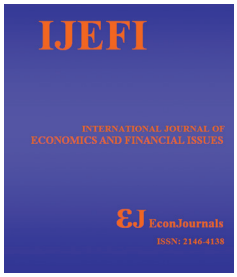

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Health Expenditures and Economic Growth in Zimbabwe

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ABSTRACT

The literature on the relationship between health expenditure and economic growth continues to grow, albeit without much consensus. The study evaluates the relationship between health expenditure and economic growth in Zimbabwe, a country that repeatedly failed to meet the Abuja Declaration commitment of 15% of the national budget during the period 1980-2020, using the novel method of autoregressive distributed lag model. The study established that there is cointegration among health expenditure, economic growth, trade openness, economic crisis, and fiscal position. The main result is that health expenditure influence economic growth and vice versa. The results show that economic growth is determined by health expenditure, fiscal position, life expectancy, and economic crisis. On the other hand, health expenditure is influenced by economic growth, budget position, trade openness, life expectancy at birth, and economic crisis in the country. The results show that there is a bidirectional relationship between health expenditure and economic growth in the long run. In the short run, economic growth, trade openness, economic crisis and fiscal position significantly determine health expenditure. The study recommends that government should strive to increase budgetary allocations to health in line with the Abuja Declaration while also putting in place pro-growth policies.

Keywords: Health Expenditure, Economic Growth, Zimbabwe
JEL Classifications: H51, I11, I18, O400

1. INTRODUCTION

The advent of the COVID-19 brought to the core the importance of health expenditure in both developed and developing countries. The failure to respond timeously to the pandemic, which claimed the lives of the many people across the globe, questioned the seriousness of the public health budgets. The debate that ensures emanates from whether public health expenditure is developmental or not.

Literature has long recognised that health is an important component of the development and economic wellbeing of individuals and nations (Piabuo and Tieguhong, 2017). It has also been identified as a key ingredient that determines the quality of human capital, a necessary factor for economic growth (Muftaudeen and Bello, 2014). This realisation exerts pressure on economies to spend huge sums of money to ensure that citizens have access to quality and better healthcare. Sengupta (2015) noted that health status and economic development of states are direct derivatives of health expenditure. He further highlighted that those nations who invest a lot in health have healthier and productive human labour. It has been noted that healthcare expenditure can lead to better delivery of health opportunities, strengthening human capital, enhancing productivity, and contributing to economic performance (Raghupathi and Raghupathis, 2021).

The effect of health spending on economic performance has important ramifications for an economy. Different schools of thought portray different perspectives on how this relationship practically pans out and how the relationship can be modelled. Tsaurai (2014) identified four dominant schools of thought that explain the relationship between health expenditure and economy. The first school of thought is that health expenditure spurs the economy, while the second school of thought argues that the economy drives health expenditure. The third school of thought maintains that there is a feedback effect between health

expenditure and the economy, while the fourth mentions that there is no causality at all between the two variables.

Health is perceived as capital in the health-led growth hypothesis. The health-led growth hypothesis emphasised that expenditure on health leads to an increase in productivity, hence increases income per capita and economic growth (Piabuo and Tieguhong, 2017). Health spending is usually believed to be a function of economic growth, and citizen health is an input into the macroeconomic production function (Amiri and Ventelou, 2012).

Over time and recently, a number of studies have been undertaken to understand the relationship between the two important variables (Raghupathi and Raghupathis, 2021; Esen and Keçili, 2021; Odhiambo, 2021; Sethi et al., 2020; Shafuda and De, 2020; Yang, 2020). Quite instructive from these studies is the failure to achieve consensus among authors on the nature of the relationship, though agreeable that both economic growth and health expenditure are important for economic development. This has forced scholars to continue reviewing the relationship so as to gain further insights on the connections among the variables.

Given the importance of health financing to economic development, economists have advocated for the development of strong health financing systems. This has now become a common objective for all countries. Developing a sound system for financing health care is one of the key mechanisms to show the commitments and political will of leaders and their ability to translate these commitments into results. African countries have not lagged behind on this initiative, with various forums being set up to look at how best countries can finance health care. One of the main initiatives which was taken by heads of states and governments was the 2001 Abuja Declaration. African heads of states have undertaken several commitments to ensure improved health outcomes. Among these commitments are the Abuja Declaration, where they committed that 15% of the government expenditure should be devoted to health, and the 2008 Ouagadougou Declaration on primary health care and health systems in Africa.

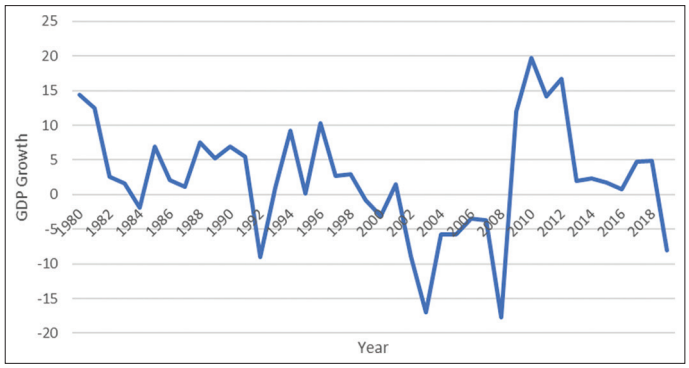
The discourse on health financing and economic growth remains lively, and this study seeks to contribute to the debate using Zimbabwe as a case study. The issue is important because Zimbabwe, like other African countries, has been experiencing retarded growth and mixed results in terms of health outcomes. Health expenditure has been failing to meet the Abuja Declaration commitment of 15% of the national budget. The study evaluates the relationship between health expenditure and economic growth in Zimbabwe, a country that repeatedly failed to meet the Abuja Declaration commitment of 15% of national budget during the period 1980-2020, using the novel method of Autoregressive distributed lag model.

The Zimbabwean economy has transformed since the attainment of independence going through different periods of economic management. The Zimbabwean economy derives its growth from several economic activities. The major economic sectors driving the economy are agriculture, manufacturing, mining, and tourism. The growth rate of the Zimbabwean economy averaged slightly below 5% in the first decade of independence (1980-1990). The impressive growth during the period helped improve the provision of social services such as healthcare and education. The situation started to reverse after the country embarked on the necessary but chaotic land reform in 2000. The situation worsened in the period 2000-2008 (Figure 1). All the sectors suffered from the disturbances that took place in the agricultural sector. The downstream industries such manufacturing, mining, and tourism were seriously affected.

The period coincided with the period of policy inconsistency, policy reversals, and generally poor economic management. The economy suffered from hyperinflation between 2007 and 2009. The effect of the economic decline negatively affected the fiscus with the fiscal space shrinking significantly. The outcome of the economic crisis was the deterioration in physical infrastructure, erosion of livelihoods, food insecurity, rising malnutrition, and the inability of the public sector to deliver basic social services such as education, health, and water amenities.

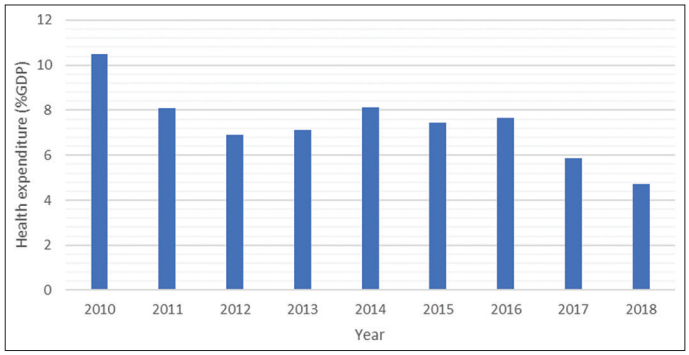
The economic decline in Zimbabwe was arrested in 2009 with the formation of a government of national unity after the hotly contested 2008 elections. The new government set the pace for the economic rebound and restoration of social services, which had been grounded to a near halt. During the post crisis period (2010-2018), the average heath care expenditure as a percentage of GDP was 7.38%, recording the minimum of 4.73% in 2018 and a maximum of 10.48% in 2010. The highest health expenditure coincided with the highest economic growth rate of around 12% (Figure 2).

Figure 1: GDP growth rate



Source: World Bank Indicators

Figure 2: Health Expenditure as percentage of GDP



Source: World Bank Indicators

The government of Zimbabwe experienced serious resource constraints, which led to its failure to meet the Abuja Declaration target. The Abuja Declaration, which was signed by African governments in 2001, commits countries to allocating at least 15% of their budgets to the health budget. The failure to attain a health budget of 15% exposed the country to a serious health budget gap. This gap was reduced by support from development partners and the private sector. With the global economic challenges, most countries are facing fiscal challenges, leading to fluctuating support from development partners. The external funding for health has been inconsistent over the past 5 years. These fluctuations lead to unsustainable healthcare.

The COVID-19 pandemic exposed the vulnerabilities in the Zimbabwean health sector. Fiscal and monetary policy responses to the pandemic have been limited. Fiscal policy remained tight despite wage pressures and additional spending needed to respond to the pandemic. The fiscal balance turned into a small deficit of 1.3% of GDP in 2020. Following a decade of positive progress in human capital indicators, the pandemic has led to some deterioration in health outcomes.

Public resource constraints and implementation challenges severely affected service delivery. This has been worsened by supply side challenges, including health workers strikes and inadequate quantities and slow access to personal protective equipment. These challenges translated to households' loss of access to basic social services and the deepening of negative coping strategies.

2. LITERATURE REVIEW

The literature on the relationship between public health expenditure and economic growth continues to grow albeit without much consensus. Preliminary work on the relationship between health expenditure and economic growth is attributable to several scholars (Barro, 1996; Bloom et al., 2004; Acemoglu and Johnson, 2007; Weil, 2007). Barro (1996) argued that health status, as measured by life expectancy or analogous aggregate indicators, is an important contributor to subsequent growth. In fact, initial health seems to be a better predictor than initial education of subsequent economic growth. This was supported by Bloom et al. (2004), who sought to find the effect of good health on economic output. The study applied an extended production function models of economic growth to account for work experience and health. The results showed that health has a positive, sizable, and statistically significant effect on economic growth. Acemoglu and Johnson (2007) established that improvements in population health may have lowered the pace of economic growth. The argument behind the findings is that health improvement increases population size as people are less prone to diseases, hence increasing their lifespan. This then reduces factor inputs per capita. The argument contradicts the findings by Weil (2007) and Bloom et al. (2004), who established that improvement in health has a positive effect on economic growth. In order to create macroeconomic estimates of the proximate effect of health on GDP per capita, Weil (2007) used microeconomic methodology to investigate the influence of health on individual outcomes. The variance of log GDP per worker would decrease by 9.9% and the ratio of GDP per worker at the 90th percentile to GDP per worker at the 10th percentile would drop from 20.5 to 17.9 if health disparities between nations were eliminated. Although this effect is economically significant, estimates of the impact of health on economic growth derived from cross-country regressions are significantly larger. According to Ali et al. (2018), who used data spanning 15 years and 132 countries, human capital only contributes positively to per capita GDP development in the context of superior legal institutions and greater economic prospects. The influence of human capital on growth is strengthened by economic opportunities; the easier it is to do business and trade both domestically and globally, the greater the impact of human capital on growth.

Since then, there has been a proliferation of studies on the subject. Hu and Wang (2024) investigated how public health spending affects economic growth. The findings demonstrated that when household consumption, worker earnings, and per capita physical capital investment rise, the favourable relationship between public health spending and economic growth progressively becomes more pronounced. Raghupathi and Raghupathi (2021) explored the relationship between public health expenditure and economic performance across the United States. The authors noted that health expenditure contributes towards human capital, productivity, and ultimately economic performance. The study employed visual analytics and established a positive correlation between health expenditure and economic performance indicators of income, GDP, and labour productivity. It was established that increases in health expenditure have a positive significant effect on economic performance. Odhiambo (2021) evaluated the causal relationship between economic growth and health expenditure among sub-Saharan African countries for the period 2008-2017. The study revealed unidirectional causality from public health expenditure to economic growth in low-income nations. Wang and Wang (2021) examined the optimal health care expenditure in a growing economy among the OECD countries for the period 1990-2009. The study employed the system generalised methods of moments to model the relationship between health expenditure and economic growth. The study revealed that increased health expenditure led to better economic performance. Ridhwan et al. (2022) used 64 international researches to investigate the relationship between health and economic growth. The effect of size is also increased by longer working hours, more years of required education, and more favourable environmental factors. Ceteris paribus the findings support the notion that health plays a major role in elucidating national economic progress.

Shafuda and De (2020) studied the role of government expenditure on human capital and growth in Namibia. The study used time series data ranging from 1980 to 2015. The study established a significant long-run negative relationship between government spending on healthcare with infant mortality rate, under-5 mortality rate and fertility rate. Yang (2020) evaluated the connection between national health expenditures and economic growth under different levels of human capital. The study established that the effect of health expenditure on growth was dependent on the

different levels of human capital. Health expenditure exhibited a negative relationship to growth under low levels of human capital. There was a positive relationship between the two variables when capital levels were at a medium level. Further examinations show the negative effect of health expenditure on growth is worsened by the aging population and low fertility. Abbasi et al. (2023) uses global aggregate data analysis from 2000 to 2019 using the Threshold Structural Vector Autoregressive model to shed light on whether the global shock of education budget, health budget, and environmental footprint is supporting national development in the twenty-first century. The results showed that global shocks to the health and education budgets are contributing to economic development.

Piabuo and Tieguhong (2017) undertook a comparative study on the effect of health expenditure between countries in the CEMAC sub-region and five other African countries that achieved the Abuja declaration. The study established that health expenditure positively influenced economic growth in the two samples considered. The study further established cointegration between health expenditure and economic growth. Lin et al. (2017) evaluated the quantitative relation between public health expenditure and social economic development in Shandong Province. The study found that public expenditure on health per capita and medical aid cover promotes social economic development. Aboubacar and Xu (2017) examined the relationship between public health expenditure and economic growth. Health expenditure was found to have a positive effect on Sub-Saharan economic growth. The study further found that health care is a necessity rather than a luxury in Sub-Saharan Africa. Sethi et al. (2020) examined the short run and long run impacts of health expenditure, institutional quality, and domestic and foreign investment on economic growth. The study was done in South Asia, covering the period 1996-2018. The results revealed that causality runs both directions from health expenditure to growth, and from growth to health expenditure in the short run.

In order to address endogeneity bias and account for varying levels of human and physical capital as well as a set of health expenditure indicators, Gales (2022) applied the threshold panel data models and dynamic linear data models to capture the dynamic impact of health expenditure on growth on a large sample of developing countries. The primary findings indicate that expenditures on domestic health care, both public and private, boost economic growth, but health care expenditures from outside sources do not. Moreover, human and physical capital also contributes to this beneficial effect, showing that expenditures in health, physical capital, and human capital are complementary rather than interchangeable. Bedir (2016) examined the connection between income and health expenditure in emerging markets in Europe and Middle East African and Asian countries over the period from 1995 to 2013. The study found that there was bi-directional causality for the Czech Republic and the Russian Federation. In the countries, Egypt, Hungary, Korean Republic, South Africa, and the Philippines, it was shown that health expenditure causes economic growth. Causality was found to run from growth to health expenditure in Greece, Poland, the United Arab Emirates, China, Indonesia, and the Korean Republic. Ndaguba and Hlotywa (2016) investigated the relationship between health expenditure and economic development in South Africa. The study made use of the autoregressive distributed lag model, the error-correction model, and a time series panel data method. The study revealed that public health expenditure and development had a positive significant relationship. They concluded that health expenditure has the potential to improve health workers' income and their working conditions, leading to more lives being saved. Kurt (2015) examined the internal and external effects of healthcare expenditure on economic growth using monthly data for Turkey. The study established that generally, public health expenditure on economic growth is significantly positive, while the indirect effect is significantly negative. Boussalem et al. (2014) evaluated the relationship between public health expenditure and economic growth in Algeria using time series data spanning 1974-2014. The study employed the cointegration and error correction models methodologies. The results of the study revealed that there is a long run causal effect running from public health expenditure to economic growth. In the short run, there were no causal relationships established. Tsaurai (2014) evaluated the applicability of the Wagner's theory in explaining the health expenditure in Botswana. The motivation of the study was derived from the lack of consensus among scholars on the causal relationship between health expenditure and economic growth. The study failed to establish a causal relationship between growth and health expenditure. The study dismissed the applicability of Wagner's theory.

3. MODEL SPECIFICATION AND METHODOLOGY

Literature on the studies evaluating the relationship between health expenditure and economic growth reveals that scholars have been adopting different methodologies to establish the relationship. The methods that have been used include cointegration and granger causality test (Esen and Keçili, 2021; Shafuda and De, 2020); panel ECM-based Granger-causality (Odhiambo, 2021); visual analytics (Raghupathi and Raghupathi (2021); error correction granger-causality test (Odhiambo, 2021; Boussalem et al., 2014); panel ordinary least square, fully modified ordinary least square and dynamic ordinary least square (Piabuo and Tieguhong, 2017); generalised method of moments method (Aboubacar and Xu, 2017); Toda and Yamamoto granger causality test (Bedir, 2016); autoregressive distributed lag model, error-correction model and a time series panel data method (Ndaguba and Hlotywa 2016) and the Feder-ram model (Kurt, 2015) among others. The divergent number of methodologies shows the general lack of consensus on the subject and how to approach it.

The current study uses the autoregressive distributive lag model (Pesaran et al., 2001). The method has been chosen based on its ease of use when the variables are not integrated of the same order. In other words, the method can be used when the variables are stationary at different levels, save for orders above 1 (Shrestha and Bhatta, 2018). The ARDL model is premised on the ordinary least squares method.

The ARDL method is credited with being a smarter method than other methods of similar nature. The method has the following features: It is applicable to small or finite samples specifically 30 or more observations (Ghatak and Siddiki, 2001). The method can be used even in situations where variables are not stationary at the same level with the exception that the variables are not stationary at levels >1. In other words, the method can be used comfortably where there is a mix of variables integrated of order one and order zero, not anything above. The method resolves the challenges of serial correlation and indogeneity when modelled with appropriate lags (Pesaran et al., 2001). The ARDL method is useful when estimating the long run and short run relationships (Pesaran et al., 2001).

In this study, the model chosen is borrowed from Piabuo and Tieguhong (2017), Esen and Keçili (2021) and Babatunde (2014) though with modifications. Equation (1) highlights the importance of human capital accumulation. The study specifies the following general model to capture the relationships between economic growth and health expenditure:

$$GDP_t = f(BUDG_t, HEA_t, LE_t, CRI_t, OPEN_t) \quad (1)$$

The econometric model adopted is specified as:

$$GDP_t = \beta_0 + \beta_1 BUDG_t + \beta_2 HEA_t + \beta_3 LE_t + \beta_4 CRI_t + \beta_5 OPEN_t \quad (2)$$

Where, GDP is the aggregate real output which is an indicator for economic growth is proxied as growth in gross domestic product and human capital proxied as Total Health Expenditure per capita (HEA). Besides economic growth and health expenditure, the study incorporates the country's trade openness (OPEN), Life Expectancy Rate (LE) at birth defined as an average number of years a child lives from birth life expectancy, government fiscal position (BUDG) and economic crisis (CRI) prevailing in the country taken as a dummy variable capturing economic crisis/ stability as control variables.

The ARDL method estimate $(P+1)^k$ number of regressions to determine the optimal lags for each variable. $P+1$ shows the highest number of lags to be used and k is the number of variables in the equation (Shrestha and Chowdhury, 2005). The model is selected based on the Schwartz-Bayesian Criterion (SBC) that use the smallest possible lag length and is therefore described as the parsimonious model.

Since the study is mostly interested in the relationship between health expenditure and economic growth only two equations are perceived. The ARDL models are specified in equations 3 and 4. These equations incorporate both short run and long run dynamics among the variables.

$$\Delta GDP_t = \beta_0 + \beta_1 GDP_{t-1} + \beta_2 BUDG_{t-1} + \beta_3 HEA_{t-1} + \beta_4 LE_{t-1} + \beta_5 CRI_{t-1} + \beta_6 OPEN_t + \sum_{t=1}^{p} \theta_t \Delta GDP_{t-1} + \sum_{t=1}^{p} \vartheta_t \Delta BUDG_{t-1} + \sum_{t=1}^{p} \mu_t \Delta HEA_{t-1} + \sum_{t=1}^{p} \varphi_t \Delta LE_{t-1} + \sum_{t=1}^{p} \omega_t \Delta CRI_{t-1} + \sum_{t=1}^{p} \varepsilon_t \Delta OPEN_{t-1} \quad (3)$$

$$\Delta HEA_t = \beta_0 + \beta_1 HEA_{t-1} + \beta_2 BUDG_{t-1} + \beta_3 GDPP_{t-1} + \beta_4 LE_{t-1} + \beta_5 CRI_{t-1} + \beta_6 OPEN_t + \sum_{t=1}^{p} \theta_t \Delta HEA_{t-1} + \sum_{t=1}^{p} \vartheta_t \Delta BUDG_{t-1} + \sum_{t=1}^{p} \mu_t \Delta GDP_{t-1} + \sum_{t=1}^{p} \varphi_t \Delta LE_{t-1} + \sum_{t=1}^{p} \omega_t \Delta CRI_{t-1} + \sum_{t=1}^{p} \varepsilon_t \Delta OPEN_{t-1} \quad (4)$$

where β_1 to β_6 are long run parameters and θ, ϑ, μ, φ, ω and ϵ are short run parameters. The null hypothesis of no cointegration is given as $\beta_1=\beta_2=\beta_3=\beta_4=\beta_5=\beta_6$ and the alternative hypothesis is $\beta_1\neq\beta_2\neq\beta_3\neq\beta_4\neq\beta_5\neq\beta_6$. When the null hypothesis is rejected based on the F-statistic implies there is cointegration. The rejection criterion is premised on the Bounds test. The goodness of fit for the ARDL model will be assessed through the stability test provided by cumulative sum of squares of recursive residuals (CUSUMSQ).

3.1. Justification of the Variables

Health expenditure (HEA) have positive effect on GDP. This result emanates from the fact that health is treated as a component of human capital. This means that an increase in health expenditure leads to a higher GDP. Increasing health expenditure leads to effective health intervention which increases labour supply and productivity, eventually leading to a higher GDP.

Life expectancy (LE) at birth is used to measure the effect of technology on health expenditure. It is expected that as the life expectancy at birth changes due to changes in technology, human behaviour will be affected at personal as well as at aggregate level. This then impacts human capital and growth (Coile et al., 2002).

Economic crisis (CRI) is expected to lead to reductions in expenditures on health, lower utilisation of health services, and deterioration of child and maternal nutrition and health outcomes. Economic crisis leads to reduced expenditure on social services and leads to increased cost of health care, which will force households to switch to public health care.

Government fiscal (BUDG) position measures the government surplus or deficit as a percentage of GDP. This determines whether the government has enough fiscal space to accommodate any shocks such a major health outbreak. The fiscal position has an impact on economic growth since the government can manipulate it to achieve certain economic objectives.

Trade openness is defined (OPEN) as the sum of exports and imports relative to GDP. It basically captures the degree of international openness (Dhrifi, 2018)

3.2. Data Sources

The data utilised in this study was secondary data sourced from the Central Bank of Zimbabwe (RBZ) as well as the Zimbabwe Statistical Agency (Zimstats). The study covered the period 2000-2018. The choice of this period is based on availability of data. The period under consideration is the period post the attainment of independence in Zimbabwe.

4. RESULTS AND DISCUSSION

The current study employed time series analysis to determine the relationship between health expenditure and economic growth. To avoid running spurious regressions, the study undertook a unit root test to evaluate the stationarity of the series. Dickey and Fuller (1981) developed the augmented Dickey-Fuller (ADF) test which has gained dominance as a unit root test. The test is premised on parametric approach and developed the Dickey-Fuller (DF) approach. The unit root test results are shown in Table 1.

The results of the unit root test show that BUDG, OPEN are stationery in their levels i.e., there are integrated of level zero. All the other variables (GDP, LIFE, CRI, HEA) are non-stationary and integrated of order 1. This means that the variables of interest in the study are integrated of mixed orders. The highest order of integration is one. This then qualifies the study to proceed using the ARDL method. This is justified on the basis that the ARDL method can be used where there is a mix of variables integrated of order one and order zero (Pesaran et al., 2001). In the next step the study evaluates the existence of cointegration among the variables.

To determine the presence of long-run relationships among GDP, health expenditure, government budget position, trade openness, life expectancy and economic situation, bound test was conducted using the Pesaran, et al. (2001) procedure. Given a relatively small sample size and the use of annual data, a lag length of 2 is used in the bounds test. The bound test results are presented in Table 2.

Table 1: ADF unit root test

Variable	Trend and intercept Level	Trend and intercept First difference
GDP	−0.9727	−5.3525
	(0.9351)	(0.0006)
BUDG	−4.5837	−10.8336
	(0.0043)	(0.0000)
OPEN	−3.7444	−6.0596
	(0.0323)	(0.0001)
LIFE	−0.2995	−8.9524
	(0.9873)	(0.0000)
CRI	−1.4516	−5.6379
	(0.8169)	(0.0000)
HEA	−2.3610	−5.1111
	(0.3923)	(0.0011)

Table 2: Bounds test for cointegration

Test statistic	Dependent variable: GDP			
	Value	Significance (%)	LCB	UCB
F-statistic	8.6769	10	2.331	3.417
K	5	5	2.804	4.013
		1	3.900	5.419
Test Statistic	**Dependent variable: HEA**			
	Value	Significance (%)	LCB	UCB
F-statistic	8.4619	10	2.56	3.09
K	5	5	2.88	3.49
		1	3.29	4.37

The critical values for the lower and upper bound are provided in Table 2. The results show that there is long run relationship among the variables given that the F-statistic is greater than the critical values. The two results imply that there is long run relationship among GDP, health expenditure, government budget position, trade openness, life expectancy and economic crisis.

Following the identification of the long run relationship, the succeeding step is to estimate the coefficients of the long-run relations and the related error correction model employing the ARDL approach. The optimal lags on variables were selected by the Schwartz Bayesian Criterion (SBC) and turned out to be the ARDL (2,4,1,4,3,4) for the GDP equation and ARDL (3, 2, 3, 4,3,4). The long-run estimated coefficients are shown in Table 3.

Table 3 summarise the estimated results of the regression taking GDP and HEA as a dependent variable, regressed on other explanatory variables as shown in the Equation 3 and 4.

The results show that GDP is determined by health expenditure, budget position, life expectancy and economic crisis in the country. Health expenditure and economic crisis have a negative effect on economic growth while the other variables except openness have a positive influence on economic growth.

Health expenditure has a negative effect on economic growth. The results mean that as health expenditure increases, economic growth declines. The results could imply that health expenditure in the country is not growth enhancing but discouraging. This then calls for close analysis and decomposition of the health budget to evaluate the major components of the budget. In Zimbabwe salaries and wages over the years were chewing the greater part of the budget with programming taking the smaller component of the total budget. Yang (2020) found similar result and established that the effect of health expenditure exhibited negative relationship to growth under low levels of human capital. Whilst other authors have established a positive relationship between health expenditure and economic growth (Odhiambo, 2021; Shafuda and De, 2020; Raghupathi and Raghupathi, 2021).

Life expectancy has a positive effect on economic growth. In other words, life expectancy and economic growth trend together. This results in line with other scholars who argue that life expectancy affects economic growth by increasing the investment in human capital. Longer life expectancy means higher return of human

Table 3: Long run regression results

Variable	Dep: GDP Coefficient	Dep: HEA Coefficient
HEA	−1.2933** (0.0153)	-
GDP	-	0.5433* (0.0882)
BUDG	0.0094* (0.0875)	−0.01211* (0.0966)
OPEN	−0.5308 (0.1194)	−1.6733* (0.0782)
LIFE	6.3733* (0.0956)	−1.7660* (0.0841)
CRIS	−1.4308** (0.0383)	−0.4515* (0.0848)
C	14.7419** (0.0433)	1.8072 (0.4198)

Source: Own computation

capital, which encourages more investment in education which ultimately stimulates economic growth (He and Li, 2020). The study established significant positive long-run relationships between life expectancy and GDP per capita in most of the countries in the study (He and Li, 2020).

The results show that the fiscal position has a positive effect on economic growth. The result implies that as the government's fiscal space improves, economic growth also increases. This result makes sense given that the public budget is the tool used by the government to translate its planned programs into action. Therefore, the government is able to manipulate its finances to influence economic growth. The result is supported by Onifade et al. (2020) who found that there exists a level relationship between public spending and economic growth in Nigeria.

Economic crisis has a negative effect on economic growth. This is consistent with other research because an economic crisis leads to disruptions in economic activity while economic stability leads to improved economic activity in the country. The results are in sync with the developments in Zimbabwe, where between 1999 and 2008, the economy suffered an economic crisis and economic growth declined by a significant 40% (Abel and Le Roux, 2016). Post the economic stability the economy registered impressive growth.

Table 3 shows that health expenditure is determined by economic growth, budget position, openness, life expectancy at birth, and the economic situation in the country. Budget position, openness, economic crisis and life expectancy are negatively related to health expenditure. On the other hand, economic growth has a positive effect on health expenditure.

The result of health expenditure on economic growth implies that as an economy grows, the opportunity to increase social spending on health also increases. This implies that as the economy grows, the amount that is earmarked for health expenditure also grows. The growth of an economy increases the national cake for distribution to the various economic and social sectors. This is in line with Wang and Wang (2021), who found that increased health expenditure led to better economic performance.

The other determinants of health care expenditure are in line with apriori expectation. Economic crisis has a negative effect on health expenditure since economic down turns affect government revenues, hence expenditures on health and other sectors. Life expectancy is expected to have a negative effect on health expenditure. The longer the life span of individuals due to improved technology, the lower the cost of individual maintenance. This reduces the cost of health care for the government. The negative coefficient on openness is counterintuitive since it is expected that once a country is more open, the country's health expenditure is expected to increase. The more the economy is open to trade with other countries, the fewer infant mortalities and increased life expectancies in developing countries (Owen and Wu, 2007). Trade openness is a source of increased living standards (Dollar and Kraay, 2004).

Table 4 shows the results of the error correction results. The coefficients on ECM (−1) is statistically significant for the health expenditure and GDP regression. The signs of the ECM (−1) have the correct sign, also confirming that there is long run relationship among the variables.

The error-correction term relates to the fact that the last-period's deviation from a long-run equilibrium, the error, influences its short-run dynamics. Thus, ECMs directly estimate the speed at which a dependent variable returns to equilibrium after a change in other variables. The GDP regression shows that about 69% of equilibrium in last period is corrected in the current year. On the other hand, the health expenditure regression shows that about 31% of equilibrium in the last year is corrected in the current year. The results show that the GDP equation has a higher speed of adjustment as compared to the health expenditure regression.

The error correction model results show that in the short run economic growth is determined by health expenditure, fiscal position, trade openness, life expectancy, and economic crisis. Economic crisis and health expenditure have a negative effect on GDP in the short run while all the other variables have a positive effect. On the other hand, the fiscal position and trade openness have a negative effect on health expenditure, while economic growth and life expectancy positively influence health expenditure in the short run.

The results of the estimated model show that Adjusted R-Squared was 0.965 and 0.835 for the GDP regression and Health regression respectively, indicating a high correlation between dependent and explanatory variables used in the model. Also, the results of the diagnostic tests showed no problem of serial correlation, stability or functional form, normality, and heteroscedasticity.

Figure 3 shows the results of stability test of coefficients.

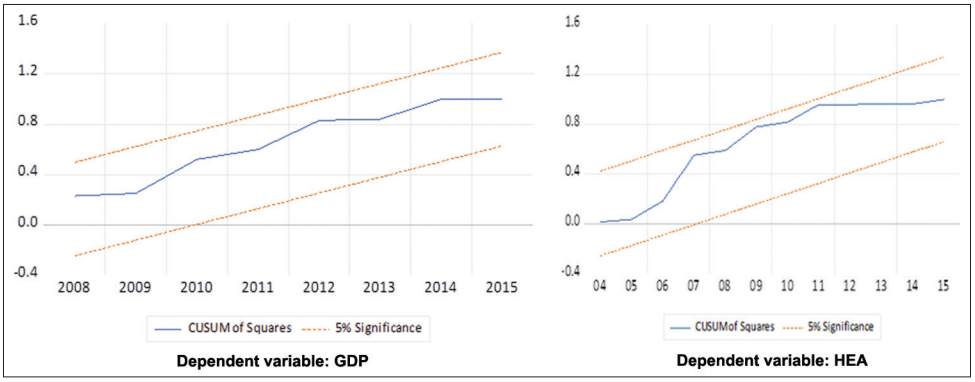
As illustrated in the figure, it is apparent that the plots of CUSUMSQ lie within the two critical lines, and therefore there is no structural break in the model. On the other hand, this shows that long-run and short-run estimates are stable and efficient.

The policy implications deriving from the study are that healthy citizens contribute to overall better economy. Increasing expenditure on health-related issues can potentially increase income. On the other hand, a booming economy has the potential to increase health standards of its citizens. This works by enhancing the fiscal space, which increases the share of expenditure devoted to social sectors such as health and education.

Table 4: Error correction model results

Variable	Dep: GDP	Dep: HEA
D (GDP)	-	1.8168 (0.0078)
D (HEA)	−0.09121 (0.0044)	-
D (BUDG)	0.0034 (0.0005)	−0.0019 (0.5628)
D (OPEN)	0.0869 (0.0000)	−0.5761 (0.0004)
D (LIFE)	2.7213 (0.0097)	3.5069 (0.0139)
D (CRIS)	−2.62E-09 (0.0532)	0.1170 (0.3619)
ECM(−1)	−0.6887 (0.0000)	−0.3055 (0.0000)

Figure 3: CUSUMSQ results



5. CONCLUSIONS AND RECOMMENDATIONS

The study sought to evaluate the relationship between health expenditure and economic growth both in the short and long run, applying the novel method of Autoregressive distributed lag model. The study established that there is cointegration among the variables of health expenditure, economic growth, trade openness, economic crisis and fiscal position. The main result is that health expenditure influences economic growth and vice versa both in the short and long run. The results show that economic growth is also determined by fiscal position, life expectancy and economic crisis. On the other hand, health expenditure is also influenced by budget position, openness, life expectancy at birth and economic crisis in the country.

The results show that there is bidirectional relationship between health expenditure and economic growth in the long run. In the short run, economic growth, trade openness, economic crisis and fiscal position significantly determine health expenditure. The study recommends that government should strive to increase budgetary allocations to health in line with the Abuja Declaration while also putting in place pro-growth policies.

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