

## The Determinants of Life Expectancy A Cross-Sectional Study of Asia and Europe

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### ABSTRACT

**Purpose:** Asian and European nations tend to show divergence in their life expectancies at birth. While part of the explanation for this lies in historical factors, socio-economic factors also play an important role. Using cross-sectional data for 2019, this study attempts to estimate a multi-variate model to assess how national income (GNI per capita in PPP terms), government health spending (share of GDP), and share of population having access to safely managed drinking water, are related to life expectancy at birth in Asian and European countries. The study builds on the hypothesis that higher national income as well as greater government spending on health tend to impact life expectancy positively, and so does better access to clean drinking water.

**Methodology:** The study is quantitative in nature, based on secondary data of 53 countries collected from World Development Indicators database (WDI, World Bank); World Inequality Database (WID), and Gender Inequality Index (UNDP). It involves statistical testing of an econometric model using Gretl software, by means of which a simple OLS regression has been performed.

**Findings:** The estimated model appears to be theoretically relevant and reasonably satisfactory. The study concludes that the three independent variables are positively related to life expectancy at birth, and are also statistically significant. This corroborates the hypothesis described above.

**Originality/Value:** The study underlines the need for re-orienting government spending patterns. The results highlight that it is essential to divert a greater share of national income towards health expenditure, ensure higher GNI per capita, and ramp up spending to reduce inequalities in access to safely managed drinking water. The study will prove useful to designers of public policy as well as academicians to develop more equitable policies in this domain..

**Paper Type:** Empirical Research Paper

**KEYWORDS:** Life Expectancy | Health Spending | National Income | Clean Drinking Water

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## Introduction

As the 20<sup>th</sup> century drew to its end, the notions of economic growth that had chased narrow goals and fuelled policies for decades at length, too underwent major changes. The evolution of the 'capability approach' (Sen, 1997) and there upon, HDI (UNDP, 1990), accorded new found focus to the enhancement of human capabilities as the major goal of development, rather than economic growth alone (Sen, 1997). HDI has served as a measure of a country's longevity, education, and income. The dimension of longevity is captured by life expectancy at birth. As distinct from the concept of crude death rate, life expectancy at birth is a broader concept that encapsulates mortality patterns across age-groups- children, adults, and the elderly. It is also linked to the existence, or in many cases, absence, of various socio-economic aspects, such as the education levels of the population, demographic patterns in a society, the existence of appropriate healthcare institutions, aspects of gender and discrimination in accessing healthcare, and the prevalence of deep-rooted inequalities in the percolation of benefits of improved health status of the population.

The history of the post 2<sup>nd</sup> world war era has witnessed remarkable improvements in life expectancy, rising from a world average of 51 years in 1960 to an all-time high of 73 years in 2019. Provision of quality healthcare has thus emerged as an important objective of social policy in all democratic nations across the globe. However, considerable differences continue to exist between countries, more remarkably in the developing world. In 2019, the highest life expectancy was over 84 years for Japan but as low as 53 years for Central African Republic.

While the aspect of life expectancy has been studied extensively, there exists a gap in the literature in identifying the factors producing such divergent trajectories in the recent period. To achieve the above mentioned objectives, the theme of the paper is introduced in the first section. This is followed by a section that presents a brief review of literature. The third section details the methodology followed. The fourth section discusses the results of the study, followed by the fifth section that presents the graphs. The penultimate section comprises of interpretation and analysis of the results. The last section describes the policy recommendations and concludes the paper.

## Review of Literature

A vast body of existing literature describes the plausible factors affecting life expectancy. Given the rapid decline in mortality rates post 2<sup>nd</sup> world war, a prominent line of reasoning that emerged sought to explain the influence of

economic factors upon mortality. Preston's (1975) seminal work discusses the appropriateness of national income as an indicator of the same, describing it as the best reflection of living standards of a country and the basis for formulation of policy measures. He proposed the 'Preston Curve' to trace the relationship between the two variables. Pritchett and Summers (1996) elaborated that a 5% rise in GDP led to an average decrease in infant mortality rate by 1% in a cross-national analysis. Although considered important, the singular focus on income lost much credence with the shift in attention over the decades to effects of literacy, health, and medical care. Sen (1997) highlighted examples of income-poor areas such as Kerala, Sri Lanka and China that had higher life expectancies than income-rich countries like South Africa and Brazil. Husain (2002) suggested that higher literacy, higher per-capita calorie intake, higher percentage of population having access to clean drinking water, along with lower total fertility rates is likely to lead to better utilization of health services in Bangladesh. Her analysis underlines the role of gender inequality and regional variations in impacting life expectancy. Miladinov (2020) attributes life expectancy at birth to population health and socio-economic development of the country, apart from GDP. Farag et al. (2013) and Coker and Bein (2018) discuss evidence of government health spending having a significant impact on reducing infant and child mortality.

The availability of clean drinking water is a crucial aspect of public amenities. Andreas et al. (2021) and Macfarlane et al. (2000) attribute the dramatic increase in life expectancy over the past two centuries to water treatment and sanitation. Timothy (2018) discusses similar findings for Sub-Saharan Africa. Ummalla et al. (2022) find that access to sanitation and water facilities in rural and urban areas also played a vital role in reducing child mortality, and improving quality of life by increasing life expectancy, for 100 countries between 1990 and 2015.

This paper attempts to add to the existing body of work by focusing on the factors affecting life expectancy at birth in the contemporary period.

## Research Methods

### a. Variables included in the analysis

This analysis treats life expectancy at birth (including both males and females) as the dependent variable and drawing from the literature, focuses upon its two key indicators viz. government expenditure on health (as percentage of GDP), and GNI per capita in PPP terms (current international USD). These are also derived from a general understanding



that the two tend to contribute to better health outcomes and hence, higher life expectancy. More specifically, government expenditure on health reflects social welfare spending and governmental commitment to healthcare. GNI per capita in PPP terms can be considered to be an indicator of economic growth. Data for these independent variables was drawn from the World Development Indicators database (WDI, World Bank).

Another independent variable under consideration is percentage of population using safely managed drinking water. The World Bank defines 'people using safely managed drinking water services (% of population)' as "the percentage of people using drinking water from an improved source that is accessible on premises, available when needed and free from faecal and priority chemical contamination" (World Bank Metadata Glossary).

When placed in the larger literature, access to clean drinking water is considered an indicator of access to health technology (Husain, 2002). The data for this variable was also derived from the World Development Indicators database (WDI, World Bank).

The initial analysis also included models testing different combinations of variables such as adult literacy rate, female literacy rate, and prevalence of under-nourishment, derived from the World Development Indicators database (WDI, World Bank); income share of the top 1% of the population to capture income inequality, derived from World Inequality Database (WID); and a variable for gender inequality, captured by the Gender Inequality Index (UNDP). They were eliminated from the final model discussed henceforth since statistical testing showed them to be statistically insignificant.

## b. Analysis of sample

The multi-variate analysis has been conducted using cross-sectional data for the year 2019. The choice of the time period was based on two primary concerns, one of which was the availability of latest reliable figures for all the variables. The other consideration pertained to the negative impact of the COVID-19 pandemic (2020-21) on life expectancy at birth. The World Development Indicators database (WDI, World Bank) shows that life expectancy at birth had shown a continuous increase from 1970 till 2019, post which it showed a falling trend till 2021. Hence, 2019 corresponded to the last year not impacted by any noise in the data arising on account of the pandemic.

The initial sample comprised of 82 countries of Asia and Europe, out of a total of over 85 countries. Countries lacking figures for one or more variables were dropped from the sample for maintaining accuracy.

## c. The model

The final linear econometric model constructed was as follows:

$$LE = b_0 + b_1 (GNIPERCAP) + b_2 (GY) + b_3 (WATER) + e_i$$

### Variable definitions:

- LE = life expectancy at birth in years, 2019
- GNIPERCAP = GNI per capita in PPP terms (current USD), 2019
- GY = Government expenditure on health as % of GDP, 2019
- WATER = % of population using safely managed drinking water, 2019
- $b_0$  = intercept coefficient
- $b_1, b_2, b_3$  = coefficient of variables
- $e_i$  = stochastic error term

Statistical testing of the model was done using Gretl software by means of which a simple OLS regression was performed.

The Breusch-Pagan test showed the presence of heteroscedasticity in the initial round of results. This is a common characteristic of cross-sectional data. A check of the residual plot revealed certain outliers. These countries were subsequently dropped from the sample, reducing sample size to 70. Further, the software also dropped countries with missing values, reducing the final sample size to 53.

- Countries that were dropped were outliers for several reasons. Some of these had life expectancies much higher than the world average of 73 years in 2019. These include Greece, Spain, Israel, Italy, and Japan, where average life expectancy hovers in the range of 81-84 years. This is a direct outcome of above average performance on the variables included in this study, not just for 2019 but for over a decade. These countries diverted over 7.5% of total government expenditure to health in 2019, apart from ensuring safely managed drinking water facilities for over 95% of the population. Also, their GNI per capita in PPP terms was more than USD 4000, above the sample mean of USD 3271.
- Afghanistan, with a life expectancy of 63.565 years, was far below the world average. Many factors feed into this result. Although government expenditure on health in

the country remained above 14% of GDP in 2019, the country's health infrastructure remains badly ravaged by decades of civil war. Moreover, high out-of-pocket health expenditure, low GNI per capita in PPP terms (USD 2200), low access to clean drinking water (26% of population), high gender inequality and low adult literacy rates seem other prominent factors.

- Lebanon's life expectancy was high at 79.23 years despite political instability and war, and other factors similar to most of the West European countries. It was an outlier owing to only 47% of the population having access to safely managed drinking water.
- Turkmenistan, that possesses some of the world's largest oil and gas reserves, had a life expectancy of 69 years. Despite faring well on factors like GNI, health infrastructure in the country remains poor on account of 21 years of authoritarian rule of president Niyazon; which saw some of the worst human rights violations and State-sponsored killings of the post-Soviet era. This is supplemented by the problem of drug trafficking from Afghanistan.
- Bangladesh was also an outlier, mainly because of government spending on health being only 2.6% of GDP. Moreover, majority of the population did not have access to safe drinking water in 2019.
- For Moldova (70 years) and Myanmar (66.6 years), very low GNI per capita (PPP terms) in 2019 was the main reason behind them being detected as outliers.
- Russia had a life expectancy of 73 years. Its per capita income (USD 29120), however, was lower than the sample mean. Moreover, health outcomes in the country have been impacted by the post-Soviet era economic collapse, which translated directly into higher rates of alcoholism and smoking than before, leading to a spike in the rates of suicide.

After removing the above mentioned nations from the sample, heteroscedasticity was eliminated from the model.

Table 1 presents the results of the Breusch Pagan test, signifying that the final model does not show traces of heteroscedasticity. Table 2 lays down the summary statistics for the data.

**Table 1: Test results for Breusch Pagan Test**

Breusch-Pagan test for heteroscedasticity
Null hypothesis: heteroscedasticity not present
Test statistic: LM = 0.782601 with p-value = P (Chi-square (3) > 0.782601) = 0.853624 Hence, the null hypothesis is not rejected.

**Source:** Author's calculations based on Gretl software

**Table 2: Summary statistics for variables (2019)**

Name of variable	Mean	Standard Deviation	Maximum	Minimum
Life expectancy at birth (years)	76.8	4.621	83.90 (Switzerland)	65.09 (Yemen)
GNI per capita in PPP terms (current USD)	32791	23413	92300 (Qatar)	4130 (Nepal)
Govt. expenditure on health (as % of GDP)	6.491	2.557	11.70 (Germany)	2.194 (Brunei Darussalam)
% of population using safely managed drinking water	82.99	23.52	100 (Iceland, Kuwait, Malta, Singapore)	17.59 (Lao PDR)

**Source:** World Development Indicators (WDI), World Bank<sup>8</sup>.

Table 2 reveals the average life expectancy in the countries under study for the year 2019 to be 76.8 years. Switzerland, which is a developed European country, has the highest life expectancy in the sample (83.9 years), while an Asian country, Yemen, has the lowest life expectancy (65.09 years). However, neither is Switzerland the richest country in terms of GNI per capita (spot claimed by Qatar) nor does it spend the highest proportion of its GDP on health (Germany). Similarly, Nepal has the lowest GNI per capita and Brunei Darussalam has the lowest government spending on health, and not Yemen. The sample suggests that for 2019, the whole of Iceland, Kuwait, Malta, and Singapore's populations had access to safely managed drinking water, while for Lao PDR, the value was as low as 17.59%.

## Results

Table 3 presents the results of regressing life expectancy at birth on the independent variables mentioned above.

## Graphs

The following two graphs are based on the regression results obtained.

**Table 3: Results of OLS regression for life expectancy at birth (2019)**

Dependent variable: Life expectancy at birth (years)				
Observations: n = 53				
	coefficient	std. error	t-ratio	p-value
Constant	65.1693	0.716764	90.92	2.68e-056***
Govt. expenditure on health (as % of GDP)	0.482587	0.0801660	6.020	2.18e-07 ***
GNI per capita in PPP terms (current USD)	0.000111508	1.02968e-05	10.83	1.34e-014***
% of population using safely managed drinking water	0.0580512	0.0109157	5.318	2.58e-06 ***
R squared	0.925423			
Adjusted R squared	0.920857			
S.E. of regression	1.287594			
Standard deviation (dependent variables)	4.576922			
Mean dependent variation	77.16198			
Log-likelihood	-86.52133			
Akaike criterion	181.0427			
Schwarz criterion	188.9238			
Hannan-Quinn	184.0734			

Note: For P value \*\*\* depicts the level of statistical significance of each estimate under the two-tailed t-test at 5% level of significance.

Source: Author's calculations based on Gretl software.

### • Check for multicollinearity

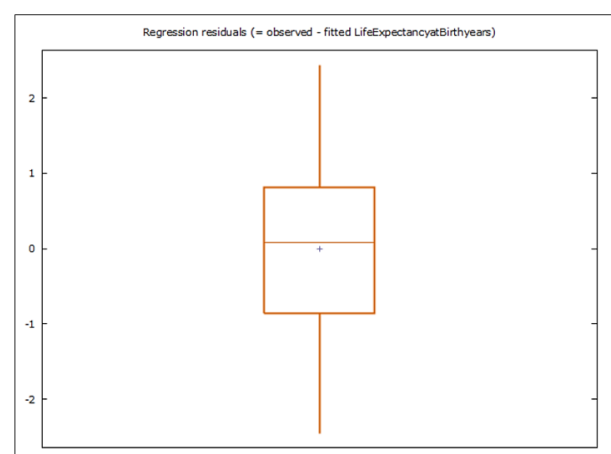
The high value of R squared (92.5423%) as obtained in the model might have been indicative of the problem of multicollinearity. The VIF (Variance Inflation Factor) test was performed to test for the presence of multicollinearity. VIF shows the degree to which variance of OLS estimators is inflated due to collinearity between variables. Table 4 presents the results of the test.

**Table 4: Test results for VIF test**

Variance Inflation Factors	
Minimum possible value = 1.0	
Values > 10.0 may indicate a collinearity problem	
GNI per capita in PPP terms (current USD)	1.863
Govt. expenditure on health (as % of GDP)	1.315
% of population using safely managed drinking water	2.116
Hence, no traces of multicollinearity were found.	
VIF(j) = 1 / (1 - R(j) <sup>2</sup> ), where R(j) is the multiple correlation coefficient between variable j and the other independent variables (Gujarati, 2010).	

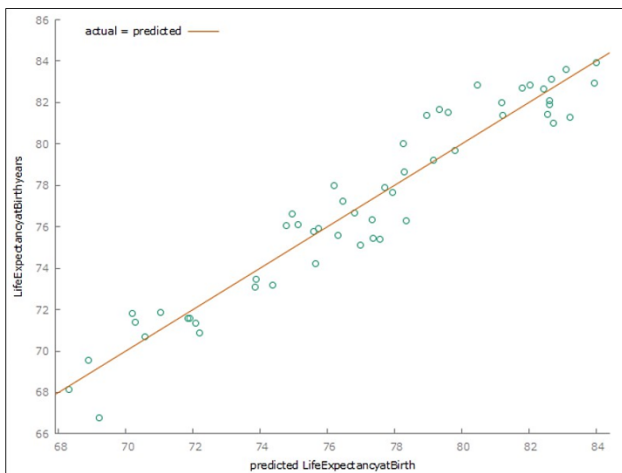
Source: Author's calculations based on Gretl software.

**Figure 1. Box plot for the regression.**



The above box plot shows the distribution of the absolute values of the residuals. There do not seem to be any outliers.

**Figure 2. The graph comparing actual versus fitted values for the regression.**



R squared for the model is 0.925423, revealing it to be a good fit.

## Analysis and Interpretation

The estimated model appears to be theoretically relevant and reasonably satisfactory, as highlighted by the value of R squared. 92.5423% of the variation in life expectancy at birth (years) is explained by the combined effect of GNI per capita in PPP terms, government expenditure on health (as % of GDP), and percentage of population using safely managed drinking water. All three independent variables are statistically significant (i.e.,  $p < 0.05$ ), and show a positive relationship with life expectancy at birth, as depicted by the sign of the coefficients. This corroborates our hypothesis for the three independent variables.

The statistically significant constant (intercept term) highlights that in the absence of other factors, the life expectancy at birth in Asia and Europe is likely to be 65.1693 years on an average.

Ceteris paribus, an increase in GNI per capita (PPP terms) by \$1 raises life expectancy by a mere 0.00011508 years on an average. Two noteworthy observations demand attention here. First, the study seems to suggest that national income may not be the single most dominant factor affecting life expectancy at birth in 2019, signifying the role of other variables. Second, this figure appears small, perhaps because the impact of national income on health is not always direct. As Preston (1975) notes, it merely shows the rate at which goods and services enter the economy. At the same time, an increase in per capita income tends to diversify consumption in favour of better quality food, housing, sanitation, improved access to healthcare facilities such as hospitals, as well as better educational outcomes. For low-income individuals with higher marginal propensities to consume, these goods

and services absorb large proportions of their expenditure. The marginal gains from higher per capita income are thus, often large. Rising per capita incomes are also associated with the channelisation of a country's resources to health-related research, and the development of institutions administering advanced training to health-sector workers. This explains the positive relationship of GNI per capita with life expectancy at birth.

The model further estimates that ceteris paribus, a 1% increase in government expenditure on health, as percentage of its GDP, is likely to increase life expectancy at birth by 0.482587 years for the countries under study, on an average. This is the most influential of the three variables studied. Public expenditure on healthcare is an important reflection of social welfare spending by a government. Further, the returns to government spending on healthcare is often larger than private spending as it affects a wider range of population, particularly those who cannot access private health services owing to their high costs, and also because private health facilities tend to be concentrated in urban areas, making them less accessible to the rural population. Low levels of public health spending often result in high out-of-pocket expenditures for treatment. Government spending on health is also critically linked to life expectancy given the role that it plays in controlling diseases such as cholera and tuberculosis, which have traditionally reduced life expectancy of people. Thus, it can be argued that public health expenditure ensures broad-based gains in any economy in general, and for life expectancy in particular. This elucidates the positive sign of the coefficient for government expenditure on health.

The estimates for percentage of population using safely managed drinking water reveal that ceteris paribus, a one percent increase in the population using safely managed drinking water raises life expectancy at birth on an average by 0.0580512 years. Poor water services tend to be an impediment in the realisation of proper sanitation and hygiene as well, lowering life expectancy at birth (WHO, 2019).

The sample reveals extreme divergence in percentage of people using safely managed drinking water (Table 2). All the countries with less than 40% of the population having access to safely managed drinking water, such as Lao PDR, Nepal (which is second to Lao PDR), Bhutan and Pakistan, are located in South and Southeast Asia. Even if the ratio is increased to 60%, the count includes only Asian nations, and none of Europe. This is reflective of a deeper inequality between Asia and Europe, based on income as well as historical trajectories. Developing nations, such as in Asia, have a greater proportion of poor people in comparison to Europe, making it difficult for them to access water given rising prices. Secondly, public provision of water tends to be weak, with limited outreach to rural areas. This impacts poor



and rural communities much more, particularly children and females as they venture out to collect water along long and unsafe distances. UNICEF's WASH (Water, Sanitation and Hygiene) Report (2019) corroborates this divergence. Around 165 million people lacked access to clean drinking water facilities in Asia and Pacific region in 2019, compared to 16 million in Europe.

Ensuring equitable access to safely managed drinking water facilities is essential to ensure attainment of higher life expectancies at birth in these countries, hence explaining the positive relationship between the two variables.

## Policy implications and Conclusion

The cross-sectional study undertaken has certain limitations. First and most importantly is the issue of unavailability of reliable data, since official surveys collecting such information are not conducted annually, making it highly likely that data was extrapolated. Second, our analysis clubs together Asian and European countries, which hides region-specific characteristics that might impact life expectancy at birth significantly.

Keeping these limitations at bay, the results of the model provide important insights for improving life expectancies in Asia and Europe. It underlines the need for governments to ensure that a greater share of GDP is diverted towards health expenditure. An effective State role in expanding the number of existing healthcare institutions and raising their quality appears to be imperative. Policy focus should also be on ensuring that the level of economic growth remains high i.e., higher GNI per capita (in PPP terms), so that people are able to better access a decent standard of living in the forms of nutritious food, decent shelter, and higher educational standards than currently possible. Further, ensuring high economic growth is a necessary condition for attaining higher life expectancy, but it is not a sufficient condition. It is also reasonable to argue that countries need to ramp up their spending to reduce inequalities in access to quality and quantity of safely managed drinking water, especially for the vulnerable masses. All these measures signify that a broader outlook is needed in policy formulation to help increase life expectancy at birth in Asia and Europe.

## References

- Acemoglu, D., & Johnson, S. (2007). Disease and Development: The Effect of Life Expectancy on Economic Growth. *Journal of Political Economy*, 115(6), 925–985. <https://doi.org/10.1086/529000>
- Angelakis, A.N., Vuorinen, H.S., Nikolaidis, C., Juuti, P.S., Katko, T.S., Juuti, R.P., Zhang, J., Samonis, G. (2021). Water Quality and Life Expectancy: Parallel Courses in Time. *Water*. <https://doi.org/10.3390/w13060752>
- Farag, M., Nandakumar, A. K., Wallack, S., Hodgkin, D., Gaumer, G., & Erbil, C. (2013). Health expenditures, health outcomes and the role of good governance. *International Journal of Health Care Finance and Economics*, 13(1), 33–52. <http://www.jstor.org/stable/23352541>
- Gujarati, D. N., & Porter, D. C. (2010). *Essentials of Econometrics* (4th ed., International ed.). McGraw-Hill.
- Husain, A. R. (2002). Life Expectancy in Developing Countries: A Cross-Section Analysis. *The Bangladesh Development Studies*, 28(1/2), 161–178. <http://www.jstor.org/stable/40795653>
- International Labour Organization. (2021). *Extending social health protection: Accelerating progress towards universal health coverage in Asia and the Pacific*. <https://www.ilo.org/publications/extending-social-health-protection-accelerating-progress-towards-universal-0>
- Macfarlane, S., Racelis, M., & Muli-Muslime, F. (2000). Public health in developing countries. *The Lancet*, 356(9232), 841–846.
- Miladinov, G. (2020). Socioeconomic development and life expectancy relationship: evidence from the EU accession candidate countries. *Springer*. <https://doi.org/10.1186/s41118-019-0071-0>
- Popoola Oladayo Timothy (2018). Macroeconomic Implications of Low Life Expectancy in Sub-Saharan Africa Nations: A Panel Technique Approach. *Social Sciences*. Vol. 7.
- Preston, S. H. (1975). The Changing Relation between Mortality and Level of Economic Development. *Population Studies*, 29(2), 231–248. <https://doi.org/10.2307/2173509>
- Pritchett, L., & Summers, L. H. (1996). Wealthier is Healthier. *The Journal of Human Resources*, 31(4), 841–868. <https://doi.org/10.2307/146149>
- Sango-Coker, E. Y., & Bein, M. A. (2018). The Impact of Healthcare spending on Life Expectancy: Evidence from Selected West African Countries. *African Journal of Reproductive Health / La Revue Africaine de La Santé Reproductive*, 22(4), 64–71. <https://www.jstor.org/stable/26563442>
- Sen, A. K. (1997). From Income Inequality to Economic Inequality. *Southern Economic Journal*, 64(2), 384–401. <https://doi.org/10.2307/1060857>
- Ummalla, M., Samal A., Zakari A., Lingamurthy, S. (2022). The effect of sanitation and safe drinking water on child mortality and life expectancy: Evidence from a global sample of 100 countries. *Australian Economic Papers*. Wiley. <https://doi.org/10.1111/1467-8454.12265>
- UNICEF. (2019). *Water, sanitation and hygiene (WASH) annual results report*. <https://www.unicef.org/eap/media/5516/file/WASH%202019%20report.pdf>
- World Bank. *World Bank metadata glossary: Series SH.H2O.SMDW.ZS*. <https://databank.worldbank.org/metadataglossary/world-development-indicators/series/SH.H2O.SMDW.ZS>
- World Bank. *World Development Indicators database*. <https://databank.worldbank.org/source/world-development-indicators>
- World Health Organization. (2019). *World health statistics 2019: Monitoring health for the SDGs, sustainable development goals*. <https://www.who.int/data/gho/publications/world-health-statistics>

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8	washdata.org	<1	Publication
9	Gender, culture and later life a dilemma for contemporary feminism by Sen-1995	1	Publication
10	washdata.org	1	Publication
11	pnc.ncbi.nlm.nih.gov	1	Internet Data
12	www.ajol.info	1	Publication
13	s3.amazonaws.com	<1	Publication
14	journals.vilniustech.lt	1	Publication
15	www.econstor.eu	1	Publication
16	moam.info	<1	Internet Data

### Reviewers Memorandum

**Reviewer's Comment 1:** The paper provides a well-written and comprehensive model of measuring life expectancy of Asia and Europe continents. It covers a wide range of perspectives including national income (GNI per capita in PPP terms), government health spending (share of GDP), and share of population having access to safely managed drinking water. The paper is relevant to both academics and policymakers as it brings attention to life expectancy ratio. To make the study even stronger, the methodology of the literature review can be explained in more detail and the data used could be added in annexure.

**Reviewer's Comment 2:** This study is well described but separate sections could be made such as limitations of the present study, future scope of research in the present topic to help other future scholars to start from. Apart from this the author would have provided the various implications for the stakeholders. Providing these sub heading related to limitation, future scope as well as the contribution not only provide guiding light to future research topics but also help in formulating the proposed research methodology for more comprehensive research on the domain.

**Reviewer's Comment 3:** The manuscript effectively highlights the key drivers of life expectancy at birth, demonstrating how economic factors and access to clean water are crucial determinants. The use of a diverse dataset from Asia and Europe allows for valuable cross-regional comparisons. The statistical approach is well-executed, and the interpretation of results is clearly aligned with the study's hypothesis. The conclusions are well-supported by the data, particularly the positive correlation between health expenditure and life expectancy.



Shatakshi Srivastava  
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**Conflict of Interest:** Author of a Paper had no conflict neither financially nor academically.

**Editorial Excerpt**

The article has 10% plagiarism, which is within the accepted percentage as per the norms and standards of the journal for publication. As per the editorial board's observations and blind reviewers' remarks, the paper had some minor revisions, she was communicated promptly to the authors (Shatakshi), and all necessary corrections were incorporated as and when directed. The comments related to this manuscript are closely aligned with the theme "The Determinants of Life Expectancy A Cross-Sectional Study of Asia and Europe" both subject-wise and research-wise. The article offers a comprehensive model for measuring the life expectancy ratio by comparing two continents. It covers a wide range of perspectives including national income (GNI per capita in PPP terms), government health spending (share of GDP), and share of population having access to safely managed drinking water. After thorough reviews and the editorial board's remarks, the manuscript has been categorized and approved for publication under the "Empirical research paper" category.

**Acknowledgement**

The acknowledgement section is an essential part of all academic research papers. It provides appropriate recognition to all contributors for their hard work and effort taken while writing a paper. The data presented and analysed in this paper by the author (Shatakshi) were collected first handily and wherever it has been taken the proper acknowledgment and endorsement depicts. The author is highly indebted to others who facilitated accomplishing the research. Last but not least, endorse all reviewers and editors of GJEIS in publishing in the present issue.

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