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Determinants of Healthcare Expenditure: A Cross - Sectional Analysis at the Country Level

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Abstract:

This study examines the determinants of healthcare expenditure through a cross-sectional analysis of 153 countries using 2018 data. The research employs a classical linear regression model to identify key socioeconomic and demographic factors influencing healthcare spending per capita, expressed in PPP (Purchasing Power Parity). The results show that GDP per capita, public health expenditure as a percentage of GDP, physician availability, and out-of-pocket healthcare costs are statistically significant determinants of healthcare spending. Specifically, the analysis highlights the non-linear relationship between GDP and healthcare expenditure, where wealthier nations tend to spend disproportionately more on healthcare. Public investment in healthcare and the availability of medical professionals also play crucial roles in shaping national healthcare expenditures. Out-of-pocket expenses by households further increase overall healthcare costs, especially in countries with lower public funding. The proposed model explains 96.5% of the variation in healthcare expenditure, suggesting that the selected variables are strong predictors of healthcare spending. These findings provide valuable insights for policymakers, particularly in the context of balancing public healthcare financing and improving access to medical services while managing overall costs.

Keywords: Healthcare expenditure, Public Health Financing, Socioeconomic Determinants; Cross-Sectional Analysis, Classical Linear Regression Model

Introduction:

In light of aging populations, epidemiological challenges, and the dynamic development of medical technologies in recent years, the issue of healthcare expenditure has become a pressing topic (1). The methods of covering healthcare costs and the quality of care vary significantly across different countries, which is reflected in the differences in healthcare spending (2). The aim of this study is to create an econometric model that best defines the relationship between various socioeconomic and demographic indicators and the level of healthcare expenditure per capita, expressed in PPP (Purchasing Power Parity) across different countries. This topic has been frequently addressed in the literature, and numerous publications can be found in this area (3). However, most of these works date back to the previous century, when the availability of cross-sectional data from non-OECD countries and less-developed nations was considerably limited. The advancement of information technologies and the expansion of systems monitoring key macroeconomic, sociological, and demographic data from underdeveloped countries now allow for the examination of a larger sample. This creates the opportunity to use previously unavailable data and raises the hope of achieving a model with better accuracy than those previously presented.

Determinants of health expenditure:

A significant majority of existing studies indicate that GDP per capita is crucial for determining healthcare expenditure (4,5). This is justified by the fact that GDP reflects the development level of a country. It is expected that the higher the development level, the more welfare-oriented the state becomes and the more advanced medical technologies are used, leading to increased expenditures. To estimate these effects, the variable (GDP) was introduced into the model. We also introduced the square of income to examine the non-linear impact of income on the level of healthcare expenditure (intlnGDPXlnGDP). An important aspect in terms of the income side of healthcare expenditures seems to be the division of costs incurred by citizens and the state. The intuition put forth by the authors of this thesis is that an increase in the state's share of funding medical services lowers the price for the individual consumer, thereby increasing demand. Therefore, it is expected that healthcare expenditure will rise as the percentage funded by the state increases (1,6,7). To estimate this division, the percentage share of public health expenditures in GDP (GHE) and the amount of out-of-pocket expenses (OOP) were used. In the case of low-income countries, the amount of development assistance received from abroad is crucial; therefore, we include its estimate (ODA) in the model (4).

In addition to GDP per capita and the state's share in healthcare financing, a number of non-income factors determining healthcare expenditure have been identified in the literature. It can be assumed that the age structure of the population is significant in this group. In many studies, this variable was found to be statistically insignificant (2,3). However, the intuition that aging populations lead to increased expenditures warrants re-examination, which will be done using the variable (AGE65). Depending on the authors, they analyse the percentage of the population below 15 years of age or above 65 years of age, identifying these two groups as equally significant and generating the highest costs for the healthcare system (2,3). They do not show a preference for a specific age group. Therefore, this study will analyse the percentage of the population over 65 years of age.

Another very important factor influencing healthcare expenditure may be technological progress. Unfortunately, there is no clear way to measure it. In this model, to approximate it, life expectancy at birth (LEB) and infant mortality rate (IMR) were used (8). Each of these variables emphasizes a different aspect of a country's technological development, attempting to identify key areas for determining healthcare expenditure.

The next variables to analyse are the parameters of a so-called healthy lifestyle, such as the percentage of overweight or obese individuals in the population (BMI), total alcohol consumption per capita and tobacco use (CIG) (9). Urbanization can also be an interesting variable. Leu (1986) treats it as a proxy for access to healthcare facilities and the costs of this access for consumers, which are lower in urban centres (1). However, it can alternatively be considered as a proxy for environmental pollution. Thus, the impact of urbanization may vary among different groups of countries. For high-income countries, high urbanization seems to facilitate easier and cheaper access to healthcare services, reducing expenditures, whereas for low-income countries, following the argument of Gugler and Flanagan (1978), healthcare expenditures are expected to increase (10). This is due to the emergence of cities with low sanitary standards, high pollution due to primary industrialization, and low housing standards, which contribute to the spread of epidemics. Considering the dual significance of urbanization, both in terms of healthcare access and living conditions, it was decided to include an estimate of it (URB) in the model. To complete the picture of healthcare access, the number of physicians per 1000 inhabitants (PHY) was introduced.

Data and Methodology:

To estimate the impact of various factors on healthcare expenditure and to determine which of these factors are statistically significant, we will develop and estimate a classical linear regression model. This model will allow us to quantify the relationship between the dependent variable, healthcare expenditure per capita, and the independent variables, which include socioeconomic, demographic, and health-related indicators. By applying this econometric approach, we aim to identify which factors have a meaningful influence on healthcare spending, while also providing a comprehensive understanding of the magnitude and direction of these relationships. Additionally, the model will help in distinguishing between variables that are merely correlated and those that have a causal effect on healthcare expenditure.

To estimate the model, data from 153 countries for the year 2018 were used. The list of countries used in the analysis is presented in Table 1.

Albania, Algeria, Argentina, Armenia. Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cabo Verde, Cambodia, Cameroon, Canada, Chad, Chile, China, Colombia, Comoros Dem. Rep. of Congo, Congo Rep., Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Czechia, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Eswatini, Ethiopia, Fiji, Finland, France, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea-Bissau, Guyana, Haiti, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Korea. Rep., Kyrgyz Republic, Lao PDR, Latvia, Lebanon, Lesotho, Liberia, Lithuania, Luxembourg, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Netherlands, New Zealand, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russian Federation, Rwanda, Samoa, Sao Tome and Principe, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Slovak Republic, Slovenia, Solomon Islands, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Tanzania, Thailand, Timor-Leste, Togo, Tonga, Tunisia, Türkiye, Turkmenistan, Tuvalu, Uganda, Ukraine, United Kingdom, United States, Uruguay, Uzbekistan, Vanuatu, Viet Nam, Zambia, Zimbabwe

Table 1. The list of countries used in the analysis *Source: Own elaboration, based on the databases of the World Bank, World Health Organization, and the Organisation for Economic Co-operation and Development.*

The data, with the exception of the BMI and ODA variables, were sourced from The World Bank datasets, while BMI data were obtained from the World Health Organization (WHO) website and ODA from Organization of Economic Cooperation and Development (OECD) website. The year 2018 was chosen as it was the last year unaffected by the disruptions caused by the COVID-19 pandemic and had the most comprehensive data availability.

Throughout this study, healthcare expenditure is understood as the total healthcare spending per capita, expressed in current international dollars, adjusted by the Purchasing Power Parity (PPP) conversion factor. International dollars, a measure used by the World Bank, are defined as a unit of currency that would purchase the same amount of goods and services in the analysed country as a U.S. dollar would in the United States. The term "current" refers to the purchasing power of this unit, with its estimation reflecting the most up-to-date values. For the dataset used, this means the year 2022.

It should be noted that the data for the variables related to alcohol consumption (ALC) and tobacco use (CIG) were reported in five-year intervals. To fill in the data for the year 2018, linear interpolation was applied. In this study, we assume a 5% significance level as the cutoff point for determining the statistical significance of the variables (2,3).

The following definitions of independent variables have been adopted in accordance with the definitions provided by the data sources: CHE - "Current health expenditure per capita, PPP (current international $)" - Current health expenditure per capita, expressed in current international dollars calculated using the Purchasing Power Parity (PPP) conversion factor.; GDP - "GDP per capita, PPP (current international $)" - This indicator represents the value of gross domestic product (GDP) per capita, expressed in current international dollars calculated using the Purchasing Power Parity (PPP) conversion factor.; GHE - "Domestic general government health expenditure (% of GDP)" - Public health expenditure from domestic sources as a percentage of the economy, measured by GDP.; AGE65 - "Population ages 65 and above (% of total population)" - The population aged 65 and above as a percentage of the total population. This population is based on the de facto definition, which includes all residents regardless of legal status or citizenship.; URB - "Urban population (% of total population)" - Urban population refers to people living in urban areas as defined by national statistical offices.; PHY - "Physicians (per 1,000 people)" - The number of physicians per 1,000 inhabitants. Physicians include both general practitioners and specialists.; LEB - "Life expectancy at birth, total (years)" - Life expectancy at birth indicates the number of years a newborn would live if the prevailing patterns of mortality at the time of birth were to remain constant throughout their life.; IMR - "Mortality rate, infant (per 1,000 live births)" - Infant mortality rate refers to the number of infants dying before reaching one year of age, per 1,000 live births in a given year.; OOP - "Out-of-pocket expenditure (% of current health expenditure)" - The percentage of healthcare expenditure paid directly by households through "out-of-pocket payments" as part of total healthcare expenditures. This includes costs such as purchasing medicines, doctor visits, or additional tests.; BMI - "Prevalence of overweight among adults, BMI >= 25 (age-standardized estimate) (%)" - The percentage of adults aged 18 and over whose Body Mass Index (BMI) is 25 kg/m² or higher.; ALC - "Total alcohol consumption per capita (litres of pure alcohol, projected estimates, 15+ years of age)" - Total alcohol consumption per capita, defined as the total amount (including both recorded and unrecorded alcohol) consumed per person (aged 15 and older) during a calendar year, measured in litres of pure alcohol, adjusted for tourist consumption.; CIG - "Prevalence of current tobacco use (% of adults)" - The percentage of the population aged 15 and older who currently use any tobacco product (smoked and/or smokeless) daily or occasionally.; ODA - "Official development assistance (ODA)" - The value of development assistance provided to a given country, expressed in U.S. dollars at constant 2022 prices. Data in percentage terms or expressed in international dollars according to PPP were unavailable, which would have been more suitable for this analysis.

Descriptive statistics:

The average current health expenditure per capita (PPP) is $1,589.00, with a large standard deviation of $1,923.00, indicating substantial variation in healthcare spending. The minimum is $35.45, while the maximum is $10,285.00, with an IQR of $1,897.80. This spread highlights the diverse healthcare funding levels across different countries. The average GDP per capita (PPP) is $21,428.00, with a high standard deviation of $21,744.00, indicating significant differences in economic development. The minimum GDP per capita is $758.20, while the maximum reaches $116,499.00. The IQR of $26,863.00 reflects a wide distribution in GDP values across the countries.

The average government health expenditure as a percentage of GDP is 3.62%, with a standard deviation of 2.49%. The values range from a minimum of 0.35% to a maximum of 15.07%, with an IQR of 3.22%, indicating moderate variability in government spending on healthcare. The average proportion of the population aged 65 and older is 9.19%, with a standard deviation of 6.58%. The minimum value is 1.13%, while the maximum is 28.90%, with an IQR of 11.29%. This demonstrates considerable variation in age demographics across countries. On average, 58.82% of the population lives in urban areas, with a standard deviation of 22.80%. The minimum urban population is 13.03%, and some countries are fully urbanized (100%). The IQR of 35.58% indicates a wide range of urbanization levels.

The average number of physicians per 1,000 people is 1.91, with a standard deviation of 1.64. The values range from 0.04 to 7.56 physicians per 1,000 people, with an IQR of 2.80, showing large differences in access to healthcare professionals. The average life expectancy at birth is 72.50 years, with a standard deviation of 7.62 years.

VARIABLES	(1) N	(2) Mean	(3) SD	(4) Max	(5) Min	(6) IQR
CHE	153	1,589.00	1,923.00	10,285.00	35.45	1,897.80
GDP	153	21,428.00	21,744.00	116,499.00	758.20	26,863.00
GHE	153	3.62	2.49	15.07	0.35	3.22
AGE65	153	9.19	6.58	28.90	1.13	11.29
URB	153	58.82	22.80	100.00	13.03	35.58
PHY	153	1.91	1.64	7.56	0.04	2.80
LEB	153	72.50	7.62	84.21	52.55	11.76
IMR	153	20.38	19.16	85.20	1.90	26.80
OOP	153	31.33	19.14	84.28	0.09	28.28
ALC	153	5.81	4.03	16.96	0.01	7.33
CIG	153	20.84	10.03	49.20	3.60	15.50
ODA	153	555.10	883.40	5,198.00	-575.10	838.50
BMI	153	40.09	18.51	89.65	4.85	30.78

Table 2. Descriptive statistics *Source: Own elaboration, based on the databases of the World Bank, World Health Organization, and the Organisation for Economic Co-operation and Development.*

The minimum value is 52.55 years, and the maximum is 84.21 years, with an IQR of 11.76 years, indicating significant disparities in life expectancy across different countries. The average infant mortality rate is 20.38 deaths per 1,000 live births, with a standard deviation of 19.16. The minimum value is 1.90, while the maximum is 85.20, with an IQR of 26.80, highlighting large variations in infant mortality rates. Households spend an average of 31.33% of total healthcare costs out of pocket, with a standard deviation of 19.14%. The minimum is 0.09%, and the maximum is 84.28%, with an IQR of 28.28%, reflecting wide differences in the financial burden on households across countries.

The average alcohol consumption per capita is 5.81 litres of pure alcohol, with a standard deviation of 4.03 litres. The minimum value is 0.01 litres, and the maximum is 16.96 litres, with an IQR of 7.33 litres, indicating substantial differences in alcohol consumption across countries. The percentage of adults who currently use tobacco averages 20.84%, with a standard deviation of 10.03%. The minimum value is 3.60%, and the maximum is 49.20%, with an IQR of 15.50%, reflecting diverse smoking habits across the countries. The average official development assistance received is $555.10, with a high standard deviation of $883.40. The minimum value is -$575.10 (indicating net contributions), and the maximum is $5,198.00, with an IQR of $838.50, suggesting significant variability in external financial aid among countries. The average prevalence of overweight adults (BMI ≥ 25) is 40.09%, with a standard deviation of 18.51%. The minimum value is 4.85%, while the maximum is 89.65%, with an IQR of 30.78%, showing wide disparities in overweight prevalence among adults across different countries.

The summary of the basic descriptive statistics is presented in Table 2.

The Econometric Modelling of Healthcare Expenditure:

The selection of variable forms and the functional form of the model was made based on the relevant literature cited above. An analysis of the variable distributions led to the proposal of the initial model form, represented by the following equation:

$$\mathrm{lnCHE_i} = \beta_0 + \beta_1\mathrm{lnGDP_i} + \beta_2\mathrm{GHE_i} + \beta_3\mathrm{AGE65_i} + \beta_4\mathrm{URB_i} + \beta_5\mathrm{lnPHY_i} + \beta_6\mathrm{lnLEB_i} + \beta_7\mathrm{lnIMR_i} + \beta_8\mathrm{OOP_i} + \beta_9\mathrm{BMI_i} + \beta_{10}\mathrm{lnALC_i} + \beta_{11}\mathrm{CIG_i} + \beta_{12}\mathrm{ODA_i} + \beta_{13}\mathrm{intlnGDPXlnGDP_i} + \varepsilon_i$$

We conducted an initial estimation of the model, and subsequently, using the general-to-specific approach, we verified its form and eliminated variables that were not significant for describing the phenomenon (11). For each step, we tested the null hypothesis $H_0: \beta_i = 0$, where failure to reject the null hypothesis indicated that the independent variable was insignificant, and the alternative hypothesis $H_1: \beta_i \neq 0$, where acceptance suggested that the variable was significant. Variables were eliminated starting with those that had the highest p-value. For clarity in the description, we present the variables added at each step rather than all variables simultaneously, even though in the analysis the joint insignificance of the sequentially added variables was taken into account. The following p-values were obtained for the respective variables in the joint significance tests in the model: lnALC 0.7749, ODA 0.8873, URB 0.9418, lnLEB 0.9684, lnGDP 0.9606, lnIMR 0.9621, BMI 0.8489, CIG 0.3640, AGE65 0.2947, OOP 0.0048. This led to the derivation of a new form of the model, represented by the following equation:

$$\mathrm{lnCHE_i} = \beta_0 + \beta_2\mathrm{GHE_i} + \beta_5\mathrm{lnPHY_i} + \beta_6\mathrm{lnLEB_i} + \beta_8\mathrm{OOP_i} + \beta_{13}\mathrm{intlnGDPXlnGDP_i} + \varepsilon_i$$

Model diagnostic tests:

A series of tests were conducted for the estimated model. The Breusch-Pagan test was used to test for heteroskedasticity. The null hypothesis H_0: homoskedasticity and the alternative hypothesis H_1: heteroskedasticity were tested. The p-value obtained was 0.000, so the null hypothesis of homoskedasticity in the model was rejected. To address the issue of heteroskedasticity, robust standard error matrices were used in further estimations (11).

The next analysis performed was the calculation of the Variance Inflation Factor (VIF). This allows checking for imperfect multicollinearity, i.e., whether there is excessive correlation between the variables in the model. Variables with VIF values above 10 would raise serious concerns. The results obtained indicate that there is no imperfect multicollinearity in the model. For the individual variables, the VIF values were as follows: for lnPHY = 4.10, for intlnGDPXlnGDP = 3.81, for GHE = 2.46, and for OOP = 1.84 (12).

Next, the model was examined for the presence of outliers or erroneous observations. Leverage and Cook's distance were used for this purpose. Leverage identified 5 outliers, while Cook's distance suggested that as many as 13 observations were outliers. To rule out errors in data processing, the data for the outlier countries were reviewed to ensure their rationality (13).

Subsequently, an additional regression was performed after excluding the 13 observations for which Cook's distance indicated outliers. The resulting estimators differed slightly from those obtained in the regression including all observations, but these differences were not qualitatively significant. Given the lack of errors in data entry, it was decided to proceed with the analysis using all observations. This decision was made due to concerns about overfitting the model (13). It should also be noted that the outliers may pertain to poor countries or those with extreme forms of healthcare organization, where the combinations of analysed variables may be atypical for this reason.

The assumption of normality of the error term was also tested using the skewness and kurtosis test. The null hypothesis H_0: the error term is normally distributed, and the alternative hypothesis H_1: the error term is not normally distributed were tested. The p-value obtained in the test was 0.0213, leading to the rejection of the null hypothesis, which suggests that the error term is not normally distributed (11,12).

The final test conducted was the RESET test, which assesses the correctness of the functional form of the model. The null hypothesis H_0: the model has the correct functional form, meaning no variables are omitted, and the alternative hypothesis H_1: the model does not have the correct functional form were tested. A p-value of 0.2035 was obtained, providing no basis to reject the null hypothesis of the correct functional form. Therefore, the model presented above has a proper functional form, and no variables are omitted (12,13).

Results:

The estimation results are presented in Table 3. Four variables were found to be statistically significant at the assumed 5% significance level. The statistically significant variables were: square of the logarithm of GDP (intlnGDPXlnGDP), public health expenditure from domestic sources as a percentage of the economy, measured by GDP (GHE), the number of physicians per 1,000 inhabitants (lnPHY) and the percentage of healthcare expenditure paid directly by households (OOP). An R^2 of 96.5% was obtained, which means that the proposed model explains 96.5% of the variability in healthcare expenditure.

VARIABLES	(1) Coefficient	(2) Standard errors	(3) t	(4) p > |t|	(5) 95% Confidence interval
intlnGDPXlnGDP	0.046***	(0.002)	22.248	0.000	0.042 - 0.051
GHE	0.169***	(0.020)	8.503	0.000	0.130 - 0.208
lnPHY	0.088***	(0.033)	2.665	0.009	0.023 - 0.153
OOP	0.006***	(0.002)	2.991	0.003	0.002 - 0.010
Constant	1.612***	(0.204)	7.909	0.000	1.210 - 2.015
Observations	153				
R-squared	0.965				

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3. Results of the Linear Regression Model Estimation
Source: Own elaboration, based on the databases of the World Bank, World Health Organization, and the Organisation for Economic Co-operation and Development.

The following interpretation of the obtained parameters should be adopted. As the GDP increases, the healthcare expenditure grows at an increasing rate, suggesting the non-linear impact of GDP on healthcare spending (11). A 1% increase in the proportion of public spending on healthcare as a percentage of GDP is associated with a 16.9% increase in healthcare expenditure per capita. A 1% increase in the number of physicians leads to a 0.088% increase in healthcare spending, highlighting the cost implications of expanding the medical workforce. This suggests that countries with higher physician availability tend to have higher healthcare expenditures (13). A 1% increase in the proportion of healthcare costs paid directly by households leads to a 0.006% increase in healthcare expenditure per capita. This result indicates that in countries where individuals bear more of the healthcare costs directly, overall healthcare spending tends to increase (12).

The results of this study have several important policy implications. First, governments seeking to control healthcare costs must carefully consider the trade-offs involved in increasing the supply of healthcare professionals. While improving access to healthcare is essential, policymakers should be aware of the cost implications of such policies (14). Additionally, the significant role of out-of-pocket payments highlights the potential inequities in healthcare systems where individuals must bear a large share of the cost burden. Policymakers should therefore consider reforms aimed at reducing out-of-pocket expenditures, particularly for vulnerable populations, to ensure more equitable access to healthcare services (15).

Furthermore, the study emphasizes the importance of government investment in healthcare. Countries that allocate a greater share of GDP to public healthcare spending tend to have higher total healthcare expenditures, which can be associated with improved health outcomes and access to services. Policymakers in lower-income countries, in particular, should consider increasing public healthcare funding to address healthcare disparities and improve access to essential medical services (16).

While this study offers valuable insights, there are several limitations that should be addressed in future research. First, the cross-sectional nature of the analysis means that we cannot infer causality from the observed relationships. Future research could build on this work by using panel data to examine how healthcare expenditure evolves over time and to better understand the dynamic interactions between the variables. This would also allow for an increase in the sample size and the acquisition of more reliable estimates. Additionally, the model used in this study focused primarily on economic and demographic factors. Future research could explore other potential determinants of healthcare expenditure, such as the role of healthcare quality, healthcare system efficiency, and the impact of cultural factors on healthcare consumption.

Conclusions:

This study successfully identified significant determinants of healthcare expenditure across 153 countries, using data from 2018 and a classical linear regression model. The results emphasize the crucial roles played by GDP per capita, public health expenditure, physician availability, and out-of-pocket healthcare costs in driving healthcare spending.

The non-linear relationship between GDP and healthcare expenditure highlights that as countries become wealthier, they allocate proportionally more resources to healthcare. Furthermore, higher public health expenditure and increased availability of physicians are associated with rising healthcare costs, reflecting the growing demand for healthcare services and medical advancements. Out-of-pocket healthcare costs also play a significant role, suggesting that individual financial contributions to healthcare can drive total spending.

The findings of this study provide important insights for policymakers, especially regarding the balance between public and private healthcare financing. Policymakers in lower-income countries should consider increasing public healthcare investment to address disparities and improve access, while also addressing the challenges of out-of-pocket healthcare costs that may create inequities.

This study contributes to the literature by explaining healthcare expenditure using key socioeconomic and demographic factors. Future research could benefit from examining the dynamics of healthcare expenditure over time to better understand the evolving nature of healthcare costs and the impact of additional factors like healthcare quality and system efficiency.

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This research received no external funding.

Data Availability Statement:

All the data used in the analysis can be found on the websites of: https://databank.worldbank.org/; https://www.who.int/data/gho/data/indicators; https://data-explorer.oecd.org

Conflict of Interest Statement:

The author declares no conflict of interest.

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