STANDARD OF LIVING, QUALITY OF LIFE AND PER CAPITA GDP: A SOUTH AFRICAN EXPERIENCE

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Abstract

This study looked at the phenomenon of the quality of life (QoL) as measured by the Human Development Index (HDI), which is a composite statistic used to rank countries by the level of "human development". Measuring and determining what is QoL is not an easy task. In this study, using HDI as the yardstick for QoL, the concepts of standard of living and per capita income were examined closely in relation to the role of government in its public expenditure programmes and how these programmes in turn influenced QoL. This research question was seen as the key to addressing the phenomenon of QoL. In particular, the role of government expenditure on health and education seems to signify the commitment of a government in improving the HDI or QoL. Using data on government expenditure of South Africa for the period 1995 to 2011, the relationships amongst these variables were examined. The findings indicate that there seems to be a significant correlation between HDI and government spending on health and education as a percentage of GDP, but there seems to be of no significance to include the variable government spending on health and education as a percentage of total government spending. The findings tell us that between 1995 and 2011, government spending on education as a percentage of GDP has had a positive impact on HDI. However, government spending on health as a percentage of GDP has had a retarding effect as shown by the negative coefficient of variation. It then implies that for South Africa to realize the MDG goals and improve on the HDI, public spending on health as a percentage of GDP needs to be significantly increased.

Keywords: HDI, Per Capita, SADC, Quality of Life, Health Spending, Education Spending

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1. Introduction

Residents of richer countries are perceived generally to have a higher Quality of Life (QoL) than residents of poorer countries. In his book *The European Dream*, Jeremy Rifkin (2008) contends that Europe's vision of the future is quietly eclipsing the American Dream. Rifkin contends that the progressive, idealistic policies of the 1960s — dismissed as "old hippieism" in the U.S. — have taken root and have matured into a politically viable mix of tolerance, multilateralism, and environmental-friendly policies that governments are embracing and electorates are supporting, leading to a stronger European economy buoyed by a strong euro currency. On the other hand, The American Dream — a belief that anyone who works hard can succeed and better oneself economically with a guarantee of certain basic human rights seems to be failing in an open global economy. As Europe emerges as an economic and cultural superpower, it is becoming clear that its beliefs and traits are often at tangent to those of the United States. The American Dream emphasizes autonomy, national pride, and material wealth, while Europe's vision of the future emphasizes community, cultural diversity, and quality of life. While America values hard work, property ownership, and a unilateral foreign policy, Europe champions fun and free time, human rights, and multilateralism.

For most people, standard of living is a difficult concept to define and pinpoint. Most people would argue that there is a visible poor Standard of Living (SoL) or Quality of Life (QoL) for certain citizens or countries based on their observations or based on certain economic statistics, for example, GDP per capita. While it is possible to accept that QoL cannot easily be expressed precisely, there are certain characteristics that most people would agree to that are directly linked to QoL. Examples are a nice car, a decent place to live, clothes, furniture, appliances, food, vacations, education or health care. Yet there is a generally accepted measure for standard of living that economists refer to as the average real gross domestic product (GDP) per capita. But as a tool for measuring how well people live, GDP per capita has its shortcomings. There are a number of things that it

does not take into account, for example, unpaid work (a full-time housewife who provides good quality meals and services for her family instead of the use of maid services, butlers and cooks; as well as ensuring good quality family life with less stress and more happiness), distribution of wealth (the bulk of a country's GDP could be sitting in the hands of a few individuals or foreign multinationals), changes in the quality of life (like clean air, clean water, more leisure time; increased life expectancy; nor such undesirable changes such as traffic congestion or crowded cities, mushrooming of sea-side resorts) and changes in the quality of goods (heated homes in winter or cooled homes in summer; car, rail and air travel with reduced times and stress-free travel).

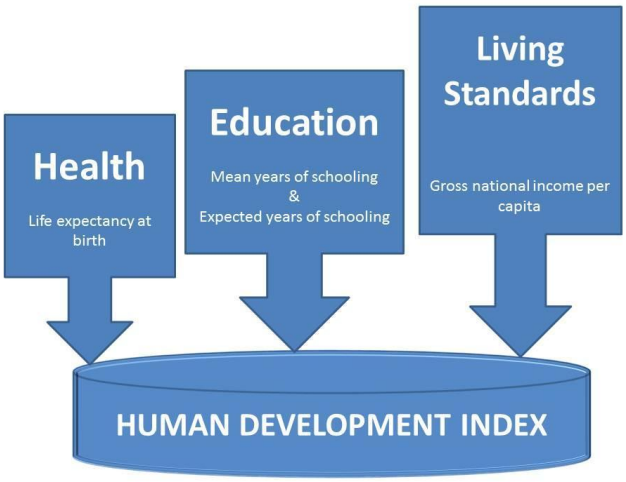
This article presents the results of a study that looked at the relationship between QoL as measured by the Human Development Index (HDI) and the independent variables 'Public Expenditure on health as a % of GDP', 'GDP per capita in PPP terms' and 'Public expenditure on education as a % of GDP'. The research question of interest is as whether there exists any relationship between the dependent variable HDI and the independent variables GDP per capita, Public spending on education as a % of government expenditure, Public spending on education as a % of GDP, Health expenditure per capita, Public Health expenditure as a % of government expenditure, Public Health expenditure as a % of GDP, Total Health expenditure as a % of GDP and GNI per capita. It is the objective of this study to indicate the extent of the relationship between the variables under study. While there have been a number of studies on developed countries, no similar studies have been undertaken for the South Africa.

The subsequent sections look at a summary of related literature, the data collection methods used and a detailed analysis of time-series data covering the period 1995 to 2011. The last section presents the conclusions from the data analysis and the limitations of the study, as well as proposals for future research.

2. Review of Related Literature

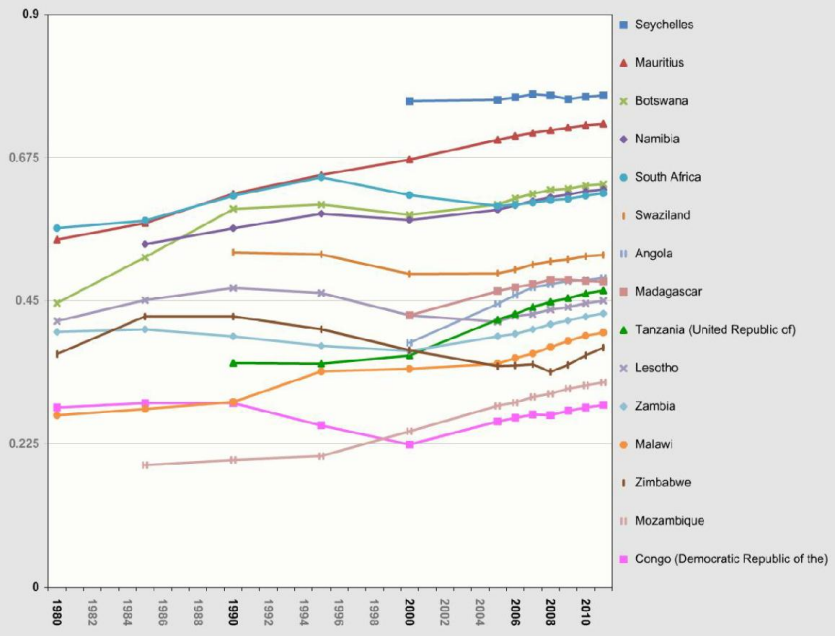
The Human Development Index (HDI) offers a global perspective on the question of how well people are living. It was devised by the United Nations in the 1990s, and is a composite of three different indicators: (1) Health as measured by life expectancy at birth, (2) Education as measured by mean years of schooling and average years of schooling, and, (4) standard of living as measured gross national income per. Figure I below shows the components used when calculating the HDI.

Figure I. Human Development Index Components



The United Nation's Human Development Index (HDI) was developed in 1990 and is used to indicate the development status of a country. The HDI measures life expectancy, literacy, education and standard of living. The HDI critics claim that the HDI indicators are too few and too arbitrarily chosen (Berenger & Verdier-Chouchane, 2007). The Economist measures QoL using an index consisting of nine indicators: 1) material well-being, 2) health, 3) political stability and security, 4) family life, 5) community life, 6) climate & geography, 7) security, 8) political freedom and 9) gender equality (Kenny, 2005). Figure II shows the HDI index of the 15 SADC countries from 1980 until 2010.

Figure II. HDI index of SADC countries



The 20 ranked countries in the world measured by HDI show that countries with high QoL and Life Expectancy Index (LEI) have a high GDP per capita (UN, 2007). This is also evident among the SADC countries. Higher ranked countries on the HDI generally display higher LEI, implying better health, and higher GDP per capita. Whatever the debate on the definition and the measurement on QoL, health is a key component of any such measurement. The World Health Organisation's constitution defines health to constitute "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 1946). Government expenditure on health is a critical component of any health system (United Nations, 2007). Any improvement in the health system, via government expenditure, should improve QoL.

Health care expenditure can also be regarded as an investment in human capital (Grossman, 1972). Smith & Abdullah (2004) have argued that a good human resource management used by Malaysia during the financial crisis had helped the country in overcoming the turmoil. This scenario questions the causality relationship between government expenditure on health and GDP. Does greater healthcare expenditure result in higher GDP or does higher GDP result in greater healthcare expenditure (Devlin & Hansen, 2001)? Often healthcare is treated as a share of GDP (Docteur and Oxley, 2003). Wagner's "Law of increasing State Spending" would interpret that the increase in economic activities leads to an increase in government activities, which in turn results in the rise of public expenditure (Liu & Chang *et.al*, 2005).

According to the United Nations 2007 report, the quality of health and health services are better in richer countries (UN, 2007). As such, it can be argued that Gross Domestic Product (GDP) per capita and health expenditure, which is a measure of the quality of health service, are positively correlated. Sinha (1998) showed that in some countries, an increase in population was followed by an increase in education and health expenditure. If this is indeed the case, any governmental expenditure on health should improve the QoL of its citizens and lead to a healthy, working citizenry with increased productivity gains. This would be expected to lead to a growth in per capita GDP. This raises the question on the nature of the causality between QoL and per capita GDP.

Ross and van Willigen (1997) found that education is a key to enabling individual well-being as it provides access to paid work and supportive relationships. This supports earlier findings, that indicated that unlike poorly educated, well-educated persons have access to paid work that increases the sense of personal control over the labour process (Kohn, 1976) and that work gave people the freedom from routine and monotonous jobs, and gave them external control on the one hand, and a chance to use their skills, develop as a person, and learn new things (Marx, 1964). Investment in education, which, together with health sector investment, not only promotes better quality of life, but it also aids social welfare.

3. Materials and Methods

In this study, HDI index is used to measure QoL in South Africa. It is noted that GDP per capita (GDP), health expenditure and spending on education by the government are often used as measures of SoL which leads to a better QoL in a country. GDP is often used to measure the SoL. It is used as the proxy for QoL when comparing between countries (Becker,

Philipson & Soares, 2005; Be´Renger & Verdier-Chouchane, 2007). It is argued that the amount of government expenditure on health has a positive effect on QoL. Devlin & Hansen (2001) using data from 20 OECD countries found that "Granger Causality" between health expenditure and GDP could be in either direction or none.

The purpose of this study was to examine the relationships between the independent variables GDP per capita (GDP), Public spending on education as a % of government expenditure (EDU_GOV), Public spending on education as a % of GDP (EDU_GDP), Health expenditure per capita (HEA_PPP), Public Health expenditure as a % of government expenditure (HEA_P_GOV), Public Health expenditure as a % of GDP (HEA_P_GDP), Total Health expenditure as a % of GDP) (HEA_T_GDP), GNI per capita (GNI_PPP) and the dependent variables Human Development Index (HDI), Life Expectancy Index (LEI), Education Index (EI) and Income Index (II). The study also sought to investigate whether changes in the independent variables contributes positively or negatively to the dependent variables. The effect of the independent variables on HDI is well supported by empirical studies in developed countries but very little in known on how they affect HDI in developing countries, particularly South Africa.

The study also examined whether there were any positive or negative relationships between the independent variables and how these relationships affected the dependent variables. Consequently, the study looked at the impact of these macroeconomic variables and the magnitude of this impact on the dependent variables.

The independent variables were then used to test certain a hypothesis shown below.

The model is represented as:

$$\ln HDI_t = a + b\ln GDP_t + c\ln EDU\_GOV_t + d\ln EDU\_GDP_t + f\ln HEA\_P\_GOV_t + ...$$
$$g\ln HEA\_P\_GDP_t + h\ln HEA\_T\_GDP_t + i\ln GNI\_PPP_t + e_t$$

The hypotheses tested are:

- There is a positive relationship between the HDI and GDP
- There is a positive relationship between the HDI and EDU_GOV
- There is a positive relationship between the HDI and EDU_GDP
- There is a positive relationship between the HDI and HEA_PPP
- There is a positive relationship between the HDI and HEA_P_GOV
- There is a positive relationship between the HDI and HEA_P_GDP
- There is a positive relationship between the HDI and HEA_T_GDP
- There is a positive relationship between the HDI and GNI_PPP

It was hypothesised that there is a positive relationship between the HDI (dependent variable) and all the independent variables under study. This is based on the assumed relationship between HDI and these independent variables (Khodabakhshi, 2011; Grossman, 1972; Smith & Abdullah, 2004; Devlin & Hansen, 2001; and Docteur and Oxley, 2003).

In the next section, the methodology is discussed, with emphasis being placed on the statistical techniques used and the assumptions made.

4. Results and Discussion

The next section contains an analysis of the findings using standard descriptors (mean, standard deviation, skewness and Kurtosis) which were used to examine the likely distribution of data on each variable. Thereafter, summary statistics for all the macroeconomic variables in this study are presented. The section is concluded by looking at the question of multicollinearity. Where more than two independent variables are tested for a relationship with a dependent variable, multicollinearity between variables has to be tested.

4.1. Multicollinearity tests

A multicollinearity tests were conducted for all the independent variables using the Pearson coefficient of correlation. After calculating the VIFs, it was found that the VIFs for *GDP per capita at current US$, Total health expenditure per capita at constant 2005 international US$, Public health expenditure as a % of GDP*, and *GNI per capita at constant 2005 international US$* were extremely high (above 50) signifying that they were highly correlated with other independent variables. In order to eliminate multicollinearity, these four independent variables were dropped from the calculations. If these variables are not removed, they will lead to a very large standard error. Table 1 below shows the results of the multicollinearity tests that were done using Variance Inflation Factors (VIF) and Eigenvalues.

Table 1. Collinearity Diagnostics

	Collinearity Statistics	Eigenvalue	
	Tolerance	VIF	
			4.996
Total public spending on education as a % of government expenditure	0.765	1.307	0.002
Total public spending on education as % of GDP	0.745	1.342	0.001
Total public health expenditure as % of government expenditure	0.844	1.185	0.001
Total health expenditure as a % of GDP	0.885	1.130	0.000

The remaining variables now have VIFs of less than two and very small Eigenvalues and reasonable tolerance levels. Very low "tolerance" values would have indicated that there are variables that contain redundant information. From the table, it is clear that there is very little multicollinearity in the remaining variables and the regression model serves the purpose of the study, which was to determine if there is a relationship between HDI and the following variables:

- Total public spending on education as a % of government expenditure
- Total public spending on education as % of GDP
- Total public health expenditure as % of government expenditure
- Total health expenditure as a % of GDP.

4.2. Descriptive Analysis

Table 2 provides the summary statistics for all the variables in this study. It reveals that the distribution of the series could be considered as slightly dispersed as represented by the standard deviation values, which are small when compared to the mean.

Table 2. Descriptive Statistics for All Variables

	Mean	Std. Deviation	Skewness	Kurtosis		
			Stat.	Std. Error	Stat.	Std. Error
Total public spending on education as a % of govern. expenditure	2.944	0.110	0.431	0.550	-0.970	1.063
Total public spending on education as % of GDP	1.713	0.067	0.111	0.550	-1.788	1.063
Total public health expenditure as % of government expenditure	2.380	0.090	-0.072	0.550	-0.539	1.063
Total health expenditure as a % of GDP	2.129	0.050	-1.166	0.550	0.945	1.063
Human Development Index	-0.483	0.026	0.409	0.550	-0.968	1.063

Also of importance is the skewness of the distributions which indicates that they are approximately normal as the individual variables' skewness factors are closer to zero, except for the variable *Total health expenditure as a % of GDP*. Normal distributions produce a skewness statistic of about zero. The results from this analysis also reveal that the kurtosis values for all the variables are less than 1, which is very good and indicative of normal distributions. The only exception is the variable *Total public spending on education as % of GDP* which has negative kurtosis value of -1.788. The negative kurtosis values indicate the possibility of a platykurtic (flat) distribution. These overall findings provide a general indication that the distributions of the individual variables are normal.

4.3. Regression Analysis

The final part of the analysis was done by running a regression model on the dependent variable HDI against the independent variables *Total public spending on education as a % of government expenditure, Total public spending on education as % of GDP, Total public health expenditure as % of government expenditure and Total health expenditure as a % of GDP*. The regression model exhibits results that are in line with the hypotheses discussed earlier. Tables 3 to 5 show the results of the regression analysis.

Table 3. Regression model summary

Model	R	R Square (R^2)	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	0.956	0.914	0.885	0.0087395	1.810

The R^2 of 95.6% indicates that the model is a good predictor of the dependent variable. It implies that the model can be used for estimating HDI and that 95% of the HDI can be explained by the independent variables. The standard error of the estimate is very small, implying that there is a one percent error in estimating HDI. In the research, the standard error of the estimate would be calculated from the difference between the estimate of HDI as calculated from the regression equation, and the HDI actual values.

Table 4. Analysis of variance (ANOVA)

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.010	4	0.002	31.871	0.000[b]
Residual	0.001	12	0.000		
Total	0.011	16			
a. Dependent Variable: Human Development Index b. Predictors: (Constant), Total health expenditure as a % of GDP, Total public spending on education as a % of government expenditure, Total public health expenditure as a % of government expenditure, Total public spending on education as a % of GDP					

The regression sum of squares is about 10 times greater than the residual sum of squares, which indicates that most of the variation in HDI is explained by the model. The model above clearly accounts for almost 95% of the data from independent variables. The F value of 31.871 is significant at a value close to zero. The significance value shows that the regression equation does have some validity in fitting the data.

Table 5. Regression coefficients

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	
	B	Std. Error	*βeta*		
(Constant)	-0.512	0.127		-4.042	0.002
Total public spending on education as a % of government expenditure	0.014	0.023	0.058	0.597	0.562
Total public spending on education as a % of GDP	0.295	0.038	0.765	7.795	0.000
Total public health expenditure as a % of government expenditure	-0.023	0.026	-0.081	-0.883	0.394
Total health expenditure as a % of GDP	-0.217	0.046	-0.420	-4.666	0.001

The "t" statistic shown in Table 6 is a measure of the possibility that the actual value of each of the independent variables in the model is less likely to be zero. The sig. (t) also indicates that it is less likely that the actual parameter value is zero. For example in the model above, the variable *Total public spending on education as a % of GDP* has a t-statistic of 7.795 and significance closer to zero. The larger the absolute value of t, the less likely that the actual value of the parameter could be zero. The variable *Total health expenditure as a % of GDP* has a t- statistic of -4.666 and significance closer to zero. This indicates that there is a less than 0.1% chance that both parameters could be zero, and eliminating the variables from the model would be incorrect. The significance value for *Total public spending on education as a % of government expenditure* and *Total public health expenditure as a % of government expenditure* is greater than 0.562 and 0.394 respectively and is indicative of the possibility that these variables may have little influence in determining HDI. It implies that HDI is dependent on the level of spending as a % of GDP and not as a proportion of government spending. It how much government spends towards these two sectors that counts and not the amount as a proportion of total government spending. This was also found to be true in a study conducted in the European Union by Opreana and Mihaiu (2011).

Based on the results of the regression analysis presented in Table 6 earlier, the following table shows the accepted and rejected hypotheses.

Table 6. Summary of hypotheses tested

Hypotheses	Accept / Reject
There is a positive relationship between the HDI and GDP	Variable was dropped
There is a positive relationship between the HDI and HEA_PPP	Variable was dropped
There is a positive relationship between the HDI and HEA_P_GDP	Variable was dropped
There is a positive relationship between the HDI and GNI_PPP	Variable was dropped
There is a positive relationship between the HDI and EDU_GOV	**Reject. Insignificant**
There is a positive relationship between the HDI and HEA_P_GOV	**Reject. Insignificant**
There is a positive relationship between the HDI and EDU_GDP	**Positive Relationship**
There is a positive relationship between the HDI and HEA_T_GDP	**Negative Relationship**

Based on the results of the regression model, the model proposed earlier is presented as follows:

$$\ln HDI_t = \text{-}0.512 + 0.295 \ln EDU\_GDP_t - 0.217 \ln HEA\_T\_GDP_t + e_t$$

It can be interpreted from the model that the HDI is highly sensitive to variation as indicated by R^2 of 0.956. In other words, according to the model developed from the data, almost 95% of the variation in the HDI is explained by the two independent variables. The variability as measured by the coefficient of variation (*βeta*) is positive for EDU_GDP (0.295) and is negative for HEA_T_GDP (-0.217). This model tells us two things: That between 1995 ad 2011, government spending on education as a percentage of GDP has had a positive impact on HDI. However, government spending on health as a percentage of GDP has had a retarding effect as shown by the negative coefficient of variation. It then implies that for South Africa to realise the MDG goals and improve on the HDI, public spending on health as a percentage of GDP needs to be significantly increased.

5. Conclusion

This study examined the role and relationship between public spending in education and health and Quality of Life as measured by the Human Development Index in South Africa between 1995 and 2011. For this purpose, the study involved the use of time series data, which was tested for multicollinearity using the Pearson coefficient of correlation, Variance Inflation Factors (VIF) and Eigenvalues. The tests confirmed that *Total public spending on education as a % of government expenditure; Total public spending on education as % of GDP; Total public health expenditure as % of government expenditure* and *Total health expenditure as a % of GDP* had very little very little multicollinearity.

Although a correlation between HDI and *Total public spending on education as % of GDP and Total health expenditure as a % of GDP was observed*, however, HDI was found to have a very little correlation to *Total public spending on education as a % of government expenditure and Total public health expenditure as % of government expenditure.* This aspect shows that it is the magnitude of spending on public health and education as a percentage of the GDP per capita and not as a proportion of the national budget. This implies that for South Africa to experience a positive impact on HDI and QoL, government needs to spend more resources on health and education as a proportion of GDP. As a matter of fact, spending on education and health care initially leads to the development of human capital, which ultimately manifests itself in the form of economic growth. Development of human capital is a time-consuming process and it is therefore imperative for policy makers and government to be persistent in allocation of resources for the development of the education and health sectors. Utilization of allocated resources in the education and health sectors may depend largely on good governance and efficient institutions, and skilled manpower of South Africa. This is particularly so in the case of South Africa, which is facing economic and political challenges typical of developing countries, and should pay much closer attention to those elements that can easily corrode the benefits gained from investments in education and health by putting in place mechanisms to deter corruption and administrative bottlenecks. In such a situation, inclusion of some potential variables, such as good governance and democracy, may provide insights about the efficacy of such spending on economic growth.

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