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Article

Measuring the interdependence between economic growth and human development in South Africa

EuroEconomica

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Reference: Ngwakwe, Collins C. (2020). Measuring the interdependence between economic growth and human development in South Africa. In: EuroEconomica 39 (2), S. 94 - 103.
<https://dj.univ-danubius.ro/index.php/EE/article/download/294/479/>.

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Measuring the Interdependence between Economic Growth and Human Development in South Africa

Collins C. Ngwakwe¹

Abstract: This paper measures the interdependence between economic growth and human development in South Africa. Therefore, the objective of this paper is to examine if interdependence exists between economic growth represented by GDP and the variables of human development (life expectancy, standard of living and education). This paper is inclined on the theory of economic welfare, which advocates the measuring of economic growth by including the wellbeing of all and not to concentrate on GDP alone which is somewhat asymmetry. Data on South Africa's economic growth and human development index were collected from the World Bank archives of economic indicators and from the United Nations Development Programme. Data were analysed using the vector auto-regression (VAR) and the Granger causality Wald tests. Findings show that economic growth in South Africa is dependent on the achievement of human development variables namely health or life expectancy, standard of living or GNI and education. provides insight toward improving the constituents of human development to ensure a combination of economic growth and wellbeing; the paper provides a teaching case for the academia. Based on the causality results, this paper contributes by providing a model for further research.

Keywords: Economic growth; human development; GDP; gross national income; standard of living; well-being; economic welfare; life expectancy; education

JEL Classification: O4; O1; O2; O5; O15; I1; I3; I25

1. Introduction

This paper aims to analyse the interdependence between economic growth (represented by GDP), and human development (represented by standard of living or GNI, health or life expectancy and education). Most popularly, scholars use the concept of economic growth to describe a measurable increase in the production of goods and services of a nation from period to period. Albeit alternative measures growth, but economic growth has ubiquitously been proxied by growth in gross domestic product (GDP) (Srivastava & Talwar, 2020; Rahmawati & Intan (2020). Closely related to economic growth is the concept of human development, which has been operationalized generically by the United Nations Development Programme as consisting of standard of living, life expectancy and education (UNDP (2020).

There is a global concern that a focus on economic growth might be trampling on human development. This has given rise to various research with different research results that point to urgent need for a balanced measure of economic growth and development by looking beyond the GDP (Coscieme et al.

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2019; Bleys, 2012). This is because a focus on economic growth alone (GDP) in measuring a country's growth is tilted as it relies only on economic or financial wealth of a nation without due consideration to aspects of human development which ensures economic welfare or wellbeing of the people through health or life expectancy, standard of living and education (Ranis, 2004; Ranis et al. 2000; Coscieme et al. 2019). There is thus a growing call by researchers to look beyond the GDP in economic growth planning to cater for the needs of those at the bottom of society's pyramid, which will thus ensure economic wellbeing for all (Barr, 2020; UNDP, 2020). This requires a continuous search for impartial economic growth models; hence this research is one of the means to provide research suggestions that focus on highlighting the interdependence between economic growth and human development to enlighten policy makers about the need to strike a balance between economic growth and economic welfare of citizens.

This paper is structured in separate though logically linked parts as follows: this introduction is preceded by the problem statement and the objective of study. Thereafter, the next section presents a description of underlying theory of the paper, which is followed by a review of related literature. Following the literature, the method and results are presented; this is followed by the implication of findings and contribution. The final section is the conclusion and recommendation.

1.1. Problem Statement

The problem of this paper is inclined on the ubiquitous criticism by welfare economists that the GDP is not an absolutely fair measure of a country's economic well-being (Bleys, 2012). This is heightened by staggering number of poverty and inequality in South Africa amidst being one of the two largest economies in Africa. South Africa has a high level of inequality and is thus ranked amongst the most unequal societies in the world despite its economic growth trajectory (Hundenborn et al. 2019). It thus becomes asymmetry to assume that South Africa is enjoying economic wellbeing in the midst of large proportion of inequality and poverty. It therefore becomes very pertinent to explore additional models that could instil a functional combination of variables that can contribute to a balance of economic growth and economic welfare of citizens wherein the wellbeing of the poor citizens can be accommodated. This is the reason why this paper seeks to measure the interdependence between economic growth (represented by the GDP) and human development (represented by health measured by life expectancy, education, and standard of living measured by gross national income) (UNDP, 2020).

1.2. Objective of the Paper

The objective of this paper is to analyse the interdependency between economic growth as represented by the gross domestic product (GDP) and the variables of human development namely life expectancy/health, education and standard of living. The aim is thus to suggest a model of interdependence for assessing a balanced economic growth that encapsulates human development (well-being or welfare) for South Africa at the end of the paper's analysis.

2. Theoretical Framework: *Economic Welfare Theory*

This paper is inclined on the economic welfare theory (Barr, 2020) which advocate the notion of common good of the people rather than focussing exclusively on economic growth measure (GDP), which captures the wealth that are tilted more on the few rich populations. Welfare economic theory is focussed on the evaluation of economic policies and economic growth that caters for the general wellbeing of the community (Binder & Robeyns, 2019). Accordingly, welfare economics focusses on how resources and goods are allocated to enhance improvement in social welfare of all communities within the state (Binder & Robeyns, 2019). This means that welfare economic theory can be extended to the enhancement of economic efficiency and equitable income distribution to elevate the general wellbeing of the citizens. This calls for both research tools and/or models that can guide public policy to improve and achieve higher level of economic and social benefits to all members of the society (Laditka et al. 2019). This means that welfare economic theory seeks to achieve a point wherein all members of the society can reach a highest level of economic and social satisfaction irrespective of individuals' social stratum (Binder & Robeyns, 2019). Welfare economic theorists employ the concept of utility in microeconomics (Banerjee, Chen & Lakshmanan, 2019) – they associate general economic wellbeing of all by attempting to check the utility derived by individuals (consumers and producers) (Ioan, 2015), in society, and postulate that welfare or wellbeing will subsist in an economic policy environment that ensures the good and/or utility satisfaction of all. This practically means that policy makers will do well to balance the production, supply and consumption arrangements in a country by applying a balancing act that avoids the placing of producers of capital and goods at the domineering level of exploiting the meagre means of those at the lower level of societal pyramid (Raynolds, 2002). Applying a balancing act of economic planning and equitable market structuring will enable the poor to afford basic means of livelihood (basic living standard), acquire quality education and afford health maintenance to acquire good health and longer life (UNDP, 2020). Doing this is in adherence to welfare economic theory of not focussing completely on unbalanced growth of GDP, which is criticised for not catering for the general economic welfare of all citizens – but rather tilted in favour of the affluent members of the society. This is the reason why this research paper seeks to ascertain the interdependency between the GDP and variables of human development to suggest a balancing model of economic growth planning that can instil an inclusive economic wellbeing (Brys et al. 2016; Vellala et al. 2014).

3. Literature Review

The quest by researchers and advocates of human development for economic welfare has spawned diverse contentions and research results that point to the importance of alternative and/or ancillary measure of economic growth and development by looking beyond the GDP (Coscieme et al. 2019; Ioan, 2016; Bleys, 2012; Ioan & Ioan, 2013). It has thus been argued that relying on GDP alone to measure a country's growth is asymmetric since it captures only financial prowess of a country and relegates human wellbeing and sustainable economic development (Ranis, 2004; Ranis et al. 2000; Coscieme et al. 2019). This is the reason why research is now burgeoning to assess the link and/or interdependence between economic growth represented by the GDP and human development (Ranis et al. 2000; Ghosh, 2006; Rahman et al. 2020; Khan & Chaudhry, 2019; Srivastava & Talwar, 2020; Nawatmi et al. 2020).



Ranis et al (2000) conducted a cross-country regression analysis of the relationship between economic growth and human development; their results show a significant relationship running from both directions of variables. They conclude that human development should be accorded priority since support for human development would yield a more sustainable economic growth that supports human wellbeing. Khan and Chaudhry (2019) studied the effect of human development variables namely health and education on economic growth. They applied a panel data fixed and random effect regression on data collected over the period of 1996 to 2018. Their panel regression results show that health and education are significantly related to economic growth and employment creation. Hanushek and Woessmann (2020) examined the effect of education (focusing on knowledge capital) on the enhancement of economic growth. Their analysis found a substantial evidence to prove that it is not necessarily school completion that drives economic growth, but that the chief driver of a long run economic growth is the population's cognitive skill, which run concurrently with the quality of a country's economic institutions. They conclude that whilst educational quality is also a very important variable in driving growth, patience is needed to enable educational attainment mature to a productive and growth status.

In their research, Srivastava and Talwar (2020) examined the relationship between economic growth measured by GDP, foreign direct investment and human development index. They applied the cointegration statistics regression combined with the panel dynamic and modified least square models. Their findings indicate that human development index and foreign direct investment are statistically significant factors that show positive effect on the movement of economic development (GDP); they highlight however that human development have a stronger effect on economic growth far more than the effect of foreign direct investment (Srivastava & Talwar, 2020). Some researchers in Indonesia conducted a recent research to ascertain the variables that influence economic growth in Indonesia. They used time series data from thirty-four Provinces in Indonesia and applied the random and fixed effect regression model. Their results show that capital, labour and fiscal decentralisation are key factors that determine economic growth in Indonesia; they find that human development index did not prove a significant variable on economic growth (Nawatmi, Nusantara & Santosa, 2020).

Other researchers have questioned whether GDP is the rightful single determinant of economic wellbeing of a nation; advocates of a balanced sustainable economic development criticise uncontrolled effort that is solely bent toward the growth of gross domestic product (a measure of economic growth). To unravel this question, Coscieme et al (2019) opine that at least within the European Union, GDP does not properly connect with other indicators of economic wellbeing namely the level of employment; they find that GDP has exhibit an inverse relationship with wider measures of wellbeing. Hence, they contend that unbalanced effort on the growth of GDP alone will suffocate the actualisation of reduction in inequality. Rahman et al (2020) examined the effect of human development on economic growth; they applied the panel data consisting of twenty-five countries each from developed and developing countries. They used education and health as disaggregated indicators of human development and applied the OLS random and fixed effect model to analyse the data. Findings from their research show two different results, firstly, they find that health and education exhibit a negative impact on economic growth. On the contrary, their second finding show that human development index (HDI) as an aggregate variable has a positive relationship with economic growth (Rahman et al., 2020). The aforesaid findings from the research of Rahman et al (2020) suggests that an aggregate examination of

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HDI might yield a more positive influence on economic growth than when the variables are disaggregated.

Rahmawati and Intan (2020) evaluated the effect of government spending and GDP on human development in East Java Province (Indonesia) for four years. They applied a panel data regression and disaggregated government spending into three parts namely employee spending, capital expenditure spending and expenditure on goods and services. Findings from their analysis show that local government spending on the income perspective and GDP per capita income perspective showed a significant relationship with human development index. Other group of researchers examined the link between resources and economic growth by applying the “beyond GDP” postulate to consider substitute indicators of welfare (Kalimeris, Bithas, Richardson & Nijkamp, 2020). They criticised the explicit concentration on GDP as the sole measure of economic progress; rather Bithas et al (2020) explored other indicators of progress, which they consider as better measures of economic wellbeing. These alternatives are index of human development, sustainable economic welfare index and the genuine progress index. They highlight and caution against concentration on economic growth which consumes a disproportionate amount of natural resources – this aspect of growth is contrary to global sustainable development campaign and may retard sustainable economic development if not minimized and balanced (Bithas et al., 2020).

4. Methodology

Similar to previous studies on economic growth interdependency analysis (Ranis, 2000; Rahman, 2020; Gosh, 2006; Khan & Chaudhry, 2019; Hanushek & Woessmann, 2020), this paper is quantitative and based on the analysis of archival data on South Africa’s economic growth represented by gross domestic product (GDP), human development represented by (life expectancy/health, education and standard of living represented by gross national income) in line with the UNDP, (2020) measure of human development. Data on South Africa’s economic growth and human development index were collected from the World Bank archives of economic indicators and from the UNDP human development index respectively. Data were analysed using the vector auto-regression (VAR) (Pesaran et al, 1999) and the granger causality Wald tests. The VAR is one of the widely used stochastic model applied in delineating potential linear interdependency between time series variables (Pesaran et al, 1999). The following symbols were used to represent the four variables whose interdependence were tested:

sagni = South Africa gross national income (or standard of living);

sahealth = South Africa health (or life expectancy);

saedu = South Africa education

sagdp = South Africa GDP

4.1. Results

Given that the paper seeks to examine the interdependence between economic growth (with GDP as proxy) and human development; in addition to the GDP variable, the paper used the three variables



which represent human development index from the United Nations Development Programme (UNDP), which are (life expectancy or health, education and standard of living measured by gross national income). Results appear in Table 1 to Table 3. Table provides the first result which shows that all the four variables are significant since the P values are less than 0.05 alpha level. Table 2 shows the effect of each variable on the other at lag 1. The point of interest is in Table 3, which provides result on the focus of this paper, namely the interdependence between economic growth variable (GDP) and human development variables namely standard of living represented by the gross nation income (sagni); life expectancy represented by health (sahealth) and education. Accordingly, Table 3 provides the Granger causality Wald test, which thus provides a measure of interdependence sought.

Within the limit of South Africa used in the analysis in Table 3, the following results are visible, there is a bidirectional causal relationship between health and standard of living (sagni); there is no causal relationship between education and standard of living; there is no causal relationship between GDP and standard of living. Education Granger cause health or life expectancy, but health does not Granger education. There is a bidirectional causal relationship between economic growth (GDP) and health – GDP Granger cause health, in turn, health Granger cause GDP. Education Granger cause economic growth (GDP), but GDP does not Granger cause education. This finding about health and education effect on economic growth is contrary to the earlier finding of Rahman et al (2020), who found that health and education exhibit a negative impact on economic growth; this suggests the need for more country-specific study to see how specific country data yield different results. These findings lead to an important conclusion, which is that GDP alone is not a complete measure of economic wellbeing or welfare for South Africa. There has to be a fortified human development, which can provide a true and balanced economic development. Hence from the foregoing results and the analysis in Table 2 and Table 3, the paper proposes that a balanced economic growth model for South Africa should be driven by satisfactory human development as represented in the following model:

$$GDP = \alpha + \beta_1 (Health) + \beta_2 (Education) + \beta_3 (Standard\ of\ living) + \varepsilon .$$

Future researchers should apply the above model in many years of time series using expanded data for South Africa and should also compare this with other sub-Saharan African countries. This also provides important policy implication for economic policy officers; it points to the importance of not focussing on top-bottom approach to economic development wherein all efforts are focussed on growing the GDP whilst negating the essence starting from the grass root to cater for health care which as shown in Table 3 can Granger cause the standard of living; hence growing the GDP should not be pursued in isolation of human development. Therefore, a national policy for to ensure a sustained economic growth that caters for the bottom of the pyramid should be such that does not exclude inclusive education, standard of living for all citizens and a good health system that supports enhanced life expectancy.

Table 1. Vector Autoregression Model (var) Sagni Sahealth Saedu Sagdp, lags (1/1) Small Dfk

Sample:		1991- 2017	Number of obs		27
Log likelihood		-299. 6114	AIC		23. 67492
FPE		228822. 9	HQIC		23. 96034
Det (Sigma_ml)		51119. 93	SBIC		24. 6348
Equation	Parms	RMSE	R-sq	F	P > F
sagni	5	148. 306	0. 9891	499. 0932	0. 00000
sahealth	5	0. 148304	0. 9986	3903. 579	0. 00000
saedu	5	0. 348124	0. 8985	48. 69082	0. 00000
sagdp	5	167. 351	0. 9883	466. 1686	0. 00000

Table 2. Vector Autoregression Estimation Results

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Sagni	0. 96985	0. 292551	3. 32	0. 003	0. 363137	1. 576564
sagni:L1.						
sahealth:L1	-35. 6968	8. 634926	-4. 13	0. 000	-53. 6045	-17. 789
saedu:L1	82. 00151	58. 81511	1. 39	0. 177	-39. 9736	203. 9766
Sagdp:L1	-0. 03047	0. 281886	-0. 11	0. 915	-0. 61507	0. 554128
_cons	2091. 136	623. 3403	3. 35	0. 003	798. 4072	3383. 865
Sahealth						
Sagni:L1	0. 003595	0. 000293	12. 29	0. 000	0. 002988	0. 004202
sahealth:L1	0. 962215	0. 008635	111. 43	0. 000	0. 944308	0. 980123
saedu:L1	-0. 19678	0. 058814	-3. 35	0. 003	-0. 31875	-0. 0748
Sagdp:L1	-0. 00264	0. 000282	-9. 38	0. 000	-0. 00323	-0. 00206
_cons	-5. 97995	0. 62333	-9. 59	0. 000	-7. 27265	-4. 68724
Saedu						
Sagni:L1	-0. 0002	0. 000687	-0. 28	0. 778	-0. 00162	0. 001229
sahealth:L1	-0. 00864	0. 020269	-0. 43	0. 674	-0. 05067	0. 033397
saedu:L1	0. 616042	0. 138059	4. 46	0	0. 329726	0. 902358
Sagdp:L1	0. 000398	0. 000662	0. 6	0. 554	-0. 00097	0. 00177
_cons	1. 946132	1. 463187	1. 33	0. 197	-1. 08833	4. 980596
Sagdp						
Sagni:L1	0. 13885	0. 330119	0. 42	0. 678	-0. 54577	0. 823474
sahealth:L1	-31. 2367	9. 743774	-3. 21	0. 004	-51. 444	-11. 0293
saedu:L1	141. 4174	66. 36781	2. 13	0. 045	3. 77894	279. 0558
Sagdp:L1	0. 775296	0. 318085	2. 44	0. 023	0. 115628	1. 434963
_cons	1576. 336	703. 3861	2. 24	0. 035	117. 6024	3035. 069

Table 3. Granger Causality Wald Tests

Equation	Excluded	F	df	df_r	Prob > F
sagni	sahealth	17.09	1	22	0.0004
sagni	saedu	1.9439	1	22	0.1772
sagni	sagdp	.01168	1	22	0.9149
sagni	ALL	8.5404	3	22	0.0006
sahealth	sagni	151.02	1	22	0.0000
sahealth	saedu	11.194	1	22	0.0029
sahealth	sagdp	88.031	1	22	0.0000
sahealth	ALL	273.18	3	22	0.0000
saedu	sagni	.08112	1	22	0.7784
saedu	sahealth	.18162	1	22	0.6741
saedu	sagdp	.36177	1	22	0.5537
saedu	ALL	1.522	3	22	0.2367
sagdp	sagni	.17691	1	22	0.6781
sagdp	sahealth	10.277	1	22	0.0041
sagdp	saedu	4.5404	1	22	0.0445
sagdp	ALL	6.5062	3	22	0.0026

4.2. Implications of Findings for Practice and Academia

The foregoing findings provide important implication for economic policy makers who are looking for models to instil a comprehensive economic growth in sub-Saharan Africa. Given that human development has a strong proportionate effect on the growth of GDP, public policy managers should therefore devote effort and resources toward improving the constituents of human development in order to expedite economic growth in South Africa and in sub-Saharan Africa. Furthermore, the findings provide a teaching case for the academia who will find this relevant to their academic curricular in business schools.

4.3. Value (Contribution)

This is the first research that has used a unique South African data (27 years inclusive of three years before the advent of democracy) to examine the interdependency between economic growth and human development by disaggregating human development into three core sub-sets namely life expectancy or health, education and standard of living. From the results, the paper provides a new model for future researchers, which is to consider economic growth as driven by the core human development index as in the following suggested model for future research:



$$GDP = \alpha + \beta_1 (\text{Health}) + \beta_2 (\text{Education}) + \beta_3 (\text{Standard of living}) + \varepsilon$$

This suggested model provides a new agenda for further research to apply expanded number of time series for further study on the link between economic growth and human development in other African countries. Given contrary findings from some previous researchers such as Rahman et al (2020), the positive findings in this paper regarding the interdependence between health, education and GDP emphasizes the need for more country-specific study to see how specific country data may yield different results that can inform country-specific policy improvement.

5. Conclusion

This paper aimed to analyse the interdependence between economic growth (represented by GDP) and human development (represented by standard of living or GNI, health or life expectancy and education). The paper applied the vector autoregression model (VAR) and the Granger causality Wald tests to analyse the interdependence between economic growth and human development variables in South Africa. Results from the analysis show that economic growth in South Africa is driven by human development variables and as such, policy makers should refocus attention from targeting a single variable of economic growth (GDP), but to pursue a balanced growth that fosters economic wellbeing or welfare by first ensuring that variables of human development namely, standard of living or GNI, health or life expectancy and education are prioritised. This will enhance achieving economic growth that is comprehensive – a growth that caters for the citizens at the bottom of the pyramid wherein health, education and standard of living reaches all citizens. Accordingly, based on the results, the paper contributes by proposing that a balanced economic growth model for South Africa should be such that is driven by human development variables; hence the paper proposes a model for further research. Therefore, the paper recommends the need for future researchers to engage in further research that would apply the recommended model by using more years of time series to enhance an expanded data for South Africa and that such future research should also be compared with other sub-Saharan African countries. The paper highlights attendant policy implication, which the urgent need for public policy managers to devote effort and resources toward improving the constituents of human development to all sectors of the society in order to expedite economic growth and wellbeing in South Africa and in sub-Saharan Africa.

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