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Fiscal Policy And Poverty In The Southern African Customs Union: The Case Of Frontier Technology Readiness Index and Skills

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Abstract: The study examines the relationship between fiscal policy, the level of poverty, and the frontier technology readiness index (skill) in the Southern African Customs Union over the period of 2012 to 2022. The technique of pooled ordinary least squares was used to ascertain the empirical findings, while the LLC and IPS established the stationarity of the variables. The empirical findings show that government expenditure on education, indirect taxes, and the skills index directly affect household consumption expenditure significantly and, by implication, reduce poverty. However, the interaction of government expenditure on education and skills significantly reduces household final consumption expenditure. The essence of the study is that the respective government in the Southern African Customs Union should harness efforts towards integrating relevant skills into the educational system in light of the 21st-century technology revolution. It is admitted that previous studies have largely concentrated on issues such as income inequality, financial inclusion, government expenditure program in addressing the problem of poverty in developing economies, this study, while observing the crucial role of fiscal policy, evaluates the effect of a frontier technology readiness index, skills, in abating the severity of poverty in the region.

Keywords: Fiscal Policy; Frontier Technology Readiness Index; Household Consumption Expenditure; Poverty

1. Introduction

The concept of poverty is inextricably linked to factors such as acquired skills, level of educational attainment, and income stream. This study used household final consumption expenditure as a reflection of the likely welfare status prevailing in the Southern African Customs Union (SACU). The age-long theory of demand provides information on a number of factors that influence the demand for goods and services, and by implication, affect household final consumption expenditure. For instance, government fiscal policy, one of the determinants of demand, could exert a pronounced impact on household final consumption expenditure. A fiscal policy in the form of indirect taxes on goods and services, assuming other variations constant, could impact the attractiveness of goods and services to consumers. According to Andiny & Mandasari (2017), Statistics Indonesia defined poverty as an economic inability to achieve basic food and non-food needs based on expenditure as a measure; therefore, the impoverished are inhabitants having a mean monthly per capita expenditure beneath the poverty line.

The World Bank (2016) observed that sub-Saharan Africa holds custody of 50.7% of the world's most extreme poor individuals, while 42.7% are in Asia, and 4.4% reside in the Caribbean and Latin America. Twenty-five percent of the world's extremely poor individuals as of 2002 lived in sub-Saharan Africa. The region, in 2015, however, inhabited more individuals in the category of extreme poverty (like 413 million individuals) than anywhere else in the globe combined (Christiaensen & Hill, 2019; World Bank, 2018a). The level of poverty in developing economies and, by implication, the Southern African Customs Union could be a result of the high level of unemployment in the region due to a poor macroeconomic environment and the acquisition of primitive skills relative to the skills necessary, given the spate of industrial revolution. For instance, according to a report as contained in Msolomba (2023), high rates of unemployment of around 20 percent were reported for Zimbabwe and Botswana, while that of South Africa and Lesotho were respectively about 30 percent and 40.5 percent. Namibia's unemployment rate increased from 19% in 1991 to 34.8 percent at the end of 1997.

It was observed that the number of individuals in SSA living in extreme poverty was 278 million in 1990, which increased to 437 million in 2018 (Wadhwa, 2018). Moreover, a 2018 World Bank report projected that 9 out of 10 extremely impoverished individuals would be living in SSA by 2023 (World Bank, 2018). Thealleviation of poverty is an issue that constitutes a priority attention in the Sustainable Development Goals (Strønen et al., 2019). The foregoing information on

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the severity of poverty in Sub-Saharan Africa, of which SACU belongs, calls for the need to examine the menace in the context of recent data streams and analyze the potency of government fiscal policy in achieving Goal 1 of no poverty, Goal 4 of quality education, and Goal 9 of industry, innovation, and infrastructure, with specific focus on fiscal policy instruments. Inference on the severity of poverty in the region can be observed from the performances of the respective economies over time. For instance, following an IMF country report on Lesotho (n.d.), Lesotho's economy was reported to have stagnated despite high public expenditure. Specifically, since 2016, it was observed that real activity and per capita incomes decreased by 10%. Lesotho's average growth in the decade prior to the pandemic was among the frailest in the region, at 1.8% between 2009 and 2019, which was close to South Africa's 1.7%, while about 3% lagging in relation to Botswana. Growth was reported to have been below the economy's self-stated 5% target for achieving national development goals. The figure below displays the performances of the respective economies in the Southern African Customs Union before and after the pandemic, while the second figure displays government spending across the respective economies in 2022.

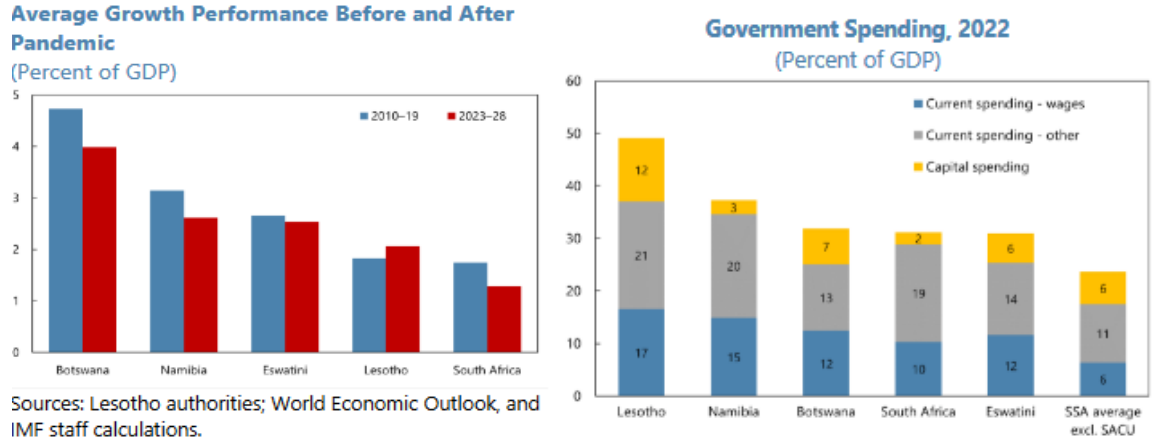

Figure 1: Average growth performance and government spending in SACU

Source: Ministry of Finance and Development Planning; IMF, World Economic Outlook, and IMF staff calculations.

A close observation of government spending in 2022 shows that the respective countries in the region devoted a low percentage of spending to capital projects relative to current spending, including wages and other current expenses. The low spending on capital projects could result in the insignificance of government national spending in abating the level of poverty in the region. For instance, according to Rosenstein-Rodan (1961) in "Notes on the theory of the 'big push'," it is necessary to commit a minimum amount of resources to a development program in order to generate desirable effects. It was allegorically described that the drive of an economy to self-sustaining growth is akin to driving an airplane off the ground. A crucial ground speed must be exceeded for the aircraft to become airborne. A minimum level of investment is required, but it is not a sufficient condition for desirable effects.

The question arises: despite the resources government expended in previous years in the region, why is the incidence of low levels of living still rampant in the region? In what ways should government expenditure programs be utilized to generate desirable effects on the welfare of citizens? Several factors could influence the low levels of living in the region, of which this study examines the fiscal policy impact as measured by government national expenditure, government expenditure on education, and indirect taxes. Another variable is a frontier technology readiness index measured by skills. While it is acknowledged that previous studies have largely concentrated on issues such as income inequality, financial inclusion, and government expenditure programs in addressing the problem of poverty in developing economies, this study, while observing the crucial role of fiscal policy, made efforts to evaluate the effect of a frontier technology readiness index, skills, in abating the severity of poverty in the region. This becomes necessary given the spate of industrial revolution the global economy is experiencing and the need to adequately equip citizens to enhance their employability, increase income prospects, and raise their standard of living. This study also makes a robust contribution to the literature by examining government expenditure on education and the skills index to assess the probable impact of a government education program that prepares citizens with the frontier technology readiness index.

The study is categorized into five sections: Introduction, Literature Review, and Methodology are contained in sections one, two, and three, while Empirical Analysis and Interpretation of Results occupy section four. The study concludes with conclusions and policy recommendations in section five.

2. Literature Review

This section provides an overview of previous related studies. It begins with a theoretical framework of the "Iceberg Model" of individual poverty and concludes with the documentation of some empirical studies on the subject matter.

2.1. Theoretical Literature

Saci (2023) explored the "Iceberg Model" of individual poverty, which suggests that poverty starts with psychological poverty. Poor households lacking the psychological resources to integrate into society experience enhanced capacity and rights of poverty, ultimately leading to income poverty. The figure below illustrates the output effects of education in addressing individual poverty.

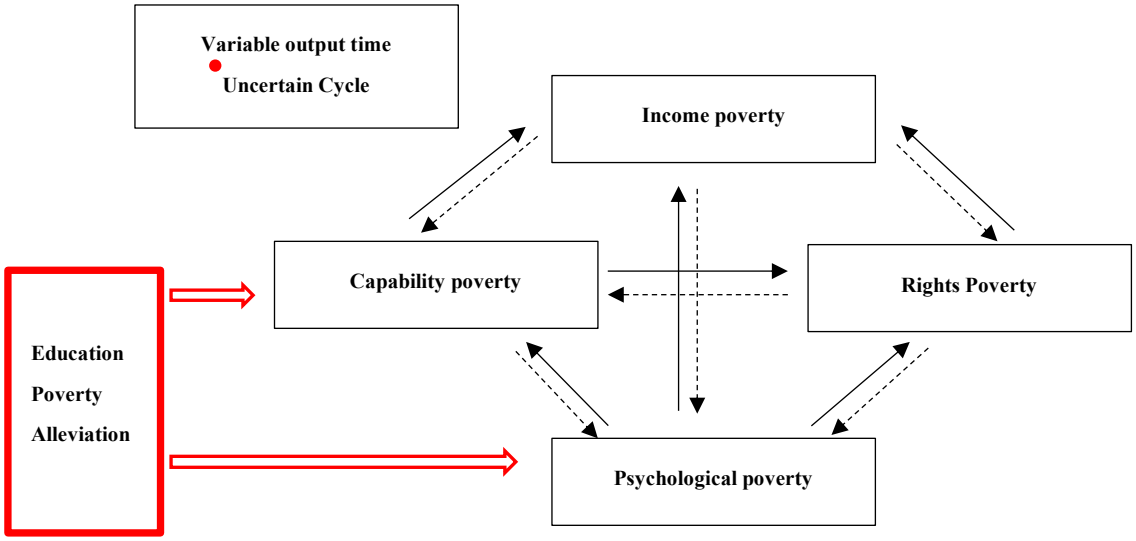

Figure 2: Output effects of education in solving individual poverty
Source: Saci (2023)

The role of education in reducing poverty lies in its ability to alleviate mental and capacity poverty. Primary and further education can address psychological poverty by enhancing psychological capital and helping low-income households overcome psychological barriers. Additionally, education helps individuals acquire general knowledge, professional skills, and quality training, thereby improving their professional level and constituting knowledge and skills capital (Saci, 2023).

This study examines the impact of fiscal policy on poverty levels in the Southern African Customs Union, considering the influence of the skills index and its interaction with government expenditure on education. The iceberg model suggests that psychological poverty, capability poverty, and rights poverty simultaneously contribute to income poverty. Therefore, this study underscores the relevance of government fiscal policy to the iceberg model of individual poverty. For instance, government indirect taxation policies that affect the prices of goods and services can impact household real income, thus influencing poverty levels. Similarly, effective government expenditure on education, aimed at enhancing citizens' skill acquisition for better employment prospects, can lead to increased household incomes, consumption, and poverty reduction. Furthermore, government national expenditure stimulating infrastructural development and economic activities has the potential to create employment opportunities, boost productivity, and improve household income streams, thereby reducing poverty.

2.1.1. Baro's Theoretical Proposition

Another theoretical consideration pertinent to this study is the Ricardian equalization theory proposed by Baro (1974), as discussed in Omodero et al. (2023). Baro suggests that the choice of fiscal strategy in the macroeconomy—government spending, revenue taxes, or cash transfers—is indifferent to the distributions generated for household consumption. He argues that sudden increases in government spending do not impact household consumption regardless of the funding approach, as household members are presumed to be forward-thinking and do not view government spending as part of their wealth.

2.2. Empirical Review

Several studies have assessed the impact of fiscal policy actions on poverty levels. Notably, Voto & Ngepah (2023) analyzed the impact of direct and indirect taxes on poverty in developing economies, encompassing 37 countries and their regions from 1990 to 2021. They employed Dynamic Common Correlated Effects Instrumental Variable estimators to address endogeneity, cross-sectional dependence, and heterogeneity issues. Their findings indicate that direct and indirect taxes do not significantly alleviate poverty in developing economies. However, the breakdown of tax revenue reveals that taxes on goods and services, and corporate income tax, contribute to poverty reduction. Taxes on goods and services show an average decrease in poverty by 10.5%, while corporate income tax has a reducing effect of 3.1%. Regionally, personal income tax and corporate income tax decrease poverty in three regions, while taxes on goods and services do so in four. Specifically, in the regions of East Asia and Pacific (EAP), Latin America and Caribbean (LAC), and Sub-Saharan Africa (SSA), corporate income tax (CIT) and taxes on goods and services (TGS) help minimize poverty.

Nwadiani (2018) illustrates that in Nigeria, individuals with secondary education are more likely to pursue tertiary education, which leads to better opportunities for skilled employment. Tertiary education imparts specialized knowledge and advanced skills, fostering access to higher-paying jobs.

Kamfose & Agila (2023) explored the impact of investment in human capital on poverty. An increase was noted among urban and non-agricultural high-income households, whereas a decrease was observed in other household poverty indices. They concluded that investment in human resources, particularly education, can reduce the incidence, severity, and depth of poverty—except for upper-class non-agricultural households in villages, as opposed to the rural labor force.

Kadenge (2021) investigated the effects of excise duties, VAT, revenue taxes, and customs duties on economic performance in Kenya, finding that indirect taxation boosts consumption but decreases savings.

Shafuda and De (2020) assessed the impact of government spending on human capital in Namibia, looking at human development indicators from 1980 to 2015. These indicators include healthcare outcomes, educational achievements, and increases in national income. They utilized vector auto-regression and error correction models for their study. Their error correction model revealed that long-term government expenditure on healthcare significantly reduces the infant mortality rate, fertility rate, and under-5 mortality rate. However, there was no co-integration found between healthcare spending and life expectancy or adult mortality rates. On the other hand, a significant direct long-term effect of government expenditure on education was established, although no co-integration was detected between spending on education at primary and secondary levels and gross enrollment rates. Moreover, healthcare and education expenditures have long-term effects on economic growth, as evidenced by vector auto-regression analysis.

Muindi and Mukorera (2022) examined the efficacy of fiscal management in Kenya, considering the crowding-in effects of fiscal policies on consumer spending. Their findings suggest that taxation has no short-term impact on household expenditure but does have long-term imbalanced implications for household consumption.

Andersson & Värja (2023) studied the relationship between local government spending components and income growth rates at the local level. Using a panel of municipality-level data from Sweden (1996-2015), they found a negative relative "growth effect" of spending on education when compared to non-productive spending shares and productive expenditures such as childcare and infrastructure. Their results, which considered spatial interactions and the choice of panel construction to address reverse causality, suggest that local fiscal policies are characterized by exogeneity to some extent.

2.2.1. Gap in the Literature

The originality of this study in assessing household consumption expenditure performance, in comparison to the aforementioned empirical research, relies on the inclusion of a frontier technology readiness index—skills—which was examined independently and in conjunction with government expenditure on education. This inclusion is vital considering the current wave of the industrial revolution and the need for authorities in the Southern African Customs Union to prepare citizens to enhance their employability, boost household consumption expenditure, and consequently reduce poverty levels in the region.

3. Methodology

The study evaluated the most suitable model among the fixed effect, random effect, and pooled ordinary least squares to assess the impact of fiscal policy on the poverty level in the Southern African Customs Union, considering the role of skill indexes for the region. The functional relationship among the variables is expressed in Equation 1 below:

$$lhfc = f(lindt, gne, ge, skills, gesk) \quad \text{..... [1]}$$

Subsequently, the econometric model takes the following expression in Equation 2.

$$lhfc_{it} = \beta_0 + \beta_1 lindt_{it} + \beta_2 gne_{it} + \beta_3 ge_{it} + \beta_4 skills_{it} + \beta_5 gesk_{it} + \epsilon_{it} \text{..... [2]}$$

where lhfc represents the log of households and NPISHs' final consumption expenditure, lindt represents the log of indirect taxes/taxes on products minus subsidies. Government national expenditure and government expenditure on education are denoted by gne and ge, respectively. Skills capture the skills index for the respective countries in the region, while gesk measures the interaction of government expenditure on education and skills.

3.1. Sources of Data

The data for LHFC, GNE, and ge were sourced from the World Development Indicators (WDI). The data for lindt were obtained from the African Development Bank (AfDB). The skills index was accessed from UNCTADSTAT's frontier technology readiness index. The range of the data spanned from 2012 to 2022, although there were some missing data points that were addressed through interpolation. For instance, lindt was interpolated for South Africa over the period 2021 and 2022. Lesotho's interpolation included lhfc, lindt, and gne over the same period. Botswana's data were interpolated for ge and lindt for 2021 and 2022, respectively. The interpolated missing data points for Eswatini include lindt for 2021 and 2022, as well as gne and lhfc for 2022. However, each country's data were interpolated for skills in respect of 2022 only.

4. Empirical Analysis and Interpretation of Results

This section reports the respective findings in examining the effect of fiscal policy and skills on the poverty level in the Southern African Customs Union (SACU). The next subsection provides information on the time stationarity of the macroeconomic variables.

4.1. Panel Unit Root Test

Testing for a unit root is crucial in empirical analysis to avoid spurious regression. We employ the Levin-Lin-Chu and Im-Pesaran-Shin panel unit root tests to examine the stationarity of the variables as expressed in Table 1. The outcomes from both the LLC and IPS tests indicate that LHFC, LINDT, AND GNE are stationary after the first difference, while ge became stationary at the level. However, skills were only stationary after the first difference based on the LLC test. The stationarity conditions of the macroeconomic variables are therefore appropriate for the study. The following table provides information on the panel unit root tests.

The overall approach of this study was quantitative and correlational design. This design was preferred over other designs as it allowed the researcher to describe the extent of socioeconomic status, extension contact, social participation, and attitude of SHG members associated with the GDE. According to Creswell, correlational design provides an opportunity to measure the relationship among variables (Creswell, 2012). It is helpful in yielding measures of association and the influence of one variable on another (Cohen, et al., 2005).

Table 1: Panel Unit Root Test Results

Variables	Model	Levels	First Difference
lhfc	LLC		-5.1252***(0.0000)
	IPS		-2.4660***(0.0068)
lindt	LLC		-6.8291***(0.0000)
	IPS		-3.7257***(0.0001)
gne	LLC		-4.0725***(0.0000)
	IPS		-2.1533**(0.0156)
ge	LLC	-3.2027***(0.0007)	
	IPS	-1.8796**(0.0301)	
skills	Llc		-3.0438***(0.0012)
	ips		

Notes: ***p<0.01, **p<0.05, *p<0.1 are respectively the levels of significance.

4.2. Analysis of Summary Statistics, Correlation, and Scatter Plots

The summary statistics are contained in Table 2, showing that LHFC, LINDT, GNE, GE, and skills have means of approximately 9.983, 9.114, 115.198, 7.306, and 0.347, respectively. The minimum and maximum values range from 0.2 to 180.18. The respective standard deviations are 0.748, 0.801, 22.501, 1.534, and 0.081, which measure the deviation of each series from its mean. Furthermore, the descriptive statistics also indicate that all variables are positively skewed. Based on kurtosis, lhfc, lindt, and skills are relatively normally distributed, with respective kurtosis values of 2.778, 2.536, and 2.596. The kurtosis values for gne and ge are 3.525 and 1.757, respectively. Such deviations from normality can be attributed to the heterogeneity of the series. The last item (gesk) in the descriptive table is an interactive term with a mean of 2.5, ranging between 1.457 and 3.703. The standard deviation is 0.625, with a negative skewness of -0.095.

Table 2: Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max	p1	p99	Skew.	Kurt.
lhfc	55	9.983	.748	9.208	11.446	9.208	11.446	1.112	2.778
lindt	55	9.114	.801	8.304	10.629	8.304	10.629	.949	2.536
gne	55	115.198	22.501	91.242	180.182	91.242	180.182	1.282	3.525
ge	55	7.306	1.534	5.085	10.315	5.085	10.315	.172	1.757
skills	55	.347	.081	.2	.5	.2	.5	.61	2.596
gesk	55	2.5	.625	1.457	3.703	1.457	3.703	-.095	1.856

Source: Authors' computation

The correlation matrix, presented in Table 3, shows the degree of association among the variables. There is a very strong positive association between indirect taxes and skills in relation to household consumption in South Africa. This is to be expected, as indirect taxes are imposed on goods and services commonly used by households. Additionally, the skill level of citizens could influence their income levels and, correspondingly, their household consumption. However, this association is preliminary and should be verified against regression estimates. Government expenditure on education and government national expenditure, on the other hand, exhibit negative associations with household consumption. The interactive term of government expenditure on education and skills shows a direct association with household consumption.

Further insights from the correlation matrix indicate that government expenditure on education and government national expenditure are inversely related to indirect taxes, while a positive association exists between government

expenditure on education and government national expenditure. Skills exhibit a positive association with indirect taxes but a negative association with government national expenditure and government expenditure on education. Additionally, the interactive term is directly related to indirect taxes, government expenditure on education, and skills, but it negatively relates to government national expenditure.

Table 3: Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) lhfc	1.000					
(2) lindt	0.987	1.000				
(3) gne	-0.509	-0.504	1.000			
(4) ge	-0.300	-0.240	0.276	1.000		
(5) skills	0.839	0.869	-0.495	-0.307	1.000	
(6) gesk	0.416	0.499	-0.223	0.555	0.609	1.000

Source: Authors' computation

The visual display of the relationship between household consumption and the explanatory variables are contained in Figure 3. Some of the variables are consistent with the direction of association as provided by the correlation matrix. This includes government national expenditure, skills, and indirect taxes. However, government expenditure on education and the interaction term show region of positive and negative associations.

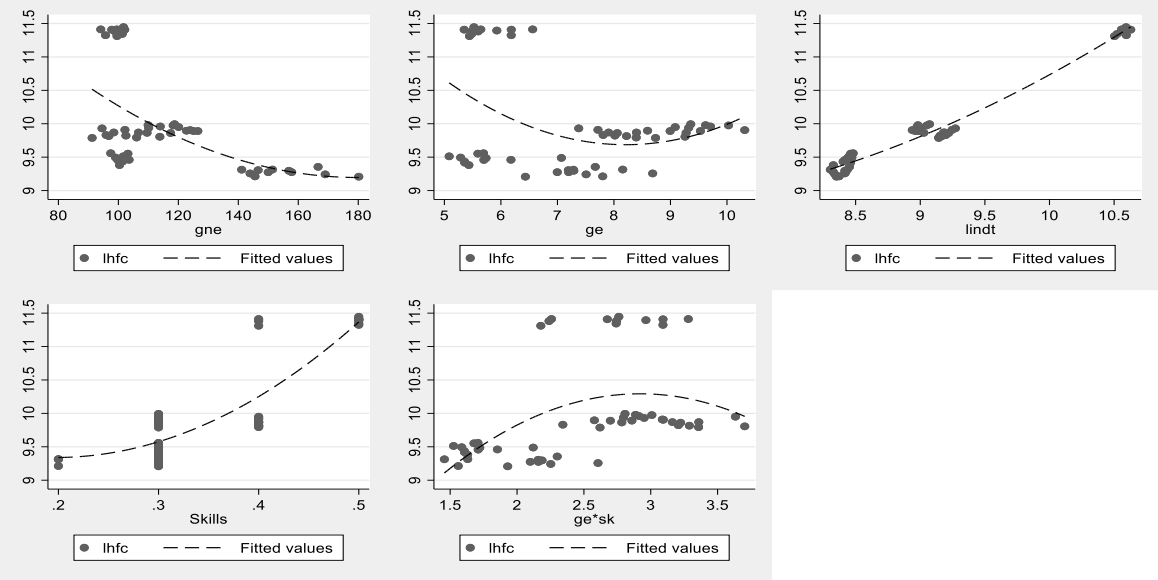

Figure 3: Scatter plots displaying the relationship between household consumption and the explanatory variables. Source: Authors' computation

4.3. Regression estimates

This section quantifies the specific effects of the macroeconomic variables on poverty level in the Southern African Customs Union as proxied by household consumption expenditure. We examined the appropriate model between fixed effects, random effects and the pooled ordinary least squares through the Hausman test. The results are presented in Table 4.

Table 4: Fixed Effect, Random Effect and Pooled OLS, Dependent variable: lhfc

Variables	Fixed Effect	Random Effect	Pooled OLS
Lindt	.616***	.866***	.866***
	(.132)	(.053)	(.053)
Gne	-.001	-.001	-.001
	(001)	(.001)	(.001)
Ge	-.006	.193**	.193**
	(.035)	(.077)	(.077)
Skills	.153	4.429**	4.429**
	(.789)	(1.835)	(1.835)
Gesk	-.003	-.678***	-.678***
	(.103)	(.226)	(.226)
_cons	4.463***	.987***	.987***
	(1.200)	(.343)	(.343)

Source: Authors' computation

The results of the Hausman test between the fixed effects and the random effects is presented in Table 5. The Hausman test shows that the null hypothesis that the appropriate model is the fixed effects model cannot be rejected. However, further effort was made to test the possibility of random effects through the Breusch-Pagan Lagrange multiplier as expressed in Table 6

Table 5: Hausman test

Variables	Fixed(b)	Random(B)	Difference(b-B)	Sqrt(diag(V_b – V_B) (Std. err.)
Lindt	.616	.866	-.250	.121
Gne	-.001	-.001	.000	.000
Ge	-.006	.193	-.199	.
skills	.153	4.429	-4.276	.
Gesk	-.003	-.678	.675	.

chi2 (5) = (b-B)'[(V_b-V_B) ^ (-1)] (b-B)

= 76.47

Prob > chi2 = 0.000 (V_b-V_B is not positive definite)

Table 6: Breusch-Pagan Lagrangian multiplier test for random effects

	Var	SD = sqrt (Var)
LHFC	.559	.748
e	.001	.039
u	0	0

Source: Authors' computation

Test: Var(u) = 0
chibar2 (01) = 0.00
Prob > chibar2 = 1.0000

The Breusch-Pagan Lagrangian multiplier test for random effects produced a prob > chibar2 of 1.000 which is not statistically significant. It therefore connotes the rejection of the random effects in preference for the pooled OLS. This outcome thus resulted in the necessity to examine the appropriate model between the fixed effects and the pooled OLS. Correspondingly, the Hausman test is expressed in table 7.

Table 7: Hausman test

Variables	Fixed(b)	Pooled(B)	Difference(b-B)	Sqrt(diag(V_b – V_B) (Std. err.)
Lindt	.616	.866	-.250	.121
Gne	-.001	-.001	.000	.000
Ge	-.006	.193	-.199	.
skills	.153	4.429	-4.276	.
Gesk	-.003	-.678	.675	.

chi2 (5) = (b-B)'[(V_b-V_B)^(-1)](b-B)

= 76.47

Prob > chi2 = 0.000 (V_b-V_B is not positive definite)

The hausman test generated a chi value of 76.47 at prob > chi of 0.000 which is statistically significant. This implies the rejection of the fixed effects model in preference for the pooled OLS. Consequently, this study adopts the pooled OLS to quantify the effects of government expenditure on education, government national expenditure, indirect taxes, skills and the interaction term (gesk) on poverty level in the Southern African Customs Union as proxied by household consumption expenditure.

4.4. The diagnostics

In order to ensure the reliability of the empirical estimates, certain diagnostics were examined. This includes the skewness and kurtosis tests for normality, Shapiro-Wilk test, Cameron & Trivedi's decomposition of IM-test as well as the Breusch–Pagan/Cook–Weisberg test for heteroscedasticity. The skewness and kurtosis tests for normality as conveyed in Table 8 have joint Chi2 of 3.68 at a p-value of 0.1589 which is not statistically significant. This connotes that the null hypothesis that the model is normally distributed cannot be rejected.

Table 8: Skewness and kurtosis tests for normality

Variable	Obs	Pr(skewness)	Pr(kurtosis)	----- Joint test -----	
				Adj chi2	(2) Prob>chi2
Residuals	55	0.4195	0.0921	3.68	0.1589

Source: Authors' computation

Table 9 conveys information on the Shapiro–Wilk W test for normal data having Z of 1.414 at a p-value of 0.07875. The outcome thus corroborates the previous test for normality strengthening the decision that our data set is normally distributed.

Table 9: Shapiro–Wilk W test for normal data

Variable	Obs	W	V	Z	Prob>z
Residuals	55	0.96188	1.933	1.414	0.07875

Source: Authors' computation

Table 10 provides information on Cameron & Trivedi's decomposition of the IM-test and the Breusch–Pagan/Cook–Weisberg test for heteroscedasticity. It can be observed from the table that while the null hypothesis of normality of the residuals based on the kurtosis cannot be rejected because its p-value is 0.1715 which is not statistically significant, however, that of skewness with a p-value of 0.0028 contradicts it. Moreover, the heteroscedasticity from Cameron & Trivedi's decomposition of the IM-test has a chi2 of 43.58 at a p-value of 0.0011 which is statistically significant suggesting that the null hypothesis that the model is homoscedastic is rejected. However, the Breusch–Pagan/Cook–Weisberg test does not reject the null hypothesis of homoscedasticity based on its chi of 0.58 at a p-value of 0.4452 which is not statistically significant.

Table 10: Cameron & Trivedi's decomposition of the IM-test and the Breusch–Pagan/Cook–Weisberg test for heteroscedasticity

Source	chi2	Df	p
Heteroscedasticity	43.58	19	0.0011
Skewness	18.10	5	0.0028
Kurtosis	1.87	1	0.1715
Breusch–Pagan	(0.58)		(0.4452)
Total	63.55	25	0.0000

Source: Authors' computation

The variations in the outcomes of the two measures of heteroscedasticity therefore warrants the re-estimation of the pooled Ordinary Least Squares based on the robust option as contained in Table 11 below.

Table 11: Pooled OLS with the robust option to correct for heteroscedasticity.

Dependent: lhfc	Coefficient	Robust (std. err.)	P>|t|
Lindt	.866	.039	0.000
Gne	-.001	.001	0.074
Ge	.193	.069	0.007
Skills	4.429	1.484	0.004
Gesk	-.678	.209	0.002
_cons	.987	.331	0.004

Source: Authors' computation

The robust option pooled OLS shows that indirect taxes, government expenditure on education, and skills are statistically significant alongside the interaction term, gesk. Specifically, a unit rise in indirect taxes, and government expenditure on education and skills increases household consumption expenditure by 0.866, 0.193, and 4.429 respectively. The interaction term gesk, exerts a negative effect with a unit increase in it depressing household consumption expenditure by 0.678.

5. Discussion of the Empirical Results

The implications of the above empirical findings are discussed in this section and contextualized within prior research. Government expenditure on education was found to have a direct effect on household consumption expenditure, implying a reduction in poverty within the region. The positive impact is anticipated since increased educational attainment promotes human capital, enhancing citizens' access to employment opportunities, which in turn increases the capacity to earn income and stimulates household consumption expenditure, leading to a decline in poverty levels. This finding is somewhat consistent with Ningaye et al. (2007), who postulated that the educational level of a household head determines the ease with which they can secure civil service employment based on examinations.

Our findings also indicate that indirect taxes have a positive effect on household consumption expenditure. Such taxes, levied on goods and services, are meant to generate government revenue. The direct effect may result from indirect taxes being structured in a way that does not overburden low-income earners, thus constituting a negligible fraction of their income and not hindering increased household consumption. While this study observed a significant positive effect of indirect taxes on household consumption, Idris & Sebastine (2023) found a direct but insignificant effect. Their analysis of the short-term and long-term relationship between indirect tax and household consumption in Nigeria from 1985 to 2020, using ordinary least square and co-integration techniques, showed among other findings, a nonsignificant direct relationship between value-added tax and household consumption.

The positive impact of indirect taxes noted in this study is supported by Kadenge (2021), who observed that in Kenya, indirect taxation enhanced consumption.

The findings also revealed that the skills index directly affects household consumption expenditure at a one percent significance level, which implies a reduction in poverty in the region. Access to employment opportunities, which enhances the prospects for income and thereby higher levels of household consumption expenditure, heavily depends on the populace's acquired skills. Employers seek individuals with the requisite skills for various tasks within their enterprises.

While examining the effect of government expenditure on education in relation to household consumption, an effort was made to incorporate the interaction between government expenditure on education and the skills index, represented by gesk. The regression estimates show that a one-point increase in gesk decreases household consumption, which paradoxically implies an increase in the level of poverty in the Southern African Customs Union over the study period. This outcome appears contradictory because an education system infused with necessary skills is expected to promote citizens' employability, increase household income and consumption expenditure, and thereby reduce poverty.

Therefore, this contradictory result implies that government expenditure on education may be a necessary but not sufficient condition to reduce poverty in the region. It is crucial to ensure that government resources are invested in education so that individuals are equipped with relevant skills to enhance their employability, increase household consumption expenditure, and consequently reduce poverty in the SACU region. For instance, Li et al. (2020) maintain that the nature of education, along with its economic and social functions, is relevant not only in eradicating individuals' current poverty situation but also plays a critical and unique role in eliminating the intergenerational transmission of poverty.

6. Conclusion and Policy Recommendations

This study explored the intricate relationship between household final consumption expenditure as a poverty measure, fiscal policy instruments, and the Frontier Technology Readiness Index, as measured by skills, in the Southern African Customs Union (SACU) from 2012 to 2022. The study is pertinent given the prevalent poverty levels in developing economies, including those in the SACU.

The empirical findings suggest that while government national expenditure does not significantly influence household final consumption expenditure, and by implication, the level of poverty, government expenditure on education and indirect taxes do have a positive effect. This indicates that government fiscal policy remains a viable tool for mitigating poverty in the region. The findings support United Nations Sustainable Development Goals 1 (No Poverty), 4 (Quality Education), and 9 (Industry, Innovation, and Infrastructure). The insignificance of government national expenditure highlights the need to reassess government expenditure programs to ensure resources are not misallocated from intended projects. Moreover, a mechanism should be implemented in the countries within the region to ensure greater transparency in the disbursement and implementation of resources, aiming to positively affect household welfare and reduce poverty levels.

In light of the positive impact of government expenditure on education, continued efforts should be made to allocate more resources to education, including scholarships for the underprivileged and the construction of educational infrastructure, to expand educational access to a significant portion of the region's population. Regarding the positive effect of indirect taxes, tax administrators should manage the taxes on goods and services so that their price and demand effects do not impede productivity, income levels, household consumption, and poverty. This requires professional efforts to consider the price elasticity of products when administering indirect taxes.

Furthermore, the study established that the Frontier Technology Readiness Index, skill, has a desirable impact on poverty levels in the region. Achieving no poverty under the sustainable development goals will significantly depend on individuals' ability to secure profitable employment that boosts their income levels, thereby increasing consumption and decreasing poverty. In an era of rapid technological development, individuals and governments that do not invest in skill upgrades may be marginalized in the industrial revolution. This study, therefore, underscores the necessity for SACU governments to establish capacity development programs for their citizens.

The interactive effect of government expenditure on education and skills resulted in a negative impact on household consumption, which, by implication, increases poverty in the region. Such an undesirable outcome suggests that merely integrating skills acquisition into the educational process is not enough. Hence, the region should incorporate relevant industrial skills and promote government investment in research and development centres.

The Southern African Customs Union has the potential to alleviate poverty by implementing these measures, standing out among its peers.

7. Limitations and Future Recommendations

This study, focusing on the impact of fiscal policy and the Frontier Technology Readiness Index on the Southern African Customs Union, could be extended to other blocs such as SADC, ECOWAS, etc., in future empirical research.

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