Journal of Social, Humanity, and Education (JSHE)
ISSN2746-623X, Vol 5, No 3, 2025, 179-193 https://doi.org/10.35912/jshe.v5i3.2704

Causality between foreign aid and life expectancy in Zimbabwe

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Article History
Received on 7 February 2025
1st Revision on 26 February 2025
2nd Revision on 3 March 2025
3rd Revision on 16 April 2025
4th Revision on 17 April 2025
Accepted on 22 April 2025

Abstract
Purpose: To investigate the causal relationship between foreign aid and life expectancy in Zimbabwe.
Research methodology: This study employed a Granger causality test to analyze the causal relationship between foreign aid and life expectancy for the period–1980-2019.
Results: This study revealed that there is no causal relationship between foreign aid and life expectancy in Zimbabwe.
Conclusions: This study focuses on the causal relationship between foreign aid and life expectancy in Zimbabwe. This finding reveals that aid does not improve life expectancy. Policies for Zimbabwe should not focus much on improving life expectancy by relying mostly on foreign aid, but through domestic financing.
Limitations: The study's limitations include potential factors that may not have been included, which could impact the relationship between aid and life expectancy. These results are specific to Zimbabwe and may not be generalizable to other countries.
Contribution: This study offers valuable insights to the government and other stakeholders in formulating evidence-based policies aimed at optimizing the utilization of foreign aid. Specifically, these findings can inform the design of targeted health policies with the potential to positively influence life expectancy outcomes in Zimbabwe.
Novelty: While previous research has often focused on broad economic indicators, this study uniquely emphasizes health outcomes, specifically life expectancy, as a key measure of development. This study highlights the critical issues of aid mismanagement and corruption, advocating for greater transparency and accountability in the usage of foreign aid.

Keywords: *Causality, Foreign Aid, Life Expectancy, Zimbabwe*

How to Cite: Kondo, T., Mutsvangwa, S., & Mandishekwa, R. (2025). Causality between foreign aid and life expectancy in Zimbabwe. *Journal of Social, Humanity, and Education*, 5(3), 179-193.

1. Introduction

Foreign aid, as a conduit of growth, has attracted research interest. Moyo and Tsakata Mafuso (2017) define foreign aid as a voluntary transfer of public resources, from one government to another independent government, or a Non-Governmental Organization (NGO), or to an international organization (such as the World Bank or United Nations Development Program (UNDP)) with at least a 25 percent grant element, the goal of which is to improve the human conditions in the country receiving the aid. The elite class, which includes important individuals and powerful institutions within the country, has a significant sway over economic policy and resource distribution (Okuji, 2023). Several countries take part in the process of foreign aid either as benefactors, beneficiaries, or as both donors (Kamguia, Tadadjeu, Miamo, & Njangang, 2022). The effect of foreign aid in donor and beneficiary nations is generally unsettled in both theory and empirics, and this has consequently led to

various disputes for and against the benefits of foreign aid. Numerous economists have argued that foreign aid is a sufficient instrument for economic development since it supplements and enhances public assets and provides extra resources that will help economic development (Shpak, 2021).

Thus, according to Nairobi, Santi, and Afif (2021), development is one way to create social welfare. Contrary to this notion, others argue that foreign aid can promote aid reliance, which hinders development (Dalgaard & Hansen, 2015). Despite the current disputes over and against the impact of official development aid in numerous nations, the question of the effectiveness of foreign aid remains an unresolved issue. Throughout the most recent years, developing countries, including Zimbabwe, received net ODA, and some of these nations witnessed momentous changes in development, while others failed to take up ODA. This provides room for this important study. Foreign aid was formed on the basis that it is difficult for developing nations to attain economic development without the help of high-income countries. It started flowing to developing countries with annual amounts averaging to US$22.8 billion during the 1980s (Moyo & Tsakata Mafuso, 2017). According to Murwirapachena and Mlambo (2015), foreign aid flows were US$38.9 billion and US$59.4 billion during the 1990s and the 2000s, respectively. Throughout recent years, about US$3.1trillion of foreign aid in total spilled to African countries including Zimbabwe (Karanda & Toledano, 2018). Sawitri, Eltivia, and Riwajanti (2021) pointed out that, the Covid 29 pandemic led to disruptions in the delivery of foreign aid due to lockdowns, travel restrictions, and logistical challenges. Nasir and Ahsan (2023) added that many aid programs were halted or scaled back, affecting vulnerable populations reliant on external support.

Despite the inflow of aid to support economic development in developing countries, Zimbabwe is among the African countries with a low life expectancy (Murwirapachena & Mlambo, 2015). The popular belief is that the life expectancy of females is always higher than that of males; however, in the past decade, the life expectancy of the Zimbabwean female population has been lower than that of males (Murwirapachena & Mlambo, 2015). Zimbabwe's average life expectancy in 2000 was around 45.67 years and increased to 47.36 years and 52.02 years in 2009 and 2011 respectively (worldbank, 2013). Official development aid seems to have caused more harm than good, seemingly supporting the argument that foreign aid programs depress nations, which leads to high dependency (Easterly, Levine, & Roodman, 2004). The proceeds of development aid from high-income countries to low-income countries have been witnessed for a long time. Such funds are important, as they target economic development in any country. However, a number of developing countries are aid dependent, and such dependence is not favorable for economic development. Figure 1 shows the trends in foreign aid and life expectancy for the period 1980–2019 in Zimbabwe.

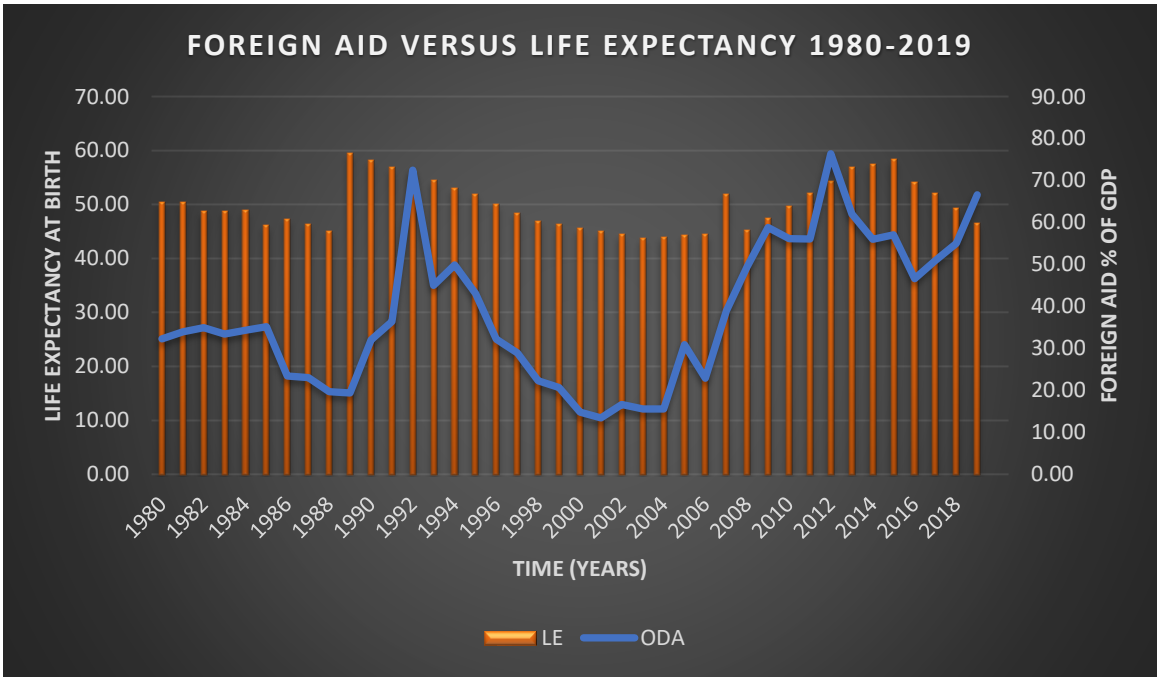

Figure 1: Life expectancy versus Official Development Aid over the Years1980-2019.
Source. World Bank and WHO (1980-2019)

Figure 1 shows that foreign aid in Zimbabwe was low at 19.35% of GDP, while life expectancy was the highest at around 60 years in 1989. Again, the figure shows that ODA rose from 46.63 percent to 66.57%, while life expectancy decreased from 54.2 years to 46.4 years during 2016 to 2019. Thus, this study seeks to unveil the causal relationship between official development aid and life expectancy in Zimbabwe from 1980 to 2019.

ODA in Zimbabwe and other developing countries helped in development areas such as the health sector, primary and secondary education assistance, food aid programs, creation and support of small enterprises, and women empowerment programs, among others. Regardless of the significant and noticeable flow of official development aid in Zimbabwe, the economy is among emerging countries with low life expectancy. Of particular interest is the decrease in life expectancy since 2016 (Figure 1). Conversely, during the same period, official development aid increased, as shown in Figure 1. Because of such observations, the importance of official development aid towards improving human life expectancy becomes uncertain and questionable. Therefore, the current study aims to analyze the nature and significance of the causal nexus between official development aid and life expectancy in Zimbabwe, utilizing time series data from 1980 to 2019.

The objective of this study is to examine the causal relationship between official development aid and life expectancy in Zimbabwe from to 1980-2019. The study lays out the direction of the causal relationship between foreign aid and life expectancy in Zimbabwe and examines the patterns of foreign aid and life expectancy in Zimbabwe over the study period. It is important to understand the relationship between ODA and life expectancy because policymakers and donor countries will be able to evaluate whether the resources available are put to good use in terms of lengthening people's lives through improved health. Different studies related to the link between foreign aid and life expectancy in developed countries exist, but there is a dearth of empirical work that provides the exact link between foreign aid and life expectancy in developing countries, particularly in Zimbabwe. Therefore, the current study focuses on the partially explored foreign aid and life expectancy in Zimbabwe.

The remainder of this paper is organized as follows: the following section reviews both the theoretical and empirical literature that connects with the study. Subsequently, we present the study methodology followed by the present results. The last section provides conclusions and suggestions for future studies.

2. Literature Review

Dependency theory contends that foreign aid is not entirely good for the receiving country, as it has some adverse consequences on its economic and social sectors. They believed that foreign aid creates a monopolistic modern structure that would bring about the underutilization of productive forces that will divide the nation, such that the poor will endure and the rich will benefit. In this way, a gap between rich and poor people will be created, leading to low life expectancy, as the poor will be suffering from a shortage of access to better services. An economy ruled or constrained by foreigners would grow in a disarticulated way (Tsaurai, 2021). With respect to the works of Jensen (2024), foreign aid is crucial for economic development, but it creates dependency. A further study by Mikesell (2017) also revealed that aid is vital for economic development, but it led to high dependency.

Chenery (1967), Rostow (2013), and Galbraith (1961) concur that the huge constraint to economic development for the less developed countries is due to lack of reserve funds, investment rate, and their inability to extend this in both short and long run-on account of institutional and non-institutional bottlenecks that keep their investment at a low rate. They contend that, assuming additional reserve funds as long as foreign aid is injected into less developed nations, they could accomplish a higher development rate than what can be justified by the countries' own investment funds and savings rate. Additionally, it is contended that because of a deficiency of capital, the economies of these nations develop below optimum levels. Along these lines, with the assistance of foreign aid in terms of funds, they can enjoy the advantages of high-output production and can harvest economies of scale as a result

of high-output production. Subsequently, the development rate will prompt higher life expectancy in those economies. The continuous flow of foreign aid will directly increase the development of social sectors such as health facilities and education, among others. Akıllı (2022) finds a positive link after examining the relationship between foreign aid and life expectancy. The study further contends that a country that receives foreign aid and tends to utilize aid funds efficiently has higher possibilities of achieving higher life expectancy. In this way, aid can help in improving life expectancy, particularly in emerging nations.

In line with the works by McKinnon (1964) and Chenery (1967), the foreign exchange earnings expenditure gap approach emphasizes that foreign aid can have a huge positive impact on the development of developing nations, assuming that funds are being utilized for the acquisition of goods and services not produced locally but which are of key importance to the development of the economy. This is important, as the economies of these nations cannot work at the ideal level because of the inaccessibility of foreign exchange reserves to import. Prebisch (1950) recommends that these nations should move out of basic products and go for gigantic import replacement, even with the assistance of foreign aid for the economy to move to a self-supporting development stage. Purchase of goods and services from different nations further develops food sustenance through variety and affordable products, which leads to growth in life expectancy. It is well known that food help programs play a vital role in improving life expectancy.

On empirical grounds, the causal relationship between foreign aid and life expectancy has been explored extensively. The current literature can be arranged into two categories: studies that used time-series techniques for single countries to explore whether foreign aid has an effect on life expectancy and studies that applied panel data techniques to a sample of heterogeneous nations.

Herzer (2019) examined the relationship between total aid and population health using panel cointegration and causality techniques designed to deal with problems afflicting previous aid-health studies: spurious regressions, omitted variables, endogeneity, cross-sectional dependence, and parameter heterogeneity. Their main results found that aid has, on average, a small but negative long-run effect on health, while the long-run (or trend) effect of aid on health is negative and the short-run (temporary) effect of aid on health is positive. Causality runs in only one direction, from aid to health, and aid worsens health mainly in sub-Saharan countries but has a positive, albeit statistically insignificant, long-run impact on health in Latin American and Caribbean countries and in countries with negative values of net ODA..

Korkmaz and Kulunk (2016) examined granger causality between life expectancy, education and economic growth in OECD countries, using data from 2007-2013. A panel causality test was conducted to reveal the relationship between higher education schooling rate, life expectancy at birth, and economic growth, showing a unidirectional causality relationship from economic growth to higher education schooling rate and life expectancy at birth.

Tang and Bundhoo (2017) investigated the impact of foreign aid on economic growth in Africa's ten largest recipient of aid. Their results show that aid does not contribute significantly to economic growth. However, the interaction of aid with the policy index shows that aid tends to increase the growth rate when the policy environment is good. Therefore, the research found that the effectiveness of foreign aid is conditional on economic and political polity.

Adebanji, Nwosa, Ojo, and Alake (2020) examined the relationship between foreign aid and infant mortality rate in Nigeria from 1981 to 2019 using the autoregressive distributed lag (ARDL) technique. Their research concluded that foreign aid negatively impacted child mortality, health, real GDP, and carbon dioxide emissions in Nigeria. Mary and Gomez y Paloma (2015) examined the impact of aid on reducing malaria prevalence and health care quality. The study used representative household surveys and geo-information data, while the difference-in-difference technique was used for estimation. Their results showed that aid reduced malaria prevalence and increased individual health care reporting.

Eze, Okpara, and Madichie (2020) examine the impact of foreign aid on growth in Nigeria using disaggregated data for foreign aid. Their study ascertained how various types of aid (education, health, industry, and economic infrastructure) affected economic growth. Their research employed Canonical Cointegrating Regression (CCR) on data ranging from 1995 to 2017. Their results showed that only education aid contributes to economic growth significantly in Nigeria; although health aid was positive, it was not significant.

Wayoro and Ndikumana (2020) analyzed the impact of local-level aid on health outcomes in Côte d'Ivoire. Using the Demographic Health Survey and geoinformation dataset, difference-indifference techniques were used for the estimation. Their results showed that proximity to development aid projects reduced infant mortality rates. The research suggested that proximity to prenatal and postnatal facilities are channels through which aid affects infant mortality.

Şentürk and Ali (2021) analyzed the socioeconomic determinants of Turkey's aggregate and gender-specific life expectancies for the period 1971 to 2917. The ARDL bound test was conducted to identify cointegration. Their estimated results show that the overall level of education, purchasing power, and economic development have a significant role in determining the average life expectancy among the Turkish population at the aggregate level, while population growth and environmental degradation are found to be insignificant. Gender-wise, the estimation results show that environmental degradation, purchasing power, and level of male education contribute significantly to the life expectancy of males in Turkey, while economic development and the share of the male population are found to have insignificant effects. Moreover, environmental degradation, female education, fertility rates, and female population significantly affect female life expectancy, while purchasing power plays a statistically insignificant role.

Oseni (2022) assessed the effect of health aid on life expectancy using data on 46 SSA countries from 2000 to 2019, which were sourced from the World Development Indicator, Organization for Economic Co-operation and Development Creditor Reporting System, and United Nations Children's Fund. The system Generalized Method of Moment (system GMM) was adopted in analyzing the data owing to its appropriateness for the scenario at hand. The validity of the model was examined with autoregressive (AR) tests AR (1) and AR (2)), while the Sargan and Hansen tests assessed the validity of the instruments used in the estimation. The robustness of the system GMM was confirmed using pooled ordinary least squares and fixed effect regressions. The results showed that health aid does not have any significant effect on life expectancy in SSA. Rather, life expectancy was significantly improved by school enrolment, trade openness, Gross Domestic Product per capita, and physician density, while corruption significantly reduced it. The study recommended more judicious utilization of official development assistance meant for the health sector, policies capable of achieving noticeable growth and development, and improved efforts to eradicate corruption in government policy implementation in the health sector to significantly improve life expectancy in the region.

Regardless of the fact that the outcomes from empirical reviews between the two variables are mixed, most of the reviewed empirical works support a positive link between foreign aid and life expectancy. Other empirical studies that have investigated the relationship between official development aid and other variables, such as economic growth, also support a positive link. In addition, there are no results on the Granger causality between foreign aid and life expectancy in Zimbabwe. Given these mixed findings, this study is rightfully placed to examine the nexus between foreign aid and life expectancy. The following section presents the methods used in this study.

3. Methodology

Chika, Oshiogwemoh, and Promise (2022) pointed out that research analysis should be guided by a functional effect that establishes both dependent and independent variable metrics. To attain the objectives of the study, the Granger causality approach is used. The Granger approach of testing causal relationships is a type of vector autoregressive model by which all variables are treated as endogenous. Consequently, the model is sometimes termed VAR-Granger. D. N. Gujarati (2009) pointed out that the most critical benefit of involvingisRthatsithat it accounts for the the t for lintertemporalmporal

dynamics between variables. Among the previous scholars who used the method to deal with the causal relationship between foreign aid and other variables are Korkmaz and Kulunk (2016) and Şentürk and Ali (2021). The model used in this study was adapted from Korkmaz and Kulunk (2016) and is specified as follows:

$$GDP_{1t} = \alpha_{11} + \sum_{l=1_{p1}}^{P_1} \beta_{11l}\, GDP_{1t-l} + \sum_{l=1_{P_1}}^{P1} \delta_{11l} SR_{1t-l} + \sum_{l=1_{P_1}}^{P_1} \varphi_{11l}\, LE_{1t-l} + \varepsilon_{11t}$$

$$GDP_{Nt} = \alpha_{1N} + \sum_{l=1} \beta_{1Nl}\, GDP_{Nt-l} + \sum_{l=1} \delta_{1Nl}\, SR_{Nt-l} + \sum_{i-1} \varphi_{1Nl}\, LE_{Nt-l} + \varepsilon_{11t}$$

$$SR_{1t} = \alpha_{21} + \sum_{L=1_P}^{P_2} \beta_{21l}\, GDP_{1t-l} + \sum_{L=1_P}^{P_2} \delta_{21l}\, SR_{1t-l} + \sum_{l=1_p}^{p_2} \varphi_{21l}\, LE_{1t-l} + \varepsilon_{21t}$$

$$SR_{Nt} = \alpha_{2N} + \sum_{l=1}^{2} \beta_{2Nl}\, GDP_{Nt-l} + \sum_{L=1}^{2} \delta_{2Nl}\, SR_{Nt-l} + \sum_{l=1}^{2} \varphi_{2Nl}\, LE_{Nt-l} + \varepsilon_{2Nt}$$

$LE_{1t} = \alpha_{31} + \sum_{l=1_{p1}}^{P_3} \beta_{31l}\, GDP_{1t-l} + \sum_{l=1_P}^{P3} \delta_{31l} SR_{1t-l} + \sum_{l=1_{P_1}}^{P_3} \varphi_{31l}\, LE_{1t-l} + \varepsilon_{31t}.$

$$LE_{Nt} = \alpha_{3N} + \sum_{l=1}^{3} \beta_{3Nl}\, GDP_{Nt-l} + \sum_{L=1}^{3} \delta_{3Nl}\, SR_{Nt-l} + \sum_{l=1}^{3} \varphi_{3Nl}\, LE_{Nt-l} + \varepsilon_{3Nt}$$

From the sets of equations above, GDP is Gross Domestic Product, SR is Schooling rate, LE is life expectancy at birth, ε is a white noise, α, β, δ, and ϕ are constant. Because the goal of Korkmaz and Kulunk (2016) was to find the link between life expectancy, Gross Domestic Product and Schooling Rate, the current study changed the model to suit its goals. Thus, the equations were modified as follows:

$$ODA_t = \alpha + \sum_{i=1}^{m} \beta_{11}\, ODA_{t-p} + \sum_{i=1}^{m} \rho_{12}\, LE_{t-p} + \varepsilon_{At}$$

$$LE_t = \eta + \sum_{i=1}^{m} \gamma_{21}\, ODA_{t-p} + \sum_{i=1}^{m} \varphi_{22}\, LE_{t-p}\, \varepsilon_{Bt}$$

In these equations, ODA_t and LE_t are foreign aid flows and life expectancy, respectively. The model constraints are α and η whilst β, ϱ, γ, φ are parameter coefficients termed model restrictions. The above equations are unrestricted because they include lagged values of both the dependent and independent variables on the right side.

3.1 Data source

Statistical data, which incorporate net official development aid and life expectancy, were obtained from the World Bank and WHO, and the determination of sample size was in accordance with (D. N. Gujarati, 2009).

3.2 Post diagnostic test

As pointed out by Kondo and Mutsvangwa (2025), it is fundamental that one should carry out diagnostic tests when assessing the validity of the chosen model. C. Brooks (2019) contendthat ed t,hat prior to assessioutcomesmes,mes one ougto perfodo diagnostic tests to guarantee the availability of dathatithat ch satisfy assumptions of the chosen parameter estimation proced;re, fexamplexam,ple the Gauss Markov assumptions while utilizing OLS. In the case that such assumptions are not satisfied, the scholar needs to settle on other assessment methodologies that do not have extreme preconditions. Traditional tests, such as heteroscedasticity, are important because the variance of the error terms is not consistent. Put plainly, the spread of residuals will vary over time. Greene (2003) mentioned that the impacts of

heteroscedasticity consolidate misjudging standard errors and variance of parameter coefficients and inaccurately high t-proportions leading to the conclusion that our variables are inconsequential but actuality, there are not. Moreover, they can lead to a type-one error (D. Gujarati, 2014). Autocorrelation occurs when the error terms from the regression equation are connected. Suppose the residuals follow a comparative sequence; it is recommended that autocorrelation is accessible. This disregards the assumption that all values of the error term are independent of each other. Among the reasons behind autocorrelation is the omission of significant factors; in the current review, picking lags lower than the ideal might lead to autocorrelation. Asteriou and Hall (2007) pointed out that in the event that the above conditions are fulfilled, the error terms show sequential autonomy. D. N. Gujarati (suggestedght up that model misspecificoccursappens dthe ue to prohibition of an important variable or consideratian on of immaterial variable. In this review, model misspecification could come because of including fewer lags of aid flows than ideal, and incorporation of more than ideal lags may over-fit the model.

4. Results and Discussions

4.1 Descriptive statistics

The descriptive statistics for DODA and DLE provide major aspects on respective distributions and behaviors, particularly in the context of the Zimbabwean economy. Yeboah (2020) argued that the central tendencies of the data can be measured using the means, and the nature of the distribution of the series (normality) is determined by the values of the coefficients of the skewness.

Table 1. Descriptive statistics.

	DODA	**DLE**
Mean	0.878974	-0.10077
Median	-0.08	-0.65
Maximum	36.1	14.32
Minimum	-27.48	-6.75
Std. Dev.	10.70304	3.270035
Skewness	0.61379	2.325102
Kurtosis	5.361127	11.60374
Jarque-Bera	11.50804	155.4292
Probability	0.00317	0.0000
Observations	39	39

From Table 1, DODA has a mean value of approximately 0.88, suggesting that, on average, the observations are slightly positive. However, a median of -0.08 indicates that a substantial portion of the data lies below this average, revealing a degree of asymmetry in the distribution. The maximum value of 36.1 and the minimum of -27.48 highlight the considerable range of values, pointing to a highly volatile dataset. This volatility is further emphasized by the standard deviation of 10.70, which indicates that the data points are widely dispersed from the mean, suggesting that extreme fluctuations are common. A skewness of 0.61 indicates a moderate positive skew, meaning that while most values cluster around the lower end, there are some significant outliers on the higher end. This is supported by the kurtosis of 5.36, which characterizes the DODA as leptokurtic. Such a distribution has a sharper peak and fatter tails than a normal distribution, suggesting a higher likelihood of extreme values, which is typical in economic datasets influenced by volatile market conditions. The Jarque-Bera statistic of 11.51, with a corresponding probability of 0.00317, indicates that DODA significantly deviates from normality, reinforcing the notion of its non-normal distribution and the presence of outliers.

In contrast, DLE presents a different profile. The mean of -0.10 suggests a slightly negative average outcome, with a median of -0.65, further confirming that more than half of the observations fall below this average. The maximum value of 14.32 and a minimum of -6.75 indicate a limited range compared to DODA, which aligns with the lower standard deviation of 3.27, suggesting that DLE is more stable and less volatile in nature. However, the skewness of 2.33 indicates a strong positive skew, suggesting

a greater number of high-value outliers relative to the bulk of the data, which could be indicative of certain economic phenomena impacting this variable. The kurtosis of 11.60 signals that DLE is highly leptokurtic, with an even sharper peak and significantly fatter tails compared to a normal distribution, indicating a very high propensity for extreme values. This is further corroborated by the Jarque-Bera statistic of 155.43, with a probability of 0, suggesting that DLE also significantly departs from normality.

The descriptive statistics illustrate that DODA is characterized by high volatility and a tendency for extreme values, while DLE, although less volatile, exhibits strong skewness and a high likelihood of outliers, both indicating leptokurtic distributions.

4.2 Unit Root Test

Table 2. Augmented Dickey–Fuller results.

Variable	ADF Statistic	P-value	Critical Value at 5%	Drift	Trend	Intercept	Order of integration
LE	-6.569448	0.0000	-2.941145	NO	NO	YES	1(1)
ODA	-7.589722	0.0000	-2.941145	NO	NO	YES	I (1)

The variables in Table 2 are stationary at I (1), demonstrating a mean-reverting series. This is proven by the absolute values of the ADF statistics, which are greater than 0.05. D. Gujarati (2014) pointed out that variables are said to be stationary whenever the absolute values of ADF statistics are greater than the critical values. Hence, the scholar concluded that the ODA and LE are stationary at I (1).

4.3 Phillip - Perron test

The researcher also applied the Phillips-Perron (PP) test to determine stationarity among variables because ADF has lower power in the event that the stationary process is close to the unit root, particularly when the sample size is small. The findings of the Phillips–Perron test are presented in Table 3.

Table 3. Phillips -Perron test

Variable	PP Statistic	P-Value	Critical value at 5%	Drift	Trend	Intercept	Order of integration
LE	-6.564149	0.0000	-2.941145	NO	NO	YES	I(1)
ODA	-7.465404	0.0000	-2.941145	NO	NO	YES	I(1)

The absolute values of PP test statistics are greater than 0.05 levels of significance. ADF and PP tests demonstrated that the variables are stationary at I (1); therefore, the condition to complete the cointegration test is fulfilled.

4.4 Cointegration test

The absence of I (2) variables in the model encourages the researcher to test for a long-term relationship between foreign aid and life expectancy. We used the ARDL bound test approach with Pesaran tables (Pesaran, Shin, & Smith, 2001). This is because the ARDL bound test allows for different lag lengths for each variable in the model, providing greater flexibility in capturing the dynamics of the relationship

between variables than Engle and Granger (1987). In contrast, the Engle-Granger method typically assumes the same lag structure for both the variables. Values of the upper and lower are basic in choosing if there is a long-run association. Table 4 presents the cointegration results.

Table 4. ARDL Cointegration test results

Test Statistics	Values	K
F-Statistics	14.08041	1

Critical value Bounds

Significance	Lower Bound	Upper Bound
5%	3.62	4.16

The ARDL bound test results highlighted in Table 4 present positive results. K addresses the number of autonomous variables in the model (number of regressors). At the 5% significance level, the F-statistics is higher than the lower bound and upper bound values, and this gives space to infer that there is a run relationship between life expectancy and foreign aid. To check for the long-run speed of adjustment between foreign aid and life expectancy, we employed the ECM model. The findings are shown in Table 5.

Table 5. Error Correctional Method

Variable	**Coefficients**	**Probability**
CointEq(-1)*	-1.108648	0.0000

The findings in Table 5 show a long-run causal relationship among the variables. The study concludes that there is a long run reversion to equilibrium ($p < 0.001$). This shows that there is a rapid change from short-run to long-run equilibrium in any case of disequilibrium in the system. In other words, the adjustment time which is - 1.108648 shows that the reversion to the long-run equilibrium is at an adjustment speed of 110%.

4.5 Lag length criteria

To choose the appropriate lag length, Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), and Hannan-Quinn Information Criterion (HQIC) were used. D. G. Brooks (1989) postulates that AIC is efficient yet not dependable while SIC is not viable yet firmly reliable. Moreover, Diebold (2017) and Greene (2003) put forward that the AIC has the flaw of over-fitting a model as time increases to infinity, while the SIC has the result of under-parameterizing models in small samples. In this manner, utilizing universal insight, a trade-off between consistency and efficiency is preferable. The results are presented in Table 6.

Table 6. Optimum Lag Length

Lag order	**Akaike Information Criterion**	**Schwarz Information Criterion**	**Hannan-Quinn information criterion**
0	14.32041	14.40748	14.35110
1	12.88718	13.49541	13.21352
2	13.06003	13.14841	12.97927
3	13.12568	13.73522	13.34057

While the AIC results conflict with the results from the other two criteria, the study chose a lag length of two using SIC and HQIC. This was informed by the findings of Koehler and Murphree (1988), who showed that when AIC and SIC yield conflicting results, SIC is a better option. However, it yields

models with fewer parameters (Gayawan & Ipinyomi, 2009). In addition, while the AIC and HQIC impose a penalty term on a number of parameters, the HQIC has a lower penalty. Therefore, lag length 2, which was chosen by the SIC and HQIC, was used in this study.

4.6 Other Diagnostic Test

To check the suitability of the model, we carry out diagnostic tests to check for the possible issues of autocorrelation, heteroskedasticity, and misspecification. Using a 5% level of significance, the study concluded that there is no serial correlation, as shown by the LM test. Results from the Harvey-Godfrey test indicted that there is no heteroskedasticity; thus, the model residuals are homoscedastic and the model correctly specified as indicated by Ramsey Reset test results.

Table 7. Results for another diagnostic Test

Diagnostic Test	**P-value**	**F-value**
Serial LM	0.7599	0.276852
Heteroskedasticity	0.9298	0.073130
Ramsey Reset	0.7068	0.540981

4.7 Granger Causality Test results

To examine the causal relationship between foreign aid and life expectancy in Zimbabwe, the study used the Granger causality approach. The findings are reported in Tables 8 and 9. From the findings in Table 8, D stands for the difference operator. Taking the hypothesis that DODA does not Granger cause DLE, the probability values are above the 5% level of significance, which makes one not accept the null hypothesis. The second hypothesis in that table states that DLE does not Granger-cause DODA and is also not accepted. Therefore, differenced foreign aid does not Granger cause the differenced life expectancy in Zimbabwe, and vice versa.

Table 8. Granger causality Test

Direction of causality (Null hypothesis)	**Decision Rule**	**F-statistic**	**P-value**	**Conclusion**
DODA does not Granger cause DLE	Reject H_0 if the p-value < 0.05	0.74937	0.4808	Do not reject H_0
DLE does not Granger cause ODA	Reject H_0 if the p-value < 0.05	0.88517	0.4225	Do not reject H_0

Table 9. Granger Causality Test

Direction of causality (null hypothesis)	**Decision Rule**	**F-statistic**	**P-value**	**Conclusion**
ODA does not Granger cause LE	Reject H_0 if the p-value < 0.05	0.67161	0.5177	Do not reject H_0
LE does not Granger cause ODA	Reject H0 if the p-value < 0.05	0.78659	0.4637	Do not reject H_0

The results in Table 9, where the data were not differenced, support the findings in Table 8. Hence, this study supports the Dependency Theory and Dead Aid Hypothesis.

4.8 Discussion of Results

Research findings indicate that foreign aid is not a contributing factor to life expectancy in Zimbabwe. Like other African nations, Zimbabwe prominently depends on foreign aid to stimulate economic development. The results of this study clearly reveal that there is no causal relationship between foreign aid and life expectancy, meaning that these two variables are independent of each other. Low life expectancy remains a challenge in many developing countries, and the conviction keeps on winning that under specific circumstances, foreign aid can mitigate such a problem. Given this paradigm, this study refines the adverse consequences of foreign aid on life expectancy. The study finds that foreign aid, in general, has a milled egalitarian effect on life expectancy in Zimbabwe. In the words of Moyo and Tsakata Mafuso (2017), the response was zero. Moyo and Tsakata Mafuso (2017) contend that foreign aid affects African countries, and aid has helped make the poor poorer and slower in development in these countries. They contended that such behavior emanates from mismanagement of aid funds, political gimmicks, and absence of good administration in the beneficiary country. In addition, Dependency Theory proposes that foreign aid is not entirely good for the receiving country as it has some adverse consequences on the countries' economic and social sectors and the distribution of income in the economy, and hence, this alone will have an imbalance in life expectancy within the economy. Akıllı (2022), Oseni (2022), and Kharel, Adhikari, and Khadka (2021) reached the same conclusion in their respective studies. They called attention to socio-economic factors and lack of statistics on who should benefit from the program as some of the significant reasons for the ineffectiveness of foreign aid in improving life expectancy in developing countries. The inflow of foreign aid does not guarantee access to basic needs such as health services and clean water, particularly for individuals in remote areas. Therefore, health improvements remain static in remote areas (Easterly et al., 2004). In Zimbabwe, the non-existence of strong democratic institutions has possibly discredited the economic system, repressive policies, corruption, and mismanagement of aid, thereby potentially diverting from the first intention in which the aid was given. Other than this, onerous conditionalities and fiscal imprudence may have made foreign aid a curse rather than a blessing in Zimbabwe.

The study reveals that foreign aid inflow is not an important tool in fostering the improvement of life expectancy in a developing country. The results have several significant policy implications. In light of these results, the authorities may need to be conscious of its mismanagement of resources.

Shpak (2021) argued that, it is extremely dangerous to depend on different nations' offers. In this manner, the author emphasizes self-reliance as an approach to stimulate development, and a case in hand is the freezing of foreign aid by US President Donald Trump. The government of Zimbabwe may not consider depending solely on foreign aid as an approach to stimulate life expectancy. It may also consider implementing policies such as imposing a high tax on, say, cigarette companies such that the rate of smoking will be reduced, which may then positively affect life expectancy.

5. Conclusion

The study carried out diagnostic checks, and the results show that variables have no unit root at first difference after employing ADF and PP tests; thus, all variables became stationary at first difference. The study proceeded to perform a cointegration test using the ARDL bounds test to check for the long-run relationship between variables. The null hypothesis of no long-run relationship between variables was dismissed. To determine the long-run speed of adjustment between foreign aid and life expectancy, the authors employed the ECM model. The results show that there is a rapid change from short-to long-run equilibrium in any case of disequilibrium in the system. The results are in accordance with the foreign exchange earning expenditure gap approach, which postulates that in the long run, foreign aid has a larger favorable impact on the growth and development of underdeveloped countries. The long-run relationship also upholds the work of Herzer (2019), who contended that proceeds from foreign aid in developing economies stimulate economic development in the long run, assuming good government policy exists in the receiving country. Although the study was generally intended to analyze the causal relationship between foreign aid and life expectancy, it ought to be justified that no single theoretical framework fits into a solitary response in a consistently changing economic development landscape. Hence, the results of this study clearly reveal no causal relationship between foreign aid and life expectancy, meaning that these two variables are independent of each other. Low life expectancy

remains a challenge in many developing countries and the conviction keeps on winning that under specific circumstances, foreign aid can mitigate such a problem

5.1 Policy recommendations

Proof in this research reveals that foreign aid inflows are not an important tool in fostering the growth of life expectancy in the case of Zimbabwe. The results have several significant policy implications. In light of these results, public authorities should be conscious of better management of resources, especially aid. The mismanagement of AID from external organizations such as USAID should be emulsified such that there is efficient use of AID for development purposes to benefit the poor. There should be transparency and accountability. of aid. Thus, the government must impose stiff penalties on those found diversifying funds from the development agenda for other purposes.

Foreign aid in the form of funds should be channeled into social sectors, such as health and education, to make a greater impact on life expectancy. Channeling funds to the health sector helps improve health facilities such as hospitals and clinics. They should utilize it to establish more clinics, purchase medicines, and other facilities. This could contribute to growth in life expectancy.

It is extremely dangerous to depend on different nations' offers. In this manner, it is within this study that Zimbabwe should consider self-reliance as an approach to stimulate development. The government should not depend only on foreign aid as an approach to stimulate life expectancy growth, but also have other strategies to domestically pool the funds towards important social sectors. It should also implement policies such as imposing a high tax on cigarette companies such that the rate of smoking will be reduced, which then positively affects life expectancy. It must also buy irrigation equipment to sustain agriculture throughout the year, thereby stimulating exports that also promote high economic development.

Training in different skills in developing countries provides the basis for development, as it facilitates entrepreneurship. Developed countries or any Non-Governmental Organization that provides foreign aid to developing countries, such as Zimbabwe, must provide training as a way of increasing human skills. They must offer training in different projects, such as fish projects and cattle breeding, as a way of facilitating long-term economic development. This additionally empowers a country to support itself instead of relying upon foreign aid or other help from rich nations.

5.2 Suggestions for future study

The current research focused on the causal relationship between foreign aid and life expectancy in Zimbabwe, utilizing the Granger approach only. Thus, researchers propose that future studies should look at foreign aid and life expectancy in a panel analysis utilizing random effects methods such as ARCH and GARCH models. It is paramount for other authors to use other major explanatory variables that have a high impact on life expectancy in Zimbabwe. Expenditure on the health sector, poverty, unemployment, and population growth are some of the factors that affect life expectancy.

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