

Impact of Government Health Expenditure, Energy Use and Ecological Foot Prints Consumption on Life Expectancy: An Analysis from Developing Countries

Mudassar Yasin¹, Shahla Saeed², Muhammad Tahir Amin³, Durdana Qaiser Gillani⁴ and Iqbal Javed⁵

¹Department of Agriculture Extension, MNS-University of Agriculture, Multan, Pakistan.

²College of Nursing, Services Institute of Medical Sciences, Lahore, Pakistan.

³Preston University Kohat, Islamabad Campus, Pakistan.

⁴Department of Economics, Preston University, Islamabad, Pakistan.

⁵Department of Economics, University of Lahore, Sargodha, Pakistan.

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ABSTRACT

Healthcare expenditures are one of the most important rudiments of life expectancy, and research has concluded that a positive association exists between life expectancy and healthcare. Considering this, we have focused on how immunization, government health expenditures, economic growth, and energy consumption may enhance the life expectancy of some selected developing economies. The data was analyzed from 2005 to 2020 in nine developing Asian economies. Life expectancy at birth was used as the dependent variable. The authors used the fixed effect technique to analyze how life expectancy was affected by these factors. Findings indicate that immunization, economic growth, and energy consumption have enhanced life expectancy. Moreover, consumption of an ecological footprint has decreased life expectancy at birth in Asian economies. Findings suggest more allocation and proper utilization of health expenditure in the concerned economies. Proper energy usage for more production should exist, which may not affect the environment. Finally, the Government must provide medical facilities to increase the life expectancy.

Corresponding Authors: Iqbal Javed (Email: iqbaljaved.uaf@gmail.com)

INTRODUCTION

Jie et al. (2001) and Courtney et al. (2002) explained that life expectancy has imperative repercussions for persons and comprehensive human assertiveness. The authors pointed out that it decisively affected fertility behavior, economic growth, human capital investment, intergeneration allocations, and enticements for pension remunerations. In excess of the previous two eras, one of the astonishing attainments of rich nations has been the extraordinary upsurge in life expectancy. Life expectancy at birth is the average number of years an individual can be predicted to live from birth, assuming continuous age-detailed mortality levels (Laranjeira & Szrek, 2016). Life expectancy is perhaps a major significant pointer of a nation's welfare (Ho & Hendi, 2018), a substitution for health that the World Health Organization (WHO, 2006) describes in place of "a state of comprehensive corporeal, rational and communal comfort and not just the nonappearance of illness or susceptibility". Life expectancy is more than just a figure; it is the system to recognize and evaluate the effects of management strategies, human performance, and traditional arrangements in an assumed setting or nation. Life expectancy could inspire numerous further communal and financial features, for instance, fertility rate, customer tendency to use, human capital investment, pension expenditure, public finance, and growth (Shaw et al., 2005).

Life expectancy has been observed as a centralized or much-focused issue in developing nations. Income, educational level, urbanization, healthcare expenditure, contributions, the number of physicians, access to safe drinking water, nutritional consequences, and terrestrial places have been noted to be noteworthy factors of life expectancy in underdeveloped nations (Husain, 2002). Human actions; like, burning fossil fuels to power transportation, manufacturing sectors, and energy manufacture, are the major sources of growing ecological pollution. Dangerous air substances or pollutants released into the air by numerous anthropogenic or usual developments of achievement can upsurge the harmful special effects on community well-being (Montazeri et al., 2018). Consequently, administrations may allocate their partial possessions to the growth of environmentally poisonous waste preclusion.

Healthcare expenditures play a significant role in determining and improving economies' growth potential. Research work has been done on the positive link between spending on health services and the growth of the economies. Much spending on health results in improved efficiency and production, which benefits the economy.

Extraordinary growth tends to increase human capital investment levels; healthcare expenses significantly enhance economic growth and improve ecological sustainability (Raghupathi and Raghupathi, 2020).

Much research has been done regarding different factors affecting life expectancy at birth in developing and developed nations. However, we show the major role of immunization, energy use, economic growth, and ecological footprint consumption in life expectancy at birth. Castello and Domenech (2002) offered a theoretical model showing the effects of inequality on per capita income in case persons make decisions about human capital accumulation based on their life expectancy. Moreover, giving out education was based on the continuation of numerous steady states. Shaw et al. (2005) found that pharmaceutical use positively affected the life expectancy at the centre and highly developed ages but was responsive to the age distribution of a specified nation. It was also found that increased pharmaceutical expenditures increased life expectancy for males aged 40.

Balan and Jaba (2011) also worked on the life expectancy in 2008. The result showed that wages, the number of beds in hospitals, the number of doctors, and the number of readers subscribed to libraries led to increased life expectancy. However, the ratio of the Roma and illiterate populations decreased life expectancy. Lin et al. (2012) also analyzed factors affecting life expectancy in 119 less-developed nations using data from 1970 to 2004. The authors used linear mixed models. The result showed that democratic politics and democracy increased life expectancy.

Monsef and Mehrjardi (2015) investigated the causes of life expectancy in 136 nations from 2002 to 2010. Findings highlighted that unemployment and inflation led to a decrease in life expectancy. However, the gross capital formation and gross national income resulted in increased life expectancy. Gilligan & Skrepnek (2015) highlighted the socio-economic and expenditure reasons affecting life expectancy using data from 21 economies from 1995 to 2010. It was found that gross domestic product, vaccination, literacy, health expenditures, and urbanization caused increased life expectancy. Sede & Ohemeng (2015) analyzed Nigeria's socio-economic determinants of life expectancy by utilizing data from 1980 to 2011. The authors have used VAR and VECM models for the analysis. The study result showed that per capita income, education and government expenditure on health may affect life expectancy. The study suggested improved government health expenditure, reduced unemployment and depreciation of the Nigerian Naira.

Chan et al. (2022) tried to show the factors influencing life expectancy using data from 1991 to 2019 of D-8 countries. They used the ARDL model. The result showed that life expectancy was influenced positively by health expenditure and urban population growth. Rofia et al. (2023) also focused on the causes of life expectancy at birth in 36 OECD countries using data from 1999 to 2018. Fixed effect results pointed out that per capita healthcare expenditure, incidence of out-of-pocket expenditure, physician density, hospital bed density, social spending, economic growth, workforce, prevalence of chronic respiratory diseases, temperature, and total population affected life expectancy at birth. However, Redzwan & Ramli (2024) analyzed the association between carbon emissions, GDP, health expenditure, and life expectancy in Malaysia using data from 1997 to 2021. The ARDL result showed that carbon emissions and health expenditure significantly affected life expectancy. Murthy et al. (2021) analyzed the causes of life expectancy in D-8 nations from 1992 to 2017. The result indicated that population and healthcare expenditure affected life expectancy positively.

The current work has focused on the impact of immunization, energy consumption, ecological footprint consumption, economic growth, and government health expenditures on the life expectancy of developing economies. The current research will also offer a strategy for further development and chief enactments.

Significance of the Study

Much of the analysis has been done to check the impact of investment levels, human capital, trade liberalization, inflation, and unemployment on life expectancy at birth. However, the existing work reveals how immunization, energy usage, economic growth, government health spending, and ecological footprint consumption affect life expectancy at birth in selected developing economies, which is indispensable for additional growth in developing economies.

Research Hypothesis

The hypotheses of the current work are given as:

- H1: A positive link between immunization and life expectancy is expected in developing economies.
- H 2: The higher the energy usage, the higher the life expectancy.
- H 3: Economic growth positively affects life expectancy in developing economies.
- H 4: Ecological footprint consumption is negatively related to life expectancy.
- H5: Higher Government health spending and higher economic growth in developing economies.

RESEARCH METHODOLOGY

By drawing data from 2005 to 2020, an effort has been made to highlight factors such as immunization, economic growth, energy consumption, government health expenditures, and consumption of ecological footprints affecting life expectancy at birth in some developing economies. The data were drawn from Bangladesh, India, Indonesia, Iran, Jordan, Malaysia, Pakistan, Philippines and Sri Lanka. Life expectancy was used as the dependent variable, and data for explanatory variables was collected from World Development Indicators. This analysis used immunization, energy use per capita, economic growth (GDP per capita), government health expenditure, and ecological footprint consumption per capita as independent variables. Finally, we have used a fixed effect model to link dependent and explanatory factors.

Model Specifications

The econometric model is given as:

$$LLIFEX = \beta_0 + \beta_1 LGDPPC_{it} + \beta_2 LEFPCP_{it} + \beta_3 LENRGYU_{it} + \beta_4 IMMUN_{it} + \beta_5 GVTHEX_{it} + u_{it} \quad (1)$$

LLIFEX= Life expectancy at birth

LGDPPC= Log economic growth (GDP per capita)

LEFPCP= Log ecological footprints consumption per capita

LENRGYU= Log energy use per capita

IMMUN= Immunization measles (% of children ages 12-23 months)

GVTHEX= Government health expenditure % of GDP

it = (time trend)

u_{it} = (error term)

RESULTS AND EMPIRICAL ANALYSIS

This section reveals summary statistics of important factors influencing the life expectancy of some selected developing economies. It is shown in Table 1 that, on average, LIFEX is 70.5465 percent in underdeveloped nations of the world. GDP per capita is 10025.8 percent in the concerned economies. This index has ranged from 1990.954 percent to 28176.4 percent in economies. On average, government health expenditures (GVTHEX) were 62.40541 percent across a few developing nations. Likewise, variations in ecological footprint consumption per capita were observed from 0.5986 to 4.4776 percent with former variables.

Table 1: Summary statistics of determinants of life expectancy

Variables	Observations	Mean	Standard deviation	Minimum	Maximum
LIFEX	144	70.5465	3.6670	63.951	76.648
GDP	144	10025.8	6631.317	1990.954	28176.4
EFPCP	144	1.9331	1.1727	0.5986	4.4776
ENRGYU	144	1191.142	1017.249	163.9427	3060.387
IMMUN	144	87.67361	11.9847	56	99
GVTHEX	144	62.40541	10.7692	39.8104	80.4763

Empirical Estimations

Table 2 shows the results of the fixed effect technique. In analysis, the probability value of Chi2 is 0.0000, which is recommended as a fixed effect technique.

Table 2: Fixed Effect Results, Dependent Variable is Life Expectancy at birth

Variables	Coefficients, Standard Errors and t-values
LGDPPC	0.0575* 0.0100 (5.72)
LEFPCP	-0.0349** 0.0168 (-2.08)
LENRGYU	0.0456** 0.0208 (2.19)
IMMUN	0.0003* 0.0001 (3.79)
GVTHEX	-0.0001 0.0001 (-0.93)
C	1.4778 0.0459 (32.20)
R2 Within	0.73
R2 Between	0.52
R2 Overall	0.52

t-values are in parentheses; ** p<0.05, * p<0.1 and *** p<0.01/

DISCUSSION

Improved economic growth may play a positive role in enhancing or improving life expectancy at birth. Its role contributes to the positive health outcomes of the people of economies. High growth results in high and improved economic and social status, finally improving life expectancy. One percent increased GDP per capita will cause an increased life expectancy of 0.0575 percent in developing economies. The result is consistent with Gilligan & Skrepnek (2015).

Ecological footprint consumption also affects life expectancy at birth in developing economies. Most people are busy with economic actions in industries and other sectors of economies and improving economic growth. However, this has negative effects on life expectancy at birth. Results reveal that a one percent increase in ecological footprint consumption will decrease life expectancy at birth by 0.0349 percent in selected developing economies. Our result is supported by Redzwan & Ramli (2024).

Energy consumption also contributes positively to life expectancy at birth in underdeveloped economies. Most of the population works in factories, and electricity is consumed to increase the economic growth of nations. The result has highlighted that one percent increased energy usage will cause an increase in life expectancy by 0.0456 percent in these nations.

Immunization also affects life expectancy at birth in developing economies. The death rate can be controlled by governments in economies through immunization services. People can survive, and in this way, life expectancy increases. The study findings show that a one percent increase in immunization will increase life expectancy by 0.0003 percent in some selected developing nations. Our result is favored by Gilligan & Skrepnek (2015).

CONCLUSIONS

An effort has been made to check the role of economic growth along with other control variables affecting life expectancy at birth in developing countries. Life expectancy at birth was taken as dependent variable. However, it also includes economic growth, ecological footprint consumption per capita, energy use, immunization, and government health expenditure. The data were drawn from nine selected developing economies for analysis. The fixed effect result reveals that economic growth, energy usage, and immunization positively affect life expectancy at birth. However, consumption of an ecological footprint has caused lower life expectancy at birth in the concerned economies. Furthermore, government health expenditure also seems to influence life expectancy at birth. Based on the results, the study suggests that governments of concerned developing economies must offer free-of-cost vaccination and health facilities. There should be an increased share of health expenditures in the budgets of the selected nations. Finally, stability should be the priority of all governments in order to increase investment, production, and development in developing economies.

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