas. In approximately 75 member countries of LAMICS, maternal and child death reached over 95 percent. Meanwhile, the median proportion of birth attended by a skilled health worker is only 62 percent and women with no money or coverage for this service are less likely to receive it than women who can afford it. Moreover, roughly 100 million people in LAMICS are pushed below the poverty line each year due to health care expenses and many of the remaining others do not seek care because they cannot afford it (Mills 2014).

Health financing has become a burden due to the low amount of expenditure allocated for health purposes. Previous studies indicate that increase in health expenditure would improve health outcome and subsequently stimulate economic growth through productivity, skills and knowledge as well as the technology which would eventually achieve the long-term goal of economic development (Bloom et al. 2004; Elmi & Sadeghi 2012; Kurt 2015; Piabuo & Tieguhong 2017). However, the budget allocated for health sector in LAMICS is extremely low compared to developed countries. This scarcity of funds in turn results in low quality health services in LAMICS (Yaqub et al. 2012).

However, several past studies show contradicting findings suggesting that the rise of health spending does not significantly improve health and development outcomes if inefficiency in governance exists (Ahmad & Hassan 2016). Even though allocation for health sectors in LAMICS is low, Grepin et al. (2018) assert that LAMIC nations have received a substantial amount of external funding. Unfortunately, the deficiencies of public health

system in these countries are still open for debate. The scarcity of health sectors in LAMICS is mainly due to weak governance, apart from the less responsive services and often lack of supplies. Moreover, private health sector in LAMICS was found to be less efficient in terms of its weak regulation, higher cost of drugs and unreasonable charges into unnecessary testing and treatment. Hence, a higher proportion of health spending does not necessarily result in development if the flaws in healthcare system in LAMICS are not addressed. This study therefore aims to determine the contribution of health expenditure to economic development in LAMICS. Specifically, this study attempts to identify significant changes in the development level due to the adjustments made in health expenditure by comparing two different groups of income among the LAMICS, namely the low-income countries and middle-income countries.

Our study contributes to the literature in several aspects. Firstly, we highlight the significance of health expenditure in achieving economic development. Previous studies that discussed the role of health expenditure in determining output growth are substantial (Elmi & Sadeghi 2012; Kutt 2015; Piabuo & Tieguhong 2017; Suhrcke et al. 2005). Likewise, numerous studies examined the contribution of health towards economic development (Banerjee et al. 2009; Bloom et al. 2015; Hussain 2009; Strittmatter & Sunde 2011). However, very little argument was found pertaining the effect of health expenditure on the level of economic development. Thus, this study predominantly contributes to enrich the existing literature in the field of health expenditure and economic development. Second, we compare the role of health expenditure towards economic development between low-income countries' group and middle-income countries' group in parallel. Frequently, the existing studies analysed health issues in LAMICS as a whole which may lead to inaccurate findings (Hopkins 2010). Even though these two groups usually refer to developing countries, they possess different characteristics such as demographic compositions, political environment and policies. Moreover, middle-income and low-income countries also considerably vary in terms of how their health care is financed. Middle-income countries tend to have higher share of health spending and are funded by compulsory prepaid sources, particularly via government budgets and social health insurance. Furthermore, public health allocation in middle-income countries has increased from 2000 to 2015, while in low income countries, public funding sources have declined (Xu et al. 2017). Finally, this study also could possibly assist in policy making decision by offering a guideline on budget allocation with regards to health expenditure. In order to form a sound policy on health that would benefit the whole nation, the governments of LAMICS need to place a significant emphasis on the allocation for health expenditure. In other words, the importance of health expenditure should be highlighted in accordance with the

need of the population. For example, health allocation should be more emphasised in rural and remote areas as the accessibility to health care in these regions is very low.

LITERATURE REVIEW

Economic growth is a common measurement used to evaluate the economic development of a country prior to 1970s. In general, economic growth is a quantitative measurement that has been derived by several variables, namely human resource, capital formation, economic advancement and social as well as political factors. The prominent theory of growth proposed by Solow (1956) is known as an exogenous growth model. This theory was constructed based on the Cobb-Douglas production function which indicates the role of human capital and physical capital in determining output growth. The notion of human capital contribution to economic growth through productivity was later suggested by Becker (1962). He argued that expenditures on education, training and medical care are important investments in human capital. Later, Grossman (1972) advocated the importance of human capital investment to economic performance via the improvement in health. He constructed a model that differentiated health as consumption and capital goods. The model implies that from the consumption perspective, people practically enjoy their wellbeing and good condition of health while from the capital point of view, the number of days spent ill would be reduced. The rate of worker absenteeism would decrease because of the fewer days of sick leave taken; hence, the number of productive days and time for leisure increases. These notions thus propose that health is not just for consumption, but also as an investment.

However, economic development is a vast concept that cannot be sufficiently and entirely explained with output growth. Economic development should be sought with a broader perspective as it is a multidimensional process involving numerous changes in social structures, popular attitudes, national institutions, acceleration of economic growth, inequality reduction as well as poverty mitigation (Todaro & Smith 2009). Previous studies suggest the measurement of economic development should encompass non-economic factors such as poverty, illiteracy, diseases, malnutrition, unemployment, technology advancement and inequality, apart from merely focusing on economic factor (Fagerberg & Srholec 2017; Frazer 2006; Kimenyi 2011; Oyeshola 2007). The challenge in a nation's development includes to improve the quality of life by generally increasing the income level and to recognise the need to incorporate better education and address issues of good health and nutrition, poverty reduction, better environment, equality and opportunity improvement as well as freedom and richer cultural life (Ahmad et al. 2013). According to Elakhe (2014), economic development is a normative

concept which comprises all aspects of life, including social, political and economic dimensions. Kim (2014) asserts that the key indicator for economic development is via economic growth, human development and quality of life.

Since health has a vital effect on economic growth, health investment through health expenditure is expected to have a similar effect on development process. Numerous models have been developed to emphasise the significance of human capital on economic development (Barro 1991; Romer 1986). Studies show that increased current investment in human capital through health expenditure has enhanced labour productivity which resulted in growth of income and propelled the population's welfare (Brempong & Wilson 2004; Galor & Moav 2004; Haldar 2008). The positive effects of improved health quality do play a role in promoting economic growth (Finlay 2007). This notion corresponds with Bloom et al. (2015) findings which highlights the strong impact of health on the female groups of higher income level. Even though previous literature focused on health contribution to income growth in low- and middle-income countries, a similar pattern is observed in most developed countries (Suhrccke et al. 2005).

Apart from discussing the contribution of health to economic development, previous studies also highlighted the flaws of health sector in LAMICS such as the issue of human resource shortages in health care sector and the inappropriate distribution of available resources, mainly in the rural and remote areas (Lisa et al. 2016). Other than that, inadequate health facilities, lack of access to basic health services, and hunger and undernutrition among workers have been identified as reasons for poor health in these countries. The poor health status in turn has declined the capital formation to boost the economy (Black et al 2013; Sunny & Osuagwu 2016). Moreover, poor health status is deemed as difficult to improve aggregate productivity and causes failure in poverty mitigation (Cole & Neumayer 2006; Husain 2009; Lustig 2006). On the other hand, the lack of access to health care services among the low-income or poor communities has been found to be a huge constraint in achieving health equality in a country, which is a very important factor to attain universal health coverage (Orach 2009). Hence, the improvement in healthcare system such as health facilities through financing and healthcare provision could increase utilisation of health, mainly in primary care (Audibert & Mathonnat 2013).

Even though many previous studies have suggested that health expenditure has a positive effect on development, others have argued against it. Increase in health expenditure would have an impact on development if the efficiency of government is improved (Kulkarni 2016) According to Ahmad and Hasan (2015), health expenditure is ineffective in improving health in the midst of an inefficient governance. For example, poor governance i.e. the high rate of corruption has reduced the

productivity in economy by becoming a barrier against health improvement. Apart from that, the importance of transparent government practices is also stressed. In order to reach optimisation in healthcare resource allocation, transparency is essential. Evidently, increase in health expenditure has not enhanced the quality of health care; instead, it has widened the variation in care (Yong et al. 2010).

Many existing studies debate on the link between health expenditure and economic growth (Elmi & Sadeghi 2012; Kutt 2015; Piabuo & Tieguhong 2017; Suhreke et al. 2005;), while numerous other studies discuss on the nexus of health and development (Banerjee et al. 2009; Bloom et al. 2015; Hussain 2009; Strittmatter & Sunde 2011). However, this study seeks to explore a more specific health aspect, namely health expenditure and its contribution to not only the growth of output, but the entire growth aspect considered as economic development. Apart from that, this study also discusses the related arguments on health expenditure and development, by focusing the analysis on the comparison between low-income countries and middle-income countries. Previous studies (Banerjee et al. 2009; Bloom et al. 2015; Hussain 2009; Strittmatter & Sunde 2011;) predominantly discussed the contribution of health expenditure to the development in LAMICs as a whole, which has not often been explained to reflect the genuine circumstance. Even though low-income countries and middle-income countries have normally been placed in the same boat, they have certain distinctive characteristics such as demographic compositions, political environment and policies that would engender different considerations and effects in health expenditure and its impact to economic development. Furthermore, the way health care is financed also vary in middle income countries in comparison to low-income countries. Middle-income countries have higher share of health spending and are financed by compulsory prepaid sources such as government budgets and social health insurance. Moreover, public health allocation in middle-income countries has increased from 2000 to 2015, while in low income countries, public funding sources have declined in similar time period (Xu et al. 2017). Hence, the differences in several dimensions could possibly generate different impacts.

METHODOLOGY

This study considered data of 67 countries that were analysed separately according to income group level: 35 low-income countries and 32 middle-income countries. The data covered information from 2010 to 2014. This study used gross domestic product per capita as the dependent variable and a proxy for economic development. Health expenditure per capita was used as the main driver of the model that represents total

health expenditure, including public health spending and private health spending, divided by population. To compare the spending level, health spending for each country was converted to a common currency, namely US dollar and was adjusted to take into account the different purchasing power of the national currencies, where the year 2005 was used as a base year. Apart from that, other control variables used in this study were total labour and fixed capital formation which represent the labour used in the economy and the investment in physical capital, respectively. The data were compiled from World Development Indicator website.

According to neoclassical growth theory (Solow 1956), economic growth and development are boosted by capital deepening or improvement in total factor of productivity (TFP). Although investments in physical and human capital have increased output, marginal gain via capital deepening has been declining. Hence, the growth of output can be alternatively preserved via the improvement in TFP. Providing higher spending on health sector, mainly on technology, will improve the quality of human capital, and this will eventually contribute to the economic growth of a country.

The empirical model of this study was derived by the following the formula of simple production function for aggregate output, as follows:

$$Y_t = A_t F(K_t, L_t) \quad (1)$$

Aggregate output that denotes as Y_t is determined by physical capital, labour force and total factor of productivity, which are denoted as K_t , L_t and A_t , respectively. Equation (1) was then rewritten in the form of Cobb-Douglas function, as follows:

$$Y_t = A_t K_t^\beta L_t^{1-\beta} \quad (2)$$

Next, both sides of Equation (2) were transformed into a logarithm form before being subtracted with the term ($\ln L_t$). The process of transformation and subtraction is given as follows:

$$\ln Y_t = \ln A_t + \beta \ln K_t + (1 - \beta) \ln L_t \quad (3)$$

$$\ln Y_t = \ln A_t + \beta \ln K_t + \ln L_t - \beta \ln L_t \quad (4)$$

$$\ln Y_t - \ln L_t = \ln A_t + \beta \ln K_t + \ln L_t - \beta \ln L_t - \ln L_t \quad (5)$$

Hence, Equation (5) was simplified as Equation (6) to describe TFP (Yalcinkaya et al., 2017), as follows:

$$\ln \left(\frac{Y_t}{L_t} \right) - \beta \ln \left(\frac{K_t}{L_t} \right) = \ln A_t \quad (6)$$

This study has employed static panel data analysis to estimate the relationship established between health expenditure and economic development and also to assess the shift effect of independent variables towards economic development within the selected LAMICs countries. Based on the study of Bakare and Sunmi (2011), the standard specification of static panel data model in logarithm form is depicted by Equation (7), as follows:

$$\ln GDPPC_{it} = \beta_0 + \beta_1 \ln HEPC_{it} + \beta_2 \ln LAB_{it} + \beta_3 \ln CAP_{it} + \mu_i + \varepsilon_{it} \tag{7}$$

where $GDPPC_{it}$ is gross domestic product per capita, $\ln HEPC_{it}$ is total health expenditure per capita, $\ln LAB_{it}$ is total labour and $\ln CAP_{it}$ is fixed physical capital formation. Both subscript i and t refer to each country and each period. Meanwhile, term μ_i captures an unobserved specific effect and ε_{it} is a random disturbance which is assumed to be normal and identically distributed (IID) with $E(\varepsilon_{it}) = 0$; $Var(\varepsilon_{it}) = \sigma^2$. The transformation into log-linear function was applied to stabilise the value of time series data. The rationale of this transformation into natural logarithm is to compress the differences between the parameter estimated values compared to the original into smaller values and hence, diminish the heteroscedasticity problem. Further, the logarithm model enabled the estimation of elasticity for each parameter represented by coefficient β_i .

Equation (8) shown below indicates the summation of panel model. The estimation procedure begins with Ordinary Least Square (OLS) estimation of pooled model. In this model, all countries are assumed to share similar characteristics. Pooled model denies the heterogeneity or the individuality that may exist among countries in the same groups of income. Nevertheless, pooled model is an appropriate model to be used if X_j s are so comprehensive that they capture all the relevant characteristics of the individual country of which the unobserved specific effect (cross-sectional or time specific effect) is deemed irrelevant and the term μ_i can be dropped, as shown in the following:

$$\ln GDPPC_{it} = \beta_0 + \sum_{j=1}^k \beta_j X_{jit} + \mu_i + \varepsilon_{it} \tag{8}$$

However, the existence of unobserved specific effect, μ_i in longitudinal data is plausible. Each country or year demonstrates different level of development and every country has its own initial level. Therefore, pooled model should be compared with random effect and fixed effect model. Once random effect model has been estimated, Breusch Pagan LM test is deployed to choose the best model that fits the data. At this stage, F statistic would allow the test of the null hypothesis of the same specific effects for all countries. Rejecting null hypothesis indicates that random effect is preferable or else that the OLS estimator is better. The analysis can proceed with fixed effect model estimation if the result aftermaths have specified random effect as an appropriate model compared to pooled OLS model. Generally, random effect model assumes that observed explanatory variables has zero correlation with unobserved specific effect, $Cov(X_{jit}, \mu_i) = 0, t = 1, 2, \dots, T$, while in fixed effect model, observed explanatory variable is allowed to correlate with unobserved specific effect, $Cov(X_{jit}, \mu_i) \neq 0, t = 1, 2, \dots, T$. Hence, Hausman test is used to finally determine the best model between random effect model and fixed effect model. However, the analysis should not be halted

by the Hausman test because the final model has to go through another stage of robustness. If the test indicates that random effect model estimation is more consistent than fixed effect model estimation, the result can be improved via Generalized Least Square (GLS) estimation. On the other hand, if fixed effect model estimation has been chosen, the result would need to be re-estimated to produced fixed effect robustness which has lower standard deviation.

RESULTS

The procedure of static panel analysis basically requires the estimation of a few models, after which the most appropriate model that suits the data will be selected based on several statistics tests to determine the relationship between the dependent and independent variables. Table 1 and 2 show the results of the analysis for low-income countries and middle-income countries, respectively. The analysis began with pooled model and random model estimation before the appropriate model was determined using Breusch Pagan LM test. Results of F-statistics of Breusch Pagan LM test displayed in both Table 1 and 2 indicate that random effect model is better than pooled OLS model. Hence, the model was used for

TABLE 1. Low-income countries

	GDPPC	HEPC	LAB	CAP
Mean	1671.97	99.79	33191874	4.17E+10
Std. dev	1069.01	73.23	81193900	1.26E+11
Min	311.25	12.38	11147472	6.01E+08
Max	4038.96	311.16	4.97E+08	7.65E+11
Obs	175	175	175	175

Note: Data on GDPPC, HEPC and CAP are measured in US dollar and at constant 2005 US price.
 GDPPC: per capita gross domestic product
 HEPC: per capita health expenditure
 Lab: Total labor (number of labour in economy)
 Cap: Total fixed capital formation

TABLE 2. Middle-income countries

	GDPPC	HEPC	LAB	CAP
Mean	8022.25	503.66	40598026	1.80E+11
Std. dev	3710.94	188.7	1.38E+08	6.01E+11
Min	3225.59	217.71	135264	1.80E+08
Max	24304.52	1055.14	8.06E+08	3.98E+12
Obs	160	160	160	160

Note: Data on GDPPC, HEPC and CAP are measured in US dollar and at constant 2005 US price.
 GDPPC: per capita gross domestic product
 HEPC: per capita health expenditure
 Lab: Total labor (number of labour in economy)
 Cap: Total fixed capital formation

comparison with fixed effect model in Hausman test. At this stage, fixed effect model was found to perform better than random effect model for both the low-income countries' group and middle-income countries' group. For robustness purpose, fixed effect model was re-estimated to minimise the standard error.

Columns (I), (II) and (III) in Table 3 and 4 refer to the results of pooled model, random effect model and fixed effect model, respectively, while column (IV) represents the final result for the analysis, the fixed effect robust. Table 3 shows that the health expenditure per capita variable exhibited a highly positive significant relationship with the GDP per capita variable which indicated a significant contribution of health expenditure to the development of economy in low-income countries. The increase of 1 percent in health expenditure per capita in low-income countries will boost the GDP per capita at 0.1035 percent. Similar results were reported for middle-income countries, as presented in Column (IV), Table 2. Health expenditure per capita indicated a highly positive significant contribution to the economic development of middle-income countries. Every 1 percent of increase in health expenditure will increase the GDP per capita at about 0.1907 percent. Evidently, health expenditure has a significant effect on economic development in LAMICs. This finding is in line with those reported in many previous studies which asserted that investment in health could facilitate the process of development. Even though the shift in the level of development is slightly low, this finding is probably useful in convincing that health expenditure allocation is equitably necessary with other non-health related allocations for a country to become a developed nation. Raising health expenditure is essential, not merely to improve health services, but also to ensure that the supply of medicine is adequate

to fulfil its increasing demand. Moreover, it is essential that health expenditure is invested in health care research and development as well as to promote technology transfer as it will certainly benefit the population. The deficiencies of health system in LAMICs such as the lack of accessibility to health services and the scarcity of sources, both in terms of facilities or human skills, are predominantly caused by the lack of funding. Hence, health expenditure obviously plays a crucial role in the economic development of LAMICs.

However, in comparison with middle-income countries, health expenditure in low-income countries was found to have a less significant effect on their economic development. The impact of health expenditure is greater on the economic development in middle-income countries, possibly due to the more comprehensive policies and strategies. Middle-income countries have focused the share of public expenditure to enhance health care services to reach the poor, including the urban fringe. Likewise, middle-income countries have begun to devote their expenditure on research and development activities. Meanwhile, low-income countries have less aggressive policies compared to middle-income countries. The amount of health expenditure allocated in low-income countries are relatively lower than middle-income countries and the share of public health allocation has also declined over 15 years, from 2000 to 2015 (Xu et al. 2017).

In addition, other variables such as labour and physical capital were found to be significant in both groups. Investment in labour which increased by 1 percent will boost the GDP per capita at approximately 0.7075 percent in low-income countries. However, a contradictory result was found for middle-income countries, whereby a rise of 1 percent in labour variable

TABLE 3. Low-income countries

Variables	Pooled (I)	Random Effect (II)	Fixed Effect (III)	Fixed Effect Robust (IV)
LHEPC	0.4643*** (-0.0393)	0.2464*** (-0.0191)	0.1035*** (-0.0226)	0.1035*** (-0.0166)
LLAB	-0.4317*** (-0.0456)	-0.0824** (-0.0317)	0.7075*** (-0.0910)	0.7075*** (-0.0266)
LCAP	0.4597*** (-0.0390)	0.1169*** (-0.0184)	0.0331* (-0.0194)	0.0331*** (-0.0051)
CONSTANT	1.6969*** (-0.2407)	4.796*** (-0.3855)	-5.5083*** (-1.3014)	-5.5083*** (-0.4325)
Observations			175	
R-squared	0.9113	0.5712	0.9984	0.9984
Breusch-Pagan LM Test		208.2915***		
Hausman Test		248.22***		

Note: Figures in parentheses are standard errors. ***, ** and * indicate statistical significance at 1%, 5% and 10% level respectively. Data on GDPPC, HEPC and CAP are measured in US dollar and at constant 2005 US price, while the LAB is the number of labours in economy. All data have transformed into logarithmic form

TABLE 4. Middle-income countries

Variables	Pooled (I)	Random Effect (II)	Fixed Effect (III)	Fixed Effect Robust (IV)
LHEPC	0.4847*** (-0.0517)	0.1957*** (-0.0226)	0.1907*** (-0.0236)	0.1907*** (-0.0205)
LLAB	-0.4462*** (-0.0364)	-0.2318*** (-0.0331)	-0.1869** (-0.0877)	-0.1869*** (-0.0664)
LCAP	0.4478*** (-0.0367)	0.2406*** (-0.0260)	0.2104*** (-0.0278)	0.2104*** (-0.0129)
CONSTANT	2.1465*** (-0.3488)	5.5466*** (-0.3611)	5.5987*** (-1.1695)	5.5987*** (-0.7968)
Observations			160	
R-squared	0.7324	0.6323	0.9956	0.9956
Breusch-Pagan LM Test			262.99***	
Hausman Test			26.0939***	

Note: Figures in parentheses are standard errors. ***, ** and * indicate statistical significance at 1%, 5% and 10% level respectively. Data on GDPPC, HEPC and CAP are measured in US dollar and at constant 2005 US price, while the LAB is the number of labours in economy. All data have transformed into logarithmic form

will cause a decline of 0.1869 percent in GDP per capita. This outcome is probably due to the excess supply of labour in production (Cho et al. 2012), which in the long run will increase unemployment rate and eventually affect the development process (Tsen & Furuoka 2005). Apart from that, physical capital variable proved to be consistent with the theory. An increase of 1 percent in physical capital investment will generate an increase of 0.0331 percent and 0.2104 percent in GDP per capita, indicating the rising level of development in low-income countries and middle-income countries, respectively.

SUMMARY AND CONCLUSIONS

The primary purpose of this study was to investigate the importance of health expenditure in determining the economic development in LAMICs. We applied panel data analysis which involved 67 LAMICs which were divided into two groups, according to their level of income. In this analysis, a few procedures of model selection were carried out before the best final model was chosen. Based on fixed-effect robust model estimation, the findings suggest that health expenditure has a positive significant effect on economic development. Increment 1 percent of health expenditure per capita in both low-income countries' group and middle-income countries' group will generate the increase of 0.1035 percent and 0.1907 percent, respectively in their GDP per capita. This outcome implies that health expenditure has a significant effect on economic development in LAMICs, consistent with those reported in many previous studies, highlighting that investment in health care are beneficial for economic development (Banerjee et al. 2009; Bloom et al. 2015; Hussain 2009; Strittmatter & Sunde 2011). Apart from

that, this study also aimed to assess the impact of health expenditure on the economic development of low-income countries' group and middle-income countries' group separately as many previous studies analysed health issues in LAMICs as a whole. The outcome specifies that the impact of health expenditure towards economic development in middle-income countries is slightly greater than the impact shown in low-income countries. The disparity is probably due to the different strategies and policies taken by each group of countries. In comparison with low-income countries, middle-income countries have allocated higher funding for health and were perceived to have more comprehensive strategies and policies. They placed the focus on the root of the problem, which is to firstly address the underprivileged community by providing them with basic necessities, including health care. In addition, the middle-income countries have also begun to emphasise the need of allocation for health care research and development as a long-term strategy to improve the health sector en route to achieve higher development. In the meantime, low-income countries appeared to be less aggressive in policies and provided less allocation for health care sector (Xu et al. 2017).

The findings have some important implication for policy purpose. Firstly, the government in LAMICs need to increase the allocation of health expenditure to boost their health sector. The rise of health expenditure is essential to enhance health facilities such as hospitals, clinics, health care centres etc. to meet the needs of the society. Secondly, the health system in LAMICs should be revised to identify the real problem, particularly how health expenditure is distributed to achieve universal health coverage. Hence, the rise of health expenditure could reach underprivileged citizen, primarily the poor and

those living in rural and remote areas. The allocation of health expenditure for each country in LAMICs should be based on the necessity by considering many aspects such as diseases burden, shortages of skilled health workers and also the need of technology utilisation in health sector. To become a developed country, LAMICs should work harder and embark on emphasising the vital aspects of health sector, chiefly health expenditure. However, this study considers total health expenditure as a general form of health allocation, whereas the proportion of public and private health expenditure could also distinctly produce a significant effect to economic development. Hence, we suggest that future study include public and private health expenditure as another factor to examine economic development in LAMICs.

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Suhaila Saad*
Fakulti Ekonomi dan Pengurusan
Universiti Kebangsaan Malaysia
43600 UKM Bangi Selangor
MALAYSIA
E-mail : suhailasaad@ukm.edu.my

Norashidah Mohamed Nor
Fakulti Ekonomi dan Pengurusan
Universiti Putra Malaysia
43400 Serdang Selangor
MALAYSIA
E-mail : norashidah@upm.edu.my

*Corresponding author

